Sapphire®
Anterior Cervical Plate System

Vertu®
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Crystal® Ti-Bond®
Cervical Interbody System

Mosaic®
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Net proceeds benefit children with life-threatening medical conditions

Controlled Delivery
No Impaction/Self-Distracting Interbody Delivery

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Lucent® MIS TLIF
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Exhibit 1163
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Questions?

**Educational Programming:** education@spine.org  
**Registration:** registration@spine.org  
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WELCOME TO CHICAGO!

It will be your kind of town this week as spine professionals from around the world convene to present, discuss, collaborate, learn and network.

Chicago is a great destination to hold the NASS 30th Annual Meeting. McCormick Place West is a modern center with a convenient, consolidated floor plan to accommodate all of the educational sessions within close proximity. World class restaurants, shopping on the Magnificent Mile and cultural attractions are yours to enjoy during your free time. And the beautiful lakefront is ideal for a run, bike ride or walk to take in the city sights.

The Best Paper sessions are aptly named with nearly 1,200 abstracts submitted and approximately one-third making it on the program. The science will be top-notch. Add the symposia, section specialty tracks, breakout sessions as well as interdisciplinary spine forums, and you have an incredibly diverse range of presentations, debates and case discussions to enhance the educational program.

The Learning Place will house the ePosters, practical theater, exercise demonstrations, and the Surgical Innovation Labs featuring product demonstrations and workshops to round out the program. Review the ePosters, and during the morning and afternoon breaks, meet with selected ePoster authors. Hear NASS experts address current issues and topics in the Practical Theater. View exercise demonstrations that feature core stabilization, mechanical diagnosis and therapy, pain sensitization treatment, and neuromotor control. Industry representatives will demonstrate their latest products during daily surgical lab demonstrations as well as host evening surgical training workshops on Wednesday and Thursday.

Don’t miss presidential guest speaker Sir Ken Robinson, an internationally recognized authority on creativity and innovation in education and business. Mark Halperin, managing editor of Bloomberg Politics and host of Bloomberg TV’s With All Due Respect, will participate in the Healthcare 2016 symposium. Kevin E. O’Connor, the leadership development session speaker, is an author and executive coach working with medical professionals who have been promoted to leadership positions.

Take advantage of the beverage breaks, lunches and receptions to meet and discuss cases, possible collaborations, research or to simply catch up.

To help you manage your annual meeting schedule, download the NASS 2015 app at www.spine.org/mobile.

Have a great week.

Heidi Prather, DO
President
Michael D. Daubs, MD
Gwendolyn Sowa, MD, PhD
2015 Program Co-chairs
VISIT SI-BONE at booth 1171 and learn more about the diagnosis and treatment of certain SI joint disorders.

Learn more about diagnosis and the use of the iFuse Implant System®

- The SI Joint in the Differential Diagnosis of Lower Back Pain
  - Including Hands-on Experience with Provocative Tests
- SI Joint Fusion with the iFuse Implant System®
- The Latest Published Clinical Results
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The iFuse Implant System® is intended for sacroiliac fusion for conditions including sacroiliac joint dysfunction that is a direct result of sacroiliac joint disruption and degenerative sacroiliitis. This includes conditions whose symptoms began during pregnancy or in the peripartum period and have persisted postpartum for more than 6 months. There are potential risks associated with the iFuse Implant System. It may not be appropriate for all patients and all patients may not benefit. For information about the risks, visit: www.si-bone.com/risks

SI-BONE and iFuse Implant System are registered trademarks of SI-BONE, Inc. ©2015 SI-BONE, Inc. All rights reserved. U.S. Patent Nos. 8,202,305; 8,840,623; 9,098,348 and 9,039,743, pending U.S. and foreign patent applications 9234.082515
LEARNING OBJECTIVES
Upon completion of this meeting, participants should gain strategies to:

• Promote discussion of new scientific developments and best practices in spine care;
• Demonstrate the application of current techniques, procedures and research;
• Practice evidence- and value-based medicine relative to spine care.

CONTINUING MEDICAL EDUCATION (CME) CREDIT
The North American Spine Society is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians and takes responsibility for the content, quality and scientific integrity of this CME activity.

The North American Spine Society designates this live activity for a maximum of 26.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The American Medical Association has determined that physicians not licensed in the U.S. who participate in this CME activity are eligible for AMA PRA Category 1 Credits™.

The American Academy of Physician Assistants (AAPA) accepts Category 1 credit from AOACCME, prescribed credit from the American Academy of Family Physicians (AAFP) and AMA PRA Category 1 CME Credit™ for the Physician’s Recognition Award from organizations, such as NASS, accredited by the ACCME.

CONTINUING EDUCATION (CE) CREDIT FOR ALLIED HEALTH PROFESSIONALS
NASS is proud to offer continuing education units (CEUs) to accommodate nonphysician attendees’ certification requirements. The following indicates the status of CEU accreditation for nonphysician attendees:

Physical Therapists: The Illinois Chapter Continuing Education Committee has approved this meeting according to the Criteria for Approval of Continuing Education offerings established by the Illinois Physical Therapy Association.

Nurse Practitioners: This program is approved for 24.75 contact hour(s) of continuing education by the American Association of Nurse Practitioners. Program ID 1508349. This program was planned in accordance with AANP CE Standards and Policies.

Nurses and Chiropractors: Accreditation varies for every state certification agency. Retain this final program and your CE certificate for use when completing the recertification process.

Each state has different requirements for nurses, physical therapists and other nonphysician providers; please contact your credit granting organization for their requirements.

EVALUATION AND EDUCATIONAL CERTIFICATES
Visit www.spine.org/CME to claim education credit and print your CME certificate. Contact education@spine.org with questions.
INTERDISCIPLINARY SPINE FORUM PRESENTED BY THE SECTION ON ALLIED HEALTH

Multidisciplinary specialty educational tracks are offered to all attendees, including allied health professionals, physician assistants, nurse practitioners, nurses, chiropractors, physical and occupational therapists, and rehabilitation professionals.

Featured topics include:

- The Future of Spine Care: The Role of Advance Practice and Allied Health Providers
- The Critical Nature of Early Spine Care: A Biopsychosocial and Disability Prevention Perspective
- Clinical Biomechanics of the Spine
- Hip-Spine Syndromes: Evaluation and Treatment of Patients with Concurrent Low Back Pain and Hip Pathology
- Spine Point/Counterpoint: Surgical Versus Nonsurgical Approaches to Spine Care
- Perioperative Care: What the Surgeon Needs to Know
- Value-based Reforms and the Changing Landscape of Spine Care

The North American Spine Society thanks the following individuals for their invaluable contributions in creating the allied health educational tracks at this year’s meeting:

Eric H. Buchl, PA-C
Simon Dagenais, DC, PhD
Julie Fritz, PT, PhD
Evan K. Johnson, PT, DPT, OCS
Brian Justice, DC
Brian D. Stemper, PhD
Leonard Voronov, MD, PhD
Sherri Weiser, PhD
Gregory L. Whitcomb, DC

DISCLAIMER

The material presented at the 30th Annual Meeting is made available by the North American Spine Society for educational purposes only. The material is not intended to represent the only, nor necessarily the best, method or procedure appropriate for the medical situations discussed; rather, it is intended to present an approach, view, statement or opinion of the faculty which may be helpful to others who face similar situations.

NASS disclaims any and all liability for injury or other damages to any individual attending the meeting and for all claims which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by physicians or any other person.

This Final Program contains confirmed program content, faculty and presenters as of September 18, 2015. Any further changes from the published Final Program will be announced at the beginning of each session.

ANNUAL MEETING 2015 SESSIONS ON DEMAND
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The North American Spine Society designates this enduring material for a maximum of 33 AMA PRA Category 1 Credits™.

Order the 30th Annual Meeting session recordings and get 24/7 access to more than 300 scientific presentations, including electronic posters, scientific sessions, symposia, breakout sessions, abstracts, featured lectures and more. Presentations recorded in Skyline Ballroom AB will have video with synchronized audio and slides. Presentations from all other rooms will include audio and slides only. Topics covered include biomechanics, motion preservation, spinal deformity, diagnostics and imaging, injections and interventions, and more. Purchase through the online shop at www.spine.org.
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NASS thanks the following members for their valued time, effort and dedication in planning the educational content for this year’s Annual Meeting:

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Gwendolyn Sowa, MD, PhD
2015 Program Co-chairs

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2014 Program Co-chairs

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2014 Program Committee Liaison

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Continuing Medical Education Chair
2016 Program Co-chair

D. Scott Kreiner, MD
2016 Program Co-chair

Edward J. Dohring, MD
Education Council Director

2015 SCIENTIFIC PROGRAM REVIEWERS

NASS thanks the following volunteers who spent numerous hours reviewing abstracts:

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- Albert Einstein

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When you grow tired of sitting in lecture halls, the Technical Exhibition offers you a variety of experiences to continue your professional development. Food, a place to meet, surgical training, interactive learning, or even find a new job: the Technical Exhibition features something for you.

With more than 300 exhibitors you can find the newest products in spine. The best way to search out exactly what you are looking for is by using the mobile app. Search by product category, type in a keyword. Don’t wander; plan out your search and find what you need. Our exhibitors would love to put their products into your hands, and NASS is the only place where all of the spine market is gathered for you.

Technical Exhibition hours:
Wednesday, October 14 ................ 9:00 a.m.–5:00 p.m.
Thursday, October 15 .................. 9:00 a.m.–5:00 p.m.
Friday, October 16 .................... 9:00 a.m.–1:30 p.m.

BOX LUNCHES
Connect with past colleagues or make new connections over lunch. For registered medical attendees, complimentary box lunches are available in the Technical Exhibition from 12:00–1:00 p.m. Wednesday, Thursday and Friday.

NASS BISTRO
The NASS Bistro provides the largest variety and best value for lunch at the convention center, allowing attendees and exhibitors to purchase a hot lunch.

Please note: A box lunch is included in the attendee registration fee for Wednesday, Thursday and Friday. The NASS Bistro is an added lunch option at the Annual Meeting.

Bistro Hours:
Wednesday, October 14, 2015 ........ 11:00 a.m.–2:30 p.m.
Thursday, October 15, 2015 .......... 11:00 a.m.–2:30 p.m.
Friday, October 16, 2015 .......... 11:00 a.m.–1:30 p.m.

Visit www.nassbistro.com or the NASS Bistro booth located in the Level 3 Lobby to purchase tickets.

NETWORKING BREAKS
Grab a beverage and have a conversation during the Networking Breaks. Located in the Technical Exhibition (except where noted), the breaks are scheduled:

Wednesday, October 14 .......... 10:00–10:30 a.m.; 3:05–3:35 p.m.
Thursday, October 15 .......... 9:10–9:40 a.m.; 3:10–3:40 p.m.
Friday, October 16 .......... 10:00–10:30 a.m.; 2:45–3:15 p.m.*
Saturday, October 17 .......... 10:00 – 10:30 a.m.*
*Located in the Level 3 Lobby

LUNCH AND LEARN AT THE SOLUTION SHOWCASE THEATER
Technical Exhibition, Booth 1799
Grab your lunch and take it to the Solution Showcase where the latest research from Industry will be presented. Two presentations each day will take place from 12:00–1:00 p.m. These presentations are always well attended so be sure to get there early to listen to presentations from Richard Wolf, Zimmer Biomet, Misonix, Medicrea USA and DJO Global. Check the mobile app for an updated schedule.

NASS CAREER FAIR
Booth 776 adjacent to NASS Resource Center
Wednesday, October 14 ............. 9:00 a.m.–5:00 p.m.
Thursday, October 15 .............. 9:00 a.m.–5:00 p.m.
Stop by the NASS Career Fair to speak with employers face-to-face about opportunities in their organizations. This is a free service to NASS members and meeting attendees. At the event, you will complete a brief profile and upload your CV, and participating companies can reach out to you to set up interviews. Companies interested in signing up onsite for an online package can stop by the Career Fair. Visit the registration area outside of the Career Fair for more information.
THE LEARNING PLACE
Level 3 Lobby

Designed for those who would like an alternative to sitting in a lecture hall, the Learning Place features areas for experiential and independent learning.

ePosters

View any of the hundreds of ePosters; ePosters also are provided in the meeting’s mobile app and with the OnDemand meeting recordings, if purchased.

Meet the Author

During the morning and afternoon networking breaks, attendees will have the opportunity to meet with and ask questions of selected ePoster authors.

Internet Station

Visit the Internet Station to keep in touch with your home or office while at the Annual Meeting. Several computers with internet access are available.

Surgical Innovation Labs

Want to get really hands on? The Surgical Innovation Labs offer you the opportunity to see the newest products in situ. Cadaveric demonstrations will take place from 8:00 a.m.–4:00 p.m. Wednesday and Thursday. Surgical workshops are offered by companies on Thursday evening allowing you to scrub in and try out the latest innovations for yourself. Located in the Learning Place to the left of Registration, the expanded offerings of the Surgical Innovation Lab offer you experiential learning to compliment your professional goals. Check the mobile app for an updated schedule.

Thank you to Philips Healthcare and Protech Medical for their lab support.

Practical Theater Presentations

Connect with specific topics of interest to you and your practice. Presentations will occur during breaks throughout the day. Topics include:

- Navigating CMS Quality Initiatives (PQRS and Value-based Modifier): How to Successfully Report and Avoid Payment Adjustments
- Current CMS Quality Initiatives, Reporting Requirements and Transition to the New Merit-based Incentive Payment System (MIPS)

Exercise Booth: Selecting the Right Exercise Treatment for My Patient

Developed by the Exercise Committee, this updated interactive booth showcases roles for core stabilization, mechanical diagnosis and therapy, pain sensitization treatment, and neuromotor control. Information about exercises and short videos will be available at the Exercise Booth. Come interact with colleagues, Exercise Committee members and physical therapists and learn from ongoing live demonstrations for a chance to win an Apple Watch.

Spine Education & Research Center

Stop by The Learning Place to find out about the Spine Education & Research Center. Staff will be available to answer questions about the facility featuring a 4,088 square foot bioskills lab (up to 15 stations), an auditorium with tiered-seating to accommodate 112 guests, spacious meeting rooms and state-of-the-art technology. SERC is utilized by NASS for hands-on courses and is regularly rented by companies or other societies. Schedule a tour or book course dates.

In celebration of our 30th year, we are giving away a FREE 30 year membership!

Pay your 2016 dues at the membership kiosk in the lobby or at the NASS Resource Center located in the exhibit hall for your chance to win!
TUESDAY, OCTOBER 13

Welcome Reception
6:00–7:30 p.m.
Hilton Chicago Normandie Lounge

Ready to meet a few new faces at this year’s meeting? Or just reconnect with your colleagues? The Welcome Reception is the perfect opportunity to do so! This great networking event takes place after sessions conclude so you have time to grab a bite, have a drink and chat before heading off to dinner. Please note that your meeting badge is required for entry.

WEDNESDAY, OCTOBER 14

Resident, Fellowship and Program Directors Meeting
12:00–1:00 p.m.
Room W181B

The response to the Spine Fellowship Match continues to be positive with more than 70 programs currently enrolled. In an effort to maintain the enthusiasm, there is a meeting of Fellowship Directors during the 30th Annual Meeting in Chicago. This is an open discussion, and lunch is provided.

Leadership Development and Training Guest Speaker: Kevin E. O’Connor, CSP
1:00–3:30 p.m.
Room W471

Kevin E. O’Connor, CSP is an author, executive coach, businessman, and professional speaker. He specializes in working with medical professionals who have been promoted to leadership positions where they now lead their former peers, especially physician leaders. He holds three masters degrees and his expertise focuses on the challenges of leadership, business relationships and the effectiveness of teams. He is a 25-year faculty member of the American Association for Physician Leadership (formerly ACPE) and faculty for the American College of Healthcare Executives (ACHE). O’Connor customizes his message by communicating with his audiences in advance. He facilitates his message with their knowledge through his interactive presentations.

Symposium: Healthcare 2016: Emerging Payment Policies and the NASS/Washington, DC Relationship Guest Speaker: Mark Halperin
3:40–5:30 p.m.
Skyline Ballroom AB

Mark Halperin is managing editor of Bloomberg Politics and host of Bloomberg TV’s With All Due Respect. He also is a regular contributor to MSNBC’s Morning Joe and the most frequent guest in the history of Charlie Rose. Prior to joining Bloomberg, Halperin served as editor-at-large and senior political analyst for TIME, covering politics, elections and government. Prior to joining TIME, Halperin worked at ABC News, where he covered five presidential elections. Additionally, Halperin founded and edited the online publication “The Note” on abcnews.com, which was characterized as the most influential daily tip sheet in American politics. Halperin’s speech will focus on the upcoming presidential elections and the role healthcare will play in determining our nation’s next leader.

SpinePAC Reception
5:30–6:30 p.m.
W375 West Lobby

The reception features Mark Halperin, managing editor of Bloomberg Politics and host of Bloomberg TV’s With All Due Respect. The reception is open to all NASS members who have donated to SpinePAC in 2015.
Why are we such a strong proponent of lean manufacturing? To provide an opportunity for people to live a better life.

As a full value stream manufacturer, we make it our job to provide you with the latest technology and the best total supply chain value.

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All with the mission to help others live a better life.

Visit Orchid at NASS 2015, Booth 1411

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THURSDAY, OCTOBER 15

Presidential Guest Speaker:
Sir Ken Robinson
10:10–11:00 a.m.
Skyline Ballroom AB

An internationally recognized authority in creativity and innovation in education and business, Sir Ken Robinson is one of the world’s leading speakers. Videos of his famous talks to the prestigious TED Conference are the most viewed in the history of the organization and have been seen by an estimated 300 million people in more than 150 countries. Sir Ken works with governments in Europe, Asia and the US, international agencies, Fortune 500 companies and leading cultural organizations. He led a national commission on creativity, education and the economy for the UK Government, was the central figure in developing a strategy for creative and economic development as part of the Peace Process in Northern Ireland, and was one of four international advisors to the Singapore Government for a strategy to become the creative hub of southeast Asia. Called “one of the world’s elite thinkers on creativity and innovation” by Fast Company magazine, Sir Ken has received numerous awards and recognitions for his groundbreaking contributions. He was included in Thinkers50 list of the world’s leading business thinkers and has been named one of TIME/Fortune/CNN’s Principal Voices. In 2003, he received a knighthood from Queen Elizabeth II for services to the arts. His 2009 book, The Element: How Finding Your Passion Changes Everything, is a New York Times best seller and has been translated into 21 languages. A 10th anniversary edition of his classic work on creativity and innovation, Out of Our Minds: Learning to be Creative, was published in 2011. His latest book, Finding Your Element: How to Discover Your Talents and Passions and Transform Your Life, was published by Viking in May 2013 and is also a New York Times best seller.

The Spine Journal Outstanding Paper Awards Presentations
11:00 a.m.–12:00 p.m.
Skyline Ballroom AB

Honor your colleagues as The Spine Journal presents this year’s Outstanding Paper Awards.

Members’ Business Meeting
3:10–3:40 p.m.
Room W476

Find out the latest news, events and information, and meet the Board of Directors.

Resident, Fellow and Program Directors Reception
5:00–6:00 p.m.
W375 West Lobby

NASS is proud to announce the 13th Annual Resident, Fellow and Program Directors Reception at the 30th Annual Meeting. The reception provides an opportunity for residents, fellows and potential fellows to mingle with each other and the program directors and provides a casual setting to enjoy cocktails and hors d’oeuvres with colleagues.

Joint Sections of NASS Reception
5:00–6:00 p.m.
W375 West Lobby

This reception provides an opportunity to network with section members and those interested in becoming involved in sections. Come enjoy and learn how NASS is supporting these specific sections of its membership:
- Allied Health
- Biologics and Basic Research
- Minimally Invasive Procedures
- Radiology
- Rehabilitation, Interventional and Medical Spine (RIMS)
- Robotics and Navigation
- Spine Motion Technology
Global Spine Forum: Advancing Spine Care Worldwide
9:00 a.m.–5:00 p.m.
Room W471

NASS Recognition Awards Presentation
10:25–10:30 a.m.
Skyline Ballroom AB
The Recognition Awards are presented to outstanding society members.

2015 Leon Wiltse Award:
Frank J. Eismont, MD

2015 Henry Farfan Award:
James C. Iatridis, PhD

2015 David Selby Award:
Donna M. Lahey, RNFA

2015 Past President Award:
David A. Wong, MD, MSc, FRCS

Inaugural Spine Advocacy Award:
Jeffrey J. Wise, MD

See biographies of award winners on the following pages.

Research Grant and Fellowship Awards Presentation
10:30–11:00 a.m.
Skyline Ballroom AB
Honor your colleagues as NASS presents this year’s research grants and traveling fellowships to those proposing advancements in spine care and research. Grant recipients from 2012 and 2013 also present their research findings.

Value Abstract Awards Presentations
3:20–3:50 p.m.
Skyline Ballroom AB
Value Abstract Awards foster and recognize efforts to define value in spine care.

Resident and Fellow Research Awards Presentations
3:20–3:50 p.m.
Skyline Ballroom C
Resident and Fellow Research Awards recognize young researchers’ and clinicians’ work in spine care.

International Reception
4:45–5:45 p.m.
W375 West Lobby
Network with colleagues after the sessions have concluded. This reception is open to all attendees.
The Leon Wiltse Award recognizes excellence in leadership and/or clinical research in spine care.

Dr. Eismont’s contributions to the field of spinal surgery over the last 30 plus years have been extraordinary. His research in spinal trauma and infection has changed many traditions and has advanced the methods of treatment and improved patient outcomes. His commitment to education and furthering the excellence of orthopaedic surgery for our trainees and practicing physicians had been well documented.

*Nominated by Harry Herkowitz, MD*

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The Henry Farfan Award recognizes outstanding contributions in spine related basic science research.

Dr. Iatridis has been extremely forward thinking and productive in his basic science research of disc biomechanics and biochemistry. His work is in many respects leading the field, combining the two subdisciplines of basic science in order to lead disc repair.

*Nominated by Christopher Bono, MD*

Dr. Iatridis is a world authority on numerous aspects of disc biology and mechanobiology. Dr. Iatridis is at the forefront of research on annular repair, disk regeneration, pain biology, studies of the notochord and its function in healthy and degenerated discs. Dr. Iatridis’s contributions to the field of disk biology are immeasurable, and he continues to run a continuously funded NIAH research lab. He has built a collaborative team of academic spine surgeons, post-doctoral fellows, medical students, orthopedic residents, who all continue to work with him on this ongoing research. His ability to solve basic science problems and never lose sight of their translational applications is both inspiring and remarkable. His post-doctoral fellows continue to be sought after candidates all over the country for numerous spine research positions and major academic medical centers. Dr. Iatridis has an extensive publication history with over 200 publications, peer reviewed, in the areas of disc biology, disk mechanobiology, annular repair, disc mechanics. Dr. Iatridis continues to be a leader in the field of disc mechanobiology, annular repair and intervertebral disc regeneration for years to come.

*Nominated by Andrew Hecht, MD*
The David Selby Award recognizes contributions to the art and science of spinal disorder management through service to NASS.

Donna Lahey has been a NASS member since 1995. Our organizational rules limit the options and incentives for non-physician members to actively engage in the organization. Despite knowing that there might not be recognition for her efforts, Donna has always freely given her time and energy to NASS. She has served on 8 NASS committees, authored numerous NASS educational articles, and in addition has organized and been faculty for numerous NASS courses. She is always the first to respond when volunteers are needed for a project. She has devoted countless hours offering her time in service to NASS, commands the utmost respect from the physician leaders of NASS, and is truly a role model for all of our members. Donna’s comprehensive compendium of NASS volunteerism demonstrates her commitment and dedication to the educational, patient care, and service mission of NASS. She exemplifies the ideals envisioned for recipients of the David Selby Award.  

Nominated by Charles Mick, MD, Christopher Kauffman, MD, Edward Dohring, MD, Christopher Bono, MD and Gregory Przybylski, MD

The Past President Award recognizes a past president of the North American Spine Society who has made exceptional contributions to the society and its mission, who not only served as a president of NASS but continues to provide service to the society beyond presidency.

Dr. Wong served as the NASS president from 2002 to 2003, and for the last 12 years has continued to be a major contributor to the organization. He is selfless, tireless, reliable, articulate, and very productive. He is always helping with committee work or education, and exhibits extraordinary professionalism with his interactions. His dedication to the society has contributed greatly to the overall mission of the society. Through all of his accomplishments, he has remained humble and an exceptional ambassador for NASS.  

Nominated by Charles Reitman, MD

The Spine Advocacy Award recognizes exceptional contributions to federal advocacy efforts on behalf of patients and members of the society.

Dr. Wise is a diplomate of the American Board of Orthopaedic Surgery, a fellow of the American Academy of Orthopaedic Surgery and an active member of the North American Spine Society. He is a member of the American Medical Association, Medical Society of Virginia and Fauquier County Medical Society. Dr. Wise was the delegate from the North American Spine Society to the American Medical Association House of Delegates and the American Academy of Orthopaedic Surgeons Board of Specialty Societies for many years. He presently holds privileges at Fauquier Hospital, Fair Oaks Hospital, Novant Health Haymarket Medical Center and Haymarket Surgical Center. He is the team physician for Kettle Run High School and one of the physicians for the Virginia Gold Cup. Dr. Wise secured Advocacy’s legacy as a fixture of NASS by leading efforts to formalize the Advocacy Committee (now Council) and becoming its first official chairman.  

Nominated by the North American Spine Society Board of Directors and Advocacy Council
REGISTRATION
Level 3 Lobby
Hours:
Monday, October 12 ........................ 6:30 a.m.–5:00 p.m.
Tuesday, October 13 ...................... 6:30 a.m.–5:00 p.m.
Wednesday, October 14 .................. 6:30 a.m.–5:00 p.m.
Thursday, October 15 .................... 6:30 a.m.–5:00 p.m.
Friday, October 16 ....................... 7:00 a.m.–5:00 p.m.
Saturday, October 17 .................... 7:30 a.m.–12:00 p.m.

INTERNATIONAL CERTIFICATE PRINTING
Level 3 Lobby
Visit the certificate printing station to print your certificate of meeting attendance.

COAT AND LUGGAGE CHECK
Level 3 Lobby
The Coat and Luggage Check is available for your convenience. The cost is $4 per luggage item and $3 per coat. Please note: All items must be picked up by closing. NASS and the convention center are not responsible for items left at the close of the day.

Hours:
Tuesday, October 13 ...................... 6:30 a.m.–5:30 p.m.
Wednesday, October 14 .................. 7:00 a.m.–5:30 p.m.
Thursday, October 15 .................... 7:00 a.m.–7:30 p.m.
Friday, October 16 ....................... 7:00 a.m.–6:15 p.m.
Saturday, October 17 .................... 7:30 a.m.–12:30 p.m.

CHICAGO INFORMATION COUNTER
Level 1, Near Shuttle Drop-off
Staff at the information counter will be able to supply attendees with information on the city and beyond: tourist attractions, places of interest, shopping, dining, tips for tourists, etc. Restaurant reservation services also are available to assist with suggestions and reservations.

HOUSING BUREAU
Level 3 Lobby
onPeak is the official NASS Housing Agency and will have representatives available to answer questions about your hotel, help you with any hotel issues, and help to book your housing for the 2016 Annual Meeting in Boston.

PHOTOGRAPHY ORDERS
Visit http://www.spine.smugmug.com to view and order photos of the general sessions, symposia, Technical Exhibition, special events and more.

DINING
Medical Attendee Food Service
Technical Exhibition
Box lunches are available for registered medical attendees in the Technical Exhibition from 12:00–1:00 p.m. on Wednesday, Thursday and Friday.
Concessions are available on level 2.5.

NASS Bistro
Technical Exhibition
The NASS Bistro is a great option that saves time, allows attendees and exhibitors to purchase a hot lunch, and provides the largest variety and best value for lunch at the convention center. Please note: A box lunch is included in the attendee registration fee for Wednesday, Thursday and Friday. The NASS Bistro is an added lunch option at the Annual Meeting.
Bistro Hours:
Wednesday, October 14 .................. 11:00 a.m.–2:30 p.m.
Thursday, October 15 .................... 11:00 a.m.–2:30 p.m.
Friday, October 16 ....................... 11:00 a.m.–1:30 p.m.
Visit www.nassbistro.com or the NASS Bistro booth located in the Level 3 Lobby to purchase tickets.

Networking Breaks
Beverage services are held in the Technical Exhibition Wednesday–Friday morning. Friday afternoon and Saturday morning breaks are held in the Level 3 Lobby.

BOSTON INFORMATION
Level 3 Lobby
Stop by the information kiosk to review exciting material for your trip to the Boston area, site of the 2016 Annual Meeting.

WINE AND DINE FOR SPINE
Help fund spine research by booking restaurant reservations through NASS’s partnership with OpenTable. Each reservation made through the NASS website (www.spine.org/opentable) earns 40 cents for the Annual Research Fund (ARF).
MAXIMIZE LUMBAR LORDOSIS

WITH MIS LLIF

DIRECT LOOK® + RISE®- L
Visually navigate around neural elements and minimize implant impaction to preserve patient anatomy.

Discover more at GlobusMedical.com/DirectLook

In Booth Presentation
LATERAL TECHNIQUES TO MAXIMIZE LUMBAR LORDOSIS
Wednesday, October 14th
10:00 – 10:30am
Dr. Joseph O’Brien

Featuring RISE®-L and Direct Look®

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ALTERA®
Optimize anterior implant placement to enhance lordosis restoration and to preserve posterior muscles.

Discover more at GlobusMedical.com/TLIF

In Booth Presentation
TLIF TECHNIQUES TO MAXIMIZE LUMBAR LORDOSIS
Thursday, October 15th
9:10 – 9:40am
Dr. Brad Prybis

Featuring ALTERA®

Visit us at Booth #1459
Visit the NASS Resource Center in Booth 669 in the Technical Exhibition to see all that NASS has to offer spine care professionals.

**Hours:**
Wednesday, October 14 \(\ldots\) 9:00 a.m.–5:00 p.m.
Thursday, October 15 \(\ldots\) 9:00 a.m.–5:00 p.m.
Friday, October 16 \(\ldots\) 9:00 a.m.–1:30 p.m.

**MEMBERSHIP SERVICES**
All meeting attendees are encouraged to visit Membership Services to take advantage of several meeting-only membership offers. Current members can pay their 2016 dues or update their contact information here (as well as at the Membership kiosk located in the Level 3 Lobby). Individuals who are not members can learn more about membership benefits or complete an application to join during the meeting. Attendees also can renew or join through the following links:

Renew: www.spine.org/renew
Join: www.spine.org/join

**NASS STORE**
NASS publishes or co-publishes several fundamental educational resources for spine care providers. These staple publications can be purchased at a discount for members at the Store throughout the meeting. Free shipping is available on orders of $300 or more (see a Store representative for details). Publications available include clinical guidelines, preorders of Common Coding Scenarios for Comprehensive Spine Care 2016 publication, patient education brochures, Orthopaedic Knowledge Update: Spine 4, logo merchandise and more.

**EDUCATION PROGRAMS**
Review the 2016 course and conference listings at the Education kiosk. Find out what’s new for 2016. Details are at www.spine.org.

**SPINECONNECT AND FIND-A-SPECIALIST PROFILE UPDATES**
All meeting attendees are automatically subscribed to a private, secure community on the NASS engagement site, SpineConnect, where they can communicate before, during and after the Annual Meeting. Faculty and attendees can post questions on this community and connect with others to meet socially throughout the meeting. NASS members also are subscribed to the SpineConnect Open Forum where they can discuss cases, ask questions and collaborate with other members from around the world.

Stop by the SpineConnect booth to browse through the site, post questions or update your profile. A photographer also will be available at the booth to take headshots for the new Find-a-Specialist website for NASS members and for your practice website or social media profiles.

**ADVOCACY AND SPINEPAC**
Health care reform. Skyrocketing professional liability costs. Plunging Medicare reimbursement. Ever-increasing administrative burdens. Together, these forces imperil patient access to quality specialty care. To remedy these issues, the National Association of Spine Specialists—the 501(c)(6) trade organization which serves as NASS’ advocacy arm—unites physicians and patients in the fight for sound health care policy. The Association advocates in the legislative and regulatory arenas for public policies that protect members’ ability to practice medicine and give patients access to the specialists and technologies they require for the treatment of spine disorders.

Stop by the SpinePAC booth to learn about issues shaping the health policy debate. Advocacy staff provide demonstrations so that members can learn how to make a difference in the public policy process. The NASS Legislative Action Center, an online advocacy tool, lets members tell lawmakers how they feel about physician reimbursement under Medicare.

SpinePAC is the fund through which the Association supports federal candidates who champion public policies benefiting spine care providers and their patients. Members can make their contributions to SpinePAC by visiting the Advocacy booth.
Exclusive Technology… Exceptional Possibilities

Mobi-C®
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for motion preservation

VerteBRIDGE®
PLATING TECHNOLOGY
for zero-profile fusion

ROI-C®
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LATERAL LUMBAR CAGE

ROI-A®
ALIF CAGE

Visit us at NASS Booth #1437

www.cervicaldisc.com - www.ldr.com
PUBLICATIONS

SpineLine
Comment on SpineLine content, click through a short reader survey, and offer suggestions for upcoming issues. Help yourself to complimentary copies of the recent issue and find information about digital and mobile SpineLine.

The Spine Journal
The Spine Journal (TSJ) welcomes authors, readers and reviewers. Visit the Publications kiosk for the latest information on submitting manuscripts, our impact factor and efficient review processes. Also find information about becoming a reviewer and pick up a copy of TSJ’s latest issue.

Patient Education
Suggest ideas for brochure topics, as well as web articles, series or videos that would benefit spine patients. Members with current disclosure also can sign up to author pieces for the website and blog.

Coverage Recommendations eBook Demo
To maintain access to high-quality, evidence-based and ethical spine care, NASS is proactively developing coverage recommendations for common spine care treatments, procedures and diagnostics. NASS is pleased to offer these game-changing coverage recommendations now in a comprehensive, searchable e-book free to all NASS members and as an annual subscription to nonmembers. Spine specialists can use this up-to-the-minute material to provide evidence to justify their treatment recommendations, to seek appropriate reimbursement and to guard against inappropriate denials of quality spine care. Stop by the Publications booth to demo this definitive new resource.

RESEARCH

The NASS Research Council and its committees are dedicated to advancing the science and care of spine on behalf of the NASS membership and spine field. Their work focuses on issues and projects related to spine research, clinical care and policy. Stop by and see what’s new and pick up information about:

- NASS’ spine registry
- Clinical Guidelines
- Appropriate use criteria and mobile app
- Sign, Mark & X-ray Wrong Site Surgery Prevention
- Patient safety alerts
- 2016 Research Funding Application
- Clinical tools and more!

NORTH AMERICAN SPINE FOUNDATION
On September 8, 2014, NASS launched the North American Spine Foundation (NASF). The purpose of NASF is to engage the public and other nonmedical stakeholders in addressing spine-related impairment and associated functional decline; the #1 cause of disability worldwide. NASF is advocating for you, your patients with spinal disorders, and all stakeholders by supporting research, education, and activism to improve functional capabilities and lessen the burden of spine disability. A national public awareness campaign, multi-stakeholder collaborations, legislative advocacy, and research grants are being employed to achieve the mission of the NASF. Please join NASF by texting Michael Reed at 561-427-8008 or by visiting www.Spine.Foundation.

THE NEW NASS FIND A SPECIALIST DIRECTORY FOR PATIENTS IS LIVE!

Find it at www.spineconnect.com/findaspecialist and www.knowyourback.org

Stop by the SpineConnect booth in the NASS Resource Center to view your profile, make updates and to take a headshot photo.

CAMERA AND GIFT CARD GIVEAWAYS!

All meeting attendees with a profile photo on the site by 5:00 p.m. on Thursday will be entered into a drawing for a Canon PowerShot G16 camera (a $500 value!) or one of two $250 Amazon gift cards! Upload a photo or stop by the booth to get a headshot taken and to get entered into the drawing.
At SeaSpine, we believe it should be easy for surgical spine patients to benefit from high quality, cost effective products and the latest technology. That’s why we invest in a collaborative approach that allows us to be the best innovators, educators, and partners we can be. The result is accelerated innovation and patient-centric research and development, backed by two decades of clinical and technical expertise. This combination builds strength—in our brand and our partners—to enable patients to return to active lifestyles. StrongerTogether.

Visit us at NASS – Booth 1469
SPEAKER INFORMATION CENTER
Level 3 Lobby

There is no Speaker Ready Room at this meeting. Podium and ePoster abstract presenters are not permitted to upload or amend their presentations at any time onsite. Exceptions include The Spine Journal Outstanding Paper Awards and Research Grant Award presentations.

Course faculty, symposia presenters and Interdisciplinary Spine Forum/Breakout Session speakers may upload or amend presentations by visiting the Speaker Information Center in the Level 3 Lobby, near the registration area. Speakers are not permitted to use their own laptops for their presentations. No exceptions will be made.

Hours:
Monday, October 12 ...................... 12:00–5:00 p.m.
Tuesday–Friday, October 13-16 ........ 6:30 a.m.–5:00 p.m.
Saturday, October 17 ...................... 7:00–11:00 a.m.

PRESS ROOM
Room W183A

The on-site Press Room includes a media-only work area with free online access, charging stations and printer access. Snacks and coffee for credentialed journalists are served.

Only conference staff, credentialed media and presenter interviewees are allowed access to the press room. Members of the media, advertising staff and exhibitors may not host meetings in the press room.

Hours:
Wednesday, October 14 ............... 7:30 a.m.–5:00 p.m.
Thursday, October 15 ................. 7:00 a.m.–5:00 p.m.
Friday, October 16 .................... 7:00 a.m.–5:00 p.m.
Saturday, October 17 ...................... 7:30–11:00 a.m.
LEADING THE CONVERSION TO SINGLE-PROCEDURE IMPLANT KITS

Join the move to disposable procedural kits for spine, extremity and trauma implants. OEMs are securing new annuity revenue and saving over $1,000 per procedure by reducing life cycle costs. Surgeons are gaining a robust, ergonomic, sterile packed solution with guaranteed accurate fixation for every implant. Hospitals and ASCs are achieving cost savings, hassle free inventory management and reduced risk of surgical site infection. Collaborate with ECA Medical Instruments® and enjoy competitive advantage—today.

Call us and we’ll help you transform healthcare economics.
CHICAGO IS MORE THAN JUST A BIG CITY.

Besides its striking downtown, which includes some of the tallest buildings in the world, Chicago has a distinctive coastline, hundreds of vibrant parks and more than 200 unique neighborhoods with some of the country’s best restaurants, theaters and museums, and an exciting nightlife as well as incredible shopping on The Magnificent Mile. It’s truly a distinctive mix of global attractions and local charm that make this city second to none and the perfect location for NASS 2015.

DINING
Chicago’s dining scene is unparalleled, featuring celebrity chefs and award-winning, world-renowned restaurants with ethnic dining from around the globe. From lavish cuisine to deep dish pizza, Chicago is one of the world’s culinary epicenters serving up everything from tasty cheap eats to avant-garde cuisine.

ARCHITECTURE
From modern skyscrapers to landmark buildings, Chicago’s boasts some truly unique architectural wonders including Water Tower, Wrigley Building, Merchandise Mart, Willis Tower, Trump Tower, John Hancock Building, Marina Towers, and the Aqua building, among many others.
**MUSEUMS AND GALLERIES**
Three world-renowned museums call Chicago their home: The Adler Planetarium & Astronomy Museum, The Field Museum, and The Shedd Aquarium, and all are filled with opportunities to stretch your mind. For art lovers, the Art Institute of Chicago offers masterpieces from ancient to ultra-modern, and Chicago’s cultural institutions cover everything from famous historical events to current issues.

**MILLENIUM PARK**
With 25 acres of awe-inspiring landscape, breathtaking architecture and an iconic collection of public art, Millennium Park is Chicago’s premier green space offering dozens of free events and programs including art installations, outdoor concerts, films screenings, alfresco workouts and more.

**SHOPPING**
Any shopping adventure in Chicago should begin on The Magnificent Mile, a cosmopolitan, history-packed section of Michigan Avenue. Chicago’s shopping destinations extend throughout the city and include boutiques that line the streets of its diverse neighborhoods. Not to be missed is Chicago’s Loop, anchored by State Street, a shopper’s paradise for more than a century.

**MUSIC SCENE**
Chicago is famous for legendary blues and jazz, which can be heard nightly in venues throughout the city. Chicago’s music scene can also take an indie turn, or a hip hop spin, or electronic, or just plain rock n’ roll. Jam out at mega concert halls or discover up-and-coming artists at revered clubs, or just settle into a cozy relaxing venue.

**THEATER**
Chicago offers an impressive collection of playhouses. The Loop is a guidepost for the industry’s biggest names and most anticipated stage shows. With more than 200 theaters and five Tony Award-winning theater companies, Chicago is a standing ovation for theater lovers.

**NAVY PIER**
This 50-acre playground of entertainment, museums, activities, restaurants, and shops is the perfect place for some family fun time. Head to Pier Park for a ride on the 150-foot Ferris wheel, which offers great city and Lake Michigan views and is open year-round.

**GRANT PARK**
Often referred to as “Chicago’s front yard,” Grant Park is over 300 acres of carefully landscaped green space separating the city’s downtown area from Lake Michigan. The Park hosts some of the city’s most popular attractions including: Buckingham Fountain, Millennium Park and the Art Institute of Chicago.

**NIGHTLIFE AND COMEDY**
From dance clubs to swanky lounges, comedy stages to beer havens, you’ll find it all. Chicago boasts numerous bars and nightclubs that are leaders of the cocktail culture. And if you like to laugh, the comedy scene ranges from traditional stand-up to competitive improv to sketch at Chicago’s top comedy clubs.
**DINING**

**Alinea** $$$ American  1723 N. Halsted St.
Chef Grant Achatz draws foodies with New American tasting menus featuring highly creative plates.
Zagat—Best Business-Dinner Restaurants in Chicago

**Everest Restaurant** $$$ French  440 S. La Salle St.
Elegant 40th floor eatery in the Chicago Stock Exchange with French prix fixe menus and city views.
Zagat—Best French Restaurants in Chicago

**Grace** $$$ American  652 W. Randolph St.
Chef Curtis Duffy delivers top notch tasting menus featuring refined dishes with stunning flavors and presentations.
Zagat—Best New-American Restaurants in Chicago

**Moto Restaurant** $$$ American  945 W. Fulton Market St.
High-end, adventurous, modern cuisine-as-art with exotic ingredients and futuristic presentations.
Zagat—One-of-a-Kind Restaurants in Chicago

**Next Restaurant** $$$ Eclectic Restaurant  953 W. Fulton Market St.
High-end foodie destination known for Grant Achatz’s themed tasting menus and inventive presentations.
Zagat—Best Power-Scene Restaurants in Chicago

**Tru** $$$ French  676 N. St. Clair St.
Luxurious French dining with a lavish fixed-price menu, caviar service and an art-filled room.
Zagat—Best French Restaurants in Chicago

**Acadia** $$$ American  1639 S. Wabash Ave.
An airy, upscale restaurant serving seasonal New American dishes inspired by coastal Maine.
Zagat—Best Dessert Specialists in Chicago

**Arami** $$ Japanese/Sushi  1829 W. Chicago Ave.
Some of the best sushi and sashimi around plus excellent cooked fare like noodles and robata grilled items. Large windows give the simple brick-and-wood surrounds an airy feel.

**Avec Restaurant** $$ Mediterranean  615 W. Randolph St.
Inventive small and large plates served in a cozy, minimalist space with communal seating.
Zagat—Best Mediterranean Restaurants in Chicago

**The Aviary** $$ Bar  955 W. Fulton Market St.
Swanky cocktail lounge with intricate drinks in super creative presentations and clever small bites.
Zagat—Best Bars and Restaurants for Cocktails in Chicago

**Bavette’s Bar & Boeuf** $$ French Steakhouse  218 W. Kinzie St.
Upscale steakhouse with a New American menu in an ornate, dimly lit wood and brick setting.
Zagat—Most Romantic Restaurants in Chicago

**Benny’s Chop House** $$$ Steakhouse  444 N. Wabash Ave.
For a top-notch steakhouse experience, fans swear by this River North “beefery” where perfect finishing crusts make for even more delicious chops and the cocktails are worth the trip too.

**Blackbird Restaurant** $$$ American  619 W. Randolph St.
Chef-owner Paul Kahan’s sleek flagship known for inventive fare and a popular fixed-price lunch menu.
Zagat—Best Dessert Specialists in Chicago

**The Boarding House** $$$ American  720 N. Wells St.
Cellar lounge, 1st-floor bar and upstairs fine-dining restaurant with a menu of upscale American fare.
Zagat—Best Restaurants for Comfort Food in Chicago

**The Capital Grille** $$$ Steakhouse  633 N. St. Clair St.
This upscale chain is a quintessential steakhouse pick, offering delicious classic dishes via attentive staffers with a setting that is classy but not stuffy.

**Chicago Chop House** $$$ Steakhouse  60 W. Ontario St.
A classic big-city steakhouse, this excellent gets props for its juicy, “cooked-to-perfection” chops, set in a restored brownstone, the white-tablecloth setting has a cool, old-fashioned ambiance.

**Gibson’s Bar & Steakhouse** $$$ Steak/Seafood  1028 N. Rush St.
A martini and red meat haven, this Gold Coast staple offers juicy, top-notch steaks, excellent seafood and rich sides the size of your head.

**Girl & the Goat** $$$ American/Seafood  809 W. Randolph St.
Hot Spot where Stephanie Izard serves up innovative small plates from a dramatic open kitchen.
Zagat—Best people watching restaurant in Chicago

**Goosefoot** $$$ American  2656 W. Lawrence Ave.
Creative, avant-garde American fare offered in a contemporary, intimate fine-dining space plus BYO.
Zagat—Best New-American Restaurants in Chicago

**GT Fish & Oyster** $$$ Seafood  531 N. Wells St.
Seafood hot spot pairing inventive shared plates with creative cocktails in a buzzy, modern space.
Zagat—Best Restaurants for Healthy Dining in River North

**Joe’s Seafood, Prime Steak & Snow Crab** $$$ Seafood/Steak  60 E. Grand Ave.
Classic steak and seafood fare, including signature stone crab claws, served by a tuxedo-clad staff.
Zagat—Best Business-Dinner Restaurants in Chicago

**Lawry’s The Prime Rib** $$$ Steakhouse  100 E. Ontario St.
Tradition reigns at this longtime Chicago steakhouse known for dramatic tableside preparations, including prime rib carved from a rolling roasting cart and “spinning salads” mixed in front of you. A beautiful setting in the former McCormick mansion

**MK** $$$ American  868 N. Franklin St.
Acclaimed New American fare in a loft-like setting with an extensive wine list and a light bar menu.
Zagat—Best New-American Restaurants in Chicago
Regenerative Solutions
for Orthopaedic, Spine & Neurosurgery

www.collagenmatrix.com
<table>
<thead>
<tr>
<th>Restaurant Name</th>
<th>Cuisine Type</th>
<th>Location</th>
<th>Description</th>
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<tbody>
<tr>
<td>Naha</td>
<td>American</td>
<td>500 N. Clark St.</td>
<td>Imaginative dishes with California and Middle Eastern accents are served in a contemporary setting. Zagat—Best Celebrity Chef Restaurants in Chicago</td>
</tr>
<tr>
<td>Paris Club Bistro &amp; Bar</td>
<td>French</td>
<td>59 W. Hubbard St.</td>
<td>Bustling spot with classically inspired French bistro fare in a chic space with an upstairs lounge. Zagat—Best People-Watching Bars in Chicago</td>
</tr>
<tr>
<td>Perennial Virant</td>
<td>American</td>
<td>1800 N. Lincoln Ave.</td>
<td>Inventive New American cuisine based around seasonal ingredients plus pickled/preserved products. Zagat—Best Farm-to-Table Restaurants in Chicago</td>
</tr>
<tr>
<td>Sepia</td>
<td>American</td>
<td>123 N. Jefferson St.</td>
<td>Seasonal, inventive, upscale American in a brick, tile and wood interior evoking classic Chicago. Zagat—Best Restaurants for Craft Cocktails in Chicago</td>
</tr>
<tr>
<td>Balena</td>
<td>Italian</td>
<td>1633 N. Halsted St.</td>
<td>Seasonal Italian-inspired dishes, including handmade pastas and pizza, plus a lengthy wine list. Zagat—Best People-Watching Restaurants in Chicago</td>
</tr>
<tr>
<td>Belly Q</td>
<td>Japanese</td>
<td>1400 W. Randolph St.</td>
<td>Trendy, minimalist Asian barbecue restaurant with tabletop grill options plus sake and wine on tap. Zagat—Best Restaurants Near Chicago’s United Center</td>
</tr>
<tr>
<td>Carnivale</td>
<td>Nuevo Latino</td>
<td>702 W. Fulton Market St.</td>
<td>Lively eatery with colorful decor, festive vibe and food from South America, Spain and the Caribbean. Zagat—Chicago’s Best Restaurants for Group Dinners</td>
</tr>
<tr>
<td>Carmine’s</td>
<td>Italian</td>
<td>1043 N. Rush St.</td>
<td>Lively supper club, famous for its hearty portions of pasta, meat plates and other Italian dishes.</td>
</tr>
<tr>
<td>The Gage</td>
<td>American</td>
<td>24 S. Michigan Ave.</td>
<td>Inventive American eats plus a long list of beers in a lively space with Millennium Park views. Zagat—Best Restaurants Near Chicago’s Millennium Park</td>
</tr>
<tr>
<td>Gyu-Kaku Japanese BBQ</td>
<td>Japanese BBQ</td>
<td>210 E. Ohio St.</td>
<td>This delicious, Japanese yakiniku is where you cook your own BBQ on tabletop charcoal braziers.</td>
</tr>
<tr>
<td>Hub 51</td>
<td>American</td>
<td>51 W. Hubbard St.</td>
<td>Diverse eats from sushi to tacos to burgers in a trendy, hopping space with a downstairs club. Zagat—Best Restaurants for Happy Hour in Chicago</td>
</tr>
<tr>
<td>Kai Zan</td>
<td>Japanese/Sushi</td>
<td>2557 W. Chicago Ave.</td>
<td>Inventive sushi beautifully presented at this Humboldt Park BYO. Menu includes everything from teppenyaki to individually tailored omakase tasting menus.</td>
</tr>
<tr>
<td>Nellcôte</td>
<td>American</td>
<td>833 W. Randolph St.</td>
<td>European-inspired small plates and cocktails in a posh setting with chandeliers and white marble. Zagat—Best Restaurants for Craft Cocktails in Chicago</td>
</tr>
<tr>
<td>Nightwood</td>
<td>American</td>
<td>2119 S. Halsted St.</td>
<td>Local carnivores gather in the modern-rustic interior or outdoor patio for seasonal New American fare. Zagat—Best Dessert Specialists in Chicago</td>
</tr>
<tr>
<td>The Publican</td>
<td>American</td>
<td>837 W. Fulton Market St.</td>
<td>The Publican’s eclectic menu is inspired by simple farmhouse fare in a space evocative of a European beer hall. Zagat—Best Restaurants in Chicago’s West Loop</td>
</tr>
<tr>
<td>The Purple Pig</td>
<td>Mediterranean</td>
<td>500 N. Michigan Ave.</td>
<td>Adventurous small plates plus house-cured meats and lengthy wine list in lively quarters. Zagat—Best Mediterranean Restaurants in Chicago</td>
</tr>
<tr>
<td>Quartino Ristorante</td>
<td>Italian</td>
<td>626 N. State St.</td>
<td>Bustling, bi-level space where groups go for small and large plates plus cocktails and carafes of wine. Zagat—Best Restaurants for Sidewalk Dining in River North</td>
</tr>
<tr>
<td>Sai Café</td>
<td>Japanese/Sushi</td>
<td>2010 W. Kedzie Ave.</td>
<td>It’s all about the fish at this Lincoln Park eatery turning out pristinely fresh sushi and other high-quality fare and a pleasant décor.</td>
</tr>
<tr>
<td>Siena Tavern</td>
<td>Italian</td>
<td>51 W. Kinzie St.</td>
<td>Neapolitan pies, homemade pastas, mozzarella bar and wine in an upscale space with bar/lounge. Zagat—Best Restaurants with Patio Seating in Chicago</td>
</tr>
<tr>
<td>Sunda</td>
<td>Chinese</td>
<td>110 W. Illinois St.</td>
<td>Hip spot for creative Asian fusion fare, sushi and specialty cocktails in a chic modern space.</td>
</tr>
<tr>
<td>Trenchermen</td>
<td>American</td>
<td>2039 W. North Ave.</td>
<td>Hip spot for modern American dining and craft cocktails in a former bathhouse with a vintage vibe. Zagat—Best Brunches in Wicker Park/Bucktown</td>
</tr>
<tr>
<td>Untitled</td>
<td>American</td>
<td>111 W. Kinzie St.</td>
<td>Restaurant/lounge featuring creative American food and craft cocktails in space with a speakeasy vibe.</td>
</tr>
<tr>
<td>Yusho</td>
<td>Japanese</td>
<td>2853 N. Kedzie Ave.</td>
<td>Relaxed spot serving small plates of grilled meats and vegetables inspired by Yakitori street food. Zagat—Best Hipster Restaurants in Chicago</td>
</tr>
</tbody>
</table>
XTANT MEDICAL
Partnering for the Next Generation of Advanced Spine Care

To learn more, visit NASS Booth 1057
www.xtantmedical.com
Complimentary shuttle service is provided between McCormick Place West and the hotels listed below.

## Shuttle Routes

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Route</th>
<th>Shuttle Boarding Location at Hotel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago Marriott Magnificent Mile</td>
<td>4</td>
<td>SW Corner of Ohio &amp; Rush</td>
</tr>
<tr>
<td>Courtyard Chicago Downtown River North</td>
<td>4</td>
<td>SW Corner of Ohio &amp; Rush</td>
</tr>
<tr>
<td>Embassy Suites Chicago – Lakefront</td>
<td>3</td>
<td>Walk to Sheraton Chicago – Convention Center Entrance</td>
</tr>
<tr>
<td>Fairmont Chicago</td>
<td>5</td>
<td>Curbside on Upper Columbus Drive</td>
</tr>
<tr>
<td>The Gwen, A Luxury Collection Hotel (fmr. Conrad Hilton)</td>
<td>4</td>
<td>SW Corner of Ohio &amp; Rush</td>
</tr>
<tr>
<td>Hilton Chicago</td>
<td>1</td>
<td>8th Street Side Entrance</td>
</tr>
<tr>
<td>Hyatt Regency Chicago</td>
<td>5</td>
<td>Curbside on Wacker Drive</td>
</tr>
<tr>
<td>Hyatt Regency McCormick Place</td>
<td>N/A</td>
<td>Walk to McCormick Place West</td>
</tr>
<tr>
<td>InterContinental Chicago</td>
<td>4</td>
<td>Upper Illinois side door</td>
</tr>
<tr>
<td>Palmer House Hilton</td>
<td>2</td>
<td>Wabash Avenue entrance</td>
</tr>
<tr>
<td>Sheraton Chicago Hotel &amp; Towers</td>
<td>3</td>
<td>Convention Center Entrance</td>
</tr>
</tbody>
</table>

## Shuttle Schedule

### Monday, October 12

| Shuttle Service | 6:00 a.m. – 5:00 p.m. | Every 30 minutes |

### Tuesday, October 13

| Welcome Reception Shuttle | 5:30 p.m. – 8:00 p.m. | Every 10-15 minutes |
| Shuttle Service           | 6:00 a.m. – 5:30 p.m. | Every 30 minutes |

### Wednesday, October 14

| Shuttle Service | 6:00 a.m. – 2:00 p.m. | Every 10-15 minutes |
| Shuttle Service | 2:00 p.m. – 4:00 p.m. | Every 30 minutes * |
| Shuttle Service | 4:00 p.m. – 5:45 p.m. | Every 10-15 minutes |

### Thursday, October 15

| Shuttle Service | 6:00 a.m. – 10:30 a.m. | Every 10-15 minutes |
| Shuttle Service | 10:30 a.m. – 1:30 p.m. | Every 30 minutes * |
| Shuttle Service | 1:30 p.m. – 6:00 p.m.  | Every 10-15 minutes |

### Friday, October 16

| Shuttle Service | 6:00 a.m. – 10:30 a.m. | Every 10-15 minutes |
| Shuttle Service | 10:30 a.m. – 1:30 p.m. | Every 30 minutes * |
| Shuttle Service | 1:30 p.m. – 6:00 p.m.  | Every 10-15 minutes |

### Saturday, October 17

| Shuttle Service | 7:00 a.m. – 12:30 p.m. | Every 30 minutes * |

*Departures McCormick Place West on the hour & half-hour.

Schedule may vary due to traffic & weather conditions.
Last bus leaves from hotel 60 minutes prior to end time with no return service.

Note: This is a preliminary shuttle schedule and is subject to change.
Please check the signage in your hotel lobby, upon your arrival in Chicago, for the most current information.
HOTEL MAP

1. Chicago Marriott Downtown Magnificent Mile
   540 N. Michigan Ave.
   Miles to McCormick Place: 3.1
   $258 S/D; $278 T; $298 Q

2. The Gwen (Tina Conrad Chicago)
   521 N. Rush St.
   Miles to McCormick Place: 3.4
   $289 S/D; $314 T; $339 Q

3. Courtyard Chicago Downtown River North
   165 E. Ontario St.
   Miles to McCormick Place: 3.3
   $245 S/D; $265 T; $285 Q

4. Embassy Suites Chicago Downtown/Lakefront
   511 N. Columbus Dr.
   Miles to McCormick Place: 3.3
   $255 S/D; $280 T; $305 Q

5. Fairmont Chicago, Millennium Park
   200 N. Columbus Dr.
   Miles to McCormick Place: 2.7
   $209 S/D; $239 T; N/A Q

6. Hilton Chicago - HQ Property
   720 S. Michigan Ave.
   Miles to McCormick Place: 1.8
   $265 S/D; $290 T; $312 Q

7. Hyatt Regency Chicago
   633 N. St. Clair St.
   Miles to McCormick Place: 3.3
   $269 S/D; $294 T; $319 Q

8. Hyatt Regency McCormick Place
   2233 S. Martin Luther King Dr.
   Miles to McCormick Place: 0
   $304 S/D; $320 T/Q

9. InterContinental Chicago Magnificent Mile
   505 N. Michigan Ave.
   Miles to McCormick Place: 3.0
   $240 S/D; $270 T; $300 Q

10. Palmer House
    17 E. Monroe St.
    Miles to McCormick Place: 2.5
    $255 S/D; $280 T; $305 Q

11. Sheraton Chicago Hotel & Towers
    301 E. North Water St.
    Miles to McCormick Place: 3.0
    $269 S/D/T/Q
STRENGTH THROUGH CONNECTIONS.

Valuing our relationships, above all else, fosters the mutual trust and openness needed for Captiva Spine to be a conduit of high quality, smart, elegant, and intuitive patient solutions. Captiva Spine operates as a family of industry professionals that take pride in delivering these solutions responsibly and ethically.

Can't stop by but want to know more? VISIT captivaspine.com/see-more-towerlox
## MONDAY, OCTOBER 12

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30 a.m.–5:00 p.m.</td>
<td>Attendee Registration&lt;br&gt;Level 3 Lobby</td>
</tr>
<tr>
<td>7:30 a.m.–4:00 p.m.</td>
<td><strong>Instructional Course:</strong> Coding Update 2015: Essentials and Controversies of Spine Care Coding&lt;br&gt;Skyline Ballroom D</td>
</tr>
<tr>
<td>8:00 a.m.–12:00 p.m.</td>
<td><strong>Hands-on Course:</strong> Complex Spine Surgery—Session 1&lt;br&gt;International Physicians Only&lt;br&gt;Room W474</td>
</tr>
<tr>
<td>8:00 a.m.–5:00 p.m.</td>
<td><strong>Exhibitor Registration</strong>&lt;br&gt;Level 3 Lobby</td>
</tr>
<tr>
<td>1:00–5:00 p.m.</td>
<td><strong>Hands-on Course:</strong> Complex Spine Surgery—Session 2&lt;br&gt;International Physicians Only&lt;br&gt;Room W474</td>
</tr>
</tbody>
</table>

*Requires separate registration fee*

## TUESDAY, OCTOBER 13

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30 a.m.–5:00 p.m.</td>
<td>Attendee Registration&lt;br&gt;Level 3 Lobby</td>
</tr>
<tr>
<td>7:00 a.m.–4:00 p.m.</td>
<td><strong>Instructional Course:</strong> Fundamentals of Evidence-based Medicine&lt;br&gt;Skyline Ballroom C</td>
</tr>
<tr>
<td>7:30 a.m.–3:00 p.m.</td>
<td><strong>Instructional Course:</strong> Coding Update 2015 (Continued)&lt;br&gt;Skyline Ballroom D</td>
</tr>
<tr>
<td>7:30 a.m.–4:30 p.m.</td>
<td><strong>Hands-on Course:</strong> Minimally Invasive Spine Surgery&lt;br&gt;Room W474</td>
</tr>
<tr>
<td>8:00 a.m.–12:00 p.m.</td>
<td><strong>Instructional Courses:</strong>&lt;br&gt;- Section on Biologics and Basic Research: The Biology of the Degenerative Disc: To Fuse or Not to Fuse...This is the Question: Clinical and Applied Science Updates in Degenerative Disc Disease&lt;br&gt;Room W470A&lt;br&gt;- Section on Spine Motion Technology: The Evolution of Total Disc Replacement and Future Directions&lt;br&gt;Room W470B</td>
</tr>
<tr>
<td>8:00 a.m.–6:00 p.m.</td>
<td><strong>Exhibitor Registration</strong>&lt;br&gt;Level 3 Lobby</td>
</tr>
<tr>
<td>1:00–5:00 p.m.</td>
<td><strong>Technique Workshop:</strong> Fundamentals of Spine Deformity&lt;br&gt;Room W471</td>
</tr>
<tr>
<td>6:00–7:30 p.m.</td>
<td><strong>Welcome Reception</strong>&lt;br&gt;Chicago Hilton Normandie Lounge</td>
</tr>
</tbody>
</table>

### MOBILE EVENT GUIDE

Maximize your conference experience by using our interactive mobile event app. From developing your itinerary and connecting with colleagues to locating exhibitors, the app is your comprehensive tool for navigating the meeting.

Simply type [www.spine.org/mobile](http://www.spine.org/mobile) into your phone’s browser, search “NASS 2015” in your app store or scan the QR code.
## WEDNESDAY, OCTOBER 14

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30–8:00 a.m.</td>
<td>Continental Breakfast</td>
<td>Level 3 Lobby</td>
</tr>
<tr>
<td>6:30 a.m.–5:00 p.m.</td>
<td>Attendee Registration</td>
<td>Level 3 Lobby</td>
</tr>
<tr>
<td>7:00 a.m.–5:00 p.m.</td>
<td>Exhibitor Registration</td>
<td>Level 3 Lobby</td>
</tr>
<tr>
<td>7:25–7:30 a.m.</td>
<td>Welcome Remarks</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td>7:30–7:35 a.m.</td>
<td>NASS Working for You: Spine Registry Update</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td>7:35–9:00 a.m.</td>
<td>Symposium: Section on Biologics and Basic Research: Interbody Fusion Options: So Many Designs, So Many Materials...How Do You Choose the Best Option for Your Patient?</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td>8:00–10:00 a.m.</td>
<td>Surgical Innovation Lab Demonstration: Mazor Robotics Surgical Techniques</td>
<td>The Learning Place, Yellow Lab</td>
</tr>
<tr>
<td>9:00–10:00 a.m.</td>
<td>Best Papers: Biologics and Fusion</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td>9:00 a.m.–5:00 p.m.</td>
<td>Technical Exhibition</td>
<td>Technical Exhibition, Booth 776</td>
</tr>
<tr>
<td>10:00–10:30 a.m.</td>
<td>Networking Break—Beverage Service</td>
<td>Technical Exhibition</td>
</tr>
<tr>
<td></td>
<td>Practical Theater: Navigating CMS Quality Initiatives (PQRS and Value-based Modifier): How to Successfully Report and Avoid Payment Adjustments</td>
<td>The Learning Place, Red Theater</td>
</tr>
<tr>
<td></td>
<td>Meet the Author</td>
<td>The Learning Place</td>
</tr>
<tr>
<td>10:30–10:35 a.m.</td>
<td>NASS Working for You: Update on Sections</td>
<td>Skyline Ballroom AB</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Time</th>
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<th>Location</th>
</tr>
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<tbody>
<tr>
<td>10:35 a.m.–12:00 p.m.</td>
<td>Symposium: Recent Advances in Managing Postoperative Pain without Opioids</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td></td>
<td>Breakout Session: How Much Evidence is Enough? When to Translate New Biologics into Clinical Practice</td>
<td>Skyline Ballroom C</td>
</tr>
<tr>
<td>11:00 a.m.–1:00 p.m.</td>
<td>Surgical Innovation Lab Demonstrations:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Amendia: Thoracolumbar Posterior Fixation: Oblique Technique—Invitation Only</td>
<td>The Learning Place, Yellow Lab</td>
</tr>
<tr>
<td></td>
<td>• Paradigm Spine LLC: Minimally Invasive Decompression with Coflex Interlaminar Stabilization presented by John Peloza, MD</td>
<td>The Learning Place, Green Lab</td>
</tr>
<tr>
<td>11:00 a.m.–2:30 p.m.</td>
<td>NASS Bistro</td>
<td>Technical Exhibition</td>
</tr>
<tr>
<td>12:00–1:00 p.m.</td>
<td>Complimentary Box Lunch</td>
<td>Technical Exhibition</td>
</tr>
<tr>
<td></td>
<td>Solution Showcase Theater</td>
<td>Technical Exhibition, Booth 1799</td>
</tr>
<tr>
<td></td>
<td>• 12:00 Richard Wolf: Rationale and Evidence for Full-Endoscopic Spine Surgery presented by Sebastian Ruetten, MD, PhD and Martin Komp, MD, PhD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 12:30 Zimmer Biomet: Supplement MIS Fixation Options for LLIF presented by K. Brandon Strenge, MD</td>
<td></td>
</tr>
<tr>
<td>1:00–2:00 p.m.</td>
<td>Breakout Sessions:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risks and Treatments in Cervical Myelopathy Abstract Presentations</td>
<td>Skyline Ballroom AB</td>
</tr>
<tr>
<td></td>
<td>• Patient-Reported Outcomes for Spine Care Abstract Presentations</td>
<td>Skyline Ballroom C</td>
</tr>
<tr>
<td></td>
<td>• Novel Diagnostics Abstract Presentations</td>
<td>Skyline Ballroom D</td>
</tr>
<tr>
<td></td>
<td>• Lumbar Procedures Abstract Presentations</td>
<td>Room W470A</td>
</tr>
<tr>
<td></td>
<td>• Obesity and Infection Complicating Spine Care Abstract Presentations</td>
<td>Room W470B</td>
</tr>
</tbody>
</table>

### MEETING-AT-A-GLANCE

- Continental Breakfast
- Attendee Registration
- Exhibitor Registration
- Welcome Remarks
- NASS Working for You: Spine Registry Update
- Symposium: Section on Biologics and Basic Research: Interbody Fusion Options: So Many Designs, So Many Materials...How Do You Choose the Best Option for Your Patient?
- Surgical Innovation Lab Demonstration: Mazor Robotics Surgical Techniques
- Best Papers: Biologics and Fusion
- Technical Exhibition
- Networking Break—Beverage Service
- Practical Theater: Navigating CMS Quality Initiatives (PQRS and Value-based Modifier): How to Successfully Report and Avoid Payment Adjustments
- Meet the Author
- NASS Working for You: Update on Sections
- Symposium: Recent Advances in Managing Postoperative Pain without Opioids
- Breakout Session: How Much Evidence is Enough? When to Translate New Biologics into Clinical Practice
- Surgical Innovation Lab Demonstrations:
  - Amendia: Thoracolumbar Posterior Fixation: Oblique Technique—Invitation Only
  - Paradigm Spine LLC: Minimally Invasive Decompression with Coflex Interlaminar Stabilization presented by John Peloza, MD
- NASS Bistro
- Complimentary Box Lunch
- Solution Showcase Theater
  - 12:00 Richard Wolf: Rationale and Evidence for Full-Endoscopic Spine Surgery presented by Sebastian Ruetten, MD, PhD and Martin Komp, MD, PhD
  - 12:30 Zimmer Biomet: Supplemental MIS Fixation Options for LLIF presented by K. Brandon Strenge, MD
- Breakout Sessions:
  - Risks and Treatments in Cervical Myelopathy Abstract Presentations
  - Patient-Reported Outcomes for Spine Care Abstract Presentations
  - Novel Diagnostics Abstract Presentations
  - Lumbar Procedures Abstract Presentations
  - Obesity and Infection Complicating Spine Care Abstract Presentations
<table>
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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
</table>
| 1:00–3:05 p.m.| **Interdisciplinary Spine Forum:** The Future of Spine Care: The Role of Advance Practice and Allied Health Providers  
Room W474   |                                                       |            |
<p>| 1:00–3:30 p.m.| <strong>Leadership Development and Training</strong>                                                          | Room W471  |</p>
<table>
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<tr>
<td>7:00 a.m.–5:00 p.m.</td>
<td><strong>Exhibitor Registration</strong>&lt;br&gt;Level 3 Lobby&lt;br&gt;<strong>ePosters</strong>&lt;br&gt;The Learning Place</td>
</tr>
<tr>
<td>7:30–7:35 a.m.</td>
<td><strong>Announcements</strong>&lt;br&gt;Skyline Ballroom AB</td>
</tr>
<tr>
<td>7:35–7:40 a.m.</td>
<td><strong>NASS Working for You:</strong>&lt;br&gt;Hosting a Practice Congressional Visit&lt;br&gt;Skyline Ballroom AB</td>
</tr>
<tr>
<td>7:40–9:10 a.m.</td>
<td><strong>Symposium:</strong>&lt;br&gt;Current Concepts in the Role of the SI Joint in Spine Conditions&lt;br&gt;Skyline Ballroom AB</td>
</tr>
<tr>
<td>8:00–10:00 a.m.</td>
<td><strong>Surgical Innovation Lab Demonstrations:</strong>&lt;br&gt;• Mazor Robotics Surgical Techniques&lt;br&gt;The Learning Place, Yellow Lab&lt;br&gt;• Benvenue: 3D Expandable Technologies for Fusion and VCF presented by Sandeep Kunwar, MD, FACS&lt;br&gt;The Learning Place, Green Lab</td>
</tr>
<tr>
<td>9:00 a.m.–5:00 p.m.</td>
<td><strong>Technical Exhibition</strong>&lt;br&gt;Technical Exhibition&lt;br&gt;NASS Career Fair&lt;br&gt;Technical Exhibition, Booth 776</td>
</tr>
<tr>
<td>9:10–9:40 a.m.</td>
<td><strong>Networking Break—Beverage Service</strong>&lt;br&gt;Technical Exhibition</td>
</tr>
<tr>
<td>9:40–10:10 a.m.</td>
<td><strong>Introduction &amp; Presidential Address:</strong>&lt;br&gt;Christopher M. Bono, MD and Heidi Prather, DO&lt;br&gt;Skyline Ballroom AB</td>
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<tr>
<td>10:10–11:00 a.m.</td>
<td><strong>Introduction &amp; Presidential Guest Speaker:</strong>&lt;br&gt;Heidi Prather, DO and Sir Ken Robinson&lt;br&gt;Skyline Ballroom AB</td>
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<tr>
<td>11:00 a.m.–12:00 p.m.</td>
<td><strong>Breakout Sessions:</strong>&lt;br&gt;• The Spine Journal Outstanding Paper Awards Presentations&lt;br&gt;Skyline Ballroom AB&lt;br&gt;• The Surgical Treatment of Degenerative Scoliosis: An Evidence-based Expert Panel Case Discussion&lt;br&gt;Skyline Ballroom C&lt;br&gt;• The Evolving Field of Spinal Cord Stimulation&lt;br&gt;Skyline Ballroom D&lt;br&gt;• Accommodating Multiple Stakeholders in Spine Care: Patients, Payors and Providers&lt;br&gt;Room W470A&lt;br&gt;• Evaluation and Management Options for Posterior Pelvic Girdle Disorders&lt;br&gt;Room W470B</td>
</tr>
<tr>
<td>11:00 a.m.–1:00 p.m.</td>
<td><strong>Surgical Innovation Lab Demonstration:</strong>&lt;br&gt;Amendia: Thoracolumbar Posterior Fixation: Midline Technique featuring Expandable Technology—Invitation Only&lt;br&gt;The Learning Place, Yellow Lab</td>
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<tr>
<td>11:00 a.m.–2:30 p.m.</td>
<td><strong>NASS Bistro</strong>&lt;br&gt;Technical Exhibition</td>
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<tr>
<td>12:00–1:00 p.m.</td>
<td><strong>Complimentary Box Lunch</strong>&lt;br&gt;Medical Attendees Only&lt;br&gt;Technical Exhibition</td>
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<tr>
<td>12:00 p.m.–5:00 p.m.</td>
<td><strong>Technical Exhibition</strong>&lt;br&gt;NASS Career Fair&lt;br&gt;Technical Exhibition, Booth 776</td>
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<tr>
<td>12:00–1:00 p.m.</td>
<td><strong>Symposium:</strong>&lt;br&gt;Current Concepts in the Role of the SI Joint in Spine Conditions&lt;br&gt;Skyline Ballroom AB</td>
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<tr>
<td>1:00–1:05 p.m.</td>
<td><strong>NASS Working For You:</strong>&lt;br&gt;Spine Safety Update&lt;br&gt;Skyline Ballroom AB</td>
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<tr>
<td>1:00–3:10 p.m.</td>
<td><strong>Interdisciplinary Spine Forum:</strong>&lt;br&gt;Clinical Biomechanics of the Spine&lt;br&gt;Room W474</td>
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<tr>
<td>1:05–2:05 p.m.</td>
<td><strong>Best Papers:</strong>&lt;br&gt;Measurement of Surgical Outcomes&lt;br&gt;Skyline Ballroom AB</td>
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<tr>
<td>1:10–2:10 p.m.</td>
<td>Committee Orientation Program</td>
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<tr>
<td>2:00–4:00 p.m.</td>
<td><strong>Surgical Innovation Lab Demonstrations:</strong></td>
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<td></td>
<td>• LinkSPINE: Introduction to LinkSPINE’s Less Invasive Midline Fusion Platform—Invitation Only</td>
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<td></td>
<td>Speaker: Christopher Chaput, MD</td>
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<td></td>
<td>• ChoiceSpine LP: VEO™ Lateral Access &amp; Interbody Fusion System and THUNDERBOLT™ MIS Pedicle Screw System—Invitation Only</td>
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<td>Speaker: Christopher Chaput, MD</td>
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<td>• 4Web Medical: Introduction to Posterior Truss Implant Technology—Invitation Only</td>
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<td>Speaker: Christopher Chaput, MD</td>
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<td>2:10–3:10 p.m.</td>
<td><strong>Section Specialty Track:</strong></td>
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<td>• Section on Biologics and Basic Research: Abstract Presentations</td>
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<tr>
<td></td>
<td>3D Printing: A New Frontier</td>
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<td></td>
<td>• Section on Minimally Invasive Procedures: Abstract Presentations</td>
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<td>The Continuum of Care for Symptomatic Degenerative Spondylolisthesis: Is There Value to Traditional Stepwise Care or Are We Wasting Time and Money?</td>
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<td></td>
<td>• Section on Radiology: Current Strategies for Decreasing Radiation Exposure during Spine Surgery and Interventional Procedures</td>
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<td></td>
<td>• Section on Rehabilitation, Interventional and Medical Spine (RIMS): The Management Considerations of Spine Patients with Obesity and Diabetes</td>
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<tr>
<td>3:10–3:40 p.m.</td>
<td>Networking Break—Beverage Service</td>
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<td>Technical Exhibition</td>
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<td><strong>Members’ Business Meeting</strong></td>
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<tr>
<td>3:40–5:10 p.m.</td>
<td><strong>Section Specialty Track:</strong></td>
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<td>• Section on Biologics and Basic Research: Abstract Presentations</td>
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<td>Hip-Spine Syndromes: Evaluation and Treatment of Patients with Concurrent Low Back Pain and Hip Pathology</td>
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<td></td>
<td>• Section on Radiology: MRI of Complications and Failures of Spine Surgery</td>
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<td>• Section on Robotics and Navigation: Fundamentals of Image-guided Spinal Surgery</td>
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<tr>
<td>3:40–5:15 p.m.</td>
<td><strong>Interdisciplinary Spine Forum:</strong></td>
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<td>Hip-Spine Syndromes: Evaluation and Treatment of Patients with Concurrent Low Back Pain and Hip Pathology</td>
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<tr>
<td>5:00–6:00 p.m.</td>
<td><strong>Resident, Fellow and Program Directors Reception</strong></td>
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<td><strong>Joint Sections of NASS Reception</strong></td>
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<tr>
<td>5:00–8:00 p.m.</td>
<td><strong>Surgical Innovation Lab Workshops:</strong></td>
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<tr>
<td></td>
<td>• Spineology: Advanced Techniques in Midline Lumbar Interbody Fusion and Fixation—Invitation Only</td>
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<td></td>
<td>Speaker: Dwight Tyndall, MD</td>
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<td>• Zimmer Biomet: Timberline MPF—A Unique Modular Solution for Lateral Interbody Fusion and Fixation</td>
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**Meet the Author**

The Learning Place
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<tr>
<td>6:30–8:00 a.m.</td>
<td>Continental Breakfast</td>
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<tr>
<td>7:00 a.m.–1:30 p.m.</td>
<td>ePosters</td>
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<td>7:00 a.m.–5:00 p.m.</td>
<td>Attendee Registration</td>
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<td>7:20–7:25 a.m.</td>
<td>Announcements</td>
<td>Skyline Ballroom AB</td>
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<td>7:25–7:30 a.m.</td>
<td>NASS Working for You: Coding Update</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>7:30–8:55 a.m.</td>
<td>Symposium: Crossing the Bridge from Basic Science to Clinical Practice</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>8:00–9:00 a.m.</td>
<td>Interdisciplinary Spine Forum: Spine Point/Counterpoint: Surgical Versus Nonsurgical Approaches to Spine Care</td>
<td>Room W474</td>
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<tr>
<td>8:00 a.m.–1:00 p.m.</td>
<td>Exhibitor Registration</td>
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<td>8:55–9:00 a.m.</td>
<td>NASS Working for You: Payor Policy Review Committee Update</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>9:00–10:00 a.m.</td>
<td>Best Papers: Adjacent Segment and Junctional Complications</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>10:25–10:30 a.m.</td>
<td>NASS Recognition Awards</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>10:30–11:00 a.m.</td>
<td>NASS Research Grant and Fellowship Awards Presentation</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>10:30 a.m.–12:00 p.m.</td>
<td>Global Spine Forum: Perioperative Care: What the Surgeon Needs to Know</td>
<td>Room W474</td>
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<tr>
<td>11:00 a.m.–12:00 p.m.</td>
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<td>Technical Exhibition</td>
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<td>12:00–1:00 p.m.</td>
<td>Complimentary Box Lunch</td>
<td>Technical Exhibition</td>
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<tr>
<td>1:00–1:10 p.m.</td>
<td>North American Spine Foundation Update</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>1:00–2:45 p.m.</td>
<td>Interdisciplinary Spine Forum: Value-based Reforms and the Changing Landscape of Spine Care</td>
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<tr>
<td>1:00–3:40 p.m.</td>
<td>Young Spine Surgeons Forum</td>
<td>Room W470B</td>
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<tr>
<td>1:10–1:15 p.m.</td>
<td>NASS Working for You: SpineWeek Update</td>
<td>Skyline Ballroom  AB</td>
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<td>1:15–2:45 p.m.</td>
<td>Symposium: Choosing the Right Spine Outcome Measure for the Lumbar Spine</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>2:00–3:00 p.m.</td>
<td>Global Spine Forum: Brazilian Spine Society</td>
<td>Room W471</td>
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<td>2:45–3:15 p.m.</td>
<td>Networking Break—Beverage Service</td>
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<tr>
<td>3:00–4:00 p.m.</td>
<td>Global Spine Forum: Association of Spine Surgeons of India</td>
<td>Room W471</td>
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<tr>
<td>3:15–3:20 p.m.</td>
<td>NASS Working for You: Spine Safety Update</td>
<td>Skyline Ballroom AB</td>
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<tr>
<td>3:15–4:45 p.m.</td>
<td>Interdisciplinary Spine Forum: Value-based Reforms and the Changing Landscape of Spine Care (Continued)</td>
<td>Room W474</td>
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<tr>
<td>3:20–3:50 p.m.</td>
<td>Value Abstract Awards Presentations</td>
<td>Room W470A</td>
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<tr>
<td>3:50–4:50 p.m.</td>
<td>Breakout Sessions:</td>
<td>Room W470B</td>
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<tr>
<td>4:00–5:00 p.m.</td>
<td>Global Spine Forum: AOSpine</td>
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<tr>
<td>4:45–5:45 p.m.</td>
<td>International Reception</td>
<td>W375 West Lobby</td>
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**SATURDAY, OCTOBER 17**

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<td>Breakout Sessions:</td>
<td>Room W471</td>
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<tr>
<td>8:00 a.m.–5:30 p.m.</td>
<td>Instructional Course: State-of-the-Art in Motor Control and Low Back Pain: International Clinical and Research Expert Forum</td>
<td>Room W474</td>
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<tr>
<td>9:00–10:00 a.m.</td>
<td>Breakout Sessions:</td>
<td>Room W471</td>
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<td>Networking Break—Beverage Service</td>
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<tr>
<td>10:30 a.m.–12:00 p.m.</td>
<td>Symposium: Sport-related Head and Neck Injuries: Making the Correct Call</td>
<td>Room W471</td>
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<td>12:00 p.m.</td>
<td>Meeting Adjourns</td>
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*Requires separate registration fee*
Recognized by spine professionals as one of the most comprehensive, informative and interactive courses in the spine industry, the NASS coding course is essential to practices desiring to maximize reimbursement through proper coding while staying on the forefront of coding changes, payer policies and new government regulations. The course provides tools and instruction to increase your practice’s bottom line and propel it into the future, including ICD9/ICD10 cross walking, E&M coding and CPT4 coding of surgical, medical and radiologic procedures. Participants will leave this course with tips on how to navigate through the authorization and denial process, utilize Medicare NCCI edits and properly document to receive reimbursement.

Participants will be given the opportunity to meet one-on-one with physician faculty who lead NASS’ CPT, RUC and reimbursement efforts; participate in “real op notes” hands-on coding sessions and be part of an interactive panel discussion with leading experts in the spine coding industry.

Upon completion of this session, participants should gain strategies to:
• Become familiar with Coding Updates for 2015 including new CPT codes, modifiers, NCCI edits and OIG work plan changes;
• Correlate correct coding with practice reimbursement ensuring that every procedure is reimbursed at its highest allowable level;
• Recognize the relationship between proper diagnostic (ICD9/10) and procedural coding (CPT4) and how to link them to avoid denials;
• Learn the elements required for complete and accurate documentation for E&M coding and medical and surgical procedure notes;
• Take advantage of government incentive programs and avoid penalties (EHR, Value-based payment modifier);
• Know the accurate use of modifiers and their impact on reimbursement;
This course provides an introduction to the fundamentals of evidence-based medicine (EBM) with specific focus on critically appraising the literature. The course is comprised of didactic presentations and small group assignments to allow for practice in critiquing studies and assigning levels of evidence. It is intended for those who wish to develop their skills in critically analyzing study methodologies and assigning levels of evidence to studies based upon how the studies are being utilized to answer a specific clinical question. Completion of this course meets the EBM training requirement for participation on all NASS committees for which EBM training is strongly encouraged or required.

Upon completion of this session, participants should gain strategies to:

- Define evidence-based medicine, appreciating the importance of the integration of all three components in its practice: best research evidence, clinical expertise and patient values;
- Construct answerable questions to assist in identifying relevant evidence;
- Perform computer searches of electronic databases of clinical research literature;
- Evaluate clinical value of research from an evidence-based perspective;
- Define different types of studies, their strengths and limitations;
- Determine levels of evidence and how they are applied based upon the type of clinical question being addressed;
- Apply these techniques within their practices;
- Assign levels of evidence to research studies;
- Apply these techniques in the critical appraisal of studies that impact planning care for patients.

The North American Spine Society designates this live activity for a maximum of 8 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
Recent publications, meetings and shared experience make it clear that there is no consensus regarding the best choice of treatment in the case of fusion/nonfusion for appropriate cases (single- or even two-level degenerative disc disease that requires stabilization). The evidence is disparate with strong arguments on both sides of the question. This may speak to industry concerns; choice of surgery; type of device used; and short-, medium-, long-term data. Is there any? What is long-term?

Why do some surgical treatments result in failure while others do well? What about the development of multisegment degeneration? What lessons do genetics provide? Are there biomarkers that could help instruct us for proper patient selection? Finally, biology versus biomechanics within the context of treatment options (do nothing, surgery, exercise therapy, cognitive behavioral therapy)? This course addresses these questions and discusses treatment options.

Upon completion of this session, participants should gain strategies to:

- Review the salient biology of disc degeneration with a special emphasis upon the cellular/molecular contribution to the function of the disc. Do biology, genetics and biomechanics data inform us of the best approach?
- Compare endplate “failure” and normal “ageing” versus pathological degeneration (same, similar or different?) intersections, and the consequences with respect to the decision of fusion versus nonfusion. The artificial disc needs to sit upon an endplate; does it matter what the endplate is like? Or is it better to fuse the whole thing?
- Explain evidence that adjacent segment pathology is associated with altered biomechanics imposed by fusion. Is this an urban/surgical myth? For surgical treatment of the spine where stabilization is required, what does the data tell us? Is there support for disc arthroplasty or has it arisen secondary to imperfect science and theory regarding induced forces as a consequence of fusion? Has industry preceded the science?
- Arrive at a consensus of what the data tells us to date. What are the best determinants of the successful surgery? Sagittal alignment? Where does surgical skill meet the biology/physics of the intervention? How much is the success a consequence of the skill of the surgeon?
- Describe the current state of the art concerning biologically-based therapy, stem cells and growth factors. Hope or hype? Are we any closer?

The North American Spine Society designates this live activity for a maximum of 3.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
8:00 a.m.–12:00 p.m.
Ticketed Technique Workshop:
Fundamentals of Spine Deformity
Room W471
Chairs: Christopher P. Ames, MD; Ronald A. Lehman, Jr., MD

This workshop focuses on didactic discussions including: sagittal and coronal balance, clinical applications of pelvic parameters, osteotomy techniques, iliolumbar fixation techniques and anatomy techniques utilizing thoracic pedicle screws. Through expert lectures, moderated case discussions and hands-on practice on sawbones, spine surgeons gain practical knowledge and technical skills to improve the care they provide to their spinal deformity patients.

Upon completion of this session, participants should gain strategies to:
• Recognize various forms of cervical deformity, patient presentations, symptoms, evaluation and surgical treatment;
• Identify issues involved with optimal spinal balance, pelvic parameters, and principles and techniques of revision spinal reconstruction;
• Differentiate between the options for various osteotomy techniques, their indications, results, possible complications, and where these are potentially headed in the future.

The North American Spine Society designates this live activity for a maximum of 3.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

6:00–7:30 p.m.
Welcome Reception
Chicago Hilton Normandie Lounge

1:00–5:00 p.m.
Ticketed Technique Workshop:
Cervical Spine Stabilization
Room W471
Chairs: Thomas E. Mroz, MD; Michael P. Steinmetz, MD

This workshop focuses on didactic discussions including: anterior and posterior instrumentation and stabilization techniques in the cervical spine, occipital fixation, C1-2 transarticular and C1 lateral mass/C2 pars screw fixation, anterior cervical plating techniques and lateral mass fixation and odontoid screw fixation. These techniques are taught by neurosurgical and orthopedic experts. The workshop also includes hands-on practice on sawbones.

Upon completion of this session, participants should gain strategies to:
• Recognize anatomical landmarks for placement of various screws in the occiput and cervical spine;
• Assess X-ray and patient set-up for odontoid and transarticular screws;
• Perform freehand technique for C1 lateral mass, C2 pedicle and upper thoracic pedicle screws.

The North American Spine Society designates this live activity for a maximum of 3.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

8:00 a.m.–6:00 p.m.
Exhibitor Registration
Level 3 Lobby
While at the NASS 2015 Annual Meeting, make sure to stop by the NASS Career Fair! Located in the Main Exhibit Hall.

As an extension of NASS’s online job board, the Career Fair provides an opportunity for participants and top employers to discuss careers in the field of spine care.

**JOB SEEKERS**

You have the skills and knowledge that employers are searching for - they just need to find you. Go to the NASS Career Fair and meet directly with employers. Network, make contacts and find the job that’s right for you.

Attendees interested in learning about open positions or interviewing onsite can [register for the Career Fair for FREE!](#)
6:30–8:00 a.m.
Continental Breakfast
Level 3 Lobby

6:30 a.m.–5:00 p.m.
Attendee Registration
Level 3 Lobby

7:00 a.m.–5:00 p.m.
Exhibitor Registration
Level 3 Lobby

ePosters
The Learning Place

7:25–7:30 a.m.
Welcome Remarks
Skyline Ballroom AB

7:30–7:35 a.m.
NASS Working for You:
Spine Registry Update
Skyline Ballroom AB
Moderator: Daniel K. Resnick, MD, MS

7:30–9:00 a.m.
Symposium:
Section on Biologics and Basic Research: Interbody Fusion Options: So Many Designs, So Many Materials... How Do You Choose the Best Option for Your Patient?
Skyline Ballroom AB
Moderator: Celeste Abjornson, PhD

This symposium is designed to provide spine care providers scientific and clinical data on the various materials and designs currently available for interbody fusion. The cage design and material can play an important role in the biological response towards the ultimate goal of achieving fusion. From traditional allografts to three-dimensional printed metal cages, attendees are provided information to enable them to choose the most cost-effective, patient-appropriate device for different surgical situations. The session closes with an overview of the appropriate bone grafting materials for different cage designs.

Upon completion of this session, participants should gain strategies to:
• Describe the various interbody cage designs and the biologic implications;
• Understand the difference between allograft, polymer and metal-based cage designs;
• Discuss methods used to determine the cost-effective, patient-appropriate choice;
• Evaluate bone grafting options for the interbody space.

Agenda
Introduction
Celeste Abjornson, PhD

What We Have Learned from the Past and Where the Technology Stands Today
Frank P. Cammisa Jr., MD

Changes in the FDA Regulatory Landscape for Interbody Cages
Glenn Stiegman, MS

Bone Grafting in a Cage: The Importance of Finding the Best Match
Sam Stupp, PhD

Debate: What is the Best Material for a Structural Interbody Cage?
• Bone: Scott Daffner, MD
• Ceramic: David A. Stafford, BS
• PEEK: R. Todd Allen, MD
• Metals: Darren Lebl, MD

Debate: To Integrate or Not to Integrate, That is the Question
• Classic Cages Work (PEEK, Allograft): Safdar Khan, MD
• Integrated Designs Are the Future: Richard D. Guyer, MD

The Future: Novel Biomaterials are the Way to Go
Wellington K. Hsu, MD

Discussion/Q&A

FDA Device/Drug Status:
Glenn Stiegman, MS: Centinel Stalif C, Centinel Stalif Midline, LDR ROI-C, Amedica Valeo, Medtronic LT-Cage (Approved for this indication)
Frank Cammisa Jr., MD: NuVasive XLIF, Centinel Spine STALIF, 4WEB Medical 3D Printed Technology (Approved for this indication)
8:00–10:00 a.m.  
**Surgical Innovation Lab Demonstration**  
**Mazor Robotics Surgical Techniques**  
The Learning Place, Yellow Lab

9:00–10:00 a.m.  
**Best Papers:**  
**Biologics and Fusion**  
Skyline Ballroom AB  
**Moderator:** Gwendolyn Sowa, MD, PhD

1. Moved to Resident/Fellow Research Awards Presentations Session (Friday, October 16, 3:20 – 3:50 p.m.)

9:00–9:06 a.m.  
**2. Benefit of TLIF Versus PSF in Lumbar Spine Disorders**  
**Steven D. Glassman, MD**1; Leah Y. Carreon, MD, MSc2; Zoher Ghogawala, MD, FACS3; Matthew J. McGirt, MD4; Kevin T. Foley, MD, FACS5; Anthony Asher, MD, FACS6

**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

9:06–9:12 a.m.  
**3. Local Insulin Application has a Dose Dependent Effect on Lumbar Fusion in a Rabbit Model**  
**Michael J. Vives, MD**1; Jessica Cottrell, PhD; Sangeeta Subramanian, PhD2; J. Patrick O’Connor, PhD3; Sheldon Lin, MD4; Saad Chaudhary, MD, MBA5; Neel Shah, MD, FACS6; William Munoz, MD

**FDA Device/Drug Status:** Insulin/Collagen Sponge (Not approved for this indication)

9:12–9:18 a.m.  
**4. The Activin A/BMP 2 Chimera AB204 Exhibits Superior Spinal Bone Fusion Properties over rhBMP2**  
**Seung Hwan Yoon, MD, PhD**1; JiYoung Kim, MD2; Chang Hyun Oh, MD3

1Inha University College of Medicine, Incheon, South Korea; 2Incheon, South Korea; 3Guro Teun Teun Hospital, Seoul, South Korea  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

9:18–9:24 a.m.  
**5. Laminectomy and Fusion Versus Laminoplasty for the Treatment of Cervical Spondylotic Myelopathy: Results from the AOSpine North America and International Prospective Multicenter CSM Studies**  
Michael G. Fehlings, MD, PhD, FRCSCE1; Carlo Santaguida, MD2; Branko Kopjar, MD, PhD3; Paul M. Arnold, MD4; Helton Luiz A. Defino, MD, PhD5; Shashank Kale, MD6; S. Tim Yoon, MD, PhD7; Giuseppe Barbagallo, MD, MD8; Ronald Bartels, MD, PhD9; Qiang Zhou, MD10; Alexander R. Vaccaro, MD, PhD11

1Toronto Western Hospital, Toronto, ON, Canada; 2University of Toronto, Toronto, ON, Canada; 3University of Washington, Seattle, WA, US; 4University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US; 5Universidade De Sao Paulo Faculdade De Medicina De Ribeirao Preto, Ribeirao Preto, Sao Paulo, Brazil; 6All India Institute of Medical Sciences, New Delhi, Delhi, India; 7The Emory Spine Center, Atlanta, GA, US; 8A.O.V. Poli clinico, Catania, Italy; 9Radboud University Medical Center Department of Neurosurgery, Nijmegen, Nether lands; 10Southwestern Hospital, Chongqing, China; 11Rothman Institute, Philadelphia, PA, US  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

9:24–9:30 a.m.  
**6. A Randomized Control Trial Evaluating Effectiveness of a Synthetic Protein (B2A) in Achieving Lumbar Interbody Fusion: 24-Month Results of a Multicenter, Blinded Canadian Study**  
**Zeeshan Sardar, MS, MSc**1; D. Greg Anderson, MD2; Peter F. Jarzem, MD1

1McGill University, Montreal, Quebec, Canada; 2Rothman Institute, Philadelphia, PA, US  
**FDA Device/Drug Status:** B2A Peptide Enhanced Ceramic Granules (Investigational/Not approved)

9:30–9:36 a.m.  
**7. Allograft Versus Autograft for Posterior Atlantoaxial Fusion with Screw-rod System: A Prospective Comparative Study**  
**Dageng Huang, MD**1; Dingjiao Hao, MD; Baorong He, MD; Hua Guo, MD

Department of Spine Surgery, Honghui Hospital, Xi’an Jiaotong University Health Science Center, Xi’an, China  
**FDA Device/Drug Status:** Study conducted outside US/Not intended for submission to FDA.

9:36–10:00 a.m.  
**Discussion**

9:00 a.m.–5:00 p.m.  
**Technical Exhibition**  
Technical Exhibition Booth 776 (adjacent to NASS Resource Center)

**NASS Career Fair**

**NASS 30th Annual Meeting**
10:00–10:30 a.m.
Networking Break—Beverage Service
Technical Exhibition

**Practical Theater:**
Navigating CMS Quality Initiatives (PQRS and Value-based Modifier): How to Successfully Report and Avoid Payment Adjustments
The Learning Place, Red Theater

Stop by to learn more about the latest reporting requirements for the Medicare Physician Quality Reporting System (PQRS) and Value-Based Payment Modifier. NASS Performance Measurement Committee Members will discuss the various reporting mechanisms that can be used to meet requirements and avoid penalties.

10:00–10:30 a.m.
Meet the Author:
**Anuj Singla, MD**
The Learning Place, Yellow Theater


Anuj Singla, MD1; Scott Yang, MD2; Brian C. Werner, MD3; Jourdan Cancienne, MD4; Hamid Hassanzadeh, MD5; Adam L. Shimer, MD6; Francis H. Shen, MD7

1University of Virginia School of Medicine, Charlottesville, VA, US; 2Charlottesville, VA, US; 3University of Virginia Department of Orthopedic Surgery, Charlottesville, VA, US; 4University of Virginia School of Medicine Department of Orthopaedic Surgery, Charlottesville, VA, US

**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

10:00–10:30 a.m.
Meet the Author:
**Alok D. Sharan, MD, MHCDS and Saankritya Ayan, MD**
The Learning Place, Green Theater

**P111. The Fate of Bulging Discs after Multilevel Posterior Cervical Decompression and Fusion for Spondylotic Cervical Myelopathy**

Saankritya Ayan, MD1; Woojin Cho, MD, PhD2; Alok D. Sharan, MD, MHCDS3

1Monterey Medical Center, Bronx, NY, US; 2Albert Einstein College of Medicine, New York, NY, US

**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

10:00–10:30 a.m.
Meet the Author:
**Baron S. Lonner, MD**
The Learning Place, Blue Theater

**P141. The Transverse Process Trajectory Technique: A New Pathway to the Thoracic Pedicle in the Deformed Spine**

Baron S. Lonner, MD1; Chanland Roonprapunt, MD2; Yuan Ren, PhD3; Mark Buehler, MD4; Vijay K. Goel, PhD5


**FDA Device/Drug Status:** Expedium (Approved for this indication)

10:00–10:30 a.m.
Meet the Author:
**Bryce Basques**
The Learning Place, Purple Theater

**P115. Adjacent Segment Level Ossific Disease after ACDVF: Comparative Study between Stand-Alone Anterior Cervical Interbody Fusion (SAACIF) Device and Conventional Plating**

Saankritya Ayan, MD1; Woojin Cho, MD, PhD2; Daniel Shein, MD3; Manal Abouelrigal4; Alok D. Sharan, MD, MHCDS5

1Monterey Medical Center, Bronx, NY, US; 2Albert Einstein College of Medicine, New York, NY, US; 3Chappaqua, NY, US

**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P104. Cervical Total Disc Replacement and Anterior Cervical Discectomy and Fusion Have Similar Short-Term Complication Rates**

Bryce Basques1; Adam M. Lukasiewicz, MSc2; Matthew L. Webb3; Andre Samuel, BA4; Daniel D. Bohl, MPH5; Jonathan N. Grauer, MD1

1Yale School of Medicine, New Haven, CT, US; 2Yale University School of Medicine, New Haven, CT, US; 3New York, NY, US

**FDA Device/Drug Status:** Cervical total disc replacement (Approved for this indication)
Spine surgery is one of the most common surgical procedures performed in the United States but not without significant postoperative pain. Severe or prolonged postoperative pain can delay patient recovery, impede rehabilitation and prolong hospital length of stay. Although opioids are often used to manage postoperative pain, their use is associated with opioid-related adverse events such as nausea, vomiting, constipation, itchiness, dizziness, drowsiness, ileus, and respiratory depression, which also may delay patient recovery.

Recent guidelines on the management of postoperative pain recommend using multimodal approaches to minimize the use of opioids and enhance patient recovery. Alternatives to opioids for postoperative pain include intravenous nonopioid analgesics, intravenous or oral nonsteroidal anti-inflammatory drugs, intravenous or oral corticosteroids, oral adjunctive analgesics, and local infiltration with long-acting local anesthetics. This symposium discusses the evidence supporting each of these approaches to postoperative pain, including efficacy, effectiveness, safety and costs.

This symposium also discusses the role of postoperative pain management in enhanced recovery after surgery (ERAS) pathways in spine surgery that aim to maximize patient recovery through patient education, fluid management, early mobilization and medication management.

Upon completion of this session, participants should gain strategies to:

- Recognize the prevalence, severity and consequences of postoperative pain;
- Identify risk factors and consequences of opioid-related adverse events;
- Apply recommendations from the American Society of Anesthesiologists (ASA) Task Force on Acute Pain Management;
- Know the different classes of medications used in multimodal approaches to postoperative pain;
- Comprehend the impact of minimally invasive surgical (MIS) approaches on postoperative pain;
- Appreciate the role of postoperative pain management in enhanced recovery after surgery (ERAS) protocols;
- Consider the evidence supporting various approaches to manage postoperative pain with or without opioids.

**Agenda**

**Opioid-related Adverse Events: New Narcotic Analgesic Analogues and Managing the In-hospital Overdose**
Sheeraz A. Qureshi, MD, MBA

**Use of Sustained Infusion/Drug Delivery (Pumps, Catheters, Patches)**
Fred Geisler, MD, PhD

**Anti-inflammatory Medications in the Setting of Spinal Surgery: Fusion Versus Nonfusion**
Choll W. Kim, MD

**The Pharmacology of Local Anesthetics and its Application to Manage Post-operative Pain, Perioperative Fluid Management**
Karthik Madhavan, MD

**Clinical and Pain Outcomes Measures/Monitoring in the Future**
Anand Veeravagu, MD

**The Role of Bracing, Therapy and Psychological Counseling in Managing Postoperative Pain**
Matthew Smuck, MD

**Building a Multidisciplinary Service for Managing Postoperative Pain**
Joseph S. Cheng, MD, MS

**Discussion, Questions and Answers**

**FDA Device/Drug Status:**
All presenters: These presentations do not discuss or include any applicable devices or drugs.
10:35 a.m.–12:00 p.m.

**Breakout Session:**
**How Much Evidence is Enough? When to Translate New Biologics into Clinical Practice**
Skyline Ballroom C
Moderator: Gwendolyn Sowa, MD, PhD

The field of biologic therapies continues to rapidly expand as new technologies become available. As we proceed with cautious optimism into this new realm of health care, the question of how quickly to translate a new biologic tool into clinical care becomes of paramount concern. Early translation can result in unanticipated side effects and complications, while requirement of additional preclinical evidence can prevent patient access to helpful therapies and curtail innovation. This debate focuses on the risks and benefits of rapid clinical translation and the threshold for initiating clinical trials.

**Agenda**

**Introduction/Welcome**
Gwendolyn Sowa, MD, PhD

**Pro: Early Translation of Biologics into Human Clinical Studies**
Wellington K. Hsu, MD
Jason W. Savage, MD

**Con: Delaying Transition of Biologics to Collect Additional Basic Science Data**
W. Mark Erwin, DC, PhD; James Kang, MD

**Q&A/Discussion**

**FDA Device/Drug Status:**
All presenters: These presentations do not discuss or include any applicable devices or drugs.

11:00 a.m.–1:00 p.m.

**Surgical Innovation Lab Demonstrations**
- **Amendia: Thoracolumbar Posterior Fixation: Oblique Technique—Invitation Only**
  The Learning Place, Yellow Lab
- **Paradigm Spine LLC: Minimally Invasive Decompression with Coflex Interlaminar Stabilization**
  Speaker: John Peloza, MD
  The Learning Place, Green Lab

11:00 a.m.–2:30 p.m.

**NASS Bistro**
Technical Exhibition

12:00–1:00 p.m.

**Complimentary Box Lunch**
Medical Attendees Only
Technical Exhibition

**Solution Showcase Theater**
Technical Exhibition, Booth 1799

12:00 p.m.
**Richard Wolf Medical Instruments: Rationale and Evidence for Full-Endoscopic Spine Surgery**
Presented by Sebastian Ruetten, MD, PhD, and Martin Komp, MD, PhD

12:30 p.m.
**Zimmer Biomet: Supplemental MIS Fixation Options for LLIF**
Presented by K. Brandon Strenge, MD

**Resident, Fellow and Program Directors’ Meeting**
Room W181B

1:00–2:00 p.m.

**Breakout Session:**
**Risks and Treatments in Cervical Myelopathy Abstract Presentations**
Skyline Ballroom AB
Moderator: Thomas E. Mroz, MD

1:00–1:06 p.m.

Michael G. Fehlings, MD, PhD, FRCSC; *Lindsay Tetreault*; Branko Kopjar, MD, PhD; Pierre Cote, DPT, PhD; Paul M. Arnold, MD; Helton Luiz A. Defina, MD, PhD; Shashank Kale, MD; S. Tim Yoon, MD, PhD; Giuseppe Barbagallo, MD, MD; Ronald Bartels, MD, PhD; Qiang Zhou, MD; Alexander R. Vaccaro, MD, PhD

1:00–2:00 p.m.

**Resident, Fellow and Program Directors’ Meeting**
Room W181B

**12:00–1:00 p.m. Complimentary Box Lunch**
Medical Attendees Only
Technical Exhibition

**Solution Showcase Theater**
Technical Exhibition, Booth 1799

**12:00 p.m. Richard Wolf Medical Instruments: Rationale and Evidence for Full-Endoscopic Spine Surgery**
Presented by Sebastian Ruetten, MD, PhD, and Martin Komp, MD, PhD

**12:30 p.m. Zimmer Biomet: Supplemental MIS Fixation Options for LLIF**
Presented by K. Brandon Strenge, MD

**Resident, Fellow and Program Directors’ Meeting**
Room W181B

**1:00–2:00 p.m. Breakout Session:**
**Risks and Treatments in Cervical Myelopathy Abstract Presentations**
Skyline Ballroom AB
Moderator: Thomas E. Mroz, MD

**1:00–1:06 p.m.**

Michael G. Fehlings, MD, PhD, FRCSC; *Lindsay Tetreault*; Branko Kopjar, MD, PhD; Pierre Cote, DPT, PhD; Paul M. Arnold, MD; Helton Luiz A. Defina, MD, PhD; Shashank Kale, MD; S. Tim Yoon, MD, PhD; Giuseppe Barbagallo, MD, MD; Ronald Bartels, MD, PhD; Qiang Zhou, MD; Alexander R. Vaccaro, MD, PhD

**FDA Device/Drug Status:**
This abstract does not discuss or include any applicable devices or drugs.
1:06–1:12 p.m.

Peter G. Passias, MD; Kris E. Radcliff, MD; Robert E. Isaacs, MD; Kristina Bianco, BA; Cyrus Jalai, BA; Nancy Worley, MS, BA; Alexander R. Vaccaro, MD, PhD; Michael C. Gerling, MD

1New York Spine Institute, New York University Medical Center Hospital for Joint Diseases, New York, NY, US; 2NYU School of Medicine, New York, NY, US; 3Rothman Institute, Thomas Jefferson University, Egg Harbor Township, NJ, US; 4Duke University Medical Center, Durham, NC, US; 5Spine Research Center, New York University Hospital for Joint Diseases, New York, NY, US; 6New York, NY, US; 7Rothman Institute, Philadelphia, PA, US; 8Lutheran Medical Center, Department of Surgery, Brooklyn, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:12–1:18 p.m.
10. Outcome of Spinal Decompression in Cauda Equina Syndrome Presenting Late in Developing Countries: Case Series of 50 Cases

Sarvdeep S. Dhatt, MBBS, MS
PGIMER, Chandigarh, UT, India

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:18–1:24 p.m.
11. Gender and Age-related Changes of Diffusion Tensor Imaging Parameters of Cervical Spinal Cord

Xiang Li, MD; Tin Yan Chan, MSc; Kin Cheung Mak, MD; Jason P. Cheung, MBBS, MSc; Keith D. Luk, MD; Yong Hu, PhD

1The University of Hong Kong, Hong Kong, China; 2Duchess of Kent Children Hospital, Pokfulam, Hong Kong, China; 3Department of Orthopaedics & Traumatology, Hong Kong, China; 4Queen Mary Hospital, Hong Kong, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:24–1:30 p.m.
12. Surgical Treatment of Lower Cervical Fracture-Dislocations with Spinal Cord Injuries by Anterior Approach (Five- to 15-Years Follow-up)

Hua Guo, MD; Biao Wang; Dingjun Hao, MD

1Xi’an, China; 2Xi’an Honghuai Hospital, Xi’an, Shaanxi, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:30–1:36 p.m.
13. Total Disc Replacement in Cervical Spondylotic Myelopathy: An Obstacle to Clinical Improvement?

Jean-Edouard Loret, MD; Thierry Dufour, MD; Vincent Challier, MD; Renaud Lafage; Virginie Lafage, PhD

1Tours, France; 2CHR Orléans La Source, Orleans, France; 3Spine Research Institute, New York, NY, US; 4New York University Hospital for Joint Diseases, New York, NY, US

FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

14. Moved to Resident/Fellow Research Awards Presentations Session (Friday, October 16, 3:20–3:50 p.m.)

1:36–2:00 p.m.
Discussion

1:00–1:06 p.m.
15. Does Patient Satisfaction Reflect Quantitative Pain and Function Measurements in Cervical Spine Surgery?

Kris E. Radcliff, MD; Domagoj Coric, MD; Todd J. Albert, MD


1:00–1:06 p.m.
FDA Device/Drug Status: Mobi-C (Approved for this indication)

1:06–1:12 p.m.
16. Does Depression or Anxiety Affect Patient-reported Outcomes and Satisfaction following Operative Treatment for Cervical Myelopathy?

Harrison F. Kay; Silky Chotai, MD; David Stonko; Joseph Wick, BA; Matthew J. McGirt, MD; Clinton J. Devin, MD; Ahilan Sivaganesan, MD

1Nashville, TN, US; 2Vanderbilt University School of Medicine, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US; 4Vanderbilt University Medical Center, Nashville, TN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
1:12–1:18 p.m.
17. Does Number of Reported Drug Allergies Affect Patient-reported Outcomes and Satisfaction following Operative Treatment for Degenerative Lumbar Spine Disease?

Harrison F. Kay1; Silky Chotai, MD2; Joseph Wick, BA3; David Stonko4; Anthony Asher, MD, FACS5; Matthew J. McGirt, MD6; Clinton J. Devin, MD4

1Nashville, TN, US; 2Vanderbilt University School of Medicine, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US; 4Vanderbilt University Medical Center, Nashville, TN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:18–1:24 p.m.
18. Patient Reported Outcomes after Lumbar Epidural Steroid Injection for Degenerative Spine Disease in Depressed Versus Nondepressed Patients

Silky Chotai, MD2; Ahilan Sivaganesan, MD2; Scott L. Parker, MD2; John A. Sielatycki, MD2; Joseph Wick, BA3; Matthew J. McGirt, MD4; Clinton J. Devin, MD4


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:24–1:30 p.m.
19. Fulfillment of Expectations Two Years after Lumbar Spine Surgery

Carol A. Mancuso, MD; Frank P. Cammisa Jr., MD; Andrew A. Sama, MD; Alexander P. Hughes, MD; Darren R. Lebl, MD; Roland Duculan, MD; Federico P. Girardi, MD

Hospital for Special Surgery, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

20. Moved to Resident/Fellow Research Awards Presentations Session (Friday, October 16, 3:20–3:50 p.m.)

1:30–1:36 p.m.
21. A 30-Meter Walking Test as a Measure of Cervical Spondylotic Myelopathy Severity: Test Characteristics and Results from Two Multicenter Cohort Studies

Paul M. Arnold, MD2; Parker Bohm, BS1; Michael G. Fehlings, MD, PhD, FRSC1; Branok Kopjar, MD, PhD1

1University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US; 2Rothman Institute, Philadelphia, PA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:36–2:00 p.m.
Discussion
1:24–1:30 p.m.
26. In Vivo Deformation of L4/5 and L5/S1 Discs during a Weight-Lifting Extension
Zhan Liu1; Minfei Wu, MD2; Sean J. Driscoll1; Shaobai Wang, PhD3; Tsung-Yuan Tsai, PhD3; Thomas D. Cha, MD, MBA4, Kirkham B. Wood, MD5; Guoan Li, MD6
1Boston, MA, US; 2Changchun, China; 3Massachusetts General Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:30–1:36 p.m.
27. Do Intervertebral Kinematics Correlate with T2 Relaxation Times in the Lower Human Cervical Spine?
Sean J. Driscoll; Haqing Mao, MD; Shaobai Wang, PhD; Weiyi Zhong, MD, PhD; Martin Torriani, MD; Guoan Li, MD; Kirkham B. Wood, MD; Thomas D. Cha, MD, MBA
Massachusetts General Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:36–2:00 p.m.
Discussion

1:00–2:00 p.m.
Breakout Session:
Lumbar Procedures Abstract Presentations
Room W470A
Moderator: Ali Araghi, DO

1:00–1:06 p.m.
28. Therapeutic Sustainability and Durability of Coflex® Interlaminar Stabilization after Decompression for Lumbar Spinal Stenosis: A Four-Year Assessment
Hyun W. Bae, MD1; Michael J. Musacchio Jr., MD1; Carl Laurysen, MD2; Greg Maislin, MS3; Scott Leary, MD4
1Spine Institute St. John’s Health Center, Los Angeles, CA, US; 2NorthShore University HealthSystem, Evanston, IL, US; 3Olympia Medical Center, Los Angeles, CA, US; 4Wynnewood, PA, US
FDA Device/Drug Status: Coflex interlaminar stabilization device (Approved for this indication)

1:06–1:12 p.m.
29. BMP Decreases Risk of One-Year Revision in Primary Multilevel Anterior Column Fusion: A Longitudinal Analysis of 2,053 Patients
David Sing, BS1; Paul H. Yi, MD1; Thomas Aguilar, MS1; Dezba Coughlin, MD1; Jeffrey C. Lotz, PhD2; R Adams Dudley, MD, MBA3; Serena S. Hu, MD4
1UCSF/SFGH Orthopaedic Trauma Institute, San Francisco, CA, US; 2San Francisco, CA, US; 3University of California San Francisco, San Francisco, CA, US; 4Stanford University School of Medicine, Redwood City, CA, US
FDA Device/Drug Status: BMP (Not approved for this indication)
1:36–1:42 p.m.
34. Return to Play in Professional Athletes following Lumbar Microdiscectomy: A Meta-Analysis
Steven J. McAnany, MD1; Samuel C. Overley, MD2; Samuel K. Cho, MD3; Sheeraz A. Qureshi, MD, MBA1; Wellington K. Hsu, MD1; Andrew Hecht, MD3

1Mount Sinai Medical Center, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Icahn School of Medicine at Mount Sinai, New York, NY, US; 4Northwestern University, Chicago, IL, US; 5New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:42–2:00 p.m.
Discussion

1:00–2:00 p.m.
Breakout Session:
Obesity and Infection Complicating Spine Care
Abstract Presentations

Moderator: Simon Dagenais, DC, PhD

1:00–1:06 p.m.
35. The Impact of Diabetes upon Quality of Life Outcomes after Lumbar Decompression
Michael P. Silverstein, MD1; Jacob Miller, BS2; Roy Xiao, BA1; Daniel Lubelski, BA3; Edward C. Benzle, MD1; Thomas E. Mroz, MD3

1Cleveland Clinic Foundation, Cleveland Heights, OH, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Icahn School of Medicine at Mount Sinai, New York, NY, US; 4Northwestern University, Chicago, IL, US; 5New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:06–1:12 p.m.
36. Obesity Effects on Peri- and Postoperative Outcomes in Complex Spinal Reconstructive Surgery
Devender Singh, PhD; Matthew J. Geck, MD1; Eeric Truumees, MD; Dana L. Hawthorne, PA-C

Seton Spine & Scoliosis Center, Austin, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

37. Moved to Value Abstract Awards Presentations Session (Friday, October 16, 3:20–3:50 p.m.)

1:12–1:18 p.m.
38. Does the Use of Intrawound Vancomycin Decrease the Risk of Surgical Site Infection after Elective Spine Surgery? A Multicenter Analysis
Silky Chotai, MD1; Clinton J. Devlin, MD2; Alexander R. Vaccaro, MD, PhD3; Matthew J. McGirt, MD4; Jim A. Yousuf, MD4; Douglas G. Orndorff, MD5; Paul M. Arnold, MD5; Anthony K. Frempong-Boadu, MD5; Isador H. Lieberman, MD, FRCSc, MBA5; Hirad S. Hedayat, MD5; Jeffrey C. Wang, MD5; Robert E. Isaacs, MD5; Joshua Patt, MD5; Kris E. Radcliff, MD5; Kristin Archer, PhD, DPT5


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:18–1:24 p.m.
39. Paraspinal Tissue Infection Rates in Symptomatic Degeneration Disc Patients versus Nondegenerate Controls: Multicenter Prospective Study
Kevin Phan, MD1; Prashanth J. Rao, MD2; Ralph J. Mobbs, MD, FRACS3

1Sydney, Australia; 2Prince of Wales Private Hospital, Sydney, Australia; 3Prince of Wales Private Hospital Department of Neurosurgery & NSURG Group, Sydney, Australia

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:24–1:30 p.m.
40. Risk Factors of Surgical Site Infection in Adult Degenerative Lumbar Scoliosis: Detection and Management Based on Serial Procalcitonin Measurements: An Open-Label Randomized Trial
Xie En, MD1; Dingjun Hao, MD2; Dageng Huang, MD3; Biao Wang, MD4; Hua Guo, MD5

1Hong Hui Hospital, Xi’an Jiaotong University College of Medicine, Xi’an, Shan Xi, China; 2Xi’an Honghui Hospital, Xi’an, Shan Xi, China; 3Xi’an Hong Hui Hospital, Department of Spinal Surgery, Xi’an, Shan Xi, China; 4Xi’an, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:30–1:36 p.m.
41. Risk Factors of Elevated Postoperative Blood Glucose and Preoperative Hemoglobin A1C are Associated with Increased Wound Complications following Surgical Treatment of Adult Degenerative Lumbar Scoliosis
Xie En, MD1; Dingjun Hao, MD2; Dageng Huang, MD3; Biao Wang, MD4; Hua Guo, MD5

1Hong Hui Hospital, Xi’an Jiaotong University College of Medicine, Xi’an, Shan Xi, China; 2Xi’an Honghui Hospital, Xi’an, Shan Xi, China; 3Xi’an Hong Hui Hospital, Department of Spinal Surgery, Xi’an, Shan Xi, China; 4Xi’an, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
Interdisciplinary Spine Forum:
The Future of Spine Care: The Role of Advance Practice and Allied Health Providers
Room W474
Moderator: Eric Buchl, PA-C

Changing dynamics in health care continue to change the role and utilization of Allied Health Providers in patients care. The purpose of this section is to advance the understanding of the medical staff on how Allied Health Providers can be utilized in spine care. At the conclusion of this session, attendees will have a working knowledge on how allied health providers benefit patient care, improve patient satisfaction, improve medical staff quality of life, and generate revenue.

Upon completion of this session, participants should gain strategies to:
- Review the medical literature on advantages to patients when Allied Health Providers are utilized in spine care;
- Consider the question, “should I hire a PA or NP, and how should I utilize them?”
- Understand how to best utilize an allied health provider in patient care, office, operative or hospital settings;
- Review billing and reimbursement for Allied Health Providers in spine care.

Agenda
Introduction and Welcome
Eric Buchl, PA-C

Advance Practice and Allied Health Providers in Spine Care: A Literature Review
Christopher Reudink, PA-C

Current and Future State of Spine Care: The Utilization of Advance Practice Providers and Allied Health Providers as Primary Spine Care Practitioner
Donald R. Murphy, DC

Utilization of Advance Providers in Nonoperative Spine Care
Michael Halasy, PhD, MS, PA-C

Utilization of Advance Providers and Allied Health Providers in Operative Spine Care: From Preoperative to Postoperative Care: Why the Advance Provider is a Key to Patients’ Success
Susan Saunders, MSN, ARNP, CCRN

Billing and Reimbursement for Advanced Providers and Allied Health Providers
Donna Lahey, RNFA

Leadership Development and Training
Room W471
Moderator: Mitchel Harris, MD, FACS

The Leadership Development and Training program provides an opportunity for individuals to enhance their leadership skills within the ever changing health care environment and expand the pool of well-qualified candidates ready for advancement. Whether you’re looking to build your own skills, those of a committee or even an entire organization, this leadership development program allows you to gain knowledge and expertise from highly qualified faculty. This program helps develop leaders who lead with a vision of a better future.

Upon completion of this session, participants should gain strategies to:
- Acquire skills to become a stronger leader who can build a shared vision, improve teamwork and increase productivity within the organization;
- Develop a personal action to create a greater impact in the organization.

Speaker
Kevin E. O’Connor, CSP is an author, executive coach, businessman, and professional speaker. He specializes in working with professionals who have been promoted to leadership positions where they now lead their former peers. He holds three masters degrees and his expertise focuses on the challenges of leadership, business relationships and the effectiveness of teams. O’Connor customizes his message by communicating with his audiences in advance. He facilitates his message with their knowledge through his interactive presentations.

Agenda
Welcome/Introductions
Mitchel Harris, MD, FACS

Make Your Team an Extension of Your Best Intention
Kevin O’Connor, CSP

Question/Answer Session

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
2:00–4:00 p.m.
Surgical Innovation Lab Demonstrations
  • X-Spine Systems Product Demonstration
    Speaker: Jerrel Boyer, DO
    The Learning Place, Yellow Lab
  • Choice Spine: VEO™ Lateral Access & Interbody Fusion System and THUNDERBOLT™ MIS Pedicle Screw System—Invitation Only
    The Learning Place, Green Lab

2:05–3:05 p.m.
Breakout Session:
Cervical Spine Treatments Abstract Presentations
Skyline Ballroom AB
Moderator: Alpesh A. Patel, MD, FACS

2:05–2:11 p.m.
42. Adjacent Segment Pathology Correlated with HRQOL following Cervical Laminoplasty Versus Posterior Cervical Decompression and Fusion
Virginie Lafage, PhD1; Themistocles S. Protopsaltis, MD1; Amir Amrani2; Anthony J. Boniello, BS3; Matthew Spiegel, BS, MD4; Renaud Lafage5; Vincent Chalier, MD5; Yuriy Trinba, BA6; Emmanuelle Ferrero, MD5; Michael Smith, MD5; Peter G. Passias, BS6, MD7; Yong H. Kim, MD8; Afsheen E. Razi, MD9; Ronald Moskovich, MD9
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:11–2:17 p.m.
43. Berry’s Ligament and the Inferior Thyroid Artery as Reliable Anatomical Landmarks for the Recurrent Laryngeal Nerve (RLN): A Fresh Cadaveric Study Relevant to the Cervical Spine
Ali Rajabian, FRCSEd1; Nasir A. Quraishi, MD9
1The Centre for Spinal Studies and Surgery, Nottingham, UK; 2Queens Medical Centre, Nottingham, UK
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:17–2:23 p.m.
44. Does Age Affect Surgical Outcomes in Patients with Degenerative Cervical Myelopathy?: Results from the Prospective, Multicenter AOSpine International Study on 479 Patients
Michael G. Fehlings, MD, PhD, FRSCS; Hiroaki Nakashima, MD1; Lindsay Tetreault2; Braniko Kopjar, MD, PhD2; Narihito Nagoshi, MD; Aria Nouri, BA, MD2; Paul M. Arnold, MD9
1Toronto Western Hospital, Toronto, ON, Canada; 2Nagoya University
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:23–2:29 pm.
45. Return to Work Rates after Single Level Cervical Fusion Surgery for Degenerative Disc Disease (DDD) Compared to Fusion for Radiculopathy in Workers’ Compensation (WC) Setting
Mhamad Faour, MD1; Joshua T. Anderson, BC;1 Arnold R. Haas, BS, BA2; Stephen T. Woods, MD3; Uri M. Ahn, MD4; Nicholas U. Ahn, MD5
1Cleveland, OH, US; 2Cleveland Heights, OH, US; 3Ohio Bureau of Worker’s Compensation, Columbus, OH, US; 4OrthoNeuro, Columbus, OH, US; 5New Hampshire NeuroSpine Institute, Bedford, NH, US; University Hospital of Cleveland, Cleveland, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:29–2:35 pm.
46. Are Patients Undergoing an Anterior Cervical Discectomy and Fusion Treated Differently at a Physician-Owned Hospital?
Gregory D. Schroeder, MD1; Mark F. Kurd, MD2; Christopher K. Kepler, MD, MBA3; Kris E. Radcliff, MD4; Jeffrey A. Rihn, MD5; D. Greg Anderson, MD5; Alan S. Hilibrand, MD6; Alexander R. Vaccaro, MD, PhD5
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:35–2:41 pm.
47. Nonoperative Treatment Modalities Prior to Cervical Surgery Affect Patient Outcomes: An Analysis of 1522 Patients
Peter G. Passias, MD1;2; Michael C. Gerling, MD1; Robert E. Isaacs, MD4; Nancy Worley, MS, BA1; Cyrus Jalal, BA1; Kristina Bianco, BA1; Kris E. Radcliff, MD1; Alexander R. Vaccaro, MD, PhD1
1New York Spine Institute, New York University Medical Center Hospital for Joint Diseases, New York, NY, US; 2New York University School of Medicine, New York, NY, US; 3Lutheran Medical Center Department of Surgery, Brooklyn, NY, US; 4Duke University Medical Center, Durham, NC, US; 5New York, NY, US; 6Spine Research Center, New York University Hospital for Joint Diseases, New York, NY, US; 7Rothman Institute, Thomas Jefferson University, Egg Harbor Township, NJ, US; 8Rothman Institute, Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
2:41–2:47 p.m.
48. A Triangle Model of the Pathoanatomy of Congenital Cervical Stenosis
Harry T. Mai1,2; Tyler J. Jenkins, MD3; Robert J. Burgmeier, MD3; Jason W. Savage, MD3; Alpesh A. Patel, MD, FACS4; Wellington K. Hsu, MD5
1Northwestern University Feinberg School of Medicine Department of Orthopaedic Surgery, Chicago, IL, US; 2David Geffen School of Medicine at UCLA, Los Angeles, CA, US; 3Northwestern University Feinberg School of Medicine, Chicago, IL, US; 4Northwestern University Department of Orthopedics, Chicago, IL, US; 5Northwestern University, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:47–3:05 p.m.
Discussion

2:05–3:05 p.m.
Breakout Session:
Trends in Health Care Reform Abstract Presentations
Skyline Ballroom C
Moderator: Andrew J. Schoenfeld, MD

2:05–2:11 p.m.
49. Changes in the Care of Patients with Cervical Spine Fractures following Health Reform in Massachusetts
Andrew J. Schoenfeld, MD; Christopher M. Bono, MD; Mitchel Harris, MD, FACS
Brigham and Women’s Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:11–2:17 p.m.
50. Risk Factors for 30-Day Readmission following Spine Fusion Surgery in Adults: A Review of the National Surgical Quality Improvement Program (NSQIP) Database
Alvin Su, MD, PhD1; Ahmad N. Nassr, MD2; Elizabeth Habermann, PhD, MPH3; Kristine Thomsen, BA4; Todd Milbrandt; Annalise N. Larson, MD1
1Mayo Clinic, Rochester, MN, US; 2Mayo Clinic Department of Orthopedic Surgery, Rochester, MN, US;
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:17–2:23 p.m.
51. Correlation of PROMIS Physical Function and Pain CAT Instruments with Oswestry Disability Index and Neck Disability Index in Spine Patients
Mark O. Papuga, PhD1; Addisu Mesfin, MD2; Robert W. Molinari, MD3; Paul T. Rubery Jr., MD4
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:23–2:29 p.m.
52. Validation of Patient Reported Outcomes Measurement Information System (PROMIS) in Surgically Managed Lumbar Spinal Stenosis Patients
Alpesh A. Patel, MD, FACS1; Shah-Nawaz M. Dowdaw, MD2; Surabhi Bhatt, BS3; Wellington K. Hsu, MD4; Jason W. Savage, MD4; Nan Rothrock, PhD5
1Northwestern University Department of Orthopaedics, Chicago, IL, US; 2Northwestern University Feinberg School of Medicine, Chicago, IL, US; 3Northwestern University, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:29–2:35 p.m.
Addisu Mesfin, MD1; Brandon L. Raudenbush, DO2; Caroline Thrukumaran, MBBS, MHA3; Paul T. Rubery Jr., MD3
1University of Rochester, Rochester, NY, US; 2Strong Memorial Hospital, University of Rochester, Rochester, NY, US; 3Rochester, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:35–2:41 p.m.
54. Factors Associated with Increased Incidence of Postoperative Readmission following Elective Spine Surgery
Scott L. Parker, MD1; Silky Chotai, MD2; Ahilan Sivaganesan, MD3; Matthew J. McGirt, MD4; Anthony Asher, MD, FACS5; Clinton J. Devin, MD1
1Vanderbilt University, Nashville, TN, US; 2Vanderbilt University Medical Center, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:41–2:47 p.m.
55. Presurgical Physician Utilization in Elective Thoracolumbar Spine Surgery Candidates: A Nationwide Analysis from the CSORN Database
Alana J. Green, BA1; Neil A. Manson, MD, FRCS5; Greg McIntosh1; Edward P. Abraham, MD2
1Saint John, NB, Canada; 2Saint John Regional Hospital, Saint John, NB, Canada; 3Canadian Back Institute, Oakville, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:47–3:05 p.m.
Discussion
2:05–3:05 p.m.
Breakout Session:
New Perspectives in Spine Cancer Abstract Presentations
Skyline Ballroom D
Moderator: Paul Park, MD

2:05–2:11 p.m.
56. Incidence of Cancer and Infertility in Patients Treated for Adolescent Idiopathic Scoliosis 25 Years Prior
Ane Simony, MD; Leah Y. Carreon, MD, MSc; Steen Bach Christensen, MD; Mikkel O. Andersen, MD
Sector for Spine Surgery & Research, Middelfart, Denmark
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:11–2:17 p.m.
57. Predictive Factors for Survival in Surgical Series of Symptomatic Metastatic Epidural Spinal Cord Compression: A Prospective North American Multi-Centre Study in 142 Patients
Michael G. Fehlings, MD, PhD, FRCSC; Anick Nater, MD; Lindsay Tetreault; Branko Kopjar, MD, PhD; Paul M. Arnold, MD; Mark B. Dekutoski, MD; Joel A. Finkelstein, MD; Charles G. Fisher, MD; John C. France, MD; Ziya L. Gokaslan, MD, FACS; Laurence D. Rhines, MD; Peter Rose, MD; James M. Schuster, MD, PhD; Alexander R. Vaccaro, MD, PhD

- Toronto Western Hospital, Toronto, ON, Canada
- University of Toronto, Oakville, ON, Canada
- University of Washington, Seattle, WA, US
- University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US
- The CORE Institute, Phoenix, AZ, US
- Sunnybrook Health Sciences Centre, Toronto, ON, Canada
- Vancouver General Hospital, Vancouver, BC, Canada
- Robert C. Byrd Health Sciences Center, Morgantown, WV, US
- Johns Hopkins University Department of Neurosurgery, Baltimore, MD, US
- Houston, TX, US
- Mayo Clinic Department of Orthopedic Surgery, Rochester, MN, US
- University of Pennsylvania Department of Neurosurgery, Philadelphia, PA, US
- Rothman Institute, Philadelphia, PA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:17–2:23 p.m.
58. Evaluation of Imprint Cytology as an Early Diagnostic Modality Compared with Histopathology in Vertebral Lesions
Manish Chadha, MBBS, MS
University College of Medical Sciences, Department of Orthopedics, New Delhi, India

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:23–2:29 p.m.
59. Modeling One-Year Survival after Surgery on the Metastatic Spine
Dana A. Leonard, BA; Ahmer K. Ghori, MD; Ehsan Saadat, MD; Nathan L. Scott; Christopher M. Bono, MD; Andrew P. White, MD; Marco Ferrone, MD; Mitchell Harris, MD, FACS

- Brigham and Women’s Hospital, Boston, MA, US
- Harvard Combined Orthopaedic Surgery, Boston, MA, US
- Harvard Orthopaedic Residency Program, Boston, MA, US
- Massachusetts General Hospital Harvard Medical School, Boston, MA, US
- Beth Israel Deaconess Medical Center, Boston, MA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:29–2:35 p.m.
60. Surgery for Metastatic Spine Tumors in the Elderly. Don’t Delay Surgery, Don’t Wait for Complications!
Christian Mazel, MD, PhD; Global Spine Tumour Study Group

1 Paris, France; 2 London, England, UK

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:35–2:41 p.m.
61. Survival and Clinical Outcomes in Patients with Metastatic Epidural Spinal Cord Compression: Result of the AOSpine Prospective Multicenter Study of 142 Patients
Michael G. Fehlings, MD, PhD, FRCSC; Anick Nater, MD; Lindsay Tetreault; Branko Kopjar, MD, PhD; Paul M. Arnold, MD; Mark B. Dekutoski, MD; Joel A. Finkelstein, MD; Charles G. Fisher, MD; John C. France, MD; Ziya L. Gokaslan, MD, FACS; Laurence D. Rhines, MD; Peter Rose, MD; James M. Schuster, MD, PhD; Alexander R. Vaccaro, MD, PhD

- Toronto Western Hospital, Toronto, ON, Canada
- University of Toronto, Oakville, ON, Canada
- University of Washington, Seattle, WA, US
- University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US
- The CORE Institute, Phoenix, AZ, US
- Sunnybrook Health Sciences Centre, Toronto, ON, Canada
- Vancouver General Hospital, Vancouver, BC, Canada
- Robert C. Byrd Health Sciences Center, Morgantown, WV, US
- Johns Hopkins University Department of Neurosurgery, Baltimore, MD, US
- Houston, TX, US
- Mayo Clinic Department of Orthopedic Surgery, Rochester, MN, US
- University of Pennsylvania Department of Neurosurgery, Philadelphia, PA, US
- Rothman Institute, Philadelphia, PA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:41–2:47 p.m.
62. Kypho-IORT: Results of Phase II-Dose Escalation Study and Clinical Results of 61 Cases
Frederic Bludau, MD
Medical Faculty Mannheim of the University of Heidelberg, Orthopaedic and Trauma, Mannheim, Germany

FDA Device/Drug Status: Intrabeam System (Carl Zeiss Meditech GmbH) (Approved for this indication), Needle Applicator for Intrabeam (Carl Zeiss Meditech GmbH) (Approved for this indication), Kyphoplasty-Sets (Medtronic) (Approved for this indication)
2:47–3:05 p.m.
Discussion

2:05–3:05 p.m.
Breakout Session: Kinematics and Spinal Alignment Abstract Presentations
Room W470A
Moderator: Scott Kreiner, MD

2:05–2:11 p.m.
63. Targets for Compensated Center of Gravity-Based Sagittal Balance
Roger P. Jackson, MD1; Anne C. McManus, RN2; Jill A. Moore3; Travis J. Rump, DO4
1North Kansas City Hospital, North Kansas City, MO, US; 2Spine & Scoliosis Surgery, North Kansas City, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:11–2:17 p.m.
64. Acetabular Anteversion Changes in Spinal Deformity Correction: Implications for Hip and Spine Surgeons
International Spine Study Group1; Aaron J. Buckland, MBBS, FRACS2; Jonathan Vigdorchik, MD3; Renaud Lafage4; Gregory M. Mundis Jr., MD5; Jeffrey L. Gum, MD6; Michael P. Kelly, MD7; Robert A. Hart, MD7; Christopher F. Ames, MD7; Justin S. Smith, MD, PhD8; Shay Bess, MD9; Thomas J. Errico, MD10; Frank J. Schwab, MD10; Virginie Lafage, PhD11
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:17–2:23 p.m.
65. Effects of Volitional Spine Stabilization on Lifting Task in Recurrent Low Back Pain Population
Ram Haddas, PhD, MEng1; James Yang, PhD2; Isador H. Lieberman, MD, FRCS 2; MBA3
1Texas Back Institute Research Foundation, Plano, TX, US; 2Texas Tech University, Lubbock, TX, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:23–2:29 p.m.
66. Improving Surgical Spine Outcomes by Improving Rehabilitation Engagement
Richard L. Skolasky, ScD1; David Li2; Stephen Wegener, PhD3; Lee H. Riley III, MD4
1Johns Hopkins University, Baltimore, MD, US; 2Johns Hopkins Department of Orthopaedics, Baltimore, MD, US; 3Johns Hopkins Outpatient Center, Department of Orthopedic Surgery, Baltimore, MD, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:29–2:35 p.m.
67. In Vivo Dynamic Changes of Dimensions in the Lumbar Intervertebral Foramen
Weiye Zhong, MD, PhD1; Sean J. Driscoll2; Tsung-Yuan Tsai, PhD3; Shaobai Wang, PhD4; Jing-Sheng Li, PT5; Zhan Liu4; Thomas D. Cha, MD, MBA6; Kirkham B. Wood, MD7; Guoan Li, MD8
1Massachusetts General Hospital, Boston, MA, US; 2Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:35–2:41 p.m.
68. Replication of a Multidisciplinary Hospital Based Clinical Pathway for the Management of Low Back Pain
Michael Allgeier, DC, MDT1; John M. Ventura, DC2; Donald R. Murphy, DC3
1Mercy Hospital and Medical Center, Chicago, IL, US; 2Rochester Chiropractic Group, Rochester, NY, US; 3Rhode Island Spine Center, Pawtucket, RI, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:41–2:47 p.m.
69. Do We Underestimate the Ability of Patients to Return to Physical and Athletic Activities after Scoliosis Surgery? A Validated Patient Questionnaire Based Study
Vishal Sarwahi, MD1; Stephen Wendolowski, BS2; Rachel Gecelter, BS3; Dana Orlando4; Dan Wang, MS5
1Montefiore Medical Center, Bronx, NY, US; 2Orthopaedic Department at Montefiore Medical Center, Bronx, NY, US; 3Albert Einstein College of Medicine, Bronx, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:47–3:05 p.m.
Discussion
2:05–3:05 p.m.  
**Breakout Session: Assessment and Treatment of Spine Pain Abstract Presentations**  
Room W470B  
Moderator: Joshua D. Rittenberg, MD

2:05–2:11 p.m.  
**70. Central Sensitization Index as a Predictor of Worse Quality of Life Measures following Cervical and Lumbar Spinal Fusion**  
Elizabeth E. Bennett, MD, MS²; Kevin M. Walsh, MD²; Nicolas Thompson, MS²; Ajit A. Krishnaney, MD⁴  
¹Cleveland Clinic Neurosurgery Department, Cleveland, OH, US; ²Cleveland Clinic Foundation Department of Neurosurgery, Cleveland, OH, US; ³Cleveland Clinic Foundation, Cleveland, OH, US; ⁴Cleveland, OH, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:11–2:17 p.m.  
**71. Intradiscal Injection of YH14618, a First-in-Class Disease Modifying Therapy, Reduces Pain and Improves Daily Activity in Patients with Symptomatic Lumbar Degenerative Disc Disease**  
Young-Joon Kwon, MD, PhD¹; Eun Sang Kim, MD, PhD¹; Sung-Min Kim, MD, PhD¹; Hee Park, MD, PhD¹; Hae Mi Byun²; Su-Youn Nam, MD, PhD⁵  
¹Sungkyunkwan University School of Medicine, Kangbuk Samsung Hospital, Seoul, South Korea; ²Samsung Medical Center, Seoul, South Korea; ³Kyung-Hee University, Seoul, South Korea; ⁴Seoul, South Korea; ⁵Yuhan Co., Yongin-si, South Korea  
FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

2:17–2:23 p.m.  
**72. Chronic Opioid Use and Patients’ Expectations in Lumbar Spinal Surgery**  
Oliver Sax¹; Alexa Feldman, FNP, FNP²; Carol A. Mancuso, MD¹; Cyrena Lam³; Andrew A. Sama, MD¹; Frank P. Cammisa Jr., MD¹; Federico P. Girardi, MD¹; Alexander P. Hughes, MD¹  
¹Hospital for Special Surgery, New York, NY, US; ²New York, NY, US; ³Washington, DC, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:23–2:29 p.m.  
**73. Patterns of Lumbar Pain: A Cost Analysis Approach to Lumbar Pain in Primary Care in Occupational Medicine. A Comparative Study of Two Retrospective Cohorts of 2375 Patients during 2014**  
Jaime Diaz de Atauri, MD⁴; Oscar Zabalza Mantilla, MD³; Mikel Ayala Garcia, MD⁴  
³Mutualia Clinica Ercilla Bilbao Spine Unit, Bilbao, Vizcaya, Spain; ⁴Hospital San Jose Vithas-Mutualia, Vitoria, Spain

2:29–2:35 p.m.  
**74. Preoperative Duration of Opioids Use and Return to Work (RTW) Rates after Multilevel Cervical Fusion in Workers’ Compensation (WC) Setting**  
Mhamad Faour, MD⁸; Joshua T. Anderson, BC²; Arnold R. Haas, BS, BA³; Stephen T. Woods, MD⁴; Uri M. Ahn, MD³; Nicholas U. Ahn, MD⁶  
¹Cleveland, OH, US; ²Cleveland Heights, OH, US; ³Ohio Bureau of Worker’s Compensation, Columbus, OH, US; ⁴OrthoNeuro, Columbus, OH, US; ⁵New Hampshire NeuroSpine Institute, Bedford, NH, US; ⁶University Hospital of Cleveland, Cleveland, OH, US  
FDA Device/Drug Status: Opioids (Approved for this indication)

2:35–2:41 p.m.  
**75. The Need for Multidimensional Stratification of Chronic Low Back Pain (LBP)**  
Raja Y. Rampersaud, MD, FRCSI¹; Andrew Bidos, DC²; Caroline L. Fanti, PT³; Anthony V. Perruccio, PhD³  
¹Toronto Western Hospital, Toronto, ON, Canada; ²Thunder Bay Regional Health Sciences Centre, Thunder Bay, ON, Canada; ³University of Toronto, University Health Network, Toronto, ON, Canada  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:41–2:47 p.m.  
**76. Risk Factor Analysis of Residual Low Back Pain after Decompressive Surgery for Lumbar Spinal Stenosis**  
Jae Chul Lee, MD, PhD; Sung-Woo Choi; Hae-Dong Jang; Byung-Joon Shin, MD, PhD  
Soonchunhyang University College of Medicine, Seoul, South Korea  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:47–3:05 p.m.  
Discussion

3:05–3:35 p.m.  
**Networking Break—Beverage Service**  
Technical Exhibition
3:05–3:35 p.m.
Meet the Author: Siddhant Kapoor, MBBS, DNB
The Learning Place, Yellow Theater

Siddhant Kapoor, MBBS, DNB; Hwan T. Hee, MD, FRCS; Eugene Yang, FRCS; Roy Koh Kio Kiat Miang, MBBS, FRCS; Jacob Y. Oh, MD
1Singapore, Singapore; 2Pinnacle Spine & Scoliosis Centre, Singapore, Singapore; 3Fem Surgery, Singapore, Singapore; 4Khoo Teck Puat Hospital, Singapore, Singapore
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:05–3:35 p.m.
Meet the Author: Donna D. Ohnmeiss, PhD and Jack E. Zigler, MD
The Learning Place, Green Theater

P26. Influence of Adverse Events on Clinical Outcomes of Patients in an FDA IDE Clinical Trial of Cervical Total Disc Replacement Versus Anterior Cervical Discectomy and Fusion
Donna D. Ohnmeiss, PhD; Hyun W. Bae, MD
1Texas Back Institute Research Foundation, Plano, TX, US; 2Spine Institute St. John’s Health Center, Los Angeles, CA, US
FDA Device/Drug Status: Mobi-C (Approved for this indication)

3:05–3:35 p.m.
Meet the Author: Nanjundappa S. Harshavardhana, MD, MS, DO
The Learning Place, Blue Theater

P91. Comprehensive Analysis of Level of Evidence (LoE) of Scoliosis Research Society (SRS) Annual Meeting Presentations in the New Millennium (2001-13)
Nanjundappa S. Harshavardhana, MD, MS, DO; John P. Dormans, MD, FACS
1Twin Cities Spine Center, Minneapolis, MN, US; 2Children’s Surgical Associates, Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
Risk Stratification: Screening Tools and Psychometrics in the Rehabilitation Setting  
Julie Fritz, PT, PhD

The Role of Fear-Avoidance and Motivation in Patient Reactivation  
Evan K. Johnson, DPT, OCS

Returning the Patient to Work: Identifying Psychosocial Risk Factors and What to Do About Them  
Marco Campello, PT PhD

Back Disability as a Social Construct: Understanding the Patient Predicament  
Margareta Nordin, Dr. Med. Sci.

Cultural Factors: Understanding and Bridging the Divide in the Changing World of Spine Care  
Linda Carroll, PhD

Practical Implementation: An Empirical “Real World” Biopsychosocial Care Model  
Gregory L. Whitcomb, DC

Discussion

FDA Device/Drug Status:  
All presenters: These presentations do not discuss or include any applicable devices or drugs.

3:40–5:30 p.m.  
Symposium:  
Healthcare 2016: Emerging Payment Policies and the NASS/Washington, DC Relationship  
Skyline Ballroom AB  
Moderator: John G. Finkenberg, MD

As the recognized thought leader in fostering and delivering high quality and innovative care, NASS and its members are playing a critical role in advocating on behalf of spine care providers at the federal level. The current state of the U.S. healthcare system is at a crossroad and is increasingly becoming more difficult for physicians, medical providers and patients to navigate. Members of Congress and federal agencies are now relying more than ever on medical societies and their members for expertise on a range of issues from Medicare physician payment reform to medical innovation. Therefore, it is necessary for spine care providers to understand the important role NASS plays to ensure that the issues affecting their practices are at the forefront of the policy discussions taking place in Washington, DC.

This symposium offers attendees greater insight about NASS’ legislative objectives and its ability to promote sound healthcare policy on behalf of patients and the spine care providers who treat them. Understanding how advocacy advances our profession’s cause ensures that NASS remains an integral part of the federal healthcare conversation. Additionally, understanding current healthcare trends offers spine care providers the necessary background information to discuss medical issues with Members of Congress and federal agency officials. New York Times No. 1 best-selling author, Mark Halperin is the guest speaker during this symposium. Halperin will discuss the upcoming 2016 presidential elections and the role healthcare will play in shaping the outcome of the race.

Upon completion of this session, participants should gain strategies to:  
• Recognize NASS’ current federal legislative priorities and emerging trends in healthcare policy in Washington, DC;  
• Discover recent trends in Medicare payment policies and how NASS has worked with lawmakers to accomplish solid payment and delivery reforms on behalf of the spine care profession.

Agenda

Introductory Remarks/NASS Legislative Agenda  
John G. Finkenberg, MD, NASS Board of Directors, Chair, NASS Advocacy Council

How the SGR Repeal Law Will Affect Medicare Reimbursements Moving Forward  
Philip L. Schneider, MD, Member, NASS Advocacy Council

Emerging Trends in Medicare and Third Party Reimbursement Policy  
Alan S. Hilibrand, MD, NASS Board of Directors, Member, NASS Advocacy Council

Utilization Review: Should Society Guidelines Prevail?  
David A. Wong, MD, MSc, FRCS, Past President, NASS, Member, NASS Advocacy Council

Special Guest Speaker  
Mark Halperin

Special Guest Speaker: Mark Halperin  
Mark Halperin is managing editor of Bloomberg Politics and host of Bloomberg TV’s With All Due Respect. He also is a regular contributor to MSNBC’s Morning Joe and the most frequent guest in the history of Charlie Rose. Prior to joining Bloomberg, Halperin served as editor-at-large and senior political analyst for TIME; covering politics, elections and government. Prior to joining TIME, Halperin worked at ABC News, where he covered five presidential elections. Additionally, Halperin founded and edited the online publication “The Note” on abcnews.com, which was characterized as the most influential daily tip sheet in American politics.

FDA Device/Drug Status:  
All presenters: These presentations do not discuss or include any applicable devices or drugs.

5:30–6:30 p.m.  
SpinePAC Reception  
W375 West Lobby
2016 Courses and Conferences

Lumbar Spinal Injections
January 22-23, Phoenix, AZ

12th Annual Evidence and Technology Summit
February 24-27, Park City, UT

Section on Robotics and Navigation:
Improving Accuracy and Efficiency in Navigated and Robotic Spine Surgery
March 18-19, Burr Ridge, IL

Coding Update 2016: Essentials and Controversies of Spine Care Coding
April 8-9, San Diego, CA

Cervical Spine Surgery
April 22-23, Burr Ridge, IL
Co-sponsored with Cervical Spine Research Society

Lumbar Spinal Injections
May 20-21, Burr Ridge, IL

SpineWeek
May 16-20, Singapore

Summer Spine Meeting
July 20-23, Miami, FL

Section on Allied Health:
Psychologically Informed Practice
September 16-17, Chicago, IL
Co-sponsored with Rehabilitation Institute of Chicago

Fundamentals of Spine Surgery and Interventional Pain Management
September 24-25, Burr Ridge, IL

31st Annual Meeting
October 26-29, Boston, MA

Details at www.spine.org
The sacroiliac joint has been a topic of controversy as it relates to its contribution to spine conditions. Multiple approaches have been pursued to both diagnose and treat the SI joint as a potential source of pain and biomechanical abnormalities. This symposium reviews the anatomy and innervation of the sacroiliac joint, and delves into the complex biomechanics that govern how the sacroiliac joint interfaces with spine and hip biomechanics to create or accommodate for dysfunction. Diagnostic dilemmas and treatment options also are reviewed in the context of structure and function.

Upon completion of this session, participants should gain strategies to:
• Apply the understanding of form and force closure as it applies to patients with sacroiliac joint (SIJ) pain;
• Identify diagnostic tests to evaluate patients with low back and posterior pelvic girdle pain that may direct the diagnosis of SIJ pain;
• Incorporate diagnostic tests to direct specific treatment for patients with SIJ pain.

Agenda
SIJ Anatomy and Biomechanics
• Anatomy and Biomechanics as They Relate to the Pelvic Girdle and Implications for SIJ and Low Back Pain
• Form and Force Closure and the Impact of Neuro Control and Cognitive Function
• Ligaments, Muscle, Fascia as They Relate to Form and Force Closure and Potential Source of Pain
• Take Home:
  » Increased Form and Force Closure Associated with Increased Joint Stiffness
  » Decreased Form and Force Closure Associated with Joint Laxity
  » These are Important:
    • To Differentiate in Patients as They Direct Course of Treatment
    • Because They Have Implications on the Lumbar Spine and Hip

Andry Vleeming, PhD

Clinical Evaluation and Differential Diagnosis to Help Assess Lumbopelvic Pain Related to the SIJ
• SIJ Innervation
  » Innervation has Implications Regarding Pain Distribution
  » Innervation as It Relates to Joint Denervation as a Diagnostic and Treatment Tool
• Common History
• Differential Diagnosis
• Types of SIJ Pain
  » Traumatic
  » Pregnancy-related
  » Tumor
  » Infection
  » Inflammatory Arthropathis
  » Iatrogenic
  » Idiopathic
• Physical Examination
• Diagnostic Injections
Matthew Smuck, MD
Rehabilitation and Medical Management of Lumbopelvic Pain Related to the SIJ
• Why Choose Which Intervention
• Therapeutic Injections
D.J. Kennedy, MD

Surgical Options for Chronic Lumbopelvic Pain Related to the SIJ
David W. Polly Jr., MD

Summary of Appropriate Care: What Do We Know?
Gwendolyn Sowa, MD, PhD; Michael D. Daubs, MD

Questions and Answers

FDA Device/Drug Status:
Andry Vleeming, PhD: This presentation does not discuss or include any applicable devices or drugs.
Matthew Smuck, MD: Local anesthetics (Approved).
D.J. Kennedy, MD: Not available at time of publication.
Gwendolyn Sowa, MD, PhD: This presentation does not discuss or include any applicable devices or drugs.
Michael D. Daubs, MD: This presentation does not discuss or include any applicable devices or drugs.
David W. Polly, Jr.: Not available at time of publication.

8:00–10:00 a.m.
Surgical Innovation Lab Demonstrations
• Mazor Robotics Surgical Techniques
  The Learning Place, Yellow Lab
• Benvenue: 3D Expandable Technologies for Fusion and VCF presented by Sandeep Kunwar, MD, FACS
  The Learning Place, Green Lab

9:00 a.m.–5:00 p.m.
Technical Exhibition
Technical Exhibition

NASS Career Fair
Technical Exhibition, Booth 776 (adjacent to NASS Resource Center)

9:10–9:40 a.m.
Networking Break—Beverage Service
Technical Exhibition

Practical Theater:
Current CMS Quality Initiatives Reporting Requirements and Transition to the New Merit-based Incentive Payment System (MIPS)
The Learning Place, Red Theater

Join members from the NASS Performance Measurement Committee in discussion on the reporting requirements for current CMS quality initiatives and the impact that the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) will have on these programs. As authorized by MACRA, several Medicare quality reporting programs will be consolidated into one new system called the Merit-based Incentive Payment System (MIPS), which will begin in 2019.

9:10–9:40 a.m.
Meet the Author:
Seong Ju Kong, MD
The Learning Author, Yellow Theater

P113. Comparison of Radiological Changes and Clinical Outcomes after ACDF with Plate Construct, ACDF with Stand-Alone Cages, and Cervical Total Replacement in Single-Level Lesion
Seong Ju Kong, MD; Soo-Beom Kim, MD; Sang-Ho Lee, MD, PhD
1Seoul Gimpo Airport Spine Health Wooridul Hospital Department of Neurosurgery, Seoul, South Korea; 2Seoul, South Korea; 3Wooridul Spine Hospital, Seoul, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:10–9:40 a.m.
Meet the Author:
John A. Sielatycki, MD
The Learning Author, Green Theater

P96. Does Obesity Correlate with Poor Patient-Reported Outcomes following Cervical Surgery for Degenerative Conditions?
John A. Sielatycki, MD; Silky Chotai, MD; Joseph Wick, BA; David Stonko; Harrison F. Kay; Kevin O’Neill, MD; Clinton J. Devin, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Vanderbilt Medical Center Department of Orthopedics, Nashville, TN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P57. Prospective Cost Utility Analysis of Adult Deformity Surgery
John A. Sielatycki, MD; Silky Chotai, MD; Scott L. Parker, MD; Matthew J. McGirt, MD; Clinton J. Devin, MD; Kevin O’Neill, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Vanderbilt University Medical Center Department of Orthopedics, Nashville, TN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P164. Does Obesity Predict Poor Patient-Reported Outcomes following Lumbar Surgery for Degenerative Conditions?
John A. Sielatycki, MD; Silky Chotai, MD; Harrison F. Kay; David Stonko; Joseph Wick, BA; Matthew J. McGirt, MD; Clinton J. Devin, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P49. Diabetes Predicts Worse Patient Reported Outcomes at Two-Years following Spine Surgery
Sheyan J. Armaghani, MD; Kristin Archer, PhD, DPT; John A. Sielatycki, MD; Silky Chotai, MD; Rena Clayton Rolfe; David Demaio; Matthew J. McGirt, MD; Clinton J. Devin, MD
1Nashville, TN, US; 2Vanderbilt University Medical Center, Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P126. Does Cervical Sagittal Alignment Correlate with Outcomes following Anterior Cervical Surgery?
John A. Sielatycki, MD; Sheyan J. Armaghani, MD; Arnold Silverberg, BS; Matthew J. McGirt, MD; Clinton J. Devin, MD; Kevin O’Neill, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Vanderbilt University Medical Center, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P13. Analysis of PMMA Distribution around Cannulated and Fenestrated Cement-Augmented Pedicle Screws: Clinical Study
Luis Alvarez, MD; Sergio Gomez, PhD; Maria Daniela Vlad, PhD; Angel R. Pinera, MD; Felix Tome-Bermejo, MD, PhD; Enrique Fernández
1Fundación Jimenez Díaz Traumatología, Madrid, Spain; 2Madrid, Spain; 3Fundación Jimenez Díaz, Madrid, Spain; 4Hospital Universitario Fundación Jimenez Diaz, Madrid, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P52. Sandwich Vertebral Fracture in the Study of Adjacent-Level Fracture after Vertebral Cement Augmentation
Luis Alvarez, MD; Silvia Perez, MD; Marta Martín-Fernández, PhD; Angel R. Pinera, MD; Felix Tome-Bermejo, MD, PhD
1Fundación Jimenez Díaz Traumatología, Madrid, Spain; 2Madrid, DE, Spain; 3Madrid, Spain; 4Fundacion Jimenez Diaz, Madrid, Spain; 5Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P6. Effect of Parathyroid Hormone (PTH) on the Fusion Mass and Clinical Outcome of Instrumented Spinal Fusion
Luis Alvarez, MD; Marta Martín-Fernández, PhD; Angel R. Pinera, MD; Felix Tome-Bermejo, MD, PhD
1Fundación Jimenez Díaz Traumatología, Madrid, Spain; 2Madrid, Spain; 3Fundacion Jimenez Diaz, Madrid, Spain; 4Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain
FDA Device/Drug Status: Parathyroid hormone (Approved for this indication)

Meet the Author:
Luiz Alvarez, MD
The Learning Place, Blue Theater

Meet the Author:
Mhamad Faour, MD
The Learning Place, Purple Theater

Meet the Author:
Christopher M. Bono, MD and Heidi Prather, DO
Skyline Ballroom AB

Introduction and Presidential Address:
Christopher M. Bono, MD and Heidi Prather, DO
Skyline Ballroom AB

Introduction and Presidential Guest Speaker:
Heidi Prather, DO and Sir Ken Robinson
Skyline Ballroom AB
11:00 a.m.–12:00 p.m.  
Breakout Session:  
The Spine Journal Outstanding Paper Awards Presentations  
Skyline Ballroom AB  
Moderator: Eeric Truumees, MD

11:00–11:10 a.m.  
Introduction from Eeric Truumees, MD

11:10–11:20 a.m.  
Outstanding Paper: Surgical Science  
Morbidity and Mortality of Complex Spine Surgery: A Prospective Cohort Study in 679 Patients Validating the Spine AdVerse Event Severity (SAVES) System in a European Population  
Sven Karstensen, BSc1; Tanvir Bari, BSc1; Martin Gehrchen, MD, PhD1; John Street, MD, PhD2; Benny Dahl, MD, PhD, DMSci1  
1Spine Unit, Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark; 2Combined Neurosurgical and Orthopedic Spine Program, Vancouver General Hospital, University of British Columbia, Blusson Spinal Cord Center, Vancouver, British Columbia, Canada  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:20–11:30 a.m.  
Outstanding Paper: Surgical Science  
Total Disc Arthroplasty versus Anterior Cervical Interbody Fusion: Use of the Spine Tango Registry to Supplement the Evidence from RCTs  
Lukas P. Staub, MD, PhD1; Christoph Ryser, MD1; Christoph Röder, MD1; Anne F. Mannion, PhD2; Jeffrey G. Jarvik, MD3; Max Aebi, MD4; Emin Aghayev, MD1  
1Institute for Evaluative Research in Medicine, Bern, Switzerland; 2Spine Centre Division, Department of Research and Development, Schulthess Klinik, Zurich, Switzerland; 3Comparative Effectiveness, Cost and Outcome Research Centre. University of Washington, Seattle, WA, USA; 4Department of Orthopaedic Surgery, Salem Spital, Bern, Switzerland  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:30 a.m.–12:00 p.m.  
Discussion

11:00 a.m.–12:00 p.m.  
Breakout Session:  
The Surgical Treatment of Degenerative Scoliosis: An Evidence-based Expert Panel Case Discussion  
Skyline Ballroom C  
Moderator: Michael D. Daubs, MD

An expert panel gives their treatment recommendations on presented cases with degenerative scoliosis. The audience also is invited to participate in the debates and discussions along with the panelists. The findings of the Rand/SRS Appropriate Use Criteria (AUC) Study for Degenerative Scoliosis also are presented.

Upon completion of this session, participants should gain strategies to:  
• Identify indications for surgical treatment of degenerative scoliosis;  
• Determine appropriate indications for decompression alone, decompression and fusion, and decompression and fusion with deformity correction;  
• Determine when to fuse long and when to fuse short.

Faculty Panel  
Steven D. Glassman, MD  
Clifford B. Tribus, MD  
Sigurd H. Berven, MD

FDA Device/Drug Status: All presenters: These presentations do not discuss or include any applicable devices or drugs.

11:00 a.m.–12:00 p.m.  
Breakout Session:  
The Evolving Field of Spinal Cord Stimulation  
Skyline Ballroom D  
Moderator: Ashwini Sharan, MD, FACS

Spinal cord stimulation has been utilized for management of spinal pain for nearly three decades. In the last five years, a number of prospective trials have emerged, and there have been significant advances in the technology. The paradigms of the frequency of stimulation, stimulation of muscles through nerves, target structures such as the dorsal root ganglion, and even stimulation of the spinal cord for gait and spinal cord injury are emerging.

Upon completion of this session, participants should gain strategies to:  
• Review the prospective RCT data on the use of 10 Khz stimulation on the spinal cord;  
• Identify the prospective data on the use of dorsal root ganglion stimulation;  
• Distinguish neurostimulation technologies and their interaction with MRI;  
• Comprehend the science of stimulation of nerve to drive and treat muscle pain.
Agenda
Introduction
Ashwini Sharan, MD, FACS

High Frequency Stimulation for Low Back Pain
Leo Kapural, MD, PhD

Dorsal Root Ganglion for Pain
Todd Sitzman, MD, MPH

Advances in MRI Compatibility for Spinal Cord Stimulation
Yair Safriel, MD

Nerve Stimulation for Muscle Pain
John Chae, MD

Discussion

FDA Device/Drug Status:
Leo Kapural, MD, PhD: HF10 Therapy (Approved for this indication), Spinal cord stimulation (Approved for this indication).

11:00 a.m.–12:00 p.m.
Breakout Session:
Accommodating Multiple Stakeholders in Spine Care: Patients, Payers and Providers
Room W470A
Moderator: Kris Radcliff, MD

With reporting of outcome and cost data gaining traction, detailed information from payers and providers about spine care will be increasingly available. The purpose of this session is to discuss publicly reportable outcome, coverage and cost data relevant to spine care.

Since value is defined as the relationship between outcome and cost, both corporate entities and providers recognize the need to provide patients with meaningful outcome data instead of process measures. Patient satisfaction has emerged as an important outcome measure in public reporting due to the ease of collection, the technical complexity of disease specific measures, and patient centered nature of the data. Patient satisfaction can be framed as satisfaction with symptoms or satisfaction with treatment. Advantages of a patient satisfaction outcome measure in spine care are that it is a general health measure that is comprehensive and easily comparable. However, patient satisfaction may not correlate directly with relief of spine-specific symptoms and may be somewhat dependent on patient expectations. Additionally patient satisfaction may conflict with professional responsibilities, such as counseling about weight loss or smoking cessation or avoidance of opioid pain medication. In this session, we review the existing patient satisfaction data in spine care, discuss factors that influence patient satisfaction, and identify future trends in patient satisfaction.

The other part of the value equation in spine is controlling costs. Payers have long attempted to control expenditures by coverage of specific procedures through precertification. As corporate accountability and transparency increases in spine care, the rationale for such decisions has evolved from internal, confidential guidelines to specific systematic reviews that are accessible online by providers and patients. Levels and grades of evidence are provided to establish medical necessity or experimental status. Similarly, NASS has created a set of coverage recommendations based on a systematic review approach to readily summarize the supporting evidence for common spine procedures. In this session, we review the different types and processes for coverage recommendations, discuss what levels of evidence are reasonable and necessary to justify spine care, and discuss strategies to handle conflicting systematic literature reviews.

Finally, provider-specific cost information has become readily available online. Such reporting of information may enable patients to identify variability in provider costs and to make cost-informed choices. Disadvantages of such charge and reimbursement reporting include the possibility of misinterpretation of case complexity and provider numbers. Additionally, there is a possibility that providers may choose to eschew high cost patients with medical comorbidities or high cost procedures such as spinal osteotomies. In this session, we debate the provider-specific implications of participating in high-cost or low-cost care.

Upon completion of this session, participants should gain strategies to:
- Discuss suitability of patient satisfaction as a measure of quality of spine care;
- Review current evidence and insurance practice patterns regarding coverage;
- Identify potential effects of health care bundling on coverage and authorization policies;
- Discuss whether future innovations in spine surgery should emphasize cheaper, short-term solutions or more expensive, long-term solutions.

Agenda
Introduction
Kris Radcliff, MD

Ryan Spiker, MD

Insurance Coverage: Is there a Discrepancy between the Literature and Insurance Coverage Decisions? Should Coverage Recommendations Be Public, Transparent and Peer-reviewed?
Barrett Woods, MD
Online Quality Ratings: What Measures Are Being Reported and How Accurate is the Information?
Clinton Devin, MD

Increased Public Reporting Will Lead to Avoidance of High Risk Patients and Procedures Due to High Intrinsic Costs and High Complication Rates
Adam Pearson, MD

Discussion

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

11:00 a.m.–12:00 p.m.
Breakout Session:
Evaluation and Management Options for Posterior Pelvic Girdle Disorders
Room W470B
Moderators: Devyani Hunt, MD; Gwendolyn Sowa, MD, PhD

An expert panel discusses the differential diagnosis, evaluation and treatment regarding case scenarios of patients with posterior pelvic girdle pain. The audience is invited to participate in the debates and discussions along with the panelists.

Upon completion of this session, participants should gain strategies to:
• Identify the differential diagnosis of posterior pelvic girdle pain;
• Describe the appropriate options for evaluation of posterior pelvic girdle pain;
• Apply the rationale types of treatment recommendations including surgical and nonsurgical options.

Faculty Panel
Andry Vleeming, PhD
David Polly Jr., MD
D.J. Kennedy, MD
Matthew Smuck, MD

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

11:00 a.m.–1:00 p.m.
Surgical Innovation Lab Demonstration:
Amendia: Thoracolumbar Posterior Fixation: Midline Technique featuring Expandable Technology—Invitation Only
The Learning Place, Yellow Lab

11:00 a.m.–2:30 p.m.
NASS Bistro
Technical Exhibition

12:00–1:00 p.m.
Complimentary Box Lunch
Medical Attendees Only
Technical Exhibition

Solution Showcase
Technical Exhibition, Booth 1799
12:00 p.m.
Misonix: Ultrasonic BoneScalpel Assisted MIS TLIF
Presented by Juan Uribe, MD
Deformity Correction with the Ultrasonic BoneScalpel
Presented by Greg Mundis, MD
12:30 p.m.
Medicrea: UNiD: The Role of Pre-operative Planning and Patient-Specific Implants in Sagittal Alignment
Presented by Themistocles Protopsaltis, MD

1:00–1:05 p.m.
NASS Working For You:
Spine Safety Update
Skyline Ballroom AB

1:00–3:10 p.m.
Interdisciplinary Spine Forum:
Clinical Biomechanics of the Spine
Room W474
Moderator: Brian D. Stemper, PhD

This session highlights recent advancements in clinical biomechanics of the spine by basic science researchers including measurement and recreation of spinal kinematics, computer modeling of the spine and applications, assessment of degeneration and development and characterization of low level spinal injuries, and quantifying biomechanics associated with catastrophic spinal injuries.

Upon completion of this session, participants should gain strategies to:
• Comprehend recent advances in the clinical measurement and experimental recreation of spinal kinematics;
• Appreciate the clinical applications of computer models of the spine;
• Recognize the assessment of disc degeneration and the development and consequences of spinal injuries.
Agenda
Introduction/Welcome
Brian D. Stemper, PhD

Measurement of Spine Kinematics in Patients
Boyle Cheng, PhD

Incorporating Robots to Recreate Spinal Motion and Loads in the Laboratory
Brian Kelly, PhD

MR Imaging of the Disc
Ron N. Alkalay, PhD

Muscle and Spinal Cord Degeneration and Clinical Translation
James M. Elliott, PhD, PT

Injury Biomechanics
Peter Cripton, PhD

Contribution of Soft Tissue Yield and Bony Microfractures to Spinal Instability
Brian D. Stemper, PhD

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:05–2:05 p.m.
Best Papers: Measurement of Surgical Outcomes
Skyline Ballroom AB
Moderator: Michael D. Daubs, MD

1:05–1:11 p.m.
77. Fulfillment of Expectations Two Years after Cervical Spine Surgery
Carol A. Mancuso, MD; Frank P. Cammisa Jr., MD; Andrew A. Sama, MD; Alexander P. Hughes, MD; Darren R. Lebl, MD; Roland Duculan, MD; Federico P. Girardi, MD
Hospital for Special Surgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:11–1:17 p.m.
78. Concordance between Patients’ and Surgeons’ Expectations of Lumbar Spine Surgery
Carol A. Mancuso, MD; Roland Duculan, MD; Frank P. Cammisa Jr., MD; Andrew A. Sama, MD; Alexander P. Hughes, MD; Darren R. Lebl, MD; Federico P. Girardi, MD
Hospital for Special Surgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:17–2:05 p.m.
79. Patient-Reported and Performance-Based Measures and Patient Satisfaction following Spine Surgery: A Longitudinal Analysis
Kristin Archer, PhD, DPT; John A. Sielatycki, MD; Rogelio Coronado, PT, PhD; Stephen Wegener, PhD; Joseph S. Cheng, MD, MS; Oran S. Aaronson, MD; Clinton J. Devin, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Vanderbilt Orthopaedic Institute, Nashville, TN, US; 3Johns Hopkins, Baltimore, MD, US; 4Vanderbilt University Medical Center Department of Neurosurgery, Nashville, TN, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

1:23–1:39 p.m.
Discussion

81. Moved to Value Abstract Awards Presentations Session (Friday, October 16, 3:20–3:50 p.m.)

1:39–1:45 p.m.
82. Operative Treatment of Adult Spinal Deformity (ASD) Improves Health Related Quality of Life (HRQOL) for All Spinal Deformity Types, while Patients Treated Nonoperatively Demonstrate No Change at Mean 4.9 Years Follow-Up
International Spine Study Group; Shay Bess, MD; Breton Line; Eric O. Klineberg, MD; Christopher P. Ames, MD; Oheheba Boachie-Adjei, MD; Douglas C. Burton, MD; Vedat Deviren, MD; Munish C. Gupta, MD; Jeffrey L. Gurn, MD; Robert A. Hart, MD; D. Kojo Hamilton, MD; Richard A. Hostin Jr., MD; Han Jo Kim, MD; Khaled M. Keibaish, MD; Michael P. Kelly, MD; Virginie Lafage, PhD; Gregory M. Mundis Jr., MD; Frank J. Schwab, MD; Christopher I. Shaffrey, MD; Justin S. Smith, MD, PhD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
1:45–1:51 p.m.  
83. Clinical and Radiological Results of Bryan Cervical Disc Arthroplasty after Follow-Up of Ten Years  
Chiara Liberati; Roberto Assietti, MD  
Milan, Italy  
FDA Device/Drug Status: Bryan cervical disc (Approved for this indication)

1:51–2:05 p.m.  
Discussion

1:10–2:10 p.m.  
Committee Orientation Program  
Room W472

2:00–4:00 p.m.  
Surgical Innovation Lab Demonstrations  
- LinkSPINE: Introduction to LinkSPINE’s Less Invasive Midline Fusion Platform—Invitation Only  
  Speaker: Christopher Chaput, MD  
  The Learning Place, Yellow Lab  
- ChoiceSpine LP: VEO™ Lateral Access & Interbody Fusion System and THUNDERBOLT™ MIS Pedicle Screw System—Invitation Only  
  The Learning Place, Green Lab  
- 4Web Medical: Introduction to Posterior Truss Implant Technology—Invitation Only  
  The Learning Place, Blue Lab

2:10–3:10 p.m.  
Section Specialty Track:  
Section on Biologics and Basic Research: 3D Printing: A New Frontier  
Room W470A  
Moderator: Alan Dang, MD

Agenda  
Introduction/3D Printing in the Consumer World  
Alan Dang, MD

3D Printing Surgical Tools: Patient and Surgeon Specific  
Richard Manos, MD

3D Printing Structural Implants: A Clinical Case  
Paul Anderson, MD

3D Printing Biologic Scaffolds: The Promise of Engineered Tissues  
Adam Jakus, PhD

Discussion

FDA Device/Drug Status:  
Glenn Steigman, MS: Centinel Stalif C, Centinel Stalif Midline, LDR ROI-C, Amedica Valeo, Medtronic LT-Cage (Approved for this indication)

2:10–3:10 p.m.  
Section Specialty Track:  
Section on Minimally Invasive Procedures: Abstract Presentations  
Skyline Ballroom C  
Moderator: Raja Y. Rampersaud, MD, FRCSC

2:10–2:16 p.m.  
Section on Minimally Invasive Procedures Best Paper  
84. Treatment for Acute or Subacute Osteoporotic Vertebral Compression Fractures: Percutaneous Vertebroplasty Versus Facet Blocking: A Clinical Randomized Study  
Hua Guo, MD; Biao Wang; Dingjun Hao, MD  
1Xi’an, China; 2Xi’an Honghui Hospital, Xi’an, Shaanxi, China  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:16–2:22 p.m.  
85. The Effect of Transforaminal Epidural Steroid Injections in Patients with Spondylolisthesis  
Savas Sencan; Emel E. Ozcan, MD; Bobby Tay, MD; Sigurd H. Berven, MD; Shane Burch, MD; Vedat Deviren, MD; Sibel Demir-Deviren, MD  
1University of California San Francisco, Department of Orthopaedic Surgery, San Francisco, CA, US; 2University of California San Francisco, San Francisco, CA, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

“3D printing” or “additive manufacturing” is a tool that has rapidly caught the excitement of the general public as well as scientists across many disciplines. Though this technology has been around for decades, it is only recently approaching the point of cost effectiveness. In this session, a brief overview of the current state of “3D printing” as it applies to spine surgery is discussed.

Upon completion of this session, participants should gain strategies to:  
- Provide an overview of 3D printing for both spine surgery and nonspine surgery activities;  
- Clarify how 3D printing may ultimately be used to generate structural implants, cellular scaffolds or surgical tools;  
- Understand limitations of current 3D printed technology.
2:22–2:28 p.m.
86. The Utility of Obtaining Routine Hematologic Laboratory Values following a Minimally Invasive Transforaminal Lumbar Interbody Fusion

Junyoung Ahn1; Vincent J. Rossi, BS, BA; Andrew J. Park2; Islam Elboghdaydy3; Daniel D. Bohl, MPH4; Kern Singh, MD5; Khaled A. Aboushaala6

1Rush University Medical Center, Chicago, IL, US; 2Chicago, IL, US; 3Yale University School of Medicine, New Haven, CT, US; 4Midwest Orthopaedics at Rush, Chicago, IL, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:28–2:34 p.m.
87. Percutaneous Lumbar Intradiscal Injection of Autologous Bone Marrow Concentrated Cells Significantly Reduces Discogenic Pain through 24 Months

Fernando Techy, MD

University of Colorado Health, Rocky Mountain Associates Department of Spine Surgery, Fort Collins, CO, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:34–2:40 p.m.

Anuj Singla, MD1; Scott Yang, MD2; Brian C. Werner, MD3; Jourdan Cancienne, MD2; Hamid Hassanzadeh, MD4; Adam L. Shimer, MD4; Francis H. Shen, MD5

1University of Virginia School of Medicine, Charlottesville, VA, US; 2Charlottesville, VA, US; 3University of Virginia Department of Orthopedic Surgery, Charlottesville, VA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:40–2:46 p.m.
89. A Critical Analysis of Sagittal Plane Deformity Correction with Minimally Invasive Adult Spinal Deformity Surgery: A Two-Year Follow-Up Study

International Spine Study Group1; Gregory M. Mundis Jr., MD2; Jay D. Turner, MD, PhD3; Vedat Deviren, MD4; Juan S. Uribe, MD4; Pierce D. Nunley, MD5; Christopher I. Shaffrey, MD5; Neel Anand, MD6; Paul Park, MD7; David O. Okonkwo, MD7; Michael Y. Wang, MD7; Adam S. Kanter, MD8; Richard G. Fessler, MD, PhD9; Stacie Nguyen, MPH10


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:46–2:52 p.m.
90. The Impact of Minimally Invasive Spinal Deformity Surgery on ICU and Hospital Stay

International Spine Study Group1; Dean Chou, MD2; Michael Y. Wang, MD3; Donald J. Blaskiewicz, MD4; Stacie Nguyen, MPH5; Christopher I. Shaffrey, MD5; David O. Okonkwo, MD6; Adam S. Kanter, MD7; Vedat Deviren, MD7; Juan S. Uribe, MD8; Robert K. Eastlack, MD9; Pierce D. Nunley, MD10; Neel Anand, MD11; Paul Park, MD12; Gregory M. Mundis Jr., MD13


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

2:52–3:10 p.m.
Discussion
Radiation exposure is a significant concern for the spine specialist. This is especially true given the advances in minimally invasive spine surgery techniques, which may rely heavily on fluoroscopy. In addition to exposing the spine surgery patient to radiation, those specialists affected include orthopaedic and neurosurgeons, interventional radiologists, interventional pain specialists, and anesthesiologists. Other medical professionals, such as physician assistants, nurses, and operating room technicians, may be frequently exposed to radiation as well. This session provides a focused discussion on current strategies for decreasing radiation exposure during spine surgery and other interventional procedures, while also exploring future directions to reduce the radiation burden to both spine specialist and patient.

**Upon completion of this session, participants should gain strategies to:**

- Counsel patients and staff on the risks of radiation exposure;
- Differentiate the magnitude of radiation from fluoroscopy versus x-ray versus computed tomography (CT);
- Choose the most appropriate radiation reduction techniques (MIS, image-guidance, etc.) for their practice.

**Agenda**

**Introduction**
Joseph P. Gjolaj, MD

**The Essentials of Radiation Exposure and General Tips for Avoidance**
A. Jay Khanna, MD

**Minimally Invasive Spine Surgery: One Step Forward, Two Steps Back?**
Daniel M. Sciubba, MD

**The Role of Image Guidance in Reduction of Radiation Exposure**
S. Samuel Bederman, MD, PhD, FRCSC

**Free-Hand Technique in Spine Surgery: Radiation Reduction at its Best**
Mark M. Mikhael, MD

**Interventional Spine Specialist’s Guide to Radiation Reduction**
John A. Carrino, MD

**Discussion, Questions and Answers**
Faculty Panel
Cervical Stenosis and Myelopathy
Jerome Schofferman, MD

Discussion, Questions and Answers
Faculty Panel

FDA Device/Drug Status:
E. Kaney Mayer, MD: This presentation does not discuss or include any applicable devices or drugs.
Daniel J. Mazanc, MD: Acetaminophen, Nonsteroidal anti-inflamatory drugs, Opioids (All approved for this indication).
Jerome Schofferman, MD: This presentation does not discuss or include any applicable devices or drugs.
Alison Stout, DO: This presentation does not discuss or include any applicable devices or drugs.
Ryan A. Tauzell, MA, PT, MDT: This presentation does not discuss or include any applicable devices or drugs.

2:10–3:10 p.m.
Section Specialty Track:
Section on Robotics and Navigation: Do Robotics and Navigation Have a Place in the Evolving Health Care Environment of Value-based Purchasing?
Room W470B
Moderator: Chetan K. Patel, MD

Implementation of new technology is an essential step in improving outcomes and advancing healthcare. We must always weigh the cost of the technology against the potential benefits to decide which technologies are ready for implementation. In this symposium, we will critically analyze the outcomes of navigated and robotic spine surgery based on the best quality evidence available. This analysis will be used to propose the value of these technologies and how they fit into today’s environment of value-based purchasing.

Upon completion of this session, participants should gain strategies to:
• Determine the evidence-based advantages and disadvantages of navigated spine surgery;
• Recognize the evidence-based advantages and disadvantages of robotic spine surgery;
• Analyze the cost-benefit ratio for implementation of navigation and robotic technologies in the operating room.

Agenda
Looking Beneath the Surface: Navigated Spine Surgery Outcomes Based on the Highest Quality Evidence
Srinivas K. Prasad, MD

Looking Beneath the Surface: Robotic Spine Surgery Outcomes Based on the Highest Quality Evidence
Bawarjan Schatlo, MD

Do Navigation and Robotic Spine Surgery Have a Place in the New Era of Value-based Purchasing?
Eric Truumees, MD

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

2:10–3:16 p.m.
Section on Spine Motion Technology: Abstract Presentations
Room W471
Moderator: Scott L. Blumenthal, MD

91. Cervical Disc Arthroplasty with PRESTIGE LP Disc Versus Anterior Cervical Discectomy and Fusion: Seven-Year Outcomes
Matthew F. Gornet, MD; J. Kenneth Burkus, MD; Mark E. Shaffrey, MD; Hui Nian; Frank E. Harrell Jr., PhD
1The Orthopedic Center of St. Louis, St. Louis, MO, US; 2The Hughston Clinic, Columbus, GA, US; 3UVA Health System Department of Neurosurgery, Charlottesville, VA, US; 4Vanderbilt University, Nashville, TN, US; 5Vanderbilt University Medical Center, Nashville, TN, US

FDA Device/Drug Status: PRESTIGE LP Disc (Approved for this indication)

92. Clinical and Radiological Assessment of Lumbar Disc Prosthesis with Controlled Mobility with Five-Year Follow-Up: A Prospective Study on 411 Patients
Jacques Beaurain, MD; Jerome Allain, MD; Joel Delecro, MD; Herve L. Chataigner, MD; Thierry Dufour, MD; Jean Huppert, MD; Alexandre F. Poignard Sr., PhD; Marc Arneil, MD; Thierry Vila, MD, Spine Consultant; Jean-Paul Steib, MD
1Neurochirurgie CHU Hôpital Général, Dijon, France; 2Hospital Henri Mondor, Creteil, France; 3CHU de Nantes, Nantes Cedex, France; 4Boussieres, France; 5CHR Orléans La Source, Orleans, France; 6Service De Neurochirurgie, Saint Priest En Jarez, France; 7Polyclinique Saint Andre, Reims, France; 8Paris, France; 9Strasbourg, France

FDA Device/Drug Status: Mobidisc (Approved for this indication)

2:22–2:28 p.m.
93. Seven-Year Results from the PCM Cervical Disc US FDA IDE Clinical Trial
Kelli Howell; Frank M. Phillips, MD; Fred Geisler, MD, PhD; Christopher J. Reath, PhD; Paul C. McAfee, MD, MBA
1NuVasive, San Diego, CA, US; 2Midwest Orthopaedics at Rush, Chicago, IL, US; 3The Chicago Back Institute, Chicago, IL, US; 4Orthopaedic Associates of Towson, Towson, MD, US

FDA Device/Drug Status: PCM Cervical Disc (Approved for this indication)
2:28–2:34 p.m.
94. The Benefit of Continued Motion of a Cervical Artificial Disc Replacement on Radiographic Adjacent Level Degeneration at Seven-Year Follow-Up
Jeffrey M. Spivak, MD¹; Jack E. Zigler, MD²; Michael E. Janssen, DO³; Bruce V. Darden II, MD⁴; Kris E. Radcliff, MD⁵
¹New York University Hospital for Joint Diseases, New York, NY, US; ²Texas Back Institute, Plano, TX, US; ³Center for Spinal Disorders, Denver, CO, US; ⁴OrthoCarolina Spine Center, Charlotte, NC, US; ⁵Rothman Institute, Thomas Jefferson University, Egg Harbor Township, NJ, US
FDA Device/Drug Status: ProDisc-C (Approved for this indication)

2:34–2:40 p.m.
95. Two-Level Cervical Disc Arthroplasty with PRESTIGE LP Disc Versus ACDF: A Prospective, Randomized, Controlled Multicenter Clinical Trial with 24-Month Results
Matthew F. Gornet, MD¹; Jeffrey R. McConnell, MD²; J. Kenneth Burkus, MD³; Todd H. Lanman, MD⁴; Randall F. Dryer, MD⁵; Scott D. Hodges, DO⁶; Hui Nian⁷; Frank E. Harrell Jr., PhD⁸
¹The Orthopedic Center of St. Louis, St. Louis, MO, US; ²OAA Orthopaedic Specialists, Allentown, PA, US; ³The Hughston Clinic, PC, Columbus, GA, US; ⁴University of California Los Angeles, Los Angeles, CA, US; ⁵Central Texas Spine Institute, Austin, TX, US; ⁶Center for Sports Medicine & Orthopaedics, Chattanooga, TN, US; ⁷Vanderbilt University, Nashville, TN, US; ⁸Vanderbilt University Medical Center, Nashville, TN, US
FDA Device/Drug Status: PRESTIGE LP Cervical Disc (Investigational/Not approved)

2:40–2:46 p.m.
96. Serum Metal Ion Levels after Surgery in Patients with Metal-on-Metal Cervical Disc Arthroplasty: A Prospective Study Up to 84 Months
Matthew F. Gornet, MD¹; Vaneet Singh²; Francine W. Schranck, RN, BSN³; Anastasia K Skipor⁴; Joshua Jacobs⁵
¹The Orthopedic Center of St. Louis, St. Louis, MO, US; ²Medtronic Spinal and Biologics, Memphis, TN, US; ³SPIRITT, Saint Louis, MO, US; ⁴Rush University Medical Center, Chicago, IL, US; ⁵Chicago, IL, US
FDA Device/Drug Status: PRESTIGE® LP Cervical Disc (Approved for this indication)

2:46–2:52 p.m.
97. Seven-Year Cost-Effectiveness of Cervical Disc Replacement Versus Anterior Cervical Discectomy and Fusion: Results from Investigational Device Exemption and Post-Approval Studies of ProDisc®-C Total Disc Replacement
Kris E. Radcliff, MD¹; Jason H. Lerner, PT, MBA²; Thierry Bernard, MS³; Chao Yang, MD⁴; Jack E. Zigler, MD⁵
FDA Device/Drug Status: ProDisc-C (Approved for this indication)

3:10–3:40 p.m.
Networking Break—Beverage Service
Technical Exhibition
Members’ Business Meeting
W181B
Practical Theater:
Navigating CMS Quality Initiatives (PQRS and Value-based Modifier): How to Successfully Report and Avoid Payment Adjustments
The Learning Place, Red Theater
Stop by to learn more about the latest reporting requirements for the Medicare Physician Quality Reporting System (PQRS) and Value-based Payment Modifier. NASS Performance Measurement Committee Members will discuss the various reporting mechanisms that can be used to meet requirements and avoid penalties.

3:10–3:40 p.m.
Meet the Author:
Ji-Hoon Seong, MD
The Learning Place, Yellow Theater
P112. Multilevel Fusion Versus Hybrid Surgery in Three-Level Cervical Disc Disease: Retrospective Matched Analysis of Clinical and Radiologic Results in Minimum Two-Year Follow-Up
Jung-Woo Hur, MD¹; Kyeong-Sik Ryu, MD²; Jin-Sung Kim, MD, PhD³
¹Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, South Korea; ²KangNam Saint Mary’s Hospital, Seoul, South Korea; ³Seoul St. Mary’s Hospital, Seoul, South Korea
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:10–3:40 p.m.
Meet the Author:
Alan S. Hilibrand, MD
The Learning Place, Green Theater
P129. Prolonged Weakness Affects Recovery of Motor Function following Anterior Cervical Discectomy and Fusion
Ronald Huang, MD¹; Alan S. Hilibrand, MD²
¹Philadelphia, PA, US; ²Rothman Institute, Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
3:10–3:40 p.m.
Meet the Author:
Sandip Chatterjee, FRCS
The Learning Place, Blue Theater

P119. Atlantoaxial Rotatory Subluxations in Children: A Review
Sandip Chatterjee, FRCS
Park Clinic, Kolkata, India
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:10–3:40 p.m.
Meet the Author:
Saleh S. Baeesa, MD
The Learning Place, Purple Theater

P106. Cervical Disc Arthroplasty for Degenerative Disc Disease: Two-Year Follow-Up from an International Prospective, Multicenter, Observational Study
Saleh S. Baeesa, MD
Jeddah, Saudi Arabia
FDA Device/Drug Status: Artificial Cervical Disc (Approved for this indication)

3:40–5:10 p.m.
Section Specialty Track:
Section on Biologics and Basic Research: Abstract Presentations
Room W470A
Moderator: Wellington K. Hsu, MD

3:40–3:44 p.m.
Introduction by Wellington K. Hsu, MD, Chair, Section on Biologics and Basic Research

3:44–3:50 p.m.
Section on Biologics and Basic Research Best Paper
98. Characterization, Imaging and Treatment of a Mouse Model of Human Spinal Cancer
Davina Cossigny, PhD
Spinal Biology Research, Heidelberg, Australia
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:50–3:56 p.m.
Julia Vavken, MD1; Alexander T. Mameghani, MD2; Patrick Vavken, MD2; Stefan Schaeren, MD1
1Basel, Switzerland; 2Boston, MA, US
FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

3:56–4:02 p.m.
100. Effect of a Selective Estrogen Receptor Modulator on Bone Formation in Osteoporotic Spine Fusion Using an Ovariectomized Rat Model
Sung Bae Park, MD, PhD1; Chi Heon Kim, MD, PhD2; Chun Kee Chung, MD, PhD1
1Seoul National University Boramae Hospital, Seoul, South Korea; 2Seoul National University Hospital Department of Neurosurgery, Seoul, South Korea
FDA Device/Drug Status: Rafloxfene (Approved for this indication)

4:02–4:08 p.m.
101. An Investigational Study of a Novel Parathyroid Hormone-Based Bone Graft Substitute for Interbody Spinal Fusion: An In Vivo Ovine Model
Bryan W. Cunningham, PhD1; Jason Schense, MD2; Ashley A. Murgatroyd, BS3; Paul C. McAfee, MD, MBA1
1Globus Medical, Audubon, PA, US; 2Kuros Biosurgery AG, Zürich, Switzerland; 3Orthopaedic Associates of Towson, Towson, MD, US
FDA Device/Drug Status: Osteogenic paste (Investigational/Not approved), BMP-2 with a collagen carrier (Approved for this indication)

4:08–4:14 p.m.
102. Notochordal Cell-Based Therapeutics Regenerate the Degenerative Disc: Evidence in a Preclinical Animal Model of Disc Disease
William Mark Erwin, DC, PhD1; Ajay Matta, PhD1; Muhammad Zia Karim, DVM, MSc1; Zhen J. Zhou, BS1
1Toronto Western Hospital, Toronto, ON, Canada; 2KDT, Toronto, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:14–4:20 p.m.
103. Interrelationships of Vitamin D Status, Bone Health and Fusion Consolidation
Ruben Maldonado, BS1; Mark Svet1; Lea Kanim, MA2; Melodie F. Metzger, PhD1
1Orthopaedic Biomechanics Laboratory, Los Angeles, CA, US; 2Brea, CA, US; 3Spine Center, Cedars-Sinai Medical Center, Los Angeles, CA, US; 4Cedars Sinai Medical Center, West Hollywood, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
THURSDAY, OCTOBER 15

4:20–4:26 p.m.
104. Effect of rhBMP-2 on Lung Cancer Spine Metastasis in Rodents
Abhishek Kannan, BS1; Kevin A. Sonn, MD2; Sharath S. Bellary, MD, MS3; Chawon Yun, PhD4; Sohaib Hashmi, MD5; Ralph Cook6; Anrutha Ashitkar4; Anjan Ghosh1; Michael S. Nickoli, MD3; Jason H. Ghodasra, MD3; Michael Okoli, BA7; Stuart R. Stock, PhD8; Erin L. Hsu, PhD9; Wellington K. Hsu, MD1
1Northwestern Feinberg School of Medicine Department of Orthopaedic Surgery, Chicago, IL, US; 2Maywood, IL, US; 3Northwestern University, Chicago, IL, US; 4Columbus, OH, US; 5Chicago, IL, US; 6David Geffen School of Medicine at UCLA, Department of Orthopaedic Surgery, Los Angeles, CA, US
FDA Device/Drug Status: recombinant bone morphogenetic protein 2 (Not approved for this indication)

4:26–4:32 p.m.
105. Expression of Survivin and VEGF in Sacral Chordoma Provides Potential Targets for Therapy
Huilin Yang, MD, PhD1; Chao Chen, MD1; Xiaochun Liu2; Jiayong Liu, MD3; Mustafa H. Khan, MD4
1First Affiliated Hospital of Soochow University, Suzhou, China; 2Toledo, OH, US; 3The University of Toledo College of Medicine, Toledo, OH, US; 4University of Toledo Medical Center, Toledo, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:32–4:38 p.m.
106. Dioxin Exposure Inhibits Osteogenic Differentiation and Impairs Bone Healing in a Rat Spine Fusion Model
Chawon Yun, PhD1; Ryan Freshman2; Danielle Chun, BA3; Sean M. Mitchell, BS4; Abhishek Kannan, BS5; Kevin A. Sonn, MD6; Sharath S. Bellary, MD, MS7; Michael S. Nickoli, MD8; Sohaib Hashmi, MD9; Jason H. Ghodasra, MD10; Marco Mendoza, MD11; Christian Park, BS12; Anjan Ghosh13; Jongwha Yun, MD14; Akshay Jain, BS15; Stuart R. Stock, PhD16; Erin L. Hsu, PhD17; Wellington K. Hsu, MD18
1Northwestern University, Chicago, IL, US; 2Feinberg School of Medicine, Department of Orthopaedic Surgery, Chicago, IL, US; 3Northwestern University Department of Orthopaedic Surgery, Chicago, IL, US; 4Columbus, OH, US; 5Chicago, IL, US; 6David Geffen School of Medicine at UCLA, Department of Orthopaedic Surgery, Los Angeles, CA, US
FDA Device/Drug Status: Human Recombinant Bone Morphogenetic Protein-2 (Approved for this indication), Resveratrol (Investigational/Not approved), Luteolin (Investigational/Not approved), 3,3’-Diindolylmethane (Investigational/Not approved), alpha-Napthoflavone (Investigational/Not approved)

4:38–5:10 p.m.
Discussion

3:40–5:10 p.m.
Section Specialty Track:
Section on Minimally Invasive Procedures: The Continuum of Care for Symptomatic Degenerative Spondylolisthesis: Is There Value to Traditional Stepwise Care or Are We Wasting Time and Money?
Skyline Ballroom C
Moderator: Raja Y. Rampersaud, MD, FRCS
Lumbar spinal stenosis (LSS) is a common degenerative condition that leads to significant pain, disability, work loss, reduced health-related quality of life (HRQoL) and an annual economic burden estimated in the billions of dollars. Degenerative lumbar spondylolisthesis (DLS) is a common subgroup of LSS with an estimated prevalence of 6% of the adult population that increases from the 5th to 8th decade of life. With the aging population, the future health resource demands for the DLS population will be significant. In the current health resource environment, meaningfully and comparative effectiveness research (CER) are paramount to enable advocacy for this growing demographic. The current medical paradigm dictates a step-wise approach starting with self-management, allied health interventions, pain interventions, and eventually surgical interventions or those who have failed everything else. However, while this approach makes perfect sense for patients likely to respond to conservative intervention, it may delay effective ‘downstream’ care to those who are high risk of failure of a particular ‘upstream’ intervention and thus can lead to poorer outcomes and ultimately higher cost.

This session presents both a pragmatic and best evidence approach to the continuum of care for DLS. Opinion leaders from across the continuum of care provide evidence to identify the ideal patient for different interventions and also identify scenarios where those interventions are of little value to the DLS patient. In addition, the panel and session participants openly discuss the value of the traditional stepwise care approach for DLS.

Upon completion of this session, participants should gain strategies to:
• Develop a patient-centered, outcomes-based approach to the management of DLS across the continuum of care;
• Consider the relative value of different management options for DLS;
• Identify the right care for the right patient at the right time.

Agenda
Introduction and Case Presentation
Raja Y. Rampersaud, MD, FRCS
Self-Management and Allied Health Interventions
Gregory L. Whitcomb, DC
Pain Management: Pills to Interventional Procedures
Aneesh K. Singla, MD
Surgery
• The Role for Decompression Alone
  Raja Y. Rampersaud, MD, FRCSC
• The Role for Decompression and Fusion
  Zoher Ghogawala, MD

The Clinical Practice Guideline Perspective: What Role Do They Play Across Disciplines?
Daniel K. Resnick, MD, MS

The Value Perspective: What is the Cost of Ineffective Care?
Sigurd H. Berven, MD

Moderated Open Panel and Participant Discussion: Is the Stepwise Approach Justifiable or Do We Need to Better Stratify the Management of DLS?
Faculty Panel

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

3:40–5:10 p.m.
Section Specialty Track:
Section on Radiology: MRI of Complications and Failures of Spine Surgery
Skyline Ballroom D
Moderator: A. Jay Khanna, MD

This session reviews the spectrum of complications and failures of spine surgery that can be evaluated by MR imaging of the spine. The faculty stratify the types of complications after spine surgery based on the type of spine surgery performed and the time of occurrence of the complication or finding after spine surgery. Numerous images and cases are reviewed in a systematic fashion with the intent of providing spine surgeons and other specialists the knowledge required to make similar diagnoses in their own patients.

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

3:40–5:10 p.m.
Section Specialty Track:
Section on Rehabilitation, Interventional and Medical Spine (RIMS): The Management Considerations of Spine Patients with Obesity and Diabetes
Skyline Ballroom AB
Moderator: Carrie A. Diulus, MD

Greater than one-third of the US population is obese and one-third (86 million adults) are diabetic or prediabetic, many of whom don’t even know it. Unfortunately, these numbers are growing and affect a disproportionate percentage of spine patients. Diabetic and obese patients present unique challenges for spine providers including challenges with differential diagnosis, medical, operative and perioperative management. Under value-based care, treatment outcomes will be closely linked with reimbursement. In this session, we tackle the most common challenges faced by spine providers and provide insight into improving not only patient outcomes, but also decreasing provider frustration.

Upon completion of this session, participants should gain strategies to:
• Appreciate unique diagnostic challenges in diabetic and obese patients;
• Recognize medical, lifestyle and supplemental strategies for improving outcomes in diabetic patients;
• Consider reimbursement implications of diabetes and obesity;
• Decrease surgical complications in obese and diabetic patients.

Agenda
The Role of Diabetes and Obesity in Spine Care
Carrie A. Diulus, MD

Diabetes and Obesity: Reversing Modifiable Risk Factors of Poor Surgical Outcomes
Sarah Hallberg, DO

Exercise in Modifying Risk Factors Associated with Diabetes and Obesity
Alison Stout, DO

Preoperative and Perioperative Management and Impact on Surgical Outcomes
Carrie A. Diulus, MD

Value-based Care Reimbursement in Diabetic and Obese Patients
E. Kano Mayer, MD

Discussion, Questions and Answers

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
There has been a renewed interest in spinal image guidance secondary to the development of more user-friendly technology and a growing concern for radiation exposure in the operating room. This session teaches the fundamentals of image-guided spinal surgery. The caveats and pitfalls of this technology are discussed, in addition to the operating room setup. Participants learn the applications of image guidance to cervical, thoracic, lumbar, minimally invasive, revision and deformity spinal surgery procedures. A review of the published literature on spinal image guidance and operating room radiation exposure is presented. The session concludes with case presentations and discussion.

Upon completion of this session, participants should gain strategies to:
- Demonstrate the proper setup in the operating room for image-guided spinal surgery;
- Identify and perform different registration techniques used in image-guided spinal surgery;
- Describe methods to maintain navigation accuracy in image-guided spinal fusion procedures;
- Compare different image guidance technologies that are available and understand CPT codes for spinal image guidance;
- Review the most common pitfalls of spinal image guidance that can add time and frustration to the procedure and identify methods to avoid these pitfalls.

Agenda
Introduction
Eric W. Nottmeier, MD and Eric A. Potts, MD

Pitfalls and Caveats of Spinal Image Guidance
Stephen Pirris, MD

Use of Image Guidance in Lateral Interbody Fusion
Michael Mac Millan, MD

Use of Image Guidance in Cervical Surgery
Eric W. Nottmeier, MD

Minimally Invasive Applications of Spinal Image Guidance
Eric A. Potts, MD

Radiation Exposure in Spinal Surgery
Iain H. Kalfas, MD

Topic to be determined
Srinivas K. Prasad, MD
The relationship between decreased hip mobility and altered lumbar spine kinematics is evident in the literature. Progressive degeneration of the hip joint has been identified as a factor in the development of lumbar spine spondylosis and stenosis. Researchers have noted a complex hip-spine syndrome where flexion deformities of the hip result in increased loading of the lumbar spinal zygapophyseal joints as well as atypical postural findings. Low back pain arising from limited hip mobility is not confined exclusively to the elderly population and has been found to affect a large demographic of patients. In otherwise healthy athletes, hip stiffness and pathology have been linked to the development of spine injuries and has been found to be predictive of LBP in athletes.

This session reviews the etiology, clinical presentation and management of patients with concurrent spine and hip pathology. A multidisciplinary faculty presents on the interdependence of hip and lumbopelvic motion and the effects of hip degeneration on lumbar spine conditions. Biomechanical considerations, examination techniques and treatment modalities in common conditions arising from concurrent spine and hip pathology are reviewed. Indications for clinical examination techniques and treatment modalities in patients who present with hip-spine syndrome are presented. Presenters emphasize the importance of utilizing reliable, sensitive and specific clinical examination techniques where they exist to screen the interdependent functions of the lumbopelvic hip complex.

Upon completion of this session, participants should gain strategies to:
• Recognize distinctive characteristics of the history, functional limitations and physical examination of individuals who present with pain and disability arising from concurrent spine and hip pathology;
• Integrate knowledge of hip and spine biomechanics with clinical findings to facilitate optimal triage of patients with pain and disability arising from concurrent spine and hip pathology in a manner consistent with best practice;
• Identify the advantages and disadvantages of specific clinical examination and treatment techniques for individuals who present concurrent spine and hip pathology;
• Enhance the use of best practice examination and treatment techniques of individuals with concurrent spine and hip pathology, based on the most current evidence.

Agenda
Introduction/Welcome
Leonard Voronov, MD, PhD

Hip-Spine Syndrome: What Does the Literature Tell Us About the Co-Occurrence of Hip Pathology and Low Back Pain?
Evan Johnson, PT, DPT, OCS

Progressive Hip and Lumbar Spine Degeneration: Evaluation of Hip-Spine Syndromes
Peleg Ben-Galim, MD

Kinematics and Regional Interdependence of the Lumbar Spine and Lower Quarter
Rick Placide, MD, PT

The Impact of Hip Stiffness on Locomotion: How Does Hip OA Affect the Lumbar Spine During Gait?
D. Casey Kerrigan, MD

Common Hip Injuries That May Present with Low Back Pain
Robert R. Turner, PT, MS, OCS

Interventions for the Patient with Hip-Spine Syndrome
Clark Smith, MD, MPH

Questions and Answers

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
5:00–6:00 p.m.  
Resident, Fellow and Program Directors Reception  
W375 West Lobby  

Joint Sections of NASS Reception  
W375 West Lobby  

5:00–8:00 p.m.  
Surgical Innovation Lab Workshop:  
Spineology: Advanced Techniques in Midline Lumbar Interbody Fusion and Fixation—Invitation Only  
Speaker: Dwight Tyndall MD  
The Learning Place, Yellow Lab  

Zimmer Biomet: Timberline MPF—A Unique Modular Solution for Lateral Interbody Fusion and Fixation  
The Learning Place, Green Lab  

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**SUBMIT AN ABSTRACT**  
THE NORTH AMERICAN SPINE SOCIETY  
SUMMER SPINE MEETING  
JULY 20–23, 2016 · MIAMI, FLORIDA  

ELECTRONIC SUBMISSION DEADLINE:  
DECEMBER 16, 2015  
Submit an abstract for ePoster consideration or session proposal at http://sms.spine.org  
Questions: education@spine.org
The amount of basic and clinical science in the peer review literature is enormous. One of the biggest challenges for the clinician is the integration of emerging science into clinical practice. In addition to managing the relevant information, physicians often are called upon to coordinate patient care with rehabilitative therapy. This symposium presents the latest science regarding neurophysiology and neuromuscular control related to function of the spine. Further, the science behind subgrouping of patients with low back pain are discussed. Case examples are presented to describe physician and therapist decision-making that applies the science presented to the patient evaluation. Finally, implementation based on the evaluation is discussed, including how to measure the therapeutic plan recommended.

Upon completion of this session, participants should gain strategies to:
- Ascertain the importance of biomechanical interventions;
- Define how changes in motor control effect treatment;
- Recognize the importance of integrating pain science and biomechanics in treatment;
- Describe why subgrouping patients increases treatment success;
- Comprehend the way the clinicians translate the science into everyday practice;
- Identify the importance of objective measurement in clinical practice;
- Consider the evidence of efficacy of application of science to practice.

Agenda
Introduction
Ted E. Dreisinger, PhD

How Understanding Motor Control of the Spine is Changing: What this Means for Treatment
Paul Hodges, PT, PhD

How Biomechanics and Motor Control of the Spine Can Shape Clinical Interventions
Jaap van Dieën, PhD

Do All Patients Benefit from the Same Treatment or Does Subgrouping Identify the Right Patients for the Right Treatments?
Linda van Dillen, PhD

Cognitive Functional Therapy for Targeted Management: Integrating Biological, Psychological and Social Factors
Peter O’Sullivan, PhD

Why We Need Measurement in Clinical Practice, What Can We Do, What More Do We Need?
Ted E. Dreisinger, PhD

Clinical Trials of Interventions that Target Biomechanics and Motor Control: What is the Evidence?
Chris Maher, PhD

Discussion

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
Upon completion of this session, participants should gain strategies to:

- Apply evidence-based recommendations to common spine cases;
- Determine which components of the clinical presentation are relevant to this type of decision-making;
- Acknowledge gaps in scientific evidence on related topics;
- Appreciate the importance of shared decision-making in determining appropriate spine care.

Panelists
Kristin Archer, PhD, DPT
Geri Baumbattl, MA
S. Samuel Bederman, MD, PhD, FRCSC
Scott Haldeman, MD, PhD, DC
Donald Murphy, DC
James Rainville, MD
Matthew J. Smith, MD
William C. Watters III, MD, MS

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

8:00–9:00 a.m.
Interdisciplinary Spine Forum: Spine Point/Counterpoint: Surgical Versus Nonsurgical Approaches to Spine Care
Room W474
Moderator: Simon Dagenais, DC, PhD

8:00–9:00 a.m.
Best Papers: Adjacent Segment and Junctional Complications
Skyline Ballroom AB
Moderator: Michael D. Daubs, MD

8:00–9:06 a.m.
107. Can Long Posterior Cervical Fusions Be Safely Stopped at C7 Instead of the Upper Thoracic Spine?
David B. Bumpass, MD; Lukas P. Zebala, MD; Jacob A. Haynes, MD; Mikhail Roubakha, BS; Jacob M. Buchowski, MD, MS; K. Daniel Riew, MD
Washington University, Saint Louis, MO, US; Washington University School of Medicine, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

8:06–9:12 a.m.
108. Age-Adjusted Alignment Goals Have the Potential to Reduce Proximal Junctional Kyphosis
International Spine Study Group; Frank J. Schwab, MD; Renaud Lafage; Steven D. Glassman, MD; Shay Bess, MD; Bradley Harris, JD; Justin K. Scheer, BS; Robert A. Hart, MD; Breton Line; Douglas C. Burton, MD; Han Jo Kim, MD; Eric O. Klineberg, MD; Themistocles S. Protopsaltis, MD; Christopher P. Ames, MD; Virginie Lafage, PhD
Washington University, Saint Louis, MO, US; New York University Hospital for Joint Diseases, New York, NY, US; Rocky Mountain Scoliosis and Spine, Denver, CO, US; University of California San Diego, San Diego, CA, US; Oregon Health & Science University, Portland, OR, US; University of Kansas Medical Center, Kansas City, KS, US; Hospital for Special Surgery, New York, NY, US; University of California San Francisco School of Medicine, Sacramento, CA, US; University of California San Francisco, San Francisco, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:12–9:18 a.m.
109. Development of Validated Computer Based Preoperative Predictive Model for Proximal Junctional Failure or Clinically Significant Proximal Junction Kyphosis with 86% Accuracy Based on 510 Adult Spinal Deformity Patients with Two-Year Follow-Up
International Spine Study Group; Justin K. Scheer, BS; Justin S. Smith, MD, PhD; Frank J. Schwab, MD; Virginie Lafage, PhD; Christopher I. Shaffrey, MD; Shay Bess, MD; Robert A. Hart, MD; Munish C. Gupta, MD; Themistocles S. Protopsaltis, MD; Richard A. Hostin Jr., MD; Vedat Deviren, MD; Breton Line; Alan Daniels, MD; Bassel G. Diebo, MD; Renaud Lafage; Lukas P. Zebala, MD; Gregory M. Mundis Jr., MD; Amit Jain; Tamir Alion, MD, FRCSC, MPH; Han Jo Kim, MD; D. Kojo Hamilton, MD; Douglas C. Burton, MD; Eric O. Klineberg, MD; Christopher P. Ames, MD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
9:18–9:24 a.m.
110. Upper Thoracic PJK/PJF is Typically Due to Spondylolisthesis Whereas Lower Thoracic PJK/PJF is More Often Due to Vertebral Fractures
Murat S. Eksi, MD1; Alexander A. Theologis, MD2; Altug Yucekul, MD3; Murat Pekmezci, MD4; Shane Burch, MD4; Sigurd H. Berven, MD4; Bobby Tay, MD4; Dean Chou, MD4; Christopher P. Ames, MD4; Vedat Deviren, MD4
1University of California San Francisco, CA, US; 2University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US; 3Ankara, Turkey; 4University of California San Francisco Department of Orthopaedic Surgery, San Francisco, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:24–9:30 a.m.
111. Clinical Adjacent-Segment Pathology after Anterior Cervical Discectomy and Fusion: Results after a Minimum of Ten-Year Follow-Up
Sung-Kyu Kim; Jae-Yoon Chung, MD; Hyoung-Yeong Seo, MD; Jun-Ik Choi, MD
Gwajung, South Korea
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:30–9:36 a.m.
112. Effect of Inclusion of Asymptomatic Spondylotic Levels on Adjacent Segment Disease following ACDF
Paul W. Millhouse, MD1; Caleb J. Behrend, MD2; Vismay Thakkar, MD2; Alexander R. Vaccaro, MD, PhD1; Alan S. Hillbrand, MD1; Todd J. Albert, MD4
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:36–9:42 a.m.
113. Transition from Radiological to Clinical Adjacent Disc Problems: Which Factors are Responsible? A Prospective Ten-Year Study
Sandip Chatterjee, FRCS
Park Clinic, Kolkata, India
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
9:10–9:16 a.m.
115. Comprehensive Nonsurgical Treatments Decrease the Need for Spine Surgery in Patients with Spondylolisthesis
Emel E. Ozcan, MD1; Sibel Demir-Deviren, MD2; Savas Sencan; Sigurd H. Berven, MD1; Vedat Deviren, MD2; Shane Burch, MD2; Bobby Tay, MD2
1University of California San Francisco, Department of Orthopaedic Surgery, San Francisco, CA, US; 2University of California San Francisco, San Francisco, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:16–9:22 a.m.
116. Assessment of General Practitioner’s Interests in Expediting Wait Lists for Spine Surgical Consultation with Use of Allied Health Professionals: Results of a Pilot Study
Patrick Thornley, BHSc1; Ahmed Al Jishi, FRCSC, MD, BS2; Darryl Yardley, PT2; Leah Wall, MD2; Edward Kachur, MD3; Aleksa Cenic, MD4
1Michael G. DeGroote School of Medicine, Faculty of Health Sciences, McMaster University, Hamilton, ON, Canada; 2Hamilton, ON, Canada; 3Spine Clinic Neuroscience Ambulatory Centre (NAC), Hamilton, ON, Canada; 4Hamilton General Hospital, Hamilton, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:22–9:28 a.m.
117. Patterns of Lumbar Pain: An Effective Approach to Lumbar and Sciatic Pain in Primary Care in Occupational Medicine. Comparative Study of Two Retrospective Cohorts of 3627 Patients
Jaime Diaz de Atauri, MD1; Oscar Zabalza Mantilla, MD2; Mikel Ayala Garcia, MD2
1Mutualia Clinica Ercilla Bilbao Spine Unit, Bilbao, Vizcaya, Spain; 2Hospital San Jose Vithas-Mutualia, Vitoria, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:28–9:34 a.m.
118. Attitudes Toward Scoliosis Specific Exercises Among Scoliosis Research Society Surgeons
Cindy L. Marti, PT1; Steven D. Glassman, MD2; Leah Y. Carreon, MD, MSc2; Patrick Knott, PhD, PA-C2; Michael T. Hresko, MD4
1Spinal Dynamics of Wisconsin, Wauwatosa, WI, US; 2Norton Leatherman Spine Center, Louisville, KY, US; 3Rosalind Franklin University, North Chicago, IL, US; 4Children Hospital Boston, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
10:00–10:30 a.m.
Meet the Author:
Lindsay Tetreault and Michael G. Fehlings, MD, PhD, FRCSC
The Learning Place, Yellow Theater

P123. Clinical and Surgical Predictors of Complications following Surgery for the Treatment of Cervical Spondylotic Myelopathy: Results from the Multicenter, Prospective AOSpine International Study of 479 Patients

Michael G. Fehlings, MD, PhD, FRCSC2; Lindsay Tetreault2; Branko Kopjar, MD, PhD3; Pierre Cote, DPT, PhD3; Paul M. Arnold, MD4; Natalia Nugaeva, PhD6

2Toronto Western Hospital, Toronto, ON, Canada; 3University of Toronto, Oakville, ON, Canada; 4University of Washington, Seattle, WA, US; 5Toronto Western Research Institute, Toronto, ON, Canada; 6University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US; 7University of Toronto, Toronto, ON, Canada

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P178. Efficacy and Safety of Riluzole in Acute Spinal Cord Injury (SCI): Rationale and Design of AOSpine Phase III Multicenter Double Blinded Randomized Controlled Trial (RISCIS)

Michael G. Fehlings, MD, PhD, FRCSC2; Branko Kopjar, MD, PhD3; Robert G. Grossman, MD4

2Toronto Western Hospital, Toronto, ON, Canada; 3University of Washington, Seattle, WA, US; 4The Methodist Hospital, Houston, TX, US

FDA Device/Drug Status: Riluzole (Not approved for this indication)

10:00–10:30 a.m.
Meet the Author:
Sang-Hun Lee, MD, PhD
The Learning Place, Green Theater

P125. Outcomes and Related Factors of C5 Palsy following Cervical Laminectomy with Instrumented Fusion: Comparison with Laminoplasty Group

Sang-Hun Lee, MD, PhD3; Kyung-Chung Kang, MD; Kyung-Soo Suk, MD, PhD3; Sang-Phil Hwang, MD; Soojin Jang, MD3

3Seoul, South Korea; 4KyungHee University Medical Center, Seoul, South Korea; 5Yonsei University College of Medicine Department of Orthopaedic Surgery Kangnam Severance Hospital, Seoul, South Korea; 6Seoul, South Korea; 7Spine Center, Kyung Hee University Hospital at Gangdong, Seoul, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P43. A Comprehensive MRI Classification System for Cervical Foraminal Stenosis

Sang-Hun Lee, MD, PhD3; So Young Park, MD, PhD; Jeffrey C. Wang, MD2; Kyung-Chung Kang, MD2; Sang-Phil Hwang, MD; Soojin Jang, MD2

2Seoul, South Korea; 3University of Southern California Spine Center, Los Angeles, CA, US; 4KyungHee University Medical Center, Seoul, South Korea; 5Spine Center, Kyung Hee University Hospital at Gangdong, Seoul, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

10:00–10:30 a.m.
Meet the Author:
Xie En, MD
The Learning Place, Blue Theater

P42. Risk Factors of Severe Adolescent Scoliosis Tied to HTN

Xie En, MD3; Dingjun Hao, MD; Dageng Huang, MD; Biao Wang1; Hua Guo, MD4

1Hong Hui Hospital, Xi’an Jiaotong University College of Medicine, Xi’an, Shan Xi, China; 2Xi’an Honghui Hospital, Xi’an, Shan Xi, China; 3Honghui Hospital, Department of Spinal Surgery, Xi’an, Shan Xi, China; 4Xi’an, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

10:00–10:30 a.m.
Meet the Author:
Dante M. Leven, DO, PT
The Learning Place, Purple Theater

P81. Higher American Society of Anesthesiologist (ASA) Score is an Independent Risk Factor for Complications following Adult Deformity Surgery (ADS)

Dante M. Leven, DO, PT1; Parth Kothari, BS1; Branko Skovrlj, MD2; Jeremy Steinberger, MD2; Javier Guzman, BS1; Nathan J. Lee, BS1; John I. Shin, BS1; Samuel K. Cho, MD4

1Mount Sinai School of Medicine, New York, NY, US; 2Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 3Mount Sinai, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P150. Risk Factors for Readmission following Posterior Lumbar Fusions

Dante M. Leven, DO, PT1; Nathan J. Lee, BS1; Parth Kothari, BS1; Jeremy Steinberger, MD2; Branko Skovrlj, MD; John I. Shin, BS1; Javier Guzman, BS1; Samuel K. Cho, MD4

1Mount Sinai School of Medicine, New York, NY, US; 2Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 3Mount Sinai, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
10:25–10:30 a.m.
NASS Recognition Awards
Skyline Ballroom AB

The 2015 Recognition Awards are presented to outstanding society members.

Leon Wiltse Award: Frank J. Eismont, MD
David Selby Award: Donna M. Lahey, RNFA
Henry Farfan Award: James C. Iatridis, PhD
Past President Award: David A. Wong, MD, MSc, FRCS
Inaugural Spine Advocacy Award: Jeffrey J. Wise, MD

10:30–11:00 a.m.
Research Grant and Fellowship Awards Presentations
Skyline Ballroom AB
Moderator: Charles A. Reitman, MD

10:30–10:35 a.m.
2012 Research Grant Award Winner
Alterations in Intervertebral Disc Composition, Matrix Homeostasis and Biomechanical Behavior in the UCD-T2DM Rat Model of Type 2 Diabetes
Aaron J. Fields, PhD1; Britta Berg-Johansen, MS1; Lionel N. Metz, MD2; Stephanie Miller, BS; Brandon La, BS1; Ellen C. Liebenberg, BS1; Dezba G. Coughlin, PhD1; James L. Graham, PhD1,3; Kimberly L. Stanhope, PhD1,3; Peter J. Havel, PhD, DVM3; Jeffrey C. Lotz, PhD1
1Orthopaedic Bioengineering Laboratory, Department of Orthopaedic Surgery, University of California, San Francisco, CA, US; 2Department of Molecular Biosciences, University of California, Davis, CA, US; 3Department of Nutrition, University of California, Davis, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

10:35–10:40 a.m.
2013 Research Grant Award Winner
Regulation of 3D Axonal Outgrowth from Cultured DRG by Anulus Fibrosus Cells
Hyunchul Kim, MS1; Sameer B. Shah, PhD1; Adam H. Hsieh, PhD1
1University of Maryland, College Park, MD, US; 2University of California San Diego, San Diego, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

10:40–10:45 a.m.
2013 Research Grant Award Winner
The Role of BMP9 in Regulating the Proliferation and Survival of the Intervertebral Nucleus Pulposus Cells (NPCs)
Michael J. Lee, MD; Tong-Chuan He, MD, PhD
Department of Orthopaedic Surgery and Rehabilitation Medicine, The University of Chicago Medical Center, Chicago, IL, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

10:45–10:55 a.m.
Discussion/Questions

10:55-11:00 a.m.
2015 Research Grants and Fellowship Awards Presentation

10:30–11:00 a.m.
Global Spine Forum:
World Spine Care Update
Room W471
Presenter: Scott Haldeman, MD

10:30 a.m.–12:00 p.m.
Interdisciplinary Spine Forum:
Perioperative Care: What the Surgeon Needs to Know
Room W474
Moderator: Jeffrey C. Wang, MD

Despite advancements in diagnostic and surgical technologies, axial conditions continue to be a costly and clinically-vexing problem with major ramifications for personal quality-of-life, societal productivity, and health insurance and disability systems. These factors have resulted in health-system emphasis on improved outcomes and reduced costs. Strategies such as ACO driven clinical pathways, pay for performance (P4P), and bundled or episode-based reimbursement are forging new relationships in spine care.

Historically, patient care has been silo-based with arguably negative consequences. Administrative and market pressures now make it clear that multidisciplinary care integration will redefine the perioperative experience. This session provides an evidence-informed view of optimal perioperative patient care teams and how care integration can enhance outcome and value.

Upon completion of this session, participants should gain strategies to:

• Critically evaluate extant perioperative spine care programs in the context of best-available evidence;
• Effectively discriminate high-quality preoperative care and identify what constitutes truly “failed” nonsurgical care;
• Assess the quality and potential outcome benefit of presurgical rehabilitation;
• Incorporate preoperative psychological screening and/or evidence-informed patient education regarding the pre- and postoperative surgical experience;
• Optimize immediate and transitional postoperative care with an emphasis on early patient reactivation.
Agenda

Perioperative Team Care: Why the Surgeon Needs to Know
Jeffrey C. Wang, MD

Establishing a Perioperative Team: Defining Players and Roles
Michael L. Reed, DPT, OCS

What Does Evidence-based Rehabilitation Look Like and When Has It Failed?
Julie Fritz, PT, PhD

Conservative Care that May or May Not Lead to Surgery
Evan Johnson, PT, DPT, OCS

What Can Presurgical Psychological Evaluation Tell Us?
Daniel Bruns, PsyD, FAPA

Seamless Postoperative Care: Guiding the Transition From Early Pain Management to Active Care
Matthew Smuck, MD

Putting It All Together: A Surgeon’s Perspective on the Practical Benefits of Team-based Perioperative Care
Edward J. Dohring, MD

Moderated Open Panel and Participant Discussion: The Future of Perioperative Care: Where Are We Headed and Who Should Be Involved?
Faculty Panel

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

11:00 a.m.–12:00 p.m.

Breakout Session:
Cervical Spinal Alignment Abstract Presentations
Skyline Ballroom AB
Moderator: Alan T. Villavicencio, MD

11:00–11:06 a.m.

120. Does Cervical Sagittal Alignment Correlate with Outcomes following Posterior Laminectomy and Fusion for Cervical Myelopathy?
John A. Sielatycki, MD1; Sheyan J. Armaghani, MD2; Arnold Silverberg, BS3; Matthew J. McGirt, MD4; Clinton J. Devin, MD5; Kevin O’Neill, MD6

1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US; 4Vanderbilt University Medical Center Department of Orthopaedics, Nashville, TN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:06–11:12 a.m.

121. Identifying Preoperative Thoracic Compensation and Predicting Postoperative Reciprocal Thoracic Kyphosis and PJK

International Spine Study Group1; Themistocles S. Protopsaltis, MD2; Bassel G. Diebo, MD3; Renaud Lafage, PhD4; Justin S. Smith, MD, PhD5; Justin K. Scheer, BS5; Daniel M. Scuibba, MD6; Peter G. Passias, MD7,8; Han Jo Kim, MD8; D. Kojo Hamilton, MD9; Alexandra Soroceanu, MD, MPH9; Michael F. O’Brien, MD10; Eric O. Klineberg, MD11; Christopher P. Ames, MD12; Christopher I. Shaffrey, MD13; Shay Bess, MD14; Robert A. Hart, MD15; Frank J. Schwab, MD16; Virginie Lafage, PhD17


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:12–11:18 a.m.

122. Restoration of Cervical Alignment is Associated with Improved Clinical Outcome after One and Two Level Anterior Cervical Discectomy and Fusion

Xiaobang Hu, PhD1; Donna D. Ohnmeiss, PhD2; Jack E. Zigler, MD3; Richard D. Guyer, MD4; Isador H. Lieberman, MD, FRCSC, MBA5

1Scoliosis and Spine Tumor Center, Texas Back Institute, Texas Health Presbyterian Hospital Plano, Plano, TX, US; 2Texas Back Institute Research Foundation, Plano, TX, US; 3Texas Back Institute, Plano, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:18–11:24 a.m.

123. Can Measurements on Cervical Radiographs Predict Concurrent Thoracolumbar Deformity and Provide a Threshold for Acquiring Full-Length Spine Radiographs?

Brandon B. Carlson1; Themistocles S. Protopsaltis, MD2; Peter G. Passias, MD3,4; Justin S. Smith, MD, PhD5; Christopher P. Ames, MD6; Richard A. Hostin Jr., MD7; Munish C. Gupta, MD8; Virginie Lafage, PhD9; Gregory M. Mundis Jr., MD10,11; Michael P. Kelly, MD12,13; Robert A. Hart, MD14; Frank J. Schwab, MD15; Douglas C. Burton, MD16


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
11:24–11:30 a.m.
124. Functional Spinal Unit Height and Sagittal Alignment of Two-Level CDA and ACDF Patients
Jonathan J. Liu, MD1; Ripul R. Panchal, DO2; Kee D. Kim, MD3
1University of California Davis, Sacramento, CA, US; 2Department of Neurological Surgery, Sacramento, CA, US; 3University of California Davis School of Medicine, Sacramento, CA, US
FDA Device/Drug Status: Mobi-C® Cervical Artificial Disc (Approved for this indication)

11:30–11:36 a.m.
125. Is the C7 Sagittal Vertical Axis (SVA) the Best Radiographic Measure to Predict Clinical Outcomes in Adult Spinal Deformity?
Yong-Chan Kim, MD, PhD1; Jeffrey L. Gum, MD2; Lawrence G. Lenke, MD3; Ho-Guen Chang; Cheol-Jung Yang; Sirichai Wilartratsami; Linda Koester4; Leah Y. Carreon, MD, MSc2; Kathy Blanke, RN5
1Department of Orthopaedic Surgery, Hallym University Sacred Heart Hospital, Anyang-si, South Korea; 2Norton Leatherman Spine Center, Louisville, KY, US; 3Washington University School of Medicine, Saint Louis, MO, US; 4Saint Louis, MO, US; 5Washington University in St. Louis, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:36–11:42 a.m.
126. Changes in Sagittal Alignment after Cervical Disc Arthroplasty: Results of a Pilot Study
Kemal Yucesoy, MD1; Zafer Yuksel, MD2; Idiris Altun, MD3
1Ozel Kent Hospital, Neurosurgery Department, Izmir, Turkey; 2Avşar Kampüsü, Kahramanmaras, Turkey; 3Ksu Medical School Hospital, Neurosurgery Service, Kahramanmaras, Turkey
FDA Device/Drug Status: Synergy Disc (Investigational/Not approved)

11:42 a.m.–12:00 p.m.
Discussion

11:00 a.m.–12:00 p.m.
Breakout Session:
Does Our Current Research Paradigm Improve or Impede the Quality of Care for Low Back Pain (LBP) Patients?
Skyline Ballroom C
Moderator: Ronald G. Donelson, MD, MS

The spine has a very limited vocabulary for expressing that something is wrong. Low back pain (LBP) therefore reflects many different conditions. Unfortunately, imprecise diagnoses complicate treatment selection and decrease treatment effectiveness.

Spine care research has been locked in a search for the best treatment for a nonspecific symptom, satisfied for decades with analyzing randomized clinical trial (RCT) group means in large heterogeneous samples. Two questions then arise: Have RCTs improved or impeded the quality of care for LBP patients? Are LBP patients better off now than they were 30 years ago?

Meanwhile, two large international surveys of LBP researchers reveal that the highest research priority is the identification and validation of subgroups of more homogeneous patients, perhaps independent of making a structural/anatomic diagnosis. Although subgroup-specific studies have proliferated, most spine clinicians and even LBP clinical guidelines do not appreciate their primary role in moving us toward individualized care.

We need to escape from one-size-fits-all treatments of this regional symptom in favor of treatment decisions based on individual patient’s characteristics. For RCTs rich in information and sample size, post hoc subgroup analyses can produce useful findings by using baseline patient characteristics to create a more homogeneous cohort with treatment effects re-evaluated relative to outcomes measured. However, the rare a priori or preplanned identification of homogeneous subgroups based on a more precise diagnosis has particular value.

The first necessary research step is demonstrating inter-examiner reliability in identifying members and nonmembers of each clinical syndrome or subgroup. Each reliable syndrome then requires validation, first with preliminary prospective cohort studies followed by RCTs that randomize members of that syndrome.

The Levels of Evidence paradigm, intended to both guide and evaluate research design and quality, does not include or acknowledge the fundamental importance of reliability studies, instead focusing on the need for a gold standard for diagnosis, which unfortunately and ironically does not exist for most LBP. Each validated syndrome or subgroup, even for non-anatomic-based criteria, needs its own diagnostic gold
standard. This also will decrease the number of patients that have no diagnosis, i.e. have nonspecific LBP.

With no anatomic basis for diagnosing the cause of most LBP, new research and diagnostic paradigms are required in order to identify and validate these clinical syndromes or subgroups. Subgroup-specific RCTs are essential versus more nonspecific RCTs that will simply perpetuate our past lack of progress. We also present a real-life example of an innovative “precise” spinal diagnosis identifying individualized treatments leading to predictably good and well-documented outcomes.

Upon completion of this session, participants should gain strategies to:
• Examine the consequences of a precise versus imprecise diagnosis on treatment selection and outcomes;
• Compare the strengths and weaknesses of RCTs in helping decision-making when treating individuals;
• Review the types of research studies essential to identifying and validating low back pain subgroups;
• Debate the strengths and weaknesses of the “Level of Evidence” construct in guiding and evaluating subgroup-specific research;
• Analyze a real-life example of a standardized, predictably-effective, individualized treatment resulting from making a “precise” spinal diagnosis.

Agenda
What Comprises a “Precise” Spinal Diagnosis? The Key to Effective Individualized Care
Ronald G. Donelson, MD, MS

How to Establish and Validate a Precise Diagnosis: The Essential Research Pathway toward More Individualized Care
Kevin F. Spratt, PhD

Diagnostic Gold Standard: Currently Missing-In-Action for Most Low Back Pain
Jon D. Lurie, MD, MS

Debate: The Current “Levels of Evidence” Construct is Advancing the Quality of Patient Care
Pro: Jon D. Lurie, MD, MS
Con: Kevin Spratt, PhD

A “Precise” Diagnosis Identifying a Standardized, Predictably-Effective, Individualized Treatment: A Real-Life Example
Ronald G. Donelson, MD, MS

Proposed Action Steps
F. Todd Wetzel, MD

Discussion, Questions and Answers

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
11:24–11:30 a.m.
131. Do Adult Spinal Deformity Patients with Severe but Flexible Sagittal Malalignment Need a Three-Column Osteotomy?

Isaac O. Karikari, MD1; Lawrence G. Lenke, MD2; Keith H. Bridwell, MD2; Michael P. Kelly, MD3; Jeffrey L. Gum, MD3; Patrick A. Sugrue, MD4; David B. Bumpass, MD5

1Washington University, Saint Louis, MO, US; 2Washington University School of Medicine, Saint Louis, MO, US; 3Northwestern University Spine Center, Louisville, KY, US; 4Northwestern University Medical School, Chicago, IL, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:30–11:36 a.m.
132. Thoracic Volume Modeling of Growing Spine Interventions in Early Onset Scoliosis

Charles Gerald T. Ledonio, MD1; David Matson2; Kristin England, BA, MD3; David W. Polly Jr., MD4; Jeff B. Pawelek4

1University of Minnesota, Minneapolis, MN, US; 2University of Minnesota Medical School, Minneapolis, MN, US; 3University of Minnesota Department of Orthopaedic Surgery, Minneapolis, MN, US; 4San Diego Center for Spinal Disorders, San Diego, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:36–11:42 a.m.
133. Surgery Outcomes of Adolescent Idiopathic Scoliosis Surgery Related to Age and Length of Follow-Up

Glenn R. Buttermann, MD; Sarah A. Mueller, CST, BA

Midwest Spine and Brain Institute, Stillwater, MN, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:42 a.m.–12:00 p.m.
Discussion

11:00 a.m.–12:00 p.m.
Breakout Session:
Hip-Pelvis-Spine Abstract Presentations
Room W470A
Moderator: Michael L. Reed, DPT, OCS

11:00–11:06 a.m.
134. Restoration of Lumbopelvic Sagittal Alignment and its Maintenance following Transforaminal Lumbar Interbody Fusion (TLIF): Comparison between Straight Type Versus Curvilinear Type Cage

Myung-Hoon Shin, MD

Department of Neurosurgery, Incheon St. Mary’s Hospital, College of Medicine, The Catholic University, Incheon, Republic of Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:06–11:12 a.m.
135. Characteristics of Sagittal Spine-Pelvis-Leg Alignment in Patients with Severe Hip Osteoarthritis Comorbid with Low Back Pain

Wenjie Wang, MD; Weijun Wang, MD; Mingda Wu, MD; Minghui Sun, MD; Zhihong Xu, MD; LeiLei Xu, MD; Yong Qiu, MD

The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:12–11:18 a.m.

Virginie Lafage, PhD1; Bassel G. Diebo, MD2; Jonathan H. Oren, MD3; Shaleen Vira, MD2; Matthew Spiegel, BS, MD3; Bradley Harris, JD4; Renaud Lafage2; Barthelemy Liabaud, MD3; Jensen Henry, BA4; Themistocles S. Protopsaltis, MD3; Thomas J. Ernico, MD2; Frank J. Schwab, MD2


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:18–11:24 a.m.
137. The Effect of Total Hip Arthroplasty on Preoperative Low Back Pain in Secondary Hip-Spine Syndrome: A Radiographic Study

Xiao Han Il; Weijun Wang, MD; Mingda Wu, MD; Fei Liu, MD; Minghui Sun, MD; Tao Yuan, MD; Yong Qiu, MD; Wenjie Wang, MD

The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:24–11:30 a.m.
138. Novel Virtual Modeling of Alignment following ASD Surgery: Establishing Relationships between Compensatory Changes and Overcorrection Due to Proximal Junctional Kyphosis

International Spine Study Group1; Renaud Lafage2; Shay Bess, MD3; Steven D. Glassman, MD4; Christopher P. Ames, MD5; Douglas C. Burton, MD4; Bradley Harris, JD4; Robert A. Hart, MD4; Han Jo Kim, MD4; Eric O. Klineberg, MD4; Breton Line4; Justin K. Scheer, BS5; Themistocles S. Protopsaltis, MD3; Frank J. Schwab, MD2; Virginie Lafage, PhD2


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
11:30–11:36 a.m.
139. Does Pelvic Fixation Increase Morbidity and Mortality in Patients Undergoing Posterior Lumbar Fusion?

Jeremy Steinberger, MD1; Javier Guzman, BS2; Parth Kothari, BS3; Branko Skovrjil, MD4; Nathan J. Lee, BS5; Dante M. Leven, DO, PT; John I. Shin, BS6; Samuel K. Cho, MD7

1New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:36–11:42 a.m.
140. Lumbar Spine Disease Negatively Affects Outcomes after Total Hip Arthroplasty

Daniel J. Blizzard, MD1; Colin Penrose, BS, BA2; Charles Sheets, PT3; Thorsten Seyler, MD4; Michael Bolognesi, MD5; Mitchell Klement, MD6; Abiram Bala, BA7; Michael A. Gallizzi, MD, MS5; Christopher R. Brown, MD8

Duke University Medical Center, Durham, NC, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:42 a.m.–12:00 p.m.
Discussion

11:00 a.m.–12:00 p.m.
Breakout Session: Deformity Abstract Presentations
Room W470B
Moderator: Charles A. Reitman, MD

11:00–11:06 a.m.
141. Reducing Rod Breakage and Nonunion in Pedicle Subtraction Osteotomy: The Importance of Rod Number and Configuration in 264 patients with Two-Year Follow-Up

International Spine Study Group1; Munish C. Gupta, MD2; Jensen Henry, BA3; Virginie Lafage, PhD4; Frank J. Schwab, MD4; Christopher P. Ames, MD5; Eric O. Klineberg, MD6; Justin S. Smith, MD, PhD7; Vedat Deviren, MD8; Christopher I. Shaffrey, MD9; Robert A. Hart, MD9; Richard A. Hostin Jr., MD10; Gregory M. Mundis Jr., MD10; Amit Jain11; Justin S. Smith, MD, PhD12; Christopher P. Ames, MD13


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:06–11:12 a.m.
142. Ratio of Disability to Deformity Burden in 264 Adult Spinal Deformity Patients with Two-Year Follow-Up: Novel Insight into Drivers of Disability

International Spine Study Group1; Justin K. Scheer, BS2; Jeffrey L. Gum, MD3; Michael P. Kelly, MD4; Frank J. Schwab, MD4; Richard A. Hostin Jr., MD5; Virginie Lafage, PhD6; Shay Bess, MD7; Themistocles S. Protopsaltis, MD8; Khaled M. Kebaish, MD9; Douglas C. Burton, MD9; Munish C. Gupta, MD10; Alexandra Sorocceanu, MD, MPH11; Robert A. Hart, MD12; Gregory M. Mundis Jr., MD13; Amit Jain14; Justin S. Smith, MD, PhD15; Christopher P. Ames, MD16


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:12–11:18 a.m.
143. Revision Versus Primary Adult Spinal Deformity Surgery: Comparison of Radiographic and Clinical Outcomes

Isador H. Lieberman, MD, FRCSC, MBA1; Xiaobang Hu, PhD1

Scoliosis and Spine Tumor Center, Texas Back Institute, Texas Health Presbyterian Hospital Plano, Plano, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:18–11:24 a.m.
144. Adult Scoliosis Deformity (ASD) Surgery: Comparison of One Versus Two Attending Surgeons’ Clinical Outcomes

International Spine Study Group1; Jaime Gomez, MD2; Virginie Lafage, PhD3; Daniel M. Sciubba, MD4; Shay Bess, MD5; Gregory M. Mundis Jr., MD6; Barthelemy Liabaud, MD7; Christopher I. Shaffrey, MD8; Michael P. Kelly, MD9; Christopher P. Ames, MD9; Justin S. Smith, MD, PhD10; Peter G. Passias, MD11; Douglas C. Burton, MD12; Thomas J. Errico, MD12; Frank J. Schwab, MD13


FDA Device/Drug Status: BMP (Not approved for this indication)
11:24–11:30 a.m.
145. Comorbidities and Operative Factors Are Predictive of Mortality following Adult Deformity Surgery
Dante M. Leven, DO, PT; John I. Shin, BS1; Branko Skovrlj, MD2; Javier Guzman, BS3; Nathan J. Lee, BS3; Jeremy Steinberger, MD4; Parth Kothari, BS5; Samuel K. Cho, MD6
1Icahn School of Medicine at Mount Sinai, New York, NY, US; 2Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 3Mount Sinai School of Medicine, New York, NY, US; 4New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:30–11:36 a.m.
146. Biomechanical Assessment of L5 Nerve Root Strain in a 3D Print High-Grade Spondylolisthesis Model
Keun Heng Huo, MD1; Alexander Peterson, BA2; S. Samuel Bederman, MD, PhD, FRCSC3; Lauren Nguyen4
1University of California Irvine, Orange, CA, US; 2Marina Del Rey, CA, US; 3University of California Irvine Department of Orthopaedic Surgery, Orange, CA, US; 4Stanford, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:36–11:42 a.m.
147. MRI-Based Determination of Convex or Concave Surgical Approach for Lateral Lumbar Interbody Fusion in Lumbar Degenerative Scoliosis
Myung-Hoon Shin, MD
Department of Neurosurgery, Incheon St. Mary’s Hospital, College of Medicine, The Catholic University, Incheon, Republic of Korea
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

11:42 a.m.–12:00 p.m.
Discussion

12:00–1:00 p.m.
Complimentary Box Lunch
Medical Attendees Only
Technical Exhibition

Solution Showcase Theater
Technical Exhibition, Booth 1799
12:00 p.m.
DJO Global: MotionCare™: Differentiate Your Practice with a Physician Driven Protocol Solution to Restore Motion and Document Conservative Care
Presented by Paul A. Glazer, MD, FAAOS

12:30 p.m.
DJO Global: Electromagnetic Simulations of Combined Magnetic Fields for Coverage of Interbody and Posterolateral Lumbar Spinal Fusion Sites
Presented by Lisa Holt, PhD

1:00–1:10 p.m.
North American Spine Foundation Update
Skyline Ballroom AB
Moderator: Michael L. Reed, DPT, OCS

1:00–2:45 p.m.
Interdisciplinary Spine Forum:
Value-based Reforms and the Changing Landscape of Spine Care
Room W474
Moderators: Julie Fritz, PT, PhD; Brian Justice, DC

Escalating health care costs, without commensurate improvements in patient-centered outcomes, have spawned initiatives designed to improve the value of health care. Value is the benefit achieved relative to the money spent. Spine care is an area targeted for value-based reform because costs for spine care are outstripping those for overall health care, yet outcomes for spine patients are not proportionate.

Various value-based reform initiatives are beginning to impact spine care providers including Affordable Care Organizations (ACOs), pay-for-performance or other payer partnerships and other efforts designed to standardize care through evidence-based care pathways. Without major improvements in value, the future of spine care is likely to include restricted access to services, continued cost-shifting towards patients, lower incomes for health care professionals and less than optimal outcomes for patients.

Upon completion of this session, participants should gain strategies to:
• Learn from thought leaders’ emerging designs to improve spine care value;
• Understand the ultrastructure of care pathways and their integration into profit sharing/risk sharing modes such as ACOs;
• Examine the evidence-basis for patient-centered outcomes and episode costs related to care pathway integration;
• Describe evolving value models centered on the merging of care benefit (to patient and society) with episode cost;
• Explore examples of communication and clinical skill sets to engage in the emerging health care system.

Agenda
Care Pathway Models: A Literature Review
Julie Fritz, PT, PhD

Designing for Better Spine Care with Less
Arnold Milstein, MD; Eugene Hsu, MD

An Academic’s Look at Imbedding a Care Pathway into an ACO and Hospital: The Jordan/Beth Israel Deaconess Medical Center Spine Program
Michael Schneider, DC, PhD

Discussion

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:00–3:40 p.m.
Young Spine Surgeons Forum
Room W470B
Moderators: Saad B. Chaudhary, MD, MBA; Kris E. Radcliff, MD

The transition from training to practice is a difficult time. With the best interest of young surgeons in mind, NASS has developed an educational program to assist surgeons during their early transition to practice. Experts in the community and a distinguished group of spine surgeons that recently transitioned into both academic and private clinical practices will review several critical topics, including, Early Career Decision Making and Job Search; Practice Enhancement and Getting Involved. Distinguished speakers will provide mature perspectives on various issues relevant to developing a strong clinical practice and provide seasoned perspectives on career paths. Assessment of startup needs and resource management, marketing pearls and techniques for building patient volume in competitive markets, multi-surgeon collaboration, managing conflict of interest, consulting opportunities, along with the timing and pitfalls of incorporating new technologies into the young surgeon’s practice will be reviewed.

Upon completion of this session, participants should gain strategies to:
• Identify advantages and disadvantages of academic and private practice opportunities;
• Utilize a broader scope of resources in job hunting, and better prepare for the interview process;
• Evaluate job opportunities and orthopedic employment contracts, consulting opportunities and conflicts of interest;
• Outline basic practice structures, pearls of getting started, and marketing.

Agenda
Welcome and Introductions
Saad B. Chaudhary, MD, MBA; Kris E. Radcliff, MD

Early Career Decision Making and Job Search
Moderator: Kris E. Radcliff, MD

Finding an Academic Job
Harvey E. Smith, MD

Private Practice Perspectives
Justin Hohl, MD

Panel Discussion, Questions and Answers
Practice Enhancement
Moderator: Eric Truumees, MD

Marketing in a Competitive Environment
Bobby Kalantar, MD

Developing a Niche Practice
Daniel M. Sciubba, MD

Panel Discussion, Questions and Answers
Introduction to NASS Leadership
Future of Spine Surgery
Christopher M. Bono, MD

Relationships
Moderator: Sheeraz A. Qureshi, MD, MBA

Getting Involved in Societies
Eric Truumees, MD

Working with Industry
Sheeraz A. Qureshi, MD, MBA

Working with Hospital Administration on Costs and Quality
Don K. Moore, MD

Panel Discussion, Questions and Answers
Seasoned Career Path
Moderator: Saad B. Chaudhary, MD, MBA

Academic Career Path
Steven R. Garfin, MD

Private Practice Career Path
Richard D. Guyer, MD

Panel Discussion, Questions and Answers

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
1:10–1:15 p.m.  
**NASS Working for You:**  
**SpineWeek Update**  
Skyline Ballroom AB  
Moderator: Robert Gunzburg, MD

1:15–2:45 p.m.  
**Symposium:**  
**Choosing the Right Spine Outcome Measure for the Lumbar Spine**  
Skyline Ballroom AB  
Moderator: Venu Akuthota, MD

The world of spine care is evolving into an outcome-driven, patient-focused practice. However, spine practitioners represent a variety of interests, settings and patient populations. Most are focused on pure clinical outcomes, while others are focused on specific research outcomes driven by specific research questions. This symposium addresses different ways to measure spine outcomes ranging from so-called “process measures,” to legacy condition-specific measures to new computer adaptive testing methods.

Upon completion of this session, participants should gain strategies to:

- Identify the difference between process measures and condition specific clinical outcome measures;
- Demonstrate the utility of minimal uniform dataset for research purposes;
- Show an implementation strategy that covers quality measures.

**Agenda**

**Spine Outcome Landscape**  
Sigurd H. Berven, MD

**ICHOM Standardized Clinical Measures**  
Matthew Smuck, MD

**PROMIS Experience**  
Darrel S. Brodke, MD

**NIH Research Task Force Recommendations**  
James Rainville, MD

**Registries: Pros and Cons**  
Daniel K. Resnick, MD, MS

**Coming to Consensus**  
Venu Akuthota, MD and Panel

**FDA Device/Drug Status:**  
All presenters: These presentations do not discuss or include any applicable devices or drugs.

2:00–3:00 p.m.  
**Global Spine Forum:**  
**Brazilian Spine Society**  
Room W471  
President: Mauro Volpi, MD  
Moderators: Cristiano Menezes, MD; Edson Pudles, MD

**Use of Strogen in Spinal Cord Lesion**  
Olavo Letaif, MD

**Are Systematic Reviews and Meta-Analysis for Lumbar Spine Disorders Treatment Really Conclusive?**  
Delio Martins, MD

**Study of the Lumbar Plexus by Diffusion Neurography and MRI**  
Cristiano Magalhães Menezes, MD, PhD

**Thoracic Disc Herniation: Surgical Decompression via Posterior Approach à La Carte**  
Murilo Daher, MD

**The Risk of Curve Progression and Surgery in African-Americans with Adolescent Idiopathic Scoliosis**  
Nelson Astur, MD

2:45–3:15 p.m.  
**Networking Break—Beverage Service**  
Level 3 Lobby

3:00–4:00 p.m.  
**Global Spine Forum:**  
**Association of Spine Surgeons of India**  
Room W471

**Challenges in Management of Spinal Deformity in India and Other Emerging Countries**  
Dr. Abhay Nene, Consultant Spine Surgeon, Wockhardt Hospital, Bombay, India

**Challenges in Management of Spinal Injury in India and Other Emerging Countries**  
Dr. HS Chhabra, Secretary - ASSI and Chief of Spine Service & Medical Director – Indian Spinal injuries Centre, New Delhi, India

**Innovations in Spine Surgery to Suit Local Requirements and Overcome the Challenges in India and Other Emerging Countries**  
Dr. Kanan Karthik Kailash, Prof and Head, Division of Spine Surgery, Sri Ramachandra, University, Chennai, India

**Case Based Discussions**  
All Faculty
Escalating health care costs, without commensurate improvements in patient-centered outcomes, have spawned initiatives designed to improve the value of health care. Value is the benefit achieved relative to the money spent. Spine care is an area targeted for value-based reform because costs for spine care are outstripping those for overall health care, yet outcomes for spine patients are not proportionate.

Various value-based reform initiatives are beginning to impact spine care providers including Affordable Care Organizations (ACOs), pay-for-performance or other payer partnerships and other efforts designed to standardize care through evidence-based care pathways. Without major improvements in value, the future of spine care is likely to include restricted access to services, continued cost-shifting towards patients, lower incomes for health care professionals and less than optimal outcomes for patients.

Upon completion of this session, participants should gain strategies to:

- Learn from thought leaders’ emerging designs to improve spine care value;
- Understand the ultrastructure of care pathways and their integration into profit sharing/risk sharing modes such as ACOs;
- Examine the evidence-basis for patient-centered outcomes and episode costs related to care pathway integration;
- Describe evolving value models centered on the merging of care benefit (to patient and society) with episode cost;
- Explore examples of communication and clinical skill sets to engage in the emerging health care system.

Agenda

The Relational Component to Care Pathways: The Future of Health Teams and High-Performing Networks
John Ventura, DC

The Patient-Physician Relationship and Its Effects on Resource Use
Daniel B. Wolfson, MHSA
3:34–3:41 p.m.
81. Operative Management of Adult Spinal Deformity Results in Significant Increases in QALYs Gained Compared to Nonoperative Management: Analysis of 479 Patients with Minimum Two-Year Follow-Up

International Spine Study Group1; Justin K. Scheer, BS2; Richard A. Hostin Jr., MD3; Frank J. Schwab, MD4; Chessie Robinson, MA5; Virginie Lafage, PhD6; Douglas C. Burton, MD7; Robert A. Hart, MD8; Michael P. Kelly, MD9; Malla K. Keefe10; David W. Polly Jr., MD11; Shay Bess, MD12; Christopher J. Shaffrey, MD12; Justin S. Smith, MD, PhD12; Christopher P. Ames, MD13


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:41–3:50 p.m.
Discussion

3:20–3:50 p.m.
Resident and Fellow Research Awards Presentations

Skyline Ballroom C
Edward J. Dohring, MD

3:20–3:27 p.m.
1. The Effect of Vancomycin Powder on Bone Healing in a Rat Spinal Arthrodesis Model

Marco Mendoza, MD1; Kevin A. Sonn, MD2; Abhishek Kannan, BS3; Sharath S. Bellary, MD, MS4; Sean M. Mitchell, BS5; Christian Park, BS6; Joseph Weiner, BS2; Gurmit Singh, MD7; Chawon Yun, PhD7; Anjan Ghosh8; Jonghwa Yun, MD2; Stuart R. Stock, PhD7; Erin L. Hsu, PhD9; Wellington K. Hsu, MD10

1Northwestern University, Chicago, IL, US; 2Maywood, IL, US; 3Northwestern University Feinberg School of Medicine Department of Orthopaedic Surgery, Chicago, IL, US; 4Northwestern University, Chicago, IL, US; 5Northwestern University Department of Orthopaedic Surgery, Chicago, IL, US; 6Northwestern University Feinberg School of Medicine, Chicago, IL, US; 7University of Washington, Seattle, WA, US

FDA Device/Drug Status: Vancomycin (Approved for this indication), Recombinant Human Bone Morphogenetic Protein (Approved for this indication)
The costs associated with spinal conditions are large and there is concern the current cost of spine care is not sustainable. While there are many strategies aimed at reducing costs, can they accomplish this goal without sacrificing quality? This session highlights some of the initiatives that may balance costs with quality in spine care as well as their challenges.

Upon completion of this session, participants should gain strategies to:
- Recognize the relationship between quality and cost in obtaining value;
- Discuss managed care programs aimed at spine surgery;
- Review surgeon-driven strategies for reducing costs while maintaining quality;
- Evaluate the effectiveness of quality improvement strategies in spine surgery;
- Identify how value is assessed from the insurer’s perspective.

Agenda
Introduction
S. Samuel Bederman, MD, PhD, FRCSC

Surgeon Leadership for Improving Quality and Decreasing Cost in Clinic and Operating Room
Lloyd A. Hey, MD

Getting it Right the First Time Costs Less Money in the Long Run
Zoher Ghogawala, MD, FACS

Innovative Delivery Methods, Such as Telemedicine and Phone and Web-based Programs, to Improve Access to Low-cost, High Quality Spine Care
Silky Chotai, MD

Improving Outcomes through Value-based Health Care: A Health Plan Perspective
Carole R. Flamm, MD, MPH

Payer Coverage Policies: Their Development, Evolution, and the Influence of Professional Medical Association Recommendations
Gregory J. Przybylski, MD

Discussion, Questions and Answers

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.
4:08–4:14 p.m.

151. When Does Compensation for Lumbar Stenosis Become a Deformity?

Virginie Lafage, PhD1; Aaron J. Buckland, MBBS, FRACS1; Shaleen Vira, MD1; Jonathan H. Oren, MD1; Renaud Lafage1; Bradley Harris, JD1; Matthew Spiegel, BS, MD1; Bassel G. Diebo, MD2; Barthelemy Liabaud, MD1; Themistocles S. Protopsaltis, MD1; Frank J. Schwab, MD1; Thomas J. Errico, MD2; John A. Bendo, MD2


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:14–4:20 p.m.

152. Discrepancies between Planned Postoperative Alignment and Age-Adjusted Ideals: What Are the Implications of Planning to Over- or Under-Correct?

Virginie Lafage, PhD1; Jensen Henry, BA2; Matthew Spiegel, BS, MD1; Jonathan H. Oren, MD1; Isaac Gammal, BA1; Elizabeth Tanzi, ARNP1; Nancy Worley, MS, BA1; Cyrus Jalali, BA1; Themistocles S. Protopsaltis, MD1; Thomas J. Errico, MD1; Frank J. Schwab, MD1

1New York University Hospital for Joint Diseases, New York, NY, US; 2New York, NY, US; 3New York University Medical Center, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:20–4:26 p.m.

153. Proximal Functional Angle Predicts Need for Revision but Not Deterioration in Sagittal Radiographic Parameters after Adult Spinal Deformity Surgery

International Spine Study Group1; Tamir Ailon, MD, FRCS.C, MPH2; Justin K. Scheer, BS3; Christopher P. Ames, MD4; Robert A. Hart, MD5; Eric O. Klineberg, MD6; Virginie Lafage, PhD7; Shay Bess, MD8; Douglas C. Burton, MD1; Munish C. Gupta, MD2; Themistocles S. Protopsaltis, MD1; Richard A. Hostin Jr., MD3; Vedant Deviren, MD4; Frank J. Schwab, MD1; Justin S. Smith, MD, PhD2; Christopher I. Shaffrey, MD4


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:26–4:32 p.m.

154. T1 Slope and Degenerative Cervical Spondylolisthesis

Jae Keun Oh, MD

Anyang-si, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:32–4:50 p.m.

Discussion

3:50–3:56 p.m.

Breakout Session: Complications in C-Spine Surgery Abstract Presentations

Skyline Ballroom D
Moderator: Jeremy S. Smith, MD

3:50–3:56 p.m.

155. The Revision Rate and Occurrence of Adjacent Segment Disease after Anterior Cervical Discectomy and Fusion: A Study of 672 Consecutive Patients

Carola F. van Eck, MD, PhD1; Conor M. Regan, MD1; William F. Donaldson, MD2; James D. Kang, MD1; Joon Y. Lee, MD1

1University of Pittsburgh Medical Center, Pittsburgh, PA, US; 2Durham, NC, US; 3University of Pittsburgh Department of Orthopedic Surgery, Pittsburgh, PA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:56–4:02 p.m.

156. Cervical Deformity Surgery does not Result in Acute Postoperative Dysphagia: Preliminary Results from a Prospective Cervical Deformity Study

International Spine Study Group1; Justin S. Smith, MD, PhD2; Sravisht Iyer, MD3; Han Jo Kim, MD4; Michael P. Kelly, MD5; Robert A. Hart, MD4; Munish C. Gupta, MD4; D. Kojo Hamilton, MD4; Brian J. Neuman, MD4; Themistocles S. Protopsaltis, MD4; Gregory M. Mundis Jr., MD4; Virginie Lafage, PhD4; Peter G. Passias, MD5; Eric O. Klineberg, MD4; Christopher P. Ames, MD4


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
107
NASS 30th Annual Meeting

4:02–4:08 p.m.
157. Reoperation Rates of Anterior Cervical Discectomy and Fusion versus Posterior Laminoplasty for Multilevel Cervical Degenerative Diseases: Taiwan Population-Based Cohort Study

JiannHer Lin, MD
Taipei Medical University Hospital, Department of Neurosurgery, Taipei, Taiwan

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:08–4:14 p.m.
158. Timing of Complications following Anterior Cervical Decompression and Fusion Procedures

Daniel D. Bohl, MPH¹; Andre Samuel, BA²; Matthew L. Webb³; Adam M. Lukasiewicz, MS⁴; Nicholas S. Golinvaux⁵; Bryce Basques⁶; Junyoung Ahn⁷; Kern Singh, MD⁸; Alexander R. Vaccaro, MD, PhD⁹; Jonathan N. Grauer, MD⁹
¹Yale University School of Medicine, New Haven, CT, US; ²New Haven, CT, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Rothman Institute, Philadelphia, PA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:14–4:20 p.m.
159. Morbidity and Mortality Associated with Transoral Approaches to the Cervical Spine

Jeremy Steinberger, MD¹; Dante M. Leven, DO, PT; Branko Skovrlj, MD²; John I. Shin, BS³; Nathan J. Lee, BS⁴; Parth Kothari, BS⁵; Javier Guzman, BS⁶; Samuel K. Cho, MD³
¹University of Virginia, Department of Orthopedic Surgery, Charlottesville, VA, US; ²Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; ³Icahn School of Medicine at Mount Sinai, New York, NY, US; ⁴Mount Sinai School of Medicine, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:20–4:26 p.m.
160. The Effect of Local Intraoperative Steroid Administration on the Rate of Postoperative Dysphagia following ACDF: A National Database Study of 245,754 Patients

Hamid Hassanzadeh, MD¹; Jourdan Cancienne, MD²; Brian C. Werner, MD²; Scott Yang, MD²; Francis H. Shen, MD²; Anuj Singla, MD²; Adam L. Shimer, MD²
¹University of Virginia, Department of Orthopedic Surgery, Charlottesville, VA, US; ²Charlottesville, VA, US; ³University of Virginia School of Medicine, Charlottesville, VA, US

FDA Device/Drug Status: Steroid injection (Investigational/Not approved)

4:26–4:32 p.m.
161. Impact of Local Intraoperative Steroid Application on Patient-Reported Swallow Function following Anterior Cervical Discectomy and Fusion Procedures

Junyoung Ahn¹; Junho Ahn, BS²; Daniel D. Bohl, MPH³; Ehsan Tabaraee, MD³; Gabriel Duhancioglu⁴; Rahul Kamath; Khaled A. Aboushaala⁵; Kern Singh, MD⁶
¹Rush University Medical Center, Chicago, IL, US; ²National Institute on Aging, Baltimore, MD, US; ³Yale University School of Medicine, New Haven, CT, US; ⁴UCSF, San Francisco, CA, US; ⁵Great Lakes, IL, US; ⁶Midwest Orthopaedics At Rush, Chicago, IL, US

FDA Device/Drug Status: Corticosteroids (Approved for this indication)

4:32–4:50 p.m.
Discussion

3:50–3:56 p.m.
162. Mentoring in Spine Surgery Training: Attitudes and Experiences of AOSpine North America Fellows

Christina L. Goldstein, MD, FRCSC¹; Theodore J. Choma, MD²; Brandon D. Lawrence, MD³; Robert W. Molinari, MD⁴; Daniel M. Sciubba, MD⁵; Michael G. Fehlings, MD, PhD, FRCSC⁶
¹Missouri Orthopaedic Institute, Columbia, MO, US; ²Missouri Spine Center, Columbia, MO, US; ³University Orthopaedic Center, Salt Lake City, UT, US; ⁴University of Rochester, Rochester, NY, US; ⁵John Hopkins University School of Medicine, Baltimore, MD, US; ⁶Toronto Western Hospital, Toronto, ON, Canada

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:56–4:02 p.m.
163. Patient and Surgeon Radiation Exposure during Spinal Instrumentation Using Intraoperative CT-Based Navigation

Daniel Mendelsohn, MD¹; Jason Strelzow, MD²; Nicolas Dea, MD, FRCS³; Juliet N. Batke, BS³; Charles G. Fisher, MD⁴; Marcel F. Dvorak, MD, FRCS³; John Street, MD, PhD⁴
¹University of British Columbia, Vancouver, BC, Canada; ²University of British Columbia, Vancouver, BC, Canada; ³CHUS Service de Neurochirurgie, Quebec, Canada; ⁴Vancouver General Hospital, Vancouver, BC, Canada; ⁵Blusson Spinal Cord Centre, Vancouver, BC, Canada

FDA Device/Drug Status: O-arm Intraoperative CT Spine Navigation (Approved for this indication)
4:02–4:08 p.m.
164. Association between Compensation and Outcomes in Spine Surgery: A Meta-Analysis of 31 Studies

Thomas Cheriyan, MD1; Bradley Harris, JD2; Jerry Cheriyan, MD3; John A. Bendo, MD4; Jeffrey M. Spivak, MD5; Virginie Lafage, PhD2; Jeffrey A. Goldstein, MD, FACS2

1Hospital for Joint Diseases, New York, NY, US; 2New York University Hospital for Joint Diseases, New York, NY, US; 3Marshfield Clinic, Marshfield, WI, US; 4New York University Hospital for Joint Diseases Spine Center, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:08–4:14 p.m.
165. A Comparison of Ocular Radiation Exposure Utilizing Three Types of Leaded Glasses

Bradford S. Waddell, MD1; Hunter Waddell2; Joseph M. Zavatsky, MD3

1Ochsner Orthopaedics, New Orleans, LA, US; 2Shreveport, LA, US; 3Florida Orthopaedic Institute, Temple Terrace, FL, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:14–4:20 p.m.
166. The Impact of Resident Involvement in Outcomes for Adults Undergoing Elective Posterior Cervical Fusion

Branko Skovrlj, MD1; Nathan J. Lee, BS2; Parth Kathari, BS2; Jeremy Steinberger, MD2; Dante M. Leven, DO, PT; John I. Shin, BS3; Javier Guzman, BS3; Samuel K. Cho, MD4

1Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:20–4:26 p.m.

Andrew Patton, MD; Randal Morris, BS; Yong-Fang Kuo, PhD; Ronald W. Lindsey, MD

The University of Texas Medical Branch, Galveston, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:26–4:50 p.m.
Discussion

3:50–4:50 p.m.
Breakout Session: Trauma Abstract Presentations
Room W470B
Moderator: Yu-Po Lee, MD

3:50–3:56 p.m.
168. Radiologic Progression of Vertebral Fractures in Patients with Multiple Myeloma

Roy Xiao1; Jacob Miller, BS2; Joseph Featherall2; Konstantinos Margetis, MD, PhD, FRCS2; Daniel Lubelski, BA3; Isador H. Lieberman, MD, FRCS, MBA4; Edward C. Benzel, MD5; Thomas E. Mroz, MD6

1Cleveland Clinic Foundation, Cleveland, OH, US; 2Icahn School of Medicine at Mount Sinai, New York, NY, US; 3Johns Hopkins Hospital Department of Neurosurgery, Baltimore, MD, US; 4Texas Back Institute, Plano, TX, US; 5Cleveland Clinic Foundation Departments of Orthopaedic and Neurological Surgery, Cleveland, OH, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

3:56–4:02 p.m.
169. Traumatic Cervical Unilateral and Bilateral Facet Dislocations Treated with Anterior Cervical Discectomy and Fusion Has a Low Failure Rate

Alireza K. Anissipour, DO1; Carlo Bellabarba, MD2; Richard J. Bransford, MD3

1Western Washington Medical Group, Everett, WA, US; 2University of Washington, Seattle, WA, US; 3Harborview Medical Center, Seattle, WA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:02–4:08 p.m.
170. Severity of Vertebral Fractures Caudal Adjacent to Naturally Fused Vertebral Bodies

Yasukazu Hijikata, MD1; Shinji Kumamoto, MD2; Masayuki Nakahara, MD2

1Shinkomonji Hospital, Kitakyushu, Fukuoka, Japan; 2Fukuoka Wajiro Hospital, Fukuoka, Japan

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:08–4:14 p.m.
171. Effects of Fusion and Conservative Treatment on Disc Degeneration and Rates of Subsequent Surgery after Thoracolumbar Fracture

Anthony D’Oro, BA1; Zorica Buser, PhD2; Jeremiah R. Cohen3; Frank Acosta, MD4; John C. Liu, MD5; Patrick C. Hsieh, MD, MS6; Jeffrey C. Wang, MD7; Mark J. Spoonamore, MD8; Thomas C. Chen, MD9

1South Pasadena, CA, US; 2Hoffman Medical Research Center, Keck School of Medicine, USC, Los Angeles, CA, US; 3University of California Los Angeles Department of Orthopedic Surgery, Los Angeles, CA, US; 4University of California Department of Neurological Surgery, San Francisco, CA, US; 5University of Southern California Department of Neurosurgery, Los Angeles, CA, US; 6University of Southern California, Los Angeles, CA, US; 7University of Southern California Spine Center,
Los Angeles, CA, US; 4University of Southern California Center for Spinal Surgery, Los Angeles, CA, US; 5Hoag Memorial Hospital, Los Angeles, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:14–4:20 p.m.
172. Atlantoaxial Rotatory Fixed Dislocation: Report on a Series of 32 Pediatric Cases
Peter G. Passias, MD1,2; Nancy Worley, MS, BA3; Cyrus Jalalai, BA4; Chao Wang
1New York University Hospital for Joint Diseases, New York, NY, US; 2New York University School of Medicine, New York, NY, US; 3New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:20–4:26 p.m.
173. Spinal Fracture Patterns in Patients with Ankylosing Spondylitis
Adam M. Lukasiewicz, MSc; Andre Samuel, BA; Matthew L. Webb; Bryce Basques; Daniel D. Bohl, MPH; Jonathan N. Grauer, MD
Yale University School of Medicine, New Haven, CT, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:26–4:32 p.m.
174. In-Hospital Morbidity, Mortality and Length of Stay for Osteoporosis-Related Spinal Fractures
Adam M. Lukasiewicz, MSc; Matthew L. Webb; Andre Samuel, BA; Daniel D. Bohl, MPH; Bryce Basques; Jonathan N. Grauer, MD
Yale University School of Medicine, New Haven, CT, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

4:32–4:50 p.m.
Discussion

INTERNATIONAL WORKSHOPS 2016
These international workshops feature renowned faculty, lectures and a hands-on lab utilizing state-of-the-art surgical instrumentation.

SHANGHAI, CHINA
JANUARY 8 - 9

CHENGDU, CHINA
MAY 19 - 22

BEIRUT, LEBANON
JULY

SURABAYA, INDONESIA
SEPTEMBER 21 - 22

4:00–5:00 p.m.
Global Spine Forum:
AOSpine
Room W471
Moderator: Alpesh Patel, MD

Complication Avoidance
Moderator: Alpesh Patel, MD (AOSpine Education Committee)

Introduction of the AO and AOSpine
Darrel Brodke, MD (AOSpine North American Chair Elect)

Avoiding Biomechanical Complications in Spinal Surgery
Joseph Cheng, MD (AOSpine North American Education Chair)

Avoiding Complications in Treating Spine Trauma
Michael Grevitt, MD (AOSpine International Education Chair)

Prevention and Management of Perioperative Spinal Cord Injury
Michael Fehlings, MD (AOSpine North American Chair)

Lumbar Spine Complications: How to Recognize, Avoid and Treat
Jeffrey C. Wang, MD (AOSpine International Board Chair)

Panel Discussion
Joseph Cheng, MD
Michael Grevitt, MD
Michael Fehlings, MD
Jeffrey C. Wang, MD

4:45–5:45 p.m.
International Reception
W375 West Lobby
7:30–9:00 a.m.  
Continental Breakfast  
Level 3 Lobby

7:30 a.m.–12:00 p.m.  
Attendee Registration  
Level 3 Lobby

7:55–8:00 a.m.  
Announcements  
Room W471

8:00–9:00 a.m.  
Breakout Session:  
The Surgical Treatment of Cervical Myelopathy:  
An Evidence-based Expert Panel Case Discussion  
Room W470A  
Moderator: Alpesh A. Patel, MD, FACS

An expert panel gives their treatment recommendations on presented cases of cervical myelopathy. The audience also is invited to participate in the debates and discussions along with the panelists.

Upon completion of this session, participants should gain strategies to:
• Identify indications for surgical treatment of cervical myelopathy;
• Determine appropriate indications for surgical treatment of cervical myelopathy;
• Apply the rationale for anterior versus posterior approaches and laminectomy versus laminoplasty.

Panelists  
Michael G. Fehlings, MD, PhD, FRCSC  
Jeffrey C. Wang, MD

FDA Device/Drug Status:  
All presenters: These presentations do not discuss or include any applicable devices or drugs.

8:00–9:00 a.m.  
Breakout Session:  
Understanding and Developing Online Strategies for Growing Your Practice or Business: A Guide to Online Presence Management  
Room W471  
Moderator/Presenter: Jeffrey Segal, MD

Over the past decade the importance of having an effective, up-to-date and accurate internet presence for medical practices has gone from a nice to have to a business imperative. Practices can no longer leave public perceptions to chance. Health care consumers go to the web first, what they see and how they experience a practice may be inaccurate or even unfair, but their perceptions, formed in moments, is critical in their decision making process.

This session is intended to provide meeting attendees with a greater understanding of the current landscape, the paths prospective patients choose in making health care decisions and how to best position a practice to take advantage of their online presence.

Upon completion of this session, participants should gain strategies to:
• Appreciate the growing importance of websites and online presence in building a healthy practice;
• Understand the elements of internet presence management and their connected roles in driving practice growth;
• Have an understanding of the marketing roadmap and process in developing an effective web presence;
• Develop strategies that are applicable to specific practice challenges and objectives.

FDA Device/Drug Status:  
Jeffrey Segal, MD: This presentation does not discuss or include any applicable devices or drugs.
8:00 a.m.–5:30 p.m.
Ticketed Session:
State-of-the-Art in Motor Control and Low Back Pain: International Clinical and Research Expert Forum
Room W474
Chair: Paul Hodges, PT, PhD

This forum provides a once in a lifetime opportunity to hear from and interact with the leading international experts in motor control of the spine in the same room at the same time. The workshop is an unrivalled forum to learn the state-of-the-art on the relevance of motor control for management of low back pain, the latest evidence for “if” and “how” motor control treatments are effective for management of low back pain, and how to apply motor control intervention in clinical management of patients. The latest clinical and research evidence is discussed by the leading international experts, and the new frontiers are highlighted. A particular focus is placed on understanding “who” benefits from motor control training, “how” to match the right treatment to the right patient, and “when” it is most effective.

Upon completion of this session, participants should gain strategies to:
• Recognize the latest understanding of the role of motor control training in management of low back pain;
• Determine when and how motor control training is likely to be effective;
• Determine potential mechanisms for effectiveness of motor control training;
• Identify skills for application of motor control to clinical practice.

Agenda
Welcome and Opening Remarks
Paul Hodges, PT, PhD

Motor Control and Low Back Pain: What’s New and Where are We Going?
Paul Hodges, PT, PhD

Why Might Motor Control Training Work?
Jaap van Diëen, PhD

The Functioning Coupling of the Deep Abdominal and Paraspinal Muscles
Andry Vleeming, PT, PhD

Nonspecific Effects of Motor Control Training
Jacek Cholewicki, PhD

Peripheral Muscle and Central Brain Changes in Recurrent Low Back Pain
Lieven Danneels, PhD

Neural Correlates of Proprioceptive Impairment in Patients with Recurrent Nonspecific Low Back Pain
Simon Brumagne, PhD

The Difficulties of Treating Enhanced Pain Occurring as a Consequence of Inflammation-induced Sensory Neuroplasticity
Mary Barbe, PhD

Treatment-based Classification and Spine Control
Julie Fritz, PT, PhD

Subgrouping: Another Perspective
Greg Kawchuk, DC, PhD

Adherence: An Important but Often Forgotten Determinant of Treatment Effectiveness
Linda van Dillen, PT, PhD

Clinical Trials in Motor Control for Low Back Pain
Chris Maher, PhD

Clinical Application of Motor Control to Low Back Pain: Movement Systems Impairment
Shirley Sahrmann, PT, PhD

Clinical Application of Motor Control to Low Back Pain: Motor Control Training
Julie Hides, PhD

Clinical Application of Motor Control to Low Back Pain: Cognitive Functional Therapy for Targeted Management
Peter O’Sullivan, PhD

Discussion
All Faculty

FDA Device/Drug Status:
All presenters: These presentations do not discuss or include any applicable devices or drugs.

Credit
Physicians: The North American Spine Society designates this live activity for a maximum of 8.5 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Physical Therapists: The Illinois Chapter Continuing Education Committee has approved this course according to the Criteria for Approval of Continuing Education offerings established by the Illinois Physical Therapy Association.
9:00–9:06 a.m.
175. Innovation in Growing Rod Technique for Early Onset Scoliosis: An Experimental Study Based on a Porcine Scoliosis Model

Weijun Wang, MD; Xin Zheng, MD; Shoufeng Wang, MD; Yong Qiu, MD; Bangping Qian, MD; Xu Sun, MD; Zezhang Zhu, PhD; Bin Wang, MD; Yang Yu, MD

The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:06–9:12 a.m.
176. Health-Related Quality of Life in Adolescent Idiopathic Scoliosis Patients 25 Years after Treatment

Ane Simony, MD; Leah Y. Carreon, MD, MSc; Steen Bach Christensen, MD; Mikkel O. Andersen, MD

Sector for Spine Surgery & Research, Middelfart, Denmark

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:12–9:18 a.m.
177. How Effective is Providence Night-Time Bracing in Treatment of Adolescent Idiopathic Scoliosis?

Ane Simony, MD; Lena Quisth, CPO; Inge Beauscha, CPO; Mikkel O. Andersen, MD

1Sector for Spine Surgery & Research, Middelfart, Denmark; 2Ortos, Odense, Denmark

FDA Device/Drug Status: Providence Night time brace (Approved for this indication)

9:18–9:24 a.m.
178. Different Dose Regimens of Tranexamic Acid Reduce Perioperative Blood Loss and Blood Transfusion in Adolescent Idiopathic Scoliosis Patients: A Prospective, Randomized Control Study

Jing-Ming Xie, MD; Tao Li, MD, PhD; Yingsong Wang; Ying Zhang; Ni Bi; Zhi Zhao; Zhiyue Shi

1Department of Orthopaedics, Kunming, China; 2Kunming Medical University, Kunming, China; 3The 2nd Affiliated Hospital of Kunming Medical University, Kunming, China

FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

9:24–9:30 a.m.
179. Are Congenital Bony Vertebral Deformities Associated with Spinal Cord or Neural Axis Abnormalities?

Anthony P. Trenga; Anuj Singla, MD; Mark Feger, BA, ATC; Mark Abel, MD

1University of Virginia Department of Orthopaedic Surgery, Charlottesville, VA, US; 2University of Virginia School of Medicine, Charlottesville, VA, US; 3University of Virginia, Charlottesville, VA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:30–9:36 a.m.
180. Spine Kinematics Exhibited during Running by Adolescent Idiopathic Scoliosis Patients with Spinal Fusion

Rumit S. Kakar, PT, PhD; Yumeng Li, MSc; Yang-Chieh Fu, PhD; Cathleen Brown, PhD, ATC; Kathy J. Simpson, PhD

1Ithaca College, Center for Health Sciences, Ithaca, NY, US; 2Athens, US; 3University, MS, US; 4Department of Kinesiology, Athens, GA, US; 5Athens, GA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:36–9:42 a.m.
181. Surgical Results of Magnet Driven Growing Rods (MdGR) for Early-Onset Scoliosis (EOS): Single Center Experience of Five Years

Nanjundappa S. Harshavardhana, MD, MS, DO; Amr Fahmy, MBChB, MS, MD; Hilali Noordeen, MD

1Twin Cities Spine Center, Minneapolis, MN, US; 2Chandlers Ford, United Kingdom; 3Royal National Orthopaedic Hospital NHS Trust, University College of London, UK

FDA Device/Drug Status: Magnet driven Growing Rod (MdGR) (Approved for this indication)
9:00–10:00 a.m.  
Breakout Session: Complications Abstract Presentations  
Room W470B  
Moderator: Andrew T. Dailey, MD

9:00–9:06 a.m.  
182. The Influence of Vertebral Endplate Density, Cage Contact Area, and Cage Modulus on the Incidence of Interbody Cage Subsidence  
Paul B. Suh, MD; Chad Lewis, PhD; Christian M. Puttlitz, PhD; Kirk C. McGilvray, PhD

FDA Device/Drug Status: Valeo-C (Approved for this indication)

9:06–9:12 a.m.  
183. Risks Factors for Blood Transfusion with Primary Posterior Lumbar Fusion  
Bryce Basques; Andre Samuel, BA; Adam M. Lukasiewicz, MSc; Matthew L. Webb; Daniel D. Bohl, MPH; Jonathan N. Grauer, MD

Yale University School of Medicine, New Haven, CT, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:12–9:18 a.m.  
184. Duration of Anesthesia as a Risk Factor for Postoperative Complications in Patients undergoing Posterior Lumbar Fusion  
Jeremy Steinberger, MD; Parth Kothari, BS; Javier Guzman, BS; Nathan J. Lee, BS; John I. Shin, BS; Branko Skovrlj, MD; Dante M. Leven, DO, PT; Samuel K. Cho, MD

1New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Icahn School of Medicine at Mount Sinai, New York, NY, US; 4Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:18–9:24 a.m.  
185. Confirming the Carragee Massive-Defect Results: Lumbar Discectomy Patients at High Risk of Reherniation  
Gerrit J. Bouma, MD; Adisa Kursumovic, MD; Frederic Martens, MD; Bradley K. Weiner, MD; Richard Bostelmann, MD; Javier Fandino, MD

1University Of Amsterdam, Amsterdam, DE, Netherlands; 2Donausar Klinikum Deggendorf, Deggendorf, Germany; 3OLV Ziekenhuis Neurosurgery, Aalst, Belgium; 4Duesseldorf, Germany; 5The Methodist Hospital, Houston, TX, US; 6Kantonsspital Aarau, Tellstrasse, Aarau, Switzerland  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:24–9:30 a.m.  
186. Heterotopic Ossification following Single-Level Anterior Cervical Discectomy and Fusion: Results from a Prospective, Multicenter, Historically-Controlled Trial Comparing Allograft to an Optimized Dose of rhBMP-2  
Paul M. Arnold, MD; Karen K. Anderson, BS; Kevin T. Foley, MD, FACS

1University of Kansas Medical Center, Kansas City, KS, US; 2Semmes-Murphey Clinic, Memphis, TN, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:30–9:36 a.m.  
187. Does Advancing Age Adversely Influence Clinical Outcomes following Lumbar Fusion Surgery? A Retrospective Cohort Study  
William R. Sears, MBBS, FRACS

Wentworth Spine Clinic, Sydney, NSW, Australia  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:36–9:42 a.m.  
188. The Efficacy of Intraoperative Monitoring in Spine Surgery  
Nikita Lakomkin, BS; Raul A. Vasquez-Castellanos, MD; Brandon J. Davis, MD, PhD; Travis R. Ladner, BS; Joseph S. Cheng, MD, MS

Vanderbilt University Medical Center Department of Neurosurgery, Nashville, TN, US  
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:42–10:00 a.m.  
Discussion
9:00–10:00 a.m.
Breakout Session:
Cervical Motion and Instability Abstract Presentations
Room W471
Moderator: W. Ryan Spiker, MD

9:00–9:06 a.m.
189. The Rapid and Progressive Degeneration of Neck Muscles in Whiplash: An MRI Study of Fatty Infiltration
James M. Elliott, PhD, PT
Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:06–9:12 a.m.
190. Robotic Simulation of Clinical Exams: Describing the Mechanical Effect of Alar Ligament Injury
Robert A. Hartman1; Robert T. Tisherman2; Karthik Hartharan, PT, MS3; Michael J. Schneider, DC, PhD4; Gwendolyn A. Sowa, MD, PhD5; James D. Kang, MD6
1University of Pittsburgh, Pittsburgh, PA, US; 2University of Pittsburgh Medical Center, Pittsburgh, PA, US; 3Pittsburgh, PA, US; 4School of Health and Rehabilitation Sciences, Pittsburgh, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:12–9:18 a.m.
191. A Supplemented Crosslink Improves the Fusion Rate of Posterior Atlantoaxial Fusion with Screw and Rod Constructs: A Prospective, Randomized Comparative Study
Dageng Huang, MD; Dingjun Hao, MD; Baorong He, MD; Hua Guo, MD
Department of Spinal Surgery, Honghu Hospital, Xian Jiaotong University Health Science Center, Xi’an, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:18–9:24 a.m.
192. Clinical Application of C1 Pedicle Screw and Lateral Mass Screw for Atlantoaxial Instability Patients with a Normal C1 Posterior Arch: A Prospective, Double-Blind, Randomized Controlled Trial
Liang Yan, PhD, MD; Dingjun Hao, MD; Baorong He, MD
1Xi’an Honghu Hospital, Xi’an, Shaanxi, China; 2Xi’an, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:24–9:30 a.m.
193. In Vivo Motion Characteristics of the Lower Cervical Spine during Dynamic Weight-Bearing Flexion-Extension
Sean J. Driscoll; Haiqing Mao, MD; Shaobai Wang, PhD; Weiye Zhong, MD, PhD; Guoan Li, MD; Kirkham B. Wood, MD; Thomas D. Cha, MD, MBA
Massachusetts General Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:30–9:36 a.m.
194. Canal Volume Changes in the Subaxial Cervical Spine during In Vivo Dynamic Flexion-Extension
Haiqing Mao, MD; Sean J. Driscoll; Shaobai Wang, PhD; Weiye Zhong, MD, PhD; Guoan Li, MD; Thomas D. Cha, MD, MBA; Kirkham B. Wood, MD
Massachusetts General Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

9:36–9:42 a.m.
195. When is There Iatrogenic Instability Incurred at the Supra-Adjacent Level of Posterior Cervical Instrumentation Constructs for Cervical Laminectomies: A Biomechanical Analysis
Sina Pourtaheri, MD; Andrew T. Healy, MD; Daniel Lubelski, BA
1Cleveland Clinic, Cleveland, OH, US; 2Johns Hopkins Hospital Department of Neurosurgery, Baltimore, MD, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
Head and neck injuries represent significant challenges in sporting activities. While sprains and strains without neurological sequelae are common, athletes are always at risk for more serious complications related to concussions, subdural hematomas, fractures, dislocations, disc compromise, cord compression, root tension, and other associated trauma. Far too often, severe anatomical compromise escapes early diagnosis, which can lead to catastrophic delays in care and avoidable long-term impairment. Understanding and recognizing potential worse case scenarios, regardless of how benign an injury may appear, can prevent unnecessary disability and suffering. The purpose of this symposium is to convene a group of highly experienced and respected spine specialists to review the epidemiology and etiology of sport-related head and neck injuries and the plethora of problems that can, and should, be identified as quickly as possible to prevent delays in the most appropriate and effective management.

Upon completion of this session, participants should gain strategies to:
- Appreciate the epidemiology and etiology of sport-related head and neck injuries;
- Identify predisposing factors that increase an athlete’s risk for sustaining a head and neck injury;
- Identify the most important symptoms and signs of potentially severe anatomical compromise on the field after a sport-related head and neck injury;
- Identify the most important symptoms and signs of potentially severe anatomical compromise in the acute to chronic phases of a sport-related head and neck injury;
- Utilize a diagnostic methodology that balances being exhaustively comprehensive with cost-effectiveness.

**Agenda**

**Introduction**
Michael L. Reed, DPT, OCS

**On-field Management of Head and Neck Injuries: Making the Correct Call**
Charles A. Reitman, MD

**Hospital-based Management of Neck Injuries: Making the Correct Call**
Paul A. Anderson, MD

**Sports-related Concussion Management: Where Are We in 2015?**
Stanley A. Herring, MD

**FDA Device/Drug Status:**
All presenters: These presentations do not discuss or include any applicable devices or drugs.

12:00 p.m.
**Meeting Adjourns**
P1. Polymorphism of rs2767485 in Leptin Receptor (LEPR) Gene is Associated with the Occurrence of Adolescent Idiopathic Scoliosis
Xiao Han II, Liu Zhen, MD; Zexiang Zhu, PhD; Bangping Qian, MD; Feng Zhu, MD; Yong Qiu, MD
Nanjing, China; Nanjing Drum Tower Hospital, Nanjing, Jiangsu, China; The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China
FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

P2. Differing Cytokine Profile in Intervertebral Discs Associated with and without Modic Changes
Gregory D. Schroeder, MD; Dessislava Markova, PhD; John D. Koerner, MD; Alexander R. Vaccaro, MD, PhD; Christopher K. Kepler, MD, MBA; D. Greg Anderson, MD
Rothman Institute, Thomas Jefferson University, Philadelphia, PA, US; Philadelphia, PA, US; Rothman Institute, Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P3. Stem Cell-Derived Live Bone Mimics for Superior Spinal Arthrodesis
Carl A. Gregory, PhD; Bret Clough; Christopher D. Chaput, MD
Texas A&M University Institute for Regenerative Medicine, Temple, TX, US; Temple, TX, US; Scott & White Hospital, Temple, TX, US
FDA Device/Drug Status: Adult Bone Marrow Stem Cells (Investigational/Not approved), Stem Cell Derived Proteins (Investigational/Not approved)

P4. Osteogenic Differentiation of Nucleus Pulposus Cells is Induced by Advanced Glycation End Products
Svenja Iilien-Junger, PhD
New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P5. Effect of Single versus Hypofractionated Focused Radiation Therapy on Vertebral Structure
Benjamin D. Elder, MD, PhD; Christina Holmes, PhD; Sheng-fu L. Lo, MD, MHS; Varun Puvanesarajah, BS; C. Rory Goodwin, MD, PhD; Timothy F. Witham, MD, FACS
Johns Hopkins Hospital, Baltimore, MD, US; Baltimore, MA, US; Johns Hopkins University, Baltimore, MD, US; Johns Hopkins University School of Medicine, Baltimore, MD, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P6. Effect of Parathyroid Hormone (PTH) on the Fusion Mass and Clinical Outcome of Instrumented Spinal Fusion
Luis Alvarez, MD; Marta Martin-Fernández, PhD; Angel R. Piner, MD; Felix Tome-Bermejo, MD, PhD
Fundación Jimenez Díaz-Traumatología, Madrid, Spain; Madrid, Spain; Fundacion Jimenez Diaz, Madrid, Spain; Hospital Universitario Fundación Jimenez Diaz, Madrid, Spain
FDA Device/Drug Status: Parathyroid hormone (Approved for this indication)

P7. Laser Modified PEEK Implants as an Adjunct to Interbody Fusion: A Sheep Model
David C. Briski, MD; Brandon W. Cook, MD; Joseph M. Zavatsky, MD; Timothy Ganey, PhD
Ochsner Medical Center, Jefferson, LA, US; Florida Orthopaedic Institute, Temple Terrace, FL, US; Atlanta Medical Center, Atlanta, GA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P8. Annular Repair Using High-Density Collagen Gels Seeded with Fibrochondrocytes: In Vivo Outcome in the Rodent Spine
Yu Moriguchi, MD, PhD; Brandon Borde; Peter Grunert, MD; Thamina Khasir, BA; Katherine Hudson, BS; Marjan Alimi; Lawrence Bonassar, PhD; Roger Hartl, MD
Weill Cornell Medical College Department of Neurological Surgery, New York, NY, US; Cornell University, Ithaca, NY, US; Vienna, Austria; Weill Cornell Medical College, NY, NY, US; New York Presbyterian Hospital Weill Cornell, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P9. Surgical Tubing as a Source of Intraoperative Contamination in Spine Surgery
George R. Williams, MD
Opelousas, LA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P10. Comparison of a Novel Porous Titanium-Nickel Intervertebral Fusion Device and a Polyether Ether Ketone Intervertebral Fusion Device in a Sheep Lumbar Fusion Study
Jeremiah Easley, DVM
Preclinical Surgical Research Laboratory, Colorado State University, Fort Collins, CO, US
FDA Device/Drug Status: Phusion Metal (Approved for this indication)

BIOMECHANICS

P11. An In Vitro Evaluation of Anterior, Lateral and Transforaminal Interbody Stabilization: Should Approach-Related Differences be a Consideration?
Manasa Gudipally1; Brandon Bucklen, PhD2
1Audubon, PA, US; 2Globus Medical, Audubon, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

Noelle Klocke, MS1; Heidi M. Hullinger, MD2; Mir Hussain1; Sean Jenkins, BS3; Yiwei Cai1; Brandon Bucklen, PhD2
1Globus Medical, Audubon, PA, US; 2Summit, NJ, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P13. Analysis of PMMA Distribution around Cannulated and Fenestrated Cement-Augmented Pedicle Screws: Clinical Study
Luis Alvarez, MD1; Sergio Gomez, PhD2; Maria Daniela Vlad, PhD2; Angel R. Pinera, MD3; Felix Tome-Bermejo, MD, PhD4; Enrique Fernández5
1Fundación Jimenez Diaz-Traumatologia, Madrid, Spain; 2Barcelona, Spain; 3Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain; 4Fundacion Jimenez Diaz, Madrid, Spain; 5Universidad Politecnica de Cataluna, Barcelona, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P14. Failure of Standardized Biomechanical Testing Protocol to Predict Rod Fracture in a 3-Column Spine Osteotomy Model
Jeremi M. Leasure, MS1; William Camisa, MS2; Peter M. Wanberg, BS3; Jenni M. Buckley, PhD4; Christopher P. Ames, MD5; Dimitry G. Kondrashov, MD6
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P15. Comprehensive Biomechanical Analysis of Three Reconstruction Techniques following Total Sacrectomy: An In Vitro Human Cadaveric Model
Mohamad Bydon, MD1; Mohamed Macki2; Rafael De la Garza-Ramos, MD2; Ashley A. Murgatroyd, BS3; Kenneth Mullinix, BS3; Ali Bydon, MD4; Ziya L. Gokaslan, MD, FACSF; Bryan W. Cunningham, PhD5
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

COMPLICATIONS

Thomas Cheriyan, MD; Virginie Lafage, PhD; John A. Bendo, MD; Jeffrey M. Spivak, MD; Jeffrey A. Goldstein, MD, FACS; Thomas J. Errico, MD
New York University Hospital for Joint Diseases, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P17. Patients Incurring Multiple Complications following Adult Spinal Deformity (ASD) Surgery Demonstrate an Additive Effect Resulting in Incremental Worsening of Health Related Quality of Life (HRQOL)
International Spine Study Group1; D. Kojo Hamilton, MD2; Brandon B. Carlson3; Eric O. Klineberg, MD4; Shay Bess, MD5; Robert A. Hart, MD6; Douglas C. Burton, MD7; Malla K. Keefe8; Justin K. Scheer, BS9; Christopher P. Ames, MD10; Justin S. Smith, MD, PhD11; Peter G. Passias, MD12,13; Themistocles S. Protopsaltis, MD13; Alexandra Soroceanu, MD, MPH14; Daniel M. Sciubba, MD15; Han Jo Kim, MD16; Virginie Lafage, PhD13; Gregory M. Mundis Jr., MD17; Frank J. Schwab, MD13
of Medicine, New York, NY, US; 11University of Davis Orthopaedic Surgery, Sacramento, CA, US; 12New York University Hospital for Joint Diseases, New York, NY, US; 13University of California San Francisco Health System, Charlottesville, VA, US; 14Baylor Scoliosis Center, Plano, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P18. Dural Tears Do Not Affect Outcomes or Rates of Other Associated Complications in Adult Spinal Deformity Surgery

International Spine Study Group1; Eric O. Klineberg, MD2; Srinavas Iyer, MD1; Michael P. Kelly, MD4; Matthew E. Cunningham, MD, PhD2; Lukas P. Zebala, MD2; Brian J. Neuman, MD3; Robert A. Hart, MD2; Alan Daniels, MD2; Shay Bess, MD2; Munish C. Gupta, MD2; D. Kojo Hamilton, MD2; Gregory M. Mundis Jr., MD3; Virginie Lafage, PhD2; Justin S. Smith, MD, PhD3; Christopher P. Ames, MD2; Douglas C. Burton, MD2; Han Jo Kim, MD2


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P19. Local Application of Vancomycin in Spine Surgery Does Not Result in Increased Vancomycin Resistance

Frank H. Valone III1; Shane Burch, MD2; Sigurd H. Berven, MD2; Vedat Deviren, MD2; Bobby Tay, MD2; Serena S. Hu, MD2

1University of California San Francisco, San Francisco, CA, US; 2University of California Davis School of Medicine, Sacramento, CA, US; 3University of California San Francisco Department of Orthopedics, San Francisco, CA, US; 4University of Kansas Medical Center, Kansas City, KS, US; 5Hospital for Special Surgery, New York, NY, US

FDA Device/Drug Status: Vancomycin (Investigational/Not approved)

P20. What is the Most Expensive Cause for Readmission following Adult Spinal Deformity Surgery?

International Spine Study Group1; Richard A. Hostin Jr., MD2; Chessie Robinson, MA3; Jeffrey L. Gum, MD4; Michael P. Kelly, MD1; David W. Polly Jr., MD1; Shay Bess, MD2; Christopher P. Ames, MD2; Douglas C. Burton, MD2; Munish C. Gupta, MD2; Frank J. Schwab, MD3; Justin S. Smith, MD, PhD3; Dante M. Leven, DO, PT; Branko Skovrlj, MD1; Jeremy Steinberger, MD2; Parth Kohrati, BS3; Nathan J. Lee, BS4; Javier Guzman, BS3; John I. Shin, BS3; Samuel K. Cho, MD4

1University of California San Francisco, San Francisco, CA, US; 2University of California San Francisco Department of Orthopedics, San Francisco, CA, US; 3University of Kansas Medical Center, Kansas City, KS, US; 4University of California Davis School of Medicine, Sacramento, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.


Anuj Singla, MD1; Scott Yang, MD2; Brian C. Werner, MD2; Jourdan Cancienne, MD2; Hamid Hassanadexe, MD1; Adam L. Shimer, MD2; Francis H. Shen, MD1

1University of Virginia School of Medicine, Charlottesville, VA, US; 2Charlottesville, VA, US; 3University of Virginia Department of Orthopedic Surgery, Charlottesville, VA, US; 4University of Virginia School of Medicine Department of Orthopaedic Surgery, Charlottesville, VA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P22. Radiological Signs of Adjacent Segment Degeneration Patients with Cervical Spondylotic Radiculopathy Treated with Posterior Cervical Cages: Two-Year Follow-Up

Piotr Janusz, MD, PhD1; Krzysztof B. Siemionow, MD2

1University of Illinois at Chicago Department of Orthopaedics, Chicago, IL, US; 2University of Illinois Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: DTRAX® Cervical Cage (Approved for this indication)

P23. Of 5,267 Lumbar Posterior Fusions, 4.35% of Patients Readmitted Within 30 Days: Surgical Site Issues: The Most Common Reasons for Readmission

Matthew L. Webb1; Andre Samuel, BA2; Adam M. Lukasiewicz, MSc1; Bryce Basques1; Daniel D. Bohl, MPH2; Pablo Diaz-Collado, MD2; Jonathan N. Grauer, MD1

1Yale University School of Medicine, New Haven, CT, US; 2New Haven, CT, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P24. Predictors of Unplanned Readmission for Adults Undergoing Elective Lumbar Spine Fusion

Dante M. Leven, DO, PT; Branko Skovrlj, MD1; Jeremy Steinberger, MD2; Parth Kohrati, BS3; Nathan J. Lee, BS4; Javier Guzman, BS3; John I. Shin, BS3; Samuel K. Cho, MD4

1Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Mount Sinai School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P25. Super Obesity (BMI > 50kg/m2) and Complications after Posterior Lumbar Spine Fusion
Hamid Hassanzadeh, MD; Jourdan Cancienne, MD; Brian C. Werner, MD; Scott Yang, MD; Anuj Singla, MD; Francis H. Shen, MD; Adam L. Shimer, MD
1University of Virginia Department of Orthopedic Surgery, Charlottesville, VA, US; 2Charlottesville, VA, US; 3University of Virginia School of Medicine, Charlottesville, VA, US; 4University of Virginia School of Medicine Department of Orthopaedic Surgery, Charlottesville, VA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P26. Influence of Adverse Events on Clinical Outcomes of Patients in an FDA IDE Clinical Trial of Cervical Total Disc Replacement versus Anterior Cervical Disectomy and Fusion
Donna D. Ohnmeiss, PhD; Hyun W. Bae, MD
1Texas Back Institute Research Foundation, Plano, TX, US; 2Spine Institute St. John’s Health Center, Los Angeles, CA, US
FDA Device/Drug Status: Mobi-C (Approved for this indication)

P27. Acute Proximal Junctional Failure: A T10 UIV is Not as Safe as Thought
Nicholas Spina, MD; Prokapis Annis, MD; Brandon D. Lawrence, MD; W. Ryan Spiker, MD; Jon Belding, MD; Michael D. Daubs, MD; Darrel S. Brodke, MD
1University of Utah Orthopaedics, Salt Lake City, UT, US; 2University of Utah, Salt Lake City, UT, US; 3University Orthopaedic Center, Salt Lake City, UT, US; 4Department of Orthopedic Surgery, Cleveland, OH, US; 5University of Nevada School of Medicine, Professor and Chief Division of Orthopaedic Surgery, Las Vegas, NV, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P28. Occult Infections in Patients Undergoing Revision Surgery
Tucker C. Callanan, BS; Darren R. Lebl, MD; Frank P. Cammisa Jr., MD; Josh E. Schroeder, MD; Celeste Abjornson, PhD
Hospital for Special Surgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P29. Intraoperative Neuromonitoring in Spine Surgery and New Neurologic Events: A Report from the Surgical Care and Outcomes Assessment Program (SCOAP)
Sara Khor, MSc; S. Samuel Bederman, MD, PhD, FRCS; Neal H. Shonnard, MD; Paul A. Anderson, MD; Rajiv K. Sethi, MD; Rod J. Oskouian Jr., MD; Jens R. Chapman, MD; Amy M. Cizik; Dean Martz, MD; David Flum, MD, MPH
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P29. Intraoperative Neuromonitoring in Spine Surgery and New Neurologic Events: A Report from the Surgical Care and Outcomes Assessment Program (SCOAP)
Sara Khor, MSc; S. Samuel Bederman, MD, PhD, FRCS; Neal H. Shonnard, MD; Paul A. Anderson, MD; Rajiv K. Sethi, MD; Rod J. Oskouian Jr., MD; Jens R. Chapman, MD; Amy M. Cizik; Dean Martz, MD; David Flum, MD, MPH
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P30. Incidental Extra-Spinal Findings in Lumbar Spine MRI: Incidence and Clinical Significance
Hassan Semaan, MD; Tawfik Obri, MD; Jacob Biesczad, MD; Paul Aldinger, DO; Mohammed Al- Natour, MD; Mohammad Bazerbashi, MD; Nicholas Peters, MD; Hossein K. Elgafy, MD, FRCS;1 Toledo, OH, US; 2Maumee, OH, US; 3University of Toledo Medical Center, Toledo, OH, US; 4Toledo, OH, US; 5University of Toledo Medical Center Department of Radiology, Toledo, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P31. Simplified Lumbar Degeneration Classification (SLDC): Multisite Evaluation
Dana A. Leonard, BA; Charles H. Cho, MD, MBA; Liange Hsu, MD; Nathan C. Himes, MD; Ali Al- Omari, MD; David Lunardini, BS, MD; Mitchell Harris, MD, FACS; Kevin J. McGuire, MD; Kirkham B. Wood, MD; Christopher M. Bono, MD
1Brigham and Women’s Hospital, Boston, MA, US; 2Brigham Women’s Hospital Department of Radiology, Boston, MA, US; 3Massachusetts General Hospital, Brigham and Women’s Hospital, Boston, MA, US; 4University of Vermont, South Burlington, VT, US; 5Beth Israel Deaconess Medical Center, Boston, MA, US; 6Massachusetts General Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P32. Dedicated Surgical Measurement Software (SMS) Helps Obtain Sagittal and Pelvic Parameters More Reliably Than PACS
International Spine Study Group; Munich C. Gupta, MD; Jensen Henry, BA; Frank J. Schwab, MD; Eric O. Klineberg, MD; Justin S. Smith, MD, PhD; Jeffrey L. Gum, MD; David W. Polly Jr., MD; Barthelemy Liabaud, MD; Bassel G. Diebo, MD; D. Kojo Hamilton, MD; Robert K. Eastlack, MD; Peter G. Passias, MD; Douglas C. Burton, MD; Themistocles S. Protopsallis, MD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P33. Traction X-ray under General Anesthesia (TRUGA): Does It Change the Upper and Lower Fusion Levels Selected Before Surgery?
Sinan Kahraman, MD1; Meric Enercan, MD2; Bahadir Gokcen, MD2; Tunay Sanli, MA1; Erdem Erturer, MD1; Cagatay Ozturk, MD2; Azmi Hamzaoglu, MD1
1Istanbul Spine Center, Istanbul, Turkey; 2Florence Nightingale Hospital, Istanbul, Turkey; 3Istanbul, Turkey
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P34. Is the CARDS Classification for Degenerative Spondylolisthesis Predictive of Preoperative Outcome Scores?
Garret Sobol1; Alan S. Hilibrand, MD2; Ashley Davis1; Christopher K. Kepler, MD, MBA1; John D. Koerner, MD4; Alexander R. Vaccaro, MD, PhD1; Kris E. Radcliff, MD1
1Rutgers New Jersey Medical School, Newark, NJ; 2Rothman Institute, Philadelphia, PA, US; 3Philadelphia, PA, US; 4Rothman Institute, Thomas Jefferson University, Philadelphia, PA, US; 5Rothman Institute, Thomas Jefferson University, Egg Harbor Township, NJ, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P35. Pedicle Screw Malposition in Revision Spine Surgery: Efficacy of Intraoperative CT Based Navigation
Juliet N. Batke, BS1; Andrew Pennington, BS1; Nicolas Dea, MD, FRCSC2; Melissa Nadeau, MD, MHS, FRCSC2; Charles G. Fisher, MD4; Marcel F. Dvorak, MD, FRCSC3; John Street, MD, PhD1; Daniel Mendelsohn, MD4; Juliet N. Batke, BS1
1Vancouver, BC, Canada; 2CHUS Service de Neurochirurgie, Sherbrooke, QC, Canada; 3Blusson Spinal Cord Center, Vancouver, BC, Canada; 4Vancouver General Hospital, Vancouver, BC, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P36. The Effect of Bone Mineral Density on Proximal Junctional Failure in Thoracolumbar Fusion
William F. Lavelle, MD1; Tarush Rustagi, MD2; Richard A. Tallarico, MD2; Nikhil A. Thakur, MD2; Mike H. Sun, MD4; Ian A. Madom, MD1
1East Syracuse, NY, US; 2Suny Upstate Hospital, Syracuse, NY, US; 3Upstate Orthopedics, East Syracuse, NY, US; 4State University of New York Upstate, Syracuse, NY, US
FDA Device/Drug Status:DEXA scan, CT scan, pedicle screws (Approved for this indication

P37. GeneXpert Polymerase Chain Reaction (PCR) Test: Role in the Diagnosis of Tubercular Spondylodiscitis
Justin Arockiaraj, MD1; Rohit Amritanand, MD2; Venkatesh Krishnan, DNB, MBBS1; Gabriel Sundararaj, MD, MBBS1; Joy Michael, MD, MBBS1
1Spinal Disorders Surgery Unit Department of Orthopaedics, Vellore, Tamil Nadu, India; 2Toronto, ON, Canada; 3Vellore, India; 4Department of Orthopaedics, Vellore, India; 5Christian Medical College & Hospital Department of Microbiology, Vellore, India
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P38. Investigating Metabolic and Functional Profiles of Mild and Moderate Cervical Spondylotic Myelopathy: A MRS and fMRI Study
Izabela K. Aleksanderek, PhD1; Todd Stevens, PhD2; Sandy Goncalves, BHSc, MSc2; Neil Duggal, MD, FRCSC1; Robert Bartha, PhD1
1University Hospital, London, ON, Canada; 2London, ON, Canada; 3London Health Sciences Centre Western University, London, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P39. Removed from Program

Ehsan Tabaraee, MD1; Mark F. Kard, MD2; Howard S. An, MD1
1University of California San Francisco, San Francisco, CA, US; 2Rothman Institute, Bryn Mawr, PA, US; 3Rush Hospital Orthopedic Surgery Department, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P41. Utility of Postoperative Radiographs in Adult Spine Deformity Surgery
Kirkham B. Wood, MD1; Brian Grottkauf, MD2; Mark Jacobson, MD2; Polina Osler, MS1; Dana A. Leonard, BA1
1Massachusetts General Hospital, Boston, MA, US; 2Shoreline Orthopaedics, Holland, MI, US; 3Brigham and Women’s Hospital, Boston, MA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P42. Risk Factors of Severe Adolescent Scoliosis Tied to HTN
Xie En, MD1; Dingjun Hao, MD2; Dageng Huang, MD2; Biao Wang1; Hua Guo, MD4
1Hong Hui Hospital, Xi’an Jiaotong University College of Medicine, Xi’an, Shan Xi, China; 2Xi’an Honghui Hospital, Xi’an, Shan Xi, China; 3Honghui Hospital, Department of Spinal Surgery, Xi’an, Shan Xi, China; 4Xi’an, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P43. A Comprehensive MRI Classification System for Cervical Foraminal Stenosis
Sang-Hun Lee, MD, PhD1; So Young Park, MD, PhD1; Jeffrey C. Wang, MD2; Kyung-Chung Kang, MD3; Sang-Phil Hwang, MD4; Soojin Jang, MD4
1Seoul, South Korea; 2University of Southern California Spine Center, Los Angeles, CA, US; 3KyungHee University Medical Center, Seoul, South Korea; 4Spine Center, Kyung Hee University Hospital at Gangdong, Seoul, South Korea
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P44. Increasing Rates of Surgical Management of Adult Spinal Deformity in Patients over Sixty
David Sing, BS1; Ryan Khanna; Shane Burch, MD2; Sigurd H. Berven, MD3
1University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US; 2University of California San Francisco, San Francisco, CA, US; 3University of California San Francisco Department of Orthopaedic Surgery, San Francisco, CA, US
FDA Device/Drug Status: BMP (Not approved for this indication)

P45. Risk of Infectious Complications Associated with Blood Transfusion in Elective Spinal Surgery: A Propensity Score Matched Analysis
So Kato, MD; Hirotaka Chikuda, MD, PhD; Junichi Ohya, MD; Katsushi Takeshita, MD, PhD; Sakae Tanaka, MD, PhD
The University of Tokyo, Department of Orthopaedic Surgery, Tokyo
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P46. Baseline Characteristics of Patients in the Lumbar Spinal Stenosis Outcome Study (LSOS)
Maria M. Wertli, MD, PhD1; Jakob M. Burgstaller, MD, DMD2; Ulrike Held, PhD3; Lukas Wildi, MD3; François Pochet, MD4; Johann Steurer, MD5
1Horten Centre for Patient Oriented Research and Knowledge Transfer, University of Zurich, Zurich, Switzerland; 2Spine Center, Schulthess Klinik, Zürich, Switzerland; 3Department of Rheumatology, University Hospital Zurich, Zurich, Switzerland
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P47. Effect of Body Mass Index on Intraoperative Outcomes and Complications of Instrumented Lumbar Spine Surgery
Michael A. Flippin, MD1; Samuel R. Ward, PT2; Sara Gombatto, PhD, PT3
1Kaiser Permanente Department of Orthopedics, San Diego, CA, US; 2University of California San Diego, New York, NY, US; 3San Diego State University, San Diego, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P48. Determination of the Clinical and Demographic Predictors of Missed Spinal Column Pathology at Emergency Department Level Evaluation
Clifford Lin, MD1; Eric M. Massicotte, MD, FRCCS2; Michael G. Fehlings, MD, PhD, FRCCS2; Mohammed F. Shamji, MD, PhD, FRCCS2
1Toronto, ON, Canada; 2University of Toronto, Toronto, ON, Canada; 3Toronto Western Hospital, Toronto, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P49. Diabetes Predicts Worse Patient Reported Outcomes at Two Years following Spine Surgery
Sheyan J. Armaghani, MD1; Kristin Archer, PhD, DPT2; John A. Sielatycki, MD2; Silky Chotai, MD2; Rena Clayton Rolfe; David Demaio; Matthew J. McGirt, MD4; Clinton J. Devin, MD2
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P50. Failure of “Conservative Care:” Amorphous Definition in Lumbar Spine Studies
Aaron J. Yang, MD1; Lilian Hoffecker, PhD2; Kelly Sauerwein, CCRP1; Adam Hoffberg, MHS3; Danielle Shoreman, MD; Venu Akuthota, MD4
1Vanderbilt University, Nashville, TN, US; 2University of Colorado Department of PM&R, Aurora, CO, US; 3Denver, CO, US; 4Vanderbilt University Medical Center, Nashville, TN, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P51. Autogenous Bone Marrow Concentrate (BMC) Injection to Treat One- and Two-Level Symptomatic Degenerated Lumbar Discs: A Prospective Controlled Study with a Minimum 24-Month Follow-Up
Fernando Techy, MD
University of Colorado Health, Rocky Mountain Associates Department of Spine Surgery, Fort Collins, CO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P52. Sandwich Vertebral Fracture in the Study of Adjacent-Level Fracture after Vertebral Cement Augmentation
Luis Alvarez, MD1; Silvia Perez, MD1; Marta Martín-Fernández, PhD2; Angel R. Pineda, MD3; Felix Tome-Bermejo, MD, PhD1
1Fundación Jimenez Díaz-Traumatologia, Madrid, Spain; 2Madrid, DE, Spain; 3Madrid, Spain; 4Fundacion Jimenez Díaz, Madrid, Spain; 5Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P53. Role of Lysis Blocks in Management of Adult Patients with Lower Lumbar Spondylolysis and Back Pain
Rajesh R. Shah, FRCS; Damian Taylor, MbChB; Marek Korab-Karpinski, MD, FRCS; Andrezej T. Plotka, MD; Ivan Vidakovic, MD; Michael Makowem, MbChB
1Hull & East Yorkshire NHS Trust, Hull, Humberside, UK; 2Hull, United Kingdom; 3Hull, East Yorkshire, UK; 4Hull & East Yorkshire Hospitals NHS Trust, Cottingham, East Yorkshire, UK; 5Menston, United Kingdom
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P54. Comparison between Single- and Multilevel Patients: Clinical and Radiological Interim Results at Five Years after Cervical Disc Replacement
Florence Douard, PhD; Thierry Dufour, MD; Pierre Bernard, MD; Jacques Beaurnain, MD; Jean Huppert, MD; Istvan Hovorka, MD; Thierry Vila, MD; Jean-Paul Steib, MD
1Rosières Près Troyes, France; 2CHR Orléans – La Source, Orleans, France; 3Centre Aquitain du Dos, Merignac, France; 4Neurochirurgie CHU Hôpital Général, Dijon, France; 5Service De Neurochirurgie, Saint Priest En Jarez, France; 6Nice, France; 7Paris, France; 8Chirurgie du rachis, Chirurgie B, Strasbourg, France
FDA Device/Drug Status: Mobi-C (Approved for this indication)

P55. The Influence of Preoperative Disc and Prosthesis Heights Ratio on Postoperative Range of Motion and Sagittal Balance Two Years after Cervical Arthroplasty
Patrick Fransen; Vincent Pointillart, MD, PhD; Nils Hansen-Algenstaedt, MD; Athanasios Chatzisotiriou, MD, PhD; David C. Noriega, MD
1Centre Hospitalier Universitaire Pellegrin, Bordeaux Cedex, France; 2Orthocentrum Hamburg, Hamburg, Germany; 3Thessaloniki, Greece; 4Valladolid, Spain
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P56. Heterotopic Ossification and Endplate Coverage in One-Level CDA Patients
Pierce D. Nunley, MD; David A. Cavanaugh, MD; Eubulus J. Kerr III, MD; Andrew Utter, MD; Kelly Frank, MS; Marcus Stone, PhD
1Spine Institute of Louisiana, Shreveport, LA, US; 2Shreveport, LA, US; 3Spine Institute of Louisiana Foundation, Shreveport, LA, US
FDA Device/Drug Status: Mobi-C Cervical Disc (Approved for this indication)

P57. Prospective Cost Utility Analysis of Adult Deformity Surgery
John A. Sielatycki, MD; Silky Chotai, MD; Scott L. Parker, MD; Matthew J. McGirt, MD; Clinton J. Devin, MD; Kevin O’Neill, MD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P58. Cost per Quality Adjusted Life Years Gained for Anterior Cervical Discectomy and Fusion for Degenerative Spine Disease in Elderly Population
Silky Chotai, MD; Scott L. Parker, MD; Ahilan Sivaganesan, MD; Matthew J. McGirt, MD; Clinton J. Devin, MD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P59. Cost per Quality Adjusted Life Years Gained of Lumbar Decompression and Fusion for Degenerative Spine Disease: Defining the Value of Surgical Intervention in Elderly Population
Clinton J. Devin, MD; Silky Chotai, MD; Scott L. Parker, MD; Lindsay Tetreault; Michael G. Fehlings, MD, PhD, FRSC; Matthew J. McGirt, MD
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University, Nashville, TN, US; 4University of Toronto, Oakville, ON, Canada; 5Toronto Western Hospital, Toronto, ON, Canada; 6Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P60. Determining the Drivers of Cost for Elective Anterior Cervical Discectomy and Fusion for Cervical Degenerative Disease
Silky Chotai, MD; Scott L. Parker, MD; Ahilan Sivaganesan, MD; Oran S. Aaronson, MD; Matthew J. McGirt, MD; Clinton J. Devin, MD
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P61. Geographic Variations in the Cost of Spine Surgery
Darrel S. Brodke, MD; Vadim Goz, MD; Ajinkya Rane, MD; Amir M. Abtahi, MD; Brandon D. Lawrence, MD; W. Ryan Spiker, MD
1University Orthopaedic Center, Salt Lake City, UT, US; 2University of Utah, Salt Lake City, UT, US; 3Salt Lake City, UT, US; 4University of Utah Orthopaedic Center Department of Orthopaedics, Salt Lake City, UT, US; 5University of Utah Orthopaedics, Salt Lake City, UT, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P62. Lumbar Surgery in the Elderly Provides Significant Health Benefit and Value in the U.S. Healthcare System: Patient-Reported Outcomes in 4,370 Patients from the N2QOD Registry
Scott L. Parker, MD; Matthew J. McGirt, MD; Alan S. Hilibrand, MD; Clinton J. Devin, MD; Steven D. Glassman, MD; Anthony Asher, MD, FACS
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P63. The Substantial Clinical Benefit Threshold for SRS-22R Domains after Surgical Treatment of Adult Spinal Deformity
Leah Y. Carreon, MD, MSc; Charles H. Crawford III, MD; Steven D. Glassman, MD; Keith H. Bridwell, MD
1Norton Leatherman Spine Center, Louisville, KY, US; 2Washington University in St. Louis School of Medicine, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P64. An In Vitro Evaluation of Sagittal Alignment in the Cervical Spine after Insertion of Supraphysiologic Lordotic Implants
Jeffrey E. Harris, MS; Donald J. Blaskiewicz, MD; Patrick P. Han, MD; Alexander W. Turner, PhD; Gregory M. Mundis Jr., MD
1NuVasive, San Diego, CA, US; 2Neurosurgical Medical Clinic, San Diego, CA, US; 3St. John Neuroscience Institute, Tulsa, OK, US; 4Scripps Clinic Medical Group Department of Orthopedics, La Jolla, CA, US
FDA Device/Drug Status: CoRoent Small ACR Interbody (Not approved for this indication)

P65. Surgical Treatment of Scoliosis in Marfan Syndrome: Anterior Combined with Posterior Approach versus Posterior-Only Approach
Xiao Han II; Jun Qiao, MD; Zexiang Zhu, PhD; Feng Zhu, MD; Bin Wang, MD; Bangping Qian, MD; Yang Yu, MD; Yong Qiu, MD
1Nanjing, China; 2Nanjing Gulou Hospital, Nanjing, Jiangsu, China; 3The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

Venu M. Nemani, MD, PhD; Benjamin T. Bjerke, MD, MS; Han Jo Kim, MD; Harry Akoto, MbChB; Irene Wulf; Rufai Mahmud; Jennifer Ayamga; Theresa Yiererong; Oheneba Boachie-Adjei, MD; 2FOCOS Spine Research Group
1Hospital for Special Surgery, New York, NY, US; 2Korle Bu Teaching Hospital Department of Surgery, Accra, Ghana; 3FOCOS Orthopaedic Hospital, Accra, Ghana; 4Accra, Ghana
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P67. Does Adolescent Obesity Affect Surgical Presentation and Radiographic Outcome for Patients with AIS?
Benjamin T. Bjerke, MD, MS; Rehan Saiyed, BS; Zoe Cheung; Grant Shifflett, MD; Matthew E. Cunningham, MD, PhD
Hospital for Special Surgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P68. T1 Pelvic Angle and Spinosacral Angle: Which Parameter Can Better Predict the Clinical Outcomes in Ankylosing Spondylitis?
Xiao Han II; Yunpeng Zhang, MD; Bangping Qian, MD; Yong Qiu, MD; Zhe Qu, MD; Mingliang Ji, MD; Bin Wang, MD; Yang Yu, MD; Zexiang Zhu, PhD
The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P69. Site Variability in Surgical Technique and Outcomes in Adult Spinal Deformity

International Spine Study Group; Thomas Cherian, MD; Frank J. Schwab, MD; Khaled M. Kebaish, MD; Munish C. Gupta, MD; Christopher P. Ames, MD; Christopher I. Shaffrey, MD; Elizabeth Tanzi, ARNP; Michael P. Kelly, MD; Justin S. Smith, MD, PhD; Robert A. Hart, MD; Richard A. Hostin Jr., MD; Thomas J. Errico, MD; Virginie Lafage, PhD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P70. Quantifying Risk Aversion and Likelihood of Decision Regret in the Preoperative Evaluation of the Adult Deformity Patient

International Spine Study Group; Justin K. Scheer, BS; Malla K. Keeffe; Michael P. Kelly, MD; Virginie Lafage, PhD; Shay Bess, MD; Douglas C. Burton, MD; Robert A. Hart, MD; Amit Jain; Themistocles S. Protopsaltis, MD; Richard A. Hostin Jr., MD; Christopher I. Shaffrey, MD; Justin S. Smith, MD; PhD; Frank J. Schwab, MD; Christopher P. Ames, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P71. Redefining Radiographic Thresholds for Juncional Kyphosis Pathologies

International Spine Study Group; Renaud Lafage; Frank J. Schwab, MD; Shay Bess, MD; Douglas C. Burton, MD; Christopher P. Ames, MD; Robert A. Hart, MD; Breton Line; Justin K. Scheer, BS; Justin S. Smith, MD, PhD; Han Jo Kim, MD; Eric O. Klineberg, MD; David W. Polly Jr., MD; Shay Bess, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P72. Post-Operative Changes in Lumbar Lordosis and Proximal Junctional Angle are Risk Factors for the Development of Proximal Junctional Kyphosis

Faisal Konbaz; Alim Ramji, BS; Amit Jain; Brian J. Neuman, MD

1Baltimore, MD, US; 2Portland, OR, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P73. Readmissions after Spinal Deformity Surgery

Jeremy Steinberger, MD; Parth Kothari, BS; Javier Guzman, BS; Branko Skovrlj, MD; Nathan J. Lee, BS; Dante M. Leven, DO, PT; Samuel K. Cho, MD

1New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P74. Cell Saver for Adult Spinal Deformity Surgery Minimizes Cost

International Spine Study Group; Jeffrey L. Gum, MD; Leah Y. Carreon, MD, MSc; Michael P. Kelly, MD; Richard A. Hostin Jr., MD; Chessie Robinson, MA; Douglas C. Burton, MD; David W. Polly Jr., MD; Christopher I. Shaffrey, MD; Virginie Lafage, PhD; Frank J. Schwab, MD; Christopher P. Ames, MD; Han Jo Kim, MD; Justin S. Smith, MD, PhD; Shay Bess, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P75. Impact of Cost Valuation on Cost-Effectiveness in Adult Spine Deformity Surgery

International Spine Study Group; Jeffrey L. Gum, MD; Richard A. Hostin Jr., MD; Chessie Robinson, MA; Michael P. Kelly, MD; Leah Y. Carreon, MD, MSc; David W. Polly Jr., MD; Shay Bess, MD; Douglas C. Burton, MD; Christopher I. Shaffrey, MD; Justin S. Smith, MD, PhD; Virginie Lafage, PhD; Frank J. Schwab, MD; Christopher P. Ames, MD; Steven D. Glassman, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P76. Clinical and Radiographic Parameters Associated with Best versus Worst Clinical Outcomes in Minimally Invasive Deformity Surgery

International Spine Study Group; Khoi D. Than, MD; Paul Park, MD; Stacie Nguyen, MPH; Michael Y. Wang, MD; Dean Chou, MD; Pierce D. Nunley, MD; Neel Anand, MD; Richard G. Fessler, MD, PhD; Christopher J. Shaffrey, MD; Shay Bess, MD; Bassel G. Diebo, MD; Vedat Deviren, MD; Juan S. Uribe, MD; Adam S. Kanter, MD; David O. Okonkwo, MD; Gregory M. Mundis Jr., MD

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P77. Is Preoperative Fibrinogen Testing Associated with Total Blood Loss in Adolescent Idiopathic Scoliosis Correction?

Devender Singh, PhD; Matthew J. Geck, MD; Eeric Truumees, MD; Dana L. Hawthorne, PA-C

Seton Spine & Scoliosis Center, Austin, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P78. Investigating the Universality of Preoperative Health Related Quality of Life (HRQOL) for Surgically Treated Spinal Deformity in Young Adults: A Propensity Score Matched Comparison between African and United States Populations

International Spine Study Group; Bradley Harris, JD; Matthew Roth, BS; Bassel G. Diebo, MD; Shay Bess, MD; Alexander A. Theologis, MD; Justin K. Scheer, BS; Frank J. Schwab, MD; Virginie Lafage, PhD; Christopher P. Ames, MD; Richard Hodes, MD; Jennifer Ayama; Oheneba Boachie-Adjei, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P79. Does Antibiotic-Loaded Bone Graft Used in Scoliosis Surgery Lead to Superbugs?

Sujal Patel, MD; Sina Pourtaheri, MD; Chris Stadler, MD; Suken A. Shah, MD

1Cleveland Clinic, Cleveland, OH, US; 2Paterson, NJ, US; 3DuPont Hospital for Children, Wilmington, DE, US

FDA Device/Drug Status: Vancomycin (Approved for this indication)

P80. Postoperative Transfusion Rates, Complications, and Hospital Charges following Surgical Treatment of Adolescent Idiopathic Scoliosis in the United States from 1997 to 2012

Zachary Grabel, BS; Hari Vigneswaran, BS; Mark A. Palumbo, MD; Craig Eberson, MD; Alan Daniels, MD

1Providence, RI, US; 2Warren Alpert School of Medicine at Brown University, Providence, RI, US; 3University Orthopedics, Providence, RI, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P81. Higher American Society of Anesthesiologist (ASA) Score is an Independent Risk Factor for Complications following Adult Deformity Surgery (ADS)

Dante M. Leven, DO, PT; Parth Kothari, BS; Branko Skovrlj, MD; Jeremy Steinberger, MD; Javier Guzman, BS; Nathan J. Lee, BS; John I. Shin, BS; Samuel K. Cho, MD

1Mount Sinai School of Medicine, New York, NY, US; 2Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 3New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P82. The Impact of Posterior Temporary Internal Distraction on Stepwise Corrective Surgery for Extremely Severe and Rigid Scoliosis

Huimin Hu, PhD

Xian, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P83. Time-Dependent Changes in Preoperative Sagittal Alignment Parameters: Radiographic and Clinical Considerations

Virginie Lafage, PhD; Emmanuel N. Menga, MD; Matthew Spiegel, BS, MD; Barthelymny Liabaud, MD; Renaud Lafage; Shaleen Vira, MD; Jonathan H. Oren, MD; Bassel G. Diebo, MD; Frank J. Schwab, MD; Thomas J. Errico, MD; Themistocles S. Protossaltis, MD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P84. Maintenance of Improved HRQOL Postoperatively with Utilization of Cement Augmentation of the Proximal Screws and Kyphoplasty Proximal to the Cephalad End of Long Constructs in Deformity Surgery: A Retrospective Study

Ibrahim Omeis, MD
Baylor College of Medicine, Houston, TX, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P85. Paraspinal Muscles and Sagittal Spinopelvic Alignment in Patients with Degenerative Spondylolisthesis

Sibel Demir-Deviren, MD1; Emel E. Ozcan, MD2; Julio Carballido-Gamio, PhD2; Roland Krug; Murat Pekmezci, MD2; Murat S. Eksi, MD1; Sigurd H. Berven, MD2; Vedat Deviren, MD2
1University of California San Francisco, San Francisco, CA, US; 2University of California San Francisco Department of Orthopaedic Surgery, San Francisco, CA, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P86. Predicting Short-Term Morbidity in Patients Undergoing Posterior Spinal Fusion for Neuromuscular Scoliosis

Bryce Basques; Adam M. Lukasiewicz, MSc; Matthew L. Webb; Andre Samuel, BA; Daniel D. Bohl, MPH; Brian G. Smith, MD; Jonathan N. Grauer, MD
Yale University School of Medicine, New Haven, CT, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P87. Factors Associated with Increased Length of Stay (LOS) following Adult Deformity Surgery (ADS)

Dante M. Leven, DO, PT; Javier Guzman, BS1; Nathan J. Lee, BS1; Parth Kothari, BS1; Branko Skovrlj, MD2; Jeremy Steinberger, MD3; John I. Shin, BS4; Samuel K. Cho, MD4
1Mount Sinai School of Medicine, New York, NY, US; 2Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 3New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P88. Treatment Strategy and Timing of Surgery in Congenital Cervical Scoliosis

Nanfang Xu, MD; Miao Yu, MD; Zhongjun Liu; Yu Sun, MD
Beijing, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P89. Surgical Outcome of Scoliosis Correction in Duchenne Muscular Dystrophy Using Different Instrumentation Constructs

Luigi A. Nasto, MD1; Ana Belen Perez Romera, MD2; Saggah Tarek Shalabi, MBBS2; Hossein Mehdian, FRCS1
1Spinal Unit, Nottingham, United Kingdom; 2Spinal Fellows Office, Nottingham, United Kingdom; 3Nottingham, United Kingdom; 4QMC University Hospital, Nottingham, Nottinghamshire, UK

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P90. Can S2-Alar-Iliac (S2AI) Screws Be Placed Accurately without Fluoroscopy?

Daniel G. Kang, MD1; Jacob M. Buchowski, MD, MS2; Lawrence G. Lenke, MD3; Ronald A. Lehman, MD4; Todd M. Chapman Jr., MD4; Panya Luksanaprucks, MD5; Jamal McClendon Jr., MD6; Lionel N. Metz, MD6
1Washington University School of Medicine, Saint Louis, MO, US; 2Washington University in St. Louis, Saint Louis, MO, US; 3Washington University School of Medicine Department of Orthopaedic Surgery, Saint Louis, MO, US; 4Duke University Medical Center, Durham, NC, US; 5Department of Orthopedic Surgery, Faculty of Medicine, Siriraj Hospital, Bangkok, Bangkok, Thailand

FDA Device/Drug Status: Iliac-pelvic screw ( Approved for this indication)

P91. Comprehensive Analysis of Level of Evidence (LoE) of Scoliosis Research Society (SRS) Annual Meeting Presentations in the New Millennium (2001-13)

Nanjundappa S. Harshavardhana, MD, MS, DO1; John P. Dormans, MD, FACS2

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

SURGERY—CERVICAL

P92. Outcomes and Revision Rates following Multilevel Anterior Cervical Discectomy and Fusion

Leah Y. Carreon, MD, MSc1; R. Kirk Owens II, MD2; Kelly R. Bratcher, RN2; Katlyn McGraw, BA3
1Norton Leatherman Spine Center, Louisville, KY, US; 2Spine Institute, Louisville, KY, US; 3Louisville, KY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P93. Does Depression or Anxiety Affect Patient-Reported Outcomes and Satisfaction following Operative Treatment for Cervical Radiculopathy?

Harrison F. Kay1; Silky Chotai, MD2; Joseph Wick, BA3; David Stonko4; Matthew J. McGirt, MD1; Clinton J. Devin, MD5
1Nashville, TN, US; 2Vanderbilt University School of Medicine, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US; 4Vanderbilt University Medical Center, Nashville, TN, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P94. Functional Outcomes following Anterior Cervical Discectomy and Fusion: Analysis of a Worker’s Compensation Population

Kern Singh, MD1; Junyoung Ahn2; Blaine Manning, BS3; Spencer Leblang, BS3; Amir Iqbal, BS3; Khaled A. Aboushala4
1Rush University Medical Center, Chicago, IL, US; 2Chicago, IL, US; 3Rush Medical College, Chicago, IL, US; 4Midwest Orthopaedics at Rush, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P95. Prospective Multicenter Assessment of Early Complication Rates Associated with Adult Cervical Deformity Surgery in 78 Patients

International Spine Study Group1; Justin S. Smith, MD, PhD2; Virginie Lafage, PhD3; Christopher I. Shaffrey, MD4; Themistocles S. Protopsaltis, MD5; Peter G. Passias, MD6; Frank J. Schwab, MD7; Munish C. Gupta, MD8; Michael F. O’Brien, MD9; Richard A. Hostin Jr., MD10; Gregory M. Mundis Jr., MD11; Robert K. Eastlack, MD12; Alan Daniels, MD13; Han Jo Kim, MD14; Eric O. Klineberg, MD15; Shay Bess, MD16; Vedat Deviren, MD17; Todd J. Albert, MD18; K. Daniel Riew, MD19; Christopher P. Ames, MD20
1Brighton, CO, US; 2UVA Health System, Charlottesville, VA, US; 3New York University Hospital for Joint Diseases, New York, NY, US; 4University of Virginia, Charlottesville, VA, US; 5New York University School of Medicine, New York, NY, US; 6University of California Davis Orthopaedic Surgery, Sacramento, CA, US; 7Baylor Scott & White Health, Dallas, TX, US; 8University of California San Diego, La Jolla, CA, US; 9Scripps Clinic Department of Orthopedics, La Jolla, CA, US; 10Scripps Clinic, San Diego, CA, US; 11University of Kansas Medical Center, Kansas City, KS, US; 12Oregon Health & Science University, Portland, OR, US; 13Warren Alpert Medical School of Brown University, Providence, RI, US; 14Hospital for Special Surgery, New York, NY, US; 15University of California Davis School of Medicine, Sacramento, CA, US; 16Rocky MountainSpine Institute, Denver, CO, US; 17University of California San Francisco, San Francisco, CA, US; 18Washington University School of Medicine, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P96. Does Obesity Correlate with Poor Patient-Reported Outcomes following Cervical Surgery for Degenerative Conditions?

John A. Sielatycki, MD1; Silky Chotai, MD2; Joseph Wick, BA2; David Stonko3; Harrison F. Kay2; Kevin O’Neill, MD4; Clinton J. Devin, MD1
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Vanderbilt University Medical Center Department of Orthopaedics, Nashville, TN, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P97. Right- versus Left-Sided Exposures of the Recurrent Laryngeal Nerve (RLN) and Its Branches: A Fresh Cadaveric Study Relevant to the Cervical Spine

Ali Rajabian, FRCSEd1; Nasir A. Quraishi, MD2
1The Centre for Spinal Studies and Surgery, Nottingham, UK; 2Queens Medical Centre, Nottingham, UK
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P98. Comparing the Effectiveness of Sagittal Balance and Preoperative Cord Rotation in Predicting Postoperative C5 Palsy

Arunit J. Chugh1; Douglas S. Weinberg, MD2; Jason D. Eubanks, MD3
1Case Western Reserve University School of Medicine, Cleveland, OH, US; 2University Hospitals, Case Medical Center, Cleveland, OH, US; 3Case Medical Center, Cleveland, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P99. Intramedullary MRI Changes in Cervical Spondylotic Myelopathy: Clinical Significance with Type of Intensity and Spinal Cord Compression Ratio

Yury Shulev, MD1; Marat Iusupov2
1City Hospital #2, Saint Petersburg, Russian Federation; 2Saint Petersburg, Russian Federation
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P100. Craniovertebral Junction Intradural Meningiomas: Surgical Approaches and Treatments Outcomes

Yury Shulev, MD; Vitaly V. Stepanenko, MD; Dmitry Pechiborsch
City Hospital #2, Saint Petersburg, Russian Federation
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P101. Influencing Factors on Length of Stay in Adults Undergoing Elective Posterior Cervical Fusion: An Analysis of the American College of Surgeons National Surgical Quality Improvement Program Database
Jeremy Steinberger, MD1; Parth Kothari, BS2; Nathan J. Lee, BS3; Branko Skovrlj, MD4; Dante M. Leven, DO, PT; John I. Shin, BS5; Javier Guzman, BS5; Samuel K. Cho, MD6
1New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P102. Diagnosis and Neurological Status as Predictors of Surgical Site Infection in Primary Cervical Spinal Surgery
Paul W. Millhouse, MD1; Steinman Haddad, MD2; Mitchell Maltenfort, PhD2; Christopher K. Kepler, MD, MBA2; Alexander R. Vaccaro, MD, PhD2
1Rothman Institute, Philadelphia, PA, US; 2Philadelphia, Spain; 3Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P103. Anatomic Measurement of Atlas Pedicle Based on Three-Dimensional Computed Tomography and Its Clinical Significance
Liang Yan, PhD, MD1; Dingjun Hao, MD1; Baorong He, MD1
1Xi’an Honghui Hospital, Xi’an, Shaanxi, China; 2Xi’an, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P104. Cervical Total Disc Replacement and Anterior Cervical Discectomy and Fusion Have Similar Short-Term Complication Rates
Bryce Basques1; Adam M. Lukasiewicz, MSc2; Matthew L. Webb2; André Cecchini, MD9; K. Daniel Riew, MD10
1Cleveland, OH, US; 2Cleveland Heights, OH, US; 3Ohio Bureau of Worker’s Compensation, Columbus, OH, US; 4OrthoNeuro, Columbus, OH, US; 5New Hampshire NeuroSpine Institute, Bedford, NH, US; 6Hospital Cristo Redentor Department of Neurosurgery, Porto Alegre, Brazil; 7Hospital of Cleveland, Cleveland, OH, US; 8Consultorio, Porto Alegre, Brazil; 9Hospital Cristo Redentor Department of Neurosurgery, Porto Alegre, Brazil; 10Washington University School of Medicine, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P105. Impact of Preoperative Anemia on Perioperative Outcomes in Adults Undergoing Elective Posterior Cervical Fusion
Branko Skovrlj, MD1; Dante M. Leven, DO, PT; Nathan J. Lee, BS2; Parth Kothari, BS2; John I. Shin, BS3; Jeremy Steinberger, MD4; Javier Guzman, BS5; Samuel K. Cho, MD3
1Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine at Mount Sinai, New York, NY, US; 4New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P106. Cervical Disc Arthroplasty for Degenerative Disc Disease: Two-Year Follow-Up from an International Prospective, Multicenter, Observational Study
Saleh S. Baeesa, MD
Jeddah, Saudi Arabia
FDA Device/Drug Status: Artificial Cervical Disc (Approved for this indication)

P107. Anterior versus Posterior Approaches for Surgical Odontoid Stabilization in Patients over 50 Years: 30-Day Morbidity and Mortality
Joseph T. Patterson, MD1; David Sing, BS2; Bobby Tay, MD3; Alexander A. Theologis, MD2
1University of California San Francisco, San Francisco, CA, US; 2University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P108. Trends in Epidemiology and Management of Traumatic Type II Odontoid Fracture: Experience in Latin America
Asdrubal Falavigna, MD, PhD1; Orlando Righesso Neto, MD2; Pedro da Silva; Carlos Rocca3; Jefferson Daniel, MD, PhD4; Gustavo B. Azevedo, MD5; Ratko Yurac, MD6; Felix A. Sanchez Chavez, MD7; Ericson Sfreddo, MD8; André Cecchini, MD9; K. Daniel Riew, MD10
1Caxias Do Sul University, Caxias do Sul, Brazil; 2Spine Clinic, Bento Goncalves, RS, Brazil; 3Instituto Nacional de Ortopedia y Traumatologia, Montevideo, Uruguay; 4Instituto de Neurocirurgia e Neurologia de Osasco, Osasco, Sao Paulo, Brazil; 5Instituto Nacional de Traumatologia e atoOrtopedia (INTO), Rio de Janeiro, Brazil; 6Clínica Alemana de Santiago, Vitacura - Santiago, Region Metropolitana, Chile; 7IMSS, Monterrey, Nuevo Leon, Mexico; 8Consultorio, Porto Alegre, Brazil; 9Hospital Cristo Redentor Department of Neurosurgery, Porto Alegre, Brazil; 10Washington University School of Medicine, Saint Louis, MO, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

Mhamad Faour, MD1; Joshua T. Anderson, BC2; Arnold R. Haas, BS, BA1; Stephen T. Woods, MD1; Uri M. Ahn, MD2; Nicholas U. Ahn, MD2
1Cleveland, OH, US; 2Cleveland Heights, OH, US; 3Ohio Bureau of Worker’s Compensation, Columbus, OH, US; 4OrthoNeuro, Columbus, OH, US; 5New Hampshire NeuroSpine Institute, Bedford, NH, US; 6University Hospital of Cleveland, Cleveland, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P110. Analysis of Postoperative Clinical Outcomes between Patients with and without History of Cervical Spine Surgery: A Multicenter Study of 1286 Patients of Two-Year Follow-Up

Peter G. Passias, MD; Kris E. Radcliff, MD; Michael C. Gerling, MD; Cyrus Jalali, BA; Nancy Worley, MS, BA; Kristina Bianco, BA; Robert E. Isaacs, MD; Alexander R. Vaccaro, MD, PhD


FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P111. The Fate of Bulging Discs after Multilevel Posterior Cervical Decompression and Fusion for Spondylotic Cervical Myelopathy

Saankritya Ayan, MD; Woojin Cho, MD, PhD; Alok D. Sharan, MD, MHCDS

1Montefiore Medical Center, Bronx, NY, US; 2Albert Einstein College of Medicine, New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P112. Multilevel Fusion versus Hybrid Surgery in Three-Level Cervical Disc Disease: Retrospective Matched Analysis of Clinical and Radiologic Results in Minimum Two-Year Follow-Up

Jung-Woo Hur, MD; Kyeong-Sik Ryu, MD; Jin-Sung Kim, MD, PhD; Ji-hoon Seong, MD

1Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, South Korea; 2KangNam Saint Mary’s Hospital, Seoul, South Korea; 3Seoul St Mary’s Hospital, Seoul, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P113. Comparison of Radiological Changes and Clinical Outcomes after ACDF with Plate Construct, ACDF with Stand-Alone Cages, and Cervical Total Replacement in Single-Level Lesion

Seong Ju Kong, MD; Soo-Beom Kim, MD; Sang-Ho Lee, MD, PhD

1Seoul Gimpo Airport Spine Health Wooridul Hospital Department of Neurosurgery, Seoul, South Korea; 2Seoul, South Korea; 3Wooridul Spine Hospital, Seoul, South Korea

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P114. Return to Play in Elite Contact Athletes after Anterior Cervical Discectomy and Fusion: A Meta-Analysis

Steven J. McAnany, MD; Samuel C. Overley, MD; Samuel K. Cho, MD; Sheeraz A. Qureshi, MD, MBA; Wellington K. Hsu, MD; Andrew Hecht, MD

1Mount Sinai Medical Center, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Icahn School of Medicine at Mount Sinai, New York, NY, US; 4Northwestern University, Chicago, IL, US; 5New York, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P115. Adjacent Segment Level Ossific Disease after ACDF: Comparative Study between Stand-Alone Anterior Cervical Interbody Fusion (SAACIF) Device and Conventional Plating

Saankritya Ayan, MD; Woojin Cho, MD, PhD; Daniel Shein, MD; Manal Abouelrigal; Alok D. Sharan, MD, MHCDS

1Montefiore Medical Center, Bronx, NY, US; 2Albert Einstein College of Medicine, New York, NY, US; 3Chappaqua, NY, US

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P116. Surgical Treatment for Atlantoaxial Dislocation at Patients with Occipitalized Atlas: Atlantoaxial Fixation Instead of Occipitocervical Fixation

Dageng Huang, MD; Dingjun Hao, MD; Baorong He, MD; Hua Guo, MD

1Department of Spinal Surgery, Honghui Hospital, Xian, Shaanxi Province, China; 2Xi’an Honghui Hospital, Xi’an, Shaanxi, China; 3Xi’an, China

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.


Siddhant Kapoor, MBBS, DNB; Hwan T. Hee, MD, FRCS; Eugene Yang, FRCS; Roy Koh Kioi Miang, MBBS, FRCS; Jacob Y. Oh, MD

1Singapore, Singapore; 2Pinnacle Spine & Scoliosis Centre, Singapore, Singapore; 3Fem Surgery, Singapore, Singapore; 4Khoo Teck Puat Hospital, Singapore, Singapore

FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P118. Clinical and Radiographic Results of Indirect Decompression and Posterior Cervical Fusion for Single-Level Cervical Radiculopathy Using an Expandable Implant with Two-Year Follow-Up

Piotr Janusz, MD, PhD; Krzysztof B. Siemionow, MD

University of Illinois at Chicago Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: DTRAX® Expandable Cage (Approved for this indication)
P119. Atlantoaxial Rotatory Subluxations in Children: A Review
Sandip Chatterjee, FRCS
Park Clinic, Kolkata, India
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P120. Outcomes and Complications of Fusions from the Cervical Spine to the Pelvis: Series of 46 Cases with Average 2.7-Year Follow-up
Alexander A. Theologis, MD2; Han Jo Kim, MD2; Sraavisht Iyer, MD2; Todd J. Albert, MD2; Lawrence G. Lenke, MD2; Jun Mizutani2; Shane Burch, MD2; Vedat Deviren, MD2; Ohenebo Boachie-Adjei, MD2; Christopher P. Ames, MD2
1University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US; 2Hospital for Special Surgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P121. Three-Level Anterior Cervical Disectomies and Fusion (ACDF): Radiographic Changes over Time
Ehsan Tabarae, MD2; Howard S. An, MD2
1University of California San Francisco, San Francisco, CA, US; 2Rush Hospital Department of Orthopedic Surgery, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P122. Atlas Instrumentation Guided by the Medial Edge of the Posterior Arch: An Anatomic Study
Amro Al-Habib, MD, FRCS, MPH
King Saud University, College of Medicine Department of Surgery, Riyadh, Saudi Arabia
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P123. Clinical and Surgical Predictors of Complications following Surgery for the Treatment of Cervical Spondylotic Myelopathy: Results from the Multicenter, Prospective AOSpine International Study of 479 Patients
Michael G. Fehlings, MD, PhD, FRCS1; Lindsay Tetreault1; Branko Kopjar, MD, PhD2; Pierre Cote, DPT, PhD2; Paul M. Arnold, MD2; Natalia Nugaeva, PhD2
1Toronto Western Hospital, Toronto, ON, Canada; 2University of Toronto, Oakville, ON, Canada; 3University of Washington, Seattle, WA, US; 4Toronto Western Research Institute, Toronto, ON, Canada; 5University of Kansas Medical Center Department of Neurosurgery, Kansas City, KS, US; 6University of Toronto, Toronto, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P124. Risk Factors for Hospital-Acquired Conditions (HAC) and Associated Complications following Anterior Cervical Discectomy and Fusion (ACDF)
Dante M. Leven, DO, PT; Nathan J. Lee, BS1; Jeremy Steinberger, MD2; Branko Skovrli, MD3; Javier Guzman, BS2; Parth Kothari, BS2; John I. Shin, BS2; Samuel K. Cho, MD4
1Mount Sinai School of Medicine, New York, NY, US; 2New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P125. Outcomes and Related Factors of C5 Palsy following Cervical Laminectomy with Instrumented Fusion: Comparison with Laminoplasty Group
Sang-Hun Lee, MD, PhD1; Kyung-Chung Kang, MD, PhD2; Kyung-Soo Suk, MD, PhD2; Sang-Phil Hwang, MD2; Soojin Jang, MD2
1Seoul, South Korea; 2KyungHee University Medical Center, Seoul, South Korea; 3Yonsei University College of Medicine Department of Orthopaedic Surgery Kangnam Severance Hospital, Seoul, South Korea; 4Seoul, South Korea; 5Spine Center, Kyung Hee University Hospital at Gangdong, Seoul, South Korea
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P126. Does Cervical Sagittal Alignment Correlate with Outcomes following Anterior Cervical Surgery?
John A. Sielatycki, MD1; Sheyaj J. Armaghani, MD2; Arnold Silverberg, BS2; Matthew J. McGirt, MD, 3; Clinton J. Devin, MD2; Kevin O’Neill, MD4
1Vanderbilt University Medical Center, Nashville, TN, US; 2New York, NY, US; 3Vanderbilt University Medical Center Department of Orthopaedics, Nashville, TN, US; 4Vanderbilt University Medical Center Department of Orthopaedics, Nashville, TN, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P127. Comparison of Surgical Outcomes after Anterior Cervical Discectomy and Fusion: Does the Intraoperative Use of a Microscope Improve Surgical Outcomes?
Owoicho Adogwa, MD, MPH
Duke University, Durham, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P128. Efficacy of a Novel Synthetic Small Peptide in Anterior Cervical Arthrodesis: A Randomized, Controlled, Multicenter Study with 24-Month Follow-Up
Rick Sasso2; Alexander R. Vaccaro, MD, PhD2; Michael G. Fehlings, MD, PhD, FRCS1; Joseph D. Smucker, MD2; Michael E. Janssen, DO1
1Carmel, IN, US; 2Rothman Institute, Philadelphia, PA, US; 3Toronto Western Hospital, Toronto, ON, Canada; 4Indiana Spine Group, Carmel, IN, US; 5Center for Spinal Disorders, Denver, CO, US
FDA Device/Drug Status: Small peptide (Investigational/Not approved)
P129. Prolonged Weakness Affects Recovery of Motor Function following Anterior Cervical DISCECTOMY and FUSION
Ronald Huang, MD; Alan S. Hilibrand, MD
1Philadelphia, PA, US; 2Rothman Institute, Philadelphia, PA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P130. C5 Nerve Palsy in Posterior Cervical Spinal Surgery: Does Width of Laminctomy Matter?
Lindsay Kleeman, MD, BA; Mitchell Klement, MD; Daniel J. Blizzard, MD; Michael A. Gallizzi, MD, MS; Christopher R. Brown, MD
1Duke University Medical Center, Durham, NC, US; 2Durham, NC, US; 3Duke University, Durham, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P131. Adult Spinal Deformity: National Trends in the Presentation, Treatment and Perioperative Outcomes from 2003-2010
Peter G. Passias, MD; Cyrus Jalai, BA; Nancy Worley, MS, BA; Bryan J. Marascalchi; Virginie Lafage, PhD; Thomas J. Errico, MD
1New York University School of Medicine, New York, NY, US; 2New York, NY, US; 3New York University Hospital for Joint Diseases, New York, NY, US; 4New York University Medical Center, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P132. Comparison between Decompression with and without Fusion for Patients with Synovial Facet Cysts: A Retrospective Study Including 314 Consecutive Patients
Stein Janssen, MD; Olivier Van Wulfften Palthe, MD; Kirkham B. Wood, MD; Mitchell Harris, MD, FACSp; Christopher M. Bono, MD; Joseph H. Schwab, MD
1New York University School of Medicine, New York, NY, US; 2New York, NY, US; 3New York University Hospital for Joint Diseases, New York, NY, US; 4New York University Medical Center, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P133. Trends in Operative and Conservative Treatments for Lumbar Disc Herniation and RADICULOPATHY
Changfeng Fu, MD, PhD; Zorica Buser, PhD; Jeremiah R. Cohen; Justin S. Wang; Jeffrey C. Wang
1Los Angeles, CA, US; 2Hoffman Medical Research Center, Keck School of Medicine, USC, Los Angeles, CA, US; 3UCLA Department of Orthopedic Surgery, Los Angeles, CA, US; 4Monterey Park, CA, US; 5University of Southern California Spine Center, Los Angeles, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P134. Effects on Patient Lifestyle and Quality of Life: Two-Year Outcomes of Three Lumbar Total DISC Replacement Systems from the ActivL® Multicenter Randomized Controlled IDE Clinical Trial
Jeff Muir, MSc, DC, MSc; Scott L. Blumenthal, MD
1Ancaster, ON, Canada; 2Texas Back Institute, Plano, TX, US
FDA Device/Drug Status: ActivL artificial disc (Investigational/Not approved)

P135. Analysis of Internet Information on Lateral Lumbar INTERBODY FUSION
Brandon Raudenbush, DO; Addisu Mesfin; Rebekah Belayneh
1Cleveland Clinic Foundation, Cleveland, OH, US; 2University of Rochester, Rochester, NY, US; 3Howard University College of Medicine, Washington, DC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P136. Pedicle Screw Placement Using 3D NAVIGATION: How Long Does it Take?
Charles Gerald T. Ledonio, MD; David W. Polly Jr., MD; Kristen E. Jones, MD; Hong Wei Zhu
1University of Minnesota, Minneapolis, MN, US; 2University of Minnesota Medical Center, Minneapolis, MN, US
FDA Device/Drug Status: Pedicle screws (Approved for this indication)

P137. Mobile Spine Chordoma: Results of 166 Patients
Daniel M. Sciubba, MD; Ziya L. Gokaslan, MD, FACS; Patricia L. Zadnik; Niccole M. Germscheid, MSc; C. Rory Goodwin, MD, PhD; Jean-Paul Schwab, MD; Chetan Bettegowda, MD; Mari L. Groves, MD; Alessandro Luzzati, MD; Charles G. Fisher, MD; Peter P. Varga, MD; Mark B. Dekutoski, MD; Michelle J. Clarke, MD; Michael G. Fehlings, MD, PhD, FRCCS; Nasir A. Quraishi, MD; Dean Chou, MD; Jeremy J. Reynolds, FRCS, MBBS, BS; Richard P. Williams, MD; Stefano Boriani, MD
1John Hopkins University School of Medicine Baltimore, MD, US; 2Johns Hopkins University Department of Neurosurgery, Baltimore, MD, US; 3Johns Hopkins Medicine, Baltimore, MD, US; 4AOSPine International, Davos, Switzerland; 5Johns Hopkins University, Baltimore, MD, US; 6Johns Hopkins Hospital, Baltimore, MD, US; 7Istituto Ortopedico Galeazzi, Milan, Italy; 8Vancouver General Hospital, Vancouver, BC, Canada; 9National Center for Spinal Disorders, Budapest, Hungary; 10The CORE Institute, Phoenix, AZ, US; 11Mayo Clinic, Rochester, MN, US; 12Toronto Western Hospital, Toronto, ON, Canada; 13Queens Medical Centre, Nottingham, UK; 14University of California San Francisco, San Francisco, CA, US; 15Oxford University Hospitals NHS Trust, Oxford, UK; 16Brisbane, Australia; 17Istituto Ortopedico Rizzoli, Bologna, Italy
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P138. National Trends in Operations for Idiopathic Scoliosis: Analysis of 61,840 Children from the National Inpatient Sample over a 13-Year Time Period
Alexander A. Theologis, MD1; David Sing, BS2; Mohammad Diab, MD2
1University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US; 2University of California San Francisco Pediatric Orthopaedics, San Francisco, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P139. Pregnancy after Lumbar Total Disc Replacement
Donna D. Ohnmeiss, PhD1; Jack E. Zigler, MD2; Richard D. Guyer, MD2; Scott L. Blumenthal, MD2
1Texas Back Institute Research Foundation, Plano, TX, US; 2Texas Back Institute, Plano, TX, US
FDA Device/Drug Status: Charite, ProDisc-L single level (Approved for this indication), Activ-L, Flexicore, Kineflex (Investigational/Not approved), ProDisc-L more than 1 level (Investigational/Not approved)

P140. Nutritional Status as an Adjunct Risk Factor: Any Major Complication, Prolonged Length of Hospital Stay, and 30 Day Unplanned Readmission in Adults Undergoing Elective Posterior Lumbar Fusion
Branko Skovrlj, MD1; Nathan J. Lee, BS2; Parth Kothari, BS2; Jeremy Steinberger, MD2; Javier Guzman, BS2; John I. Shin, BS4; Dante M. Leven, DO, PT; Samuel K. Cho, MD4
1Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P141. The Transverse Process Trajectory Technique: A New Pathway to the Thoracic Pedicle in the Deformed Spine
Baron S. Lonner, MD1; Chanland Roonprapunt, MD2; Yuan Ren, PhD, MSc2; Ahmet Alanay, MD3; Kushagra Verma, MD4; 5Mohamad Bazerbashi, MD4; Mark Buehler, MD2; Vijay K. Goel, PhD7
1Mount Sinai Beth Israel Medical Center, New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P142. Validation of Patient Reported Outcomes Measurement Information System (PROMIS) in Surgically Managed Lumbar Disc Herniation Patients
Alpesh A. Patel, MD1; Surabhi Bhatt, BS2; Shah-Nawaz M. Dodwad, MD3; Jason W. Savage, MD3; Wellington K. Hsu, MD; Nan Rothrock, PhD2
1Northwestern Department of Orthopaedics, Chicago, IL, US; 2Northwestern University School of Medicine, Chicago, IL, US; 3Northwestern University Feinberg School of Medicine, Chicago, IL, US; 4Northwestern University Department of Orthopaeedics, Chicago, IL, US; 5Northwestern University, Chicago, IL, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P143. Transverse Process Trajectory: A New Technique for Thoracic Pedicle Screw Placement: Early Results in Adolescent Idiopathic Scoliosis
Baron S. Lonner, MD1; Yuan Ren, PhD, MSc1; Kushagra Verma, MD2; Robert Merrill, BS4
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P144. Two-Year Outcomes of Prospective Randomized Trial Comparing Lumbar Decompression with or without Interlaminar Stabilization
Greg Maislin, MS1; Michael Rauschmann; S. Sola, MD, PhD2; Dieter Adelt, MD3; M.M. Bonsanto, MD4; Jorg Franke, MD; Sven Schmidt, PhD6
1Wynnewood, PA, US; 2Rostock, Germany; 3Damp, Germany; 4Lübeck, Germany; 5University of Magdeburg, Magdeburg, Germany; 6Orthopedic University Friedrichsheim, Frankfurt, DE, Germany
FDA Device/Drug Status: Coflex (Approved for this indication)

P145. Morbidity Associated with Pelvic Fixation in Patients Undergoing Fusion for Spinal Deformity: A Matched Propensity Adjusted Analysis
Jeremy Steinberger, MD1; Parth Kothari, BS2; Javier Guzman, BS2; Branko Skovrlj, MD3; Nathan J. Lee, BS2; Dante M. Leven, DO, PT; John I. Shin, BS4; Samuel K. Cho, MD4
1New York, NY, US; 2Mount Sinai School of Medicine, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P146. Retrospective Analysis of Complications, Revisions and Fluoroscopy in Short Fusions with Robotic Guidance versus Fluoroscopy Guided Surgeries
Richard R.M. Francis, MD, MBA, FRCSed., FRCSEd. (Tr & Orth)1; Shannon D. Francis2
1Spine Associates of Houston, Houston, TX, US; 2Massachusetts Institute of Technology, Cambridge, MA, US
FDA Device/Drug Status: Renaissance (Approved for this indication)
**P147. Lumbar Decompression for Tandem Spinal Stenosis**
Vincent J. Alentado, BS; Matthew D. Alvin, MA1; Daniel Lubelski, BA2; Edward C. Benzell, MD3; Thomas E. Mroz, MD4
1Cleveland Clinic Foundation, Cleveland, OH, US; 2Johns Hopkins Hospital Department of Neurosurgery, Baltimore, MD, US; 3Cleveland Clinic Foundation Departments of Orthopaedic and Neurological Surgery, Cleveland, OH, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P148. Influence of Smoking on Wound Complications in Adults Undergoing Elective Posterior Lumbar Fusion**
Javier Guzman, BS1; Nathan J. Lee, BS1; John I. Shin, BS1; Dante M. Leven, DO, PT; Branko Skovrlj, MD2; Jeremy Steinberger, MD3; Parth Kothari, BS1; Samuel K. Cho, MD1
1Mount Sinai School of Medicine, New York, NY, US; 2Icahn School of Medicine at Mount Sinai, New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P149. Nonfusion Does Not Prevent Adjacent Segment Disease: Dynesys Long Term Outcomes with Minimum Five-Years Follow-Up**
Godefroy Hardy St-Pierre, MD, FRCSC1; Andrew Nataraj, FRCSC, MD2; Aaron Hockley, MD3
1Royal Alexandra Hospital, Edmonton, AB, Canada; 2University of Alberta Hospital, Edmonton, AB, Canada; 3Calgary, AB, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P150. Risk Factors for Readmission following Posterior Lumbar Fusions**
Dante M. Leven, DO, PT; Nathan J. Lee, BS1; Parth Kothari, BS1; Jeremy Steinberger, MD2; Branko Skovrlj, MD2; John I. Shin, BS4; Javier Guzman, BS1; Samuel K. Cho, MD4
1Mount Sinai School of Medicine, New York, NY, US; 2New York, NY, US; 3Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; 4Icahn School of Medicine at Mount Sinai, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P151. Assessing Patient-Reported Outcomes Measures Via Phone Interviews versus Patient Self-Survey in Clinic: Are We Measuring the Same Thing?**
Owoicho Adogwa, MD, MPH
Duke University, Durham, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P152. Postoperative Ambulation in Patients Undergoing Total Hip Arthroplasty, Total Knee Arthroplasty and Elective Lumbar Spine Surgery to Treat Arthritic Pathologies**
Alana J. Green, BA1; Neil A. Manson, MD, FRCSC2; Mike Cochran, DC3; Edward P. Abraham, MD4
1Saint John, NB, Canada; 2Saint John Regional Hospital, Saint John, NB, Canada; 3Salisbury, NB, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P153. Presurgical Imaging, Testing and Injection Utilization in Elective Thoracolumbar Spine Surgery Candidates: A Nationwide Analysis from the CSORN Database**
Alana J. Green, BA1; Edward P. Abraham, MD2; Greg McIntosh1; Neil A. Manson, MD, FRCSC2
1Saint John, NB, Canada; 2Saint John Regional Hospital, Saint John, NB, Canada; 3Canadian Back Institute, Oakville, ON, Canada
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

**P154. Early Outcomes following Percutaneous Sacroiliac Joint Fusion**
Vamsi Kancherla, MD1; Shane McGowan2; Brittany Audley, MD3; Gbolabo O. Sokunbi, MD4; Steven T. Puccio, DO5
FDA Device/Drug Status: iFuse Implant System (Approved for this indication)

**P155. Saphenous Nerve Somatosensory Evoked Potentials Monitoring during Lateral Interbody Fusion**
Nick S. Jain, MD1; S. Samuel Bederman, MD, PhD, FRCSC2; Kevin Phan, BS2; Daniel S. Yanni, MD4; Heriberto Guillen1; Lilii Mntasakanyan, MD1
1University of California Irvine, Orange, CA, US; 2University of California Irvine Department of Orthopaedic Surgery, Orange, CA, US; 3University of California Irvine Department of General Surgery, Irvine, CA, US; 4University of California Irvine Department of Neurosurgery, Orange, CA, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P156. Is ASA Score a Predictor of 30-Day Perioperative Readmission in Adults Undergoing Posterior Lumbar Fusion?
Javier Guzman, BS1; Parth Kothari, BS1; Nathan J. Lee, BS1; Jeremy Steinberger, MD2; John I. Shin, BS1; Branko Skovrij, MD2; Dante M. Leven, DO, PT; Samuel K. Cho, MD1
1Mount Sinai School of Medicine, New York, NY, US; 2New York, NY, US; 3Icahn School of Medicine at Mount Sinai, New York, NY, US; 4Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P157. Surgeon Specialty Influences Referral Rate for Osteoporosis Management following Vertebral Cement Augmentation of Compression Fracture
Scott D. Daffner, MD; Jonathan Karnes, MD; Colleen M. Watkins, MD
West Virginia University School of Medicine, Morgantown, WV, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P158. Incidence and Risk Factors for Pedicle Screw Misplacement in Scoliosis Surgeries Assisted by O-Arm Navigation
Xiao Han II1; Mengran Jin, MD2; Liu Zhen, MD3; Yong Qiu, MD3; Xingyong Liu, MD2; Bangping Qian, MD2; Feng Zhu, MD2; Zezhang Zhu, PhD2
1Nanjing, China; 2The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China; 3Nanjing Drum Tower Hospital, Nanjing, Jiang Su, China
FDA Device/Drug Status: Study conducted outside US/Not intended for submission to FDA.

P159. The Role of O-Arm Intraoperative Navigation in Instrumenting Small Thoracic Pedicles
Xiao Han II1; Liu Zhen, MD3; Mengran Jin, MD2; Yong Qiu, MD3; Xingyong Liu, MD3; Bangping Qian, MD2; Feng Zhu, MD2; Zezhang Zhu, PhD2
1Nanjing, China; 2Nanjing Drum Tower Hospital, Nanjing, Jiang Su, China; 3The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P160. The Reason Four Rods to the Pelvis Provides a Stable Revision Surgery: A Finite Element Analysis Study
Julien Clin, PhD1; Mark Driscoll, PhD1; Stefan Parent, MD; Hubert Labelle, MD2; Jean-Marc Mac-Thiong, MD, PhD2; Themistocles S. Protopsaltis, MD2; John A. Schmidt, PhD2
1Spinologics, Montreal, QC, Canada; 2Département d’orthopédie, Montreal, QC, Canada; 3Hôpital du Sacré-Coeur de Montréal, Montreal, QC, Canada; 4New York University Hospital for Joint Diseases, New York, NY, US; 5K2M, Leesburg, VA, US
FDA Device/Drug Status: Rods (Approved for this indication)

P161. Back Pain Improvement after Decompression without Fusion in Patients with Lumbar Stenosis and Clinically Significant Preoperative Back Pain
Charles H. Crawford III, MD1; Steven D. Glassman, MD2; John J. Knightly, MD2; Leah Y. Carreon, MD, MSc3; Anthony Asher, MD, FACS3
1Vanderbilt University Medical Center, Nashville, TN, US; 2Vanderbilt University School of Medicine, Nashville, TN, US; 3Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P162. Fibromyalgia in Patients Undergoing Spinal Arthrodesis: Is Surgery Beneficial?
Dennis G. Crandall, MD1; Jan Revella, RN1; Joe Nelson, MD2; Jason C. Datta, MD1; Michael S. Chang, MD1,2; Terrence T. Crowder, MD1; Lyle C. Young, MD1; Ryan McLemore, PhD4
1Sonoran Spine Center, Tempe, AZ, US; 2University of Arizona, Tucson, AZ, US; 3University of Arizona School of Medicine, Tucson, AZ, US; 4Banner Samaritan Hospital Orthopaedic Residency, Phoenix, AZ, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P163. TLIF with Expandable versus Static Height Cages: Defining Guidelines Based on Preop Disc Height and Lordosis
Dennis G. Crandall, MD1; Jan Revella, RN1; Michael S. Chang, MD1,2; Lyle C. Young, MD1; Andrew S. Chung, DO1; Lynette Taylor, RT1; Mara D. Immediato, PA-C1; Ryan McLemore, PhD4
1Sonoran Spine Center, Tempe, AZ, US; 2University of Arizona School of Medicine, Tucson, AZ, US; 3Banner Good Samaritan, Phoenix, AZ, US; 4Banner Samaritan Hospital Orthopaedic Residency, Phoenix, AZ, US
FDA Device/Drug Status: TLIF cages for L2-S1 (Approved for this indication)

P164. Does Obesity Predict Poor Patient-Reported Outcomes following Lumbar Surgery for Degenerative Conditions?
John A. Sielatycki, MD1; Silky Chotai, MD2; Harrison F. Kay2; David Stonko3; Joseph Wick, BA2; Matthew J. McGirt, MD4; Clinton J. Devin, MD1
1Vanderbilt University Medical Center, Nashville, TN, US; 2Nashville, TN, US; 3Vanderbilt University School of Medicine, Nashville, TN, US; 4Carolina Neurosurgery & Spine Associates, Charlotte, NC, US
FDA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
P165. The Effects of Adult Spinal Deformity Surgery on Total Hip Arthroplasty Acetabular Component Position
Murat S. Eksi, MD; Altug Yucekul, MD; Jeffrey J. Barry, MD; Alexander A. Theologis, MD; Jun Mizutani; Murat Pekmezci, MD; Christopher P. Ames, MD; Vedat Deviren, MD
1University of California San Francisco, San Francisco, CA, US; 2Ankara, Turkey; 3University of California San Francisco, San Francisco General Hospital Orthopaedic Trauma Institute, San Francisco, CA, US; 4Nagoya, Aichi, Japan; 5University of California San Francisco Department of Orthopedic Surgery, San Francisco, CA, US
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P166. A Comparison of Surgical Outcomes between Minimally Invasive and Open Thoracolumbar Corpectomy: A Minimum of Two-Year Follow-Up
Kern Singh, MD; Ehsan Tabaraei, MD; Junyoung Ahn; Andrew J. Park; Vincent J. Rossi, BS, BA; Khaled A. Aboushalaa
1Rush University Medical Center, Chicago, IL, US; 2University of California San Francisco, San Francisco, CA, US; 3Chicago, IL, US; 4Midwest Orthopaedics at Rush, Chicago, IL, US
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

Kern Singh, MD; Junyoung Ahn; Rahul Kamath; Gabriel Duhancioglu; Andrew J. Park; Vincent J. Rossi, BS, BA; Khaled A. Aboushalaa; Dustin H. Massel, BS
1Rush University Medical Center, Chicago, IL, US; 2University of California San Francisco, San Francisco, CA, US; 3Chicago, IL, US; 4Midwest Orthopaedics at Rush, Chicago, IL, US
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P168. Neuroforaminal Bone Growth following Minimally Invasive Transforaminal Lumbar Interbody Fusion with BMP: A Computed Tomographic Analysis
Kern Singh, MD; Junyoung Ahn; Anton Y. Jorgensen, MD; Andrew J. Park; Vincent J. Rossi, BS, BA; Khaled A. Aboushalaa; Dustin H. Massel, BS
1Rush University Medical Center, Chicago, IL, US; 2San Antonio Military Medical Center, Orthopaedic Surgery Department, San Antonio, TX, US; 3Chicago, IL, US; 4Midwest Orthopaedics at Rush, Chicago, IL, US
FMA Device/Drug Status: BMP (Approved for this indication)

P169. Multimodal versus Intravenous Patient Controlled Analgesia for Minimally Invasive Transforaminal Lumbar Interbody Fusion: A Prospective Randomized Study
Andrew J. Park; Junyoung Ahn; Asokumar Buvanendran, MD; Spencer Leblang, BS; Mark F. Kurd, MD; Dustin H. Massel, BS; Kern Singh, MD; Frank M. Phillips, MD
1Chicago, IL, US; 2Rush University Medical Center, Chicago, IL, US; 3Rush Medical College, Chicago, IL, US; 4Rothman Institute, Bryn Mawr, PA, US; 5Midwest Orthopaedics at Rush, Chicago, IL, US
FMA Device/Drug Status: TLIF (Approved for this indication)

P170. Sequelae of Persistent Durotomies following Degenerative Spinal Surgery
Janina Kueper; Jerry Y. Du; Darren R. Lebl, MD
Hospital for Special Surgery, New York City, NY, US
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P171. Pelvic Tilt May Not Improve Despite Spinopelvic Realignment: An Analysis of Causative Factors
International Spine Study Group; Han Jo Kim, MD; Sravisht Iyer, MD; Christopher P. Ames, MD; Matthew E. Cunningham, MD, PhD; Eric O. Klineberg, MD; Themistocles S. Protopsaltis, MD; Michael P. Kelly, MD; Gregory M. Mundis Jr., MD; Shay Bess, MD; Douglas C. Burton, MD; Frank J. Schwab, MD; Robert A. Hart, MD; Renaud Lafage; Virginie Lafage, PhD
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P172. Patient-Specific Factors Predicting Dissatisfaction after Elective Surgery for Degenerative Spine Diseases
Silky Chotai, MD; Ahilan Sivaganesan, MD; Scott L. Parker, MD; John A. Sielatycki, MD; David Stonko; Matthew J. McGirt, MD; Clinton J. Devlin, MD
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.

P173. Utility of MRIs in Patients with Thoracolumbar Fractures
Leah Y. Carreon, MD, MSc; Elizabeth P. Norheim, MD; Steven D. Glassman, MD; Erin Adams, BS; Allison Hunter, BA; John R. Dimar II, MD
1Norton Leatherman Spine Center, Louisville, KY, US; 2Kaiser Permanente, Downey, CA, US; 3Louisville, KY, US
FMA Device/Drug Status: This abstract does not discuss or include any applicable devices or drugs.
**P174. Percutaneous Lumbopelvic Fixation for Sacral Fractures with Spinopelvic Dissociation**  
Seth K. Williams, MD  
University of Wisconsin, Madison, WI, US  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P175. Impact of Disc-Endplate Injury on Loss of Reduction of Thoracolumbar Vertebral Burst Fracture**  
Xu Sun, MD; Xi Chen, MD; Changzhi Du, MD; Bin Wang, MD; Yang Yu, MD; Liu Zhen, MD; Zezheng Zhu, PhD; Bangping Qian, MD; Yong Qiu, MD  
1Drum Tower Hospital, Nanjing University Medical School, Nanjing, China; 2The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China; 3Nanjing Drum Tower Hospital, Nanjing, Jiang Su, China  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P176. Anterior Screw Fixation in Type II Odontoid Fractures: Comparison between the Young and the Elderly**  
Woo-Kie Min, MD  
Kyungpook National University Hospital, Daegu, South Korea  
**FDA Device/Drug Status:** 3.5 mm cannulated screw (Approved for this indication)

**P177. The Efficacy of Modified Allen Staging Classification and Subaxial Injury Classification (SLIC) Scale of Distraction-Extension Injury in Cervical Spine**  
Kyung-Jin Song, MD, PhD  
Department of Orthopedic Surgery, Jeonju, South Korea  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P178. Efficacy and Safety of Riluzole in Acute Spinal Cord Injury (SCI): Rationale and Design of AOSpine Phase III Multicenter Double Blinded Randomized Controlled Trial (RISCIS)**  
Michael G. Fehlings, MD, PhD, FRCSC; Branko Kopjar, MD, PhD; Robert G. Grossman, MD  
1Toronto Western Hospital, Toronto, ON, Canada; 2University of Washington, Seattle, WA, US; 3The Methodist Hospital, Houston, TX, US  
**FDA Device/Drug Status:** Riluzole (Not approved for this indication)

**P179. Analysis of Delays to Surgery for Cervical Spinal Cord Injuries**  
Andre Samuel, BA; Daniel D. Bohl, MD, MPH; Bryce Basques, MD, MHS; Pablo Diaz-Collado, MD; Adam M. Lukasiewicz, MSc; Matthew L. Webb; Jonathan N. Grauer, MD  
1New Haven, CT, US; 2Yale University School of Medicine, New Haven, CT, US; 3Yale School of Medicine, New Haven, CT, US  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P180. Thromboembolic Events after Traumatic Lumbar Vertebral Fractures: An Analysis of 80,558 Patients**  
Andre Samuel, BA; Pablo Diaz-Collado, MD; Raj Gala, MD; Matthew L. Webb; Adam M. Lukasiewicz, MSc; Bryce Basques, MD, MHS; Daniel D. Bohl, MD, MPH; Jonathan N. Grauer, MD  
Yale University School of Medicine, New Haven, CT, US  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.

**P181. Mortality, Adverse Events and Length of Stay after Cauda Equina Syndrome: An Analysis of 3,732 Patients**  
Andre Samuel, BA; Pablo Diaz-Collado, MD; Ameya Save, MD; Adam M. Lukasiewicz, MSc; Matthew L. Webb; Daniel D. Bohl, MD, MPH; Bryce Basques, MD, MHS; Jonathan N. Grauer, MD  
Yale University School of Medicine, New Haven, CT, US  
**FDA Device/Drug Status:** This abstract does not discuss or include any applicable devices or drugs.
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Ahn, Uri M.: Royalties: Alphatec Spine (B, Paid directly to institution/employer); Stock Ownership: Osseous (<1%); Consulting: Osseous (C), Pinnacle (B); Trips/travel: Pinnacle (A); Scientific Advisory Board: Pinnacle (A); Relationships Outside the One Year Requirement: Spine 360 (None).

Akuthota, Venu: Grants: Foundation for PM&R (B, Paid directly to institution/employer), University of Colorado Health and Welfare Trust (E, Paid directly to institution/employer); Other: PM&R Journal Senior Editor (B).

Alanay, Ahmet: Consulting: DePuy & Synthes (B, Paid directly to institution/employer); Trips/travel: Medtronic (B, Paid directly to institution/employer); Research Support - Staff and/or Materials: DePuy Synthes (C, Paid directly to institution/employer); Grants: DePuy Synthes (B, Paid directly to institution/employer).

Albert, Todd J.: Royalties: DePuy (H), Biomet (B); Stock Ownership: Facelink (B), ASIP (Amount not disclosed), PMIG (Amount not disclosed), Gensis (B and Medical Advisory Board), Crosstree (Amount not disclosed), Breakaway Imaging (Amount not disclosed), Biometrix (Amount not disclosed), Paradigm Spine (250,000 shares), In Vivo Therapeutics (Amount not disclosed), Spiniety (50,000 shares), Invuity (15,000 shares); Consulting: DePuy (C); Board of Directors: United Healthcare (None); Scientific Advisory Board: CSRS (President), IMAST (Past Chair); Relationships Outside the One Year Requirement: CSRS (None).

Allain, Jerome: Royalties: LDR (E, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: LDR (Travel expenses), DePuy Synthes (Travel expenses), Medtronic (Travel expenses), Ceraver (Travel expenses).

Allen, R. Todd: Consulting: DePuy Synthes Spine/J&J (C), DePuy Synthes Spine/J&J (B, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: DePuy Synthes/J&J (Consulting disclosed); Scientific Advisory Board: DePuy Spine MIS SAB (B); Relationships Outside the One Year Requirement: Medtronic Spine (C).

Alvarez, Luis: Consulting: Biomet (B, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Biomet (B, Paid directly to institution/employer); Trips/travel: Biomet (A); Scientific Advisory Board: DePuy (A, Paid directly to institution/employer).

Ames, Christopher P.: Royalties: Stryker (F, Paid directly to institution/employer), Biomet Spine (F, Paid directly to institution/employer); Consulting: Medtronic (B, Paid directly to institution/employer), DePuy (B, Paid directly to institution/employer), Stryker (B, Paid directly to institution/employer).

An, Howard S.: Royalties: U&I Inc. (D); Stock Ownership: U&I Inc. (<1%), Spinal Kinetics (<1%), Medsysy (<1%); Consulting: Bioventus (B), Zimmer Spine (B), RTI (A), Advanced Biologics (C); Board of Directors: Articular Engineering (18%); Scientific Advisory Board: Spinal Kinetics (Stock ownership disclosed); Research Support - Staff and/or Materials: RTI (D); Grants: SpinalCyte (D, Paid directly to institution/employer); Fellowship Support: DePuy Synthes (E, Paid directly to institution/employer).

Anand, Neel: Royalties: Medtronic (F), NuVasive (D), Globus Medical (C); Stock Ownership: Globus (<1%), Medtronic (<1%), Private Investments: Paradigm Spine (<1%), Bonovo Orthopaedics (<1%), Pearl Diver (<1%), Theracell (<1%); Consulting: NuVasive (None); Speaking and/or Teaching Arrangements: Medtronic (B); Trips/travel: Medtronic (Royalties disclosed); Scientific Advisory Board: Globus Medical (None).

Anderson, D. Greg: Royalties: Medtronic (D), DePuy Synthes Spine (G); Stock Ownership: ISD (1%); Private Investments: Spiniectyty (<1%); Consulting: Globus (A); Speaking and/or Teaching Arrangements: DePuy Synthes Spine (Royalties disclosed); Trips/travel: DePuy Synthes Spine (Royalties disclosed); Board of Directors: Society of Minimally Invasive Spinal Surgery (None); Scientific Advisory Board: ISD (None); Other Office: Society for Minimally Invasive Spinal Surgery (Chairman).

Anderson, Paul A.: Royalties: Stryker (C), Pioneer/RTC (C); Stock Ownership: Pioneer (1%), Titan Surgical (<1%), Expanding Orthopedics (<1%), Sparteck (<1%); Consulting: Pioneer (None), Aesculap (C); Scientific Advisory Board: SI Bone (Stock option); Other: JBS Deputy editor (B).

Arachi, Ali: Royalties: Globus (B); Stock Ownership: VTI (<1%); Private Investments: PDP (<1%), Bonovo (<1%), ISD (<1%), Cold Plasma Technologies (<1%), SurgiFile (<1%), Oboro (<1%); Consulting: Globus (None); Speaking and/or Teaching Arrangements: LDR (C); Trips/travel: Zyga (C); Board of Directors: American Board of Spine Surgery (None); Research Support - Investigator Salary: LDR (A), VertiFlex (A).

Arnold, Paul M.: Stock Ownership: Z-Plasty (1%, B); Private Investments: Z-Plasty (1%); Consulting: Stryker Spine (D), Medtronic Sofamer Danek (C), FzioMed (C); Speaking and/or Teaching Arrangements: University of Missouri (A); Trips/travel: AOSpine North America (B); Board of Directors: Lumbar Spine Research Society (Co-Chair of the Program Committee).

Asher, Anthony: Stock Ownership: HyperBranch Medical Technologies (1%); Consulting: Medtronic (Amount not disclosed); Board of Directors: NeuroPoint Alliance (Travel expenses); Grants: Neurosurgical Research and Education Foundation (D); Relationships...
Outside the One Year Requirement: NeuroPoint Alliance (Board of Directors, Travel expenses).

Bae, Hyun W.: Royalties: Stryker (D), NuVasive (D), Zimmer (B), Biomet (B); Stock Ownership: Diffusion (12000 shares), Spinal Restoration (10000 shares); Private Investments: Ascent (20%); Consulting: Stryker (C); Speaking and/or Teaching Arrangements: Synthes (C); Board of Directors: Prosidyam (Stock ownership), Scientific Advisory Board: Spinal Restoration (Stock ownership), Research Support - Staff and/or Materials: Medtronic (C); Paid directly to institution/employer), Mesoblast (C, Paid directly to institution/employer), LDR Spine (D, Paid directly to institution/employer), Paradigm Spine (B, Paid directly to institution/employer), Bioness (D, Paid directly to institution/employer), ISTO Technologies (C, Paid directly to institution/employer), Relevant Medsystems (D, Paid directly to institution/employer); Grants: CIRM (!).

Baeesa, Saleh S.: Consulting: Alphatec (Travel expenses, Paid directly to institution/employer), Medtronic (Travel expenses, Paid directly to institution/employer), Globus Companies (Travel expenses, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Alphatec (A, Paid directly to institution/employer), Medtronic (A); Globus (A, Paid directly to institution/employer); Trips/travel: Alphatec (Travel expenses, Paid directly to institution/employer), Medtronic (Travel expenses, Paid directly to institution/employer), Globus Companies (Travel expenses, Paid directly to institution/employer).

Barbagallo, Giuseppe: Consulting: DePuy Synthes (A, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: DePuy Synthes (A); Trips/travel: DePuy Synthes (Travel expenses); Grants: DePuy Synthes (B).

Bartha, Robert: Stock Ownership: BioScape Imaging Solutions (32%); Board of Directors: BioScape Imaging Solutions (Board of Directors); Other Office: BioScape Imaging Solutions (Chief Scientific Officer); Grants: Canadian Institutes of Health Research (E, Paid directly to institution/employer).


Beaurain, Jacques: Royalties: LDR Medical (E); Stock Ownership: LDRH (<1%); Consulting: LDR Medical (B); Speaking and/or Teaching Arrangements: LDR Medical (None); Trips/travel: LDR Medical (Travel expenses).

Bederman, S. Samuel: Royalties: Spineart (D); Consulting: Spineart (B), Ulrich Medical USA (B), Mazor Robotics (B), Vertebral Technologies (B); Research Support (Staff and/or Materials): NuVasive (B); Speaking and/or Teaching Arrangements: NuVasive (B), Baxano (B, Paid directly to institution/employer).

Bellabara, Carlo: Relationships Outside the One Year Requirement: Synthes (B).

Bendo, John A.: Relationships Outside the One Year Requirement: Synthes Spine (C).

Benzel, Edward C.: Stock Ownership: OrthoMEMS (<1%), AxioMed (<1%); Private Investments: AxioMed (<1%); Consulting: Turning Point (<1%); Speaking and/or Teaching Arrangements: DePuy (International Congress); Scientific Advisory Board: OrthoMEMS (Royalties and equity interest), Turning Point (<1%).

Bernard, Pierre: Royalties: Scient’x (D), Medicrea (B); Stock Ownership: Medtronic (D, Paid directly to institution/employer), LDR Spine (C, Paid directly to institution/employer); Trips/travel: LDR Spine (C); Consulting: Synthes Spine (D).

Bernard, Thierry: Other Office: DePuy Synthes (E).

Berven, Sigurd H.: Royalties: Medtronic (G); Stock Ownership: Providence Medical (<1%); Speaking and/or Teaching Arrangements: Medtronic (C), Stryker Spine (D), Globus Medical (C); Trips/travel: Scoliosis Research Society (Travel expenses, Paid directly to institution/employer); Scientific Advisory Board: Globus Medical (B); Grants: AO Spine (E, Paid directly to institution/employer), Globus (D, Paid directly to institution/employer); Fellowship Support: Globus Medical (D).

Bess, Shay: Royalties: Pioneer (B); Consulting: K2M (B), NuVasive (B), AlloSource (B); Speaking and/or Teaching Arrangements: K2M (B); Trips/travel: K2M (B), NuVasive (B); Scientific Advisory Board: AlloSource (B), Research Support (Investigator Salary): DePuy Spine (B), Innovasis (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer).

Blasier, R. Dale: Consulting: Synthes Spine (B); Speaking and/or Teaching Arrangements: Synthes Spine (B).

Blaskiewicz, Donald J.: Royalties: NuVasive (B); Consulting: NuVasive (C); Speaking and/or Teaching Arrangements: NuVasive (D).

Blidau, Frederic: Relationships Outside the One Year Requirement: Carl Zeiss Meditech (B), Medtronic (Trips/Travel, B).

Blumenthal, Scott L.: Device or Biologic Distributorship (Physician-Owned Distributorship): PDP (C); Stock Ownership: Spinal Motion (<1%), VeriFLEX (<1%), AeNulex (<1%), FzioMed (1%), Centinel Spine (<1%), Ranier Technology (<1%); Consulting: Aesculap (C), FzioMed (B); Speaking and/or Teaching Arrangements: Paradigm (B); Scientific Advisory Board: Aesculap (B), FzioMed (B), VeriFLEX (C).

Boachie-Adjei, Oheneba: Royalties: K2M (D), DePuy (D); Consulting: K2M (E), Trans1 (A); Speaking and/or Teaching Arrangements: K2M (B), Trans1 (A); Trips/travel: K2M (B), Trans1 (A), DePuy (A); Board of Directors: Scoliosis Research Society (Travel expenses); Scientific Advisory Board: K2M (Product development, study group), Trans1 (Product development); Research Support (Staff and/or Materials): K2M (B, Paid directly to institution/employer), DePuy (C, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer).

Bono, Christopher M.: Royalties: Wolters Kluwer (B); Consulting: Harvard Clinical Research Institute (None), United Health Care (B); Board of Directors: North American Spine Society (1st Vice President); Other Office: JAOS (B).

Bostelmann, Richard: Relationships Outside the One Year Requirement: Intrinsic Therapeutics (B).

Bouma, Gerrit J.: Research Support - Staff and/or Materials: Intrinsic Therapeutics (E, Paid directly to institution/employer).

Branch, Charles L.: Royalties: Medtronic (F, Paid directly to institution/employer); Consulting: Medtronic (F); Speaking and/or Teaching Arrangements: Medtronic (Financial, Teaching included in Consulting payments), Board of Directors: CSR (None), Board of the Children Institute for Pediatric Trauma (None), Board of Directors of Eastern European Missions (None), Scientific Advisory Board: Medtronic (Neuroscience Scientific Advisory Council, Consulting disclosed).

Bransford, Richard J.: Speaking and/or Teaching Arrangements: Globus (B), AO Spine North America (C); Grants: Synthes DePuy (B, Paid directly to institution/employer); Fellowship Support: DePuy Synthes (E, Paid directly to institution/employer), AO Spine (E, Paid directly to institution/employer).

Bridwell, Keith H.: Grants: NIH (F, Paid directly to institution/employer); Fellowship Support: AO Spine North America (E, Paid directly to institution/employer), OREF (D, Paid directly to institution/employer).

Brodke, Darrel S.: Royalties: Amedica (F), DePuy Syntheses (H), Medtronic (C); Stock Ownership: Amedica (<0.2%), Consulting: Amedica (A); Board of Directors: CSR (None); Fellowship Support: AO Spine (E, Paid directly to institution/employer).

Brown, Cathleen: Consulting: Arthrex (A, Paid directly to institution/employer); Research Support (Investigator Salary): Arthrex (A, Paid directly to institution/employer); Grants: Arthrex (A, Paid directly to institution/employer).

Brown, Christopher R.: Royalties: NuVasive (F); Consulting: NuVasive (E); Speaking and/or Teaching Arrangements: NuVasive (Consulting disclosed); Trips/travel: NuVasive (Consulting disclosed); Fellowship Support: NuVasive (E).
Buchowski, Jacob M.: Royalties: Broadwater (A), Globus Medical (C); Consulting: Stryker (D), Advance Medical (D), CoreLink (A), Medtronic (B), Globus Medical (C); Speaking and/or Teaching Arrangements: Stryker (C), Globus Medical (C), Orthofix (B); Trips/travel: Global Spine Tumor Study Group (GSTSG) (Travel expenses), AO Foundation (Travel expenses), International Spine Study Group (ISSG) (Travel expenses), Scoliosis Research Society (Travel expenses); Board of Directors: Scoliosis Research Society (International Meeting on Advanced Spine Techniques Committee, Evidence Based Medicine Committee)), Cervical Spine Research Society (Board Member, Program Committee, Research Committee, Chair of the Resident/ Fellow Grant Sub-Committee); Scientific Advisory Board: AOA Investment Committee (None).

Bucklen, Brandon: Other Office: Globus Medical (Salary).

Burch, Shane: Consulting: Medtronic (B); Speaking and/or Teaching Arrangements: Medtronic (C); Scientific Advisory Board: Medtronic Navigation (B); Research Support (Staff and/or Materials): Lilly (E, Paid directly to institution/employer); Fellowship Support: NuVasive (D, Paid directly to institution/employer), Globus (E, Paid directly to institution/employer), AOSpine (D).

Burkus, J. Kenneth: Royalties: Medtronic (F); Consulting: Biomet (None).

Burton, Douglas C.: Royalties: DePuy Spine (C); Consulting: DePuy Spine (B); Board of Directors: Kansas University Physicians (None), International Spine Study Group (None); Research Support (Investigator Salary): DePuy Spine (B).

Buttermann, Glenn R.: Royalties: Innovasis (C); Consulting: Life Spine (B), Next Spine (B).

Bydon, Ali: Consulting: MedImmune (None); Grants: DePuy (C).

Cahill, Kevin S.: Consulting: Globus Medical (C), Spine Wave (B); Speaking and/or Teaching Arrangements: DePuy Spine (B), Spine Wave (B), Globus Medical (D).

Cammisa, Frank P.: Device or Biologic Distributorship (Physician-Owned Distributorship): Alphatec (B); Royalties: NuVasive (C); Stock Ownership: Alphatec Spine (88021 shares), NuVasive (14580 shares), Paradigm Spine (<1%), K2 Medical (<1%), Knee Creation in (1%), Centinel Spine (<1%), Orthopaedic Investment Partners (<1%), Scient x USA (<1%), Small Bone Innovations (<1%), Vertebral Technology (<1%), Spinal Kinetics (20000 shares); Private Investments: Ivy Healthcare I and II (<1%), ACFel Medical (<1%), Bonovo Orthopedic (<1%), HeartpointCapital Partners (<1%); NuVasive (Stock ownership disclosed), BI Members (<1%), MMF Systems (<1%), Pioneer Surgical Technology (<1%), Viscoglosi Brothers Venture Partners III (<1%); Consulting: Alphatec Spine (B), NuVasive (Stock ownership disclosed), Paradigm Spine (Stock ownership disclosed), DePuy Synthes (A), Spinal Partners III (Amount not disclosed), Spinal Kinetics (B); Scientific Advisory Board: Alphatec (Stock ownership disclosed), HeartpointCapital Partners (Stock ownership disclosed), HeartpointCaplital Partners (Stock ownership disclosed), Ivy Healthcare Partners (Stock ownership disclosed); Research Support (Staff and/or Materials); Orthobond (E, Paid directly to institution/employer), Spinal Kinetics (C, Paid directly to institution/employer), BonoBone (F, Paid directly to institution/employer), Bacterin (F, Paid directly to institution/employer), Integra (F, Paid directly to institution/employer), NuTech (F, Paid directly to institution/employer), Vertical Spine (E, Paid directly to institution/employer); Fellowship Support: NuVasive (E, Paid directly to institution/employer).

Carragee, Eugene J.: Stock Ownership: Simplicra (<1%); Intrinsic Orthopedics (<1%); Board of Directors: NASS (Editor in Chief of The Spine Journal, E, Paid directly to institution/employer); Research Support - Investigator Salary: Kaiser - NIH (C, Paid directly to institution/employer); Fellowship Support: Orthopaedic Education Research Foundation (E, Paid directly to institution/employer), AO Foundation (E, Paid directly to institution/employer).

Carreon, Leah Y.: Trips/travel: University of Louisville (Travel expenses); Scientific Advisory Board: University of Louisville Institutional Review Board (Board Member), Scoliosis Research Society Research Committee (Member), Medtronic (Global Evidence Advisory Board), The Spine Journal (Editorial Advisory Board), Spine (Editorial Advisory Board); Other Office: Norton Healthcare (Salary), Center for Spine Surgery and Research, Lillebaelt Hospital, University of Southern Denmark (Professor); Research Support (Staff and/or Materials): Norton Healthcare (Research Salary, Paid directly to institution/employer), Orthopedic Research and Educational Fund (None, Paid directly to institution/employer), AOSpine (None, Paid directly to institution/employer), Scoliosis Research Society (None, Paid directly to institution/employer); Grants: Norton Healthcare (None, Paid directly to institution/employer), AOSpine (None, Paid directly to institution/employer), AO Spine (Amount not disclosed, Paid directly to institution/employer), AO Spine (Amount not disclosed, Paid directly to institution/employer), OOD (Travel expenses), ACSR (Travel expenses), NIH (Honoraria and Travel expenses), Medtronic (Amount not disclosed, Paid directly to institution/employer), University of Louisville (Travel expenses).

Carrino, John A.: Consulting: Pfizer (B), BioClinica (B); Scientific Advisory Board: General Electric (Travel expenses, Halyard Health (Travel expenses).

Carroll, Linda: Consulting: Government of Alberta (A); Speaking and/or Teaching Arrangements: Work Disabilty Prevention CIHR Strategic Training Program (A); Trips/travel: University of Ontario Institute of Technology, Ontario Protocol for Traffic Injury Management (B), University of Aarhus, Denmark: 12th International Association for the Study of Pain (B), Karolinska Institute, Stockholm, Sweden (A); Research Support - Investigator Salary: Alberta Innovates - Health Solutions (E, Paid directly to institution/employer), Grants: CIHR (E, Paid directly to institution/employer), MS Society (D, Paid directly to institution/employer).

Cha, Thomas D.: Consulting: Bioz (B); Research Support (Investigator Salary): Gordon and Betty Moore Foundation (B, Paid directly to institution/employer); Grants: North American Spine Society (D, Paid directly to institution/employer); Fellowship Support: AO Spine (F, Paid directly to institution/employer), Globus (F, Paid directly to institution/employer), MS Society (D, Paid directly to institution/employer).

Chang, Michael S.: Consulting: Globus (B); Speaking and/or Teaching Arrangements: Stryker (B), Integra (B), Globus (B), Medtronic (B); Scientific Advisory Board: Globus (A).

Chapman, Jens R.: Stock Ownership: Renovis (500 shares); Speaking and/or Teaching Arrangements: AOspine North America (B); Board of Directors: AOspine North America (Treasurer, B); Scientific Advisory Board: (None); Relationships Outside the One Year Requirement: Spine Journal (Travel expenses), Journals of Spine (Travel expenses), JSDT (Travel expenses), JBJS (Travel expenses), Evidence Based Spine Care Journal (Travel expenses), Global Spine Journal (Travel expenses).


Chaput, Christopher D.: Royalties: Globus (None), Facet-Link (None); Consulting: Globus (B), Facet-Link (B); Research Support (Staff and/or Materials): Medtronic (D, Paid directly to institution/employer), Globus (C, Paid directly to institution/employer), NuVasive (B, Paid directly to institution/employer).

Chataigner, Herve L.: Royalties: LDR (D), EUROS (D), Medicrea (D); Speaking and/or Teaching Arrangements: LDR (Travel expenses); Trips/travel: LDR (Travel expenses), EUROS (Travel expenses).

Chatzisotiriou, Athanasios: Relationships Outside the One Year Requirement: Spineart (B).

Chaudhary, Saad B.: Speaking and/or Teaching Arrangements: Medtronic (B), DePuy Synthes (B); Scientific Advisory Board: U & I Corporation (A).

Chen, Thomas C.: Stock Ownership: Tocagen (200,000 shares), Axonocology/3C Spine Oncology (1,000,000 shares), Pharmaco-Kinesis (800,000 shares), CSRx (200,000 shares), NasOnc (30%).
'Consulting: Pharmaco-Kinesis (D), Speaking and/or Teaching Arrangements: Synthes (B); Trips/Travel: C5Rx (Travel expenses), ERC (Travel expenses); Scientific Advisory Board: 3C Spine (Stock ownership disclosed); Other Office: Pharmaco-kinesis (D); Grants: Synthes (D); Relationships Outside the One Year Requirement: ERC America (E).

Cheng, Boyle C.: Stock Ownership: Medtronic (<1%); Private Investments: Orthokinematics (<1%); Consulting: Aesculap (Scientific Advisory Board, B); Speaking and/or Teaching Arrangements: Aesculap (B); Scientific Advisory Board: Aesculap Spine (B); Grants: K2M (D, Paid directly to institution/employer), S&Bone (D, Paid directly to institution/employer), Stryker (E, Paid directly to institution/employer), Medtronic (F, Paid directly to institution/employer).

Cheng, Joseph S.: Trips/travel: DePuy Synthes (Honoraria, Paid directly to institution/employer); Other Office: AANS/CNS (Recording Secretary: AANS/CNS Council of State Neurosurgical Societies Past-Chair: AANS/CNS Joint Spine Section).

Cho, Charles H.: Board of Directors: North American Spine Society (Evidence Compilation and Analysis Chair, Travel expenses); Other Office: American Society of Neuroradiology (Finance Management Committee Co-chair).

Cho, Samuel K.: Consulting: Stryker (B); Speaking and/or Teaching Arrangements: Medtronic (B); Research Support (Staff and/or Materials): Zimmer (None); Grants: Orthopaedic Research and Education Foundation (D, Paid directly to institution/employer).

Choma, Theodore J.: Stock Ownership: Gensis (20000 shares); Consulting: Stryker Spine (A); Speaking and/or Teaching Arrangements: AO Spine North America (A); Board of Directors: AO Spine North America (B); Scientific Advisory Board: Gensis (None).

Chou, Dean: Consulting: Orthofix (B), Medtronic (B), Globus (B).

Christie, Sean D.: Consulting: Medtronic Canada (B); Speaking and/or Teaching Arrangements: Medtronic (C, Paid directly to institution/employer); Board of Directors: Canadian Spine Society (None); Scientific Advisory Board: Canadian Spine Society (None); North American Spine Society (None): Research Support - Staff and/or Materials: Medtronic (D, Paid directly to institution/employer); Grants: Capital District Health (D, Paid directly to institution/employer).

Chutkan, Norman B.: Royalties: Globus Medical (E); Speaking and/or Teaching Arrangements: AO North America (Travel expenses); Board of Directors: AO Spine North America (Travel expenses).

Clim, Julien: Other Office: Spinologics (Salary); Grants: K2M (E, Paid directly to institution/employer), DePuy Synthes (E, Paid directly to institution/employer).

Cohen, David B.: Speaking and/or Teaching Arrangements: NASS (A).

Coric, Damagoj: Royalties: Spine Wave (F); Stock Ownership: Spine Wave (<1%), DiscGenics (<1%), Spinal Motion (<1%); Consulting: Medtronic (C), Globus Medical (F), United Healthcare (B), Spine Wave (C); Speaking and/or Teaching Arrangements: Globus Medical (B); Scientific Advisory Board: United Healthcare (B).

Cote, Pierre: Speaking and/or Teaching Arrangements: European Spine Society (B); Scientific Advisory Board: European Spine Society Task Force on Research (None); Grants: Ontario Government - Ministry of Finance (H, Paid directly to institution/employer).

Crandall, Dennis G.: Royalties: Medtronic (E); Stock Ownership: Kspine (25000 shares); Consulting: Medtronic (B), Stryker (B), Ellipse Technology (None), Spine Wave (B), Zyga (B); Scientific Advisory Board: Ellipse Technology (None).

Crawford, Charles H.: Consulting: Medtronic (C), Alphatec (C); Speaking and/or Teaching Arrangements: DePuy Synthes (B); Trips/travel: NASS (A), SRS (A); Other Office: Scoliosis Research Society (Committee Member), NASS (Committee Member).

Crowder, Terrence T.: Consulting: Integra (B); Other: Vertera (Stock options).

Cunningham, Bryan W.: Stock Ownership: Globus Medical (30000 shares); Consulting: Globus Medical (F); Speaking and/or Teaching Arrangements: Globus Medical (Travel Expenses); Trips/travel: Globus Medical (B); Board of Directors: Globus Medical (None); Scientific Advisory Board: Globus Medical (None); Other Office: Director of Musculoskeletal Research (Salary); Fellowship Support: Globus Medical (E, Paid directly to institution/employer).

Cunningham, Matthew E.: Speaking and/or Teaching Arrangements: DePuy/J&J (Amount not disclosed).

Curcin, Aleksandar: Stock Ownership: CrossCurrent (<1%); Consulting: Medtronic (None); Speaking and/or Teaching Arrangements: Medical Educational Resources (None), Board of Directors: DOCS IPA (Amount not disclosed); Scientific Advisory Board: CrossCurrent (Stock ownership disclosed).

Daffner, Scott D.: Stock Ownership: Pfizer (<1%), Amgen (<1%); Grants: CSRS (F, Paid directly to institution/employer), AO Foundation (F, Paid directly to institution/employer); Fellowship Support: AO Spine (E, Paid directly to institution/employer); Relationships Outside the One Year Requirement: Medtronic (D), Medtronic (D, Paid directly to institution).

Dagenais, Simon: Royalties: Elsevier (B); Stock Ownership: Pacira Pharmaceuticals (<1%); Private Investments: Palladian Health (<1%); Consulting: University of South Florida (C), NCMIC Foundation (B), Pacira Pharmaceuticals (B), New York University (C), Palladian Health (E), Emi Solutions (B); Speaking and/or Teaching Arrangements: NCMIC Foundation (B); Trips/Travel: Canadian Chiropractic Research Foundation (A), North American Spine Society (B): Scientific Advisory Board: Societe Franco-Europeenne de Chiropraxie (None), Palladian Health (Consulting disclosed); Other Office: North American Spine Society (2014 Annual Meeting Program Co-chair), Pacira Pharmaceutical (Salary); Grants: NCMIC Foundation (D).

Dahl, Benny: Speaking and/or Teaching Arrangements: Medtronic (B, Paid directly to institution/employer), Globus Medical (B); Grants: Globus Medical (D, Paid directly to institution/employer).

Dana, Andrew T.: Royalties: Bomet (C); Consulting: Bomet (D); Speaking and/or Teaching Arrangements: AO North America (B); Relationships Outside the One-Year Requirement: Bomet (B).

Dang, Alan: Other Office: Dang Orthopaedics (Co-founder/Owner); Research Support - Staff and/or Materials: CGBio (A, Paid directly to institution/employer).

Daniels, Alan: Consulting: Stryker Spine (B); Trips/travel: DePuy Synthes (B, Paid directly to institution/employer), Stryker Spine (B).

Darden, Bruce V.: Royalties: Stryker (D, Paid directly to institution/employer); Stock Ownership: BioMedFlex (100 shares); Consulting: Stryker (B), Synthes (B); Board of Directors: Cervical Spine Research Society (None), Lumbar Spine Research Society (None); Scientific Advisory Board: Stryker Biologic (None); Fellowship Support: AO (E, Paid directly to institution/employer).

Datta, Jason C.: Device or Biologic Distributor (Physician-Owned Distributorship); Wyco (E); Private Investments: Cerapedics (<1%); Consulting: Spine Wave (B); Grants: Medtronic (D, Paid directly to institution/employer).

Daubs, Michael D.: Royalties: Synthes Spine (F); Consulting: DePuy Synthes Spine (B); Speaking and/or Teaching Arrangements: AO Spine North America (B); Board of Directors: AO Spine North America (B); Fellowship Support: AO Spine North America (D, Paid directly to institution/employer).

Davis, Reginald J.: Royalties: Zimmer Spine (E, Paid directly to institution/employer); Consulting: Zimmer Spine (C, Paid directly to institution/employer), Paradigm Spine (B, Paid directly to institution/employer), LDR (B).

Delecin, Joel: Royalties: LDR Medical (B); Trips/travel: LDR Medical (Travel expenses).

DeMicco, Russell C.: Speaking and/or Teaching Arrangements: North American Spine Society (B); Trips/travel: AAPM&R (A); Other Office: AAMPSR (A, Membership Committee).
Demir-Deviren, Sibel: Consulting: ISTO Technologies, Inc. Independent Safety Committee (B, Paid directly to institution/employer); Grants: Pfizer (Amount not disclosed, Paid directly to institution/employer).

Devlin, Clinton J.: Consulting: Exponent (Amount not disclosed); Speaking and/or Teaching Assignments: DePuy Spine (Amount not disclosed, Paid directly to institution/employer); Trips/travel: DePuy Spine (B); Grants: Stryker spine (C, Paid directly to institution/employer).

Deviren, Vedat: Royalties: NuVasive (F); Consulting: NuVasive (Amount not disclosed), DePuy Synthes (Amount not disclosed), Guidepoint (Amount not disclosed); Fellowship Support: AO Spine (Amount not disclosed); Globus (E, Paid directly to institution/employer); Relationships Outside the One Year Requirement: NuVasive (D).

DeWald, Christopher J.: Stock Ownership: Medtronic (237 Shares), Alphatec (6800 Shares); Consulting: Stryker (B), Kisco (C); Speaking and/or Teaching Assignments: NuVasive (B), K2M (B); Trips/travel: NuVasive (A), Kisco (B); Research Support - Investigator Salary: K2M (A).

Diab, Mohammad: Consulting: Stryker (None).

Dimar, John R.: Royalties: Medtronic Sofamor Danek (None); Consulting: Medtronic (C); Speaking and/or Teaching Assignments: DePuy (C); Board of Directors: SRS (Education Council Chair Elect; Development Committee Chair), FOSA (President); Other: The Spine Journal (Article reviewer), JBJS (Amount not disclosed, Associate editor), Spine Deformity (Article reviewer), Global Spine (Article reviewer).

Dilulis, Carrie A.: Speaking and/or Teaching Assignments: Reboot Holdings PTY (B), Trips/travel: Reboot Holding PTY (B).

Dolhriing, Edward J.: Royalties: Stryker (E, Paid directly to institution/employer); Speaking and/or Teaching Assignments: Spine Wave (B, Paid directly to institution/employer); Board of Directors: North American Spine Society (B, Education Council Director); Research Support - Staff and/or Materials: Medtronic (B, Paid directly to institution/employer).

Donaldson, William F.: Speaking and/or Teaching Assignments: IEP (B); Trips/travel: IEP (A).

Donelson, Ronald G.: Stock Ownership: Integrated Mechanical Care (A); Consulting: Integrated Mechanical Care & McKenzie Institute (B); Speaking and/or Teaching Assignments: Integrated Mechanical Care & McKenzie Institute (B); Trips/travel: Integrated Mechanical Care & McKenzie Institute (B); Other Office: Integrated Mechanical Care (Stock ownership disclosed, Medical Director).

Dormans, John P.: Royalties: Elsevier (B); Board of Directors: SRS (President); Scientific Advisory Board: Global HELP (Advisory board), Shriner’s International (Advisory Board),_veritas Health (Advisory Board); Fellowship Support: Omega (E, Paid directly to institution/employer).

Dreisinger, Thomas E.: Stock Ownership: Scientific Exercise (<1%); Consulting: Scientific Exercise (50%, E, Executive Vice President of Outcomes Research); Trips/travel: Scientific Exercise (Travel expenses), NASS (Travel expenses); Board of Directors: McKenzie Institute International (B).

Driscoll, Mark: Other Office: Spinologics (Salary); Grants: K2M (E, Paid directly to institution/employer), DePuy Synthes (E, Paid directly to institution/employer), Rodin4D (B, Paid directly to institution/employer).

Dryer, Randall F: Royalties: NuVasive (E), Medtronic (E), Globus (D); Consulting: Globus (C).

Dufour, Thierry: Royalties: LDR Medical (E); Trips/travel: Synthes (B).

Duggal, Neil: Stock Ownership: Synergy Disc Replacement (Amount not disclosed); Private Investments: VentureMD (Amount not disclosed); Trips/travel: Medtronic/Synthes (Travel expenses, Paid directly to institution/employer); Board of Directors: Synergy Disc Replacement (None); Scientific Advisory Board: Synergy Disc Replacement (None).

Dvorak, Marcel F.: Royalties: Medtronic (G); Consulting: Medtronic (Amount not disclosed); Speaking and/or Teaching Assignments: Medtronic (Consulting amount disclosed), Synthes, AO Spine (Amount not disclosed); Trips/travel: Medtronic (Amount not disclosed); Board of Directors: Vancouver Hospital Foundation Board (None); Scientific Advisory Board: Medtronic (Consulting amount disclosed); Endowments: University of British Columbia (F); Research Support (Staff and/or Materials): Medtronic (F); Grants: Medtronic (F), DePuy Spine (G), Rick Hansen Institute (H); Fellowship Support: Medtronic (E), Syntheses (E), DePuy (E).

Eastlack, Robert K.: Royalties: Globus Medical (B), NuTech (I); Stock Ownership: NuVasive (<1%), Alphatec (<1%), Diffusion (<1%); Private Investments: Top Doctors Labs (100%), Spine Innovations (8%), Nocimed (<1%); Consulting: K2M (C), Ulrich (A), NuVasive (F); Aesculap (C), NuTech (None), Stryker (B), Carevacure (Stock options, Paid directly to institution/employer), DePuy Synthes (C), Alphatec (B); Speaking and/or Teaching Assignments: AO Spine (B), Synthes (DePuy) (None), Eli Lilly (B), UCSF (B); Trips/travel: DePuy Synthes (A), K2M (B), Aesculap (A), Aesculap (A); Board of Directors: San Diego Spine Foundation (None), Spine Innovations (Director); Scientific Advisory Board: Alphatec (None), Diffusion (None), Top Doctors Labs (None), Aesculap (None); Grants: Integra (D, Paid directly to institution/employer); Fellowship Support: Pioneer (E, Paid directly to institution/employer), NuVasive (E, Paid directly to institution/employer).

Eberson, Craig: Royalties: Globus Medical (B), Consulting: Orthofix (B); Speaking and/or Teaching Assignments: Alphatec Spine Company (B); Scientific Advisory Board: Rare Disease Foundation (None), Research Support (Staff and/or Materials): Stryker Spine (Amount not disclosed, Paid directly to institution/employer).

Elmont, Frank J.: Royalties: Alphatec Spine Company (E); Stock Ownership: Alphatec Spine Company (<1%); Consulting: Alphatec Spine Company (B); Scientific Advisory Board: Alphatec Spine Company (B).

Elliott, James M.: Private Investments: Pain ID (35%); Consulting: Pain ID (None).

Errico, Thomas J.: Royalties: K2M (F); Stock Ownership: Fastenexit (F); Speaking and/or Teaching Assignments: K2M (B); Board of Directors: Setting Scoliosis Straight (None); Research Support (Staff and/or Materials): Paradigm (E, Paid directly to institution/employer); Grants: Fridolin Trust (E, Paid directly to institution/employer); Fellowship Support: AO Spine (E), OMEXG (E, Paid directly to institution/employer).


Fesseler, Richard G.: Royalties: Stryker (B), DePuy (B), Medtronic (B); Private Investments: In Queue Innovations (50%).

Finkenberg, John G.: Board of Directors: North American Spine Society (Advocacy Council Director); Research Support - Staff and/or Materials: Biomet (B).

Fish, David E.: Grants: Medtronic (C, Paid directly to institution/employer); Fellowship Support: Boston Scientific (C, Paid directly to institution/employer).

Fisher, Charles G.: Royalties: Medtronic (G); Consulting: Medtronic (E, Paid directly to institution/employer), NuVasive (B); Speaking and/or Teaching Assignments: Medtronic (B), AO Spine (B), NuVasive (B); Research Support (Staff and/or Materials): Medtronic (F, Paid directly to institution/employer); Grants: OREF (E, Paid directly to institution/employer); Fellowship Support: Medtronic (E, Paid directly to institution/employer), AO Spine (E, Paid directly to institution/employer).

Flamm, Carole R.: Other Office: Blue Cross Blue Shield Association (Salary).

Foley, Kevin T.: Royalties: ArthroCare (B), Medtronic (I); Stock Ownership: Medtronic (H), NuVasive (H); Private Investments: DiscGenics (13%), Spine Wave (753000 shares), TrueVision (5%), BioD (Amount not disclosed); Consulting: Medtronic (D), NuVasive (A); Board of Directors: MERI (None), DiscGenics (None), BioD (None), TrueVision (None).
<table>
<thead>
<tr>
<th>Name</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France, John C.</td>
<td>Speaking and/or Teaching Arrangements: AO Spine (Amount not disclosed); Fellowship Support: AO Foundation (E, Paid directly to institution/employer); Consulting: AO Spine (Amount not disclosed); Medtronic (Amount not disclosed); Zimmer (Amount not disclosed); Paradigm (Amount not disclosed); Board of Directors: SSE (Board member); IGASS (Board member); German Spine Society (Board member); Scientific Advisory Board: SSE (Education Chair).</td>
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<tr>
<td>Franke, Jorg</td>
<td>Royalties: Medacta (B); Consulting: Medtronic (Amount not disclosed); Speaking and/or Teaching Arrangements: Medtronic (Amount not disclosed); Zimmer (Amount not disclosed); Paradigm (Amount not disclosed); Board of Directors: SSE (Board member); IGASS (Board member).</td>
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<tr>
<td>Fransen, Patrick</td>
<td>Consulting: Medtronic (A); Speaking and/or Teaching Arrangements: Medtronic (A); Trips/travel: Medtronic (A).</td>
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<tr>
<td>Fritz, Julie</td>
<td>Consulting: FOTO (B); Scientific Advisory Board: FOTO (B).</td>
</tr>
<tr>
<td>Ganey, Timothy</td>
<td>Stock Ownership: Vexiv Biomedical (&lt;1%); Private Investments: Medacta (B), Spinal Kinetics (10000 Shares), Surgiﬁle (50000 Shares), Cytonix Corporation (2500 Shares), SI-Bone (20000 Shares); Consulting: Vertiflex (B), Magniﬁ Group (B, Editor/Consultant for Interactive Educational Program), SI-Bone (Amount not disclosed), Globus Medical (A, Paid directly to institution/employer), Benvenernel Medical (D, Paid directly to institution/employer), NuVasive (D, Paid directly to institution/employer), Spinal Kinetics (None); Speaking and/or Teaching Arrangements: DePuy (Travel expenses), Spinal Kinetics (B, Paid directly to institution/employer); Board of Directors: International Society for the Advancement of Spine Surgery (Travel expenses); Scientific Advisory Board: NuVasive (Amount not disclosed, Paid directly to institution/employer), Spinal Kinetics (None), Spine Medical (None), Vertiflex (None), Benvenernel Medical (Amount not disclosed); Research Support - Staff and/or Materials: DePuy (D, Paid directly to institution/employer), EBII (B, Paid directly to institution/employer), Medtronic (E, Paid directly to institution/employer), NuVasive (E, Paid directly to institution/employer); Fellowship Support: Synthes Spine (E), DePuy (E), Medtronic (E), Biomet (D), AOSpine North America (D).</td>
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<tr>
<td>Garfin, Steven R.</td>
<td>Royalties: DePuy Spine (D); Stock Ownership: Cross Tree (25000 Shares), Pioneer Surgical (10000 Shares), Spinal Kinetics (10000 Shares), Surgiﬁle (50000 Shares), Cytonix Corporation (2500 Shares), SI-Bone (20000 Shares); Consulting: Vertiflex (B), Magniﬁ Group (B, Editor/Consultant for Interactive Educational Program), SI-Bone (Amount not disclosed), Globus Medical (A, Paid directly to institution/employer), Benvenernel Medical (D, Paid directly to institution/employer), NuVasive (D, Paid directly to institution/employer), Spinal Kinetics (None); Speaking and/or Teaching Arrangements: DePuy (Travel expenses), Pioneer Surgical (B, Paid directly to institution/employer); Board of Directors: International Society for the Advancement of Spine Surgery (Travel expenses); Scientific Advisory Board: NuVasive (Amount not disclosed, Paid directly to institution/employer), Spinal Kinetics (None), Spine Medical (None), Vertiflex (None), Benvenernel Medical (Amount not disclosed); Research Support - Staff and/or Materials: DePuy (D, Paid directly to institution/employer), EBI (B, Paid directly to institution/employer), Medtronic (E, Paid directly to institution/employer), NuVasive (E, Paid directly to institution/employer); Fellowship Support: Synthes Spine (E), DePuy (E), Medtronic (E), Biomet (D), AOSpine North America (D).</td>
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<tr>
<td>Geck, Matthew J.</td>
<td>Royalties: Zimmer (D); Stock Ownership: DiFusion (2%); Private Investments: DiFusion (Former holder convertible debt note); Consulting: Globus (B); Board of Directors: SpineHope (None).</td>
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<tr>
<td>Gehrchen, Martin</td>
<td>Consulting: Globus Medical (B), Medtronic (B), K2M (B); Speaking and/or Teaching Arrangements: Globus Medical (B), Medtronic (B), K2M (B).</td>
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<tr>
<td>Geissler, Fred</td>
<td>Royalties: Aesculap (C), Rhauserl (B); Stock Ownership: Rhauserl (34%), Surgitex (2%); Private Investments: Spinal Integration (&lt;1%); Consulting: Spinal Restoration (B), Spinal Motion (A), Mesoblast (B), Vertiflex (B), Aesculap (B), NuVasive (A); Speaking and/or Teaching Arrangements: Aesculap (B); Research Support (Staff and/or Materials): Spinal Motion (Amount not disclosed, Paid directly to institution/employer).</td>
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<td>Gerling, Michael C.</td>
<td>Consulting: Stryker (B); Speaking and/or Teaching Arrangements: Stryker (B).</td>
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<tr>
<td>Germscheid, Nicole M.</td>
<td>Other Office: AOSpine (Salary).</td>
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<tr>
<td>Ghiassi, Gary</td>
<td>Private Investments: DiFusion (9%); Consulting: Biomet (B); Scientific Advisory Board: DiFusion (Stock options).</td>
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<tr>
<td>Ghogawala, Zohar</td>
<td>Board of Directors: American Association of Neurological Surgeons - NeuroPoint Alliance (Board of Directors), Congress of Neurological Surgeons (Vice President, Executive Committee), Collaborative Spine Research Foundation (Board of Directors), North American Spine Society (Board of Directors); Research Support (Staff and/or Materials): Stuart Foundation (F, Paid directly to institution/employer); Grants: PCORI (H, Paid directly to institution/employer).</td>
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<tr>
<td>Girardi, Federico P.</td>
<td>Royalties: Lax (B), NuVasive (C), Ortho Development (C), DePuy Spine (D); Stock Ownership: Small Bone Innovations (&lt; 1%), Pioneer Surgical Technology (&lt; 1%), Life Spine (&lt;1%), Centinel Spine (&lt; 1%), Spinal Kinetics (&lt; 1%); Paradigm Spine (&lt;1%); Consulting: Lax (B), Gerson Lehrman Group (A), Spineart USA (C), Ortho Development (C), DePuy Spine (B); Speaking and/or Teaching Arrangements: PharmaWrite (None); Scientific Advisory Board: Spine x USA (None), Spinal Kinetics (None), Centinel Spine (None), Spineart USA (None); HealthpointCapital (None), Paradigm Spine (None).</td>
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<tr>
<td>Glaser, John A.</td>
<td>Grants: SI-Bone (D, Paid directly to institution/employer).</td>
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<tr>
<td>Glassman, Steven D.</td>
<td>Royalties: Medtronic (H); Board of Directors: Scoliosis Research Society (Past President); Scientific Advisory Board: N2QOD (Scientific Advisory Board); Research Support (Staff and/or Materials): Norton Healthcare (Amount not disclosed, Paid directly to institution/employer).</td>
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<tr>
<td>Goel, Vijay K.</td>
<td>Device or Biologic Distributorship (Physician-Owned Distributorship): Turning Point (B), Butterfly (A), Endosphere (B); Royalties: Turning Point (B), X-Spine (B); Stock Ownership: BONE (33%); Consulting: DePuy (Amount not disclosed), OrthoKinetic Technologies (Amount not disclosed); Scientific Advisory Board: Turning Point (None); Grants: DePuy (E, Research funds that has come to the institution).</td>
</tr>
<tr>
<td>Gokaslan, Ziya L.</td>
<td>Stock Ownership: Spinal Kinetics (Amount not disclosed) and US Spine (Amount not disclosed); Board of Directors: AOSpine (None); Grants: DePuy Spine (E, Paid directly to institution/employer), AO Spine North America (E, Paid directly to institution/employer), Medtronic (E, Paid directly to institution/employer), OrthoKinetic Technologies (Amount not disclosed), Board of Directors: ISASS (None); Research Support (Staff and/or Materials): AxioMed (Amount not disclosed, Paid directly to institution/employer); Fellowship Support: OREF (Amount not disclosed, Paid directly to institution/employer).</td>
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<tr>
<td>Goldenstein, Jeffrey A.</td>
<td>Royalties: NuVasive (C); Stock Ownership: NuVasive (&lt;1%); Consulting: NuVasive (A), Medtronic (B); Board of Directors: ISASS (None); Research Support (Staff and/or Materials): AxioMed (Amount not disclosed, Paid directly to institution/employer); Fellowship Support: OREF (Amount not disclosed, Paid directly to institution/employer).</td>
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<tr>
<td>Goodwin, C. Rory</td>
<td>Grants: NREF (D, Paid directly to institution/employer), Burroughs Wellcome Fund (C, Paid directly to institution/employer); Fellowship Support: UNCF-Merck Postdoctoral Science Fellowship (E, Paid directly to institution/employer).</td>
</tr>
<tr>
<td>Gornet, Matthew F.</td>
<td>Royalties: Pioneer (B), Medtronic (F); Stock Ownership: Bonovo (2%), Ouroboros (453460 shares), International Spine &amp; Orthopedic Institute (6%), Nocemed (4%), Paradigm Spine (2%).</td>
</tr>
<tr>
<td>Grauer, Jonathan N.</td>
<td>Consulting: Stryker (C), ISTO technologies (C), Harvard Clinical Research Institute (B), Bioventus (C); Grants: Orthopaedic Trauma Association (B, Paid directly to institution/employer); Other: Legal consulting (Amount not disclosed).</td>
</tr>
<tr>
<td>Greco, Carl A.</td>
<td>Stock Ownership: Theodent Holdings (1%, Paid directly to institution/employer); Consulting: SpineSmith (Amount not disclosed, Paid directly to institution/employer); Scientific Advisory Board: Theodent Holdings (Stock ownership disclosed, Paid directly to institution/employer); Research Support (Staff and/or Materials): SpineSmith Partners (Amount not disclosed).</td>
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<tr>
<td>Grossman, Robert G.</td>
<td>Scientific Advisory Board: Vertex Pharmaceuticals (B), Christopher Reeve Foundation (A), InSightec (A).</td>
</tr>
<tr>
<td>Gudipally, Manasa</td>
<td>Stock Ownership: Globus Medical (1000 shares); Other Office: Globus Medical (Salary).</td>
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<tr>
<td>Gum, Jeffrey L.</td>
<td>Royalties: Acuity (B); Consulting: Life Spine (C); Speaking and/or Teaching Arrangements: Medtronic (Amount not disclosed); Trips/travel: Alphatec (Amount not disclosed); Fellowship Support: OREF (D, Paid directly to institution/employer).</td>
</tr>
</tbody>
</table>
Gupta, Munish C.: Royalties: DePuy (H); Stock Ownership: Pioneer (18,000 shares), Johnson & Johnson (100 shares), Proctor & Gamble (100 shares), Pfzer (100 shares); Private Investments: Spinal Ventures (2%); Consulting: DePuy (C), Medtronic/Orthofix (B); Speaking and/or Teaching Arrangements: DePuy (B); Trips/travel: DePuy Spine (B); Board of Directors: FOSA (Treasurer); Scientific Advisory Board: SRS (Committee Member and Board member).

Guyer, Richard D.: Royalties: Alphatec (B); Stock Ownership: Spinal Motion (None); Private Investments: Spinal Ventures I and II (5%); Consulting: DePuy Synthes (B), Speaking and/or Teaching Arrangements: Synthes (None); Scientific Advisory Board: K2M (B), Flexuspine (Stock options), Spinal Kinetics (Stock options), Nanovis (A), Cracker Technologies (A), MMmedx (B); Fellowship Support: OREF (Amount not disclosed). Paid directly to institution/employer), AO Spine (D, Paid directly to institution/employer), Medtronic Neurological Division (C, Paid directly to institution/employer).

Gunzburg, Robert: Private Investments: Spineone (<1%); Consulting: LfC Poland (Amount not disclosed), Scientific Advisory Board: Nanovis (Amount not disclosed).

Haig, Andrew J.: Private Investments: Rehabilitation Team Assessments (100%); Board of Directors: International Society for Physical and Rehabilitation Medicine (Africa Liaison), The International Rehabilitation Forum (President); Grants: The National Institutes of Health (A, Paid directly to institution/employer).

Haldeman, Scott: Royalties: Multiple publishing companies (B); Stock Ownership: Palladian Health (<1%); Consulting: Palladian Health (F); Speaking and/or Teaching Arrangements: Multiple organizations (B), Trips/travel: Multiple meetings per prior field (Speaking and/or Teaching Arrangements disclosed), Board of Directors: Canadian Memorial Chiropractic College (B), World Spine Care (None); Scientific Advisory Board: Tech Medical (None); Other Office: WFC Research Council (Committee member).

Hank, Patrick P.: Royalties: NuVasive (C); Consulting: MicroVention (C); Speaking and/or Teaching Arrangements: NuVasive (B); Trips/travel: NuVasive (B).

Hansen-Algenstaedt, Nils: Royalties: Stryker (C, Paid directly to institution/employer), Spineart (C, Paid directly to institution/employer), Globus Medical (C, Paid directly to institution/employer); Consulting: DePuy Synthes (C), Stryker (C), Spineart (C), Aesculap (C); Speaking and/or Teaching Arrangements: AO Spine (C, Paid directly to institution/employer), DePuy Synthes (C, Paid directly to institution/employer), Spineart (C, Paid directly to institution/employer), Stryker (C, Paid directly to institution/employer), Trips/travel: AO Spine (B, Paid directly to institution/employer), DePuy Synthes (B, Paid directly to institution/employer), Spineart (B, Paid directly to institution/employer), Stryker (B, Paid directly to institution/employer).

Harrell, Frank E.: Consulting: Medtronic (D, Paid directly to institution/employer).

Harris, Jeffrey E.: Stock Ownership: NuVasive (<1%).

Hart, Robert A.: Royalties: SeaSpine (E), DePuy Synthes (B); Stock Ownership: SpineConnect (<1%); Consulting: DePuy Synthes (C), Globus (B), Medtronic (B); Speaking and/or Teaching Arrangements: DePuy Synthes (C), Trips/travel: Globus (A); Other Office: AAOS (Editor), International Spine Study Group (Executive Committee), CSRS Editorial Committee (Editorial Board), Spine (Assistant Editorial Board), AAOS (Instructional Course Committee), American Orthopaedic Association (Leadership Development Committee), Cervical Spine Research Society (Education Committee), Lumbar Spine Research Society (Membership Committee), NASS (Governance Committee), Oregon Association of Orthopaedics (Board Member), OREF (Review Committee), Prospective Clinical Grant Research), Scoliosis Research Society (Adult Deformity Committee); Research Support (Staff and/or Materials): DePuy Synthes (D, Paid directly to institution/employer), Medtronic (C, Paid directly to institution/employer), Fellowship Support: OMEGA (D), DePuy Synthes (E); Relationships Outside the One Year Requirement: Medtronic (D), DePuy Synthes (E), AO (B).

Harti, Roger: Royalties: Lanx (B); Consulting: DePuy Synthes (B), Speaking and/or Teaching Arrangements: Baxter (A), Brainlab (A); Board of Directors: AOSpine (B).

Hecht, Andrew: Royalties: Zimmer Spine (Amount not disclosed, Paid directly to institution/employer); Consulting: Stryker Spine (None), Medtronic (None), Zimmer Spine (C, Paid directly to institution/employer), Speaking and/or Teaching Arrangements: Medtronic (None); Scientific Advisory Board: Musculoskeletal Transplant Foundation (None); Grants: OREF Grant (C).

Herring, Stanley A.: Stock Ownership: Vicis (2%); Scientific Advisory Board: K2 Biosystems (None).

Hillbrand, Alan S.: Royalties: Biomet Spine (G), Amedica (D), Aesculap (B); Stock Ownership: Amedica (<1%), LifeSpine (<3%), Spinal Ventures (<3%); Private Investments: Benvenuxe (B), Neogen (B), Paradigm Spine (B), Pioneer (<1%), PBD (B), Vertiflex (B); Board of Directors: AAO (Chair of Communications Cabinet), CSRS (President), North American Spine Society (Chair of CME Committee).

Hisey, Michael S.: Device or Biologic Distributorship (Physician-Owned Distributorship); NTSS (A); Royalties: Zimmer Spine (C), LDR Spine (B); Stock Ownership: Spine Wave (<1%); Private Investments: Medical Venture Fund (<1%); Consulting: Zimmer Spine (B), LDR Spine (D); Speaking and/or Teaching Arrangements: LDR Spine (Consulting disclosed); Board of Directors: Texas Health Presbyterian Hospital of Flower Mound (Amount not disclosed), TBI CRO (None).

Holly, Langston T.: Consulting: Medtronic (C); Grants: NIH (F, Paid directly to institution/employer).

Horn, Scott I.: Consulting: Spine and/or Teaching Arrangements: North American Spine Society (Travel expenses), AAPMR (Travel expenses), ISIS (Travel expenses); Other Office: ISIS (CPT Advisor, Travel expenses).

Hostin, Richard A.: Consulting: DePuy Spine (B); Trips/travel: DePuy Spine (B); Research Support (Staff and/or Materials): DePuy Spine (F), Seeger (F), NuVasive (F), DJD (E), K2M (C).

Hovorka, Istvan: Royalties: LDR Medical (E).

Howell, Kelli: Stock Ownership: NuVasive, Inc. (100,000 shares); Trips/travel: NuVasive (Travel Expenses); Board of Directors: Society of Lateral Access Surgery (None); Other Office: NuVasive (Salary); Relationships Outside the One Year Requirement: NuVasive (Salary).

Hresko, Michael T.: Stock Ownership: Johnson & Johnson (<1%); Consulting: DePuy Spine (B); Trips/travel: Scoliosis Research Society (B).

Hsieh, Adam H: Research Support - Staff and/or Materials: Synthes USA (F, Paid directly to institution/employer), RTI (E, Paid directly to institution/employer).

Hsieh, Patrick C.: Consulting: DePuy Synthes Spine (C), Medtronic (D); Speaking and/or Teaching Arrangements: Siemens (B).

Hsu, Erin L.: Relationships Outside the One Year Requirement: Medtronic Sofamor Danek (F).

Hsu, Wellington K.: Consulting: Stryker (C, Paid directly to institution/employer), Globus (A), AONA (B), Synthes (A), Medtronic (D, Paid directly to institution/employer), Pioneer (D, Paid directly to institution/employer), Bioventus (B), LifeNet (C, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: AONA (B), Trips/travel: Stryker (B), Pioneer Surgical (B), Medtronic (B), Bioventus (A), AONA (B); Board of Directors: Lumbar Spine Research Society (None), Cervical Spine Research Society (None); Scientific Advisory Board: Bioventus (None).

Hu, Serena S.: Royalties: NuVasive (F); Consulting: Medtronic (A); Speaking and/or Teaching Arrangements: Medtronic (None); Trips/travel: Synthes, Medtronic (None); Board of Directors: ISSLS (None).

Hughes, Alexander P.: Research Support (Investigator Salary): MMmedx (C, Paid directly to institution/employer); Fellowship Support: NuVasive (E, Paid directly to institution/employer).

Hullinger, Heidi M.: Research Support (Staff and/or Materials): Globus (None).

Huppert, Jean: Royalties: LDR Medical France (F); Stock Ownership: LDRH (42,000 shares).
Hussain, Mir: Other: MERC (Salary).
Hwang, Steven W.: Speaking and/or Teaching Arrangements: NASS (A), DePuy (None).

Isaacs, Robert E.: Royalties: NuVasive (A); Stock Ownership: Villaspine (100%), Providence (Amount not disclosed), SafeRay Spine (100%), SafeWire (33334 shares), Vertera (Amount not disclosed); Private Investments: SafeWire (30000 shares); Consulting: NuVasive (D), Baxano Surgical (B); Trips/travel: Vertera (A); Board of Directors: SafeWire (Stock ownership disclosed), SafeRay Spine (Director); Scientific Advisory Board: Providence (B); Research Support (Staff and/or Materials): NuVasive (C), Paid directly to institution/employer).

Jackson, Roger P.: Royalties: Biomet (H), Sientr x (D), Medtronic (I), Aesculap (G), Zimmer (H), NuVasive (H); Relationships Outside the One Year Requirement: Mizuho OSI (Amount not disclosed), Alphatec (Amount not disclosed), DePuy (Amount not disclosed), Theken (Amount not disclosed).

Jacobs, Joshua: Stock Ownership: Implant Protection (<1%); Board of Directors: AAOS (B); Grants: Zimmer (C), NuVasive (C), Medtronic (D); Relationships Outside the One Year Requirement: Medtronic (Amount not disclosed).

Janssen, Michael E.: Device or Biologic Distributorship (Physician-Owned Distributorship): WYCO Implant Distribution (D); Consulting: Cerapedics Osteobiologics (D, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: DePuy Synthes (B); Research Support (Staff and/or Materials): Synthes DePuy Spine (C, Paid directly to institution/employer).

Janssen, Stein: Grants: KWF Kankerfonds (B).

Jenis, Louis G.: Royalties: Stryker Spine (E); Consulting: Stryker Spine (C), NuVasive (C).

Jenkins, Sean: Other Office: Globus Medical (Salary).

Jones, Kristen E.: Consulting: Bard-Davol (A).

Justice, Brian: Stock Ownership: Spine Care Partners (20%); Other Office: Spine Care Partners (Vice President), Other: Primary Spine Provider Network (20%).

Kalantar, S. B.: Stock Ownership: 4-Web (<1%); Consulting: NuVasive (B), Precision Spine (B), Medtronic (B); Speaking and/or Teaching Arrangements: NuVasive (B).

Kalfas, Iain H.: Royalties: Mako Surgical (B); Stock Ownership: Paradigm Spine (<1%).

Kang, James D.: Research Support (Staff and/or Materials): Synthes (F, Paid directly to institution/employer).

Kanim, Lea: Stock Ownership: MDT (<1%).

Kanter, Adam S.: Royalties: Lanz (F, Paid directly to institution/employer); Consulting: NuVasive (Amount not disclosed, Paid directly to institution/employer).

Karnes, Jonathan: Research Support (Staff and/or Materials): Amniox Medical (D, Paid directly to institution/employer).

Kawchuk, Greg N.: Stock Ownership: VibeDx (51%); Board of Directors: VibeDx (None); Grants: NSERC (C, Paid directly to institution/employer), CIHR (C, Paid directly to institution/employer).

Kebaish, Khaled M.: Consulting: DePuy Spine (E); Speaking and/or Teaching Arrangements: K2M (C, Paid directly to institution/employer); Trips/travel: Orthofix (D).

Kelly, Michael P.: Trips/travel: UCSF (A); Grants: AOSpine (D, Paid directly to institution/employer), OREF (C, Paid directly to institution/employer), CSRS (C, Paid directly to institution/employer), Barnes-Jewish Foundation (D, Paid directly to institution/employer).


Khanna, A. Jay: Royalties: Thieme Medical Publishers (B), Ortho Development (B); Private Investments: New Era Orthopaedics (15%), Cortical Concepts (16%), Avitus Orthopaedics (9%); Consulting: Orthofix Spine (C); Speaking and/or Teaching Arrangements: AOSpine North America (B); Trips/travel: AOSpine North America (A); Scientific Advisory Board: Orthofix Spine (B); Other Office: Johns Hopkins Center for Bioengineering, Innovation and Design (Advisory Board, Paid directly to institution/employer); Grants: Siemens Healthcare (B, Paid directly to institution/employer).

Kim, Chi Heon: Consulting: Richard Wolf GmbH (Travel expenses).

Kim, Choll W.: Royalties: Globus (C); Stock Ownership: Spine View (<1%); Consulting: Biomet (Amount not disclosed), Globus (Amount not disclosed), K2M (Amount not disclosed), Joimax (Amount not disclosed), Speaking and/or Teaching Arrangements: Globus (Amount not disclosed); Trips/travel: Globus (Travel expenses); Board of Directors: Globus (Medical Board of Directors); Research Support - Staff and/or Materials: Globus (E).

Kim, Han Jo: Royalties: World Scientific Publishers (None); Speaking and/or Teaching Arrangements: K2M (B), DePuy (B), Stryker (B); Scientific Advisory Board: Spine Innovation Advisory Board, Medtronic (B); Other: Biomet (B).

Kim, Kee D.: Royalties: LDR (D), Globus (B), Spinal USA (D); Stock Ownership: Molecular Matrix (50000 shares); Consulting: Globus (B); Speaking and/or Teaching Arrangements: AO Spine (B); Board of Directors: Molecular Matrix (Stock ownership disclosed); Research Support (Staff and/or Materials): Globus (C, Paid directly to institution/employer).

Kim, Yong H.: Royalties: Biomet (D); Consulting: Biomet (B); Speaking and/or Teaching Arrangements: Biomet (B).

Klineberg, Eric O.: Speaking and/or Teaching Arrangements: DePuy Synthes Spine (D), AO Spine (B); Grants: AO Spine (D, Paid directly to institution/employer); Fellowship Support: OREF (D, Paid directly to institution/employer), Synthes (E, Paid directly to institution/employer).

Klocke, Noelle: Stock Ownership: Globus Medical (800 shares); Other Office: Globus Medical (Salary).

Knott, Patrick: Consulting: SSTSG (Board Member); Trips/travel: DIERS Medical Systems (Advisory Board); Board of Directors: SSTSG (Board Membership); Scientific Advisory Board: DIERS Medical Systems (Advisory Board).

Kondrashov, Dimitriy G.: Consulting: Spineart (C); Trips/travel: SI-Bone (C), SI-Bone (B).

Kopjar, Branko: Consulting: Smith and Nephew (F), Cerapedics (C), Speaking and/or Teaching Arrangements: Medtronic (A), Fellowship Support: OREF (D, Paid directly to institution/employer), Fellowship Support: DePuy (D, Paid directly to institution/employer), Relationships Outside the One Year Requirement: Medtronic Sofamor Danek (D).

Kraus, Michael E.: Device or Biologic Distributorship: ThermoFisher (B); Consulting: Stryker (F), Scientific Advisory Board: Spine Innovation Advisory Board, Research Support - Staff and/or Materials: ThermoFisher (E).

Kral, Karel: Research Support (Staff and/or Materials): Orthopedic Research and Development (D, Paid directly to institution/employer), Fellowship Support: Medtronic (D, Paid directly to institution/employer), Fellowship Support: DePuy (D, Paid directly to institution/employer), Relationships Outside the One Year Requirement: Medtronic Sofamor Danek (D).

Krause, Alexander: Royalties: Medtronic (A), Other Office: Medtronic (D).

Kreiner, Scott: Stock Ownership: LDR Holdings (<1%); Consulting and/or Teaching Arrangements: North American Spine Society (Travel expenses); Trips/Travel: ISIS (Travel expenses).

Krug, Roland: Research Support (Investigator Salary): General Electrics (B, Paid directly to institution/employer).

Kursumovic, Adisa: Consulting and/or Teaching Arrangements: Intrinsi c Therapeutics (C); Trips/travel: Intrinsic Therapeutics (B).

Labelle, Hubert: Stock Ownership: SpinoLogics (30%); Speaking and/or Teaching Arrangements: DePuy (B); Trips/travel: DePuy (A); Board of Directors: Scoliosis Research Society (A); Research Support (Staff and/or Materials): DePuy (D, Paid directly to institution/employer); Fellowship Support: DePuy (D, Paid directly to institution/employer), Relationships Outside the One Year Requirement: Medtronic Sofamor Danek (D).

Lafage, Virginie: Stock Ownership: Nemaris (20%); Speaking and/or Teaching Arrangements: Medtronic (B), DePuy Spine (C), Medirea (D); NuVasive (A); Board of Directors: Nemaris (None); Other Office: International Spine Study Group (Executive Committee); Grants: Scoliosis Research Society (C, Paid directly to institution/employer).


Lanman, Todd H.: Device or Biologic Distributorship (Physician-Owned Distributorship): Medtronic (B); Consulting: Medtronic (A); Speaking and/or Teaching Arrangements: Medtronic (B).
Lauryssen, Carl: Royalties: DePuy Spine (B, Paid directly to institution/employer), Amedica (B, Paid directly to institution/employer); Stock Ownership: Spinal Kinetics (Amount not disclosed), Amedica (Amount not disclosed), Replication Medical (Amount not disclosed), Spinal Elements (Amount not disclosed), Baxano (Amount not disclosed), Pioneer (Amount not disclosed), Alphatec (Amount not disclosed); Consulting: Pioneer (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer), Biomet (B, Paid directly to institution/employer), Baxano (B, Paid directly to institution/employer), Alphatec (B, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Spinal Kinetics (A); Board of Directors: Baxano (B); Scientific Advisory Board: Replication Medical (B); Relationships Outside the One Year Requirement: DePuy Spine (B).

Lavelle, William F.: Speaking and/or Teaching Arrangements: Stryker (A); Other Office: SAS (Governing Board); Grants: Covidien (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer), DePuy, A Johnson & Johnson Co. (C, Paid directly to institution/employer), Vertebral Technologies (E, Paid directly to institution/employer).

Law, Meng: Stock Ownership: Prism Clinical Imaging (Amount not disclosed, Paid directly to institution/employer); Consulting: Bayer Healthcare (E, Paid directly to institution/employer), Toshiba America Medical (Amount not disclosed, iCAD Inc. (Amount not disclosed), Speaking and/or Teaching Arrangements: Bracco (Amount not disclosed), Scientific Advisory Board: Bayer Healthcare (Amount not disclosed); Other Office: ASSR and ASFNTR (President Elect); Grants: NIH (F, Paid directly to institution/employer).

Lawrence, Brandon D.: Consulting: Amedica (A); Speaking and/or Teaching Arrangements: AO Spine North America (A); Grants: Cervical Spine Research Society (C, Paid directly to institution/employer); Fellowship Support: AO Spine North America (E).

Leary, Scott: Royalties: Aesculap Spine (B); Private Investments: Paradigm Spine (<1%); Consulting: Medacta Spine (B), Speaking and/or Teaching Arrangements: Paradigm Spine (A); Trips/travel: Medacta Spine (A).

Leasure, Jeremi M.: Royalties: Spineart (B); Stock Ownership: Neptune (<1%); Consulting: Spinal Simplicity (Amount not disclosed, Paid directly to institution/employer), New Era Orthopaedics (Amount not disclosed, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: SF Orthopaedic Residency Program (Amount not disclosed, Paid directly to institution/employer); Trips/travel: ConforMIS (Amount not disclosed, Paid directly to institution/employer); DePuy Synthes (B, Paid directly to institution/employer), ConforMIS (B, Paid directly to institution/employer), Biomet (B, Paid directly to institution/employer).

Lebl, Darren R.: Consulting: Medtronic (B); Scientific Advisory Board: K2M MI Advisory Board (Travel expenses).

Ledet, Eric H.: Private Investments: Revivo Medical (33%), ProActive Innovations (15%), I/O Surgical (25%); Grants: DePuy Spine (C, Paid directly to institution/employer), NIH (F, Paid directly to institution/employer), Orthopaedic Research and Education Foundation (D, Paid directly to institution/employer), New York Capital Region Research Consortium (E, Paid directly to institution/employer), OREF (C, Paid directly to institution/employer), CoreSpine (C, Paid directly to institution/employer), OREF (C, Paid directly to institution/employer), CoreSpine (C, Paid directly to institution/employer), OREF (C, Paid directly to institution/employer).

Ledonio, Charles Gerald T.: Research Support (Investigator Salary): Medtronic (C, Paid directly to institution/employer), DOD (C, Paid directly to institution/employer), OREF (C, Paid directly to institution/employer), Chest Wall and Spine Deformity Foundation (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): SRS Research Grant (D, Paid directly to institution/employer).

Lee, Michael J.: Consulting: Stryker Spine (C); Speaking and/or Teaching Arrangements: AOSpine (B), St. Louis University (A); Fellowship Support: AOSpine (E).

Lee, Sang-Hun: Speaking and/or Teaching Arrangements: Medtronic (B); Scientific Advisory Board: CSRS AP (Fellowship/Prize Committee).

Lee, Yu-Po: Consulting: DePuy (D); Fellowship Support: Synthes (E, Paid directly to institution/employer).

Lehman, Ronald A.: Consulting: Medtronic (B); Speaking and/or Teaching Arrangements: Medtronic (D), DePuy (C), Stryker (C); Grants: Department of Defense (DoD) (I, Paid directly to institution/employer), Defense Medical Research Development Program (DMRDP) (H, Paid directly to institution/employer).

Lenke, Lawrence G.: Royalties: Medtronic (I), Quality Medical Publishing (B); Consulting: Medtronic (E), DePuy Synthes Spine (C), K2M (C); Speaking and/or Teaching Arrangements: DePuy Synthes Spine (C), K2M (C); Trips/travel: BroadWater (B), Scoliosis Research Society (C), Seattle Science Foundation (B), Stryker Spine (B), Medtronic (B), AO Spine (B); Endowments: Gildan Endowed Professorship (F, Paid directly to Institution/employer); Research Support (Staff and/or Materials): Fox Family Foundation (G, Paid directly to institution/employer), AO Spine/SRS (B, Paid directly to institution/employer); Grants: Axial-Biotech (Amount not disclosed, Paid directly to institution/employer), Fellowship Support: AO Spine North America (C, Paid directly to institution/employer), OREF (D, Paid directly to institution/employer).

Lerner, Jason H.: Other Office: DePuy Synthes Spine (Salary).

Lewis, Chad: Stock Ownership: Amedica (2500 shares); Other Office: Employment (Salary).

Li, Guoan: Royalties: Stryker/Mako (G, Paid directly to institution/employer); Research Support (Staff and/or Materials): K2M (E, Paid directly to institution/employer).

Lieberman, Isador H.: Royalties: Stryker (B), Axiomed Spine Corp (B); Stock Ownership: Merlot Orthopedix (32%), Mazor Surgical (<1%); Private Investments: Bionik Laboratories (<1%); Consulting: Mazor Surgical (C), Globus Spine (B), Speaking and/or Teaching Arrangements: J&J Synthes (B); Board of Directors: Merlot Orthopedix (Stock ownership disclosed).

Lin, Sheldon: Private Investments: CreOss (28%); Consulting: BMTI of Wright (Amount not disclosed); Speaking and/or Teaching Arrangements: BMTI of Wright (Amount not disclosed); Board of Directors: CreOss (Stock ownership disclosed), Scientific Advisory Board: DJ Ortho (C), BMTI of Wright (C), TissueGene (C); Other Office: Foot Ankle International (Associate Editor).

Line, Breton: Consulting: International Spine Study Group Foundation (C); Trips/travel: International Spine Study Group Foundation (B).

Linner, Baron S.: Royalties: DePuy Synthes (F); Stock Ownership: Spine Search (5 shares), Paradigm Spine (9272 shares); Private Investments: Paradigm Spine (D); Consulting: DePuy Synthes (D); Speaking and/or Teaching Arrangements: DePuy Synthes (C), K2M (C); Board of Directors: Spine Search (None), Scientific Advisory Board: DePuy Synthes (None); Other Office: SRS Spine Deformity Journal (Editorial Board); Grants: DePuy Synthes (D), AO Spine (D), John and Marcella Fox Fund (B), OREF (C).

Loret, Jean-Edouard: Consulting: Spineart (B); Trips/travel: DePuy Synthes (A), Medirea (B).

Lotz, Jeffrey C.: Royalties: University of California (B); Stock Ownership: ISTO Technologies (5000 shares), Reinvigorate Med Systems (19%), Nocimed (15%), Simplicia (18750 shares), Alvea Medical (133333 shares), SMC Biotech (30000 shares); Private Investments: Nocimed (100000 shares); Consulting: Applied Biomechanics (Amount not disclosed); Scientific Advisory Board: Reliant (None), SMC Biotech (Stock ownership disclosed), Grants: Orthofix (E, Paid directly to institution/employer).

Lorrie, Jon D.: Stock Ownership: NewVert (<1%); Consulting: Foundation for Informed Medical Decision Making (None), FioMed (C), NewVert (None), Baxano (None).

Mac Millan, Michael: Stock Ownership: Xcentric Technologies (Amount not disclosed), Consulting: Exactech (B), Spineology (B).

Mac-Thiong, Jean-Marc: Royalties: MMDS Medical Inc. (A, Paid directly to institution/employer); Stock Ownership: SpinoLogic (30%); Private Investments: SpinoLogic (30%); Consulting: Medtronic (D, Paid directly to institution/employer), Speaking and/or Teaching Arrangements: Medtronic (D, Paid directly to institution/employer).
Arrangements: Spinologics (Stock ownership disclosed); Trips/travel: Spinologics (Stock ownership disclosed); Board of Directors: Spinologics (Stock ownership disclosed); Scientific Advisory Board: Spinologics (Stock ownership disclosed); Other Office: Spinologics (Stock ownership disclosed); Endowments: Medtronic (G, Paid directly to institution/employer); Grants: DePuy Spine (C, Paid directly to institution/employer); Fellowship Support: Medtronic Canada (D, Paid directly to institution/employer).

Madom, Ian A.: Speaking and/or Teaching Arrangements: Stryker Spine (D); Research Support (Staff and/or Materials): DePuy Spine (D), Stryker Spine (D).

Maislin, Greg: Consulting: Paradigm Spine (F, Paid directly to institution/employer).

Manos, Richard E.: Consulting: Integra/Theken (B); Speaking and/or Teaching Arrangements: Medtronic (B), Stryker (B).

Manson, Neil A.: Speaking and/or Teaching Arrangements: Medtronic (B); Scientific Advisory Board: Medtronic (B), Halifax Biomedical (B); Research Support (Staff and/or Materials): Medtronic (E).

Marco, Rex A.: Speaking and/or Teaching Arrangements: Depuy Synthes (E), Globus Medical (B); Scientific Advisory Board: Aesclap (B); Fellowship Support: Globus (D, Paid directly to institution/employer), Biomet Spine (C, Paid directly to institution/employer).

Mardjetko, Steven M.: Stock Ownership: Spinecraft Corporation (10%), Mechanica (<1%), Axial Biotech (<1%); Consulting: Medtronic (Travel expenses); Board of Directors: Spinecraft (B); Scientific Advisory Board: Spinecraft (B).

Massicotte, Eric M.: Consulting: Global View Point (Amount not disclosed, Paid directly to institution/employer), Speaking and/or Teaching Arrangements: AO Spine North America (Travel expenses); Scientific Advisory Board: Canadian Neuroscience Federation society (Scientific Committee); Grants: Medtronic (B, Paid directly to institution/employer), Depuy (B, Paid directly to institution/employer).

Matson, David: Trips/travel: Clinical and Translational Science Institute, University of Minnesota (B); Research Support (Investigator Salary): Clinical and Translational Science Institute, University of Minnesota (B).

Mayer, E. Kano A.: Speaking and/or Teaching Arrangements: North American Spine Society (Travel expenses); Trips/Travel: North American Spine Society (B); Research Support - Staff and/or Materials: SI-Bone (B, Paid directly to institution/employer).

Mazanc, Daniel J.: Consulting: First Consult (A); Trips/Travel: North American Spine Society (Travel expenses).

Mazel, Christian: Stock Ownership: Amplitude (<1%); Consulting: Zimmer (B); Speaking and/or Teaching Arrangements: Medtronic (B); Trips/Travel: Depuy Spine (B); Scientific Advisory Board: Clariance (B).

McAfee, Paul C.: Royalties: Globus Medical (F), Stock Ownership: Breakaway Imaging- Medtronic (50%); Private Investments: Globus Medical (1000000 shares), Cervitech (5%); Consulting: Abbott Pharmaceutical (F); Speaking and/or Teaching Arrangements: Pioneer Surgical (F); Trips/travel: Depuy Spine (G); Board of Directors: Disc Motion Technology (F); Scientific Advisory Board: SpineMedica (D); Other Office: Bonovo (F); Endowments: Implant (E); Fellowship Support: Globus Medical (E); Other: Various companies (Amounts not disclosed); Relationships Outside the One Year Requirement: Globus Medical (G), Medtronic (G), Cervitech (G), Abbott Pharmaceutical (G), Pioneer Surgical (G), Depuy Spine (G), Bonovo (G).

McConnell, Jeffrey R.: Royalties: Globus Medical (C); Stock Ownership: Globus Medical (450000 shares), Vertical Spine (100 shares); Consulting: Globus Medical (D), Vertical Spine (A), LDR (B); Speaking and/or Teaching Arrangements: Globus Medical (B); Trips/travel: Globus Medical, Inc. (A).

McGirt, Matthew J.: Consulting: Depuy (A), Stryker (A), Biomet (A).

McGuire, Kevin J.: Consulting: Orthopedic Data Solutions (B); Research Support (Investigator Salary): High Value Health Care Collaborative (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): High Value Healthcare Collaborative (E, Paid directly to institution/employer); Grants: High Value Healthcare Collaborative (E, Paid directly to institution/employer).

Mesfin, Addisu: Grants: OREF (D, Paid directly to institution/employer); Fellowship Support: AO Spine (E, Paid directly to institution/employer).

Mikhal, Mark M.: Royalties: Oxford University Press (A); Consulting: Biomet (D), Depuy/Synthes (B).

Millhouse, Paul W.: Stock Ownership: Globus Medical (7500 shares); Consulting: Pacira (B).

Mitchell, William: Private Investments: South Jersey CyberKnife (<1%); Speaking and/or Teaching Arrangements: North American Spine Society (B); Trips/Travel: North American Spine Society (B); Board of Directors: North American Spine Society (Section Development Chair).

Mizutani, Jun: Consulting: Medtronic (A, Paid directly to institution/employer), Depuy (A, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Medtronic (None).

Moskovich, Ronald: Royalties: Exactech (C).

Moss, Isaac: Consulting: Spineart (B); Speaking and/or Teaching Arrangements: NuVasive (B); Trips/Travel: NuVasive (B).

Mroz, Thomas E.: Stock Ownership: PearDiver (10000 shares); Consulting: CeramTec (None); Speaking and/or Teaching Arrangements: AO Spine (B); Board of Directors: AOSpine North America (Board member); Fellowship Support: AO Spine (E, Paid directly to institution/employer).


Mullinix, Kenneth: Research Support (Investigator Salary): Globus Medical (E, Paid directly to institution/employer).

Mundis, Gregory M.: Royalties: NuVasive (E, Paid directly to institution/employer), K2M (A, Paid directly to institution/employer); Consulting: NuVasive (C), K2M (B, Paid directly to institution/employer), Medicrea (A, Paid directly to institution/employer), Misonix (A, Paid directly to institution/employer), Speaking and/or Teaching Arrangements: NuVasive (B); Trips/travel: NuVasive (A, Paid directly to institution/employer); Other Office: Society of Lateral Access Surgery (None); Research Support (Staff and/or Materials): NuVasive (E, Paid directly to institution/employer); Fellowship Support: NuVasive (E, Paid directly to institution/employer).

Murgatroyd, Ashley A.: Research Support (Investigator Salary): Globus Medical (E, Paid directly to institution/employer).

Murphy, Donald R.: Stock Ownership: Primary Spine Provider Network (20%), Spine Care Partners (20%); Speaking and/or Teaching Arrangements: Rhode Island Spine Center (B); Trips/travel: New York Chiropractic College (A); Scientific Advisory Board: MedRisk (B).

Musacchio, Michael J.: Consulting: Paradigm Spine (A); Speaking and/or Teaching Arrangements: CoAlign Innovations (A), Paradigm Spine (B), RTI/Pioneer (B); Trips/travel: Paradigm Spine (D), Mexican Congress of Neurological Surgeons (B), Baxano (B), Medtronic Spinal and Biologics (A), RTI/Pioneer (A).

Nam, Su-Youn: Stock Ownership: Yuhan Corporation (1000 shares); Board of Directors: Yuhan Corporation (Salary); Scientific Advisory Board: Yuhan Corporation (Chief Scientific Officer), Other Office: Yuhan Corporation (Salary).

Nassr, Ahmad N.: Speaking and/or Teaching Arrangements: Magnifi Group (Travel expenses); Fellowship Support: AO Spine NA (E, Paid directly to institution/employer).

Neuman, Brian J.: Grants: Depuy Synthes (C, Paid directly to institution/employer).

Nian, Hui: Consulting: Medtronic (D, Paid directly to institution/employer).

Nicholson, Andrew: Grants: Bracco Diagnostics / RSNA (C, Paid directly to institution/employer).
Noordeen, Hilali: Private Investments: Spinal Surgical Associates (80%); Consulting: K2M (E), Stryker (E), Baxter (E), Kspine (E), Ellipse Technologies (E); Speaking and/or Teaching Arrangements: K2M (D), Stryker (D), Kspine (D), Ellipse (D); Trips/travel: K2M (C), Stryker (C), Ellipse (C); Scientific Advisory Board: K2M (C); Research Support (Staff and/or Materials): K2M (C); Paid directly to institution/employer: ELLIPSE (C, Paid directly to institution/employer); Grants: K2M (C, Paid directly to institution/employer: Ellipse (C, Paid directly to institution/employer).

Noriega, David C.: Consulting: SpineHeart (C, Paid directly to institution/employer); Vexim (C, Paid directly to institution/employer).

Nottmeier, Eric W.: Royalties: Globus (C, Paid directly to institution/employer); Consulting: Medtronic Navigation (B), Globus (B); Speaking and/or Teaching Arrangements: DePuy/Synthes (B); Scientific Advisory Board: K2M (B); Relationships Outside the One-Year Requirement: Brainlab (Dissolved 1/2009, Consulting, B), Medtronic Navigation (Dissolved 5/2011, Consulting, B).

Nunley, Pierce D.: Royalties: Osprey Biomedical (B), LDR Spine (D), K2M (B); Stock Ownership: Amedica (<1%), SafeWire (<1%), Paradigm Spine (<1%), Spinology (<1%), and/or Materials): Stryker (None); Other Office: ISIS (Socioeconomic Council Vice-chair), AAPMR (NC CAZ representative).

O’Brien, Michael F.: Royalties: DePuy Spine (G); Consulting: DePuy Spine (D), Trips/travel: DePuy Spine (B), Research Support (Staff and/or Materials): NuVasive (F, Paid directly to institution/employer), Seeger (F, Paid directly to institution/employer), DJO (G, Paid directly to institution/employer), DePuy Spine (F, Paid directly to institution/employer), K2M (C, Paid directly to institution/employer).

Ohmmeiss, Donna D.: Other: Texas Back Institute Research Foundation (Salary).

Okonkwo, David O.: Royalties: Biomet (F, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: AO (B).

Omeis, Ibrahim: Consulting: Stryker (None); Speaking and/or Teaching Arrangements: Stryker (None).

Omdorff, Douglas G.: Consulting: Integra (D, Paid directly to institution/employer), NuVasive (D), Stryker (D, Paid directly to institution/employer); Research Support (Staff and/or Materials): Vertiflex (B), Globus Medical (B), Integra (B), NuVasive (B).

Osouian, Rod J.: Royalties: Globus (C); Fellowship Support: NuVasive (E, Paid directly to institution/employer).

Owens, R. Kirk: Speaking and/or Teaching Arrangements: Alphatec Spine (A).

Palumbo, Mark A.: Consulting: Stryker (C); Speaking and/or Teaching Arrangements: Globus Medical (None); Trips/travel: Stryker Spine (A); Fellowship Support: Globus Medical (E, Paid directly to institution/employer).

Panchal, Ripul R.: Consulting: Precision Spine (A), Globus (B), Medtronic (A), Biomet (B), Mizuho Orthopaedic Systems (B); Board of Directors: California Association of Neurological Surgeons (None); Other Office: North American Spine Society (Patient Safety Committee, CME Committee); Research Support (Investigator Salary): Baxter (B); Research Support (Staff and/or Materials): Globus Medical (E, Paid directly to institution/employer).

Parent, Stefan: Stock Ownership: Spinologics (4500 shares); Private Investments: Spinologics (30%); Consulting: Medtronic (B); Speaking and/or Teaching Arrangements: DePuy Spine (B); Trips/travel: Medtronic (B), EOS Imaging (A); Board of Directors: Scoliosis Research Society (A); Endowments: DePuy Spine (Endowed Chair); Research Support (Staff and/or Materials): DePuy Spine (C, Paid directly to institution/employer); Fellowship Support: DePuy Spine (D, Paid directly to institution/employer); Medtronic (D, Paid directly to institution/employer).

Park, Paul: Royalties: Globus Medical (B); Consulting: Globus Medical (B), Medtronic (C), Biomet (C); Speaking and/or Teaching Arrangements: Globus Medical (C); Scientific Advisory Board: Neuralstem (A); Research Support (Investigator Salary): Blue Cross Blue Shield Foundation (A, Paid directly to institution/employer); Grants: Blue Cross Blue Shield (E, Paid directly to institution/employer).

Patel, Alpesh A.: Royalties: Amedica (B); Stock Ownership: Amedica (<1%), Cytorion (<1%), Nocimed (<1%), Vital5 (<1%); Consulting: Amedica (B), Stryker (None), Biomet (B), DePuy (B); Board of Directors: Cervical Spine Research Society (None); Fellowship Support: OREF (D), Omega (B); Other: Amedica (<1%).

Patel, Chetan K.: Royalties: Globus (B); Stock Ownership: KB Medical (<1%); Consulting: Stryker (C), Trips/Travel: North American Spine Society (A); Scientific Advisory Board: Medtronic Navigation (B).

Patil, Vikas V.: Royalties: Aesculap (B, Paid directly to institution/employer), Biomet (B, Paid directly to institution/employer), Springer (A); Private Investments: Cerapedics (<1%); Consulting: Aesculap (B), Stryker (B), Biomet (B) (Paid directly to institution/employer), Baxter Healthcare (B); Speaking and/or Teaching Arrangements: Baxter Healthcare (B); Scientific Advisory Board: Aesculap (B, Paid directly to institution/employer), AlloSource (B, Paid directly to institution/employer); Research Support - Staff and/or Materials: Synthes (D, Paid directly to institution/employer); Grants: Synthes (B, Paid directly to institution/employer), Medtronic (C, Paid directly to institution/employer); Fellowship Support: OmeGA (B, Paid directly to institution/employer).

Patt, Joshua: Speaking and/or Teaching Arrangements: Synthes, DePuy (B).

Pearce, Solomon M.: Trips/Travel: Boston Scientific (A), St. Jude (B), Medtronic (B).

Pekmezci, Murat: Research Support (Staff and/or Materials): Medtronic (Travel expenses).

Philips, Frank M.: Royalties: NuVasive (F), Stryker (F), DePuy Spine (C); Stock Ownership: NuVasive (<1%), Theracell (5%), Vital 5 (<1%), Spinal Kinetics (<1%), Face Solutions (<1%), Si Bone (<1%), Bonova (2%), Pearl Diver (<1%); Consulting: NuVasive (B), ELLIPSE (<1%); Board of Directors: Vital 5 (Stock ownership disclosed), Theracell (Stock ownership disclosed).

Pimenta, Luiz H.: Royalties: NuVasive (G); Consulting: NuVasive (Amount not disclosed), Zyga Tech (Amount not disclosed), MDT (None); Board of Directors: ISASS (None); Scientific Advisory Board: LASAS (Scientific Reviewer).

Placide, Rick J.: Trips/Travel: Globus Spine (A); Research Support - Staff and/or Materials: Globus Spine (A).

Pointillart, Vincent: Device or Biologic Distributorship (Physician-Owned Distributorship); Alphatec (C); Consulting: Stryker (A); Trips/travel: Scient’s (Travel expenses).

Polly, David W.: Trips/travel: Scoliosis Research Society (B); Board of Directors: Scoliosis Research Society (None); Grants: Department of Defense (G, Paid directly to institution/employer), OREF (F, Paid directly to institution/employer), Pediatric Spine and Chest Wall Foundation (C, Paid directly to institution/employer), Minnesota Medical Foundation (E, Paid directly to institution/employer).

Potts, Eric: Royalties: Medtronic (F); Stock Ownership: L anz (None); Private Investments: Remedy Pharmaceuticals (Amount not disclosed); Consulting: LANX (None), Medtronic (B); Board of Directors: Goodman Campbell Brain and Spine (B).

Prasad, Srinivas K.: Consulting: Stryker Spine (D), Medtronic (B); Speaking and/or Teaching Arrangements: Stryker Spine (D), DePuy Synthes (B); Board of Directors: AKOS Health Systems (Board Member); Fellowship Support: AOSpine (E, Paid directly to institution/employer), NREF (E, Paid directly to institution/employer).

Prather, Heidi: Speaking and/or Teaching Arrangements: PM&R (Senior Editor for PM&R Journal); Trips/Travel: North American Spine Society (Travel expenses, Paid directly to institution/employer); Board of Directors: North American Spine Society (President).
DISCLOSURE INDEX

Protopsaltis, Themistocles S.: Consulting: Medigenea (B); Other: Zimmer Spine (Amount not disclosed, Paid directly to institution/employer).

Przybylski, Gregory J.: Private Investments: South Jersey CK Leasing (<1%); Speaking and/or Teaching Arrangements: North American Spine Society Coding Courses (B), Decision Health (B), Eli Research (B); Trips/Travel: Relative-value Update Committee of AMA (B); Other Office: Eli Research Advisory Editor (B), Board of Education, WHRHS (Member), Cigna Healthcare (Salary, Medical Director).

Puttlitz, Christian M.: Consulting: Medtronic (A); Grants: Medtronic (D, Paid directly to institution/employer).

Quraishi, Nasir A.: Consulting: Medtronic (Amount not disclosed); T rips/travel: Medtronic (T ravel expenses); Research Support (Staff and/or Materials): Medtronic (B, Paid directly to institution/employer); Fellowship Support: Alphatec (D, Paid directly to institution/employer).

Qureshi, Sheeraz A.: Royalties: Zimmer Spine (A); Consulting: Stryker Spine (B), Medtronic Spine (B), Orthofix (B); Speaking and/or Teaching Arrangements: Globus (B, Stryker (B), Medtronic (B); Board of Directors: MTF (B, Paid directly to institution/employer); Scientific Advisory Board: Orthofix (None), Zimmer (None); Other Office: CSRS (Program Committee), NASS (Value Committee), NASS (Evidence Based Guidelines Committee), CSRS (Survey Committee), AAOS (Evaluations Committee); Grants: CSRS (C, Paid directly to institution/employer); Fellowship Support: Global Medical (E, Paid directly to institution/employer).

Radcliff, Kris E.: Royalties: Globus Medical (B), Orthopedic Sciences (None), Altus Spine (None); Consulting: Globus Medical (None), Advance Medical (B), Medtronic Advanced Energy (D), DePuy Spine (B), LDR Spine (None); Board of Directors: Association for Collaborative Spinal Research (None); Scientific Advisory Board: 4 Web Medical (None); Grants: DePuy Synthes (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer), Paradigm Spine (B, Paid directly to institution/employer).

Rainville, James: Grants: Michael Wall Charitable Trust (D, Paid directly to institution/employer).

Rampersaud, Raja Y.: Consulting: Medtronic - Spine (D); Scientific Advisory Board: Surgical Navigation Technologies (B).

Rauschmann, Michael: Consulting: Biomet (Amount not disclosed), Aesculap (Amount not disclosed), DePuy Spine (Amount not disclosed), Spontech (Amount not disclosed), Paradigm Spine (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer), Aesculap (Amount not disclosed), DePuy Spine (Amount not disclosed), Spontech (Amount not disclosed), Paradigm Spine (Amount not disclosed), Medacta (Amount not disclosed); Speaking and/or Teaching Arrangements: Aesculap (Amount not disclosed), Paradigm Spine (Amount not disclosed), Medacta (Amount not disclosed); Trips/travel: Medtronic (Travel expenses), Aesculap (Travel expenses), DePuy Spine (Travel expenses), Spontech (Travel expenses), Paradigm Spine (Travel expenses), Medacta (Travel expenses); Scientific Advisory Board: Aesculap (B, Aesculap (A), DePuy Spine (A), Paradigm Spine (A), Medacta (A); Research Support (Investigator Salary): Paradigm Spine (A, Paid directly to institution/employer); Research Support (Staff and/or Materials): Paradigm Spine (None).

Reah, Christopher J.: Stock Ownership: Nuvasive (1500 shares); Other Office: Nuvasive (Salary).

Reitman, Charles A.: Trips/Travel: North American Spine Society (Travel expenses); Scientific Advisory Board: Clinical Orthopedics and Related Research - Deputy Editor (B, Deputy Editor, Paid directly to institution/employer); Board of Directors: North American Spine Society (Research Council Director).

Resnick, Daniel K.: Board of Directors: North American Spine Society (Secretary), CNS (Past President).

Reynolds, Jeremy J.: Consulting: Globus (B, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: AOSpine (B); Trips/travel: NuVasive (B); Fellowship Support: DePuy Synthes (D, Paid directly to institution/employer).

Rhines, Laurence D.: Speaking and/or Teaching Arrangements: Stryker (Amount not disclosed), Globus (Amount not disclosed).

Richardson, William J.: Consulting: DePuy Synthes (A); Speaking and/or Teaching Arrangements: DePuy Spine (A, Paid directly to institution/employer), Spine Wave (Scientific Advisory Board, A, Paid directly to institution/employer), Brainlab (B, Paid directly to institution/employer); Scientific Advisory Board: Spine Wave (Speaking and/or Teaching Arrangements disclosed), Orthofix (B, Paid directly to institution/employer).

Riew, K. Daniel: Royalties: Biomet (F), Osprey (A), Medtronic Sofamor Danek (G), Medyssey (None); Stock Ownership: Osprey (1%); Expanding Orthopedics (<1%), Spineology (<1%), Spinal Kinetics (<1%), Neogen Spine (<1%), Amedica (<1%), Vertiflex (<1%), Benvenue (<1%), Paradigm Spine (<1%), PSD (<1%), Medyssey (<1%); Trips/travel: BroadWater (Travel expenses), Selby Spine (Travel expenses), Scoliosis Research Society (Travel expenses), North American Spine Society (Travel expenses), DePuy Synthes (Travel expenses); Board of Directors: Cervical Spine Research Society (None), AO Spine (D, Spine Journal (None); Research Support (Staff and/or Materials): AO Spine (B, Paid directly to institution/employer), Spinal Dynamics/Medtronic (C, Paid directly to institution/employer), Cerapedics (A, Paid directly to institution/employer); Fellowship Support: AO Spine (E, Paid directly to institution/employer); Other: Various entities (Expert witness, E).

Rihn, Jeffrey A.: Consulting: Pfizer (B).

Riley, Lee H.: Stock Ownership: Spinal kinetics (1000 shares); Speaking and/or Teaching Arrangements: AOSNA (B); Trips/travel: DePuy Spine (B); Board of Directors: LifeNet Health (C); Other Office: CSRS (A); Grants: DePuy Spine (E, Paid directly to institution/employer).

Rittenberg, Joshua D.: Speaking and/or Teaching Arrangements: Spine (None); Board of Directors: Spine Intervention Society (A, Paid directly to institution/employer), Spine Intervention Society (B); Board of Directors: Spine Intervention Society (Trips/Travel disclosed).

Roder, Christoph P.: Consulting: Paradigm Spine (B, Paid directly to institution/employer).

Rose, Peter: Trips/travel: K2M (Travel expenses); Board of Directors: Collaborative Spine Research Foundation (None).

Rothman, David: Board of Directors: North American Spine Society (Ethicist); Other Office: Hagens Berman (Expert witness), Farrise (Expert witness); Relationships Outside the One-Year Requirement: State of Texas/Sheller (E, Expert witness).

Roybal, Raphael R.: Consulting: K2M (B), Titan Spine (B), Orthofix (B); Speaking and/or Teaching Arrangements: Orthofix (B), Centinel Spine (B); Relationships Outside the One-Year Requirement: NuVasive (B).


Saiz, Paul: Royalties: Zimmer (E); Consulting: Zimmer (A), Amedica (D); Speaking and/or Teaching Arrangements: Zimmer (A), Amedica (D); Trips/Travel: Zimmer (A), Amedica (A); Board of Directors: Las Cruces Surgical Center (ASC Board).

Sama, Andrew A.: Royalties: Ortho Development Corporation (E), DePuy (C), Stock Ownership: Paradigm Spine (37500 shares), Sentio (12000 shares); Consulting: Ortho Development (None), Clarience (B), Medtronic (None), DePuy (B); Speaking and/or Teaching Arrangements: DePuy Spine (D); Scientific Advisory Board: Clarience (B); Research Support (Staff and/or Materials): Spinal Kinetics (C, Paid directly to institution/employer), MiMedx (B, Paid directly to institution/employer), Aesculap (Amount not disclosed, Paid directly to institution/employer); Fellowship Support: AO Spine (E, Paid directly to institution/employer).

Sanli, Tunay: Research Support (Staff and/or Materials): DePuy Synthes (D, Paid directly to institution/employer).

Sarwahi, Vishal: Consulting: DePuy Spine (None), Precision Spine (None), Medtronic (B, Paid directly to institution/employer).
Sasso, Rick: Royalties: Medtronic (I); Stock Ownership: Biomet (200000 shares); Grants: Medtronic (B, Paid directly to institution/employer).

Savage, Jason W.: Consulting: Stryker Spine (B).

Schaeren, Stefan: Scientific Advisory Board: European Spine Journal (Assistant Editorial Board); Other Office: AOSpine Swiss Council (None).

Schense, Jason: Stock Ownership: Kuros Biosurgery AG (4%); Other Office: Kuros Biosurgery AG (Salary); Research Support (Investigator Salary); Kuros Biosurgery AG (B); Research Support (Staff and/or Materials); Kuros Biosurgery (D).

Schmidt, John A.: Stock Ownership: K2M (<1%); Trips/travel: K2M (Travel expenses); Other Office: K2M (Salary).

Schneider, Michael J.: Royalties: O.P.T.P. (A); Consulting: NCMIC (B); Katten Muchin Rosenman (B), Goldberg, Miller & Rubin (B); Speaking and/or Teaching Arrangements: NCMIC (B); Trips/travel: NCMIC (B), Esaki Services (B); Research Support (Investigator Salary); NIH/NCCAM (D, Paid directly to institution/employer), PCORI (D, Paid directly to institution/employer); Research Support (Staff and/or Materials); NIH/NCCAM (E, Paid directly to institution/employer), PCORI (E, Paid directly to institution/employer); Grants: NIH/NCCAM (F, Paid directly to institution/employer), PCORI (F, Paid directly to institution/employer).

Schneider, Philip L.: Royalties: Biomet (D); Consulting: Biomet (B); Speaking and/or Teaching Arrangements: Medtronic (None).

Schoenfeld, Andrew J.: Scientific Advisory Board: The Spine Journal (None); Research Support (Staff and/or Materials); Robert Wood Johnson Foundation (C, Paid directly to institution/employer), Grants: Robert Wood Johnson Foundation Clinical Scholars Program (E, Paid directly to institution/employer), Other: American Academy of Orthopaedic Surgeons (Adult Spine Evaluation Committee).

Schofferman, Jerome: Board of Directors: North American Spine Society (Committee on Ethics & Professionalism Chair).

Schoeder, Gregory D.: Trips/travel: Medtronic (Travel expenses, Paid directly to institution/employer).

Schwab, Frank J.: Royalties: MSD (D); Stock Ownership: Nemaris (37 shares); Consulting: MSD (B), K2M (D), Medicrea (E), Biomet (B); Speaking and/or Teaching Arrangements: MDS (B); Trips/travel: MSD (B), K2M (B), Medicrea (C), NuVasive (B), Biomet (B); Board of Directors: Nemaris (Stock ownership disclosed); Other Office: President (Stock options).

Schwab, Joseph H.: Speaking and/or Teaching Arrangements: DePuy Synthes (A).

Sciubba, Daniel M.: Consulting: Medtronic (C, Paid directly to institution/employer), Speaking and/or Teaching Arrangements: DePuy Synthes (C, Paid directly to institution/employer), Stryker (B, Paid directly to institution/employer).

Scully, Thomas B.: Royalties: Lifespine (B); Stock Ownership: Lifespine (<1%); Private Investments: Langford (3%); Consulting: BrainLAB (A); Speaking and/or Teaching Arrangements: AANS (A); Board of Directors: Langford (Private investments disclosed).

Sears, William R.: Royalties: Medtronic (F); Stock Ownership: Paradigm Spine (<1%); Consulting: Medtronic (C), Paradigm Spine (B); Trips/travel: Paradigm (C).

Sengupta, Dilip K.: Royalties: Globus Medical (D); Stock Ownership: Globus Medical (<1%); Private Investments: International Spine and Orthopaedic Institute (<1%, Limited Partner); Consulting: Globus Medical (None); Scientific Advisory Board: Globus Medical (None); Research Support - Staff and/or Materials: Globus Medical PA (A, Paid directly to institution/employer), Fellowship Support: Globus Medical (A, Paid directly to institution/employer), Other: Globus Medical PA (Amount not disclosed, Paid directly to institution/employer).

Sethi, Rajiv K.: Speaking and/or Teaching Arrangements: NuVasive (B, Paid directly to institution/employer), Trips/travel: Orthofix (B).

Shaffrey, Christopher I.: Royalties: Medtronic (F), NuVasive (F), Biomet (F); Stock Ownership: NuVasive (5000 shares); Consulting: Biomet (B), NuVasive (C); Speaking and/or Teaching Arrangements: NuVasive (B), Trips/travel: Medtronic (B); Board of Directors: American Board of Neurological Surgery (None), Endowments: John A Jane Professor (E, Paid directly to institution/employer), Research Support (Investigator Salary); NIH (B, Paid directly to institution/employer), Grants: Department of Defense (F, Paid directly to institution/employer), Fellowship Support: AO (E, Paid directly to institution/employer), NREF (E, Paid directly to institution/employer).

Shaffrey, Mark E.: Speaking and/or Teaching Arrangements: Medtronic (B).

Shah, Suken A.: Royalties: DePuy Spine, Inc. (F); Stock Ownership: Globus Medical (<1%); Consulting: DePuy Spine (E); Speaking and/or Teaching Arrangements: DePuy Spine (B, Paid directly to institution/employer), Research Support (Staff and/or Materials); Setting Scoliosis Straight Foundation (E, Paid directly to institution/employer).

Shamji, Mohammed F.: Consulting: Medtronic (Amount not disclosed), Speaking and/or Teaching Arrangements: Medtronic (Travel expenses), Research Support (Staff and/or Materials); AO Spine NA (D, Paid directly to institution/employer), Grants: Canadian Pain Society (D, Paid directly to institution/employer).

Sharan, Alok D.: Other: Jaypee Brothers (A).

Sharan, Ashwin: Stock Ownership: ICP (20%); Private Investments: ICVRX (5%); Consulting: Medtronic (B); Scientific Advisory Board: St. Jude Medical (B), Grants: St Jude Medical (B).

Shen, Francis H.: Royalties: Elsevier Publishing (B), Globus Medical (C); Consulting: DePuy Synthes Spine (B), Board of Directors: Musculoskeletal Transplant Foundation (B, Paid directly to institution/employer), Other Office: European Spine Journal (Editorial Staff), Spine (Editorial Staff), The Spine Journal (Editorial Staff).

Shimer, Adam L.: Consulting: Medtronic (B), NuVasive (B); Speaking and/or Teaching Arrangements: Biomet (B).

Shonnard, Neil H.: Royalties: Globus Medical (B).

Siemionow, Krzysztof B.: Royalties: Amedica (A); Stock Ownership: Teraphysics (<1%), Providence Medical Technologies (<1%), Verteks Medical Corporation (45%); Consulting: DePuy (B); Speaking and/or Teaching Arrangements: DePuy (B), Globus (B); Trips/travel: Providence Medical Technologies (A); Board of Directors: Verteks Medical (None); Scientific Advisory Board: Providence Medical Technologies (None); Research Support (Investigator Salary); DePuy (D, Paid directly to institution/employer).

Simpson, Kathy J.: Research Support (Staff and/or Materials); Scoliosis Research Society (B, Paid directly to institution/employer); Grants: Arthrex (B, Paid directly to institution/employer), Relationships Outside the One Year Requirement: Scoliosis Research Society (B).

Singh, Kern: Royalties: Stryker (C), Jaypee Publishing (B), Thieme (C), Lippincott (C), Pioneer (B), Zimmer (B); Consulting: Stryker Spine (B), DePuy (B), Zimmer (C), Globus (C), Pioneer Surgical (B); Board of Directors: Vital 5 (Board member), Indo-American Spine Alliance (Board member), TruVue Surgical (Board member), Avaz Surgical (Board member); Other Office: J Contemporary Spine Surgery (Editor-in-Chief), Spine Surgery Today (Editorial Board), Journal of Orthopedics (Editorial Board).

Singh, Vaneet: Other Office: Medtronic (Salary).

Skipor, Anastasia K: Research Support (Investigator Salary): Medtronic (C, Paid directly to institution/employer).


Smith, Brian G.: Other: American Academy of Orthopaedic Surgeons (None).

Smith, Harvey E.: Consulting: Globus Spine (B), Pacira Pharmaceuticals (A); Other: DePuy Spine (Travel expenses), Relationships Outside the One-Year Requirement: Stryker Spine (A).

Smith, Jeremy S.: Royalties: Spineart (A); Consulting: NuVasive (B); Speaking and/or Teaching Arrangements: NuVasive (B), Fellowship Support: NuVasive (A).
<table>
<thead>
<tr>
<th>Name</th>
<th>Royalties/Stock Ownership</th>
<th>Consulting/Research Support</th>
<th>Speaking and/or Teaching Arrangements</th>
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<th>Fellowship Support</th>
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<tbody>
<tr>
<td>Smith, Justin S.</td>
<td>Biomet (C), Medtronic (None), DePuy (B), Cerapedics (B), Globus (B), Grants: DePuy Synthes (B, Paid directly to institution/employer); Fellowship Support: AO (E, Paid directly to institution/employer).</td>
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<td>Smith, Matthew J.</td>
<td>Inflexion (A, Paid directly to institution/employer).</td>
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<tr>
<td>Smith, Michael</td>
<td>Speaking and/or Teaching Arrangements: Globus Medical (B).</td>
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<tr>
<td>Smuck, Matthew</td>
<td>Stock Ownership: NuSpine (&lt;1%, Scientific Advisory Board), BlueJay Mobile Health (1%, Chief Advisor); Private Investments: Vivametrica / Sikoya (20%, Founding Partner); Consulting: State Farm (F), Kaiser Permanente (C), Trips/Travel: International Spine Intervention Society (B), North American Spine Society (B): Board of Directors: Vivametrica / Sikoya (None); Scientific Advisory Board: NuSpine (Stock options), BlueJay Mobile-Health (Stock options); Other Office: The Spine Journal (Deputy Editor), International Spine Intervention Society (Board of Directors), North American Spine Society (Advanced Lumbar Course Director, Annual Meeting Program Director); Relationships Outside the One-Year Requirement: Cytonics (F).</td>
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<td>Smucker, Joseph D.</td>
<td>Consulting: Theorem Clinical Research (None), Back Bay Life Science Advisors (A).</td>
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<td>Sowa, Gwendolyn A.</td>
<td>Royalties: UpToDate (A); Board of Directors: Association of Academic Physiatrists (Board of Trustees); Other Office: Association of Academic Physiatrists (Research Committee); Research Support (Investigator Salary): NIH, NIDRR, UPMC RI (E, Paid directly to institution/employer); Research Support (Staff and/or Materials): NIH/NIDRR, UPMC RI (F, Paid directly to institution/employer).</td>
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<td>Spiker, W. Ryan</td>
<td>Consulting: Amedica (A), Nexus (A); Fellowship Support: AO Spine / DePuy Synthes (E, Paid directly to institution/employer).</td>
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<td>Spivak, Jeffrey M.</td>
<td>Royalties: Titan Spine (E); Stock Ownership: Titan Spine (5%), Elex Corp. (&lt;1%), Paradigm Spine (157500 shares); Consulting: Titan Spine (B), DePuy Synthes Spine (B); Vertebron (B); Speaking and/or Teaching Arrangements: Synthes Spine (C); Scientific Advisory Board: Titan Spine (B).</td>
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<td>Steib, Jean-Paul</td>
<td>Royalties: Alphatec (C), LDR (D), Medtronic (B, Paid directly to institution/employer); Consulting: Alphatec (B), Clariance (C); Speaking and/or Teaching Arrangements: Stryker (B, Paid directly to institution/employer), Alphatec (B, Paid directly to institution/employer), LDR (Travel expenses), Alphatec (Travel expenses), Clariance (Travel expenses); Trips/travel: LDR (Travel expenses), Alphatec (Travel expenses), Clariance (Travel expenses); Scientific Advisory Board: Clariance (B); Endowments: Alphatec (B, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer); Fellowship Support: Alphatec (B, Paid directly to institution/employer).</td>
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<td>Steinmetz, Michael P.</td>
<td>Royalties: Biomet Spine (C); Consulting: Biomet Spine (A), Inteliroid (None), DePuy Synthes (C), Stryker Spine (B); Speaking and/or Teaching Arrangements: Synthes Spine (A); Board of Directors: Congress of Neurological Surgeons (Executive Committee Ex-Officio Member); Scientific Advisory Board: Inteliroid (B); Relationships Outside the One-Year Requirement: Stryker Spine (B).</td>
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<td>Stone, Jeffrey A.</td>
<td>Relationships Outside the One-Year Requirement: Benvenue Medical (Radiology Committee, Coding Committee).</td>
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<td>Stone, Marcus</td>
<td>Relationships Outside the One-Year Requirement: Medtronic (Amount not disclosed).</td>
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<tr>
<td>Stout, Alison A.</td>
<td>Speaking and/or Teaching Arrangements: ISIS (Speaker, Education Committee, Patient Safety Task Force), AAPMU (B), AAPMR (Speaker, Program Planning Committee); Board of Directors: McKenzie Institute USA (Assigned role).</td>
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<tr>
<td>Street, John</td>
<td>Research Support (Staff and/or Materials): Medtronic (B, Paid directly to institution/employer); Grants: Medtronic (E, Paid directly to institution/employer); Fellowship Support: Medtronic (D).</td>
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<td>Swartz, Karin R.</td>
<td>Speaking and/or Teaching Arrangements: AANS/CNS (A), North American Spine Society (A); Research Support - Staff and/or Materials: NIH (A, Paid directly to institution/employer), ASUBIO (A, Paid directly to institution/employer); Grants: NIH (A, Paid directly to institution/employer).</td>
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<td>Suh, Paul B.</td>
<td>Royalties: Biomet Spine (C); Consulting: Biomet Spine (B), Amedica (B); Speaking and/or Teaching Arrangements: Lilly (B); Trips/travel: Biomet Spine (B).</td>
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<td>Takeshita, Katsushi</td>
<td>Speaking and/or Teaching Arrangements: Pfizer (B, Paid directly to institution/employer), Johnson &amp; Johnson (B, Paid directly to institution/employer), Medtronic Sofamor Danek (B, Stryker (A, Paid directly to institution/employer).</td>
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<td>Talarico, Richard A.</td>
<td>Consulting: Stryker Spine (D); Research Support (Staff and/or Materials): DePuy Spine (C, Paid directly to institution/employer), VertiFlex (B, Paid directly to institution/employer).</td>
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<td>Tay, Bobby</td>
<td>Royalties: Stryker (B); Consulting: Stryker (A); Trips/travel: Stryker (A); Fellowship Support: NuVasive (D, Paid directly to institution/employer), Globus Medical (E, Paid directly to institution/employer).</td>
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<td>Techy, Fernando</td>
<td>Consulting: Amedic (A, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Amedic (A, Paid directly to institution/employer), DePuy Synthes (A, Paid directly to institution/employer), Grafton Medical Alliance (Amount not disclosed, Paid directly to institution/employer).</td>
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<td>Thakur, Nikhil A.</td>
<td>Consulting: Stryker Spine (B).</td>
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<td>Theologis, Alexander A.</td>
<td>Trips/travel: DePuy Synthes (B), Stryker Spine (A).</td>
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<td>Tribus, Clifford B.</td>
<td>Royalties: Stryker Spine (F), US Spine (A); Stock Ownership: US Spine (30000 Shares), ESM Technologies (100%); Private Investments: ESM Technologies (100%); Consulting: Stryker Spine (C), US Spine (B), Kyphon (B); Speaking and/or Teaching Arrangements: Stryker Spine (D); Trips/Travel: Stryker Spine (B), US Spine (B), Kyphon (A); Scientific Advisory Board: US Spine (B); Other Office: ESM Technologies LLC (Owner); Research Support - Staff and/or Materials: Medtronic (C).</td>
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<td>Truumees, Eeric</td>
<td>Royalties: Stryker Spine (C); Stock Ownership: Doctor’s Research Group (&lt;1%); Private Investments: IP Evolutions (33%); Board of Directors: North American Spine Society (Administration and Development Council Director); Other Office: AAOS Communications Cabinet (Incoming Editor-in-Chief of AAOS, Currently Communications Cabinet, travel expenses); Research Support (Investigator Salary): Relevant (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): Globus (B, Paid directly to institution/employer); Other: Stryker Biotech (None, Paid directly to institution/employer).</td>
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<td>Stock Ownership: NuVasive, Inc. (&lt;1%); Other Office: NuVasive (Salary).</td>
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Vaccaro, Alexander R.: Royalties: DePuy Spine (B), Elsevier Books (B), Alphatec (C), Jaypee Books (C), Taylor Francis (A), Globus (F), Medtronic (G), Aesculap (B), Stryker Spine (G); Stock Ownership: Gamma Spine (<1%), Innovative Surgical Design (<1%), ElectroCore (<1%), Rothman Institute and related holdings (3%), Cytonics (<1%), Location Based Intelligence (20%), Progressive Spinal Technology (<1%), Computational Biodynamics (<1%), Stout Medical (1%), Borovo Orthopaedics (<1%), Flagship Surgical (<1%), In Vivo (<1%), Small Bone Innovations (<1%), Cross Current (<1%), Paradigm Spine (<1%), Spineology (<1%), Replication Medical (<1%), Globus (<1%), Flow Pharma (None), Advanced Spinal Intellectual Properties (30%), Spine Medical (<1%), R.S.I. (<1%), Spine Care Partners (B); Consulting: Gerson Lehrman Group (None), ICON Clinical Research (B), Medtronic (C), Innovative Surgical Design (None), Stout Medical (None), Guidepoint Global (B), MediaCorp (None), Stryker Spine (A), Globus (B), DePuy Spine (B), Ellipse (B), Orthobullets (A); Board of Directors: AO Spine (Knowledge Forum Director), Association of Collaborative Spine Research (President Emeritus), Innovative Surgical Design (None), Spinecare (None), NASS (Past Program Committee Co-Chairman); Other: Employment: Rothman Institute (None), Honorarium for Lectures (None), Grants: NuVasive (None), Cerepedics (None).

Ventura, John M.: Consulting: Spine Care Partners (B); Trips/travel: National Quality Forum, Musculoskeletal Committee (Travel expenses); Board of Directors: United States Bone and Joint Initiative (Travel expenses); Other Office: Technical Expert Panel, CMS (A).

Villa, Thierry: Stock Ownership: LDR Spine (30000 shares); Consulting: LDR (F); Speaking and/or Teaching Arrangements: LDR (Consulting amount disclosed); Scientific Advisory Board: LDR (Consulting disclosed).

Villavicencio, Alan T.: Device or Biologic Distributorship (Physician-Owned Distributorship); Leading Edge Spinal Implants (A); Board of Directors: Justin Parker Neurological Institute; Other Office: Boulder Neurosurgical Associates (Managing Partner); Research Support - Investigator Salary: Profibrix (F, Paid directly to institution/employer), Medtronic (F, Paid directly to institution/employer).

Vives, Michael J.: Private Investments: Accelelaxis (<1%), CreOssio (8%), NOC2 (<1%); Speaking and/or Teaching Arrangements: Musculoskeletal Transplant Foundation (B, Paid directly to institution/employer); Other Office: AAOS (Instructional Course Committee), NASS (Spine Journal Advisory Editorial Board), J of Spinal Cord Medicine (Advisory Editorial Board), NASS (SpineLine Editorial Board); Relationships Outside the One Year Requirement: Zimmer (D).

Wang, Jeffrey C.: Royalties: Stryker (A), Osprey (B), Aesculap (B), Biomet (G), Amedica (D), SeaSpine (D), Synthes (C); Stock Ownership: FzioMed (<1%), Alphatec (<1%); Private Investments: Promethean Spine (<1%), Paradigm spine (<1%), Benvenue (<1%), Neogen (<1%), Pioneer (<1%), Amedica (<1%), VertiFlex (<1%); Speaking and/or Teaching Arrangements: Surgitech (<1%), Axiomed (<1%), VG Innovations (<1%), CoreSpine (<1%), Expanding Orthopaedics (<1%), Syndicom (<1%), Osprey (<1%), Amedica (<1%), Bone Biologics (<1%), Curative Biosciences (<1%), PearlDiver (<1%); Board of Directors: North American Spine Society (Treasurer), Cervical Spine Research Society (Travel expenses), AO Spine/AO Foundation (E), Collaborative Spine Research Foundation (None); Fellowship Support: AO Foundation (E, Paid directly to institution/employer).

Wang, Michael Y.: Royalties: DePuy Spine (E); Consulting: DePuy Spine (E), Aesculap (B); Speaking and/or Teaching Arrangements: DePuy Spine (D); Scientific Advisory Board: ISD (None); Grants: Department of Defense (Amount not disclosed, Paid directly to institution/employer).

Ward, Samuel R.: Research Support (Investigator Salary): National Institutes of Health (F, Paid directly to institution/employer); Research Support (Staff and/or Materials): National Institutes of Health (F, Paid directly to institution/employer); Grants: National Institutes of Health (F, Paid directly to institution/employer).

Watters, William C.: Royalties: Stryker (B); Board of Directors: North American Spine Society (Past President), World Spine Care, American College of Spine Surgeons; Other: The Spine Journal (Assistant Editor), Spine Arthroplasty Journal (Assistant Editor), Spine (Reviewer), Kirby Glenn Surgical Center (1/22nd minority interest ownership).

Wegener, Stephen: Research Support (Investigator Salary): NIH (D, Paid directly to institution/employer); Research Support (Staff and/or Materials): DOD (C, Paid directly to institution/employer); Grants: DOD (C, Paid directly to institution/employer).

Weiner, Bradley K.: Other: Magellan Health Services (A).

Wetzel, F. Todd: Stock Ownership: Relievant Medical (1%); Board of Directors: McKenzie Institute International (B), North American Spine Society (Second Vice President, Travel expenses).

Whang, Peter G.: Stock Ownership: Diffusion (Stock options); Consulting: Stryker Spine (C), SI-Bone (B), Pacira (C), Medtronic (E); Speaking and/or Teaching Arrangements: Stryker Spine (B); Scientific Advisory Board: Diffusion (Stock options); Other Office: Cerapedics (B), Relievant (E), AxioMed (C); Research Support - Staff and/or Materials: VertiFlex (A, Paid directly to institution/employer), SI-Bone (A, Paid directly to institution/employer), Spinal Kinetics (A).


White, Andrew P.: Consulting: DePuy (B); Speaking and/or Teaching Arrangements: Globus Medical (B); Scientific Advisory Board: Spine Wave (B).

Williams, Seth K.: Consulting: DePuy Synthes Spine (D).

Witham, Timothy F.: Consulting and/or Teaching Arrangements: AO Spine North America (B); Research Support (Staff and/or Materials): Eli Lilly and Company (C, Paid directly to institution/employer); Grants: The Gordon and Marilyn Macklin Foundation (G, Paid directly to institution/employer).

Wong, David A.: Royalties: Lippincott Williams and Wilkins (A); Stock Ownership: Denver Integrated Imaging North (1%), Huron Shores (50%); Consulting: Anulex (None), United Health Care (A); Speaking and/or Teaching Arrangements: Anulex (None); Trips/Travel: DePuy Synthes (None); Scientific Advisory Board: United Healthcare (A).

Wood, Kirkham B.: Stock Ownership: TranS1 (10000 shares); Consulting: DePuy Spine (B); Research Support (Staff and/or Materials): NIH (F, Paid directly to institution/employer); Grants: Scoliosis Research Society (C, Paid directly to institution/employer), Synthes (E, Paid directly to institution/employer), NIH (E, Paid directly to institution/employer), Medtronic (D); Fellowship Support: OREF (E), Globus (E), AO Spine; Synthes (E).

Yang, Chao: Other Office: Johnson & Johnson (Salary).

Yoon, S. Tim: Royalties: Stryker Spine (C, Paid directly to institution/employer), Meditech Advisors (C), Stock Ownership: Phygien (<1%), Alphatec (<1%); Private Investments: Meditech (<1%); Consulting: Meditech Advisors (B); Speaking and/or Teaching Arrangements: Stryker (Travel expenses); Trips/Travel: The Spine Journal (None); Other Office: The Spine Journal (None); Grants: AO Spine (B, Paid directly to institution/employer).

Youssef, Jim A.: Royalties: NuVasive (F), Osprey Medical (F), Amedica (F), Integra (F); Consulting: Stryker Spine (C, Paid directly to institution/employer), Meditech Advisors (C), Stock Ownership: Amedica (<1%), Providence Medical (<1%), Paradigm Spine (<1%), Promethean Surgical Devices (<1%); Spinal Ventures (<1%), VertiFlex (<3%), Spineology (<1%), ISD (<1%); Speaking and/or Teaching Arrangements: Stryker Spine (A); Consulting: Integra (A), NuVasive (A), Amedica (A), Alphatec (A), HealthTrust (A); Board of Directors: Durango Orthopedic Associates (None); Research Support (Staff and/or Materials): Globus Medical (C, Paid directly to institution/employer), NuVasive (C, Paid directly to institution/employer), VertiFlex (C, Paid directly to institution/employer), Integra (C, Paid directly to institution/employer).

Yu, Warren D.: Royalties: Spineart (C); Consulting: Integra Spine (B), Interventional Spine (C); Speaking and/or Teaching Arrangements: Globus (B); Scientific Advisory Board: SpineFrontier (None).
Zavatsky, Joseph M.: Royalties: Biomet (B); Stock Ownership: SafeWire (<1%); Consulting: DePuy Synthes Spine (E); Speaking and/or Teaching Arrangements: Biomet Spine (B), Amendia (B); Scientific Advisory Board: Amendia (Stock options).

Zebala, Lukas P.: Consulting: Ulrich Medical (B); Speaking and/or Teaching Arrangements: DePuy Spine (B), BroadWater (Amount not disclosed); Trips/travel: Medtronic (B); Fellowship Support: AO Spine / Omega (C, Paid directly to institution/employer).

Zhang, Yunpeng: Relationships Outside the One Year Requirement: Drum Tower Hospital, Nanjing, Jiangsu, China (Amount not disclosed).

Zigler, Jack E.: Royalties: Zimmer Spine (B); Stock Ownership: Expanding Orthopedics (<1%); Consulting: Synthes Spine (C), Aesculap (B); Speaking and/or Teaching Arrangements: Synthes Spine (C); Scientific Advisory Board: Safe Orthopedics (None); Research Support - Staff and/or Materials: Various (D, Paid directly to institution/employer); Fellowship Support: Medtronic (D).

The following participants have Nothing to Disclose:

Aaronson, Oran S.
Abouelrigal, Manal
Aboushaala, Khaled A.
Abtahi, Amir M.
Adams, Erin
Adogwa, Owoicho
Aebi, Max
Aghayev, Emin
Aguilar, Thomas
Ahn, Junho
Ahn, Junyoung
Ailon, Tamar
Ajiboye, Remi M.
Akoto, Harry
Ali Jishi, Ahmed
Aldinger, Paul
Aleksanderek, Izabela
Alentado, Vincent J.
Al-Habib, Amro
Alimi, Marjan
Alkalay, Ron N.
Allgeier, Michael
Al-Natour, Mohammed
Al-Omari, Ali
Altun, Idris
Alvin, Matthew D.
Ameil, Marc
Amitai, Amir
Amritanand, Rohit
Andersen, Mikkel
Anderson, Joshua T.
Anderson, Karen K.
Acharya, Chetan
Annis, Prokopis
Archer, Kristin
Armaghani, Sheyan J.
Aravindan, Justin
Asfour, Shihab
Ashana, Adedayo O.
Ashtekar, Amruta
Assietti, Roberto
Audley, Brittany
Ayala Garcia, Mikel
Ayamga, Jennifer
Ayan, Saankritya
Azevedo, Gustavo B.
Bala, Abiram
Barbe, Mary F.
Bari, Tanvir
Barron, Mark T.
Barry, Jeffrey J.
Bartels, Ronald
Bartynski, Walter S.
Basho, Rahul
Basques, Bryce
Baumblatt, Geri
Bazebashi, Mohammad
Behrend, Caleb J.
Belayneh, Rebekah
Belding, Jon
Bellary, Sharath S.
Ben-Galim, Peleg
Bennett, Elizabeth E.
Berg-Johansen, Britta

Bettegowda, Chetan
Beuschau, Inge
Bhatt, Surabhi
Bi, Ni
Bianco, Kristina
Bidos, Andrew
Bieszczad, Jacob
Bird, Mackenzie L.
Bjerke, Benjamin T.
Blanke, Kathy
Blizzard, Daniel J.
Bohl, Daniel D.
Bohm, Parker
Bolognesi, Michael
Bonassar, Lawrence
Boniello, Anthony J.
Bonsanto, M.M.
Borde, Brandon
Boriani, Stefano
Bratcher, Kelly R.
Briski, David C.
Brumagne, Simon
Bruns, Daniel
Buchl, Eric H.
Buckland, Aaron J.
Buckley, Jenni M.
Buehler, Mark
Bumpass, David B.
Burgmeier, Robert J.
Burgstaller, Jakob M.
Buser, Zorica
Buvanendran, Asokumar
Bydon, Mohammad
Byun, Hae Mi
Cai, Yiwei
Callanan, Tucker C.
Camisa, William
Campello, Marco A.
Cancienne, Jourdan M.
Carballido-Gamio, Julio
Carlson, Brandon B.
Cavanaugh, David A.
Cecchini, André
Cenic, Aleksa
Chadha, Manish
Chae, John
Challier, Vincent
Chan, Tin Yan
Chang, Ho-Guen
Chatterjee, Sandip
Chen, Chao
Chen, Xi
Cheng, David S.
Cherian, Jerry
Cherian, Thomas
Cheung, Jason P.
Cheung, Zoe
Chikuda, Hirotaka
Cho, Woonjin
Choi, Jun-Ik
Choi, Sung-Woo
Cholewicki, Jacek
Chotai, Silky
Christensen, Steen Bach
Chugh, Arunit J.
Chun, Danielle
Chung, Andrew S.
Nothing to Disclose (cont.)

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THANK YOU!

The North American Spine Society would like to express its sincere appreciation to the following companies for their support of the NASS 30th Annual Meeting.
The AVAflex® vertebral balloon is shown at T10. Image courtesy Allan Brook, MD.

FLEXIBILITY TARGETED

Deliver precision in a single incision. The AVAflex® vertebral balloon system allows targeted balloon placement across the midline of the vertebral body through a unipedicular, lateral approach, followed by targeted cement placement for an optimal fill. This cutting-edge technology extends the capabilities of the innovative AVAmx® Advanced Vertebral Augmentation system, providing the tools you need to maximize clinical value with a minimally invasive approach.

Visit booth 1318, call 800.323.9088 or go to carefusion.com/AVAflexNASS.
Aegis Spine, Inc.
www.aegisspine.com
Aegis Spine, Inc. was founded to bring about change and innovation to the medical industry. We endeavor to be the leading manufacturer in the medical devices market. Our first priority is to provide excellent service and support to our clients, who are regarded as family. The integral strategy of our company is to keep up with changes in the industry. Our staff is open to change, innovative ideas, and new technology.

Aesculap Implant Systems
www.aesculapiimplantsystems.com
Combining years of R&D along with modern technology, Aesculap Implant Systems offers a complete line of implant systems and instrumentation to Spine surgeons. Aesculap Implant Systems is committed to excellence in satisfying surgeon and patient needs through the delivery of innovative, cost-effective operative solutions.

AIS PainCare
www.aispaincare.com
AIS is a compounding pharmacy specializing in intrathecal pump medications. We offer several unique programs such as direct billing of patients’ insurance. In addition, we maintain USP 797 compliance and use an independent, third party FDA registered lab to perform testing on our products for potency, pyrogen, pH, and sterility.

Alevio
www.aleviospine.com
Alevio, headquartered in Birmingham, Alabama, designs, manufactures and markets innovative spinal solutions. Working closely with surgeons to put patients first and maximize clinical results, Alevio is dedicated to successful patient outcomes.

Allen Medical Systems
www.allenmedical.com
The Allen Medical Spine portfolio offers innovative solutions to help with all of your patient positioning challenges in spine surgery. The Allen® Advance Spine Table is a state of the art solution designed with improved safety features, a modern user interface, intuitive pendant controls, electronic floor locks, and many other convenience features; all at a favorable cost. The Allen® Advance Table offers a fully radiolucent patient positioning solution and improved 180° rotational function.

Adkisson Search Consultants
www.adkissonconsultants.com
Adkisson Search Consultants is a nationwide search firm with proven success in recruiting Executives, Physicians, Advanced Practitioners and Allied Health Professionals to group practices and healthcare systems. Adkisson Search Consultants works closely with ALL of our clients to help find the right candidate for their group. We have many years of experience and pride ourselves on our ability to successfully place candidates in the right cultural environment.
Alligator Spine LLC
www.alligator-medical.com

Alligator Spine has been established in Miami as a distributor for spinal implants and instruments. We bring German built high quality implants and instruments exclusively to the US and have a great need for established and experienced sales reps and distributors throughout the US to sell and build relationships with KOLs in their territories. In addition to our line of spine products, the Alligator orthopedic, trauma and sports medicine line will be presented under the name Alligator O+T.

AlloSource
www.allosource.org

Learn how AlloSource partners with healthcare leaders to help patients make a comeback. For more than 20 years, AlloSource has offered biologic products to help you treat patient’s unique needs – everything from advanced technologies to cost effective solutions. Our wide portfolio of innovative allografts includes advanced technologies such as AlloStem® Cellular Bone Allograft and amniotic membrane, as well as structural allografts and DBMs, all for spine procedures and orthopedics.

Alphatec Spine, Inc.
www.alphatecspine.com

Alphatec Spine, Inc., a wholly owned subsidiary of Alphatec Holdings, Inc., is a global medical device company that designs, develops, manufactures and markets spinal fusion technology products and solutions for the treatment of spinal disorders associated with disease and degeneration, congenital deformities and trauma. The Company’s mission is to improve lives by delivering advancements in spinal fusion technologies. Additional information can be found at www.alphatecspine.com.

Amedica
www.amedica.com

Amedica is the only company with the scientific know-how to produce medical grade Silicon Nitride - a patented platform technology for spinal applications. Silicon Nitride offers doctors and patients an alternative to PEEK and titanium that is osteopromotive, anti-infective and may result in faster fusion.

Amendia
www.amendia.com

Headquartered in Marietta, Georgia, Amendia is quickly becoming a recognized leading provider of innovative Class II and Class III medical devices used in spinal surgical procedures. As a specialty-device manufacturer, Amendia collaborates with surgeons to develop, manufacture, and market minimally invasive spine and orthopedic implants and instruments. Visit us at the NASS Surgical Showcase Thursday, November 13th OLLIF Demonstration 1:00 pm & 2:30 pm OLLIF Hands-on Cadaver Course 5:00 pm & 7:30 pm

American Board of Spine Surgery
www.americanboardofspinesurgery.com

The American Board of Spine Surgery was formed in 1997 by Orthopaedic Surgeons and Neurological Surgeons who viewed spine surgery as its own unique specialty. ABSS is an independent certification organization that supports Orthopaedic Surgeons and Neurological Surgeons whose practices are primarily in spine surgery. We uphold comprehensive educational requirements for certification, as well as providing written and oral examinations.

AOSpine International
www.aospine.org

AOSpine is an international community of spine surgeons generating, distributing, and exchanging knowledge to advance science and the spine care profession through research, education, and community development. With this collaborative approach AOSpine continues to advance spine care worldwide.

APS Materials, Inc.
www.apsbiomedical.com

APS Materials Inc. is currently an implant coating provider for 7 of the top 10 medical manufacturers in the world. Our process for Titanium and Hydroxyapatite (HA) coatings uses Thermal plasma spray to deposited molten droplets onto the surface of an implant. The Titanium process creates a rough and porous surface for bone onto/into growth which provides excellent bone/implant fixation. The HA process creates a bio-active surface which accelerates bone growth improving healing time.

Arcamed, LLC
www.arcamed.com

At Arcamed, we specialize in building surgical cases and trays for the spinal marketplace, and we believe each product should be as effective and ambitious as the instruments it holds. Fast and focused, our engineering, quality and operations team’s speed and agility mean our clients can meet their critical deadlines on time, every time. Ultimately, we know there’s a patient out there whose well-being depends on those tools arriving not a minute later than expected.

Arteriocyte Medical Systems, Inc.
www.arteriocyte.com

Arteriocyte Medical Systems is dedicated to helping patients heal faster. The Magellan® Autologous Platelet Separator System is designed to be used in a clinical laboratory or intraoperatively at the point-of-care for safe and rapid preparation of platelet-rich plasma (PRP) using whole blood alone, or mixed with bone marrow aspirate. Arteriocyte Medical Systems continues to invest in platelet separation technology and is focused on the development of new surgical applications of PRP.

Artisan Medical Displays
www.artisanmedicaldisplays.com

Building Customized Products, Models and Trainers as We Cultivate Relationships with Our Clients through Our Commitment to Integrity, Excellence and Dedication
Aspen Medical Products
www.aspenmp.com
Aspen Medical Products is a leader in the development of innovative spinal bracing for post-trauma stabilization, pre-and-post surgical stabilization, pain management and long-term patient care. Aspen Medical Products offers multiple orthotic options that provide unsurpassed motion restriction, superior comfort and an economic advantage, encouraging better patient compliance.

Association of Spine Surgeons of India (ASSI)
763
The aim of Association of Spine Surgeons of India (ASSI) is to promote scientific spine care, both surgical and non-surgical, in India through the medium of national, regional and local meetings, symposia, CMEs and workshops. ASSI is also involved in advocacy as well as social work and promotes research.

Aurora Spine
www.auroraspine.us
With the latest fusion technologies in mind, Aurora presents its Screwless Procedure product portfolio. Guided by the philosophy of minimally invasive surgeries, our products are designed to match the patient’s anatomy without the use of Pedicle Screws. From our ISP devices to Interbody cages, Biologics, and our Surgical Tools, Aurora is dedicated to bringing you products that will help the patient and improve their quality of life.

Autocam Medical
www.autocam-medical.com
Autocam Medical is a contract manufacturer of precision-machined surgical drill bits, drivers, screws, plates, cutting tools and other complex, highly engineered medical parts. We offer a value-added approach to high-precision manufacturing, with specialties in CNC milling, turning and cutter grinding. State-of-the-art equipment and design for manufacturing engineering add value to the entire manufacturing process. ISO13485:2003/ISO 9001:2008, FDA Registered, VISA (Brazil).

Avalign Technologies
www.avaligntech.com
Avalign Technologies is the premier, full-service supplier of implants, instruments, cutting tools, German Specialty Instruments and cases and trays for medical device OEM’s.

Bacterin
www.bacterin.com
Bacterin is a medical device company and accredited tissue bank that designs, processes, manufactures, and markets advanced medical products for spine applications. Using designs focused on efficacy and safety for the patient, and functionality and ease of use for the surgeon, our innovative products fulfill niche needs in the industry. Bacterin has revolutionized the handling characteristics of allograft bone while maintaining many of the benefits that are native functions of autograft bone.

Banyan Healthcare Products, Inc.
www.banyanhealthcare.com
To learn more about the Atlantic Custom Collar visit www.banyanhealthcare.com

Barrier Technologies
www.barriertechnologies.com
Barrier Technologies is a USA manufacturer of Radiation Protection products. Our products protect healthcare professionals who work in fluoroscopic environments from the harmful effects of scatter radiation & include our Leaded Eyewear, Protective Aprons, (Lead & Lead-Free) SecureTouch Sterile Radiation Protective Gloves, Scatter Reducing Pads & Drapes, Mobile Barriers, & X-ray Accessories. For more information please visit us in booth #1843 or at our web site www.barriertechnologies.com

Baxter Healthcare Corporation
141, 1723
www.baxter.com
Baxter is a global, diversified healthcare company with expertise in medical devices, pharmaceuticals, and biotechnology. The company continues its quest for advancing BioSurgery by offering a comprehensive line of products for hemostasis, sealing, staple line reinforcement, soft tissue repair, bone graft substitution and preparation/delivery devices based on the latest scientific advances in the field.

BBL Medical Facilities
www.bblinc.com/bbl-medical-facilities
BBL Medical Facilities specializes in planning, design, development and construction of medical facilities offering guaranteed cost at the earliest stage of development. BBL provides real estate, financing and property management services. BBL develops projects across the country offering guaranteed cost, occupancy date and high quality at the earliest development phase.

BD (Formerly CareFusion)
1318
www.carefusion.com
CareFusion offers the AVAmax® Advanced Vertebral Augmentation system, featuring the AVAmax 11 G vertebral balloon, which is the most minimally invasive kyphoplasty system available today (as of October 2012) because the 11 G balloon fits through a cannula 17% smaller than a 10 G balloon. The system also includes the unique AVAflex® curved needle that targets cement placement and offers maneuverability and flexibility unmatched by traditional straight needles.
Benvenue Medical, Inc.
www.benvenuemедical.com
Benvenue Medical, Inc. provides minimally invasive systems for spine repair that combine expandable implants with novel delivery instruments to provide enduring functional benefits for patients. Benvenue’s Luna® 360 System is a novel, minimally invasive lumbar interbody fusion device for degenerative disc disease that incorporates PEEK-OPTIMA and nitinol in a revolutionary interbody implant that is precisely guided, controlled and a less invasive technique for the lumbar spine.

Berkeley Advanced Biomaterials, Inc.
www.ostiсt.com
Berkeley Advanced Biomaterials, Inc. manufactures high-quality and cost-effective skeletal repair resorbable biomaterials. The company offers the entire range of biologics from synthetics HAP/TCP Granules, Strip, Putty to allograft DBM 100% DBM Putty, Sponge, and Chip. Berkeley Advanced Biomaterials, Inc. is an AATB accredited licensed Tissue Bank.

BFW, Inc.
www.bfwinc.com
For more than four decades, BFW™ remains a technological leader in surgical headlights and headlight imaging systems. This year we introduce our innovative Lighthouse™ Series of portable LED headlight systems - all comfortable, extremely bright and built to handle the rigor of the OR. Also introducing Hatteras™ LED light source for fiber optic headlights, instruments and endoscopes. Our products are engineered and proudly built in the USA. BFW is a known quantity for quality and service.

Bioventus LLC
www.bioventusglobal.com
Bioventus LLC is an orthobiologics company that delivers clinically proven products that help people heal quickly and safely. The Bioventus Surgical portfolio provides technologically advanced, clinically beneficial and cost effective products that stimulate healing to achieve faster and more complete fusion in spine applications.

BioStructures
www.biостructurers.net
BioStructures® specializes in the design, development and marketing of innovative and proprietary bioresorbable implants used in spinal fusion procedures. BioStructures® offers a comprehensive portfolio of bone graft materials. The Company’s core offerings are comprised of BioActive, Collagen, Allograft, Demineralized Bone and Synthetic graft materials.

BM KOREA Co., Ltd.
www.bmkmedi.com
We are one of the largest manufacturers and exporters in Korea producing Spinal Medical Devices “Kyphoplasty”, “spinal needle” “Peek Cage”, “Pedicle Screw”, “Bone Cement” “Vertebral Fixation Device” using our latest computerized manufacturing facilities. All products are certified by CE and FDA except the bone cement which is now applied for the certification.

Bone Bank Allografts
www.bonebank.com

BOSS Instruments Ltd.
www.бossinst.com
BOSS Instruments concentrates on the global development and distribution of specialty surgical instruments in disciplines such as: Neuro, Spine, Cardiovascular/Thoracic, Orthopedic, ENT, Ophthalmic and Ob/Gyn. Displayed will be high quality German-crafted stainless steel and titanium surgical instruments and retractor systems, such as kerisson rongeurs, curettes, micro scissors and needle holders, and cervical and lumbar retractors for open and minimally invasive procedures.
There resides a great pride within our company in providing you with top notch orthopedic and spinal instrumentation. We invite you to contact us at the earliest concept phase to ensure a seamless transition from prototype through production. Our knowledgeable staff has over 25 years of industry experience and is available at all developmental stages to ensure you receive the support you deserve. Quality. Innovation. Service. Rule #1: If we don’t take care of our customers, someone else will.

Brainlab

Brainlab develops, manufactures and markets software-driven medical technology with the aim of optimizing patient treatments. Core products revolve around less-invasive image guided surgery technology, more accurate and effective radiation therapy, and integration through planning and collaboration systems that brings patient data and physicians together. www.brainlab.com

BRAMISS - Brazilian Minimally Invasive Spine Surgery Society

BRAMISS is an independent Society that has 350 members, manages a Fellowship Program and works with other medical entities in order to facilitate and standardize the MIS procedures along the private and public health care systems and also divulges MIS possibilities of treatment for patients trough regular media. BRAMISS organizes two main events: COMINCO and SIMINCO. The V COMINCO will be held on August 28-30, 2016, at WTC, Sao Paulo City, Brazil and the XIII SIMINCO 2016 (AM with live surgeries).

Breg

Breg provides premium, high-value sports medicine products and services that advance orthopedic patient care. From pioneering cold therapy products and innovative bracing to caring customer service and award-winning Business Solutions, Breg delivers a 360° customer experience unmatched in the industry.

BSS—Brazilian Spine Society

The Brazilian Spine Society – BSS is an entity that represents around 1000 Brazilian spine surgeons (orthopedists and neurosurgeons). The current president is Dr. Carlos Henrique Ribeiro. Email: coluna@coluna.com.br Future events: XV Brazilian Spine Congress will be held from 18th to 21th of April, 2015 in Belo Horizonte city, Minas Gerais state, Brazil. Registration and General Information at www.cbc2015.com.br

Business Dynamics

Since 1998, Business Dynamics has emerged as the top full service spine coding and reimbursement firm in the country. Business Dynamics was developed specifically to serve spine practices, orthopedic and neurosurgical medical groups, facility spine programs, spine product manufacturers and numerous secondary organizations within the medical community. Business Dynamics’ corporate headquarters is located in New York and services clients nationwide.

Buxton BioMedical, inc.

On turbulent seas of hi-tech companies Their ominous messages Of latest “truths”: or dire consequences for the wary and weary, prepare your defenses! Come find us to be an isle of tranquility Devices to prod, products to probe A clamp to do this, a hook to do that Exciting angulations, exotic articulations. Find civilized refinements to traditional instrument designs along with simple solutions to the plethora of problems still plaguing product performance in everyday surgeries of the spine.

C&A Tool Engineering, Inc.

Contract Manufacturer of Spinal Implants and Instruments. Be sure to ask about our Laser Sintering capabilities for Rapid Prototyping.

Cadwell Laboratories, Inc.

Cadwell has been focused on the development of useful and intuitive devices for neurophysiologists, neurologists, physiatrists, and technologists who want indestructible and easy to use monitoring and diagnostic devices to help surgeons and others provide superior patient care since 1979. Based in Kennewick, WA, our product lines include Intraoperative Neurophysiological Monitoring, EEG, EMG/NCV/EP as well as a full range of electrodes, probes and accessories.

Camber Spine Technologies

Camber Spine is an ISO 13485 certified medical device company focused on building a platform of innovative spinal fusion technologies. Since 2013, CS has launched the ORTHROS™ Pedicle Screw, ORTHROS™ MIS, ORTHROS™ Deformity, DIAGON™ anatomic TLIF, VERTA™ VBR, COVERIS™ and TLS 5.0™ interbody cages and PROLIX™ “true SI-fusion” systems. Camber is delivering the next gen of zero-profile, integrated fixation devices for anterior and lateral lumbar indications and patented 3D “open matrix” devices.

Captiva Spine

Captiva Spine supports spine surgeons, tenured distributors, and healthcare facilities in providing patients progressive care with an obsessive focus on quality. We strive to create and maintain sincere, honest, collaborative relationships. Valuing relationships, above all else, fosters the mutual trust and openness needed for Captiva Spine to be a conduit of high quality, smart, elegant, and intuitive patient solutions. Captiva Spine – Strength Through Connections.
Captive One Advisors
www.captiveone.com
CaptiveOne Advisors LLC is an advisory firm with the experts required to assess, develop, and manage captives successfully. The CaptiveOne team brings together the best and brightest minds in the captive insurance field to establish U.S.-domiciled captives and provide comprehensive management services, including accounting, claims processing, and continuing advice on premium reserve management. All CaptiveOne captives are U.S.-domiciled captives.

www.carbo-fix.com
CarboFix Orthopedics Ltd. specializes in orthopedic implants made of non-metal, continuous carbon fibers reinforced polymer (CFR-PEEK). In addition to trauma nails & plates, the company has developed the CarboClear™ Pedicle Screws & Rods made out of Carbon Fibers. The system advantages include minimal artifacts in CT & MRI, advantageous in radiation therapy (including proton therapy), superior fatigue strength & optimal modulus of elasticity.

Cardinal Spine, LLC
www.cardinalspine.net
Cardinal Spine is dedicated to creating the safest spinal implants available for use in humans. Since Cardinal Spine’s inception, we have been granted numerous US patents and currently have two Food and Drug Administration approved devices. Cardinal Spine is in the business of manufacturing, distributing and selling spinal implants and devices for positioning spinal implants.

Carl Zeiss Meditec, Inc.
www.zeiss.com/meditec
Carl Zeiss Meditec (http://www.zeiss.com/meditec) is one of the world’s leading medical technology companies that is dedicated to helping healthcare professionals enhance patient care. The Company’s portfolio of innovative solutions includes a comprehensive line of OPMI® Surgical Microscopes and EyeMag® Surgical Loupes that optimize visualization during spine surgery.

CellRight Technologies, LLC
www.cellrighttechnologies.com
CellRight Technologies is an emerging leader in the development and manufacture of evolutionary regenerative orthopedic and wound care collagen matrices. The matrices provide a delivery vehicle for current and future cellular therapies such as PDGF, BMA, PRP, antimicrobial agents and other growth factors. CellRight Technologies is the manufacturer of MatrixCellect 100, a minimally manipulated 100% human derived DBM putty intended for homologous use.

Cellumed—Aminologics
www.cellumed.co.kr
Cellumed Inc is a leading biotech company dedicated to developing bone graft substitution based on human tissue graft. Moreover, the company concentrates its R&D efforts on bio-similar business that develops human recombinant protein for treatment, employing genetic recombination technology. We are in pursuit of high value products with advanced biotechnology. Cellumed is the most prominent biotech company in Korea.

www.centinelspine.com
Centinel SpineTM created the Integrated Interbody™ market more than 25 years ago with its groundbreaking STALIF® technologies. Since then, it has continued to innovate and gain clinical success with its cervical and lumbar product families (STALIF® and MIDLINE II™), Ti-ACTIVETM (texturized, osteoconductive coating), and new allogeneic and multilevel indications.

Cerapedics, Inc.
www.cerapedics.com
Cerapedics develops and commercializes novel osteobiologic products utilizing its proprietary anorganic bone mineral (ABM) and synthetic small peptide (P-15™) technology platform to stimulate the natural bone healing process. i-FACTOR™ Bone Graft is available in 20+ countries worldwide for use in spine, trauma and orthopedic procedures. i-FACTOR bone graft is currently being evaluated in the USA (FDA) as part of an Investigational Device Exemption (IDE) Clinical Study in the cervical spine.

CFI Medical
www.cfimedical.com
CFI Medical Solutions is an FDA-registered medical device manufacturer. We can CE mark your products for selling in the European Union, we are ISO 13485 certified, and familiar with the wide range of regulatory requirements in the medical device industry.

Chicago Precision Manufacturing
www.chicagoprecisionmanufacturing.com
CPM is a manufacturer of high-quality coated metal products. From simple brackets to complex weldments CPM has the expertise to complete your vision. We are a high precision contract metal fabricator for the medical industry from prototype through production quantities.
Children's Health
www.childrens.com
More than 2.6 million children are treated each year for sports-related injuries. As the only pediatric orthopaedic institute of its kind in Texas, Children’s Health Andrews Institute aims to greatly reduce the number of children being side-lined from injuries. Dr. Andrews has a passion for not only getting young athletes back in the game but also giving them the right knowledge and skills to prevent injuries.

Chinese Association of Orthopaedic Surgeons
www.caos-china.org
Our commitment is to advance CME for over 100,000 Chinese orthopedic surgeons to achieve improved outcomes of the patient with musculoskeletal disorders. As a professional NPO endorsed by Chinese government, we dedicate ourselves to providing high quality resources as well as standardizing Chinese orthopedic CME system through implementing residency training program and launching clinical guidelines. Know us, welcome to Booth# 864.

Chinese Orthopaedic Association
www.coachina.org
Chinese Orthopaedic Association (COA) is a not-for-profit organization, which provides information on scientific exchange and improving the orthopaedic health service level. With a registered membership of more than 30,000 surgeons, COA is the largest and most influential orthopaedic society in China. The current president is Prof. TIAN Wei from Beijing Jishuitan Hospital, who takes the leading position of upper cervical spine malformation and computer-assisted minimal invasive surgery in China.

ChoiceSpine
www.choice脊椎.net
ChoiceSpine is committed to bringing superior products to orthopedic & neurosurgeon specialists who focus on the treatment of spinal disorders & deformities through operative intervention. We are committed to meeting the needs of our customers through new product offerings, existing product enhancement, & continued product development. By working closely with physicians & maintaining service-focused distribution, we will continue to bring technically-superior spinal products to the market.

Clariance
www.clariance-spine.com
Founded in 2007, Clariance is a spinal device company committed to designing, manufacturing and marketing innovative solutions for the treatment of spinal disorders. Driven by surgeon’s expertise, the company provides advanced surgical applications focused on fusion devices and minimally invasive spine surgery. Advancing patient outcomes is our fundamental and permanent concern.

Collagen Matrix, Inc.
www.collagenmatrix.com
CMI, a leading collagen- and mineral-based biomaterials company, will feature bone graft matrices and collagen dura substitute membranes. We have products at various stages of development. We are seeking independent distributors and partnerships/joint ventures with established medical device companies.

Complete Medical Services
completemedicalservices.com
Complete Medical Service, your C-Arm expert with over 17 years of experience refurbishing OEC products now brings you even better option. We strive to provide our customers with Best Valued product in the market and our exclusive product, ZEN-7000 allows us to do just that.

Complexus Medical
www.complexusmedical.com
Complexus Medical is a full service 13485 contract manufacturer that specialize in the precision machining and finishing of complex instrumentation and implants for the medical industry. With over 30 years of experience in medical machining, we are very adept at working with our medical OEM partners to meet their critical lead times and high quality standards. Please stop by our booth #953 to discuss your upcoming instrument and implant projects.

ContainMed
www.containmed.com
ContainMed designs and manufactures surgical instrument cases and trays along with screw and implant caddies. ContainMed is 13485 and 9001 certified with full, in-house sheet metal manufacturing capabilities located in Indianapolis, Indiana. ContainMed created the patented SURGrip™ screw caddy system which holds surgical screws without the use of a cover. ContainMed offers the complete spectrum of services from build-to-print capabilities to full engineering and design support.

CoreLink
www.corelinksurgical.com
CoreLink draws on 45 years of manufacturing expertise to offer its growing portfolio of premium quality implant systems. As one of the few spine companies to make its own products, CoreLink is able to exercise superior control over both quality and cost. Even more, its vertical integration provides for unparalleled responsiveness, customization, and breadth of options. CoreLink is committed to the continual improvement of the surgical treatment of the spine, from the occiput to the ilium.

COUSIN BIOTECH
www.cousin-biotech.com
IntraSPINE is for the non-fusion market; a dynamic interlaminar device made of a silicone core covered with polyester. Its innovative shape allows to preserve a full range of motion while respecting the physiological lordosis. In 2014, a ligament correction system, NAJA, was introduced during the EUROSPINE meeting in Lyon. NAJA is not FDA approved. For more information on our products, please visit www.cousin-biotech.com or contact the spine team on spine@cousin-biotech.com
Danco maintains production facilities in Arcadia, CA and Warsaw, IN with laser, silk-screen and Full Color Deep Image (R) anodizing techniques. Improvement to surgical instruments. Marking methods incorporate Friction Chrome Coating (LFCC) provides cosmetic and functional deburring, hand polishing, graining, blasting and electro polishing. Low instruments and devices. Finishing capabilities include mechanical deburring, hand polishing, graining, blasting and electro polishing. Low Friction Chrome Coating (LFCC) provides cosmetic and functional improvement to surgical instruments. Marking methods incorporate laser, silk-screen and Full Color Deep Image (R) anodizing techniques. Danco maintains production facilities in Arcadia, CA and Warsaw, IN with R&D support in CA.
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**Disc Disease Solutions, Inc.**

Disc Disease Solutions is a revolutionary approach in the treatment of lower back, neck and osteoarthritis knee pain due. Our unique and patented traction design sets our Braces apart from all other supports. DDS products are lightweight and easy to use; they offer a high degree of mobility, alleviating as well as preventing pain. We are the ORIGINAL lumbar brace company.

**DOJO Global**

DOJO Global is a leading global medical device company providing solutions for musculoskeletal and vascular health, and pain management. The Company’s products help patients prevent injuries or rehabilitate after surgery, injury or degenerative disease. DOJO’s brands include Aircast®, DonJoy®, ProCare®, CME®, Empi®, Saunders®, Chattanooga Group™, DJO Surgical, Cefar®-Compex® and Ormed®, Dr. Comfort, Bell Horn www.DJOglobal.com

**DoctorsInternet.com**

DoctorsInternet.com markets orthopedist’s website’s online in an effort to place well in Google & other search engine’s search results for keywords & phrases important to orthopedics. We also manage a doctor’s online persona by making it simple to generate positive reviews from an orthopedist’s best patients & we monitor our doctor’s online reputation. We can work with an orthopedist’s existing website or we will design a new website for free. We will get spine surgeons to page one of Google!

**Dynamic Disc Designs Corp.**

Spine Education Models. Dynamic Disc Designs Corp. (ddd) is a unique Canadian company which began in 2006 with a drive to better model spine dynamics. With principles strongly rooted in past and present spine research, ddd offers spine education models with 6 degrees of natural motion that doctors can feel confident in using. Now, many more accurate spinal conditions can be explained easily in a dynamic platform to improve spinal education to help improve clinical outcomes.

**ECA Medical Instruments**

ECA Medical Instruments is the industry leading designer & manufacturer of precision single-use surgical torque-limiting, fixed driver and related procedural instruments and kits for the ortho/spine industry. ECA collaborates with implant OEMs to develop customized single-use instruments as well as turnkey disposable and sterile packed prep, tightening and fixation trays and kits for complete range of spine implant procedures. ECA helps OEMs, hospitals & ASCs save over $1k per procedure.

**Eisertech, LLC.**

Eisertech is a manufacturer of implants and instruments for spine surgery. Our products are designed for surgeon efficiency. Please stop by our website at www.eisertech.com to learn more about our products.

**Element Materials Technology**

For over 30 years, major companies across the medical device industry have turned to Element for their device conformance, materials identification, and failure analysis needs. Element supports feasibility and submission testing for hip, knee, spine, small bone implants, plates, and screws. In addition, Element offers comprehensive wear testing solutions, microbiological evaluations, and expert failure analysis. Stop by our booth to speak with one of our engaged experts about your testing needs.

**Elite Surgical**

Originally founded in 1973 as a medical device manufacturer, Elite Surgical Supplies (Pty) Ltd. or Elite Surgical, has achieved international manufacturing recognition through its’ contributions to Research and Development in orthopaedics and through its’ compliance to the European CE, American FDA and ISO series of quality accreditations.

**Ellipse Technologies, Inc.**

Ellipse Technologies, Inc. is a privately held medical device company located in Irvine, California. The Company is dedicated to the design, development, and commercialization of its evolving proprietary technology platform for orthopedic and spinal applications. This technology enables precisely controlled, non-invasive post-operative adjustment of implants allowing surgeons to better address a range of clinical needs. For more information, please visit www.ellipse-tech.com.

**Elliquence LLC**

elliquence, LLC. manufactures patented Low Temperature surgical Radiowave technology. Cobbra™ energized cobb elevator, Medusa™ bipolar coagulator, and Disc-FX™ discectomy system are examples of the full line of accessory applications offered for all orthopedic procedures. Elliquence focuses on sparing healthy tissue while precisely treating pathology.

**Elsevier, Inc.**

ELSEVIER is a leading publisher of health science publications, advancing medicine by delivering superior reference information and decision support tools to doctors, nurses health practitioners and students. With an extensive media spectrum—print, online and handheld, we are able to supply the information you need in the most convenient format.
Eminent Spine LLC                   634
www.eminentspine.com
Eminent Spine is a highly innovative, just in time, engineering, manufacturing and distribution company. Eminent Spine is a privately held company that was founded in June of 2008 by Dr. Steve Courtney and Dave Freehill. Dr. Courtney and Mr. Freehill began Eminent Spine with the idea of combining a spine surgeon’s expertise with an engineer’s experience to design, engineer, manufacture and distribute highly innovative specialty tools, implants, and implements specifically for spinal surgery.

Empirical                   1203
www.empiricaltesting.com
With more than 15 years’ experience, the Empirical family of companies offers the full range of consulting, testing, manufacturing and validation services. Our testing division, ETC, holds A2LA accreditation for the largest number of medical device testing methods in the U.S. With sterilization and distribution validation services, our ISO/IEC 17025:2005 accreditation, custom protocol development, submission-ready reports, and tailored communications support our commitment to your success.

Enova Illumination                   1206
www.enovaillumination.com
NEW! Enova Cyclops XLT-225 is the world’s brightest LED surgical headlight designed for deep cavity surgery including SPINE SURGERY. Adjustable spot and co-axial alignment. 225,000 lux, pure white illumination, and comfortable too. Up to 12 hrs battery life! 5 year warranty on LED and made in USA.

EOS imaging                   1313
www.eos-imaging.com
Born from a technology awarded by the Nobel Prize for Physics, the EOS® system is the first imaging solution designed to capture simultaneous bilateral long length images of patients in a weight bearing position at very low dose exposure. EOS enables global assessment of balance and posture as well as a 3D bone-envelope image in a weight-bearing position, and provides automatically over 100 clinical parameters to the orthopedic surgeon for pre- and post-operative surgical planning.

Evonik                    1389
www.evonik.com/vestakeep
Evonik, a global leader in specialty polymers, develops biomaterials for permanent implant and temporary contact devices for the orthopedic and spine markets. Evonik’s VESTAKEEP® PEEK (polyetheretherketone) products demonstrate exceptional biocompatibility and biostability and are used in a wide range of spinal implants and instrumentation. VESTAKEEP® PEEK has been referenced in numerous spine 510(k) clearances and is on file at the FDA with a comprehensive Master File.

Esaote North America, Inc.                   1601
www.esaoteusa.com
Esaote North America, located in Indianapolis, is part of the Esaote Group, a global leader in the research, production and marketing of medical diagnostic equipment. Esaote is among the largest manufacturers of imaging systems worldwide and prides itself in achieving superior price and performance over competitors. With determination, Esaote North America focuses on quality medical imaging within office-based MRI and ultrasound medical equipment. Visit us at www.esaoteusa.com

EUROSPINE, the Spine Society of Europe  860
www.eurospine.org
EUROSPINE, the Spine Society of Europe, was founded on 26 June 1998 in Innsbruck, Austria. The aims of EUROSPINE are to stimulate the exchange of knowledge and ideas in the field of research, prevention and treatment of spine diseases and related problems and to coordinate efforts undertaken in European countries for further development in this field.

Exactech, Inc.                   1033, 333
www.exactechspine.com
Founded and led by a surgeon and a biomedical engineer in 1985, Exactech has a unique perspective on the challenges faced by clinicians, a clear understanding of the importance of surgeon education and a comprehensive spinal fusion line to treat the broad spectrum of spinal disorders. Surgeons count on Exactech Spine for reproducible minimally invasive solutions, intuitive instrumentation for a simplified open approach, orthobiological material and services that allow improved patient outcomes.

Fehling Surgical Instruments, Inc.             1516
www.fehlingsurgical.com
Featuring the “CERAMO® Concept Classic” Punches. Fehling Surgical Instruments provides innovative surgical instrument designs using state-of-the-art materials combined with enhanced technology manufacturing techniques. Results are products like the “Fehling Ceramo® Surgical Instrument Line”. See AND feel the black ceramic instruments.
FH Orthopedics

FH Orthopedics has dedicated a specialized business unit to market its latest generation of disc replacement (lumbar and cervical). These disc replacements are monobloc and restore natural disc functions by allowing all natural movement.

Five Star Companies

The Five Star Companies encompass two ISO13485 Certified and FDA Registered entities focused on critical sectors of the Medical Device market. Five Star Surgical specializes in surgical and powered instrument repair and special modifications of instruments. Five Star Manufacturing is a high-precision, medical device contract machining company focused on spinal implants and complex instrumentation for orthopedics, spine, trauma and sports medicine from prototype through production quantities.

Flex

Specialized in the development of Metal Injection Molding technologies for the manufacturing of small and complex metallic parts for high mix / low volume industries such as spinal implants and devices.
Main Advantages of the Maetta System™ • Shortens time-to-market by reducing prototyping and manufacturing lead time • Reduces development and manufacturing costs • Wider design flexibility and parts complexity • Use of new materials with unique properties • Faster new materials development • Reduces waste and environmental pollution

FzioMed, Inc.

FzioMed is a medical device company engaged in the development and commercialization of advanced, absorbable biosurgery products. Oxiplex®, FzioMed’s patented polymer technology, is being developed for use in adhesion prevention, hemostasis, sealants, and drug delivery. Oxiplex®/ SP Gel for the prevention of epidural adhesions has received the CE Mark and is approved in almost 70 countries.

G Surgical, LLC

G Surgical is an orthopaedic device company that is dedicated to providing healthcare professionals uncompromised quality products and cost effective solutions. G Surgical is the next-generation spinal implant company, supplying intuitive technologies for the treatment of spinal disease worldwide, with offices in the USA, Malaysia, and Thailand. We strive for continuous improvement and “We Care About Our Customers”

G21

G21 is a leading developer and manufacturer of bone cements and acrylic resins with years experience in orthopedics, oncology orthopedics and minimal invasive spine surgery. We are proud to affirm our unique and complete range of products for spine minimally invasive procedure. in particular our high viscosity acrylic resin V-Steady developed for vertebroplasty and kyphoplasty and our minimal invasive kyphoplasty kit 11 Gauge.

Gauthier Biomedical Inc.

Gauthier Biomedical is a manufacturer of high-quality instruments for spine and orthopedic applications. We strive to deliver superior customer service and welcome the opportunity to assist you with your next product launch. Gauthier Biomedical is proud to partner with medical device manufacturers, offering engineering support, contract manufacturing, and OEM products.

Globus Medical

Globus Medical, Inc. is a leading musculoskeletal implant company based in Audubon, PA. The company was founded in 2003 by an experienced team of professionals with a shared vision to create products that enable surgeons to promote healing in patients with musculoskeletal disorders.

Gold Standard Orthopedics

We design, develop, manufacture, and commercialize innovative hardware solutions for spine surgery. These clinically proven, cost-effective products are offered via a rapidly growing independent sales force throughout the United States.

GS Medical LLC

GS Medical LLC is a privately-held international medical device company offering a wide range of products for addressing many pathologies in spine surgery, including many minimally invasive options, treating cervical and thoracolumbar degenerative conditions. We are focused and committed to developing and manufacturing quality devices that provide intraoperative efficiency for surgeons, cost-effectiveness for hospitals and healthcare systems, and proven outcomes for patients.

GSource, LLC

gSource—the Orthopedic and Spinal Source for Surgical Instruments—produces instruments used throughout the world by many leaders and innovators in spine and orthopedics. From custom designs to off-the-shelf patterns, gSource is committed to putting the finest instruments into the hands of surgeons and their teams.

Hans Biomed USA Inc.

HansBiomed is a leading bio-engineering company that manufactures different types of orthobiologics such as DBM, allograft and synthetic. HansBiomed has the biggest bio-engineering research institute in Asia, and received 510K approval of the DBM products. As the first tissue bank established in Korea, Hans has been developing variety biologic products and currently selling to more than 30 different countries.
Harvest Technologies
www.harvesttech.com
Harvest Technologies is the leading cellular therapy global manufacturer that develops point-of-care products to process and concentrate multiple biologics. These include high-density platelet rich plasma (APC®+) marrow aspirate concentrate (BMAC®) and adipose tissue, all concentrated using the SmartPrep3 Multicellular Processing System.

Human Regenerative Technologies
www.humantissue.com
Human Regenerative Technologies, LLC (HRT®) is a regenerative biologics company that has emerged as a leader in new natural regenerative therapies derived from amniotic membranes, fluid and tissues from the placental organ processed with the proprietary HydraTek® Process. This next gen technology was developed to provide a complete line of grafts, in optimized configurations. HydraTek® Process has revolutionized graft storage and delivery by creating The Original Ambient Flowable Tissue Matrix.™

IMEDICOM
www.imedicom.co.kr
IMEDICOM Co., Ltd. is one of fast growing orthopaedic company that manufactures Balloon kyphoplasty system (510K cleared), Epidural catheter and Surgical power tools with Saw blades. All products of IMEDICOM are in compliance with CE, FDA regulations and ISO9001, ISO13485.

Implanet America
www.implanet.com
IMPLANET is a public company with a singular focus is to provide solutions to complex pathologies through the use of sublaminar band technology. The JAZZ Band hybrid approach has been shown to reduce implant volume in patients, decrease surgical cost, and reduce blood loss and OR time while demonstrating significant improvement in Sagittal Balance with a band-screw hybrid approach over all-screw constructs. Visit booth 1195 to see firsthand the latest advancements in band technology.

Infinite Therapeutics
www.infinitymassagechairs.com
The Infinity IT-8800, COMPARABLE TO THE INADA® for 1/2 the price, offers state of the art roller foot reflexology, thigh and hip massage, an amazing spinal decompression stretch, sensors for customized targeted massage, lumbar heat and music, endless luxury, ULTIMATE MASSAGE!

Inion Inc.
www.inion.com
Inion is a medical device company focused on the development and commercialization of innovative biodegradable and bioactive implants for Spinal, Specialty Orthopedic and Cranio maxillofacial applications. Inion’s proprietary blending technology enables application specific implants which have ‘custom fit’ capabilities for patients that do not interfere with imaging.

Innovasis, Inc.
www.innovasis.com
Innovasis is committed to the constant innovation of Spinal Implants and other related products. We Innovate. We Involve. We Invent.

Instant Patient Leads—Buzzazz
www.InstantPatientLeads.com
Utilizing an aggressive engineering approach with A/B testing, user behavior software, etc. to test nearly every popular advice made public, Buzzazz has developed its own proprietary technologies that help healthcare professionals generate a steady stream of new patients and increased revenues. 28 years of experience, 10,000+ ad campaigns has created confidence, so much confidence in our products and technologies that we'll refund your money if we don’t produce! Please visit us!

The Institute of Musculoskeletal Science & Education (IMSE)
www.imseinstitute.org
IMSE has a staff of physicians, engineers and clinical experts that deliver a turnkey solution for physicians who want to be published or commercialize their ideas. IMSE also provides solutions to medical device companies who want to bring new and/or improved products to market or into compliance. IMSE core initiatives are: Product Development, Clinical Studies, Intellectual Property and Certified Medical Education. IMSE & IMSE-CME are independent companies; we are not a medical device company.

In'Tech Medical
www.intech-medical.com
Founded in France in 2000, In’Tech Medical is a global leader in orthopedic contract-manufacturing. With the company’s recent acquisition of Turner Medical, Inc., In’Tech is now the world’s largest provider of surgical instruments to the Spine Industry. Powered by a diverse product portfolio, an ability to find solutions to complex engineering challenges, and with close to 500 employees globally, In’Tech Medical is ideally positioned for sustainable growth and personalized customer care.

Integrated Medical Solutions
integratedmedicalsolutions.net
Integrated Medical Solutions (IMS) is a contract manufacturing service provider exclusively serving the Medical Device market place. IMS is your single source solutions provider for highly complex precision machined components and assemblies. Medical device manufacturing demands the kind of specialized expertise that makes IMS a trusted partner to OEM’s.
InVivoLink
www.invivolink.com
InVivoLink is a care management platform that optimizes orthopedic and spine centers of excellence. Without burdening staff or patients, InVivoLink promotes collaboration between hospitals and physicians by providing episodic data. InVivoLink’s implant registry tracks outcomes and cost data to reduce physician-preference item spend. With enterprise analytics and a patient engagement portal for recovery, InVivoLink has pioneered an evidence-based technology to advance clinical excellence.

Revolution™ Spinal System
Intelligent Implant Systems exhibits the Revolution™ Spinal System. This posterior lumbar fixation system utilizes pre-sterilized implants and one tray of single-use instruments. No more expensive, bulky instrument trays. The elegant implant is quick to implant, saving surgery time, and is designed for open, mini-open, and minimally invasive procedures. A fully cannulated system with no rod contouring or cutting needed. Revolution™ is the perfect answer for a fast and easy-to-use system.

www.invivolink.com

Invuity, Inc
www.invuity.com
Invuity’s patented Intelligent Photonics™ technology is integrated into sophisticated retractor systems, handheld devices and intracavity drop-in illuminators. Our proprietary waveguide technology directs and shapes light into broad, uniform illumination to provide enhanced visualization inside dark surgical cavities. In addition, it converts traditional thermally hot light output to thermally cool volumetric illumination throughout the entire surgical cavity.

www.janco-inc.com

JALEX Medical, LLC
jalexmedical.com
Medical Device Design, Product Development & Regulatory Consulting: Accelerating From Concept to Market. JALEX Medical is a recognized partner in medical device development. We work with medical device companies, hospitals, surgeon inventors, and other industry professionals by offering design engineering, regulatory and quality systems solutions. Our industry experts, state of the art technology, and processes accelerate your idea from concept to market.

www.janco-inc.com

Janco, Inc.
www.janco-inc.com
Janco, Inc. is a premier contract supplier of custom plastic foam, disposable thermoformed trays and medical packaging designed and manufactured to meet exacting specifications and standards for the Medical, Dental, Pharmaceutical, and Veterinary markets. Janco’s custom thermoformed medical tray manufacturing offers the flexibility to meet exacting medical specifications and quality standards for the most demanding medical tray applications.

www.istotech.com

ISTO Technologies, Inc.
www.istotech.com
At Isto Technologies, we’re applying innovative orthobiologics to develop breakthrough products that restore and regenerate function to damaged cartilage and bone. It’s the future of regenerative medicine for chronic spine and joint conditions—and it’s happening today at Isto.

www.ionbond.com

Ionbond IHI Group
www.ionbond.com
Ionbond provides the highest performance PVD, CVD, and PACVD medical implant and surgical instrument coatings for the reduction of wear, ion release, galling, friction, and operating room light reflectivity. Ionbond ensures that the ISO 10993 certified coatings meet the specifications. In the demanding medical market, it is imperative to have the highest level of quality management and control throughout the coating process following ISO 13485 in 8 coating centers worldwide.

www.neareastspine.org

International Musculoskeletal Society IMS
www.neareastspine.org
We are pleased to announce the Society for Progress & Innovation for the Near East (S.P.I.N.E.) is now the International Musculoskeletal Society (I.M.S.). The new name marks a significant step in our growth and evolution as a society. Since its foundation in 2008, S.P.I.N.E. has broadened its focus to incorporate all musculoskeletal disorders including general Orthopedics, Pain medicine and Rehabilitation, Spine Surgery, Trauma, Pediatric, Sports-related injury, and much more. On behalf of the entire faculty and the I.M.S. Society we invite you to the July 2016 course.

www.intelligentimplantsystems.com

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Intelligent Implant Systems exhibits the Revolution™ Spinal System. This posterior lumbar fixation system utilizes pre-sterilized implants and one tray of single-use instruments. No more expensive, bulky instrument trays. The elegant implant is quick to implant, saving surgery time, and is designed for open, mini-open, and minimally invasive procedures. A fully cannulated system with no rod contouring or cutting needed. Revolution™ is the perfect answer for a fast and easy-to-use system.

www.invivity.com

Invuity, Inc
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www.janco-inc.com

JALEX Medical, LLC
www.jalexmedical.com
Medical Device Design, Product Development & Regulatory Consulting: Accelerating From Concept to Market. JALEX Medical is a recognized partner in medical device development. We work with medical device companies, hospitals, surgeon inventors, and other industry professionals by offering design engineering, regulatory and quality systems solutions. Our industry experts, state of the art technology, and processes accelerate your idea from concept to market.

www.invivolink.com

InVivoLink
InVivoLink is a care management platform that optimizes orthopedic and spine centers of excellence. Without burdening staff or patients, InVivoLink promotes collaboration between hospitals and physicians by providing episodic data. InVivoLink’s implant registry tracks outcomes and cost data to reduce physician-preference item spend. With enterprise analytics and a patient engagement portal for recovery, InVivoLink has pioneered an evidence-based technology to advance clinical excellence.

www.ionbond.com

Ionbond IHI Group
Ionbond provides the highest performance PVD, CVD, and PACVD medical implant and surgical instrument coatings for the reduction of wear, ion release, galling, friction, and operating room light reflectivity. Ionbond ensures that the ISO 10993 certified coatings meet the specifications. In the demanding medical market, it is imperative to have the highest level of quality management and control throughout the coating process following ISO 13485 in 8 coating centers worldwide.

www.neareastspine.org

International Musculoskeletal Society IMS
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www.invivity.com

Invuity, Inc
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www.janco-inc.com

Janco, Inc.
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www.invivolink.com

InVivoLink
InVivoLink is a care management platform that optimizes orthopedic and spine centers of excellence. Without burdening staff or patients, InVivoLink promotes collaboration between hospitals and physicians by providing episodic data. InVivoLink’s implant registry tracks outcomes and cost data to reduce physician-preference item spend. With enterprise analytics and a patient engagement portal for recovery, InVivoLink has pioneered an evidence-based technology to advance clinical excellence.
The Japanese Society for Spine Surgery and Related Research (JSSR)
www.congre.co.jp/jssr2016
The 45th Annual Meeting of the Japanese Society for Spine Surgery and Related Research (JSSR2016) will be held in Chiba, Japan, April 14-16, 2016. The theme has been designated as “Creation and Verification,” the roots of this annual meeting. We plan to extend invitations to currently active foreign researchers with reference to the opinions of young researchers from throughout Japan with overseas study experience as well as outstanding figures. Looking forward to seeing you in Chiba, Japan!

Jewel Precision
www.jewelprecision.com
Jewel Precision began manufacturing innovative custom sterilization case systems in 1984. Jewel Precision’s experience in sterilization case manufacturing gives us an edge in developing distinctive systems with a combination of material choices, finishes, and product housing features.

JJ International Instruments
www.myjionline.com
JJ International Instruments is a leader in designing & manufacturing high quality Surgical Instruments in India since 1999. JJ has successfully launched their products in USA market at AAOS 2013 in Chicago. JJ takes great pride in their extensive range of instruments offered for General Orthopaedic, Spine, Hand, Micro surgeries along with Neuro, Uro, Cardio Thoracic and General Surgeries. Visit booth # 1875 and experience their innovative instruments with INTERNATIONAL QUALITY @ INDIAN PRICE!

joimax, Inc.
www.joimax.com
joimax® is the leading developer and provider of complete systems for minimally invasive spine surgery. Our proven endoscopic methods allow surgeons to operate on herniated discs, spinal stenosis and other pathologies with minimal anatomical and surgical trauma through a single small incision, under local anesthetic and on an outpatient basis.

K2M
www.k2m.com
K2M Group Holdings, Inc. is a global medical device company focused on designing, developing and commercializing innovative complex spine and minimally invasive spine technologies and techniques used by spine surgeons to treat some of the most difficult and challenging spinal pathologies. K2M has leveraged these core competencies to bring to market an increasing number of products for patients suffering from degenerative spinal conditions.

Kelyniam Global Inc.
www.kelyniam.com
Kelyniam Customized PEEK Cranial/Facial Implants
LDR
www.ldr.com

LDR Holding Corporation is a global medical device company focused on the treatment of spinal disorders. LDR’s exclusive VerteBridge® fusion and Mobi® non-fusion technologies are designed for less invasive applications in the cervical and lumbar spine, which provide greater intra-operative flexibility, simplified surgical techniques, and improved clinical outcomes for patients.

Lee Medical
www.leemedicalnj.com

Lee Medical markets the only truly disposable bone mill. Our patented, sterilized Bone Shark® is used in orthopedic procedures when autologous bone is required for an injury or a spinal procedure where new bone growth is needed. No additional costly auxiliary equipment is required. Lee Medical has a reputation for delivering high quality products to hospitals and distributors. We are a certified woman-owned small business that guarantees quality, efficiency, and customer satisfaction.

Leica Microsystems
www.leica-microsystems.com

Leica Microsystems introduces our latest microscope for spine surgery, the Leica M530 OH6. The microscope provides surgeons with market-leading 600 mm working distance for unobstructed access to the surgical area. Exclusive FusionOptics technology delivers an expanded depth of field and high resolution at the same time, and an independent fine focus adjustment helps the spine assistant ensure optimal visualization. Experience the ergonomic design and beautiful visualization at booth#1101.

LH Medical Corporation
www.lhindustries.com

LH Medical, an LH Industries Company. A worldwide leader of Medical Device Outsourcing Services specializing on Orthopedic, spine, extremity and total joints. LH provides Expertise to our Partners Manufacturing High Quality Implants and Instrumentation. From General Instruments to Complex Mechanical Assemblies. LH Machines all types of Metals, Plastics and Peek. LH Medical, a Competent Qualified forward thinking Contract Manufacturing providing Answers and Solutions to our Client’s Needs.

Life Instrument Corporation
www.lifeinstruments.com

Life Instrument Corporation is dedicated to serving neurosurgeons and orthopedic surgeons with the highest quality surgical instruments. Over the years spine surgery has advanced with new procedures and approaches to the spine. Life Instrument Corporation is committed to meet the needs of spine surgeons for these new surgical techniques.

Life Spine, Incorporated
www.lifespine.com

Life Spine is a full line spine company which develops and markets an innovative family of spinal implants and instruments to serve the orthopedic and neurosurgery communities. A comprehensive product portfolio, focused on fusion devices and minimally invasive spine surgery, has been created by Life Spine via strong strategic partnerships with surgeons.

LifeLink Tissue Bank
www.lifelinktb.org

LifeLink Tissue Bank, the largest not-for-profit tissue bank in the Southeast, is an industry leader in providing allografts recovered and processed with the most stringent safety standards. LifeLink offers a complete range of traditional grafts, sports medicine grafts and milled LifeGraft spinal allografts.

LifeNet Health
www.lifenethealth.org

LifeNet Health helps to save lives, restore health and give hope to thousands of patients each year. We are the world’s most trusted provider of transplant solutions, from organ procurement to new innovations in bio-implant technologies and cellular therapies—a leader in the field of regenerative medicine, while always honoring the donors and healthcare professionals that allow the healing process.

Lilly USA, LLC
www.lilly.com

Lilly is a global healthcare leader that unites caring with discovery to make life better for people around the world. We were founded in 1876 by a man committed to creating high-quality medicines that meet real needs, and today we remain true to that mission. To learn more, visit www.lilly.com.

LinkSPINE
www.linkspine.com

LinkSPINE is focused upon improving outcomes and in the process has created an innovative portfolio of powerful, yet simple solutions for less invasive surgery. Function lies at the core of our products. We design for superior performance and take a meaningful and empathetic approach to innovation. Our devices are elegant and intuitive, fulfilling a desire for a simple, less invasive approach to lumbar surgery, adding true value for surgeons who are tiring of long learning curves.
Lisi Medical
www.lisi-medical.com
LISI MEDICAL is a world-class contract manufacturer offering proactive and experienced project management, a complete range of manufacturing capabilities, state-of-the-art quality processes and superior customer service, all focused on meeting our customers’ goals. Please contact us at contactUS@lisi-medical.com regarding your outsourcing partnership needs.

Lowell, Inc.
www.lowellinc.com
Lowell is the premier partner for the development and production of technologically advanced, implantable medical devices. We capture design intent and convert it to manufacturability through communication, anticipation and the drive to meet and exceed your requirements.

LumitexMD
www.lumitexmd.com
The bright, cool and non-obtrusive lighting engineered by Lumitex Medical Devices can be an integral part of any system. Lumitex MD engineers work with Original Equipment Manufacturers to design lighting for various retractor systems. Our patented technologies can maximize flexibility or be designed to fit a single instrument with maximum light output and precise light direction. We apply more than 50 years’ experience to solve customers’ lighting challenges. www.lumitexmd.com 800-969-5483

Matrix IT
www.matrixmedical.co
Matrix IT Medical Tracking Systems, Inc. has introduced TRACTUS, the world’s first sterile-field AIDC system. TRACTUS captures UDI information from 2D data matrix and matches all implanted medical devices with each patient, parsing the data with patient electronic health records. Pertinent information may be accessed by hospitals, physicians, implant distributors and payers.

Mazor Robotics
www.mazorrobotics.com
Mazor Robotics is dedicated to the development and marketing of innovative surgical guidance systems and complementary products that provide a safer surgical environment for patients, surgeons, and operating room staff. Mazor Robotics’ flagship product, Renaissance®, is a state-of-the-art surgical guidance system that enables surgeons to conduct spine surgeries in an accurate and secure manner. Mazor Robotics systems have been successfully used in the placement of over 50,000 implants worldwide.

Medacta International
www.medacta.com
Medacta International, a Swiss company, develops, manufactures and distributes orthopaedic and neurosurgical devices worldwide. Medacta’s success is based on innovation and education. Since 2009 Medacta has worked closely with a strong international faculty to design and develop the next generation of spine implants. Its focus is anatomical design, modular functionality and system efficiency. Medacta is committed to become a major spine partner/supplier within the leading world markets.

Medfix International, LLC
www.medifix.com
Medfix® International, LLC is focusing on delivering total solutions to the global spine market which enable our customers to deliver a more cost-effective procedure while maintaining the highest level of quality in their instrumentation and implants. Our design team has removed the uncertainty of what equipment is necessary for spinal procedures. Medfix® International, LLC can provide a comprehensive package of spine instruments, retractor sets procedure-specific instrumentation and implants.

Medical Practice Solutions, LLC
www.medpracticesolutions.com
At Medical Practice Solution LLC our goal is to make the medical billing and processing easier for you and your staff. Our goal is to maximize reimbursement for the services you provide. Our experts know how to code, bill, follow-up, appeal, track allowables, and demand the payments that you deserve. We increase revenues for EVERY medical practice. We currently provide medical billing services for providers all over the United States with offices in Plano, San Antonio and Houston Texas.

Medicrea USA
www.medicrea.com
At Medicrea, creativity is our highest priority, because we believe in the inventive power of our engineers and surgeon partners working together. It extends from designing and manufacturing next-generation spinal implants, with enhanced functionalities and quality testing, to providing more effective and less invasive treatments for all spinal pathologies. Our extensive range of spinal implants addresses spinal pathologies at all levels, from cervical to lumbar and sacrum.

Medin Corporation
www.medin.com
Medin Corporation is the largest, focused supplier of sterilization cases, trays, and accessory products. Our strategy is to provide exceptional engineering support services, vertically integrated manufacturing processes, aggressive lead-times, and a company wide commitment to stringent quality requirements. We are FDA and ISO13485 registered working with aluminum and stainless steel as well as thermoformed and machined plastics.
Medovex Corporation
www.medovex.com

DenerveX treatment results from the combined effect of a slow moving deburring or polishing action and RF ablation treatment. The slowly rotating burr removes the targeted facet joint synovial membrane and synovial membrane overlying the joint, effectively removing the end point sensory tissue of the joint. Note: DenerveX is not currently FDA approved, CE Marked or commercially available in the United States of America.

Medtech
www.medtechsurgical.com

MEDTECH designs, develops and markets the latest generation of robotic assistance for minimally-invasive neurosurgery. ROSA™ Spine is our brand new robotic platform for image guided minimally-invasive spinal procedures. It allows surgeons to safely and accurately guide pedicle screws using the navigation platform and tracking patients moves in real time. The ROSA™ technology has already been successfully adopted by 48 leading hospitals around the world.

MedWaves, Inc.
www.medwaves.com

MedWaves is a leading developer/manufacturer of MRI-Safe active temperature & wavelength controlled AveCure™ ablation system. The system, Cognitive-Eco-Technology™ consists of a full spectrum of Smart-Antenna™ (disposables) and Adaptive-Controller™ (durable), provides a cost-effective solution for safe & predictable treatment of primary and metastatic lesions in brain, spine and bone percutaneously, laparoscopically and intraoperatively. www.medwaves.com

Medyssey Spine
www.medyssey.com

Medyssey designs, develops, manufactures and markets products for the surgical treatment of spine disorders through novel instrumentation and advanced orthobiologic solutions designed to improve spinal fusion rates, preservation of mobility and clinical outcomes.

META BIOMED INC.
www.meta-biomed.com

MEDMIX SYSTEMS AG
www.medmix.ch

MEDMIX SYSTEMS AG is an ISO 13485 certified company which is developing and manufacturing mixing, delivery and application systems for multi-component biomaterial such as PMMA or calciumphosphate bone cement as well as fibringlue and tissue sealant. MEDMIX is an OEM-manufacturer. The products do not contain any biomaterial and are delivered without CE mark. It is the responsibility of our customers to register the product with corresponding legal authorities.

Metal Craft and Riverside Machine & Engineering
www.metal-craft.com

Metal Craft and Riverside Machine & Engineering provide in-house medical device and implant manufacturing from start to finish. We specialize in close tolerance precision contract manufacturing, including prototype, complex assembly, and short and long run production. We are eager to assist in engineering and design as well. We are ISO 13485, 9001, AS9100C, & FDA registered. WBENC and WSOB certified.

Metro Health Solutions
metrohealthnow.com

Metro Health Solutions offers proprietary pain management programs and services that focus on improving patient care, enhancing practice efficiency, and improving practice financial performance. Stimwave’s Freedom neuromodulation system is the world’s first and smallest wireless spinal cord stimulator and this is an example of one of the groundbreaking products that we offer. Our exemplary in-house team ensures that all phases of the claim or sales cycle are handled with utmost expertise.

Micro Machine Company
www.micromachineco.com

As a contract manufacturer in the medical device industry for nearly 40 years Micro Machine knows what it takes to get things done on-time, on target, and done right. •Industry leading DFM support •Quality/Regulatory support •Tailored VMI Programs •Design services •Prototyping •Customs As an FDA registered company utilizing validated special processes, be assured that your designs will meet all of today’s requirements. With exceptional workmanship standards at Micro Machine, your products will stand apart from the others in today’s market.

MiMedx
www.mimedx.com

MiMedx® is an integrated developer, processor and marketer of patent protected biomaterial products and tissues. Amniofix® dehydrated human amnion/chorion membrane (dHACM) allograft is uniquely processed through the Company’s patented PURION® Process, providing an easy to use, shelf-stable graft that modulates inflammation and offers barrier and surgical reconstructive properties for spinal procedures.

Misonix
www.misonix.com/bonescalpel

Misonix is a world leader in developing ultrasonic surgical devices for hard and soft tissue removal. The Misonix BoneScalpel is a unique ultrasonic osteotome for tissue-selective bone dissection that encourages en-bloc bone removal and refined osteotomies while sparing elastic soft tissue structures. Many leading surgeons have praised the BoneScalpel to be one of the most important advancements to enter spine surgery this decade. Please visit us at booth #1105 at NASS 2014 for more information.
Mitaka USA, Inc.  
[www.mitakausa.com](http://www.mitakausa.com)

The Mitaka KestrelView (KV) is an all-digital 3D microscope designed to streamline low magnification procedures by allowing surgeons to work off a full HD screen in 3D. This lets them maintain a comfortable ergonomic posture throughout the entire surgery. The KV is operated easily by surgeons who have not had microscopy training. Like any microscope, the KV is suitable for a wide variety of surgical applications and is limited only by its relatively small magnification of 5.5x.

Mizuho America, Inc.  
[www.mizuho.com](http://www.mizuho.com)


Mizuho OSI  
[www.mizuhosi.com](http://www.mizuhosi.com)

Mizuho OSI designs, manufactures, and markets Specialty Surgical Tables for spinal, orthopedic trauma and joint replacement procedures. Trios®, proAXIS®, INSITE® and the STS provide four versatile options for spine. PROfx®, hana® & hanaSSXT® are designed for orthopedic trauma/fractures and AA THA. As a multi-procedural table, INSITE® provides a platform for imaging as does Allegro®. Mizuho OSI also offers ProneView®, patient care kits and our Tempur-Pedic® Medical pressure management products.

Modernizing Medicine  
[www.modmed.com](http://www.modmed.com)

Modernizing Medicine is transforming how healthcare information is created and utilized to increase efficiency and improve outcomes. The Company’s product, Electronic Medical Assistant® (EMA™), is a cloud-based, specialty-specific electronic medical record (EMR) system designed to save physicians time. In 2013, Modernizing Medicine was named one of the top 50 of America’s Most Promising Companies by Forbes and the #2 Best Place to Work by the South Florida Business Journal.

MTS Systems Corporation  
[www.mts.com](http://www.mts.com)

Orthopaedic researchers and manufacturers worldwide depend on MTS to provide test systems that offer precision control for multiaxial test and simulation. MTS delivers innovative solutions for kinematics research, trauma studies, and biomaterial testing. By choosing MTS, you gain a partner who understands how to optimize test design and speed development.

Musculoskeletal Clinical Regulatory Advisers, LLC (MCRA)  
[www.mcra.com](http://www.mcra.com)

Musculoskeletal Clinical Regulatory Advisers, LLC (MCRA) is a highly specialized, independently-operated consulting firm and CRO serving the worldwide orthopedic industry. MCRA is a group of leading strategists committed to executing successful regulatory, clinical, quality assurance, healthcare compliance and reimbursement strategies. MCRA works with companies at all stages of development, whether they are single-product companies or companies with multiple technologies.

Musculoskeletal Transplant Foundation  
[www mtxf.org](http://www.mtxf.org)

MTF was founded by surgeons in 1987 with the goal of providing safe, high-quality tissue while advancing the science of tissue transplantation. MTF has distributed more than 5 million allografts from more than 90 thousand donors and has maintained an exemplary safety record while delivering a broad range of tissue forms.

Nadia International, Inc.  
[www.ronadro.com](http://www.ronadro.com)

Nadia International will display educational/surgical bronze sculptures specifically for the spine surgeon. These museum quality limited editions are created by the late Ronadro®. Ronadro® has over 7000 surgeons in 77 countries collecting his fine works of art. They are displayed at the Smithsonian and various medical universities all over the world. The Ronadro Collection will be introducing a new bronze sculpture “Cervical Decompression”.

Nanovis, LLC  
[www.nanovisinc.com](http://www.nanovisinc.com)

Nanovis’ mission is to lead our select markets with science-enhanced, life improving technologies. Nanovis has three advanced technology platforms, the FortiCore® implant family; a PEEK interbody system with a deeply porous titanium scaffold which has entered the U.S. market, and an advanced nanotechnology platform under development, and an innovative anti-colonization and antimicrobial implant platform also under development. Implant system and technology briefings are available at our booth.

Musculoskeletal Transplant Foundation  
[www.mtf.org](http://www.mtf.org)

Musculoskeletal Transplant Foundation

NeuroEnterprises, LLC  
[www.neuroenterprises.com](http://www.neuroenterprises.com)

NeuroEnterprises, LLC manufactures and sells innovative surgical instruments and disposable devices. Our flagship product is the ChicagoTip, a self-cleaning disposable suction. We design new instruments and make functional improvements on exiting instruments to improve surgical techniques and enhance overall surgical outcomes. Our engineering and product design teams work directly with surgeons to improve on the design and functionality of instruments currently used daily in the operating rooms.
<table>
<thead>
<tr>
<th>Company</th>
<th>Booth No.</th>
<th>Website</th>
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<tbody>
<tr>
<td>NeuronShield, LLC</td>
<td>663</td>
<td><a href="http://www.neuronshield.com">www.neuronshield.com</a></td>
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<tr>
<td>NeuroPro Spinal Jaxx, Inc.</td>
<td>133</td>
<td><a href="http://www.neuroprotech.com">www.neuroprotech.com</a></td>
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<tr>
<td>NeuroPro Spinal Jaxx, Inc. is a product development company specializing in next generation expandable cages for TLIF and PLIF approaches.</td>
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<tr>
<td>NeuroStructures Inc.</td>
<td>1688</td>
<td><a href="http://www.neurostructures.com">www.neurostructures.com</a></td>
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<tr>
<td>NeuroStructures is committed to bringing superior products to orthopedic and neurosurgeon specialists who focus on the treatment of spinal disorders and deformities. We combine innovative surgical solutions with world-class customer service to improve outcomes and patient quality of life. Additional information can be found at <a href="http://www.neurostructures.com">www.neurostructures.com</a>.</td>
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<td>Nevro</td>
<td>1935</td>
<td><a href="http://www.nevro.com">www.nevro.com</a></td>
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<tr>
<td>Headquartered in Menlo Park, Calif., Nevro Corp. is a medical device company that has developed an innovative, evidence based neuromodulation platform for the treatment of chronic pain.</td>
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<td>NEWS Orthopedics</td>
<td>861</td>
<td><a href="http://www.osteomedimplantes.com">www.osteomedimplantes.com</a></td>
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<tr>
<td>NEWS Orthopedics is a medical device company providing innovative spine technologies, focusing on optimal treatment of advanced degeneration, trauma and spondylolisthesis. Our goal is to attend to our surgeon’s needs to better serve their patients, by providing high quality implants and instrumentation. Come to visit us and find out how NEWS Orthopedics can be your best choice of products.</td>
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<tr>
<td>Next Health, LLC</td>
<td>551</td>
<td><a href="http://www.nexthealthusa.com">www.nexthealthusa.com</a></td>
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<tr>
<td>We understand the business of medicine and we are established to serve physicians and their practices by providing the resources they need to walk patients through their medical journey—from diagnosis and pain management to surgery and rehabilitation. Next Health is there every step of the way to enable patient healing and secure practice protection.</td>
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<tr>
<td>Next Orthosurgical, Inc.</td>
<td>1833</td>
<td><a href="http://www.nextorthosurgical.com">www.nextorthosurgical.com</a></td>
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<td>Next Orthosurgical is an international medical device company focused on the rapid development and distribution of innovative quality products. We’re experienced professionals using proven, advanced design and manufacturing methods. We’re guided by our surgeon customers and their patients to deliver safe, repeatable, and life changing solutions. We have a robust operational infrastructure that supports product manufacture, delivery, and expert service to our surgeons and distribution team.</td>
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<td>Nexus Spine</td>
<td>331</td>
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<td>Nexus provides novel, differentiated products for spine surgery. Our PressOn spinal fixation system features an ultra-low profile design; eliminates cross-threading and rod bending; provides a built-in revision feature, creates greater locking strength, using couplers 60-75% smaller than conventional tulips.</td>
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<tr>
<td>Nexxt Spine, LLC</td>
<td>1927</td>
<td><a href="http://www.nexxtspine.com">www.nexxtspine.com</a></td>
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<td>Nexxt Spine is a privately held medical device company dedicated to the treatment of painful and debilitation spinal pathologies. Through innovative product development, technologically advanced manufacturing platforms, and irreproachable quality standards, Nexxt Spine works toward increasing procedural efficiency and improving patient outcomes. All implant and instrument development, design, manufacturing, and distribution takes place within the company’s headquarters in Noblesville, Indiana.</td>
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<tr>
<td>Nordson MEDICAL</td>
<td>1604</td>
<td><a href="http://www.nordsonmicromedics.com">www.nordsonmicromedics.com</a></td>
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<td>Nordson MEDICAL provides innovative components, devices and custom OEM solutions for the delivery of fluids and biomaterials. Nordson Medical product lines include: Value Plastics precision plastic fluid components, Micromedics biomaterial delivery devices, and Avalon Laboratories catheters and tubing, along with a wide range of services and customized OEM solutions.</td>
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<td>Norman Noble, Inc.</td>
<td>1876</td>
<td><a href="http://www.nnoble.com/index.htm">www.nnoble.com/index.htm</a></td>
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<td>Norman Noble Inc. manufactures orthopedic devices and implants to customer specifications in compliance with FDA regulations and ISO 13485:2012. Full capabilities include seven-axis contour milling, Swiss machining, laser machining and welding, wire EDM, sinker EDM, turnkey Nitinol manufacturing, metal finishing and packaging. Prototype services are also available. Visit the company’s Web site for more information.</td>
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<tr>
<td>NovaBone Products</td>
<td>1684</td>
<td><a href="http://www.novabone.com">www.novabone.com</a></td>
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<td>NovaBone Products provides a best-in-class synthetic bone graft substitute. The unique bioactive grafting technology delivers an osteoconductive matrix while signaling and stimulating osteoblastic activity to the site. For ease of use and surgical convenience, NovaBone is available in a variety of forms and sizes along with multiple delivery options.</td>
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NuTech 1733
www.nutechspine.com
NuTech is a leading biologics and medical device company that provides an integrated portfolio of innovative products. They offer a wide range of allograft tissue products, a full line of spinal implants, and a complete line of innovative products taking advantage of the unique properties of the amniotic tissues and fluids. NuTech is dedicated to providing new technologies that will benefit surgeons, hospitals, and most importantly, patients.

NuVasive 1647, 325, 327
www.nuvasive.com
NuVasive is an innovative global medical device company that is changing spine surgery with minimally disruptive surgical products and procedurally integrated solutions for the spine. Our mission is to improve the lives of patients who suffer from debilitating back, neck, or leg pain by creating cutting-edge products and procedures that revolutionize spine surgery through focusing on Speed of Innovation®, Absolute Responsiveness®, and Superior Clinical Results.

Online Chiro 960
onlinechiro.com
Getting a beautiful chiropractic website should be easy. And with Online Chiro, it is. You can equip your practice with a professionally designed website for as little as $39.95 a month. No setup fees, no contracts, no obligations, no hidden charges—just a quality website tailored to your practice with a library of customizable content.

Orca Health Inc. 1715
www.orcahealth.com
Orca Health develops patient engagement software for healthcare providers. This software is an indispensable tool that allows them to effectively educate their patients, thereby enabling the patient to make an informed decision about their care. All information reviewed during the consult is then shared via a HIPAA-secure portal. Patients can securely access all patient education content, notifications from their provider, and satisfaction and outcomes surveys.

Orchid 1411
www.orchid-ortho.com
Orchid strives to affect people’s lives in a positive manner. We feel very fortunate and proud to be working in an industry that has the ability to impact lives in such a profound and positive way. With a comprehensive portfolio of services, every Orchid employee is motivated to work with you from start to finish, or at any step in the development process, to deliver the most innovative products possible and provide the best total supply chain value.

Ortho Development 1512
www.odev.com
Ortho Development® designs and manufactures spinal fusion and fixation devices along with related surgical instrumentation. Engineered for superior clinical results and ease-of-use, Ortho Development currently offers a lumbar pedicle screw system, a cervical plate, as well as a full complement of PEEK. Distribution opportunities are available.

Ortho Kinematics 1851
www.orthokinematics.com
Ortho Kinematics, Inc. (OKI) is an imaging informatics company focused on spinal diagnostics. OKI’s FDA cleared Vertebral Motion Analysis (VMA) system uses fluoroscopy imaging and proprietary analytical software to provide accurate and precise measurements in the detection of spinal instability. Clinical studies show the VMA results are significant improvements to imaging efficacy and performance when assessing spinal instability. OKI’s goal is to become spine’s new diagnostic standard of care.

Orthofix 1447
www.orthofix.com
Orthofix is a diversified, global medical device company focused on developing and delivering innovative repair and regenerative solutions to the spine and orthopedic markets. Our products are designed to address the lifelong bone-and-joint health needs of patients of all ages, helping them achieve a more active and mobile lifestyle.

Orthomed, Inc. 1496
www.orthomedinc.com
The Surgical Instrument Specialists offering one of the largest selections of orthopedic and spinal instruments. We provide innovative instruments to aid surgeons in new and evolving surgical techniques. We work with surgeons to design, engineer and produce custom and specialty instruments for the industry.

Orthopaedic Solutions Center 1841
www.my-osc.eu
OSC is membered by HTI & Forecreu of France and Sayan of Turkiye. HTI is professionalized in HA coating & ceramic component manufacturing whereas Sayan’s expertise is designing & manufacturing orthopedic and spinal instruments as well as implants on OEM/OBL bases. Forecreu is world leader in high speed & cannulated bars of SS & Ti for instruments and implants. With unified cooperation, OSC is glad to offer complete solution as a partner to all orthopedic and spinal implant manufacturers worldwide.
OrthoPediatrics Corp is a privately held global leader of orthopedic surgical systems focused exclusively on providing pediatric orthopedic surgeons quality and innovative products in children's hospitals. The Company is the only end-to-end provider of pediatric surgical implants and instruments and has the only global pediatric sales and distribution system in the orthopedic industry.

Orthopedic Design & Technology
www.odtmag.com

ODT is recognized as the industry-leading publication, widely recognized for its in-depth, high-quality coverage of the specialized field of orthopedic product development and manufacturing. With each issue, ODT offers readers comprehensive feature articles, industry news, trends and up-to-date market data on the ever-evolving orthopedic sector. With 7,500 subscribers ODT reaches key decision makers who look to ODT as their No. 1 source for information. Visit www.odtmag.com for more information.

ORTHOREBIRTH Co., Ltd.
www.orthorebirth.com

We are manufacturing the new shaped Synthetic Bone, which is the cotton-like Bone Void Filler named “REBOSSIS” This is made from B-TCP, Calcium Carbonate, Silicate and PLLA. We have already submitted the 510(K)Application for Trauma usage at Aug 1 2014. We will start to sell this product from 2015.

Osseon, LLC
www.osseon.com

Osseon® develops, markets, and distributes minimally invasive devices for the treatment of vertebral compression fractures (VCF). Headquartered in Santa Rosa, CA, the company’s steerable, articulating devices and delivery systems provide safe and effective solutions while offering significant advantages in efficiency and cost. At Osseon our goal is to improve the quality of life for patients and provide healthcare professionals with innovative treatment options for VCFs.

Ossur Americas
www.ossur.com

Össur, a leader in Injury Solutions, offers industry proven brands like Miami J®, Resolve® Halo, Occian™ Back, and Miami Lumbar® LSO and TLSO. Össur’s complete spinal care system and fracture management solutions meet the specialized needs of the healthcare provider and patient during each phase of the continuum of care.

OsteoNovus
www.osteonovus.com

OsteoNovus Inc. is a start-up orthopedic medical device company focused on the development of biologic materials to support and regenerate bone. Our innovative calcium phosphate based technology will be available as moldable putty and an injectable cement for spine, trauma and orthopedic surgery for treatment of bone voids, various fractures and spinal disorders.

Otto Trading Inc.
www.irestmassager.com

Oxford Performance Materials, Inc.
www.oxfordpm.com

OsteoFab Technology accelerates the speed at which implants are designed, manufactured, and cleared for sale. The OsteoFab platform combines design, material, 3D printing, quality management, and regulatory clearance into one streamlined process. The result is a faster and more predictable path to market. OPM has three FDA clearances for the following products: OsteoFab Patient Specific Cranial Device OsteoFab Patient Specific Facial Device SpineFab VBR System

Ossur Americas
www.ossur.com

Osprey Biomedical/Skye Biologics
www.ospreybiomedical.com

Osprey Biomedical Corp/Skye Orthobiologics are orthobiologics companies teamed with surgeon design and innovation to maximize fusion and patient’s outcomes through the use of natural biologics. Our focus is designing, manufacturing and supporting a full line of spinal allograft bio-implants, amniotic biologics, barriers, DBM putties, sponges and demineralized cancellous strips.
Pacira Pharmaceuticals, Inc. is a specialty pharmaceutical company focused on the development of products that meet the needs of acute care practitioners and their patients. Its lead products, EXPAREL (bupivacaine liposome injectable suspension), was launched in 2012. EXPAREL utilizes the Pacira proprietary delivery technology DepoFoam. For more information, visit http://www.pacira.com.

PAK Manufacturing Inc.
www.pakmanufacturing.com

PAK Manufacturing, Inc. has become the leading supplier of forging based specialty and custom hand held instruments to the spinal and orthopaedic industry. An extensive inventory of forgings and manufacturing in the USA allows us to provide quick solutions to customer’s needs. We take great pride in our reputation for quality, value and on time delivery. In house manufacturing capabilities include milling, grinding, heat treating, passivation and polishing, FDA registered.

Pan Med US
www.pan-medical.co.uk

Pan Medical, a worldwide leader in interventional radiology, has dominated international markets for the last five years with its Kyphoplasty product range. Our extensive range of products feature 8 and 10 gauge balloons and fully equipped Kyphoplasty kits. All of our high quality products are British made with full FDA approval and are available from our head offices in Tampa, Florida. Visit us at our booth 1182 to find out more information on our revolutionary new multi-directional cannula.

Paradigm BioDevices, Inc.
www.paradigmmediadevices.com

Paradigm BioDevices, Inc. specializes in novel spinal technologies including Interplate™ a system based solution to simple and complex spinal care; and the QuickDraw Bone Harvester® for harvesting and collecting autogenous bone graft.

Paradigm Spine, LLC
www.paradigmspine.com

Paradigm Spine, LLC was founded in 2005 to be a leader in the field of non-fusion spinal implant technology. Paradigm Spine, LLC has successfully received FDA PMA approval of the coflex® interlaminar stabilization device in the United States in October of 2012. The coflex® technology has been implanted in more than 100,000 patients, and is selling in over 45 countries. The core market for coflex® is lumbar spinal stenosis patients.

Paramed Medical Systems
www.paramedmedicalsystems.com

Paramed Medical Systems is an MRI OEM, and the company’s flagship product, the MROpen system, is the only superconductive MRI with a “totally open” magnet design, that allows Multi-position imaging including advanced weight-bearing and functional studies, besides providing the highest comfort for patients.

PHAMEDICA
www.phamedica.com

We are manufacturer of Spinal Implants and Orthopedic Implants our success key is Honesty, Mutual understanding and collaboration with all our customers, bringing advanced design and efficient product yet keeping operation with our system simple and quick. We have a vast production capacity due to our techniques and production personnel experience. For making the spinal implants we are the one!

Philips Healthcare
www.healthcare.philips.com

About Royal Philips Royal Philips (NYSE: PHG, AEX: PHIA) is a diversified health and well-being company, focused on improving people’s lives through meaningful innovation in the areas of Healthcare, Consumer Lifestyle and Lighting. The company is a leader in cardiac care, acute care and home healthcare, energy efficient lighting solutions and new lighting applications, as well as male shaving and grooming and oral healthcare. News from Philips is located at www.philips.com/newscenter.

Phillips Precision Medicraft
www.phillipsmedicraft.com

Manufacturing engineers with hands-on machining experience are uniquely capable of ensuring an OEM’s complete vision. Functioning like a natural extension of your business, a team like this can solve manufacturing challenges quickly and cost effectively. PPM proudly offers this team to every OEM we serve.

PHYSICIAN OWNED SURGERY CENTERS (“POSC”) owns and operates 70+ multi-specialty and profitable ambulatory surgery centers in partnership with physicians. We also acquire centers for the purpose of expanding/restructuring them.

Pinnacle Spine Group
www.pinnaclespinegroup.com

Pinnacle Spine Group was founded with the focused goal of developing innovative medical devices, conceived in the operating room, for surgical procedures of the spine. The objective for every device and instrument we develop is a better outcome for the patient, and a better experience for the surgeon and operating room staff. If we can’t create something innovative, we won’t do it at all. If you have your own innovative idea, bring it to us to help bring it to life.
ProScan combines our unparalleled radiologic expertise; educational heritage and vast MRI center development to bring you the performance and responsiveness that breeds trust and satisfaction. Quality reads by board certified fellowship trained MSK Radiologists. ProScan: Getting the quality and economics right!

ProScan Reading Services: World Leader in MSK MRI Interpretations. ProScan combines our unparalleled radiologic expertise; educational heritage and vast MRI center development to bring you the performance and responsiveness that breeds trust and satisfaction. Quality reads by board certified fellowship trained MSK Radiologists. ProScan: Getting the quality and economics right!

ProScan Reading Services                   849
www.proscan.com

Prosidyan was founded in 2009 to develop a family of synthetic bioactive bone graft substitutes based on microscopic fibers of bioactive glass. Prosidyan’s first product, FIBERGRAFT® BG Morsels was FDA cleared in March 2014 as a bone void filler and has since been successfully used in hundreds of surgeries. FIBERGRAFT® BG Putty is FIBERGRAFT® BG Morsels delivered through Prosidyan’s proprietary bioactive carrier OSSIGLIDE™.

Prosidyan                   1493
www.prosidyan.com

ProTech Medical Inc.                   1700
www.protechmed.com

ProTech Medical Inc. is a contract manufacturer of orthopedic implants and instruments with a focus on spine, extremities, trauma and sports medicine. We are ISO 13485:2003 Certified. Our Implant and Instrument divisions have their own separate Quality Engineering, Production Engineering, and Operating Management. The Instrument Division operates out of the Warsaw and Rome City facilities, while the Implant Division is only located at the Warsaw facility.

Precision Medical Technologies, Inc. is a contract manufacturer of orthopedic implants and instruments with a focus on spine, extremities, trauma and sports medicine. We are ISO 13485:2003 Certified. Our Implant and Instrument divisions have their own separate Quality Engineering, Production Engineering, and Operating Management. The Instrument Division operates out of the Warsaw and Rome City facilities, while the Implant Division is only located at the Warsaw facility.

Precision Medical Technologies, Inc.   1408
www.premedtec.com

Precision Spine Inc.                   1283
www.precisionspineinc.com

Take a Closer Look at Precision Spine. See the new ReForm™ Pedicle Screw System for thoracolumbar correction, and MD-Max™ ULIF Minimally Invasive Access System, a versatile, minimally disruptive “access/fixation” device. Precision Spine applies advanced technologies to produce products that continually improve patient recovery and overall surgical outcomes. We are dedicated to providing innovative spine products to help treat serious orthopedic medical conditions in a cost effective manner.

Premia Spine is commercializing the ProMIS™ Fusion System, a pedicle screw based solution for MIS lumbar fusion. Premia is launching a prospective, randomized IDE trial on the TOPS™ System, an alternative to lumbar fusion for patients suffering from spinal stenosis and/or degenerative spondylolisthesis. Interested surgeons and distributors should stop by our booth. Inquiries can be directed to Ron Sacher at ronsacher@premiaspine.com TOPS is an investigational device, limited to institutional use.

Premia Spine                   1709
www.premiaspine.com

ProGuard brand radiation reducing surgical gloves.

ProGuard - Radiation Reducing Surgical Gloves. Come visit with an innovative and leading manufacturer of Radiation Safety Products at booth 1700. ProTech offers an extensive line of lead glasses including major brands such as Bebe, Gucci & Nike. ProTech also manufactures lightweight lead and non lead aprons. Design your own apron from the inside out with our newest LuxRay brand aprons! Ask about our mobile acrylic barriers. We are also the largest supplier of the ProGuard brand radiation reducing surgical gloves.

Protech Medical                   1700
www.protechmed.com

ProTech Medical is a privately held medical device company developing innovative solutions addressing the $1 billion worldwide cervical spine market. We are commercializing the DTRAX platform of differentiated cervical implants and instruments to treat cervical degenerative disease through indirect decompression and fusion.

Pyxidis Medical Technologies is a global leader in the design, development, manufacturing and sales of a wide range of medical products. Their products are sold through a variety of medical device companies around the world. Pyxidis specializes in the design and manufacture of customized sterilization cases and trays. We are one of the market leaders and a preferred contract manufacturer for major orthopaedic OEMs. Our R&D capabilities enable us to implement your tray design and manage several of your projects at once. We multiply all combinations of materials to satisfy all expectations and market specifications on a worldwide basis. Pyxidis, quality and expertise are our first intention.

Pyxidis Medical Technologies      1103
www.pyxidis-medical.com

Quinn Medical improves lives with the world’s finest non-invasive orthopedic products and programs designed to prevent injury, relieve pain, and restore function. Simply stated: we help people get Back in Motion™. Please join us at booth #1818 to learn more about Quinn Medical and our revolutionary SLEEQ™ Spinal Therapy System.

Quinn Medical, Inc.               1818
www.quinnmedical.com

Quinn Medical, Inc. is a contract manufacturer of medical products and programs designed to prevent injury, relieve pain, and restore function. Quinn Medical offers superior compliance for the patient. All of our braces have PDAC approved L-codes.

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Ranfac Corp.  638
www.marrowcellution.com

The patent pending Marrow Cellution Bone Marrow Aspiration System overcomes the limitations of traditional bone marrow needles by allowing the user to aspirate in a measured and controlled manner over a large geography inside the marrow space, while restricting peripheral blood infiltration. For a product demonstration and to speak with a Marrow Cellution representative, please visit us at booth #638.

Renovis Surgical Technologies, Inc.  1609
www.renovis-surgical.com

Renovis Surgical Technologies is pioneering the use of additive manufacturing for spinal implants. Using this technology, our Tesera™ line of porous titanium interbody fusion cages feature truly porous upper and lower contact surfaces, providing an optimum scaffold for bone ingrowth from the vertebral endplates. A solid titanium core provides strength and allows for a large graft chamber. Featured at NASS is our Tesera Stand-alone ALIF cage, with integrated screws and locking cover plate.

RevMed Inc.  650
www.revmedinc.com

RevMed is focusing cell based product such as Blood stemcell, Bone marrow stemcell, Adipose stemcell, [TriCeLL PRP / TriCeLL BMC / AdiCeLL] And also we are concentrating minimally invasive herniated disc treatment system such as PdCT system, [Safer and effective than RF and normal conventional lasers] We also have a pain control laser named Healthera (1064nm Nd:Yag) for sport medicine clinics, anesthesia clinics and orthopedic clinics. Please visit our website for more detail information. Thanks.

Richard Wolf Medical Instruments  1351
Corporation
richardwolfusa.com

RICHARD WOLF

spirit of excellence

Richard Wolf is a world leader in spine endoscopy, featuring high-definition working channel endoscopes and innovative instrumentation enabling a wider range of surgeries through a smaller incision. See how MIS has evolved with endoscopic techniques and instrument sets for discectomy, foraminoplasty, rhizotomy, and central canal decompression. Learn more and meet the experts at the NASS Solutions Showcase on Wednesday and at lectures in our booth every day.

RMS Surgical  1703
www.rms-surgical.com

RMS Surgical is a contract manufacturer of sterilization Cases & Trays and custom Surgical Instruments. Formed in 2012 through a consolidation of Juno Inc.’s Case / Tray and RMS Company’s Instrumentation operations, RMS Surgical is an integral part of the Cretex Medical family of companies providing innovative and unique manufacturing solutions to medical device OEM’s. Our other Cretex Medical companies include RMS Co., Meier Tool, JunoPacific (with Wickstrom Rapid Tooling) and Spectralytics.

Rose Micro Solutions LLC  1046, 1307, 1719, 1743
www.rosemicrosolutions.com

Rose Micro Solutions sells High Quality Optical Loupes & LED Lights for Less! Our Loupes start @ $279.00. We are a “Family” Business consisting of 4 Brothers. We named the company after our Mother “ROSE”. Stop by Booth(s)# 1046, 1307, 1719, 1743 to see for yourself. Or visit us online @ www.rosemicrosolutions.com. 716-608-0009 Make sure you stop by and say Hi to the “ROSE” Brothers!

Rose Micro Solutions LLC  1046, 1307, 1719, 1743
www.rosemicrosolutions.com

rose plastic USA, LLP  863
www.rose-medipack.com

Rose plastic medical packaging develops, produces and sells worldwide intelligent plastic packaging products for medical engineering, dental, healthcare, laboratory and diagnostics. Choose the best solution from our diverse standard tubes, boxes, cassettes and cases or let us work with you to develop your own special packaging requirement.

RTI Surgical Inc.  1639, 433
www.rtisurgical.com

RTI Surgical is a leading global surgical implant company providing surgeons with safe biologic, metal and synthetic implants. Committed to advancing science, safety and innovation, RTI’s implants are used in sports medicine, general surgery, spine, orthopedic, trauma and cardiothoracic procedures and are distributed in nearly 50 countries. RTI is headquartered in Alachua, Fla., and has four manufacturing facilities throughout the U.S. and Europe.

Safe Orthopaedics  1295
www.safeortho.com

Safe Orthopaedics is focused on enhancing the cost-effectiveness, safety and efficiency of orthopedic implant and instrument systems through a new model of single-use, sterile and traceable procedure kits. By streamlining the expensive, complex and inefficient process by which implant systems are delivered, Safe Orthopaedics endeavors to dramatically improve the value proposition of these procedures.

Sawbones  1472
www.sawbones.com

For over three decades, Sawbones, the originators of “hands on” workshop models continues to be the leader in anatomical models for medical education, new product demonstration, sales training, and patient awareness. In addition to over 2000 products, Sawbones offers complete product development to meet company and teaching institution custom specifications.
SBH
www.sbhsurgical.com
SBH is a medical device company focused on a streamlined supply chain and operational efficiency, offering a comprehensive line of premium surgical hand-held instruments for use in Neuro, Spine, Vascular and many other Surgeries. SBH offers also a wide range of surgical retractor systems such as abdominal, bariatric. At SBH, we pledge an uncompromising commitment to the excellence. For more information visit us online at www.sbhsurgical.com.

SeaSpine
www.seaspine.com
SeaSpine is a global medical technology company focused on the design, development and commercialization of surgical solutions for the treatment of patients suffering from spinal disorders. SeaSpine has a comprehensive portfolio of orthobiologics and spinal fusion hardware solutions to meet the varying combinations of products that neurosurgeons and orthopedic spine surgeons need to perform fusion procedures on the lumbar, thoracic and cervical spine.

Shandong Guanlong Medical Utensils Co., LTD
www.cnzjp.com
Shandong Guanlong Medical Co., Ltd is the industry leading developer and manufacturer of orthopedic and spinal instruments in China. Based on over twenty years of experience, we have built an extensive sales network and enjoy an excellent reputation in our market. With the aim to share our experiences and help more customers benefit from our products, we are now opening ourselves to the world. More information visit us at www.cnmi.cc.

Showa Ika Kohgyo Co.,LTD.
www.showaika.com
Showa Ika is Japan’s leading spinal device producer; creating innovative, safe, easy-to use instruments and implants for use in spinal surgery. Our products are globally recognized by leading physicians for their outstanding quality and clinical efficacy. We offer our customers: • high quality, reliable and innovative spinal implants and instruments. • flexible, competitive pricing. • outstanding delivery and service. • access to our in-house research and development team.

Shukla Medical
www.shuklamedical.com
Shukla Medical, innovators of Xtract-All® and leading manufacturer of cutting-edge universal implant extraction systems is dedicated to meeting the needs of the medical industry. Our CTL Total Spine Implant Removal System is the first “truly” universal spine extraction system to encompass all the instruments needed to remove virtually all cervical, thoracic and lumbar locking nuts, screws and plates commonly used in today’s orthopedic/spine procedures.

SI-BONE, Inc.
www.si-bone.com
SI-BONE, Inc. is the leading sacroiliac (SI) joint medical device company dedicated to the development of tools for diagnosing and treating patients with low back issues related to SI joint disorders. The company is manufacturing and marketing a minimally invasive surgical (MIS) technique for the treatment of SI joint pathology.

Siemens Healthcare
usa.siemens.com/healthcare
Siemens Healthcare helps providers meet clinical, operational and financial challenges. A global leader in medical imaging, laboratory diagnostics and IT, we understand the entire care continuum—from prevention and early detection to diagnosis and treatment. For more: usa.siemens.com/healthcare

SIGNUS
www.signus.com
SIGNUS has a worldwide reputation for developing innovative and safe solutions for the treatment of spinal disorders using cutting-edge technology. The extensive portfolio includes fusion cages, prosthesis, ACDR, fixation and deformity systems. SIGNUS is also spearheading treatment for the problematic indication of SI pain. With the ST Line™ product family, SIGNUS recently introduced porous structural titanium, a material designed to provide a 3-dimensional framework for spinal fusion.

Simplify Medical, Inc.
www.simplifymedical.com
Simplify Medical, Inc. is developing the most advanced cervical artificial disc that enables MRI imaging, the preferred and most accurate modality for evaluating soft tissue in the spine. MRI imaging avoids the risks of ionizing radiation from CT scans. Simplify Medical is committed to providing artificial discs with advanced materials, MRI-imaging capability, kinematics, and lower heights to accommodate a wide range of patients.

Sintea Plustek
www.sinteaplustek.com
Established in 1987 near Milano, Italy, Sintea Plustek develops several innovative spine systems for the treatment of a broad range of spinal disorders. Sintea Plustek’s engineering capabilities allow for advanced research and projects to meet the needs of patients and spine surgeons. Our products line include Posterior Lumber System, Dorso-Lumbar Somatic Cage, Anterior Cervical Plate, PLIF, TLIF, and Pedicle Cement Dispenser.
Solco Biomedical Co., Ltd. 963
www.solco.co.kr
Solco Biomedical is a manufacturer and global supplier of spinal implants and instrumentation focused on developing innovative surgical solutions. We are dedicated to exploring cost-contained approaches and less-invasive surgical options that provide optimal outcomes for the surgeon and patient.

Solvay 1483
www.SolvaySpecialtyPolymers.com
Solvay manufactures high-performance plastics and biomaterials. Zeniva® PEEK is offered for use in implantable devices. Radel® PPSU is a remarkably tough plastic able to withstand over 1,000 autoclave cycles without significant loss of mechanical properties. Ixef® PARA delivers very high strength and stiffness for replacing metal in single-use instruments.

Southern Spine, LLC 1610
www.southernspine.net
Southern Spine features the StabiLink® MIS Interlaminar Spinal Fixation System along with the innovative, patented PG® Precision Guided Inserter/Compressor that redefines ease of use. The StabiLink® System is the new standard in minimally invasive spinal fusion providing the missing link between conservative therapy and more traditional invasive spinal fusion procedures. The StabiLink® Interlaminar System has the most anatomical selections and should be a part of every surgeon’s armamentarium.

SpecialtyCare 535
www.specialtycare.net
In the OR, you want real-time, critical information to make the best possible decisions for your patient. SpecialtyCare’s certified neurophysiologists and oversight physicians keep you informed immediately even in the most complex situations. And, because we’re committed to leading-edge research, you’ll have state-of-the-art knowledge at your disposal. When you want the certainty of clinical excellence, choose SpecialtyCare™. Visit us at booth 535 and online at www.specialtycare.net.

Spinal Balance 735
www.spinalelements.com
Spinal Elements develops innovative technologies for traditional and MIS procedures. The portfolio includes: Lucent® Ti-Bond® (Titanium Coated PEEK Interbody Devices) in PLIF, TLIF, and ALIF; Hero® Allograft (proceeds donated to charities benefiting children with life-threatening medical conditions); Vertu® Stand-Alone ACDF; Magnum® Stand-Alone ALIF; Sapphire® Anterior Cervical Plate; Mercury® Classic Pedicle Screw and Mercury MIS System; and Lotus® Posterior Cervical/Thoracic System.

Spinal Kinetics 1415
www.spinalkinetics.com
Spinal Kinetics develops, manufactures and markets innovative systems that treat degenerative spine diseases. The M6® artificial disc is the first motion preservation device intended to replicate the anatomic and biomechanical attributes of a natural disc, preserving the spine’s range and quality of motion. The SiNTx™ line of interbody fusion devices, made from a composite silicon nitride biomaterial, have a hydrophilic surface texture that promotes osteointegration and inhibits biofilm.

Spinal News International 660
www.cxvascular.com/spinalnews
Spinal News International Specialised, quarterly, newspaper dedicated to spinal specialists. It contains the latest news, opinion from thought leaders, summaries of cutting-edge research, expert analysis, conference coverage and information and updates on the latest products in the spinal world. Geographical distribution: Europe and North America by post, worldwide on the web. For subscription, please visit www.spinalnewsinternational.com/register.

Spinal Simplicity 1489
www.spinalsimplicity.com
Spinal Simplicity is dedicated to the creation of innovative simple solutions to treat complex spinal and orthopedic conditions through three distinct product platforms: Minimally Invasive Lumbar Fusion, Cervical Fusion and Extremities. The Minuteman®G3 MIS Fusion Plate, can be implanted through a Lateral MIS approach or a Posterior MIS approach, reducing the trauma to healthy tissue without compromising fixation. The Minuteman®G3 has FDA clearance and is now for sale in the United States.

The Spine Health Foundation 758
www.spinehealthfoundation.org
The Spine Health Foundation, Inc. (SHF) is a tax-exempt 501(c)(3) non-profit organization dedicated to providing “the working poor” access to specialized spine care. There are 3 vital components of SHF: Education, Encouragement & Healing Solutions. These three programs round out a total care treatment plan for recipients to regain their physical & emotional well-being through The Spine Health Foundation. Through SHF, individuals can find hope of getting past the pain and back to life!
Spine Surgery Today and Healio.com by SLACK Incorporated
www.healio.com/spine
SLACK Incorporated, delivering the best in health care information and education worldwide, invites you to booth #1468. Pick up a free issue of SPINE SURGERY TODAY, ORTHOPEDICS TODAY and ORTHOPEDICS. Sign up for the free news wire at Healio.com/spine.

Spine Universe, a Vertical Health Property
www.spineuniverse.com
SpineUniverse.com is the most comprehensive web resource in spine with over 6,000 articles dedicated to patient and physician education. SpineUniverse offers medical professionals a search-optimized practice listing, an extensive condition-based and searchable case library, news on the latest spine-related technologies, and more. Join our survey panel to participate in honorarium-compensated surveys—your opinions help shape the future of spine care.

Spine Wave
www.spinewave.com

Spineart
www.spineaart.com
Spineart is one of the fastest growing privately held spine companies, with a leading position in the European market and representation in more than 55 countries worldwide. Spineart established its US presence in 2009, providing to distributors, hospitals and surgeons a unique offer: Sterile-packed, barcoded implants and a compact set philosophy. Spineart introduced clinically validated technologies in Minimally Invasive Surgery, Motion Preservation, Fusion, Biologics, and Fractures Treatment.

SpineCraft
www.spinecraft.com
SpineCraft is a privately-held, US medical device company founded in 2004 by a group of medical professionals and spine executives. The company creates intelligent solutions by listening to surgeons. Surgeon input remains central to the way we approach improving existing products or work on new ideas: from our Medical Advisory Board to the individual surgeons who work with us on product development. We hear and see, first-hand, the concerns and obstacles surgeons encounter.

SpineGuard, Inc.
www.spineguard.com
SpineGuard provides the tools equipped with DSG™ (Dynamic Surgical Guidance) Technology to enhance spinal surgery. Devices built with DSG Technology give real-time audio and visual feedback to improve the accuracy of pedicle screw placement, without the need for ancillary equipment. These devices have assisted spine surgeons in accurately placing pedicle screws in approximately 40,000 spinal procedures around the world. Visit www.spineguard.com for more information.

Spineology
spineology.com
Spineology, the innovator in anatomy-conserving™ spine surgery, develops spinal implants and instruments. Spineology surgical techniques conserve spinal bone, ligament and muscle tissue. Spineology is committed to increasing procedural efficiency, reducing surgical morbidity and accelerating patient recovery. Learn more at spineology.com.

Spinesearch
www.spine-search.com
SpineSearch is an organization that provides recruitment services for spine practices. SpineSearch is led by experts in the industry who are knowledgeable about every dimension of the field. We invoke a commitment to those employed in the industry and can assist with all of your clinical and non-clinical recruitment needs.

SpineVision
www.spinevision.com
SpineVision® is a privately-owned integrated spinal technology company focused on the development and marketing of implants and instrumentation for spinal treatment. Since its foundation in 1999, the company has designed innovative products which offer key advantages to surgeons and benefits to patients. SpineVision’s current products offer solutions for approximately 90% of spinal pathologies i.e. lumbar degenerative disc diseases, deformities, cervical disorders, trauma and tumors.

SpineWave 2016
www.spineweek.org
We are pleased to announce SpineWave from 16 to 20 May, 2016 in Singapore. The idea to have a joint meeting bringing together several spine societies at the same time and at the same place originated around the turn of the century. SpineWave 2012 in Amsterdam was a great success with more than half the attendees being Asian. This incited the SpineWave committee to move east for the 2016 SpineWave meeting, and we are pleased to announce the conference from 16 to 20 May, 2016 in Singapore.
St. Teresa Medical Inc.

www.stteresamedical.com

St. Teresa Medical has developed a novel hemostatic sealant dressing called SURGICLOT. The company is nearing completion of its human clinical with great results. CE marking is expected in Q1 2016. SURGICLOT will be the only approved treatment for cancellous bone bleeding. The dressing dissolves in seconds to minutes and leaves nothing behind but a robust clot to seal the injury. The company will market and distribute its products through strategic partners in the OUS and US markets.

Stability Biologics

www.stabilitybio.com

Stability Biologics, based in Nashville, Tennessee is a rapidly growing organization focused on providing innovative products for spinal surgery, orthopedics, sports medicine and advanced wound care. Stability provides a full range of allograft and synthetic tissue including cellular repair products, structural and flowable bone products and sports medicine grafts.

Stryker

www.stryker.com

Stryker is one of the world’s leading medical technology companies and together with our customers, we are driven to make healthcare better. The Company offers a diverse array of innovative medical technologies, including reconstructive, medical and surgical, and neurotechnology & spine products to help people lead more active and more satisfying lives. Stryker products and services are available in over 100 countries around the world. For more information, please visit www.stryker.com.

Surface Dynamics/Eurocoating

www.sdbioc coatings.com

Surface Dynamics/Eurocoating are medical device coating companies with State-of-the-Art manufacturing facilities in Cincinnati, Memphis & Trento-Italy offering the best in coating technology: CP–Titanium, TiGrowth-C & Hydroxyapatite (HA) Coating, (Osprovit) are applied to any device including PEEK. We also supply Additive Manufacturing Technology—DMLS & E-Beam Sintering services with full service metallurgical laboratories. SD & EC are ISO 13485 Approved/21 CFR 820 Compliant.

SurgiT el/General Scientific Corporation

www.surgitel.com

SurgiT el’s mission is to offer customers the best in vision, comfort and ergonomics. Our patented lightweight optics and LEDs, coupled with Oakley frames, means all-day-comfort for the clinician. SurgiT el’s unmatched loupe declination angle means your body is in the correct ergonomic position, reducing pain and the risk of injury. Our loupe mounted SurgiCam Pro digital video camera and our PrismPro loupe line (5.5x-8.0x) can only be seen at SurgiT el.
TEKNIMED
www.teknimed.com

TEKNIMED is recognized as the reference in BIOMATERIALS devices for Orthopaedics and Spine. TEKNIMED designs, develops and manufactures a full range of medical devices. Synthetic & Resorbable Bone Substitutes, Orthopaedic-Cranioplasty Cements, Vertebroplasty & Kyphoplasty Cements, Biodegradable Polymers, Biodegradable Ligaments. TEKNIMED’s innovative and patented medical devices have provided numerous, scientifically proven, surgical solutions for Orthopaedics, Spinal, Dental-CMF and Trauma.

Thieme Medical Publishers
www.thieme.com

Thieme is an award-winning international medical and scientific publisher serving health professionals and students for over 125 years. Thieme promotes advancements in clinical practice, publishes the latest research, advocates medical education, and is known for the high quality and didactic nature of its books, journals, and electronic products. Thieme’s entire spine surgery library is now available on the searchable online platform Thieme eSpine. Stop by the booth for your free trial today!

Thompson Surgical Instruments, Inc.
thompsonsurgical.com

Thompson is a leader in spine exposure and the original manufacturer of the table-mounted retractor. We understand the value of exposure in surgery and are dedicated to providing innovative, high quality systems that deliver safe, versatile, and low-profile retraction. From MIS to open, we offer unlimited customization and safe, independent, retraction.

Titan Spine
www.titanspine.com

Titan Spine, LLC is a surface technology company focused on the design and manufacture of interbody fusion devices for the spine. The company is committed to advancing the science of surface engineering to enhance the treatment of various pathologies of the spine that require fusion. Titan Spine, located in Mequon, Wisconsin and Laichingen, Germany, markets a full line of Endoskeleton® interbody devices featuring its proprietary textured surface. To learn more, visit www.titanspine.com.

TranS1
www.TranS1.com

TranS1® is focused on bringing innovative technologies to the market by using surgeon inspired designs that yield excellent outcomes for degenerative spine conditions. TranS1 collaborates with surgeons to build, protect and commercialize surgeon-driven innovations. AxiaLIF+ is a safe, reproducible procedure that uses a presacral approach. It delivers excellent biomechanical stability, preservation of native anatomy, good fusion rates, and low complication rates. Building a Strong Foundation!

Tribe Medical, LLC
www.tybermedical.com

Tyber Medical, a private label original equipment manufacturer (OEM), is creating new pathways to regulatory approved implants and instruments for orthopaedic companies, distributors, and hospital organizations. Tyber Medical designs and develops class II orthopaedic systems; verifies and validates those systems using a QSR and ISO 13485 certified quality system; and pursues and maintains both US (FDA 510(k)) and OUS (CE Mark) regulatory approvals. For more information, visit www.tybermedical.com

UBS Financial Services
www.ubs.com/team/tategroup

For over 150 years, UBS has been committed to bringing its global resources to bear on the portfolios of high net worth individuals to help them achieve their wealth management goals. Customized solutions are delivered by The Tate Group who is uniquely aligned to help give clients the confidence in reaching their goals no matter what the environment.

Vertebral Technologies
vti-spine.com

Vertebral Technologies, Inc. (VTI) has provided superior interbody technology, anatomical restoration, and forward thinking since 2008. Our modular platform allows for maximal endplate coverage, virtually eliminating subsidence and migration. Assembled in the disc space, VTI’s InterFuse® line of devices can be implanted through open or MIS approaches.

Vertical Spine, LLC
www.verticalspine.com

Founded in late 2010, Vertical Spine LLC is a revenue generating spinoff from Cascade Medical Enterprises (CME) commercializing the FIBRINET® System technology which is a regenerative medical solution for lumbar fusion surgery. Two PRFM grafts and the Surgeon Defined Graft have been used successfully in a variety of spine applications and have demonstrated excellent fusion at 12 months in two separate studies. Please visit us at booth #541 to learn about the company and the technology.
VGI Medical, LLC 1412
www.VGImedical.com
VGI Medical is focused on developing a broad range of spinal implants and surgical instrument systems through industry knowledge, creative thinking, and engineering expertise. VGI is extremely dedicated to research and development, focusing on spine biomechanics to address spinal disorders in ways that have been previously overlooked.

VORZEIGEN MEDICAL 657
www.vorzeigen.com
Vorzeigen is a supplier of world class Sterilization Cases, Surgical Instruments and Implantable components to orthopedic device companies worldwide. We design, develop and produce products for all segments of the medical device market.

WCMISST Korea 2016 759
www.wcmisst.org
5th World Congress of Minimally Invasive Spine Surgery & Techniques (WCMISST) at International Convention Center Jeju, June 1-4, 2016, Korea. Dr. Gun Choi is the chairman of WCMISST 2016. It is cooperated with 15th Symposium of Korean Minimally Invasive Spine Surgery and 5th Asian MISS. Don’t miss this chance to interact with international doctors and broaden your knowledge on not only Endoscopic Spine Surgery but Minimally Invasive Spinal Techniques

Weigao Orthopaedic Device Co., Ltd. 1612
wegortho.en.alibaba.com
WEIGAO ORTHOPAEDIC DEVICE CO., LTD is China’s best spine products/services supplier. As a leading medical company in China, we work with research institutions developing innovative technology, assist top hospitals offering effective treatment solutions, relieve suffering patients from their pains and restore their health. Dedicated to global medical and health course, engaged with top surgeons and companies worldwide, we’re now seeking for opportunities to work with partners all over the world.

Wenzel Spine 1706
wenzelspine.com
Wenzel Spine is dedicated to providing true minimally invasive solutions for treatment of spinal disorders. Wenzel’s flagship product, the VariLift Expandable Interbody Fusion System, is the only, stand-alone, expandable interbody solution on the market. Through these types of products, Wenzel Spine delivers simple, dependable, and proven alternatives to traditional spinal fusion. These products help simplify and shorten spine surgery, while providing excellent clinical patient outcomes.

Whale Imaging, Inc. 723
WhaleImagingUSA.com
Whale Imaging provides world class solutions for spinal surgery using its unique G-Arm ™ biplanar fluoroscopy system. See the latest developments in our booth.

Wiggins Medical 1502
www.wigginsmedical.com
Wiggins Medical introduced The Original Black Kerrison to the U.S. market in 1995. Now, there are many copies. Compare and see the difference. In our diverse inventory, we offer ultra-thin footplates, endoscopic shafts, bayonets, delicate IVDs, rotating shafts, and other unique designs. We have a large assortment of “take apart” Kerrisons conforming to the latest, strict requirements for cleaning. Our Kerrisons are easy on the hands, and extremely smooth. Call us at 800-497-0851.

Wolters Kluwer 1201
www.lww.com
Lippincott Williams & Wilkins, a Wolters Kluwer Health company is a global provider of information, business intelligence and point-of-care solutions for the healthcare industry and a leading international publisher of medical books, journals, and electronic media. We proudly offer specialized publications and software for physicians, nurses, students and clinicians. Visit booth 1201 to review Spine, the most cited journal in the field of spinal deformity.

World Congress on Low Back and Pelvic Girdle Pain 661
www.worldcongresslbp.com
9th Interdisciplinary World Congress on Low Back & Pelvic Girdle Pain. October 31st – November 3rd 2016, Singapore. Held every three years, it is the only truly multidisciplinary conference on lumbopelvic pain. This global congress invites practitioners, academics, researchers and policy makers from all continents involved in medicine, orthopedics, neurosurgery, physiotherapy, chiropractic, biomechanics, osteopathy, manual therapy, exercise therapy, myotherapy & sports medicine.

Xenco Medical 1689
www.xenomedical.com
Headquartered in San Diego, CA, Xenco Medical is a global medical technology company committed to disruptive innovation for the purposes of creating safer, more efficient surgical environments. Through its line of sterile packaged, disposable spinal systems, Xenco Medical seeks to transform the standard of surgical care by eliminating the challenges of current surgical instrumentation processing.

X-spine Systems, Inc. 1057
www.x-spine.com
X-spine is a progressive spinal implant company delivering intuitive technologies for the treatment of spinal disease worldwide. X-spine is committed to the highest standards of product quality in service of the patient and physician. Our spinal implants and instrumentation are made in the USA and exported worldwide.
Showcase your latest spine system

SHANGHAI, CHINA
JANUARY 8 - 9, 2016
Hospital Pudong Fudan University

CHENGDU, CHINA
MAY 19 - 22, 2016
Chengdu Huaxi Hospital Cadaver Training Center

BEIRUT, LEBANON
JULY, 2016
St. Joseph University

SURABAYA, INDONESIA
SEPTEMBER 21 - 22, 2016
Universitas Airlangga Anatomy Lab

CHAIRMEN:

Jeffrey Wang, MD  Jianyuan Jiang, MD  Yan Wang, MD  Bambang Darwono, MD  Dohar Tobing, MD  Tony Tannoury, MD

To participate, email exhibits@spine.org or call (630) 230-3638
#NASS 30th Annual Meeting

## Exhibitors by Product Category

### Education—Patient and Physician

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**Technical Exhibition**

| NASS 30TH ANNUAL MEETING | 215 |
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ADMINISTRATION AND DEVELOPMENT COUNCIL
The Administration and Development Council ensures that NASS’ internal governance processes follow best practice standards for associations, including processes which preserve NASS leadership’s role as stewards of the public trust and the trust of NASS membership, ensuring legal and ethical integrity, safekeeping ongoing revenue generation and financial viability, board continuity, an effective governance process, and compliance with the corporate charter and bylaws. Committees overseen by this council include but are not limited to: Governance Relations, Leadership Development, Professional Conduct & Ethics Committee (PCEC), the Professional Compliance Panel (PCP), the Conflict of Interest Review Committee (COIRP), the Committee on Ethics and Professionalism, Membership, Finance, Audit and Section Development.

EDUCATION COUNCIL
The Education Council oversees all educational programming. The Annual Meeting attracts an international audience by offering symposia featuring world-renowned experts speaking on surgical, medical and interventional care; paper presentations announcing results of research on new techniques, treatments, devices and more; special interest group discussions; a technical exhibition; instructional courses and technique workshops; specialty tracks for allied health providers and other learning opportunities. Hands-on courses devoted to members’ needs focus on interventional injection techniques, surgical techniques and our allied health constituents. Online education offerings were reintroduced in 2009 and we continue to expand our online offerings each year. In addition to the Annual Meeting, NASS’ Education programs offer top-quality, relevant continuing medical education throughout the year.

RESEARCH COUNCIL
The Research Council promotes high quality spine care and offers numerous clinical and research resources to spine care providers and their patients, including clinical guidelines, appropriate use criteria, performance measurement information, patient safety information and tools, and more. The Research Grant and Fellowship Program supports the best of spine research applications every year and has provided more than $3.4 million in research funding to date.

HEALTH POLICY COUNCIL
The Health Policy Council promotes sound health care policies that ensure patient access to quality spine care. NASS works collaboratively with medical specialty societies, federal agencies and insurers to develop coding, coverage and reimbursement policy for spine care. NASS also monitors the practice environment to be a source of information to members and others about the state of spine care practice.

ADVOCACY COUNCIL
The Advocacy Council acts as the principal conduit between NASS members, Congress and Administration officials for the purposes of influencing policymaking in Washington, DC. The Advocacy Council oversees operations in three main areas including; fostering relationships on Capitol Hill, educating and mobilizing grassroots advocates, and forging political alliances in support of NASS’ legislative agenda. The Advocacy Council also oversees NASS’ political action committee, SpinePAC, and approves political contributions to congressional candidates who champion issues that are important to spine specialists.

SPINE EDUCATION AND RESEARCH CENTER
NASS opened the state-of-the-art Spine Education and Research Center (SERC) outside Chicago in the spring of 2007. SERC houses the NASS headquarters, a 15 station bio-skills lab, classroom and center with videoconferencing and webcasting capabilities. Members receive special discounted registration fees for all NASS-sponsored educational programs. Visit www.ChicagoBioSkillsLab.com for more information.
To pursue its advocacy agenda, NASS established the National Association of Spine Specialists, a trade that unites spine care providers and patients in the fight for sound health policy. Through awareness campaigns, legislative updates, action alerts, events and partnerships with other medical specialties, NASS Advocacy helps members understand the issues shaping health care policy and provides opportunities for members to advocate for change at the state and federal levels.

The North American Spine Foundation is a non-profit organization established to end spine-related disability, the #1 cause of suffering, through research, education and advocacy. The North American Spine Foundation is reaching out to companies large and small, spine care providers, patients, and the general public in the effort to end spine-related disability. To eliminate spine-related disability, everyone must join the effort. To for further information or to contribute to the North American Spine Foundation, visit www.spine.foundation.

The Education Publishing program is responsible for several periodicals, publications, online resources, and public affairs and media relations activities. NASS members enjoy free or discounted access to everything produced under the NASS imprint, including:

- The Spine Journal, the official scientific journal of NASS, is an international, multidisciplinary journal that publishes original, peer-reviewed articles on research and treatment related to the spine and spine care, including basic science and clinical investigations. TSJ sponsors an annual Outstanding Paper Awards program to recognize excellence in Basic Science, Surgical Science, Medical and Interventional Science and Value in Spine Care. Award winners each receive $10,000 during a podium presentation at the Annual Meeting. Published online and printed monthly by Elsevier, Inc., The Spine Journal holds the highest Impact Factor among spine publications in the world. NASS adheres to a policy of editorial independence for the journal’s editorial board, which follows guidelines of the International Committee of Medical Journal Editors, Committee on Publication Ethics and other best editorial practices.

- SpineLine, the clinical and news magazine of NASS, features relevant cutting-edge invited reviews along with pertinent discussions of controversial cases, interesting images and other clinical content. SpineLine examines current concepts in spine care, medical socioeconomics, ethics, advocacy, regulatory and reimbursement issues, and provides information about NASS’ programs and activities.

- NASS publishes guidelines, reference materials and other resources developed by leading spine experts. These include Evidence-Based Clinical Guidelines, Common Coding Scenarios for Comprehensive Spine Care, Compendium of Outcome Instruments for Assessment and Research of Spinal Disorders and other titles. NASS also collaborates with AAOS to produce spine-specific resources such as Orthopaedic Knowledge Update: Spine, Instructional Course Lectures Spine and Advanced Reconstruction: Spine.

- In addition to providing resources to members and spine providers, NASS offers comprehensive patient education information developed by physician experts. Credible, unbiased information on spine conditions, treatments, procedures, exercise and wellness is available online at www.KnowYourBack.org and in print.

- Public affairs efforts support NASS’ mission through web site content, promotional campaigns, and other print, electronic or broadcast opportunities. NASS also serves as a resource to the media on spine care topics, advocacy initiatives and related issues in the news.
MEMBERSHIP

In the late 1970s, spine care pioneers made the observation that a scientific society including all members of the spine community regardless of specialty or locale was essential to the advancement of care, and in 1984, this vision was realized through the creation of the North American Spine Society (NASS).

30 years later, these same ideas inspire a new generation of members as NASS becomes the premier multidisciplinary medical organization representing the field of spine care. With more than 8,000 members worldwide, NASS provides our members with many professional opportunities, events and initiatives designed to advance their careers, support the field, and define the future of spine care.

NASS members receive access to critical benefits of membership in the areas of education, research, health policy, reimbursement, practice management, networking, career development and philanthropy. Visit the membership kiosk in the lobby or the NASS Resource Center in the Technical Exhibition for more information about membership, to renew your membership for 2016, or to apply to become a member. You can also learn more or apply online at www.spine.org.

CATEGORIES OF MEMBERSHIP

**Active** members are Board-certified MDs and DOs, PhDs, or international equivalents (as determined by the Board of Directors) who devote at least 50% of their professional activities to spine.

Annual Dues: $625.00
Includes print and online subscriptions to *The Spine Journal* (TSJ) and *SpineLine*

**Associate** members are Board-eligible MDs and DOs or individuals who have completed a substantially equivalent program (as determined by the Board of Directors) who devote at least 50% of their professional activities to spine.

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**Affiliate** members are physicians or PhDs who devote less than 50% of their professional activities to spine, nurse practitioners, registered nurses, physician assistants, chiropractors, physical therapists, researchers, practice managers, coders, technical professionals or other health care professionals with an interest in spine.

Annual Dues: $325.00
Includes print and online subscriptions to TSJ and SpineLine

**International** members are health care professionals not residing in the United States with an interest in spine.

Annual Dues: $275.00
Includes print and online subscription to TSJ and online subscription to SpineLine

**In-training** members are physicians, medical students, graduate students or other individuals of the medical profession, basic sciences or allied services who are enrolled in a full-time, accredited program.

Annual Dues: Complimentary
Includes online subscriptions to TSJ and SpineLine

**Honorary** membership is bestowed by the Board of Directors to recognized leaders in the field of spine care.

Annual Dues: Complimentary
Includes print and online subscriptions to TSJ and SpineLine

**Emeritus** members are individuals who have been Active members for at least fifteen years and have retired from the practice of medicine.

Annual Dues: Complimentary
Includes online subscriptions to TSJ and SpineLine. Discounted print subscriptions to TSJ and SpineLine are available.
APPLICATION FOR MEMBERSHIP

Full Name (including degrees): 
Date of Birth (mm/dd/yy): _______________ Gender: □ Male □ Female

Preferred Mailing Address: □ Professional □ Home

Professional Address (as it should be listed in the Find a Specialist directory)

Company Name: 
Address: 
City: _______________ State/Province: _______ Postal Code: _______ Country: 
Phone: _______________ Fax: _______________ Email: 
Office Manager Email (to contact regarding membership information): ________________________________

Home Address

Address: 
City: _______________ State/Province: _______ Postal Code: _______ Country: 
Mobile Phone: ______________________ Email: __________________________

Professional Information

Specialty: 

MDs and DOs (or international equivalent): Are you board certified? □ Yes □ No

Name of Board providing your certification (required if applying for Active or Associate membership):

Percentage of professional activities dedicated to spine: □ Less than 50% □ 50% or Greater

My professional activities are primarily (choose one): □ Clinical □ Academic/Teaching □ Research □ Business

Primary Employer: □ Hospital □ Private Practice □ Academic Institution □ Other: __________________________

Have you ever had a license to practice medicine revoked or suspended in any jurisdiction, past or present? □ No □ Yes (If yes, please attach an explanation)

Have you ever been censured/sanctioned by another professional medical association or organization? □ No □ Yes (If yes, please attach an explanation of the circumstances and specify the sanction enforced)

Application Requirements

Curriculum Vitae/Résumé

Please submit a copy of your most recent curriculum vitae (CV) or résumé with this application. Your membership will remain inactive until a copy of this document is received.

Please provide your primary reason for applying for membership.

□ Recommendation from colleague (optional, provide colleague name: __________________________) 
□ Career development, CME, or to receive updates on spine care issues 
□ To take advantage of membership discounts on educational offerings 
□ To access journals and publications 
□ To network with colleagues 
□ To support and contribute to the field 
□ Other: __________________________

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12th ANNUAL EVIDENCE & TECHNOLOGY SPINE SUMMIT
February 24-27, 2016
Park City, UT

SUMMER SPINE MEETING
July 20-23, 2016
Miami, FL

31st ANNUAL MEETING
October 26-29, 2016
Boston, MA

2016
SPINE FOUNDATION
FLIP FLOPS & BOW TIES GALA
February 6, Palm Beach Gardens, FL

2016
SPINE FOUNDATION 10 X 25
RESEARCH SUMMIT
July 26, Burr Ridge, IL

2017
32nd ANNUAL MEETING
October 25-28
Orlando, FL

2018
SPINE ACROSS THE SEA
Dates TBD
Hawaii location TBD

2018
33rd ANNUAL MEETING
September 26-29
Los Angeles, CA

2019
34th ANNUAL MEETING
September 25-28
Chicago, IL

2020
35th ANNUAL MEETING
October 7-10
San Diego, CA

2021
36th ANNUAL MEETING
September 29-October 2
Boston, MA

2022
37th ANNUAL MEETING
October 12-15
Chicago, IL

2023
38th ANNUAL MEETING
October 18-21
Los Angeles, CA

2024
39th ANNUAL MEETING
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