Section on Radiology: MRI Essentials for the Spine Specialist
Webinar Series: Cervical and Lumbar MRI

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Presenters
A. Jay Khanna, MD (Chairman)

Although the ability to evaluate MRI studies is critical to the delivery of effective spine care, most spine specialists learn this skill in an informal fashion during training and in clinical practice. As a result, we may not have an understanding of the science and physics behind MR imaging and the various pulse sequences that are available for obtaining the scans. Many of us prefer to read our patients’ MR imaging studies ourselves rather than rely solely on the “official” radiologist’s report. We learn to make preoperative, intraoperative, and postoperative decisions based on those readings. However, unlike radiologists who are trained to evaluate MRI studies in a systematic fashion, we may be more likely to evaluate the images in a less organized manner and to rely on our anatomic expertise and experience, which may not be the most effective method.

This webinar series will help teach spine specialists how to systematically evaluate and interpret MR imaging studies of the spine. Although there are many courses that focus on MR imaging of the spine, this series is distinctive in that it is given by spine surgeons and radiologists specifically for spine specialists. As such, it is more clinically oriented than other educational opportunities. It also provides an excellent reference for radiologists and others such as physical medicine and rehabilitation clinicians, rheumatology physicians, and medical musculoskeletal care specialists who evaluate MR images of the spine and who would like to gain a better appreciation of the associated clinical aspects.

Appropriate Audience
Target audience includes: Spine surgeons, orthopedic surgeons, neurosurgeons, physiatrists, interventional pain specialists, fellows, residents, orthopedists, PA/NPs, nurses, physical therapists and other professionals with an interest in spine care.

Credits
This activity has been planned and implemented in accordance with the Essential Areas and Standards of the Accreditation Council for Continuing Medical Education (ACCME). The North American Spine Society is accredited by the ACCME 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 enduring material for a maximum of 1.5 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 US to participate in this CME activity are eligible for AMA PRA Category 1 Credits™.

This course was released on 5/29/2013, and is available for purchase through 5/28/2016.
Learning Objectives
Upon completion of this activity, participants should be able to:

- Define and recognize the normal MRI anatomy of the cervical, thoracic and lumbar spine.
- Cite and apply the rationale for use of the most common MRI pulse sequences used in the spine.
- Describe the most commonly seen pathologic findings in the cervical, thoracic and lumbar spine.
- Utilize a systematic approach to evaluate MR imaging studies.
- Correlate the imaging findings on spine MRI with those on other imaging modalities.

Agenda
- Welcome & Introduction – Khanna (5 minutes)
- MRI of the Cervical Spine – Khanna (30 minutes)
- MRI of the Lumbar Spine – Khanna (45 minutes)
- Discussion/Q&A – All faculty (10 minutes)

Conflict of Interest Disclosure
All faculty members provided estimated dollar amounts per the NASS Disclosure Policy through the NASS online disclosure module. NASS staff then translated that information into dollar ranges for purposes of this index, as well as for presentation at the live course. These ranges are as follows:

None: Existing relationship but no remuneration in prior calendar year
Level A: $100 to $1000
Level B: $1,001 to $10,000
Level C: $10,001 to $25,000
Level D: $25,001 to $50,000
Level E: $50,001 to $100,000
Level F: $100,001 to $500,000
Level G: $500,001 to $1M
Level H: $1,000,001 to $2.5M
Level I: Greater than $2.5M

Araghi, Ali: Royalties: Alphatec Spine (A); Stock Ownership: Magellan (25,000 Shares, <1%); Private Investments: PDP (<1%), AMS (<1%), Benovo (<1%), Pioneer (<1%), K2M (<1%), Surgifile (<1%), Oroboros (<1%), Disc Motion Technologies (<1%); Consulting: Pioneer (None), Alphatech Spine (B), Integra Spine (B); Speaking and/or Teaching Arrangements: Integra Spine (None); Board of Directors: American Board of Spine Surgery (None); Scientific Advisory Board: Magellan (None), Transcorp (2% stock ownership), Trinity Ortho (None); Research Support - Investigator Salary: Anulex (B), Stryker (B), LDR (A).

Choma, Theodore J.: Stock Ownership: Gentis, Inc. (20,000 shares); Consulting: Stryker Spine (B); Scientific Advisory Board: Gentis, Inc. (B); Research Support (Staff/Materials): Stryker Spine (C); Grants: DePuy Spine (D).

Chutkan, Norman B.: Royalties: Globus Medical (D); Speaking and/or teaching arrangements: AO North America (Travel expenses); Board of Directors: Walton Rehabilitation Hospital (None); Scientific Advisory Board: Orthopedics Journal (None).

Daubs, Michael D.: Royalties: Synthes Spine (F); Consulting: Synthes Spine (C); Grants: Stryker Spine (C, Paid directly to institution/employer); Fellowship Support: AO Spine North America (D, Paid directly to institution/employer).

Dekutoski, Mark B.: Consulting: Mayo Medical Ventures/Medtronic (B); Speaking and/or teaching arrangements: Mayo Medical Ventures/Medtronic (B); Fellowship Support: AO Foundation (B, Paid directly to institution/employer).

Dohring, Edward: Consulting: Stryker Spine (None, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: Stryker Spine (None, Paid directly to institution/employer); Research Support - Staff and/or Materials: Medtronic (B, Paid directly to institution/employer).

Fish, David E.: Grants: Medtronic (C, Paid directly to institution/employer); Fellowship Support: Boston Scientific (C, Paid directly to institution/employer).

Hsieh, Patrick C.: Consulting: DePuy Spine (C), Medtronic (C); Speaking and/or teaching arrangements: Medtronic Sofamor Danek (C); Research Support (Staff/Materials): DePuy Spine (C, Paid directly to institution/employer).
Jallo, George I.: Consulting: Johnson & Johnson (B); Grants: Medtronic (B); Fellowship Support: Codman (B).

Khanna, A. Jay: Royalties: Thieme Medical Publishers (None); Private Investments: New Era Orthopaedics, LLC (20%), Cortical Concepts, LLC (16%); Consulting: Orthofix Spine (D); Speaking and/or Teaching Arrangements: AO Spine North America (B); Trips/Travel: AO Spine North America (A); Other Office: Johns Hopkins Center for Bioengineering, Innovation and Design (D. Paid directly to institution/employer); Grants: Siemens Healthcare, Inc. (B, Paid directly to institution/employer).

Lehman, Ronald A.: Grants: DARPA (G, Paid directly to institution/employer), DMRDP (H, Paid directly to institution/employer).

Lenke, Lawrence G.: Royalties: Medtronic (I), Quality Medical Publishing (B); Board of Directors: Scoliosis Research Society (Travel expenses); Research Support (Staff/Materials): DePuy (B, Paid directly to institution/employer).

Moen, Erik P.: Consulting: Retul (Amount not disclosed); Speaking and/or teaching arrangements: BikePT (Owner/founder/instructor, B, Paid directly to institution/employer); Other Office: American Physical Therapy Association (B, Paid directly to institution/employer).

Mroz, Thomas: Stock Ownership: PearlDiver, Inc (10,000 Shares); Consulting: Globus Medical (B).

Rao, Raj D.: Board of Directors: North American Spine Society (Travel expenses); Scientific Advisory Board: US Food and Drug Administration Scientific Advisory Panel on Orthopaedic and Rehabilitation Devices (B); Other Office: American Academy of Orthopaedic Surgeons (Chairman, Diversity Advisory Board, Travel expenses); Grants: United States Department of Defense - Navy (G, Paid directly to institution/employer), United Stated Department of Defense – Army Medical Research Acquisition (F, Paid directly to institution/employer), National Highway Traffic Safety Administration (F, Paid directly to institution/employer), U.S. Department of Education, National Institute on Disability and Rehabilitation Research (G, Paid directly to institution/employer); Other: The Spine Journal (None), Seminars in Spine Surgery (A).

Reed, Michael L.: Nothing to Disclose.

Rittenberg, Joshua D.: Nothing to Disclose.

Villavicencio, Alan T.: Board of Directors: Justin Parker Neurological Institute (Chairman of the Board); Grants: Medtronic (C); Fellowship Support: Orthofix (E).

Wang, Jeffrey C.: Royalties: Medtronic (C), Stryker (C), SeaSpine (E), Osprey (C), Aesculap (B), Biomet (F), Amedica (D), Zimmer (E), Synthes (F); Stock Ownership: Fziomed (<1%); Private Investments: Prometheus Spine (<1%), Paradigm spine (<1%), Benvenue (<1%), NexGen (<1%), K2 Medical (<1%), Pioneer (<1%), Amedica (<1%), Vertiflex (<1%), ElectroCore (<1%), Surgitech (<1%), Axiomed (<1%); Board of Directors: North American Spine Society (Travel expenses), Cervical Spine Research Society (Travel expenses), AO Spine/AO Foundation (D), Collaborative Spine Research Foundation (Travel expenses); Scientific Advisory Board: VG Innovations (<1%), CoreSpine (<1%), Expanding Orthopaedics (<1%), Syndicom (<1%), Osprey (<1%), Amedica (<1%), Bone Biologics (<1%), Curative Biosciences (<1%), PearlDiver (<1%), Pioneer (<1%), SeaSpine (<1%).

Disclosures are current as of May 28, 2013.

Technical Requirements
The following hardware/software specifications must be met or exceeded to complete this course:

- Web browser and internet connection
- Computer equipped with audio output (speakers or headphones)
- Printer (to print PDF handout)
- Internet Explorer 7 or higher or Firefox equivalent
- Adobe reader 7 or higher
- Windows Media Player
- Disable pop-ups

Disclaimer
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