



Final Program

**North American Spine Society
28th Annual Meeting**

October 9-12, 2013

Ernest N. Morial Convention Center, New Orleans, LA

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Welcome to New Orleans and the North American Spine Society's 28th Annual Meeting. This week at NASS 2013, spine care professionals from around the globe will share the latest information, innovative techniques and procedures, best practices, and new technologies.

We encourage you to review this Final Program to learn more about must-attend sessions at this year's meeting. Topics addressed include minimally invasive spine surgery, cervical surgery, deformity, trauma, complications, outcomes, controversies in spine care and surgery, the use of biologics (BMP), spine injuries in contact sports, as well as the Patient Protection and Affordable Care Act. New collaborative sessions will include topics such as lumbar spinal stenosis, medical necessity, spine triage, and aligning expectations for surgical success. At NASS 2013 there is truly something for everyone.

In addition to the education sessions, plan to attend an engaging presentation on Wednesday by this year's guest speaker Steven Dubner, an award-winning author, journalist, and radio personality. He is the co-author of *Freakonomics*, which became an international bestseller and cultural phenomenon, as well as *Superfreakonomics*, which was published to similar acclaim, and also became an international best-seller. A former editor and writer at *New York Magazine* and *The New York Times*, Dubner, known for his off-kilter sensibility, will share his unique views on a wide variety of topics.

While in New Orleans, please take time to enjoy this exciting and unique city. New Orleans offers a rich cultural experience with many celebrated and historic districts, making it a place like no other, filled with numerous sights and attractions, including some of the best dining and nightlife in the country.

NASS 2013 provides a unique opportunity for you to learn and gain skills through a dynamic and challenging educational program. It also is an opportunity to network and build relationships with your colleagues and leading experts in spine care to learn and share the latest information.

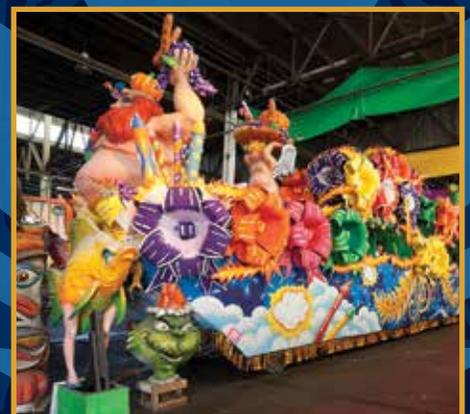
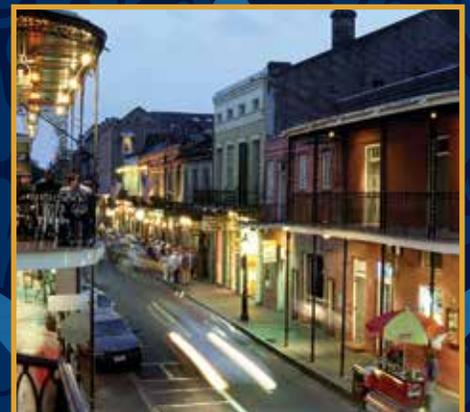
We look forward to your participation in NASS 2013 and hope you find your meeting experience to be both rewarding and productive.



Charles A. Mick, MD
President



Michael L. Reed, PT, DPT, OCS, MTC
Matthew Smuck, MD
Eric Truumees, MD
2013 Program Co-chairs



Education Information

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

This activity has been planned and implemented in accordance with the Essentials 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 live activity for a maximum of 24.25 *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. to 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.

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

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:

Professional Coders: Coding Update 2013: Essentials and Controversies of Spine Care Coding has prior approval of the American Academy of Professional Coders for 12 Continuing Education Units. Granting of this approval in no way constitutes endorsement by the Academy of the program, content or the program sponsor.

Nurses and Chiropractors: Accreditation varies for every state certification agency. Please retain this Final Program and your CME certificate when completing the recertification process.

Nurse Practitioners: This program is pending approval by the American Academy of Nurse Practitioners (AANP). This program was planned in accordance with AANP CE Standards and Policies and AANP Commercial Support Standards. Please look for information at www.nassannualmeeting.org.



Evaluation and Educational Certificates

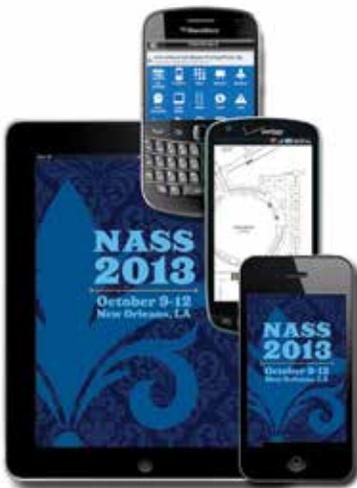
Visit www.spine.org/myaccount to claim education credit and print your CME certificate. Contact education@spine.org with questions.

Annual Meeting 2013 Sessions On-Demand—CME Credit Available!

Order the 28th Annual Meeting session recordings and get 24/7 access to more than 300 scientific presentations, including electronic posters, scientific sessions, symposia, abstracts, featured lectures and more. These web-based, fully synchronized audio, video and slide presentations are available anywhere with Internet access. Topics covered include biomechanics, motion preservation, spinal deformity, diagnostics and imaging, injections and interventions, and much more. Purchase online through the NASS Store at www.spine.org.

Mobile Event Guide

Maximize your conference experience by using our interactive mobile event app. Create a customized conference schedule, evaluate sessions, view floor plans, receive alerts and more. Type spine.org/mobile into your phone's browser, search "NASS 2013" in your app store or scan the QR code.



Educational Tracks

Collaborative Concepts in Spine Care Sessions

NASS offers multidisciplinary specialty educational tracks for allied health professionals, including physician assistants, nurse practitioners, nurses, chiropractors, physical and occupational therapists, and rehabilitation professionals.

Featured topics include:

- ABCs of Lumbar Spinal Stenosis
- Surgical Success: Aligning Expectations
- Spine Triage: An Integrated Care Model
- Perioperative Care Guidelines for the Older Patient
- Outcomes Assessment in the New Vernacular of Value
- Neck/Shoulder: Differential Diagnosis
- Medical Necessity: When to Treat or Not to Treat
- Integrated Care Case Studies
- Neck/Shoulder Workshop

The North American Spine Society thanks the following individuals for their invaluable contributions in creating the allied health educational tracks:

- Nicola Hawkinson, DNP
- Evan Johnson, PT, DPT, OCS
- Jude Miller, DC, MSc
- Rick Placide, MD, PT
- Kathleen Prussian, CNP
- Michael L. Reed, PT, DPT, OCS, MTC
- Ryan A. Tazell, MA, PT, MDT
- Gregory L. Whitcomb, DC

Young Spine Surgeons' Forum

Friday, October 11, 9:00 a.m.–12:00 p.m.
Room 275/276

The transition from training to practice is a difficult time. With the best interests of young surgeons in mind, NASS has developed a symposium 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 topics including: Finding a Job and Early Career Decision Making, Contract Negotiations and Establishing a Practice.

Disclaimer

The material presented at the 28th 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 6, 2013. Any further changes from the published Final Program will be announced at the beginning of each session.

Technical Exhibition

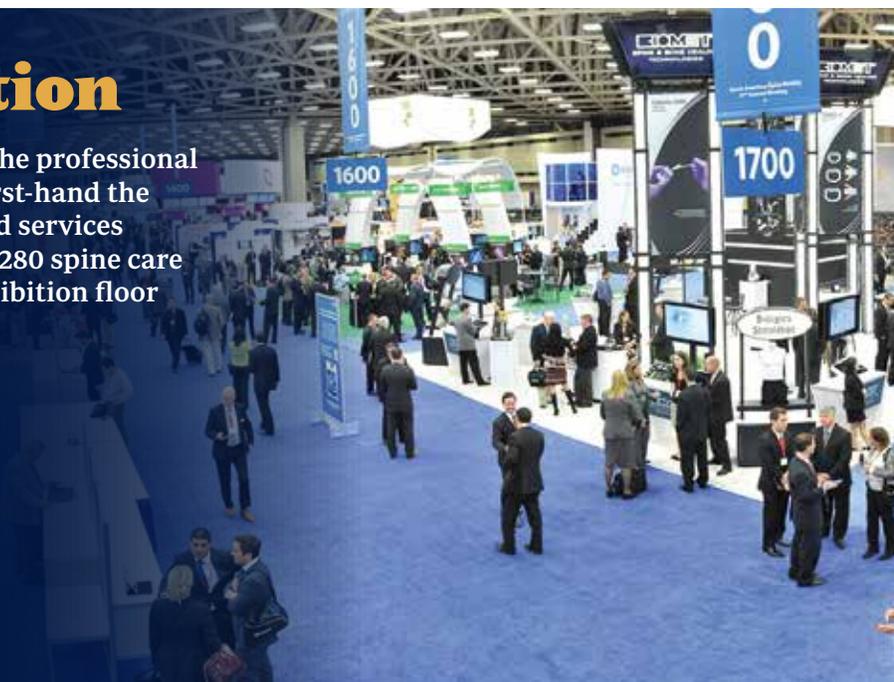
Visit the Technical Exhibition to complement the professional meetings and clinical sessions by evaluating first-hand the latest developments in equipment, supplies and services that are relevant to spine care from more than 280 spine care companies. See pages 176-213 for Technical Exhibition floor plans and exhibitor descriptions.

Hours:

Wednesday, October 9
10:00 a.m.–5:00 p.m.

Thursday, October 10
9:00 a.m.–5:00 p.m.

Friday, October 11
9:00 a.m.–1:30 p.m.



Medical Attendee Food Service, NASS Bistro

Box lunches, Networking Breaks (except for Friday afternoon), and the NASS Bistro are located in the rear of the Technical Exhibition. See page 16 for details.

Concessions

Concessions are available in the rear of the Technical Exhibition.

Topic-Specific Tables

Topic-Specific Tables will be designated during lunch in the medical attendee food service area of the Technical Exhibition to help facilitate discussions from the day's programming and to promote networking. Topics include Radiology, Deformity, Rehab Medicine, Minimally Invasive Spine Surgery, Exercise Therapies, Biologics, Basic Science, BMP, Opioids, and Socioeconomics and Advocacy.

Spine Village

Spine Societies and Congresses from across the globe are exhibiting in the International Spine Village located in the 2000 aisle.

Golf Swing Analysis

After a successful debut last year, the golf swing analyzer is coming to New Orleans. Learn how to help your patients overcome their golf-related back pain by becoming an expert on analyzing spine angles of the golf swing. Physicians will be on hand to analyze your swing using video technology to capture spine angles and other back-related issues. With a cutting-edge golf simulator, TV screens and a video camera, you'll get a detailed look at how your swing is affecting your back.

Exercise-Based Management of Lumbar Spine Pain: An Algorithmic Approach to Decision-Making

Developed by the NASS Exercise Committee, this updated interactive booth showcases principles of decision-making in determining the most effective exercise treatment for lumbar disorders. Come interact with colleagues, Exercise Committee members and physical therapists regarding exercise decision-making, and learn from ongoing live demonstrations for a chance to win an iPad.

NASS Research Information and Practical Theater Presentations

Booth 2900

Stop by to pick up information about NASS' registry efforts, new clinical guidelines, patient safety alerts, tools and more! This year the newly introduced Practical Theater will present topics of interest to you and your practice at scheduled presentation times by NASS volunteers.

Wednesday, October 9

11:30 a.m.–12:00 p.m.

Avoid Penalties—Navigating CMS Quality Initiatives (PQRS, Physician Feedback & Value-Based Modifier)

Thursday, October 10

10:30–11:00 a.m.

Selecting and Implementing EHRs

2:35–3:05 p.m.

Avoid Penalties—Navigating CMS Quality Initiatives (PQRS, Physician Feedback & Value-Based Modifier)

Friday, October 11

10:00–10:25 a.m.

Selecting and Implementing EHRs

Surgical Showcase

Booth 2602

See the latest products in action in a live cadaveric demonstration! Exhibitors at NASS will be conducting demonstrations upon specimens and holding workshops after the meeting concludes each day. 3D video of the demonstrations will be available outside the labs.

Wednesday, October 9		
9:00 a.m.–12:00 p.m.	X-Spine	
1:00–4:00 p.m.	X-Spine	Globus
Thursday, October 10		
9:00 a.m.–12:00 p.m.	LDR	Pinnacle Spine
1:00–4:00 p.m.	Spine Wave	Amendia
5:00–8:00 p.m.	Lanx	Nutech
Friday, October 11		
9:00 a.m.–12:00 p.m.	Mazor	Misonix
Saturday, October 12		
1:00–4:00 p.m.	Mazor	
5:00–8:00 p.m.	Mazor	

Truck 1

Truck 2

Solution Showcase

Booth 1849

Participate in a Solution Showcase Theater presentation during your lunch to learn more about specific products and solutions.

Wednesday, October 9

12:00–12:20 p.m.

Lanx, Inc.

A Unique Modular Solution for Lateral Interbody Fusion and Fixation

Presented by Ryan DenHaese, MD

12:30–12:50 p.m.

• SI-BONE, Inc.

Diagnosis and Treatment of SI Joint Disorders

Presented by David W. Polly Jr., MD

• SI-BONE, Inc.

Clinical Outcomes with the iFuse Implant System for SI Joint Fusion

Presented by Leonard Rudolf, MD

Thursday, October 10

12:00–12:20 p.m.

• SI-BONE, Inc.

Diagnosis and Selection Criteria for the SI Joint Fusion Patient

Presented by Ralph F. Rashbaum, MD

• SI-BONE, Inc.

Clinical Outcomes with the iFuse Implant System for SI Joint Fusion

Presented by Leonard Rudolf, MD

12:30–12:50 p.m.

FTGU Medical Consulting, LLC

Orthopedic and Neurosurgery Billing and Out-of-Network Experts

Presented by John Torres and Jamie Lynch

Friday, October 11

12:00–12:20 p.m.

Invio Biomaterial Solutions

Latest Data Supports New PEEK-OPTIMA® Material for Bone Apposition

Presented by Professor Bill Walsh



Attendee Resources



Registration

Lobby H (1st Level)

Hours:

Tuesday, October 8	6:30 a.m.–5:00 p.m.
Wednesday, October 9	6:30 a.m.–5:30 p.m.
Thursday, October 10	7:00 a.m.–5:00 p.m.
Friday, October 11	7:00 a.m.–5:00 p.m.
Saturday, October 12	7:30 a.m.–12:00 p.m.

Coat and Luggage Check

Lobby H (1st Level)

The Coat and Luggage Check is available for your convenience. The cost is \$3.00 per luggage item and \$2.00 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 8	7:00 a.m.–5:30 p.m.
Wednesday, October 9	6:30 a.m.–6:00 p.m.
Thursday, October 10	7:00 a.m.–7:30 p.m.
Friday, October 11	7:00 a.m.–6:00 p.m.
Saturday, October 12	6:30 a.m.–12:30 p.m.

Photography Orders

Looking for photos from the Annual Meeting? Visit <http://documentaryarts.smugmug.com/NASS> 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 11:00 a.m.–1:00 p.m. on Wednesday and from 12:00–1:00 p.m. on Thursday and Friday. Networking Breaks also are held in the Technical Exhibition, with the exception of the Friday afternoon break, which will be held in the Theater Lobby (2nd Level), near the General Session.

NASS Bistro

Technical Exhibition

Advance ticket sales booth in the NASS Resource Center

The NASS Bistro is a great food 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. The price is only \$25 each day. Bistro tickets are good for one (1) lunch and can be used on any of the days that the NASS Bistro is open—Wednesday, Thursday and Friday. 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 28th Annual Meeting. Purchase NASS Bistro lunch tickets at www.nassbistro.com or on-site in Lobby H (1st Level) next to the attendee registration area.

New Orleans Restaurant Reservations & Information Counter

Lobby H (1st Level)

New Orleans offers a wide variety of restaurants and dining options. On the Town will provide reservation services at the Restaurant Reservations Counter. Representatives can offer suggestions, make recommendations and provide on-the-spot reservations and confirmations. The restaurant reservations desk also is the location where you can sign up for **NASS Networking Dinners** (see page 18 for details) to enjoy meeting new colleagues and NASS members. Space is limited. On the Town also can provide information on local tours and attractions.

Wine and Dine for Spine

Help fund spine research by booking restaurant reservations through NASS's partnership with OpenTable. For each reservation made through the NASS website (www.spine.org/opentable), 40 cents will be donated to the Annual Research Fund (ARF).

Special Events



Wednesday, October 9

Resident, Fellow and Program Directors Meeting

12:00–1:00 p.m.
Room 291

The response to the Spine Fellowship Match continues to be positive with 79 programs currently enrolled. In an effort to maintain the enthusiasm, there will be a meeting of Fellowship Directors during the NASS 28th Annual Meeting in New Orleans. This will be an open discussion and lunch will be provided.

Presidential Guest Speaker: Stephen Dubner

2:40–3:30 p.m.
Theater ABC

Welcome Reception

6:00–8:00 p.m.
Mardi Gras World (Shuttle service provided)

The Welcome Reception has returned! This great networking event has been revamped and is better than ever! After sessions conclude, the reception takes place at Mardi Gras World—one of New Orleans' most unique attractions where you can get up close to Mardi Gras' grandest floats and sculptures. Reconnect with old friends and meet new ones. *Meeting badge required for entry.*

New This Year!

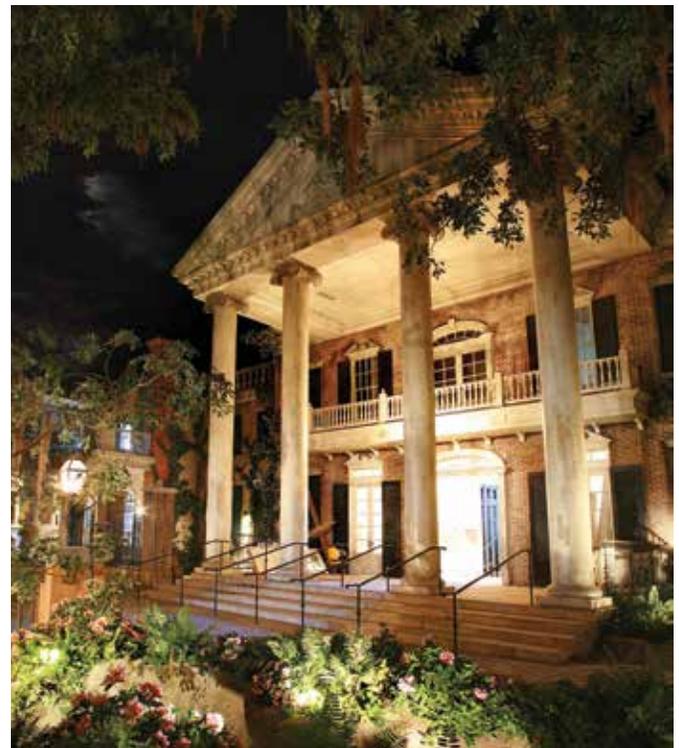
NASS Networking Dinners

NASS Networking Dinners allow attendees the opportunity to connect with their fellow professionals in a fun, relaxed environment outside of the convention center. The amazing dining options in New Orleans make this the perfect opportunity to meet other spine care professionals and make new connections.

Reservations are available on the following days and times:

Wednesday, October 9 at 7:30 p.m.
Thursday, October 10 at 7:00 p.m.

Sign up at the Restaurant Reservations Desk in the first level lobby of the convention center. Be sure to sign up early, as these dinners will fill up quickly!





An award-winning author, journalist, and radio and TV personality, **Stephen J. Dubner** is the co-author of the International Bestsellers *Freakonomics* and *Superfreakonomics*.



Originally published in the U.S. in 2005, *Freakonomics* instantly became a cultural phenomenon. Hailed by critics and readers alike, it remains on the *New York Times* bestseller list after 7 years, having sold more than 4 million copies around the world, in more than 35 languages. Dubner

and his co-author, the University of Chicago economist Steven Levitt, have appeared widely on television, and maintain the popular *Freakonomics* blog, which has been called “the most readable economics blog in the universe.”

Freakonomics made the world safe to discuss the economics of crack cocaine and the impact of baby names. *Superfreakonomics* retained that off-kilter sensibility (comparing, for instance, the relative dangers of driving while drunk versus walking while drunk) but also tackled a host of issues at the very center of modern society: terrorism, global warming, altruism, and more. From the rarefied corridors of academia to the grimmest street corners, Dubner and his co-author, University of Chicago economist Steven Levitt, address a wide variety of topics with neither fear nor favor, letting the numbers speak for themselves.

Through forceful storytelling and wry insight, Dubner shows how economics is, at root, the study of incentives – that is, how people get what they want, or need, especially when other people want or need the same thing. *Freakonomics* and *Superfreakonomics* show that the modern world, despite a great deal of complexity and downright deceit, is not impenetrable, is not unknowable, and—if the right questions are asked—is even more intriguing than we think. All it takes is a new way of looking.

Mr. Dubner is the host of *Freakonomics* Radio – a public radio project with New York Public

Radio (WNYC) and American Public Media. The show includes a weekly iTunes podcast, a segment on APM’s Marketplace, and hour-long radio specials on nearly 200 public radio stations across the country. The audio content is available on-demand at www.freakonomics.com/radio, and on iTunes.

Mr. Dubner also is the host of the NFL Network’s *Football Freakonomics*, an Emmy-nominated program that looks into the numbers behind football. The video content is available at www.nfl.com/freakonomics. The feature-length *Freakonomics* documentary is an anthology based on different chapters of the book. A dream team of directors participated in the project, including Academy Award winner Alex Gibney (*Taxi to the Dark Side*), Morgan Spurlock (*Super Size Me*), Heidi Ewing and Rachel Grady (*Jesus Camp*), Eugene Jarecki (*Why We Fight*) and Seth Gordon (*The King of Kong*). Variety calls the film “a revelatory trip into complex, innovative ideas and altered perspectives.” *Freakonomics* was chosen as the closing-night movie at the Tribeca Film Festival; Magnolia Pictures distributed it worldwide including via iTunes, where it was in the top 10 of all film downloads. It also had an extended run on Showtime.

Freakonomics and *Superfreakonomics* are primarily based on the research of Steven Levitt, whom Dubner originally profiled for *The New York Times Magazine*. Dubner spent several years at the *Times* as an editor and writer, and has also written for *The New Yorker*, *Time*, and elsewhere. His journalism has been anthologized in *The Best American Sports Writing* and *The Best American Crime Writing*. He is the author of two previous bestselling books, *Choosing My Religion* and *Confessions of a Hero-Worshiper* as well as a children’s book, *The Boy with Two Belly Buttons*.

He has been writing since he was a child; his first published work appeared in *Highlights* magazine. During college, he started a rock band that was signed to Arista Records. But he quit playing music to attend graduate school at Columbia University, where he also taught in the English Department. He still lives in New York with his wife, a former war photographer, and their two children.



Thursday, October 10

The Spine Journal Outstanding Paper Awards

11:00 a.m.–12:00 p.m.
Theater B

Honor your colleagues as *The Spine Journal* and NASS present this year's Outstanding Paper Awards.

Members' Business Meeting

2:35–3:05 p.m.
Room 280/281

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

Resident, Fellow and Program Directors Reception

5:00–6:00 p.m.
Room 292

NASS is proud to announce the 11th Annual Resident, Fellow and Program Directors Reception at the 28th Annual Meeting. The reception provides an opportunity for residents, fellows or potential fellows to mingle with each other and the program directors as well as provides a casual setting to enjoy cocktails and hors d'oeuvres with colleagues.

Funding for this reception was provided by RTI Surgical.

Allied Health Reception

5:15–7:00 p.m.
Mid-house Level Lobby

This event provides a networking opportunity for allied health practitioners as well as information about how NASS is supporting this segment of its membership. Joel M. Press, MD is the special guest speaker and will talk about **Forging New Alliances in Spine Care: A Focus on the Expanding Role of Allied Providers**. The committee members of the Section on Allied Health also will be in attendance to discuss the Section's function within NASS and to outline their initiatives for 2014 and beyond.

Friday, October 11

NASS Research Award Presentations

10:30–10:55 a.m.
Theater B

Honor your colleagues as NASS presents this year's research grants and traveling fellowships to those proposing advancements in spine care and research. Recipients from 2011 also will present their research findings.

NASS Recognition Award Presentations

10:55–11:00 a.m.
Theater B

The NASS Recognition Awards are presented to outstanding society members.

Global Spine Forum: Advancing Spine Care Worldwide

11:00 a.m.–4:30 p.m.
Room 280/281

The Global Spine Forum features presentations from AOSpine, Brazilian Spine Society, Chinese Orthopaedic Association and Turkish Spine Society.

Value Abstract Awards Presentations

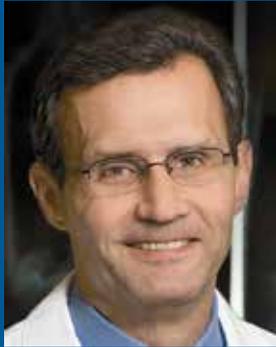
3:05–3:35 p.m.
Theater B

NASS Value Abstract Awards foster and recognize efforts to define value in spine care.

International Reception

4:30–5:30 p.m.
Mid-house Level Lobby

Network with colleagues after the sessions have concluded. This reception is open to all attendees.



**2013 Leon Wiltse Award:
Lawrence G. Lenke, MD**

"Dr. Lenke has made innumerable contributions to the treatment of spinal disorders, specifically adult and adolescent spinal deformity. His work has changed the management of these disorders."

*Nominated by
Christopher Bono, MD*



**2013 David Selby Award:
Marjorie L. Eskay-Auerbach,
MD, JD**

"Marjorie served with distinction on the Board of Directors and, more importantly, served NASS as a member and then Chair of the Ethics Committee. As an attorney, former spine surgeon and current specialist in RIMS and forensic orthopedics, she brought an exceptional background to NASS. She has been a significant contributor to the authorship of our current disclosure and divestment policies, the Professional Conduct and Ethics Committee and the NASS Conflict of Interest Review Panel. She was a valuable co-author in the *TSJ Ethics Committee* paper on Conflict of Interest in Professional Medical Associations. In addition, she is recognized as an expert in disability evaluations and has been a representative on several editions of the *AMA Guide to Impairment*, and she has lectured on this topic at several NASS courses. Her high level of commitment and service to NASS is very deserving of the David Selby NASS Service Award."

*Nominated by
Jerome Schofferman, MD*



**2013 Henry Farfan Award:
Michael G. Fehlings,
MD, PhD, FRCS**

"Dr. Fehlings is a world renowned expert in spinal cord injury and is considered the current expert authority in this area. He has contributed significantly to the basic science knowledge in this area. Dr. Fehlings can best be described as the single most influential active spinal cord injury researcher and clinician. It is not just the quantity but the quality and diversity of his work in the field on a worldwide scale that has brought him into this preeminent position."

*Nominated by
Jeffrey C. Wang, MD,
Jens Chapman, MD,
Christopher Shaffrey, MD
and Alexander Vaccaro, MD, PhD*

NASS Resource Center

Visit the NASS Resource Center in the first level lobby to see all that NASS has to offer spine care professionals.

Hours:

Wednesday, October 9
6:30 a.m.–5:30 p.m.

Thursday-Friday, October 10-11
7:00 a.m.–5:00 p.m.

Saturday, October 12
7:30 a.m.–12:00 p.m.



NASS Membership

All meeting attendees are encouraged to visit Membership Services to take advantage of several meeting-only membership offers. Current members can pay their 2014 dues or update their contact information, and 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:

Renewal: www.spine.org/dues

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 by members at the NASS Store throughout the meeting. Free shipping is available on orders of \$300 or more (see a Store representative for details). Publications available include NASS clinical guidelines, pre-orders of the *Common Coding Scenarios for Comprehensive Spine Care* 2014 publication, patient education brochures, the *Orthopaedic Knowledge Update: Spine 4* text, NASS logo merchandise and more.

**NASS
Members:
Redeem Your
Free Gift**

**when you renew your NASS
membership at the meeting.**

**Visit the Membership
Services booth in the
convention center lobby for
more information.**

**Or renew online at
www.spine.org/dues.**



ePosters

ePoster presentation stations are located in the NASS Resource Center. ePosters also will be provided with the OnDemand meeting recordings, if purchased.

Spine Care Jobs

Browse more than 1,000 job openings in the spine care field or post a job for your facility through the NASS Career Center in the Resource Center or at www.healthcareers.com/nass. Through this resource, attendees seeking a new job can apply for job openings, sign up for email job alerts or post their CV to the site. Facilities also can take advantage of low posting rates to connect with only the most qualified candidates in the field.

Complete Website Solution by Pronto Marketing

Spend less time managing your website and more time managing your business. With programs exclusively designed for medical professionals and companies; Pronto bundles your website, social media, newsletters, search engine optimization and other key elements of your Internet Presence into one, simple, inexpensive package. It's a breeze to get going, simple to manage, and it gets results. You pick a plan and Pronto does the rest. Visit www.spine.org/pronto for further information.

Buyer's Guide for Spine

Tap into the incredible network of the Buyers Guide for Spine Care. The Guide enables spine specialists like you to cut through the clutter of traditional search engines and conveniently perform targeted searches for industry-related products and services. Choose either a user-defined keyword search or an alphabetized directory search by product categories, and discover the most relevant results on the web.

Start your search today at the Buyer's Guide for Spine booth in the Lobby.

BuyersGuideForSpineCare.com
Interested in staying visible to the spine specialist community? Contact us at 800-816-6710 or by e-mail at NASS@MultiView.com.

Complimentary Professional Headshots

Is your LinkedIn, Twitter, Facebook, or practice profile picture from the 80s? Stop by the NASS Resource Center outside Hall I and have a professional headshot taken during the following times:

Tuesday, October 8	6:30–9:30 a.m.; 1:00–4:00 p.m.
Wednesday, October 9	6:30–7:30 a.m.; 1:00–4:00 p.m.
Thursday, October 10	7:00–9:00 a.m.; 1:00–4:00 p.m.
Friday, October 11	7:00–9:30 a.m.

You will be notified by email when your headshot is available, so visit www.spine.org/myaccount to ensure that your email address is current.

Internet Station

Visit the Internet Station, located in the NASS Resource Center, to keep in touch with your home or office while at the Annual Meeting. Several computers with Internet access are available.

International Certificate Printing

Visit the certificate printing station to print your certificate of meeting attendance.

NASS Housing Bureau

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 2014 NASS Annual Meeting in San Francisco.

San Francisco Information Desk

Stop by the Information Desk to review exciting material for your trip to the San Francisco area, site of the 2014 NASS Annual Meeting.

Spine Education & Research Center (SERC)

Located within the NASS headquarters outside of Chicago, the Spine Education & Research Center houses a 3,800 square foot bio-skills lab, 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 out by companies or other societies. NASS staff is available to answer questions about the facility as well as schedule courses and tours.

Advocacy

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 NASS Advocacy Booth to learn about issues shaping the health policy debate. NASS Advocacy staff will 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.

Publications

SpineLine

Connect with contributors and editors, comment on SpineLine content and suggest topics for the upcoming editorial calendar. Help yourself to complimentary copies of the recent issue and find information about the SpineLine mobile app, new in 2013.

The Spine Journal

The Spine Journal (TSJ) welcomes authors, readers and reviewers. Visit the TSJ 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.

NASS Channels

Get details for accessing all of NASS’ online, print and social media content:

- www.knowyourback.org
- NASS Blog
- The Back Story Blog
- twitter.com/NASSSpine
- LinkedIn NASS Group
- facebook.com/NASS.Spine

Courses and Conferences

View the 2014 educational offerings. A 2014 Educational Programs catalog included in your tote bag allows you to review course descriptions and further details of upcoming offerings. Visit www.spine.org for more information.

INJECTIONS

Lumbar / Cervical / Advanced Lumbar

SURGICAL

Deformity / Minimally Invasive Surgery

INTERVENTIONAL

The Art and Science of the Physical Examination

CODING

Taught by physician faculty

EVIDENCE-BASED MEDICINE

Required for participation in several NASS committees

ONLINE EDUCATION

Courses / Webinars

EVIDENCE & TECHNOLOGY SPINE SUMMIT

Feb. 27-March 1 / The Canyons, Park City, UT

SUMMER SPINE MEETING

July 23-26 / Omni Amelia Island Plantation, FL

ANNUAL MEETING

November 12-15 / San Francisco, CA

Presenters and Media



Speaker Information Center

Lobby H (1st Level)

There is no Speaker Ready Room at this meeting. Podium and ePoster presenters will not be permitted to upload or amend their presentations at any time on site. (Exceptions include *The Spine Journal* Outstanding Paper Awards and Research Grant Award Presentations.)

Course faculty, symposia presenters, and Collaborative Care Session and Focused Discussion speakers can upload or amend their presentations by visiting the Speaker Information Center in Lobby H (1st Level), across from the registration area. Speakers are not permitted to use their own laptops for their presentations. No exceptions will be made.

Hours:
 Tuesday–Friday, October 8–11.6:30 a.m.–5:00 p.m.
 Saturday, October 12 6:30–11:00 a.m.

Press Room

Room 285

The on site Press Room will include a media-only work area with Internet access, charging stations and printer access. Snacks, coffee and a light lunch for credentialed journalists also will be served.

Only conference staff, credentialed media and presenter interviewees will be allowed access to the press room. Members of the media, advertising staff and exhibitors cannot host meetings in the press room.

Hours:
 Wednesday, October 97:30 a.m.–5:00 p.m.
 Thursday, October 107:00 a.m.–5:00 p.m.
 Friday, October 117:00 a.m.–5:00 p.m.
 Saturday, October 12 7:30 a.m.–12:00 p.m.

Shuttle Routes and Schedules

Hotel	Route	Shuttle Boarding Location at Hotel
Astor Crowne Plaza	2	Curbside on Canal
Courtyard New Orleans Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
Courtyard New Orleans Downtown/Iberville	2	Walk to Ritz-Carlton – Curbside on Canal
Hampton Inn & Suites New Orleans Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
Hampton Inn New Orleans Downtown	3	Curbside on Carondelet
Hilton Garden Inn New Orleans Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
Hilton New Orleans Riverside	1	Breezeway Bus Loading Area
Hotel Monteleone	2	Walk to New Orleans Marriott –Curbside on Canal
Hyatt Place New Orleans Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
JW Marriott Hotel New Orleans	3	Curbside on Canal
Loews New Orleans Hotel	3	Curbside on Poydras
New Orleans Marriott	2	Curbside on Canal
New Orleans Marriott at the Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
Omni Royal Orleans	2	Walk to New Orleans Marriott – Curbside on Canal
Residence Inn New Orleans Convention Center	N/A	Walk to the Ernest N. Morial Convention Center
Ritz-Carlton New Orleans	2	Curbside on Canal
Royal Sonesta New Orleans	2	Walk to Astor Crowne Plaza – Curbside on Canal
Sheraton New Orleans	3	Curbside on Canal
SpringHill Suites New Orleans Downtown	N/A	Walk to the Ernest N. Morial Convention Center
W New Orleans	3	Walk to Loews – Curbside on Poydras
Westin New Orleans Canal Place	2	Canal Street Entrance - Curbside
Wyndham Riverfront New Orleans	N/A	Walk to the Ernest N. Morial Convention Center

Tuesday, October 8

Shuttle Service	6:00 a.m. – 5:30 p.m.	Every 30 minutes
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Wednesday, October 9

Shuttle Service	6:00 a.m. – 2:00 p.m.	Every 15-20 minutes
	2:00 p.m. – 4:00 p.m.	Every 30 minutes *
	4:00 p.m. – 6:00 p.m.	Every 15-20 minutes
Welcome Reception Shuttle	6:00 p.m. – 8:15 p.m.	Every 15-20 minutes

Thursday, October 10

Shuttle Service	6:00 a.m. – 10:30 a.m.	Every 15-20 minutes
	10:30 a.m. – 1:30 p.m.	Every 30 minutes *
	1:30 p.m. – 5:30 p.m.	Every 15-20 minutes

Friday, October 11

Shuttle Service	6:00 a.m. – 10:30 a.m.	Every 15-20 minutes
	10:30 a.m. – 1:30 p.m.	Every 30 minutes *
	1:30 p.m. – 5:45 p.m.	Every 15-20 minutes

Saturday, October 12

Shuttle Service	7:00 a.m. – 12:30 p.m.	Every 30 minutes *
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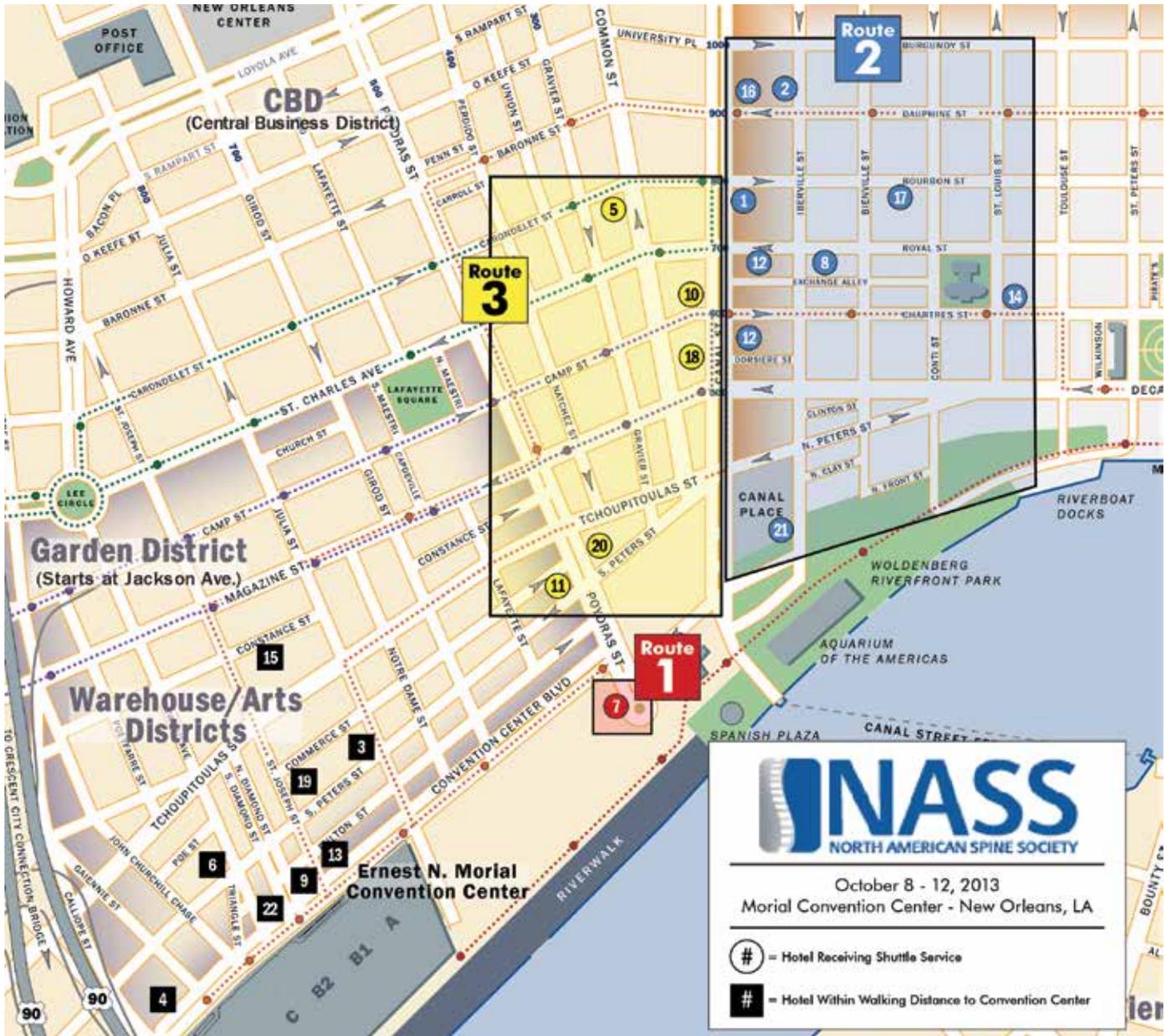
**Departs Ernest N. Morial Convention Center on the hour & half-hour.*

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 New Orleans, for the most current information.

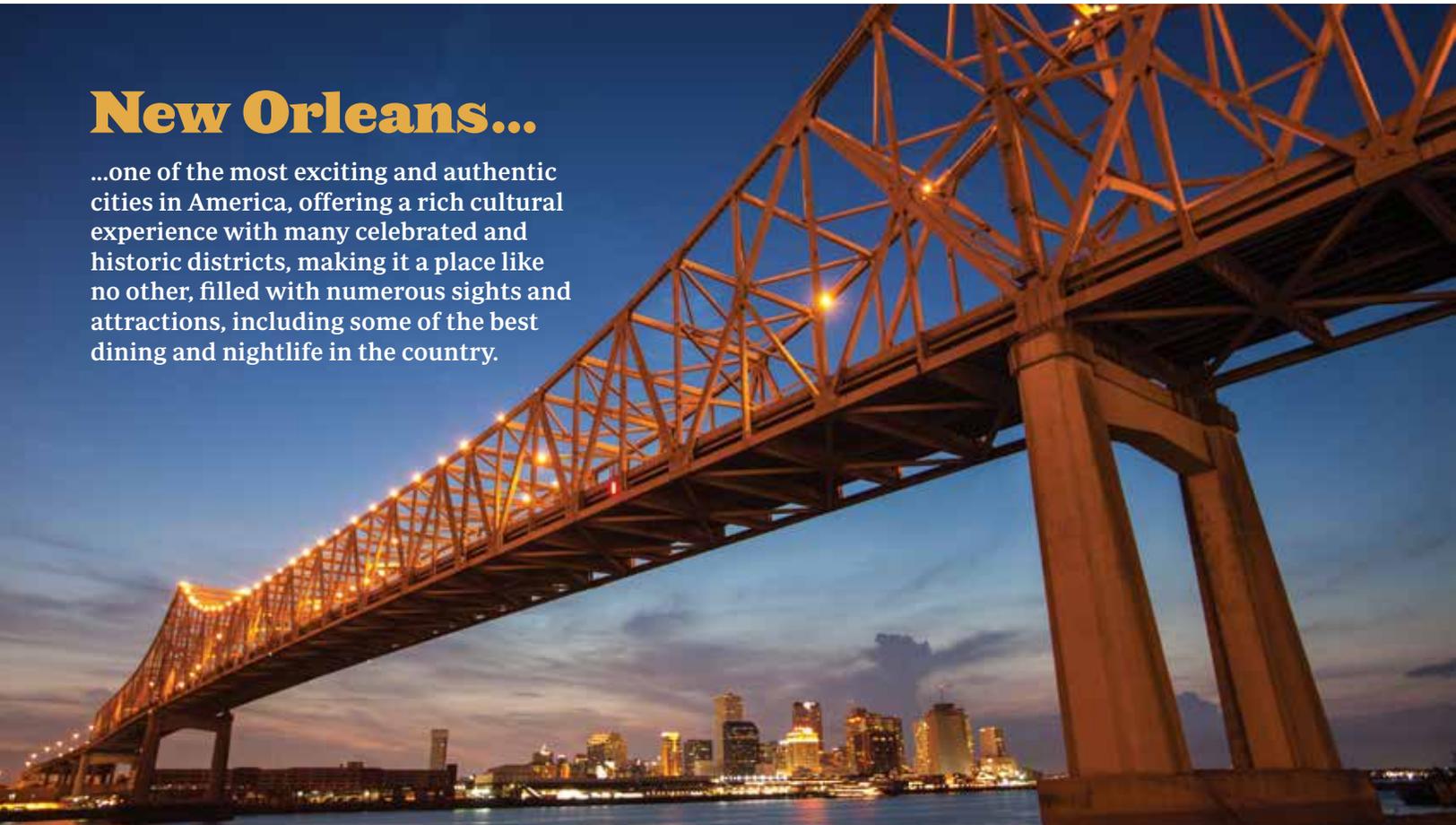


- 1 Astor Crowne Plaza 739 Canal Street
- 2 Courtyard New Orleans Downtown/Iberville 910 Iberville Street
- 3 Courtyard New Orleans Convention Center 300 Julia Street
- 4 Hampton Inn & Suites Convention Center 1201 Convention Center Boulevard
- 5 Hampton Inn Downtown—French Quarter 226 Carondelet Street
- 6 Hilton Garden Inn Convention Center 1001 S. Peters Street
- 7 Hilton New Orleans Riverside 2 Poydras Street
- 8 Hotel Monteleone 214 Royal Street
- 9 Hyatt Place New Orleans Convention Center 881 Convention Center Boulevard
- 10 JW Marriott Hotel New Orleans 614 Canal Street
- 11 Loews New Orleans Hotel 300 Poydras Street

- 12 New Orleans Marriott 555 Canal Street
- 13 New Orleans Marriott at the Convention Center 859 Convention Center Boulevard
- 14 Omni Royal Orleans 621 St. Louis Street
- 15 Residence Inn Convention Center 345 St. Joseph Street
- 16 Ritz-Carlton New Orleans 921 Canal Street
- 17 Royal Sonesta New Orleans 300 Bourbon Street
- 18 Sheraton New Orleans 500 Canal Street
- 19 SpringHill Suites Convention Center 301 St. Joseph Street
- 20 W New Orleans 333 Poydras Street
- 21 Westin New Orleans at Canal Place 100 Iberville Street
- 22 Wyndham Riverfront New Orleans 701 Convention Center Boulevard

New Orleans...

...one of the most exciting and authentic cities in America, offering a rich cultural experience with many celebrated and historic districts, making it a place like no other, filled with numerous sights and attractions, including some of the best dining and nightlife in the country.



The French Quarter

Experience more than 100 square-blocks of art, dining, shopping, entertainment and architectural treasures including New Orleans traditions such as Café DuMonde, Central Grocery, Gumbo Shop or Mother's Restaurant. Go antiquing on Royal Street or take a carriage ride to see the architecture that is uniquely New Orleans. And no night is complete without dining at one of New Orleans legendary restaurants or enjoying traditional jazz.

The Music

The city is the birthplace of jazz and a mecca for gospel, R&B and ultimately, the rock and pop we love today. The original spirit of creativity and musical magic is alive on the streets and in the clubs of New Orleans. Experience unbelievable live musical performances in venues from swank lounges to tiny honky tonks. New Orleans is one big stage.

The Food

New Orleans offers one of the most incredible—and incredibly diverse—concentrations of exceptional dining and unforgettable cuisine in the world. There is truly something for everyone. Enjoy Brigtsen's, Café Amelie, Commander's Palace, Drago's, Dickie Brennan's, Red Fish Grill, Mr. B's Bistro, among many other fine restaurants.

Make your reservation online through NASS' partnership with OpenTable and 40 cents will be donated toward spine research. Visit www.spine.org/opentable.

The Mardi Gras

See where Mardi Gras is made at Mardi Gras World where artists and sculptors work on the world's largest fleet of floats. Learn the history, traditions and pageantry of Mardi Gras at The Presbytere, A Louisiana State Museum, that explores the themes of Mardi Gras.

The NASS 2013 Welcome Reception will be at Mardi Gras World on Wednesday night.

Discover all New Orleans has to offer at www.neworleanscvb.com/nass

Education

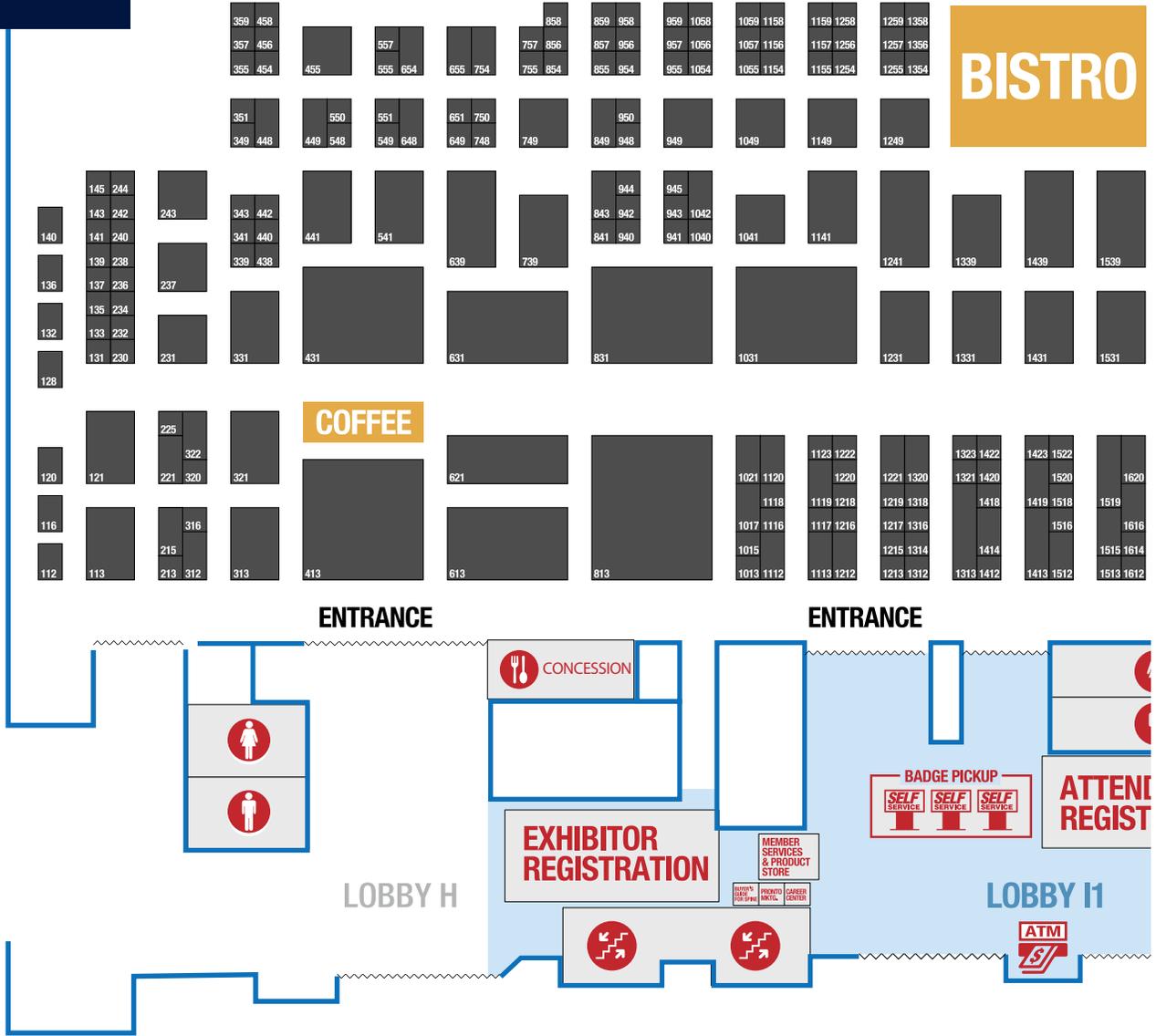
General Session

Food & Beverage -
Special Events

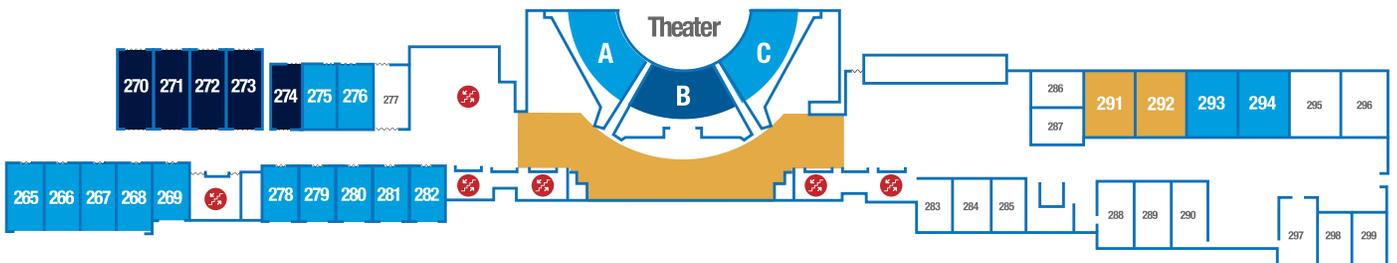
Committees

NASS Booths-
Registration

Level 1



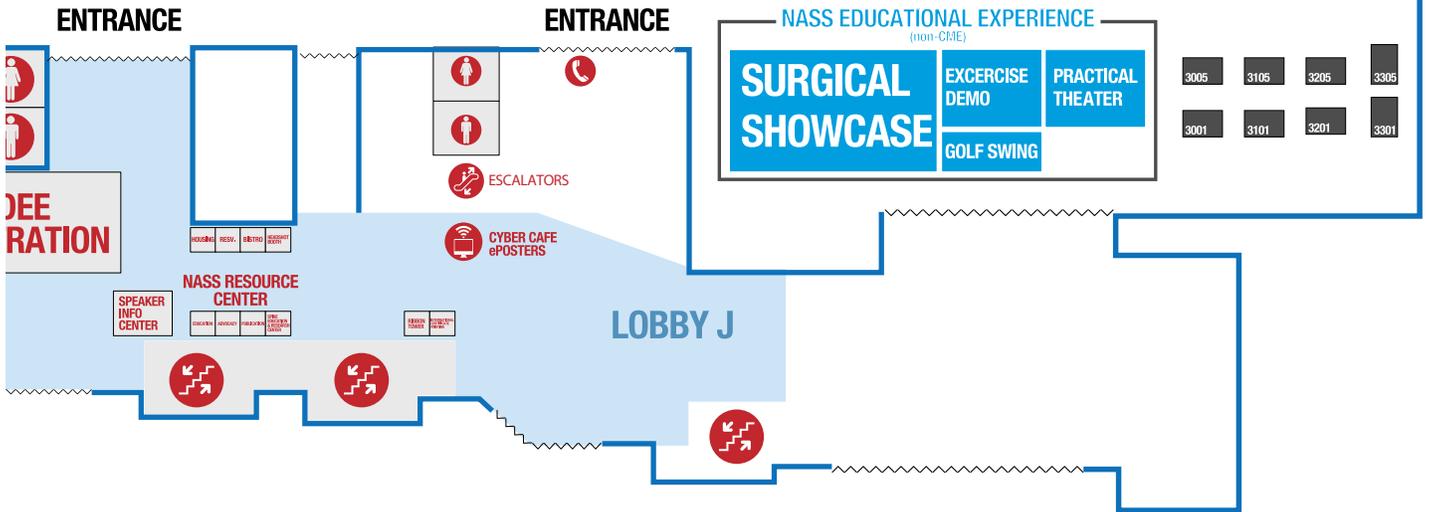
Level 2



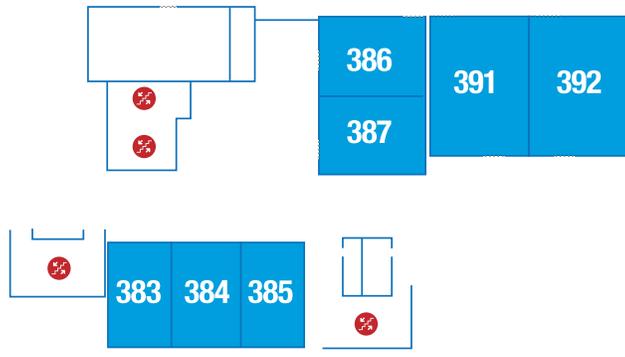


SOLUTION SHOWCASE

MEDICAL ATTENDEE FOOD SERVICE



Level 3



7:00 a.m.

8:00 a.m.

9:00 a.m.

10:00 a.m.

11:00 a.m.

12:00 p.m.

**Tuesday,
October 8**

Attendee Registration

Exhibitor Registration

Ticketed Session: Fundamentals of Evidence-Based Medicine

Ticketed Session: Hands-On Course: Minimally Invasive Spine Surgery

Ticketed Session: Coding Update 2013

**Wednesday,
October 9**

Attendee Registration/NASS Resource Center/ePosters

Exhibitor Registration

Ticketed Session: Coding Update 2013

Technique Workshops/Instructional Courses/Collaborative Concepts in Spine Care Sessions

Technical Exhibition Open

Box Lunch

NASS Bistro

**Thursday,
October 10**

Attendee Registration/NASS Resource Center/ePosters

Exhibitor Registration

Continental Breakfast

Technical Exhibition Open

Best Papers

Symposia

Break/
Practical
TheaterTSJ Awards/
Collaborative Concepts/
Focused Discussions

NASS Bistro

**Friday,
October 11**

Attendee Registration/NASS Resource Center/ePosters

Exhibitor Registration

Continental Breakfast

Technical Exhibition Open

Best Papers

Symposia

Break/
Practical
TheaterResearch/
Recognition
AwardsConcurrent Sessions/
Collaborative Concepts/
Global Spine Forum

Young Spine Surgeons Forum

NASS Bistro

**Sat.,
Oct. 12**

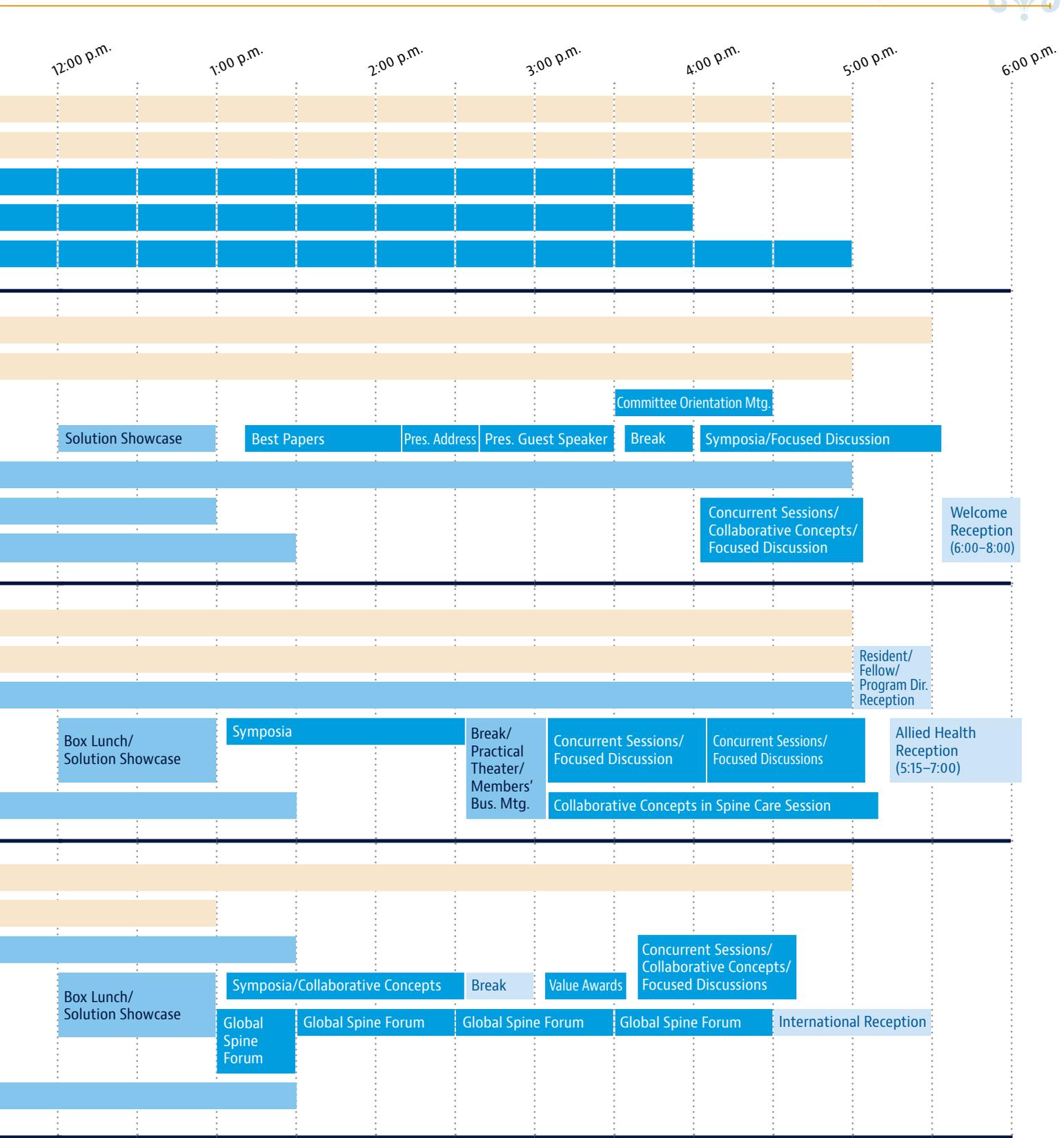
Attendee Registration/NASS Resource Center/ePosters

Continental Breakfast

Concurrent Sessions

Workshop

Symposium



Monday, October 7

8:00 a.m.–5:00 p.m.	Exhibitor Registration	Lobby H (1st Level)
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Tuesday, October 8

6:30 a.m.–5:00 p.m.	Attendee Registration	Lobby H (1st Level)
7:00 a.m.–4:00 p.m.	Ticketed Session: Fundamentals of Evidence-Based Medicine	Room 386/387
7:30 a.m.–4:30 p.m.	Ticketed Session: Hands-On Course: Minimally Invasive Spine Surgery	Room 391/392
7:30 a.m.–5:00 p.m.	Ticketed Session: Coding Update 2013: Essentials and Controversies of Spine Care Coding	Room 293/294
8:00 a.m.–5:00 p.m.	Exhibitor Registration	Lobby H (1st Level)

Wednesday, October 9

6:30 a.m.–5:30 p.m.	Attendee Registration	Lobby H (1st Level)
	NASS Resource Center Open	Lobby H (1st Level)
	ePosters Open for Viewing	Lobby H (1st Level)
7:00 a.m.–5:00 p.m.	Exhibitor Registration	Lobby H (1st Level)
7:30 a.m.–12:00 p.m.	Ticketed Session: Coding Update 2013: Essentials and Controversies of Spine Care Coding (Continued)	Room 293/294
8:00 a.m.–12:00 p.m.	Ticketed Technique Workshops:	
	Options in Posterior Cervical Fixation from Occiput to Cervical-Thoracic Junction	Room 383-385
	Evolving Anterior Technologies in the Treatment of Cervical Degenerative Disease	Room 391/392
	Ticketed Instructional Courses:	
	Exercise-Based Management of Lumbar Spine Pain: A Guide to Decision-Making	Room 266/267
	Fundamentals of Image-Guided Spinal Surgery	Room 275/276
	Section on Biologics and Basic Research: Stem Cells	Room 278/279
	Section on Radiology: Imaging of the Spine: Spectrum of Disease and Live/Interactive Case Reviews	Room 386/387
	Leadership Development and Training	Room 282
	Collaborative Concepts in Spine Care Sessions:	
ABCs of Lumbar Spinal Stenosis	Room 268	
Surgical Success: Aligning Expectations	Room 269	
10:00 a.m.–5:00 p.m.	Technical Exhibition Open	Technical Exhibition
11:00 a.m.–1:00 p.m.	Complimentary Box Lunch (Attendees Only)	Technical Exhibition, Back of Hall
11:00 a.m.–1:30 p.m.	NASS Bistro Lunch Service	Technical Exhibition, Back of Hall
11:30 a.m.–12:00 p.m.	Practical Theater: Avoid Penalties—Navigating CMS Quality Initiatives (PQRS, Physician Feedback & Value-Based Modifier)	Technical Exhibition, Booth 2900
12:00–1:00 p.m.	Program Directors' Luncheon	Room 291
	Solution Showcase: 12:00, Lanx; 12:30, SI-BONE, Inc.	Technical Exhibition, Booth 1849
1:00–1:10 p.m.	Welcome Remarks	Theater ABC
1:10–2:10 p.m.	Best Papers: Surgery	Theater ABC
2:10–2:40 p.m.	Introduction and Presidential Address: William C. Watters III, MD and Charles A. Mick, MD	Theater ABC



2:40–3:30 p.m.	Introduction and Presidential Guest Speaker: Charles A. Mick, MD and Stephen Dubner	Theater ABC
3:30–3:35 p.m.	NASS Working for You: NASS Unveils Choosing Wisely Campaign List	Theater ABC
3:30–4:30 p.m.	Committee Orientation Program Meeting	Room 270
3:35–4:00 p.m.	Networking Break (Beverage Service)	Tech. Exhibition, Aisles 400/2100
4:00–4:05 p.m.	NASS Working for You: Update on Sections	Theater ABC
4:05–5:05 p.m.	Concurrent Sessions:	
	Cervical Surgery	Room 275/276
	Prevention of Complications in Deformity	Room 278/279
	Spinal Trauma and Cord Injury	Room 280/281
	Collaborative Concepts in Spine Care Session: Spine Triage: An Integrated Care Model	Room 268
4:05–5:35 p.m.	Symposia:	
	Behind the Headlines: How News Coverage Shapes Health Care Policy and Public Perception	Theater ABC
	Data Collection, Value and Cost-Effectiveness of Spine Care	Room 266/267
	Focused Discussion: ICD-10	Room 282
6:00–8:00 p.m.	Welcome Reception	Mardi Gras World

Thursday, October 10

7:00–8:30 a.m.	Continental Breakfast	Theater Lobby (2nd Level)
7:00 a.m.–5:00 p.m.	Attendee Registration	Lobby H (1st Level)
	NASS Resource Center Open	Lobby H (1st Level)
	ePosters Open for Viewing	Lobby H (1st Level)
7:50–7:55 a.m.	Announcements	Theater B
7:55–8:55 a.m.	Best Papers: Comprehensive	Theater B
8:00 a.m.–5:00 p.m.	Exhibitor Registration	Lobby H (1st Level)
8:55–9:00 a.m.	NASS Working for You: Advocacy Update	Theater B
9:00–10:30 a.m.	Symposia:	
	Section on MIS: Controversies in the Adoption of Minimally Invasive Lumbar Fusion	Theater A
	A Retrospective on BMP-2 Research: Lessons From the YODA Project	Theater B
	The Grey Zone: Integrated Management from Clinic to Surgery	Theater C
9:00 a.m.–5:00 p.m.	Technical Exhibition Open	Technical Exhibition
10:30–11:00 a.m.	Networking Break (Beverage Service)	Tech. Exhibition, Aisles 400/2100
	Practical Theater: Selecting and Implementing EHRs	Technical Exhibition, Booth 2900
11:00 a.m.–12:00 p.m.	The Spine Journal Outstanding Paper Awards	Theater B
	Collaborative Concepts in Spine Care Session: Perioperative Care Guidelines for the Older Patient	Room 268
	Focused Discussions:	
	Exercise: Medicine for the Spine	Room 266/267
	Dynamic MRI: Current Studies and Utility in Patient Care	Room 278/279
11:00 a.m.–1:30 p.m.	NASS Bistro Lunch Service	Technical Exhibition, Back of Hall
12:00–1:00 p.m.	Complimentary Box Lunch (Attendees Only)	Technical Exhibition, Back of Hall
	Solution Showcase: 12:00, SI-BONE, Inc.; 12:30, FTGU Medical Consulting, LLC	Technical Exhibition, Booth 1849

1:00–1:05 p.m.	NASS Working for You: Video Update from US Senator Marco Rubio (FL)	Theater B
1:05–2:35 p.m.	Symposia:	
	Section on Robotics and Navigation: Should Robotics or Navigation Be Part of Your Operating Room?	Theater A
	Preparing to Practice Medicine in America under the Affordable Care Act	Theater B
	Prescription Opioids in Spine Care	Theater C
2:35–3:05 p.m.	Networking Break (Beverage Service)	Tech. Exhibition, Aisles 400/2100
	Members' Business Meeting	Room 280/281
	Practical Theater: Avoid Penalties—Navigating CMS Quality Initiatives (PQRS, Physician Feedback and Value-Based Modifier)	Technical Exhibition, Booth 2900
3:05–4:05 p.m.	Concurrent Sessions:	
	Myelopathy	Theater A
	Medical/Interventional	Theater B
	Adult Deformity	Room 266/267
	Tissue Engineering	Room 275/276
	Socioeconomics	Room 278/279
	Focused Discussion: Opioids for Spine Pain: Curve/Countercurve	Theater C
3:05–5:10 p.m.	Collaborative Concepts in Spine Care Session: Outcomes Assessment in the New Vernacular of Value	Room 268
4:10–5:10 p.m.	Concurrent Sessions:	
	Pediatric Deformity	Theater A
	Outcomes	Theater B
	Infection Management	Theater C
	Trauma	Room 266/267
	Disc Biology	Room 280/281
	Focused Discussions:	
	Best Practices Update: Antibiotic Prophylaxis in Spine Surgery	Room 269
Evidence-Based Spinal Diagnosis	Room 278/279	
Psychologically Informed Interventions for Spine Pain	Room 275/276	
5:00–6:00 p.m.	Resident, Fellow and Program Directors Reception	Room 292
5:15–7:00 p.m.	Allied Health Reception	Mid-house Level Lobby



Friday, October 11		
7:00–8:30 a.m.	Continental Breakfast	Theater Lobby (2nd Level)
7:00 a.m.–5:00 p.m.	Attendee Registration	Lobby H (1st Level)
	NASS Resource Center Open	Lobby H (1st Level)
	ePosters Open for Viewing	Lobby H (1st Level)
7:20–7:25 a.m.	Announcements	Theater B
7:25–8:25 a.m.	Best Papers: Basic Science and Socioeconomics	Theater B
8:00 a.m.–1:00 p.m.	Exhibitor Registration	Lobby H (1st Level)
8:25–8:30 a.m.	NASS Working for You: Coding Update	Theater B
8:30–10:00 a.m.	Symposia:	
	Evolving Concepts of Value in Our New Healthcare System: Who is Going to Get the Money?	Theater B
	State-of-the-Art World Spine Care: A Review of Practices from Different Regions of the World	Theater C
9:00 a.m.–12:00 p.m.	Young Spine Surgeons Forum	Room 275/276
9:00 a.m.–1:30 p.m.	Technical Exhibition Open	Technical Exhibition
10:00–10:25 a.m.	Networking Break (Beverage Service)	Tech. Exhibition, Aisles 400/2100
	Practical Theater: Selecting and Implementing EHRs	Technical Exhibition, Booth 2900
10:25–10:30 a.m.	Spine Safety Update	Theater B
10:30–10:55 a.m.	NASS Research Award Presentations	Theater B
10:55–11:00 a.m.	NASS Recognition Awards	Theater B
11:00 a.m.–12:00 p.m.	Concurrent Sessions:	
	Deformity	Theater A
	Thoracolumbar Surgery	Theater B
	Complications	Theater C
	Tumor	Room 266/267
	Biologics BMP	Room 278/279
	Collaborative Concepts in Spine Care Sessions:	
	Rehabilitation Breakout: Neck/Shoulder: Differential Diagnosis	Room 268
	RN/PA/NP Breakout: Medical Necessity: When to Treat or Not to Treat	Room 269
Global Spine Forum: Turkish Spine Society	Room 280/281	
11:00 a.m.–1:30 p.m.	NASS Bistro Lunch Service	Technical Exhibition, Back of Hall
12:00–1:00 p.m.	Complimentary Box Lunch (Attendees Only)	Technical Exhibition, Back of Hall
	Solution Showcase: 12:00, Invibio Biomaterial Solutions	Technical Exhibition, Booth 1849
1:00–1:05 p.m.	NASS Working for You: NASS Coverage Task Force and Professional, Economic and Regulatory Committee (PERC) Update	Theater B
1:00–1:30 p.m.	Global Spine Forum: World Spine Care Project	Room 280/281
1:05–2:35 p.m.	Symposia:	
	Section on Radiology: Controversies in Spine Imaging	Theater B
	How Mobile Technology is Changing Spine Care	Theater C
	Collaborative Concepts in Spine Care Session: Integrated Care Case Studies	Room 268
1:30–2:30 p.m.	Global Spine Forum: AOSpine	Room 280/281
2:30–3:30 p.m.	Global Spine Forum: Brazilian Spine Society	Room 280/281

2:35–3:00 p.m.	Networking Break (Beverage Service)	Theater Lobby (2nd Level)
3:00–3:05 p.m.	Spine Safety Alert	Theater B
3:05–3:35 p.m.	Value Abstract Awards Presentations	Theater B
3:30–4:30 p.m.	Global Spine Forum: Chinese Orthopaedic Association	Room 280/281
3:40–4:40 p.m.	Concurrent Sessions:	
	Implants and Fixation	Theater A
	Predicting and Preventing Complications	Room 266/267
	Epidemiology	Room 269
	Imaging	Theater C
	Osteoporosis	Room 278/279
	Collaborative Concepts in Spine Care Session: Neck/Shoulder Workshop	Room 268
	Focused Discussions:	
	Section on Biologics and Basic Research: Update on rhBMP-2—Current Usage, YODA Findings and Risk Management	Theater B
	Activity Monitoring Patients with Lumbar Spinal Stenosis	Room 275/276
4:30–5:30 p.m.	International Reception (Open to all attendees)	Mid-house Level Lobby

Saturday, October 12

7:30 a.m.–12:00 p.m.	Attendee Registration	Lobby H (1st Level)
	NASS Resource Center Open	Lobby H (1st Level)
	ePosters Open for Viewing	Lobby H (1st Level)
7:30–9:00 a.m.	Continental Breakfast	Theater Lobby (2nd Level)
7:55–8:00 a.m.	Announcements	Room 266/267
8:00–8:05 a.m.	Check Presentation to Shriners’ Hospital for Children	Room 266/267
8:05–9:30 a.m.	Symposium: Spine Injuries in Contact Sports	Room 266/267
10:00–11:00 a.m.	Concurrent Sessions:	
	Motion Preservation	Room 266/267
	Socioeconomics of Deformity	Room 278/279
	Basic Science of Bone and Disc	Room 280/281
11:00 a.m.–12:00 p.m.	Workshop: Who’s to Blame? When Physicians Rely on Medical Device Representatives For Instruction	Room 266/267
12:00 p.m.	Meeting Adjourns	



Monday, October 7

8:00 a.m.–5:00 p.m.

Exhibitor Registration

Lobby H (1st Level)

Tuesday, October 8

6:30 a.m.–5:00 p.m.

Attendee Registration

Lobby H (1st Level)

7:00 a.m.–4:00 p.m.

Instructional Course: Fundamentals of Evidence-Based Medicine*

Room 386/387

Course Chair: Daniel K. Resnick, MD

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 course, 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.

*Additional fee applies

7:30 a.m.–4:30 p.m.

**Hands-On Course:
Minimally Invasive Spine Surgery***

Room 391/392

Course Chairs: Michael Y. Wang, MD, FACS and
Raja Y. Rampersaud, MD, FRCSC

This hands-on course reviews basic and advanced techniques of minimally invasive spine surgery (MISS) as currently applied to the lumbar spine as well as review microsurgical anatomy and provide a hands-on opportunity to perform minimally invasive approaches for lumbar decompression, pedicle screw instrumentation, lateral approaches, and interbody access/fusion. In addition, endoscopic transforaminal decompressive techniques are demonstrated.

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

- Review the microsurgical anatomy of the lumbar spine, specifically as it relates to minimally invasive surgery;
- Practice accessing the lumbar spinal canal and intervertebral disc space through tubular access portals, posteriorly and laterally;
- Place pedicle screws in the lumbar spine using percutaneous and minimally invasive techniques;
- Develop facility with the lateral trans-psoas approach to the lumbar spine;
- Obtain hands-on experience with endoscopic far lateral decompressive procedures;
- Discuss pearls and pitfalls of complication avoidance.

7:30 a.m.–5:00 p.m.

**Instructional Course:
Coding Update 2013: Essentials and
Controversies of Spine Care Coding***

Room 293/294

Course Chairs: R. Dale Blasier, MD, FRCS(C), MBA and
William J. Sullivan, MD

Correct coding is the key to appropriate and timely reimbursement. Consistently rated one of NASS' most popular courses, this day and a half interactive, comprehensive coding/reimbursement seminar covers pertinent issues in ICD-9, the transition to ICD-10 and CPT-4 coding including the complex nuances of Evaluation and Management, Operative, Nonoperative and Radiology coding in the context of codes and physician work values. Network with others in the same Medicare region to uncover coding and reimbursement challenges and solutions. Meet one-on-one with faculty and participate in hands-on coding sessions to apply appropriate coding

*Additional fee applies

techniques to both simple and complex clinical examples. Implications and effects of proper coding and contract negotiation techniques for appropriate reimbursement and compliance are discussed.

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

- Recognize new procedure codes for 2013 and their proper usage;
- State the importance of correct coding on practice reimbursement;
- Properly use and document evaluation and management and procedure codes;
- Use modifiers and add-ons effectively;
- Identify coding for injections and neurologic testing;
- Cite payer reimbursement rules;
- Review government regulations and conflict of interest.

8:00 a.m.–5:00 p.m.

Exhibitor Registration

Lobby H (1st Level)



**Reserve dining at
spine.org/opentable
during the meeting to earn
40 cents for spine research
from each reservation!**



Wednesday, October 9

6:30 a.m.–5:30 p.m.

Attendee Registration

Lobby H (1st Level)

NASS Resource Center Open

Lobby H (1st Level)

ePosters Open for Viewing

Lobby H (1st Level)

7:00 a.m.–5:00 p.m.

Exhibitor Registration

Lobby H (1st Level)

7:30 a.m.–12:00 p.m.

Coding Update 2013: Essentials and Controversies of Spine Care Coding (Continued)

Room 293/294

8:00 a.m.–12:00 p.m.

Technique Workshop: Options in Posterior Cervical Fixation from Occiput to Cervical-Thoracic Junction*

Room 383-385

Course Chair: Thomas E. Mroz, MD

This workshop is a comprehensive presentation of the techniques used to instrument the posterior occiput, posterior cervical spine, and the cervical thoracic junction. There will be two hours for didactic presentations by nationally and internationally recognized surgeons and two hours designated for practicing the various techniques on sawbones.

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

- Identify the common indications for posterior instrumentation;
- Perform techniques for occipital fixation, C1-2 instrumentation, subaxial fixation (lateral mass screws, pedicle screws, translaminar screws), and the various methods used to instrument across the cervicothoracic junction;
- Assess complication profiles of the various techniques;
- Identify strategies to avoid complications;
- Perform optimal graft substrates for the various techniques.

8:00 a.m.–12:00 p.m.

Technique Workshop: Evolving Anterior Technologies in the Treatment of Cervical Degenerative Disease*

Room 391/392

Course Chair: Rick C. Sasso, MD

This newly developed workshop explores new and evolving technologies compared to standard techniques in the treatment of degenerative cervical disorders approached through an anterior portal. These techniques are taught by neurosurgical and orthopedic experts and includes hands-on practice on sawbones.

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

- Treat cervical radiculopathy;
- Manage myelopathy due to multilevel cervical pathology;
- Identify reconstruction options after anterior cervical decompression.

*Additional fee applies

8:00 a.m.–12:00 p.m.

**Instructional Course:
Exercise-Based Management of Lumbar
Spine Pain: A Guide to Decision-Making***

Room 266/267

Course Chairs: Alison A. Stout, DO and
Ryan A. Tuzell, MA, PT, Cert. MDT

There are many types of physical therapy utilized in the treatment of lumbar spine disorders. In treating low back pain as a whole, no single form of physical therapy has been shown to be superior to another. There is evidence, however, to suggest that sub-grouped patients may respond better to specific treatments. This course gives the provider an evidence-based approach that helps distinguish these subgroups and understand how different types of exercise-based physical therapy are beneficial for different patient characteristics. This type of approach has not yet been presented in the literature and will help providers guide clinical decision-making in the treatment of patients with lumbar diagnoses. Multiple types of physical therapy utilizing exercise, for treating lumbar diagnoses will be presented and the evidence discussed. The participant immediately will gain clinically relevant tools to guide decision-making in the management of patients with lumbar diagnoses.

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

- Appreciate how outcomes are compromised by using one-size-fits-all treatments for non-specific low back pain;
- Describe an evidence-based starting evaluation and treatment in physical therapy for lumbar diagnoses;
- Distinguish which types of physical therapy are best for specific lumbar diagnoses.

8:00 a.m.–12:00 p.m.

**Instructional Course:
Fundamentals of Image-Guided Spinal
Surgery***

Room 275/276

Course Chair: Eric Nottmeier, MD

There has been a renewed interest in spinal image guidance secondary to the development of more user-friendly technology, as well as a growing concern for radiation exposure in the operating room. This course 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 assess the applications of image guidance to cervical, thoracic, lumbar, minimally invasive, revision

and deformity spinal surgery procedures. Reimbursement strategies for image-guided spinal procedures are addressed. During a breakout session, the participants are given the opportunity to gain hands-on experience with a variety of the image-guided systems currently available. A review of the published literature on spinal image guidance and operating room radiation exposure is presented. At the conclusion of the course, cases are presented and discussed. The assembled faculty is some of the most experienced in the world in spinal image guidance.

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

- Demonstrate the proper setup in the operating room for image-guided spinal surgery;
- Identify and perform the 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;
- Name the most common pitfalls of spinal image guidance that can add time and frustration to the procedure and identify methods to avoid these pitfalls.

8:00 a.m.–12:00 p.m.

**Instructional Course:
Section on Biologics and Basic Research:
Stem Cells***

Room 278/279

Course Chairs: Hyun Bae, MD and Clinton Devin, MD

This course focuses on the emerging field of stem cells and their potential utility for spinal procedures. In addition to reviewing the scientific rationale for the use of cell-based therapies, it discusses the various conditions for which these treatments have been advocated including spinal fusion, degenerative disc disease, and spinal cord injury. In particular, the course provides a critical analysis of the existing peer-reviewed literature and identifies which studies still need to be completed in order to validate this technique. Finally, there is a review of the future of stem cells by addressing the wide range of regulatory and economic issues that may ultimately determine whether this technology gains widespread acceptance among spine surgeons. This course is intended for practitioners who want to learn more about implementing these novel treatments for spinal diseases into their own practices as well as basic science researchers with an interest in stem cells, orthobiologics, or tissue engineering.

*Additional fee applies



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

- Clarify the scientific rationale for the use of stem cells and other cell-based therapies;
- Investigate the potential clinical applications for these strategies;
- Review the existing data that has been published and discuss the studies that still need to be performed in order to establish the safety and efficacy of these novel biological techniques;
- Assess the various current economic and regulatory issues that may ultimately limit the utilization of these treatments.

8:00 a.m.–12:00 p.m.

**Instructional Course:
Section on Radiology: Imaging of the Spine: Spectrum of Disease and Live/Interactive Case Reviews***

Room 386/387

Course Chair: A. Jay Khanna, MD

Currently, most spine surgeons and specialists prefer to read their own magnetic resonance imaging (MRI) and other imaging studies. Unlike primary care physicians who are often satisfied with the official radiologist’s report for most of the imaging studies (especially MRI) requested for their patients, spine surgeons and specialists request that the films be available for review. However, clinicians tend to have minimal formal training in how imaging studies are systematically reviewed. Although radiologists have such training, they often do not have the clinical background that clinicians have. This course bridges the gap between spine surgeons, specialists and radiologists to provide each specialist with the requisite skills of the complementary specialty in a collaborative and interactive format.

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

- Describe the essentials of spine imaging and methods for systematically evaluating MRI and other imaging studies;
- Review and illustrate the spectrum of spine pathology detectable by various imaging techniques with a focus on MRI;
- Discuss case examples of spine pathology to gain experience and confidence to evaluate such studies on their own.

8:00 a.m.–12:00 p.m.

**Instructional Course:
Leadership Development and Training***

Room 282

Course Chair: Mitchel Harris, MD, FACS

The Leadership Development 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, look to the NASS Leadership Development Program Course to gain knowledge and expertise from highly qualified faculty. The Leadership Development Program will help develop leaders who lead with a vision of a better future.

Speakers will include the nationally renowned Mary Crane and David Dye. Mary Crane will be back again this year with her two-hour presentation on “Negotiations.” Leadership inspiration, David Dye, will be speaking on “How to Run a Meeting.” Course attendees also will receive David Dye’s brand new book titled *7 Things Your Team Needs to Hear You Say*.

Upon completion of this course, 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;
- Institute a system of self-evaluation and improvement;
- Apply skills on how to run an effective meeting.

*Additional fee applies

8:00 a.m.–12:00 p.m.

**Collaborative Concepts in Spine Care
Session:
ABC's of Lumbar Spinal Stenosis**

Room 268

Course Chairs: Rick J. Placide, MD, PT and
Evan Johnson, PT, DPT, OCS

Lumbar spinal stenosis is one of the primary causes of back pain and lower extremity neurologic symptoms in the elderly and is the most common diagnosis requiring lumbar spine surgery for patients over the age of 65. Despite the fact that spinal stenosis is an increasingly diagnosed source of pain and disability in aging individuals, there is a lack of evidence to support many of the common surgical and nonsurgical interventions for individuals with spinal stenosis. This course reviews the etiology, pathophysiology and typical patient presentation of lumbar spinal stenosis. Multidisciplinary faculty present indications for commonly utilized clinical examination techniques, conservative care and operative treatments for spinal stenosis. Presenters discuss varying opinions as well as current evidence for nonoperative and operative treatments for lumbar spinal stenosis identified by the NASS Task Force on Clinical Guidelines for lumbar spinal stenosis, including: pharmacological management, therapeutic exercise, flexion-based repetitive movements, manual therapy, interventional therapies and operative treatments.

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

- Recognize distinctive characteristics of the history and physical examination of individuals who present with pain and disability arising from lumbar spinal stenosis;
- Identify the advantages and disadvantages of specific clinic examination and treatment techniques for lumbar spinal stenosis;
- Enhance the use of best practice examination and treatment techniques of individuals with lumbar spinal stenosis, based on the most current evidence;
- Integrate current evidence and clinical findings to facilitate optimal triage of patients with lumbar spinal stenosis in a manner consistent with best practice.

Agenda

- **Introduction/Welcome**
Rick J. Placide, MD, PT; Evan Johnson, PT, DPT, OCS
- **Anatomy and Pathophysiology of Lumbar Spinal Stenosis**
Rick J. Placide, MD, PT
- **History and Physical Exam**
Evan Johnson, PT, DPT, OCS

- **Conservative Care: Manual Therapy and Rehabilitation**
Evan Johnson, PT, DPT, OCS
- **Interventional Spine Procedures for Lumbar Spinal Stenosis**
Joshua D. Rittenberg, MD
- **Cauda Equina Syndrome**
Rick J. Placide, MD, PT
- **Surgical Techniques for Lumbar Spinal Stenosis**
Charla Fischer, MD
- **Postoperative Care for Lumbar Spinal Stenosis**
Michael Brandao, CFNP
- **Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

8:00 a.m.–12:00 p.m.

**Collaborative Concepts in Spine Care
Session:
Surgical Success: Aligning Expectations**

Room 269

Course Chair: Michael L. Reed, PT, DPT, OCS, MTC

There is increasing pressure on all health care providers, especially those specializing in spinal disorders, to secure measurable outcomes that represent significant value for the patient, their employer, the third-party payor, and society. Strategies that must be considered, developed and employed are: properly diagnosing and identifying surgical candidates, screening for variables that might preclude a successful outcome, performing the proper surgical technique with adequate implant materials, and supporting the recovery process with appropriate medical management and rehabilitation. Aligning the expectations of all members of the surgical and perioperative teams is paramount—including the patient, employer, payor, and, perhaps, society in the dialogue may be equally important—especially, in the newly evolving model of value-based health care delivery.

This session provides a multidisciplinary perspective on current strategies to secure the most optimal surgical outcomes through multimodal communication.

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

- Identify the key components that require consideration and attention when planning for a successful surgical outcome;
- Describe the various efforts required to mitigate potential risks or threats to a successful surgical outcome;



- Outline the advantages of aligning stakeholder expectations with respect to securing successful surgical outcomes;
- Assess the various providers on the surgical and perioperative team that could, potentially, play a role in influencing the surgical outcome;
- Review the various nonprovider/nonmedical stakeholders and factors that could, potentially, play a role in influencing the surgical outcome;
- Develop strategies for interdisciplinary communication as a means of aligning expectations and mitigating risk;
- Gain insight into communicating with nonmedical stakeholder groups as a means of aligning expectations and mitigating risk;
- Demonstrate various communication strategies with specific emphasis on leveraging technology and digital media.

Agenda

- **Planning for a Successful Surgical Outcome**
S. Raymond Golish, MD, PhD
- **A Review of the Evidence**
S. Raymond Golish, MD, PhD
- **Mitigating Potential Risks or Threats to a Successful Surgical Outcome**
S. Raymond Golish, MD, PhD
- **The Advantages of Aligning Stakeholder Expectations**
- **How the Surgical and Perioperative Team Can Influence the Surgical Outcome**
- **How the Nonprovider/Nonmedical Stakeholders Can Influence the Surgical Outcome**
- **Multidisciplinary Communication: Critical Elements and Timelines**
Matthew Smuck, MD
- **Strategies for Using Technology and Digital Media to Augment Communication**
Matthew Smuck, MD
- **Securing Patient Active Engagement and the Use of Biometrics**
Matthew Smuck, MD
- **Defining What Success Might Look Like**
Michael L. Reed, PT, DPT, OCS, MTC
- **Execution: Implementing the Program, Assessing Efficacy and Refining**
Michael L. Reed, PT, DPT, OCS, MTC
- **Discussion**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

10:00 a.m.–5:00 p.m.

Technical Exhibition Open

Technical Exhibition

11:00 a.m.–1:00 p.m.

Complimentary Box Lunch (Attendees Only)

Technical Exhibition, Back of Hall

11:00 a.m.–1:30 p.m.

NASS Bistro Lunch Service

Technical Exhibition, Back of Hall

11:30 a.m.–12:00 p.m.

Practical Theater: Avoid Penalties— Navigating CMS Quality Initiatives (PQRS, Physician Feedback & Value-Based Modifier)

Technical Exhibition, Booth 2900

12:00–1:00 p.m.

Program Directors’ Luncheon

Room 291

Solution Showcase

Technical Exhibition, Booth 1849

12:00: Lanx, Inc.

12:30: SI-BONE, Inc.

1:00–1:10 p.m.

Welcome Remarks

Theater ABC

1:10–2:10 p.m.

**Best Papers:
Surgery**

Theater ABC

Moderators: Eric Truumees, MD and Jeffrey C. Wang, MD

1:10–1:16 p.m.

1. Antifibrinolytics Reduce Blood Loss in Adult Spinal Deformity Surgery: A Prospective Randomized Controlled Trial

Vadim Goz, BA¹; Kseniya Slobodyanyuk²; Thomas Cheriyan, MD³; Frank J. Schwab, MD⁴; Kushagra Verma⁵; Christian M. Hoelscher, BS²; Austin Peters, BS³; Tessa K. Huncke⁶; Baron S. Lonner, MD³; **Thomas J. Errico, MD²**

¹Spine Research Institute, Hospital for Joint Disease, New York, NY, US; ²New York University Medical Center, New York, NY, US; ³New York, NY, US; ⁴NYU Hospital for Joint Diseases, New York, NY, US; ⁵NYU School of Medicine, Philadelphia, PA, US; ⁶NYU Department of Anesthesiology, New York, NY, US

FDA Device/Drug Status: Tranexamic Acid (Not approved for this indication), Aminocaproic Acid (Not approved for this indication)

1:16–1:22 p.m.

2. Clinical Outcomes Following Surgical Management of Coexistent Cervical Stenosis and Multiple Sclerosis: A Cohort Controlled Analysis

Daniel Lubelski, BA¹; Kalil G. Abdullah, MD²; Matthew D. Alvin³; Timothy Y. Wang⁴; Amy S. Nowacki, PhD³; Michael P. Steinmetz, MD⁵; Edward C. Benzel, MD³; Thomas E. Mroz, MD³

¹Cleveland, OH, US; ²Philadelphia, PA, US; ³Cleveland Clinic Foundation, Cleveland, OH, US; ⁴Durham, NC, US; ⁵MetroHealth Medical Center Neurosurgery, Cleveland, OH, US

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

1:22–1:28 p.m.

3. Comparison Between Revision Surgeries for Cervical TDR and 1-2 Level ACDF from 2002-2009

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; **Kern Singh, MD³**

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: Bryan Disc (Approved for this indication), Prestige Disc (Approved for this indication), ProDisc-C (Approved for this indication), PCM disc (Approved for this indication), Prestige Disc (Approved for this indication)

1:28–1:34 p.m.

4. Laminoplasty Versus Laminectomy and Fusion to Treat Cervical Spondylotic Myelopathy: Outcomes of the Prospective Multicenter AOSpine International CSM Study

Michael G. Fehlings, MD, PhD, FRCS¹; Branko Kopjar, MD, PhD²; Helton Luiz A. Defino, MD, PhD³; Giuseppe Barbagallo, MD⁴; Paul M. Arnold, MD⁵; Mehmet Zileli, MD⁶; Yasutsugu Yukawa, MD⁷; Massimo Scerrati, MD, PhD⁸; Tomoaki Toyone, MD, PhD⁹; Masato Tanaka, MD¹⁰

¹Toronto Western Hospital, Toronto, ON, Canada; ²Mercer Island, WA, US; ³Universidade De Sao Paulo Faculdade De Medicina De Ribeirao Preto, Ribeirao Preto, SP, Brazil; ⁴A.O.V. Policlinico, Catania, Italy; ⁵University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁶Izmir, Turkey; ⁷Chubu Rosai Hospital, Nagoya, Japan; ⁸Ancona, Marche, Italy; ⁹Teikyo University, Ichihara, Japan; ¹⁰Okayama, Japan

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

1:34–1:40 p.m.

5. A Clinical Prediction Rule for Clinical Outcomes in Patients Undergoing Surgery for Degenerative Cervical Myelopathy: Analysis of an International AOSpine Prospective Multicenter Dataset of 771 Subjects

Lindsay Tetreault¹; Michael G. Fehlings, MD, PhD, FRCS²; Branko Kopjar, MD, PhD³; Paul M. Arnold, MD⁴; Alexander R. Vaccaro, MD, PhD⁵; Eric M. Massicotte, MD, FRCS⁶; Helton Luiz A. Defino, MD, PhD⁷; Giuseppe Barbagallo, MD⁸; Qiang Zhou⁹; Mehmet Zileli, MD¹⁰; Yasutsugu Yukawa, MD¹¹; Massimo Scerrati, MD, PhD¹²; Tomoaki Toyone, MD, PhD¹³; Masato Tanaka, MD¹⁴; Christopher I. Shaffrey, MD¹⁵; Mark B. Dekutoski, MD¹⁶; Ziya L. Gokaslan, MD, FACS¹⁷; Christopher M. Bono, MD¹⁸

¹University Health Network, Toronto, ON, Canada; ²Toronto Western Hospital, Toronto, ON, Canada; ³Mercer Island, WA, US; ⁴University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁵Rothman Institute, Philadelphia, PA, US; ⁶University of Toronto, Toronto, ON, Canada; ⁷Universidade De Sao Paulo Faculdade De Medicina De Ribeirao Preto, Ribeirao Preto, SP, Brazil; ⁸A.O.V. Policlinico, Catania, Italy; ⁹China; ¹⁰Izmir, Turkey; ¹¹Chubu Rosai Hospital, Nagoya, Japan; ¹²Ancona, Marche, Italy; ¹³Teikyo University, Ichihara, Japan; ¹⁴Okayama, Japan; ¹⁵University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹⁶The CORE Institute, Sun City West, AZ, US; ¹⁷Johns Hopkins University - Department of Neurosurgery, Baltimore, MD, US; ¹⁸Brigham & Women's Hospital, Department of Orthopedic Surgery, Boston, MA, US

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

6. Moved to *The Spine Journal* Outstanding Paper Awards and Editors' Choice Award Presentations Session



1:40–1:46 p.m.

7. C2 Nerve Root Transection During C1 Lateral Mass Screw Fixation: Does it Affect Functionality and Quality of Life?

Michael C. Dewan, MD¹; Saniya S. Godil, MD¹; Clinton J. Devin, MD²; Matthew J. McGirt, MD¹

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Nashville, TN, US

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

1:46–2:10 p.m.
Discussion

2:10–2:40 p.m.

Introduction and Presidential Address: William C. Watters III, MD and Charles A. Mick, MD

Theater ABC

2:40–3:30 p.m.

Introduction and Presidential Guest Speaker: Charles A. Mick, MD and Stephen Dubner

Theater ABC

3:30–3:35 p.m.

NASS Working for You: NASS Unveils Choosing Wisely Campaign List

Theater ABC

Moderator: F. Todd Wetzel, MD

3:30–4:30 p.m.

Committee Orientation Program Meeting

Room 270

The Committee Orientation Program Meeting is a valuable meeting for new committee members to assist them in their early committee involvement at NASS. This meeting is an opportunity to review the goals of NASS, to discuss the importance of committee work and to become familiar with the NASS Committee Evaluation and Improvement Project. There will be time during the session to ask any questions regarding committees.

3:35–4:00 p.m.

Networking Break (Beverage Service)

Technical Exhibition, Aisles 400 and 2100

4:00–4:05 p.m.

NASS Working for You: Update on Sections Theater ABC

Moderator: William Mitchell, MD

4:05–5:05 p.m.

Concurrent Session: Cervical Surgery

Room 275/276

Moderators: Ivan Cheng, MD and Raj D. Rao, MD

4:05–4:11 p.m.

8. Cervical Disc Arthroplasty Versus Anterior Cervical Discectomy and Fusion: A Systematic Review

Young Lu, BA¹; Samuel K. Cho, MD²; Andrew Hecht, MD¹; Sheeraz A. Qureshi, MD, MBA²

¹New York, NY, US; ²Mount Sinai School of Medicine, New York, NY, US

FDA Device/Drug Status: BRYAN Cervical Disc (Approved for this indication), PRESTIGE Cervical Disc (Approved for this indication), ProDisc-C Disc (Approved for this indication), Kineflex-C Disc (Investigational/Not approved), Porous Coated Motion Disc (Investigational/Not approved)

4:11–4:17 p.m.

9. A Report of 41 Cases of Three Column Osteotomies of the Upper Thoracic Spine and Cervicothoracic Junction: Complications, Outcomes and Differential Impact on Spinal Pelvic Parameters, Cervical Sagittal Alignment and General Health Status

Ehsan Tabaraee, MD¹; Alexander A. Theologis, MD²; Haruki Funao, MD, PhD³; R. Shay Bess, MD⁴; Eric O. Klineberg, MD⁵; Justin S. Smith, MD, PhD⁶; Khaled M. Kebaish, MD⁷; Vedat Deviren, MD⁷; Christopher P. Ames, MD¹

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; ³Department of Orthopedic Surgery, The Johns Hopkins Hospital, Baltimore, MD, US; ⁴Rocky Mountain Scoliosis and Spine, Denver, CO, US; ⁵University of California Davis School of Medicine, Sacramento, CA, US; ⁶UVA Health System, Charlottesville, VA, US; ⁷Baltimore, MD, US

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

4:17–4:23 p.m.

10. Outcomes of Single-Level Cervical Disc Arthroplasty Versus Anterior Discectomy and Fusion: A Single Center, Retrospective Review

Ronald A. Lehman Jr., MD¹; Robert W. Tracey, MD²; John P. Cody, MD³; Daniel G. Kang, MD⁴; Adam Bevevino⁴; Michael K. Rosner, MD⁴

¹Potomac, MD, US; ²Rockville, MD, US; ³Washington, DC, US; ⁴Bethesda, MD, US

FDA Device/Drug Status: ProDisc-C (Approved for this indication), Prestige (Approved for this indication)

4:23–4:29 p.m.

11. Role of Gender on the Diagnosis, Prevalence and Affect of Depression in Cervical Spine Surgery Patients

Richard J. Myers, MD¹; Natalie L. Zusman²; Steven D. Larsen²; Alexander C. Ching, MD¹; Robert A. Hart, MD²; Jung U. Yoo, MD²

¹Portland, OR, US; ²Oregon Health and Science University, Portland, OR, US

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

4:29–4:35 p.m.

12. Costs of Cervical Disc Replacement Versus Anterior Cervical Discectomy and Fusion for Treatment of Single-Level Cervical Disc Disease: An Analysis of the Blue Health Intelligence Database for Acute and Long-Term Costs and Complications

Kris Radcliff, MD¹; Jeffrey D. Zigler, JD²; Jack E. Zigler, MD³

¹Rothman Institute, Egg Harbor Township, NJ, US; ²Musculoskeletal Clinical Regulatory Advisers, New York, NY, US; ³Texas Back Institute, Plano, TX, US

FDA Device/Drug Status: Cervical disc replacement (Approved for this indication)

4:35–4:41 p.m.

13. Predictors of 12-Month Opioid Use After Elective Cervical Spine Surgery for Degenerative Changes

Marjorie Wang, MD, MPH¹; Andrew M. Lozen, MD²; Erin E. Krebs, MD, MPH³; Purushottam W. Laud, PhD²; Ann B. Nattinger, MD, MPH⁴

¹Medical College of Wisconsin, Department of Neurosurgery, Milwaukee, WI, US; ²Medical College of Wisconsin, Milwaukee, WI, US; ³Minneapolis VA Health Care System, Minneapolis, MN, US; ⁴Medical College of Wisconsin Center for Patient Care and Outcomes Research, Milwaukee, WI, US

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

4:41–4:47 p.m.

14. Rates of Anterior Cervical Discectomy and Fusion Following Initial Posterior Cervical Foraminotomy

Timothy Y. Wang¹; Daniel Lubelski, BA²

¹Durham, NC, US; ²Cleveland, OH, US

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

**4:47–5:05 p.m.
Discussion**

4:05–5:05 p.m.

**Concurrent Session:
Prevention of Complications in Deformity**

Room 278/279

Moderators: Norman B. Chutkan, MD and Michael D. Daubs, MD

4:05–4:11 p.m.

15. Proximal Junctional Failure in Adult Deformity Patients Results in Higher Rate of Revision But Limited Impact on Clinical Outcome

International Spine Study Group¹; Robert A. Hart, MD²; Jayme R. Hiratzka, MD²; D. Kojo Hamilton, MD²; R. Shay Bess, MD³; Frank J. Schwab, MD⁴; Christopher I. Shaffrey, MD⁵; Christopher P. Ames, MD⁶; Virginie Lafage, PhD⁴; Vedat Deviren, MD⁶; Justin S. Smith, MD, PhD⁷; Eric O. Klineberg, MD⁸; Ian McCarthy, PhD⁹; Douglas C. Burton, MD¹⁰; Richard A. Hostin, MD¹¹

¹Brighton, CO, US; ²Oregon Health & Science University, Portland, OR, US; ³Rocky Mountain Scoliosis and Spine, Denver, CO, US; ⁴NYU Hospital for Joint Diseases, New York, NY, US; ⁵University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷UVA Health System, Charlottesville, VA, US; ⁸University of California Davis School of Medicine, Sacramento, CA, US; ⁹Baylor Health Care System, Plano, TX, US; ¹⁰University of Kansas Medical Center, Kansas City, KS, US; ¹¹Southwest Scoliosis Institute, Plano, TX, US

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

4:11–4:17 p.m.

16. Prospective, Multicenter Assessment of Risk Factors for Early Rod Fracture Following Surgery for Adult Spinal Deformity (ASD)

International Spine Study Group¹; David M. Ibrahim, MD²; Justin S. Smith, MD, PhD³; Eric O. Klineberg, MD⁴; Christopher I. Shaffrey, MD⁵; Virginie Lafage, PhD⁶; Frank J. Schwab, MD⁶; Themistocles S. Protopsaltis, MD⁷; Munish C. Gupta, MD⁸; Gregory M. Mundis Jr., MD⁹; Manish Singh, MD²; Richard A. Hostin, MD¹⁰; Vedat Deviren, MD¹¹; Robert A. Hart, MD¹²; Douglas C. Burton, MD¹³; R. Shay Bess, MD¹⁴; Christopher P. Ames, MD¹¹

¹Brighton, CO, US; ²University of Virginia Medical Center, Charlottesville, VA, US; ³UVA Health System, Charlottesville, VA, US; ⁴University of California Davis School of Medicine, Sacramento, CA, US; ⁵University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁶NYU Hospital for Joint Diseases, New York, NY, US; ⁷NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, US; ⁸University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ⁹San Diego Center for Spinal Disorders, La Jolla, CA, US; ¹⁰Southwest Scoliosis Institute, Plano, TX, US; ¹¹University of California San Francisco, San Francisco, CA, US; ¹²Oregon Health & Science University, Portland, OR, US; ¹³University of Kansas Medical Center, Kansas City, KS, US; ¹⁴Rocky Mountain Scoliosis and Spine, Denver, CO, US

FDA Device/Drug Status: Pedicle screws/rods/hooks (Approved for this indication)



4:17–4:23 p.m.

17. Complications are Different for Recombinant Human Bone Morphogenetic Protein-2 (BMP) Versus No BMP Use in Adult Spinal Deformity (ASD): An Analysis of Variance in Complication Timing, Profile and Consequences

International Spine Study Group¹; R. Shay Bess, MD²; Breton Line³; Virginie Lafage, PhD⁴; Frank J. Schwab, MD⁴; Behrooz A. Akbarnia, MD⁵; Christopher P. Ames, MD⁶; Oheneba Boachie-Adjei, MD⁷; Douglas C. Burton, MD⁸; Vedat Deviren, MD⁶; Jacob M. Buchowski, MD, MS⁹; Robert A. Hart, MD¹⁰; Khaled M. Kebaish, MD¹¹; Eric O. Klineberg, MD¹²; Munish C. Gupta, MD¹³; Thomas J. Errico, MD¹⁴; Gregory M. Mundis Jr., MD⁵; Richard A. Hostin, MD¹⁵; Justin S. Smith, MD, PhD¹⁶

¹Brighton, CO, US; ²Rocky Mountain Scoliosis and Spine, Denver, CO, US; ³Denver, CO, US; ⁴NYU Hospital for Joint Diseases, New York, NY, US; ⁵San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷Hospital for Special Surgery, New York, NY, US; ⁸University of Kansas Medical Center, Kansas City, KS, US; ⁹Washington University in St. Louis, St. Louis, MO, US; ¹⁰Oregon Health & Science University, Portland, OR, US; ¹¹Baltimore, MD, US; ¹²University of California Davis School of Medicine, Sacramento, CA, US; ¹³University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ¹⁴New York University Medical Center, New York, NY, US; ¹⁵Southwest Scoliosis Institute, Plano, TX, US; ¹⁶UVA Health System, Charlottesville, VA, US

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

4:23–4:29 p.m.

18. Coronal Imbalance May Be Neglected in Patients Undergoing Major Sagittal Deformity Correction

International Spine Study Group¹; Munish C. Gupta, MD²; Oheneba Boachie-Adjei, MD³; Matthew E. Cunningham, MD, PhD⁴; Themistocles S. Protopsaltis, MD⁵; Vedat Deviren, MD⁶; Gregory M. Mundis Jr., MD⁷; Christopher P. Ames, MD⁶; Richard A. Hostin, MD⁸; Virginie Lafage, PhD⁹; Eric O. Klineberg, MD¹⁰; Justin S. Smith, MD, PhD¹¹; Jamie S. Terran¹²

¹Brighton, CO, US; ²University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ³Hospital for Special Surgery, New York, NY, US; ⁴The Hospital for Special Surgery, New York, NY, US; ⁵NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸Southwest Scoliosis Institute, Plano, TX, US; ⁹NYU Hospital for Joint Diseases, New York, NY, US; ¹⁰University of California Davis School of Medicine, Sacramento, CA, US; ¹¹UVA Health System, Charlottesville, VA, US; ¹²New York, NY, US

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

4:29–4:35 p.m.

19. Revision Surgery After Three Column Osteotomy (3CO) in 335 Adult Spinal Deformity (ASD) Patients: Intercenter Variability and Risk Factors

International Spine Study Group¹; Stephen P. Maier II, BA²; Virginie Lafage, PhD³; Justin S. Smith, MD, PhD⁴; Ibrahim Obeid⁵; Gregory M. Mundis Jr., MD⁶; Eric O. Klineberg, MD⁷; Khaled M. Kebaish, MD⁸; Richard A. Hostin, MD⁹; Robert A. Hart, MD¹⁰; Douglas C. Burton, MD¹¹; Oheneba Boachie-Adjei, MD¹²; Christopher P. Ames, MD¹³; Themistocles S. Protopsaltis, MD²; Frank J. Schwab, MD³

¹Brighton, CO, US; ²New York University Langone Medical Center Hospital for Joint Diseases, New York, NY, US; ³NYU Hospital for Joint Diseases, New York, NY, US; ⁴UVA Health System, Charlottesville, VA, US; ⁵France; ⁶San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁷University of California Davis School of Medicine, Sacramento, CA, US; ⁸Baltimore, MD, US; ⁹Southwest Scoliosis Institute, Plano, TX, US; ¹⁰Oregon Health & Science University, Portland, OR, US; ¹¹University of Kansas Medical Center, Kansas City, KS, US; ¹²Hospital for Special Surgery, New York, NY, US; ¹³University of California San Francisco, San Francisco, CA, US

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

4:35–4:41 p.m.

20. Complications of Primary Versus Revision Spinal Fusion for Adolescent Idiopathic Scoliosis

Vadim Goz, BA¹; Jeffrey H. Weinreb, BS²; Ian McCarthy, PhD³; Peter G. Passias, MD⁴; Virginie Lafage, PhD²; Thomas J. Errico, MD⁵

¹Spine Research Institute, Hospital for Joint Disease, New York, NY, US; ²New York University Hospital for Joint Diseases, New York, NY, US; ³Baylor Health Care System, Plano, TX, US; ⁴Brooklyn, NY, US; ⁵New York University Medical Center, New York, NY, US

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

4:41–4:47 p.m.

21. Cervical Sagittal Deformity Develops After PJK in Adult Thoracolumbar Deformity Correction: Radiographic Analysis Utilizing a Novel Global Sagittal Parameter, the CTPA

International Spine Study Group¹; Themistocles S. Protopsaltis, MD²; Nicolas Bronsard, MD, PhD³; Jamie S. Terran⁴; Justin Smith⁵; Eric O. Klineberg, MD⁶; Gregory M. Mundis Jr., MD⁷; Han Jo Kim, MD⁸; Richard A. Hostin, MD⁹; Robert A. Hart, MD¹⁰; Christopher P. Ames, MD¹¹; Christopher I. Shaffrey, MD¹²; R. Shay Bess, MD¹³; Frank J. Schwab, MD¹⁴; Virginie Lafage, PhD¹⁴

¹Brighton, CO, US; ²NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, US; ³Nice, France; ⁴New York, NY, US; ⁵University of Virginia, Charlottesville, VA, US; ⁶University of California Davis School of Medicine, Sacramento, CA, US; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸Washington University Orthopedics, New York, NY, US; ⁹Southwest Scoliosis Institute, Plano, TX, US; ¹⁰Oregon Health & Science University, Portland, OR, US; ¹¹University of California San Francisco, San Francisco, CA, US; ¹²University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹³Rocky Mountain Scoliosis and Spine, Denver, CO, US; ¹⁴NYU Hospital for Joint Diseases, New York, NY, US

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

4:47–5:05 p.m.
Discussion

4:05–5:05 p.m.

**Concurrent Session:
Spinal Trauma and Cord Injury**

Room 280/281

Moderators: Roger Härtl, MD and Michael J. Vives, MD

4:05–4:11 p.m.

22. Inflammatory Response After Spinal Cord Injury in Rats is Modified by Etanercept (Enbrel)

Alexandre Rasouli, MD¹; Zorica Buser, PhD¹; Li Zhao²; Yalda Safai³; LEA Kanim, MA⁴; Marshall L. Grode, MD¹; Rick B. Delamarter, MD¹

¹Los Angeles, CA, US; ²Spine Research Foundation, Los Angeles, CA, US; ³Cedars Sinai Medical Center, Los Angeles, CA, US; ⁴Spine Center, Cedars-Sinai Medical Center, Los Angeles, CA, US

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

4:11–4:17 p.m.

23. Critical Events Before Spinal Cord Injury in a Porcine Compression Model

Vishal Sarwahi, MD¹; Abhijit Y. Pawar, MD¹; Aviva Dworkin²; Etan P. Sugarman, MD³; Marina Moguevitch, MD²; Terry D. Amaral, MD⁴; Beverly Thornhill, MD⁵; Adam L. Wollowick, MD⁴; Alan D. Legatt, MD, PhD²

¹New York, NY, US; ²Montefiore Medical Center, Bronx, NY, US; ³Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, NY, US; ⁴Bronx, NY, US; ⁵Albert Einstein College of Medicine, Bronx, NY, US

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

4:17–4:23 p.m.

24. Optogenetic Photostimulation to Control Bladder Function After Experimental Spinal Cord Injury

Basem I. Awad, MD; Davina V. Gutierrez, PhD; Warren Alilain; Michael P. Steinmetz, MD

MetroHealth Medical Center, Case Western Reserve University, Cleveland, OH, US

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

4:23–4:29 p.m.

25. Risk of Odontoid Fracture is Directly Correlated to the Presence of Intraosseous Cyst at the Odontoid Base and Synovitis of the Atlanto-Odontoid Joint

Jung U. Yoo, MD, Matthew S. Shinseki, Natalie L. Zusman
Oregon Health and Science University, Portland, OR, US

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

4:29–4:35 p.m.

26. To Evaluate the Role of Autologous Bone Marrow Derived Mononuclear Cell Concentrate Infusion in Neurological Recovery in Acute Spinal Cord Injury: A Preliminary Report of a Randomized Controlled Trial

Rajeshwar Srivastava, MD

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

4:35–4:41 p.m.

27. Lumbar Spine Injury Tolerance During High-Rate Axial Loading

Brian D. Stemper, PhD¹; Jamie Baisden, MD, FACS¹; Narayan Yoganandan, PhD²; Frank A. Pintar, PhD³; Sergey Tarima¹; Qun Xiang, MD¹; Glenn R. Paskoff⁴; Barry S. Shender, PhD⁴

¹Medical College of Wisconsin, Milwaukee, WI, US; ²Department of Neurosurgery, Milwaukee, WI, US; ³VA Medical Center, Milwaukee, WI, US; ⁴Naval Air Warfare Center, Patuxent River, MD, US

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

4:41–5:05 p.m.

Discussion

4:05–5:05 p.m.

**Collaborative Concepts in Spine Care Session:
Spine Triage: An Integrated Care Model**

Room 268

Moderators: Michael L. Reed, PT, DPT, OCS, MTC and Gregory L. Whitcomb, DC

Spine-related symptomology continues to be the second most common reason people seek the help of primary care providers. Unfortunately, the associated disability and direct/indirect costs incurred by suffering patients, their employers, third-party payers, and society continue to be staggering in terms of amount and impact. Studies have shown that early navigation and educated, systematic, medical support can mitigate inefficient utilization of the healthcare system and stave off biopsychosocial maladaptive chronicity. Traditional access to the spine specialist and medical team is failing patients with spinal disorders as the number of providers diminishes, reimbursement contracts, and third-party payer restrictions mount. Patients require an early and reliable connection to a triaged support system to prevent unnecessary suffering and self-imposed disability.

This session is designed for all spine-related disciplines and provides the attendee with an understanding of the current challenges and problems, introduce the concept of spine triage, and develop a foundation from which a tiered navigation program could be customized and implemented.



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

- Identify the unique challenges and problems inherent in their current spine care delivery process;
- Articulate the meaning of a spine triage process and its potential benefits in their care delivery process;
- Support the concept of implementing a spine triage process with evidence-based examples;
- Formulate a model of spine triage management that fits their unique environments;
- Envision and plan an implementation process with objective metrics to measure success and opportunities for refinement.

Agenda

- Introduction: Challenges and Problems in Spine Care
- Spine Triage Defined and Potential Impact
- Current Evidence
- Proposed Spine Triage Model
- Working Examples and Lessons Learned
- Suggested Implementation Process
- Discussion

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

4:05–5:35 p.m.

**Symposium:
Behind the Headlines: How News Coverage Shapes Health Care Policy and Public Perception**

Theater ABC

Moderators: Eric Truumees, MD and Terry Corbin

Spine specialists often cringe when a “negative” story appears in the health care arena, from tales of corporate greed to a health care professional who was less than professional. While uplifting stories on any topic are always welcome, good journalism is about providing citizens with accurate, unbiased and reliable information they need to function in a free society. This session allows attendees to hear directly from journalists about the realities of health journalism.

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

- Recognize the role of the news media in stimulating change (what it is doing right, what it can do better);
- Describe the importance and challenges of getting accurate scientific and medical news to the public;

- Appreciate how we can all help consumers be more savvy patients;
- Manage conflicts of interest on all sides, from physicians to journalists to advertisers.

Agenda

- **Panel Introductions**
Steven Atlas, MD, MPH, Informed Medical Decisions Foundation
Eugene Carragee, MD, *The Spine Journal*
John Fauber, *Milwaukee Journal Sentinel*
Barry Meier, *New York Times*
Dawn Powell, *Spinal News International*
John Santa, MD, MPH, *Consumer Reports*
Vernon Tolo, MD, *Journal of Bone & Joint Surgery*
- **Panel Discussion**
- **Audience Q&A**

FDA Device/Drug Status:

Terry Corbin: Infuse rhBMP-2 for ALIF (Approved for this indication); Infuse rhBMP-2 for ALIF, TLIF, Infuse rhBMP-2 for PLF, ACDF, Amplify rhBMP-2 (Investigational/Not approved for this indication).

John Santa, MD, MPH, *Consumer Reports*: This presentation does not discuss or include any applicable devices or drugs.

Vernon Tolo, MD, *Journal of Bone & Joint Surgery*: This presentation does not discuss or include any applicable devices or drugs.

John Fauber, *Milwaukee Journal Sentinel*: This presentation does not discuss or include any applicable devices or drugs.

Barry Meier, *New York Times*: This presentation does not discuss or include any applicable devices or drugs.

Steven Atlas, MD, *Health News Review*: This presentation does not discuss or include any applicable devices or drugs.

Eugene J. Carragee, MD: Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)

4:05–5:35 p.m.

**Symposium:
Data Collection, Value and Cost-Effectiveness of Spine Care**

Room 266/267

Moderator: Donna D. Ohnmeiss, PhD

This symposium is designed to provide spine care providers information on valid outcome assessment instruments and data collection using a registry system. How these data can be used to evaluate the cost-effectiveness of spine care is described. A process that has been implemented to monitor quality assurance for spine surgery in a private practice is presented. The session closes with an overview of how all of these elements come together in defining how spine care is viewed in the broad spectrum of health care.

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

- Differentiate outcome assessments that have been validated from those that have not;
- Describe the use of a registry for data collection in spine care;
- Discuss methods used to determine the cost-effectiveness of spine care and how this potentially impacts practice;
- Determine how cost-effectiveness and quality in spine care fit into the greater national health care spectrum.

Agenda

- **Introduction**
Donna D. Ohnmeiss, PhD
- **Outcome Assessments: The Good, the Bad and the Ugly**
Donna D. Ohnmeiss, PhD
- **Use of a Registry for Data Collection**
Daniel K. Resnick, MD, MS
- **Determining Cost-Effectiveness of Spine Care**
David W. Polly Jr., MD
- **Monitoring Quality of Surgical Care in Your Clinic**
Richard D. Guyer, MD
- **How Spine Fits into the National Health Care Picture**
David A. Wong, MD, MS
- **Discussion, Q&A**

FDA Device/Drug Status:

Donna D. Ohnmeiss, PhD: This presentation does not discuss or include any applicable devices or drugs.

Daniel K. Resnick, MD, MS: Not available at time of publication.

David W. Polly Jr., MD: Not available at time of publication.

Richard D. Guyer, MD: This presentation does not discuss or include any applicable devices or drugs.

David A. Wong, MD, MS: BMP (Approved for this indication), BMP off label (Investigational/Not approved for this indication), Pedicle Screws, Interbody Cages, Disc Arthroplasty, Epidural Steroids, Interspinous Spacers, Vertebroplasty/Kyphoplasty (All approved for this indication).

4:05–5:35 p.m.

**Focused Discussion:
ICD-10**

Room 282

Moderator: R. Dale Blasier, MD, FRCS(C), MBA

Medical infrastructure across the nation is gearing up for the conversion from ICD-9 to ICD-10. The new system will affect providers of spine and deformity care as well as all medical specialties. There will be major changes in coding specificity and documentation which will have major effects on physician practices. This discussion provides an overview of ICD-10 to interested attendees. There will be an introduction to ICD-10 and an explanation as to

why the change was felt to be necessary. The basic code structure and function are explained. Attendees will learn about diagnosis codes relevant to spinal deformity and how to find them. New requirements for documentation are introduced. Members will learn about strategies for incorporating ICD-10 into their own practices. There will be instruction about where to locate additional information and resources about ICD-10.

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

- Differentiate between ICD-9 and ICD-10 codes;
- Accurately report ICD-10 codes;
- Implement ICD-10 into their practices.

Agenda

- **Introduction**
R. Dale Blasier, MD, FRCS(C), MBA
- **Introduction to ICD-10**
William J. Sullivan, MD
- **Introduction to ICD-10 Codes Relevant to Spinal Conditions**
Matthew D. Hepler, MD
- **Implementation**
Christopher J. DeWald, MD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

6:00–8:00 p.m.

**Welcome Reception:
Mardi Gras World**

Shuttle service will be provided to and from Mardi Gras World departing from the Convention Center and listed hotels. Please see the Shuttle Schedule on page 30 for details.

This is a private event for all NASS Annual Meeting guests. To ensure entry, please have your meeting badge visible upon arrival.



Thursday, October 10

7:00–8:30 a.m.

Continental Breakfast

Theater Lobby (2nd Level)

7:00 a.m.–5:00 p.m.

Attendee Registration

Lobby H (1st Level)

NASS Resource Center Open

Lobby H (1st Level)

ePosters Open for Viewing

Lobby H (1st Level)

7:50–7:55 a.m.

Announcements

Theater B

7:55–8:55 a.m.

Best Papers: Comprehensive

Theater B

Moderators: Michael L. Reed, PT, DPT, OCS, MTC and Eric Truumees, MD

7:55–8:01 a.m.

28. Cost-Utility and Comparative Effectiveness Analyses of Surgery Versus Comprehensive Medical Management for Lumbar Spondylosis in Elderly

Saniya S. Godil, MD¹; Scott L. Parker, MD²; Stephen K. Mendenhall²; Scott L. Zuckerman, MD³; David N. Chau, BS¹; Clinton J. Devin, MD³; Matthew J. McGirt, MD¹

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Vanderbilt University, Nashville, TN, US; ³Nashville, TN, US

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

8:01–8:07 a.m.

29. Access to Outpatient Care for Adult Lumbar Disc Herniation Patients with Private Insurance Versus Medicaid

Erik Olsson, MD¹; Moe R. Lim, MD²; Brendan Mackinnon-Patterson, MD³; Reid W. Draeger, MD¹

¹Chapel Hill, NC, US; ²UNC Orthopaedics, Chapel Hill, NC, US; ³UNC Hospitals, Chapel Hill, NC, US

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

8:07–8:13 a.m.

30. What is the Responsiveness of Clinical Insomnia to Interdisciplinary Functional Restoration in Chronic Disabling Occupational Spinal Disorders?

Tom G. Mayer, MD¹; Sali R. Asih, PhD²; Randy Neblett, MA, LPC, BCB¹; Robert J. Gatchel, PhD³

¹PRIDE Research Foundation, Dallas, TX, US; ²Arlington, TX, US; ³University of Texas Department of Psychology, Arlington, TX, US

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

8:13–8:19 a.m.

31. Multicenter Randomized Controlled Trial Comparing Particulate Versus Non-Particulate Corticosteroids via Lumbar Transforaminal Epidural Injection for Acute Unilateral, Unilevel Radicular Pain Due to Herniated Nucleus Pulposus

D.J. Kennedy, MD¹; Ellen K. Casey, MD²; Joshua D. Rittenberg, MD³; Paul H. Lento, MD⁴; Matthew Smuck, MD⁵

¹Redwood City, CA, US; ²Chicago, IL, US; ³Kaiser Permanente Department of PM&R, Oakland, CA, US; ⁴Lakewood Ranch, FL, US; ⁵Menlo Park, CA, US

FDA Device/Drug Status: Triamcinolone (Not approved for this indication), Dexamethasone (Not approved for this indication)

8:19–8:25 a.m.

32. When Is it Safe to Return to Driving After Cervical and Lumbar Spinal Surgery

Trevor Scott, MD¹; William C. Pannell, BS²; David D. Savin³; Stephanie S. Ngo⁴; Kristin A. Toy, BS⁵; Michael D. Daubs, MD⁶; Daniel C. Lu, MD, PhD⁷; Jeffrey C. Wang, MD⁵

¹University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ²El Dorado Hills, CA, US; ³Chicago, IL, US; ⁴Los Angeles, CA, US; ⁵University of California Los Angeles School of Medicine, Los Angeles, CA, US; ⁶Santa Monica, CA, US; ⁷Rancho Palos Verdes, CA, US

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

8:25–8:31 a.m.

33. Lumbar Surgery in Work-Related Chronic Low Back Pain: Can a Continuum of Care Enhance Outcomes?

Tom G. Mayer, MD¹; Robert J. Gatchel, PhD²; Emily Brede, RN, BSN³; Brian R. Theodore, PhD⁴

¹PRIDE, Dallas, TX, US; ²University of Texas Department of Psychology, Arlington, TX, US; ³Arlington, TX, US; ⁴University of Washington, Seattle, WA, US

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

8:31–8:37 a.m.

34. Prediction of Future First-Time Low Back Pain Based on Baseline MRI Findings

Dino Samartzis, ScD, PhD, MSc; Kenneth M. Cheung, MD, FRCS
Queen Mary Hospital, Hong Kong

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

8:37–8:55 a.m.

Discussion

8:00 a.m.–5:00 p.m.

Exhibitor Registration

Lobby H (1st Level)

8:55–9:00 a.m.

NASS Working for You: Advocacy Update

Theater B

Moderator: John G. Finkenberg, MD

9:00–10:30 a.m.

Symposium:

Section on MIS: Controversies in the Adoption of Minimally Invasive Lumbar Fusion

Theater A

Moderator: Y. Raja Rampersaud, MD, FRCS

Minimally invasive surgical (MIS) techniques and technologies have been increasingly introduced in spine surgery over the last decade. In the scenario where a surgical technique may obtain comparable or superior clinical efficacy while decreasing surgical morbidity, consideration for adoption is logical. However, many factors influence adoption of MIS techniques. Although clinical efficacy and safety have to be first and foremost, other factors such as the learning curve, surgical efficiency and cost to all stakeholders have to be weighed against the reported benefits of less postoperative morbidity and faster recovery. As with most MIS techniques, MIS lumbar fusion is marketed with the premise of being better than current open techniques; however, adoption is far from universal. This symposium presents both a pragmatic and evidence-based approach to the pros and cons of MIS posterior lumbar fusion for common degenerative spinal conditions. MIS and non-MIS spine opinion leaders provide a practical perspective of why they have or have not adopted MIS lumbar fusion into their practice based on the realities of clinical practice and the current best evidence. In addition, the panel and participants will openly discuss what factors and/or evidence are most compelling for or against the adaptation of MIS lumbar fusion (or hybrids) into routine clinical practice.

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

- Review the comparative patient reported perioperative and one-two year outcomes of posterior MIS versus open lumbar fusion;
- Differentiate the relative value of hospital-based process and economic outcomes of posterior MIS versus open lumbar fusion;
- Enable informed decision making for or against the adoption.

Agenda

- **Introduction**
Y. Raja Rampersaud, MD, FRCS
- **The Reasons Why I Have Not Adopted MIS Lumbar Fusion in My Practice**
Alexander R. Vaccaro, MD, PhD
- **The Reasons Why MIS Lumbar Fusion is Routine in My Practice**
Kevin T. Foley, MD, FACS



- **Comparative Clinical Evidence**
Charles G. Fisher, MD, MHSc
- **Comparative Health Economics**
Daniel K. Resnick, MD, MS
- **What are the Most Compelling Factors For or Against the Adoption of MIS Spinal Fusion?**
Faculty Panel
- **Panel Discussion/Q&A**

FDA Device/Drug Status:

- **Y. Raja Rampersaud, MD, FRCSC:** This presentation does not discuss or include any applicable devices or drugs.
- **Alexander R. Vaccaro, MD, PhD:** This presentation does not discuss or include any applicable devices or drugs.
- **Kevin T. Foley, MD, FACS:** Percutaneous pedicle screw fixation (Approved), Tubular retractors (Approved)
- **Charles G. Fisher MD, MHSc:** This presentation does not discuss or include any applicable devices or drugs.
- **Daniel K. Resnick, MD, MS:** This presentation does not discuss or include any applicable devices or drugs.

9:00–10:30 a.m.

**Symposium:
A Retrospective on BMP-2 Research:
Lessons from the YODA Project**

Theater B

Moderator: Daniel K. Resnick, MD, MS

In June 2013, the *Annals of Internal Medicine* published findings from the Yale University Open Data Access Project (YODA) on the clinical use of rhBMP-2 in spinal surgery and presented a detailed overview by the *Annals'* Editorial Board. The novel YODA method contracted two independent groups to review patient level data from industry clinical trials. Those findings were in turn extensively peer-reviewed and commented upon by a world-leading clinical journal. The outcome of this process has the potential to set a new standard for evaluating industry-sponsored medical research.

This symposium outlines the background of published BMP-2 clinical research that led from *The Spine Journal's* special issue on BMP-2 in 2011 to the subsequent release of original trial data for independent study by YODA. Faculty from Columbia University Center for the Study of Society and Medicine, the YODA group, the Editors of the *Annals of Internal Medicine*, the Editor in Chief of *The Spine Journal*, and the former Editor of *The Journal of Spinal Disorders* discuss the original BMP-2 research and the YODA review format, findings and conclusions. Faculty further discuss the historical and social context of the BMP-2 saga and its future implications for clinical research and publication.

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

- Discuss events preceding the release and independent evaluation of rhBMP-2 original FDA study data;
- Review the findings from the two independent YODA studies and recognize the impact of their results;
- Analyze the moral imperative that guides researchers, journal editors, peer reviewers and clinicians in their responses to past errors and future undertakings;
- Outline current and future reporting standards for industry-sponsored clinical research.

Agenda

- **Introduction**
Daniel K. Resnick, MD, MS
- **What Prompted *The Spine Journal* and YODA Reviews?**
Eugene J. Carragee, MD
- **Yale Open Data Project (YODA), Controlling for Potential Bias and Conflicts of Interest**
Joseph S. Ross, MD
- **YODA: Independent Group Summaries**
Sohail K. Mirza, MD, MPH
- **Annals of Internal Medicine: Editor in Chief's Perspective**
Christine Laine, MD, MPH
- **Implications for Clinical Use and Spine-Focused Journals**
Dan M. Spengler, MD
- **Historical Perspectives on BMP-2 and COI**
David J. Rothman, PhD
- **Discussion, Q&A**
Faculty Panel

FDA Device/Drug Status:

- **Daniel K. Resnick, MD, MS:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- **Eugene J. Carragee, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- **Joseph S. Ross, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- **Sohail K. Mirza, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- **Christine Laine, MD, MPH:** rhBMP-2 (Approved)
- **Dan M. Spengler, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- **David J. Rothman, PhD:** This session does not discuss or include any applicable devices or drugs.



9:00–10:30 a.m.

**Symposium:
The Grey Zone: Integrated Management
from Clinic to Surgery**

Theater C

Moderator: Ted E. Dreisinger, PhD

Literature often provides the evidence for lumbar spine disorders associated with a specific structural disorder or chronic condition. Patients with structural changes that don't match symptoms, or patients with multiple confounding biomechanical, medical or psychosocial problems fall into the "grey zone" as to what is the best recommended treatment. An understanding of the multiple factors that can support or destroy the best planned nonoperative or operative treatment plan can be found in baseline surveying of psychosocial coping mechanisms and response to treatment trials. This symposium will discuss the biomechanical, neuromuscular, and psychosocial factors that should be identified in patients with lumbar spine disorders. Further, a potential template will be presented for information sharing between all healthcare providers assessing and treating patients with lumbar spine disorders that fall into the "grey zone."

The majority of patients facing a potential surgical solution fall into evidence-based recommendations. For example, the patient with back pain only is not, in general, a particularly good surgical candidate. On the other hand, there are those patients for whom surgery may or may not be indicated depending on the input the surgeon gets from his/her medical support team. These are patients who fall into the "grey zone." This symposium will address the allied health support the medical team provides the nonoperative and operative physician in helping to discern which patients in the "grey zone" may be the better surgical candidates.

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

- Identify specific biomechanical markers of the disc complex;
- Recognize motor control exercise interventions in the management of low back pain that inform the clinical pathway;
- Define specific psychosocial pain and behavioral coping mechanisms;
- Appreciate the synthesis of nonoperative strategies that help the non-surgeon and surgeon decision-making process for patients who fall in the "grey zone."

Agenda

- **Introduction of Topic and Speakers**
Ted E. Dreisinger, PhD
- **The Biomechanical Disc Model in the Role of Clinical Rehabilitation**
Michael A. Adams, PhD
- **Motor Control Exercise Interventions for the Management of Low Back Pain**
Paul Hodges, PhD
- **Psychosocial Interventions for Low Back Pain: Pain Coping and Behavioral Approaches**
Francis J. Keefe, PhD
- **Interplay Between the Nonoperative Physician and Surgeon in the "Grey Zone" Decision-Making Process**
Heidi Prather, DO and Jeffrey C. Wang, MD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

9:00 a.m.–5:00 p.m.

Technical Exhibition Open

Technical Exhibition

10:30–11:00 a.m.

Networking Break (Beverage Service)

Technical Exhibition, Aisles 400 and 2100

Practical Theater: Selecting and Implementing EHRs

Technical Exhibition, Booth 2900



11:00 a.m.–12:00 p.m.

The Spine Journal Outstanding Paper Awards

Theater B

Moderator: Eugene J. Carragee, MD

11:00–11:08 a.m.

Introduction from Eugene J. Carragee, MD

11:08–11:16 a.m.

Outstanding Paper: Medical and Interventional Science

Does Physical Activity Influence the Relationship Between Low Back Pain and Obesity?

Matthew Smuck, MD¹; Ming-Chih Kao, PhD, MD²; Nikhraj Brar, MD²; Agnes Martinez-Ith¹; Jongwoo Choi¹; Christy Tomkins-Lane, PhD³

¹Department of Orthopaedic Surgery, PM&R Section, Stanford University, Redwood City, CA, US; ²Department of Anesthesiology, Pain Medicine Division, Stanford University, Redwood City, CA, US; ³Department of Physical Education & Recreation, Mount Royal University, Calgary, AB, Canada

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

11:16–11:24 a.m.

Outstanding Paper: Value Comparative Outcomes and Cost-Utility Following Surgical Treatment of Focal Lumbar Spinal Stenosis Compared with Osteoarthritis of the Hip or Knee: Part 1. Long-Term Change in Health-Related Quality of Life; Part 2. Estimated Lifetime Incremental Cost-Utility Ratios

Part 1: Raja Y. Rampersaud, MD, FRCSC¹; Stephen J. Lewis, MD¹; Rajiv Gandhi, MD³; Roderick Davey, MD, FRCSC²; Nizar Mahomed, MD¹

Part 2: Raja Y. Rampersaud, MD, FRCSC¹; Peggy Tso, BHSc, MSc Candidate²; Kevin Walker, BSc, MSc²; Stephen J. Lewis, MD, FRCSC¹; Rajiv Gandhi, MD, FRCSC¹; Roderick Davey, MD, FRCSC¹; Nizar Mahomed, MD, ScD, FRCSC¹; Peter Coyte MA, PhD²

¹Toronto Western Hospital, Toronto, ON, Canada; ²University Health Network, Toronto, ON, Canada; ³University of Toronto, Toronto, ON, Canada

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

11:24–11:32 a.m.

Outstanding Paper: Surgical Science Nerve Injury and Recovery After Lateral Lumbar Interbody Fusion With and Without Bone Morphogenetic Protein-2 Augmentation: A Cohort Controlled Study

Marios G. Lykissas, MD, PhD; Alexander Aichmair, MD; Andrew A. Sama, MD; Alexander P. Hughes, MD; Darren R. Lebl, MD; Fadi Taher, MD; Frank P. Cammisa, MD; Federico P. Girardi, MD

Department of Orthopedic Surgery, Spine and Scoliosis Service, Hospital for Special Surgery, Weill Cornell Medical College, New York, NY

FDA Device/Drug Status: XLIF Interbody Fusion Cage (Approved for this indication), COUGAR Interbody Fusion Cage (Approved for this indication), INFUSE Bone Morphogenetic Protein-2 (Not Approved for this indication)

11:32–11:40 a.m.

Outstanding Paper: Surgical Science Back Pain's Association with Vertebral Endplate Signal Changes in Sciatica

Abdelilah el Barzouhi, MD, MSc¹; Carmen L.A.M. Vleggeert-Lankamp, MD, PhD¹; Bas F. van der Kallen, MD²; Geert J. Lycklama à Nijeholt, MD, PhD²; Wilbert B. van den Hout, PhD³; Bart W. Koes, PhD⁴; Wilco C. Peul, MD, PhD^{1,5}; The Leiden – The Hague Spine Intervention Prognostic Study Group

¹Department of Neurosurgery, Leiden University Medical Center, Leiden, Netherlands; ²Department of Radiology, Medical Center Haaglanden, the Hague, Netherlands; ³Department of Medical Decision Making, Leiden University Medical Center, Leiden, Netherlands; ⁴Department of General Practice, ErasmusMC, University Medical Center, Rotterdam, Netherlands; ⁵Department of Neurosurgery, Medical Center Haaglanden, The Hague, Netherlands

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

11:40 a.m.–12:00 p.m.

Discussion

11:00 a.m.–12:00 p.m.

**Collaborative Concepts in Spine Care Session:
Perioperative Care Guidelines for the Older Patient**

Room 268

Moderator: Michael L. Reed, PT, DPT, OCS, MTC

The American College of Surgeons (ACS) and the American Geriatrics Society (AGS) have jointly released a set of guidelines for perioperative care for surgical patients aged 65 years and older. The guidelines specify 13 key issues of preoperative care for the elderly including: cognitive impairment and dementia; decision-making capacity; postoperative delirium; alcohol and substance abuse; cardiac evaluation; pulmonary evaluation; functional status, mobility, and fall risk; frailty; nutritional status; medication management; patient counseling; preoperative testing; and patient-family and social support systems. The guidelines are the result of 2 years of research and analysis by a multidisciplinary expert panel. The purpose of this session is to review the established guidelines and discuss their impact with respect to spine care and practice management. The intended audience includes all disciplines and support personnel.

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

- Consider the potential impact of the ACS and AGS guidelines with respect to determining spine-specific surgical candidacy;
- Recognize and act upon potential risk factors in the elderly surgical patient with a spinal disorder;
- Proactively manage risk factors as identified in the ACS and AGS guidelines as a means of mitigating spine surgery mortality and morbidity;
- Identify resources necessary to establish recognition of risk factors and the mechanism of bringing those factors clearly into view for actionable safeguards.

Agenda

- **Introduction: Review of the Challenges and Problems Faced in Managing the Elderly Spine Surgery Patient**
Michael L. Reed, PT, DPT, OCS, MTC
- **Review of the American College of Surgeons and American Geriatrics Society Perioperative Care Guidelines for the Older Patient**
Jerome Schofferman, MD
- **Recognizing and Identifying Risk Factors as They Relate to the Guidelines**
William O. Shaffer, MD
- **Mitigating Risk: How Clinicians Can Proactively Manage Potential Perioperative Complications**
William O. Shaffer, MD

- **Securing the Resources Necessary to Establish the Appropriate Process for Success**
Michael L. Reed, PT, DPT, OCS, MTC
- **Discussion**
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.

**Focused Discussion:
Exercise: Medicine for the Spine**

Room 266/267

Moderator: Heidi Prather, DO

Exercise is known to promote multiple health benefits, including improved back pain and bone strength. Still, people can be harmed by misguided exercises and activities. Increasingly, spine providers recommend exercise to their patients, yet questions about the best form and optimal amount can be difficult to answer. A focused panel of two experts, Drs. Michael Adams and Paul Hodges, will discuss their work and perspectives on this topic, leaving time for audience participation and questions.

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

- Review the science that demonstrates the role of exercise in spine care;
- State the recommended quantity and intensity of exercise to achieve health benefits;
- Identify different exercise recommendations and contraindications for common spine disorders.

Agenda

- **A Biomechanist’s View of Exercise: What is Good and What is Not?**
Michael A. Adams, PhD
- **Designing Exercise for Back Pain**
Paul Hodges, PhD
- **Discussion, Q&A**

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.

**Focused Discussion:
Dynamic MRI: Current Studies and Utility in Patient Care**

Room 278/279

Moderator: Mark Mikhael, MD

This session focuses on review of current studies, progress and data regarding dynamic MRI. The utility of this study for use in patient care and management also are discussed.

11:00 a.m.–1:30 p.m.

NASS Bistro Lunch Service

Technical Exhibition, Back of Hall

12:00–1:00 p.m.

Complimentary Box Lunch (Attendees Only)

Technical Exhibition, Back of Hall

Solution Showcase

Technical Exhibition, Booth 1849

12:00: SI-BONE, Inc.

12:30: FTGU Medical Consulting, LLC

1:00–1:05 p.m.

NASS Working for You: Video Update from US Senator Marco Rubio (FL)

Theater B

Introduction by John G. Finkenberg, MD

1:05–2:35 p.m.

**Symposium:
Section on Robotics and Navigation:
Should Robotics or Navigation Be Part of Your Operating Room?**

Theater A

Moderator: Chetan Patel, MD

This symposium identifies the latest advances in robotics and navigation systems. The advantages and disadvantages as well as the cost-effectiveness of both technologies are discussed. Through a spirited debate, faculty will help you decide if these evolving technologies are just niche technologies for surgeons with special interests or if they deserve adoption in your operating room today.

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

- Assess the advantages and disadvantages of using robotics during spine surgery;
- Describe the latest advances in robotics in spine surgery;
- Discuss the latest advances in intra-operative imaging modalities and navigation systems available for use in spine surgery;
- Gain insight into the advantages and disadvantages of using navigation during spine surgery.

Agenda

- **Critical Analysis of the Latest Robotic Technologies in Spine Surgery**
Srinivas K. Prasad, MD
- **Cost Effectiveness of Robotics in Spine Surgery**
Eric A. Potts, MD
- **Should You Adopt Robotics in Your Operating Room? —Pro**
Mark Dekutoski, MD
- **Should You Adopt Robotics in Your Operating Room? —Con**
Srinivas K. Prasad, MD
- **Critical Analysis of the Latest Intra-Operative Imaging and Navigation Technologies in Spine Surgery**
Eric A. Potts, MD
- **Cost Effectiveness of Use of Intra-Operative Imaging and Navigation in Spine Surgery**
Eric W. Nottmeier, MD
- **Should You Adopt Navigation in Your Operating Room? —Pro**
Michael Mac Millan, MD
- **Should You Adopt Navigation in Your Operating Room? —Con**
Mark Dekutoski, MD
- **Future of Robotics and Navigation**
Chetan Patel, MD
- **Q&A**

FDA Device/Drug Status:

Srinivas K. Prasad, MD: Not available at time of publication.
Eric A. Potts, MD: Not available at time of publication.
Mark Dekutoski, MD: Not available at time of publication.
Eric W. Nottmeier, MD: Not available at time of publication.
Michael Mac Millan, MD: Stealth Navigation (Approved)
Mark Dekutoski, MD: Not available at time of publication.
Chetan Patel, MD: Not available at time of publication.

1:05–2:35 p.m.

**Symposium:
Preparing to Practice Medicine in America
Under the Affordable Care Act**

Theater B

Moderator: Alan S. Hilibrand, MD

In 2014, the most dramatic effects of the Patient Protection and Affordable Care Act (PPACA) law of 2010 will begin to impact physicians across America. Incentives for participation in Accountable Care Organizations (ACOs) will increase and lead to changes in physician and hospital alignment. Hospitals will be rated based upon quality factors, and physicians will begin being penalized for not participating in Physician Quality Reporting System (PQRS) and not using Electronic Health Records (EHRs). On the insurance side, the “Universal Mandate” will take effect, and patients and businesses will be faced with penalties if they do not obtain health insurance. On the government side, the Independent Payment Advisory Board (IPAB) will be assembled and begin making coverage decision for government run plans if (when) Medicare’s budget is exceeded.

We will be facing new challenges and a new world of health care in America. This symposium is designed to help attendees understand each of these important changes and prepare them for the new requirements in 2014 for providers and patients. It utilizes the experience of NASS’ Advocacy Committee to bring attendees up to date on the efforts of NASS to advocate on behalf of its members and minimize the impact of the Affordable Care Act on the management of spinal disorders.

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

- Explain the timeline of implementation of the Affordable Care Act’s provisions that will have a direct impact on spine practitioners;
- Recognize the rules and regulations surrounding the establishment of ACOs and other “at risk” models of care promoted by the PPACA;
- Review the new provisions and penalties included in the PPACA that will take effect in 2014;
- Discuss the IPAB and other controversial provisions of the health care law and the efforts of NASS and organized medicine to address these provisions through advocacy in Washington.

Agenda

- **Introduction: What is the PPACA and What Do I Need to Do in 2013 and 2014?**
Alan S. Hilibrand, MD
- **What are ACOs and “At Risk” Models for Provision of Spine Care?**
David A. Wong, MD, MS
- **How Will PPACA Affect Nonoperative Spine Care?**
Ray M. Baker, MD
- **NASS Advocacy Activities to Address IPAB and Quality Measures**
John G. Finkenberg, MD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:05–2:35 p.m.

**Symposium:
Prescription Opioids in Spine Care**

Theater C

Moderator: Matthew Smuck, MD

Both surgeons and conservative spine specialists, whether they like it or not, are at the eye of a public health storm about prescription opioid use and abuse. With back pain being the number one diagnosis associated with ambulatory opioid prescribing, spine physicians invariably must grapple with their responsibilities and discerning the proper role of prescription opioids in treating pain. Since the late 1990s when the assessment of pain as the “5th Vital Sign” was advocated by the American Pain Society and made routine by both the VA and Joint Commission, use of prescription opioids has increased six-fold. Meanwhile, prescription opioids have become the leading cause of drug-related death in the United States, gaining the attention of the media as well as state and federal authorities, and shifting public opinion away from the liberal use of opioids in chronic pain treatment. Involved medical societies are advocating for a more judicious middle ground.

This symposium attempts to guide both conservative and surgical spine providers in a well-considered process of discernment. What professional role can and should a spine physician be prepared to play in the care of pain? Is the role different depending on one’s training and disciplinary expertise: i.e., for surgeons, physiatrists, primary care physicians, and anesthesiologists? What resources and training are required to ensure competency if one uses prescription opioids in the treatment of chronic pain? And how does one ensure smooth transitions, appropriate care, and non-abandonment for



those patients who have complex care needs that exceed one's scope of practice?

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

- Explicate the ethical underpinnings of arguments in favor of and against the use of opioids for the treatment of chronic pain;
- Recognize policies that led to the current epidemic and those that have resulted in beneficial changes;
- Review factors influencing trends in opioid prescribing for back pain;
- Outline key aspects of the FDA REMS on long-acting and extended-release prescription opiates;
- Summarize responsible opioid prescribing for post-op pain and chronic severe back pain.

Agenda

- **The Current Ethical Dilemma**
Kristi L. Kirschner, MD
- **Changing the Epidemic with Public Policy**
Gary M. Franklin, MD, MPH
- **Trends in Opioid Prescribing for Back Pain**
Matthew Smuck, MD
- **The FDA Opioid REMS/Responsible Prescribing by Spine Physicians**
Scott Fishman, MD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

2:35–3:05 p.m.

Networking Break (Beverage Service)
Technical Exhibition, Aisles 400 and 2100

Members' Business Meeting
Room 280/281

**Practical Theater: Avoid Penalties—
Navigating CMS Quality Initiatives
(PQRS, Physician Feedback & Value-Based
Modifier)**

Technical Exhibition, Booth 2900

3:05–4:05 p.m.

**Concurrent Session:
Myelopathy**

Theater A

Moderators: Michael G. Fehlings, MD, PhD, FRCSC and Alan Villavicencio, MD

3:05–3:11 p.m.

35. Comparison of Outcomes Between Anterior and Posterior Cervical Procedures: Results from the AOSpine North America Cervical Spondylotic Myelopathy Study (CSM)

Michael G. Fehlings, MD, PhD, FRCSC¹; Nikhil A. Thakur, MD²; S. Tim Yoon, MD, PhD³; John M. Rhee, MD⁴; Alexander R. Vaccaro, MD, PhD⁵; Paul M. Arnold, MD⁶; Branko Kopjar, MD, PhD⁷; John G. Heller, MD³

¹Toronto Western Hospital, Toronto, ON, Canada; ²Rhode Island Hospital, Providence, RI, US; ³The Emory Spine Center, Atlanta, GA, US; ⁴Emory University, Atlanta, GA, US; ⁵Rothman Institute, Philadelphia, PA, US; ⁶University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁷Mercer Island, WA, US

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

3:11–3:17 p.m.

36. A Clinical Prediction Rule to Determine Outcomes in Patients with Cervical Spondylotic Myelopathy Undergoing Surgical Treatment: Data from the Prospective, Multicenter AOSpine North America CSM Study

Lindsay Tetreault¹; Branko Kopjar, MD, PhD²; Paul M. Arnold, MD³; Alexander R. Vaccaro, MD, PhD⁴; Eric M. Massicotte, MD, FRCSC⁵; Michael G. Fehlings, MD, PhD, FRCSC⁶

¹University Health Network, Toronto, ON, Canada; ²Mercer Island, WA, US; ³University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁴Rothman Institute, Philadelphia, PA, US; ⁵University of Toronto, Toronto, ON, Canada; ⁶Toronto Western Hospital, Toronto, ON, Canada

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

3:17–3:23 p.m.

37. Lateral Mass Screw Fixation in the Cervical Spine: A Systematic Review

Jeffrey D. Coe, MD¹; Alexander R. Vaccaro, MD, PhD²; Andrew T. Dailey, MD³; Richard L. Skolasky Jr., ScD⁴; Rick C. Sasso, MD⁵; Steven C. Ludwig, MD⁶; Erika D. Brodt, BS⁷; Joseph R. Dettori, MPH, PhD⁷

¹Silicon Valley Spine Institute, Campbell, CA, US; ²Rothman Institute, Philadelphia, PA, US; ³University of Utah Hospital Department of Neurosurgery, Salt Lake City, UT, US; ⁴Johns Hopkins University, Baltimore, MD, US; ⁵Indiana Spine Group, Carmel, IN, US; ⁶Timonium, MD, US; ⁷Spectrum Research, Tacoma, WA, US

FDA Device/Drug Status: Lateral mass screw fixations system (Not approved for this indication)

3:23–3:29 p.m.

38. Outcomes After Cervical Laminectomy with Instrumented Fusion Versus Expansile Laminoplasty: A Propensity Matched Study of 8,587 Patients

Owoicho Adogwa, MD, MPH¹; Paul Thompson, BS²; Shivanand P. Lad, MD³; Kevin Huang, BA⁴; Matthew Hazzard, MD⁴; Timothy R. Owens, MD²; Joseph S. Cheng, MD⁵; Beatrice Ugiliweneza, PhD⁶; Maxwell Boakye, MD⁷

¹Vanderbilt University, Nashville, TN, US; ²Durham, NC, US; ³Duke Neurosurgery, Durham, NC, US; ⁴Duke University Medical Center, Durham, NC, US; ⁵Vanderbilt University Medical Center Department of Neurosurgery, Nashville, TN, US; ⁶University of Louisville, Louisville, KY, US; ⁷Frazier Rehabilitation Institute, Louisville, KY, US

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

3:29–3:35 p.m.

39. International Variations in the Clinical Presentation and Management of Cervical Spondylotic Myelopathy: One Year Outcomes of the AOSpine Multicenter Prospective CSM-I Study

Michael G. Fehlings, MD, PhD, FRCSC¹; Branko Kopjar, MD, PhD²; Helton Luiz A. Defino, MD, PhD³; Giuseppe Barbagallo, MD⁴; Paul M. Arnold, MD⁵; Mehmet Zileli, MD⁶; Yasutsugu Yukawa, MD⁷; Massimo Scerrati, MD, PhD⁸; Tomoaki Toyone, MD, PhD⁹; Masato Tanaka, MD¹⁰

¹Toronto Western Hospital, Toronto, ON, Canada; ²Mercer Island, WA, US; ³Universidade De Sao Paulo Faculdade De Medicina De Ribeirao Preto, Ribeirao Preto, SP, Brazil; ⁴A.O.V. Policlinico, Catania, Italy; ⁵University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁶Izmir, Turkey; ⁷Chubu Rosai Hospital, Nagoya, Japan; ⁸Ancona, Marche, Italy; ⁹Teikyo University, Ichihara, Japan; ¹⁰Okayama, Japan

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

3:35–3:41 p.m.

40. Predictors of Outcomes After Cervical Laminoplasty

Leah Y. Carreon, MD, MSc¹; Fabian Carballo Madrigal, MD²; Mitchell Campbell, MD²; Jay N. Patel²

¹Spine Institute, Louisville, KY, US; ²Louisville, KY, US

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

3:41–3:47 p.m.

41. The Prevalence of Cervical Radiculopathy in Patients with Cervical Myelopathy

Kelly N. Wepking, MD¹; Amir Mohamed²; Mark F. Kurd, MD¹; Joseph K. Lee, MD²; Kasra Ahmadinia, MD¹; Howard S. An, MD³

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University, Chicago, IL, 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.

**3:47–4:05 p.m.
Discussion**

3:05–4:05 p.m.

**Concurrent Session:
Medical/Interventional**

Theater B

Moderators: Matthew Smuck, MD and Christopher J. Standaert, MD

3:05–3:11 p.m.

42. A Randomized, Double-Blind, Placebo-Controlled, Prospective Study of Intraarticular Lumbar Zygapophysial Joint Corticosteroid Injection(s) as Treatment of Chronic Low Back Pain in a Selected Population

D.J. Kennedy, MD¹; Alison A. Stout, DO²; Matthew Smuck, MD³

¹Redwood City, CA, US; ²Evergreen Sport and Spine Center, Kirkland, WA, US; ³Menlo Park, CA, US

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

3:11–3:17 p.m.

43. Vitamin D Receptor Polymorphisms Are Associated with Muscle Performance

Aron Lazary, MD, Arpad Bozsodi, MD, Annamaria Somhegyi, Peter P. Varga, MD

National Center for Spinal Disorders, Budapest, Hungary

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

3:17–3:23 p.m.

44. The Effect of Extreme Obesity on Outcomes of Treatment for Lumbar Spinal Conditions

Kevin J. McGuire, MD¹; Katiri Wagner, BS¹; Mohammed A. Khaleel, MD²; Jeffrey A. Rihn, MD³; Jon D. Lurie, MD⁴; Wenyan Zhao⁵; James N. Weinstein, DO⁶

¹Beth Israel Deaconess Medical Center, Boston, MA, US; ²Brighton, MA, US; ³Thomas Jefferson University Hospital, The Rothman Institute, Philadelphia, PA, US; ⁴Dartmouth College, Lebanon, NH, US; ⁵Hanover, NH, US; ⁶Dartmouth Hitchcock Medical Center, Lebanon, NH, US

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

3:23–3:29 p.m.

45. Safety and Short-Term Effects of Postoperative Intensive 12-Week Lumbar Stabilizing Exercise After Posterior Lumbar Interbody Fusion

Kyung-Chung Kang¹; Dong-Eun Shin, MD¹; Seong-Kee Shin²

¹Department of Orthopaedic Surgery, CHA University, CHA Bundang Medical Center, Sungnam, Kyonggi-do, South Korea; ²Seoul Medical Center, Shin-nae-dong, Seoul, South Korea

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



3:29–3:35 p.m.

46. Vasovagal Rates in Fluoroscopically Guided Interventional Procedures: A Study of Over 8,000 Injections

D.J. Kennedy, MD¹; Byron J. Schneider, MD¹; Ellen K. Casey, MD²; Joshua D. Rittenberg, MD³; Paul H. Lento, MD⁴; Matthew Smuck, MD⁵

¹Redwood City, CA, US; ²Chicago, IL, US; ³Kaiser Permanente Department of PM&R, Oakland, CA, US; ⁴Lakewood Ranch, FL, US; ⁵Menlo Park, CA, US

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

3:35–3:41 p.m.

47. Number of Waddell’s Signs Present is Associated with Patients’ Perception of Their Disability, Physical and Mental Health

Jung U. Yoo, MD¹; Trevor McIver, MD¹; Brian T. Ragel, MD¹; D. Kojo Hamilton, MD¹; Jayme R. Hiratzka, MD¹; Alexander C. Ching, MD²; Natalie L. Zusman¹; Lynn Marshall¹

¹Oregon Health and Science University, Portland, OR, US; ²Portland, OR, US

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

3:41–3:47 p.m.

48. The Spinal Stenosis Pedometer and Nutrition Lifestyle Intervention (SSPANLI) Pilot Study

Christy C. Tomkins-Lane, PhD

Mount Royal University, Calgary, AB, Canada

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

3:47–4:05 p.m.

Discussion

3:05–4:05 p.m.

**Concurrent Session:
Adult Deformity**

Room 266/267

Moderators: Sigurd H. Berven, MD and David A. Wong, MD, MS

3:05–3:11 p.m.

49. Are the Benefits of Interbody Fusion Worth the Risks for Adult Deformity Correction?

Michael S. Chang, MD¹; Yu-Hui Chang, PhD²; Jan Revella, RN³; Dennis G. Crandall, MD³

¹Phoenix, AZ, US; ²Mayo Clinic, Scottsdale, AZ, US; ³Sonoran Spine Center, Mesa, AZ, US

FDA Device/Drug Status: Multilevel interbodies for deformity correction (Investigational/Not approved)

3:11–3:17 p.m.

50. Results of the AANS Membership Survey of Adult Spinal Deformity Knowledge: Impact of Training, Practice Experience and Assessment of Potential Areas for Improved Education

Aaron Clark, MD, PhD¹; Christopher P. Ames, MD¹; Malla Keefe²; Tyler R. Koski, MD³; Michael K. Rosner, MD⁴; Justin Smith⁵; Joseph S. Cheng, MD⁶; Christopher I. Shaffrey, MD⁷; Paul C. McCormick, MD, MPH⁸

¹University of California San Francisco, San Francisco, CA, US; ²San Francisco, US; ³Northwestern Medical Faculty Foundation, Chicago, IL, US; ⁴Bethesda, MD, US; ⁵Charlottesville, VA, US; ⁶Vanderbilt University Medical Center Department of Neurosurgery, Nashville, TN, US; ⁷University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁸Neurological Institute, New York, NY, US

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

3:17–3:23 p.m.

51. Adult Deformity Surgery (ASD) Patients Recall Fewer than 50% of the Risks Discussed in the Informed Consent Process Preoperatively and the Recall Rate Worsens Significantly in the Postoperative Period

International Spine Study Group¹; Rajiv Saigal, MD, PhD²; Aaron Clark, MD, PhD²; Justin K. Scheer³; Justin S. Smith, MD, PhD⁴; R. Shay Bess, MD⁵; Ian McCarthy, PhD⁶; Robert A. Hart, MD⁷; Khaled M. Kebaish, MD⁸; Eric O. Klineberg, MD⁹; Vedat Deviren, MD¹⁰; Frank J. Schwab, MD¹¹; Christopher I. Shaffrey, MD¹²; **Christopher P. Ames, MD¹⁰**

¹Brighton, CO, US; ²University of California San Francisco, San Francisco, CA, US; ³San Francisco General Hospital, San Diego, CA, US; ⁴UVA Health System, Charlottesville, VA, US; ⁵Rocky Mountain Scoliosis and Spine, Denver, CO, US; ⁶Baylor Health Care System, Plano, TX, US; ⁷Oregon Health & Science University, Portland, OR, US; ⁸Baltimore, MD, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰University of California San Francisco, San Francisco, CA, US; ¹¹NYU Hospital for Joint Diseases, New York, NY, US; ¹²University of Virginia Department of Neurosurgery, Charlottesville, VA, US

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

3:23–3:29 p.m.

52. Stiffness After Fusion for Adult Spinal Deformity Does Not Significantly Impact Patients' Functional Status or Satisfaction

International Spine Study Group¹; **Jayne R. Hiratzka, MD²**; D. Kojo Hamilton, MD²; R. Shay Bess, MD³; Frank J. Schwab, MD⁴; Christopher I. Shaffrey, MD⁵; Christopher P. Ames, MD⁶; Gregory M. Mundis Jr., MD⁷; Virginie Lafage, PhD⁴; Vedat Deviren, MD⁶; Justin S. Smith, MD, PhD⁸; Eric O. Klineberg, MD⁹; Oheneba Boachie-Adjei, MD¹⁰; Douglas C. Burton, MD¹¹; Robert A. Hart, MD²

¹Brighton, CO, US; ²Oregon Health & Science University, Portland, OR, US; ³Rocky Mountain Scoliosis and Spine, Denver, CO, US; ⁴NYU Hospital for Joint Diseases, New York, NY, US; ⁵University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸UVA Health System, Charlottesville, VA, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰Hospital for Special Surgery, New York, NY, US; ¹¹University of Kansas Medical Center, Kansas City, KS, US

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

3:29–3:35 p.m.

53. Comparison of Long-Term (Five-Year) Reoperation Rates and Outcomes for Long Fusions to the Sacrum for Adult Deformity: Primary Versus Revision Surgery

Woojin Cho, MD, PhD¹; **David A. Essig, MD²**; Michael J. Faloon, MD³; Gbolabo O. Sokunbi, MD⁴; Thomas Ross, RN, MS⁵; Matthew E. Cunningham, MD, PhD²; Bernard A. Rawlins, MD⁵; Oheneba Boachie-Adjei, MD²

¹Sutton Terrace, New York, NY, US; ²Hospital for Special Surgery, New York, NY, US; ³Hoboken, NJ, US; ⁴Summit, NJ, US; ⁵New York, NY, US

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

3:35–3:41 p.m.

54. Three Column Spinal Osteotomies for Adult Spinal Deformity: Intercenter Analysis of Variability in Technique and Alignment Impact

International Spine Study Group¹; **Pierre Devos, MS²**; Jamie S. Terran³; Richard A. Hostin, MD⁴; Robert A. Hart, MD⁵; Christopher P. Ames, MD⁶; Oheneba Boachie-Adjei, MD⁷; Justin S. Smith, MD, PhD⁸; Eric O. Klineberg, MD⁹; Ibrahim Obeid¹⁰; Gregory M. Mundis Jr., MD¹¹; Khaled M. Kebaish, MD¹²; Themistocles S. Protopsaltis, MD²; Frank J. Schwab, MD²; Virginie Lafage, PhD²

¹Brighton, CO, US; ²NYU Langone Medical Center Hospital for Joint Diseases, New York, NY, US; ³New York, NY, US; ⁴Southwest Scoliosis Institute, Plano, TX, US; ⁵Oregon Health & Science University, Portland, OR, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷Hospital for Special Surgery, New York, NY, US; ⁸UVA Health System, Charlottesville, VA, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰France; ¹¹San Diego Center for Spinal Disorders, La Jolla, CA, US; ¹²Baltimore, MD, US

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

3:41–3:47 p.m.

55. A Retrospective, Multicenter Analysis of the Efficacy of Antifibrinolytics on Intraoperative Blood Loss During Complex Adult Deformity Surgery

Adam L. Shimer, MD¹; Christopher I. Shaffrey, MD²; Justin S. Smith, MD, PhD³; Lawrence G. Lenke, MD⁴; Christopher P. Ames, MD⁵; Frank J. Schwab, MD⁶; Virginie Lafage, PhD⁶; Michael P. Kelly, MD⁷

¹University of Virginia School of Medicine, Department of Orthopaedic Surgery, Charlottesville, VA, US; ²University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ³UVA Health System, Charlottesville, VA, US; ⁴Washington University Medical Center Department of Orthopaedic Surgery, St. Louis, MO, US; ⁵University of California San Francisco, San Francisco, CA, US; ⁶NYU Hospital for Joint Diseases, New York, NY, US; ⁷St. Louis, MO, US

FDA Device/Drug Status: Amicar/animocaproic acid (Approved for this indication), Tranxemic Acid (Not approved for this indication)

3:47–4:05 p.m.

Discussion

3:05–4:05 p.m.

Concurrent Session: Tissue Engineering

Room 275/276

Moderators: Howard S. An, MD and Randall F. Dryer, MD

3:05–3:11 p.m.

56. Stem Cell-TGFb Combination Therapy for Treatment of the Degenerative Intervertebral Disc: Can Stem Cells Initiate a Healing Response on Their Own?

Farhan N. Siddiqi, MD¹; Victor Hayes, MD²; Adam J. Graver, MD³; Daniel A. Grande II, PhD⁴

¹Trinity Spine Center, Odessa, FL, US; ²Spine and Orthopaedic Specialists, Odessa, FL, US; ³The Feinstein Institute for Medical Research, Manhasset, NY, US; ⁴Manhasset, NY, US

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

3:11–3:17 p.m.

57. Tissue-Engineered Intervertebral Discs: In Vivo Outcome in the Rodent Spine

Peter Grunert, MD¹; Katherine Hudson, BS²; Michael Macielak, BS¹; Brandon Borde²; Marjan Alimi³; Lawrence Bonassar, PhD²; Roger Hartl, MD⁴

¹Weill Cornell Medical College, New York, NY, US; ²Cornell University, Ithaca, NY, US; ³New York, NY, US; ⁴NY Presbyterian Hospital - Weill Cornell, New York, NY, US

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



3:17–3:23 p.m.

58. A Whole Organ Culture Model for Intervertebral Disc in the Presence of Nicotine and Cotinine Using Rat Tail Explants in a Rotating Bioreactor

James T. Stannard¹; Aaron Stoker, PhD²; Theodore J. Choma, MD³; Tom E. Reinsel, MD³; James L. Cook, DVM, PhD⁴

¹Columbia, MO, US; ²Comparative Orthopaedic Laboratory, Columbia, MO, US; ³Missouri Spine Center, Columbia, MO, US; ⁴University of Missouri, Columbia, MO, US

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

3:23–3:29 p.m.

59. Study Comparing Mesenchymal Precursor Cells and Autogenous Iliac Crest Bone Graft for Lumbar Interbody Fusion in a Randomized Controlled Phase 2 FDA Clinical Trial

Randall F. Dryer, MD¹; Kenneth A. Pettine, MD²; Gary Ghiselli, MD³; Hyun W. Bae, MD⁴

¹Central Texas Spine Institute, Austin, TX, US; ²Rocky Mountain Associates in Orthopedic Medicine, Loveland, CO, US; ³DenverSpine, Greenwood Village, CO, US; ⁴Spine Institute St. John's Health Center, Los Angeles, CA, US

FDA Device/Drug Status: Mesoblast Mesenchymal Precursor Cells (Investigational/Not approved)

3:29–3:35 p.m.

60. Temperature and Medium Do Not Affect Nucleated Cell Survival in Bone Marrow Aspirate from Vertebral Bodies

Matthew L. Webb¹; Raghav Badrinath²; Daniel D. Bohl, MPH¹; Jordan A. Gruskay³; Jonathan N. Grauer, MD¹

¹Yale University School of Medicine, New Haven, CT, US; ²Baltimore, MD, US; ³Rothman Institute, Philadelphia, PA, US

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

3:35–3:41 p.m.

61. Oxy133, a Novel Oxysterol Molecule, Promotes Bone Healing in a Rat Model

Scott R. Montgomery, MD¹; Haijun Tian, MD²; Akinobu Suzuki, MD, PhD²; Bayan Aghdasi, BA³; Elisa Atti⁴; Jeffrey C. Wang, MD⁵; Farhad Parhami, PhD⁴; Michael D. Daubs, MD⁶

¹Venice, CA, US; ²Los Angeles, CA, US; ³Clovis, CA, US; ⁴University of California Los Angeles, Los Angeles, CA, US; ⁵University of California Los Angeles School of Medicine, Santa Monica, CA, US; ⁶Santa Monica, CA, US

FDA Device/Drug Status: Oxy133 (Investigational/Not approved)

3:41–3:47 p.m.

62. Insulin-Mimetic Local Therapeutic Adjuncts for Enhancing Spinal Fusion in a Rat Model

John D. Koerner, MD; Michael J. Vives, MD; Saad B. Chaudhary, MD, MBA; Sheldon S. Lin, MD; Eric Breitbart, MD; Linda A. Uko, BS, MS; Paul S. Chirichella, BA

Rutgers – New Jersey Medical School Department of Orthopaedics, Newark, NJ, US

FDA Device/Drug Status: Zinc, Vanadium (Not approved for this indication)

3:47–4:05 p.m.

Discussion

3:05–4:05 p.m.

**Concurrent Session:
Socioeconomics**

Room 278/279

Moderators: Simon Dagenais, DC, PhD and William Mitchell, MD

3:05–3:11 p.m.

63. Disparities in Patient Population with Different Type of Insurance: Does It Affect Outcomes

Scott L. Parker, MD¹; Saniya S. Godil, MD²; Scott L. Zuckerman, MD³; Clinton J. Devin, MD³; Matthew J. McGirt, MD²

¹Vanderbilt University, Nashville, TN, US; ²Vanderbilt University Medical Center, Nashville, TN, US; ³Nashville, TN, US

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

3:11–3:17 p.m.

64. Medicare Versus Affordable Care Act Pay Per Hour Work by Surgeons: Pay for Four Common Spine Surgeries and Comparisons to Other Professions

Dennis G. Crandall, MD¹; Melissa A. Gebhardt, PA-C¹; Michael S. Chang, MD²; Jason C. Datta, MD¹; Terrence T. Crowder, MD³; William R. Stevens, MD³; James H. Maxwell, MD⁴; Paul R. Gause, MD⁵; Justin S. Field, MD⁶

¹Sonoran Spine Center, Mesa, AZ, US; ²Phoenix, AZ, US; ³Center for Spinal Disorders, Phoenix, AZ, US; ⁴Scottsdale Spine Care, Phoenix, AZ, US; ⁵Spine Institute of Arizona, Scottsdale, AZ, US; ⁶Desert Institute for Spine Care, Phoenix, AZ, US

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

3:17–3:23 p.m.

65. The Cost Effectiveness of Less Invasive Approaches In the Treatment of Adult Degenerative Scoliosis: A Comparison of Transposas and Open Techniques

Herman Johal, MD, MPH¹; Kenneth C. Thomas, MD, FRCS²; Eric Huang, MD, FRCSC³; Bradley Jacobs, MD, FRCSC⁴; Roger Cho, MD²; Ganesh Swamy, MD, FRCSC²

¹University of Calgary, Orthopaedic Surgery, Calgary, AB, Canada; ²Foothills Medical Centre, Calgary, AB, Canada; ³Calgary, AB, Canada; ⁴University of Calgary, Foothills Hospital, Calgary, AB, Canada

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

3:23–3:29 p.m.

66. Comparison of the Lifetime Incremental Cost-Utility Ratios of Surgery Relative to Failed Medical Management for the Treatment of Hip, Knee and Spine Osteoarthritis Modeled Using Five-Year Post-Surgical Values

Raja Y. Rampersaud, MD, FRCSC¹; Peggy Tso²; Kevin R. Walker³; Nizar Mahomed, MD¹; Roderick Davey, MD, FRCSC⁴; Stephen J. Lewis, MD¹; Peter C. Coyte, PhD³

¹Toronto Western Hospital, Toronto, ON, Canada; ²Cancer Services & Policy Research Unit, Cancer Care Ontario, Toronto, ON, Canada; ³Toronto, ON, Canada; ⁴University Health Network, Toronto, ON, Canada

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

3:29–3:35 p.m.

67. Health Care Burden of Anterior Cervical Spine Surgery: National Trends in Hospital Charges and Length of Stay, 2000 to 2009

Richard L. Skolasky Jr., ScD

Johns Hopkins University, Baltimore, MD, US

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

3:35–3:41 p.m.

68. Instrumentation and Equipment Related Inefficiency in Spine Surgery: Potential for Cost Savings

Hanbing Zhou, MD¹; Natalie Egge, MD¹; Anthony S. Lapinsky, MD²; Patrick J. Connolly, MD³; Christian P. DiPaola, MD²

¹University of Massachusetts, Worcester, MA, US; ²Worcester, MA, US; ³UMASS Memorial Medical Center, Worcester, MA, US

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

3:41–3:47 p.m.

69. Impact of Lumbar Fusion on Healthcare Resource Utilization

Leah Y. Carreon, MD, MSc¹; Curtis A. Mina, MD, MBA²; Steven D. Glassman, MD³

¹Spine Institute, Louisville, KY, US; ²Louisville, KY, US; ³Norton Leatherman Spine Center, Louisville, KY, US

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

3:47–4:05 p.m.

Discussion

3:05–4:05 p.m.

**Focused Discussion:
Opioids for Spine Pain: Curve/Countercurve**

Theater C

Moderator: Jerome Schofferman, MD

A continuation of the Prescription Opioids in Spine Care symposium with expert faculty fostering discussion on a case presentation and answering audience questions.

Agenda

- **Introduction and Case Presentation**
Kristi L. Kirschner, MD
- **Pro-Opioid Therapy**
Jerome Schofferman, MD
- **Con-Opioid Therapy**
Francis Keefe, PhD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.



3:05–5:10 p.m.

**Collaborative Concepts in Spine Care Session:
Outcomes Assessment in the New Vernacular of Value**

Room 268

Moderator: Gregory L. Whitcomb, DC

Over the last 30 years, benefits payers attempted to manage spiraling costs by shifting financial risk to healthcare providers. In retrospect, cost-management strategies largely failed in their intended effect, resulting in adverse relationships between payers and provider, health care and patient advocacy organizations.

Market stresses have led to a new vernacular in which value has become the equilibrator of stakeholder interests by changing the question from “how much are we spending” to “what we are getting for what we spend?”

Value focus drives the shift from pure cost analysis to a cost to outcome analysis of relative change in health-status and functionality by asking: “Does the care we provide result in real change in the quality of life of our patients?”

Thus, quantitative measurement will be critical in assessing specific health care service value, particularly as defined in the Affordable Care Act.

This session is intended to provide attendees with a greater understanding of the emerging role of outcomes assessment.

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

- Define available outcomes assessment tools and technologies;
- Develop strategies for outcomes tracking from community-based solo practitioners to mid- and large-size multiprovider spine specialty clinics;
- Assess the relevancy and application of various assessment tools and technologies to current and future spine care practice;
- Implement and practically sustain outcomes tracking in spine-specialty practice.

Agenda

- Introduction
- Current Assessment Research Tools and Practices: An Overview
Christopher P. Kauffman, MD
- Practical Outcomes Assessment: Implementation and Sustenance
Marjorie Wang, MD, MPH
- The Benefits of Intra- and Trans-Institutional Data Pooling
Donna D. Ohnmeiss, PhD
- Regulatory Changes: Outcome Informatics, Health Service Value and Compensation Under the Affordable Care Act
- Regulatory Changes: Current and Projected Policy Changes on Outcome Informatics and Health-Service Value and Compensation Under the Affordable Care Act
- The Integration of Outcomes and Data Driven Clinical Decision Making, Pathway Development and Value Assessment
Marjorie Wang, MD, MPH
- The Future of Outcomes Assessment on Consumer Choice, Provider Referral, Accreditation, Reimbursement and Provider Compensation
Christopher P. Kauffman, MD

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

4:10–5:10 p.m.

**Concurrent Session:
Pediatric Deformity**

Theater A

Moderators: Christopher J. DeWald, MD and Clifford B. Tribus, MD

4:10–4:16 p.m.

70. Surgery for Idiopathic Scoliosis in Adolescents Versus Young Adults: A Matched Cohort Analysis

Ian G. Dorward, MD¹; Lawrence G. Lenke, MD²; Keith H. Bridwell, MD³; Kathleen E. McCoy, MD¹; Terrence F. Holekamp, MD¹; Brian J. Neuman, MD¹; Kevin O’Neill, MD⁴; Wilson Z. Ray, MD¹; Brenda A. Sides³; Linda Koester¹

¹St. Louis, MO, US; ²Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ³Washington University in St. Louis School of Medicine, St. Louis, MO, US; ⁴Vanderbilt University Medical Center Department of Orthopaedics, Nashville, TN, US

FDA Device/Drug Status: thoracic pedicle screws (Not approved for this indication)

4:16–4:22 p.m.

71. Quality of Life Improvement Following Surgery for Scheuermann's Kyphosis Compared to Adolescent Idiopathic Scoliosis

Baron S. Lonner, MD¹; Courtney Toombs²; Suken A. Shah, MD³; Patrick J. Cahill, MD⁴; Burt Yaszay, MD⁵; Paul D. Sponseller, MD⁶

¹New York, NY, US; ²New York University Medical Center, New York, NY, US; ³DuPont Hospital for Children, Wilmington, DE, US; ⁴Shriners' Hospital for Children, Philadelphia, PA, US; ⁵Pediatric Orthopaedic and Scoliosis Center, San Diego, CA, US; ⁶Baltimore, MD, US

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

4:22–4:28 p.m.

72. Is There a Global Consensus on Optimal Surgical Care for Adolescent Idiopathic Scoliosis? A Delphi Study

Niccole M. Germscheid, MSc¹; Marinus de Kleuver, MD, PhD²; Stephen J. Lewis, MD³; Ahmet Alanay, MD⁴; Sigurd H. Berven, MD⁵; Kenneth M. Cheung, MD, FRCS⁶; Steven J. Kamper, PhD⁷; Lawrence G. Lenke, MD⁸; David W. Polly Jr., MD⁹; Yong Qiu, MD¹⁰; Christopher I. Shaffrey, MD¹¹; Maurits van Tulder, PhD¹²; Manabu Ito, MD, PhD¹³

¹AOSpine International, Davos, Switzerland; ²Sint Maartenskliniek, Nijmegen, Netherlands; ³Toronto Western Hospital, Toronto, ON, Canada; ⁴Florence Nightingale Hospital, Istanbul, Turkey; ⁵University of California San Francisco, Department of Orthopaedic Surgery, San Francisco, CA, US; ⁶Queen Mary Hospital, Hong Kong; ⁷EMGO+ Institute, VU University, Amsterdam, Netherlands; ⁸Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ⁹University of Minnesota Physicians, Minneapolis, MN, US; ¹⁰The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China; ¹¹University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹²VU University, Department of Health Sciences, Amsterdam, Netherlands; ¹³Hokkaido Univ. Graduate School of Medicine, Sapporo, Japan

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

4:28–4:34 p.m.

73. Thoracic Volume Predicts Pulmonary Function Recovery in Scoliosis Patients

David W. Polly Jr., MD¹; Ben Rosenstein, BS²; Charles Gerald T. Ledonio, MD²; Charles E. Johnston, MD³; David J. Nuckley, PhD⁴

¹University of Minnesota Physicians, Minneapolis, MN, US; ²Minneapolis, MN, US; ³Texas Scottish Rite-Hospital, Dallas, TX, US; ⁴University of Minnesota, Minneapolis, MN, US

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

4:34–4:40 p.m.

74. Anterior Release: Is it Obsolete or Does it Play a Role in Contemporary AIS Surgery?

Baron S. Lonner, MD¹; Courtney Toombs²; Stefan Parent, MD; Suken A. Shah, MD³; Lawrence G. Lenke, MD⁴; Daniel J. Sucato, MD⁵; L. L. Haber, MD⁶; David H. Clements III, MD⁷

¹New York, NY, US; ²New York University Medical Center, New York, NY, US; ³DuPont Hospital for Children, Wilmington, DE, US; ⁴Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ⁵Texas Scottish Rite Hospital for Children, Dallas, TX, US; ⁶University of Mississippi Medical Center, Jackson, MS, US; ⁷Cherry Hill, NJ, US

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

4:40–4:46 p.m.

75. A Systematic Review of All Smart Phone Applications Specifically Aimed for Use as a Scoliosis Screening Tool

Westley Hayes, MS¹; Qais Naziri, MD¹; Jadie E. De Tolla, BS²; Chibuikem P. Akamnonu, MD¹; Andrew A. Merola, MD¹; Carl Paulino²

¹SUNY Downstate Medical Center, Brooklyn, NY, US; ²Brooklyn, NY, US

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

4:46–4:52 p.m.

76. Optimal Lowest Instrumented Vertebra Selection for Posterior Instrumented Fusion of Lenke Type 5 and 6 Adolescent Idiopathic Scoliosis: Is There a Difference in Outcome Between L3 and L4?

Leah Y. Carreon, MD, MSc¹; Charles H. Crawford III, MD²; Lawrence G. Lenke, MD³; Daniel J. Sucato, MD⁴; Steven D. Glassman, MD⁵

¹Spine Institute, Louisville, KY, US; ²Louisville, KY, US; ³Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ⁴Texas Scottish Rite Hospital for Children, Dallas, TX, US; ⁵Norton Leatherman Spine Center, Louisville, KY, US

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

**4:52–5:10 p.m.
Discussion**



4:10–5:10 p.m.

**Concurrent Session:
Outcomes**

Theater B

Moderators: Edward J. Dohring, MD and Charles A. Reitman, MD

4:10–4:16 p.m.

77. Patient Reported Outcomes Three Months After Spine Surgery: Is it an Accurate Predictor of 12-Month Outcome in Real World Registry Platforms?

Saniya S. Godil, MD¹; Joseph S. Cheng, MD²; Anthony Asher, MD, FACS³; Matthew J. McGirt, MD¹
¹Vanderbilt University Medical Center, Nashville, TN, US; ²Vanderbilt University Medical Center Department of Neurosurgery, Nashville, TN, US; ³Carolina Neurosurgery & Spine Association, Charlotte, NC, US

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

4:16–4:22 p.m.

78. Correlation of EQ-5D and NDI in an Adult Spine Patient Population with Degenerative Cervical Disease

Leah Y. Carreon, MD, MSc¹; Benjamin Mueller, MD, PhD²; Kelly R. Bratcher, RN¹; Nandita Das, PhD³; Jacob Nienhuis⁴; Steven D. Glassman, MD⁵

¹Spine Institute, Louisville, KY, US; ²Twin Cities Orthopedics, Fridley, MN, US; ³Louisville, KY, US; ⁴Norton Healthcare, Louisville, KY, US; ⁵Norton Leatherman Spine Center, Louisville, KY, US

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

4:22–4:28 p.m.

79. Estimating EQ-5D Values from the Neck Disability Index and Numeric Rating Scales for Neck and Arm Pain

Leah Y. Carreon, MD, MSc¹; Kelly R. Bratcher, RN¹; Nandita Das, PhD²; Jacob Nienhuis³; Steven D. Glassman, MD⁴

¹Spine Institute, Louisville, KY, US; ²Louisville, KY, US; ³Norton Healthcare, Louisville, KY, US; ⁴Norton Leatherman Spine Center, Louisville, KY, US

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

4:28–4:34 p.m.

80. Estimating EQ-5D Values from the Oswestry Disability Index and Numeric Rating Scales for Back and Leg Pain

Leah Y. Carreon, MD, MSc¹; Kelly R. Bratcher, RN¹; Jacob Nienhuis²; Nandita Das, PhD³; Steven D. Glassman, MD⁴

¹Spine Institute, Louisville, KY, US; ²Norton Healthcare, Louisville, KY, US; ³Louisville, KY, US; ⁴Norton Leatherman Spine Center, Louisville, KY, US

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

4:34–4:40 p.m.

81. Effect of Comorbidities and Psychosocial Conditions on Clinical Outcomes After Lumbar Spinal Fusion

Nandita Das, PhD¹; Steven D. Glassman, MD²; Mladen Djurasovic, MD²; Kelly R. Bratcher, RN³; Jacob Nienhuis⁴; Leah Y. Carreon, MD, MSc³

¹Louisville, KY, US; ²Norton Leatherman Spine Center, Louisville, KY, US; ³Spine Institute, Louisville, KY, US; ⁴Norton Healthcare, Louisville, KY, US

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

4:40–4:46 p.m.

82. A Novel Six-Item Outcome Instrument (VNI-6) for Assessing the Effectiveness of Cervical Surgery in Registry Efforts

Saniya S. Godil, MD, Matthew J. McGirt, MD

Vanderbilt University Medical Center, Nashville, TN, US

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

4:46–4:52 p.m.

83. Lumbar Spinal Stenosis Decompression Normalizes Free-Living Physical Activity Impairment

Matthew Smuck, MD¹; Matthew Buman, PhD²; Ma. Agnes Ith, MD³; William Haskell⁴; Ming-Chih J. Kao⁵

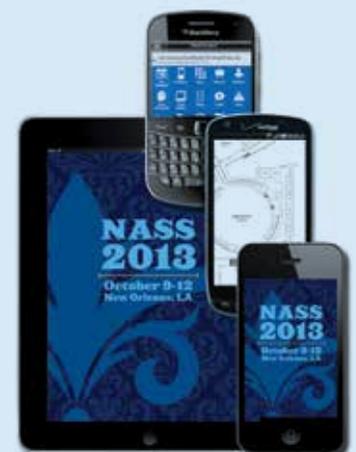
¹Menlo Park, CA, US; ²Arizona State University, Phoenix, AZ, US; ³Stanford, Redwood City, CA, US; ⁴Stanford University, Palo Alto, CA, US; ⁵Stanford University, Stanford, CA, US

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

**4:52–5:10 p.m.
Discussion**

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4:10–5:10 p.m.

**Concurrent Session:
Infection Management**

Theater C

Moderators: Jack Jallo, MD, PhD, FACS and
Christopher D. Sliva, MD

4:10–4:16 p.m.

**84. Culture Profile of Surgical Site Infections After
Topical Vancomycin Powder Use in Instrumented
Spine Fusions**

Leah Y. Carreon, MD, MSc¹; Jeffrey L. Gum, MD²; Charles H. Crawford
III, MD²; Lawrence G. Lenke, MD³; Jacob M. Buchowski, MD, MS⁴;
Charles C. Edwards, MD⁵; Steven D. Glassman, MD⁶

¹Spine Institute, Louisville, KY, US; ²Louisville, KY, US; ³Washington
University Medical Center Department of Orthopedic Surgery, St.
Louis, MO, US; ⁴Washington University in St. Louis, St. Louis, MO, US;
⁵Mercy Medical Center, The Spine Center, Towson, MD, US; ⁶Norton
Leatherman Spine Center, Louisville, KY, US

FDA Device/Drug Status: Vancomycin powder topical (Not
approved for this indication)

4:16–4:22 p.m.

**85. Incidence and Mortality of Surgical Site Infections
After Cervical Spine Surgery**

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro
Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²;
Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical
Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL,
US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

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

4:22–4:28 p.m.

**86. Primary Closure Versus Paraspinous Muscle Flaps
for Spinal Surgical Site Infections: A Survivorship
Analysis**

Gursukhman S. Sidhu, MBBS¹; Alexander R. Vaccaro, MD, PhD¹;
Jeffrey A. Rihn, MD²; Todd J. Albert, MD¹; Kris Radcliff, MD³

¹Rothman Institute, Philadelphia, PA, US; ²Thomas Jefferson
University Hospital, The Rothman Institute, Philadelphia, PA, US;
³Rothman Institute, Egg Harbor Township, NJ, US

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

4:28–4:34 p.m.

**87. When Do You Drain Epidural and Paravertebral
Abscesses of the Spine?**

Sina Pourtaheri, MD¹; Eiman Shafa, MD²; Arash Emami, MD³; Mark
J. Ruoff, MD⁴; Tyler N. Stewart⁵; Kimona Issa, MD⁶; Ki S. Hwang, MD⁷;
Kumar G. Sinha, MD³

¹Teaneck, NJ, US; ²Saddle Brook, NJ, US; ³University Spine Center,
Wayne, NJ, US; ⁴Orthopaedic Associates, Fair Lawn, NJ, US; ⁵New
York, NY, US; ⁶Baltimore, MD, US; ⁷University Place Spine Center,
Wayne, NJ, US

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

4:34–4:40 p.m.

**88. Independent Predictors of Failure of
Nonoperative Management of Spinal Epidural
Abscesses**

Sang D. Kim, MD, MS¹; Rojeh Melikian, MD²; Kevin L. Ju, MD³; David
Zurakowski, PhD⁴; Kirkham B. Wood, MD⁵; Christopher M. Bono, MD⁶;
Mitchel Harris, MD, FACS³

¹St. Louis, MO, US; ²Cambridge, MA, US; ³Brigham & Women's
Hospital, Boston, MA, US; ⁴Boston Children's Hospital, Boston, MA,
US; ⁵Massachusetts General Hospital, Boston, MA, US; ⁶Brigham &
Women's Hospital, Department of Orthopedic Surgery, Boston, MA,
US

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

4:40–4:46 p.m.

**89. Risk Factors for a Delay in Diagnosis of Vertebral
Osteomyelitis**

Sina Pourtaheri, MD¹; Mark J. Ruoff, MD²; Eiman Shafa, MD³; Arash
Emami, MD⁴; Tyler N. Stewart⁵; Kimona Issa, MD⁶; Ki S. Hwang, MD⁷;
Kumar G. Sinha, MD⁴

¹Teaneck, NJ, US; ²Orthopaedic Associates, Fair Lawn, NJ, US; ³Saddle
Brook, NJ, US; ⁴University Spine Center, Wayne, NJ, US; ⁵New York,
NY, US; ⁶Baltimore, MD, US; ⁷University Place Spine Center, Wayne,
NJ, US

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

4:46–4:52 p.m.

**90. Spinal Epidural Abscesses: Risk Factors, Medical
Versus Surgical Management: A Retrospective
Review of 128 Cases**

Timothy B. Alton, MD¹; Amit R. Patel, MD¹; Richard J. Bransford, MD²;
Carlo Bellabarba, MD³; Michael J. Lee, MD⁴; Jens R. Chapman, MD²

¹Seattle, WA, US; ²UW Harborview Medical Center, Seattle, WA,
US; ³University of Washington, Seattle, WA, US; ⁴Department of
Orthopaedic Surgery, Seattle, WA, US

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

4:52–5:10 p.m.

Discussion



4:10–5:10 p.m.

**Concurrent Session:
Trauma**

Room 266/267

Moderators: Ronald A. Lehman, MD and Jens R. Chapman, MD

4:10–4:16 p.m.

91. Floating Lateral Mass Fractures of the Cervical Spine

Richard J. Bransford, MD¹; Mark W. Manoso, MD²; Carlo Bellabarba, MD³

¹Harborview Medical Center, Seattle, WA, US; ²University of Washington Medicine Sport and Spine Physicians, Seattle, WA, US; ³University of Washington, Seattle, WA, US

FDA Device/Drug Status: Lateral Mass Screws (Not approved for this indication), Anterior Cervical Plating (Approved for this indication)

4:16–4:22 p.m.

92. Early Spine Surgery in the Multiply Injured Patient: Implications of Damage Control Criteria

James M. Mok, MD¹; Joseph W. Galvin, DO¹; Andrew J. Schoenfeld, MD²; Brett A. Freedman, MD³

¹Madigan Army Medical Center, Tacoma, WA, US; ²Canutillo, TX, US; ³Landstuhl Regional Medical Center, APO, AE, US

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

4:22–4:28 p.m.

93. Routine Analysis of Cervical Angiograms in Cervical Spine Trauma Patients

Tina Dreger, MD¹; Howard M. Place, MD¹; Christine C. Piper, BS²; Theresa K. Mattingly, BS¹; Jennifer L. Brechbuhler, BSN¹

¹St. Louis University, St. Louis, MO, US; ²Philadelphia, PA, US

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

4:28–4:34 p.m.

94. Long-Term Investigation of Operative Treatment of Thoracolumbar Burst Fractures

Arvind von Keudell, MD¹; Heiko Koller, MD²; Matthias Pumberger, MD³; Wolfgang Hitzl, PhD⁴; Herbert Resch, PhD, MD⁵; Michael Mayer, MD⁶

¹MGH, Boston, MA, US; ²Bad Wildungen, Germany; ³Hospital for Special Surgery, New York, NY, US; ⁴Salzburg, Austria; ⁵Department for Traumatology and Sports Injuries, Paracelsus Medical University, Salzburg, Austria; ⁶Paracelsus Medical University Salzburg, Salzburg, Austria

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

4:34–4:40 p.m.

95. Blunt Cerebrovascular Injuries in Association with Craniocervical Distraction Injuries

Richard J. Bransford, MD¹; Marcelo D. Vilela; Carlo Bellabarba, MD²

¹Harborview Medical Center, Seattle, WA, US; ²University of Washington, Seattle, WA, US

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

4:40–4:46 p.m.

96. The Effects of Restraint Type on Pattern of Spine Injury in Children

Justin Ernat, MD¹; Jeffrey B. Knox, MD²; Robert L. Wimberly, MD³; Anthony Riccio, MD³

¹Tripler Army Medical Center, HI, US; ²New York, NY, US; ³Orthopaedic Surgery, Texas Scottish Rite Hospital for Children and Children's Medical Center, Dallas, TX, US

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

4:46–4:52 p.m.

97. Anatomic Feasibility of C2 Pedicle Screw Fixation: the Effect of Variable Angle Interpolation of Axial CT Scans

Joseph R. O'Brien, MD, MPH¹; Lauren M. Burke, MD²; Warren D. Yu, MD³; Anthony G. Ho, MD¹; Timothy Wagner⁴

¹George Washington University, Washington, DC, US; ²Washington, DC, US; ³GWU Medical Faculty Associates, Washington, DC, US; ⁴Rochester, NY, US

FDA Device/Drug Status: Cervical pedicle screws (Not approved for this indication)

4:52–5:10 p.m.

Discussion

4:10–5:10 p.m.

**Concurrent Session:
Disc Biology**

Room 280/281

Moderators: Michael H. Heggeness, MD, PhD and Wellington K. Hsu, MD

4:10–4:16 p.m.

98. Factors Affecting Small Molecule Trans-Endplate Transport into the Intervertebral Disc In Vivo

Sarah E. Linley¹; Josh Peterson¹; Rosemarie Mastropolo, BS¹; Timothy T. Roberts, MD²; Luciana Lopes, PhD²; James P. Lawrence, MD, MBA³; Jeffrey C. Lotz, PhD⁴; Eric H. Ledet, PhD¹

¹Rensselaer Polytechnic Institute, Troy, NY, US; ²Albany, NY, US; ³Capital Region Spine, Albany, NY, US; ⁴University of California San Francisco, San Francisco, CA, US

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

4:16–4:22 p.m.

99. Effects of Type-2 Diabetes Mellitus on Intervertebral Disc Health in Rats

Lionel N. Metz, MD¹; Aaron J. Fields, PhD¹; Alberto F. Lovell, BS²; Britta Berg-Johansen³; Morsi Khashan, MD⁴; James Graham, BS⁵; Peter Havel, DVM, PhD⁵; Jeffrey C. Lotz, PhD¹

¹University of California San Francisco, San Francisco, CA, US; ²Hayward, CA, US; ³Berkeley, CA, US; ⁴University of California San Francisco Parnassus Campus, San Francisco, CA, US; ⁵University of California Davis, Davis, CA, US

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

4:22–4:28 p.m.

100. Therapeutic Effects of FK506 on Prevent Intervertebral Disc Degeneration Through Suppression of IL-2

Jun Zou, MD¹; Xuesong Zhu²; Huilin Yang, MD, PhD³

¹Soochow University, Department of Orthopaedic Surgery, Suzhou, China; ²Plano, TX, US; ³First Affiliated Hospital of Soochow University, Suzhou, China

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

4:28–4:34 p.m.

101. Canine Notochordal Cell-Secreted Factors Protect Murine and Human Nucleus Pulposus Cells from Apoptosis by Inhibition of Activated Caspases -9 and -3/7

Klaus A. Mehrkens, MD¹; Sarah J. Kim, BS²; Muhammad Zia Karim, DVM, MSc³; Michael G. Fehlings, MD, PhD, FRCSC³; William Mark Erwin, DC, PhD³

¹University of Toronto, TWH, Toronto, ON, Canada; ²Toronto, Canada; ³Toronto Western Hospital, Toronto, ON, Canada

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

4:34–4:40 p.m.

102. Annular Repair Using High Density Collagen Gel: In Vivo Outcome in a Rodent Spine Model

Peter Grunert, MD¹; Brandon Borde²; Michael Macielak, BS¹; Katherine Hudson, BS²; Marjan Alimi³; Lawrence Bonassar, PhD²; Roger Hartl, MD⁴

¹Weill Cornell Medical College, New York, NY, US; ²Cornell University, Ithaca, NY, US; ³New York, NY, US; ⁴NY Presbyterian Hospital, Weill Cornell, New York, NY, US

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

4:40–4:46 p.m.

103. A Quantitative Proteomic Analysis of the Non-Chondrodystrophic and Chondrodystrophic Canine Nucleus Pulposus

William Mark Erwin, DC, PhD¹; Muhammad Zia Karim, DVM, MSc¹; Klaus A. Mehrkens, MD²; Sarah J. Kim, BS³

¹Toronto Western Hospital, Toronto, ON, Canada; ²University of Toronto, TWH, Toronto, ON, Canada; ³Toronto, Canada

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

4:46–4:52 p.m.

104. Ex-Vivo Genetic Studies of the Intervertebral Disc: Methods and Modeling

Dominic W. Pelle, MD¹; Jacqueline D. Peacock, PhD¹; Scott S. Russo, MD²; Kenneth J. Easton, MD²; Matthew Steensma, MD³

¹Van Andel Institute, Grand Rapids, MI, US; ²Orthopedic Associates of Michigan, Grand Rapids, MI, US; ³Grand Rapids, MI, US

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

4:52–5:10 p.m.

Discussion

4:10–5:10 p.m.

**Focused Discussion:
Best Practices Update: Antibiotic
Prophylaxis in Spine Surgery**

Room 269

Moderator: William O. Shaffer, MD

Join moderator, Dr. William Shaffer, past Co-chair of the Evidence-Based Guideline Development Committee, along with key members of the work group who developed the Evidence-Based Guideline on Antibiotic Prophylaxis in Spine Surgery, in a discussion of the key recommendations made within the guideline. Discover the current state of the evidence and share your thoughts related to antibiotic prophylaxis in spine surgery.

FDA Device/Drug Status:

William O. Shaffer, MD: Cephalosporins (Approved), Vancomycin (Approved)



4:10–5:10 p.m.

**Focused Discussion:
Evidence-Based Spinal Diagnosis**

Room 278/279

Moderator: Conor O’Neill, MD

Spine clinicians rely on a variety of diagnostic tests to make important decisions, including whether to recommend surgery and other invasive procedures. Most clinicians know how to assess the quality of evidence for treatments, but not for diagnostic tests. In this session the basic methodology for assessing the evidence base for diagnostic tests will be presented, and real-world examples are discussed.

This session provides the participants with a discussion on psychological risk factors (catastrophizing, fear-avoidance beliefs, pain self-efficacy beliefs, aberrant pain drawings) for poor prognosis in spine care and with a description of psychologically informed approaches (graded exposure and graded activity) by explaining the application of empirically based psychological principles and strategic clinical reasoning, therefore helping patients to return to more-active lifestyles despite persistent spine pain. Also, illustrative examples of measurement tools are highlighted, such as the Pain Catastrophizing Scale and the Tampa Scale of Kinesiophobia. Importantly, the roles of skills in assessment, treatment planning, and communication with patients are emphasized as essential but feasible skills for spine specialists to acquire.

4:10–5:10 p.m.

**Focused Discussion:
Psychologically Informed Interventions for Spine Pain**

Room 275/276

Moderators: Armando S. Miciano, MD and Robert Levine, MD

Psychosocial prognostic factors have been previously described for the development of disability following the onset of spine pain. Overall, the evidence suggests that targeting psychosocial factors, particularly when they are at high levels, does seem to lead to more consistently positive results. Current evidence-based guidelines for managing spine pain support the central theme of the resumption of activities despite the presence of spine pain. Yet, the psychosocial barriers to implementing the guidelines dominate the clinical presentation, along with the physical factors, making it challenging for both spine specialists and patients.

5:00–6:00 p.m.

Resident, Fellow and Program Directors Reception

Room 292

5:15–7:00 p.m.

Allied Health Reception

Mid-house Level Lobby



Friday, October 11

7:00–8:30 a.m.

Continental Breakfast

Theater Lobby (2nd Level)

7:00 a.m.–5:00 p.m.

Attendee Registration

Lobby H (1st Level)

NASS Resource Center Open

Lobby H (1st Level)

ePosters Open for Viewing

Lobby H (1st Level)

7:20–7:25 a.m.

Announcements

Theater B

7:25–8:25 a.m.

Best Papers: Basic Science and Socioeconomics

Theater B

Moderators: Matthew Smuck, MD and Karin R. Swartz, MD

7:25–7:31 a.m.

105. The Relationship Between Vitamin D Status and Successful Spinal Fusion

Melodie Metzger, PhD¹; LEA Kanim, MA²; Li Zhao³; Samuel T. Robinson, BS¹; Rick B. Delamarter, MD⁴

¹Cedars-Sinai Medical Center, Los Angeles, CA, US; ²Spine Center, Cedars-Sinai Medical Center, Los Angeles, CA, US; ³Spine Research Foundation, Los Angeles, CA, US; ⁴Los Angeles, CA, US

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

7:31–7:37 a.m.

106. Influence of Intradiscal Medication on Intervertebral Disc Cells

Michael Ogon, MD¹; Claudia Eder, MD²

¹Orthopaedisches Spital Speising GmbH, Wien, Austria; ²Orthopädisches Hospital Speising, Austria

FDA Device/Drug Status: Lidocaine (Approved for this indication), Iopamidol (Approved for this indication), Triamcinolonacetonid (Approved for this indication)

7:37–7:43 a.m.

107. Correlation of Pain Response and In Vivo Imaging of NF- κ B Activity in a Model of Radiculopathy

Isaac O. Karikari, MD¹; Robby Bowles, PhD²; Lori Setton, PhD³

¹Durham, NC, US; ²Cornell University, Ithaca, NY, US; ³Duke University, Durham, NC, US

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

7:43–7:49 a.m.

108. Net Transport in the Intervertebral Disc is Dependent on Mechanical Loading Rate

Sarah E. Linley¹; Josh Peterson¹; Rosemarie Mastropolo, BS¹; Timothy T. Roberts, MD²; Sarah Frank, BS³; Joseph Glennon, VMD⁴; James P. Lawrence, MD, MBA⁵; Eric H. Ledet, PhD¹

¹Rensselaer Polytechnic Institute, Troy, NY, US; ²Albany, NY, US; ³Providence, RI, US; ⁴Capital District Veterinary Surgical Associates, New York, NY, US; ⁵Capital Region Spine, Albany, NY, US

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



7:49–7:55 a.m.

109. The Effect of Surgery on Health Related Quality of Life and Functional Outcome in Patients with Metastatic Epidural Spinal Cord Compression: The AOSpine North America Prospective Multicenter Study

Michael G. Fehlings, MD, PhD, FRCSC¹; Branko Kopjar, MD, PhD²; Charles G. Fisher, MD³; Alexander R. Vaccaro, MD, PhD⁴; Paul M. Arnold, MD⁵; James M. Schuster, MD, PhD⁶; Joel A. Finkelstein, MD⁷; Laurence D. Rhines, MD⁸; Mark B. Dekutoski, MD⁹; Ziya L. Gokaslan, MD, FACS¹⁰; John C. France, MD¹¹

¹Toronto Western Hospital, Toronto, ON, Canada; ²Mercer Island, WA, US; ³Vancouver General Hospital, Vancouver, BC, Canada; ⁴Rothman Institute, Philadelphia, PA, US; ⁵University of Kansas Medical Center, Department of Neurosurgery, Kansas City, KS, US; ⁶University of Pennsylvania Department of Neurosurgery, Philadelphia, PA, US; ⁷Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ⁸Houston, TX, US; ⁹The CORE Institute, Sun City West, AZ, US; ¹⁰Johns Hopkins University, Department of Neurosurgery, Baltimore, MD, US; ¹¹Robert C. Byrd Health Sciences Center, Morgantown, WV, US

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

7:55–8:01 a.m.

110. Comparative Effectiveness and Cost-Benefit Analysis of Topical Vancomycin Powder in Posterior Spinal Fusion for Spine Trauma and Degenerative Spine Disease

Michael C. Dewan, MD¹; Saniya S. Godil, MD¹; Scott L. Zuckerman, MD²; Stephen K. Mendenhall³; David N. Shau, BS¹; Scott L. Parker, MD³; Clinton J. Devin, MD²; **Matthew J. McGirt, MD¹**

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Nashville, TN, US; ³Vanderbilt University, Nashville, TN, US

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

8:01–8:07 a.m.

111. Patient Factors, Comorbidities and Surgical Characteristics that Increase Mortality and Complication Risk Following Spinal Arthrodesis: A Prognostic Study Based on 5,887 Patients

Andrew J. Schoenfeld, MD¹; Julia Bader, PhD²; Christopher M. Bono, MD³

¹Canutillo, TX, US; ²El Paso, TX, US; ³Brigham & Women's Hospital, Department of Orthopedic Surgery, Boston, MA, US

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

8:07–8:25 a.m.
Discussion

8:00 a.m.–1:00 p.m.

Exhibitor Registration
Lobby H (1st Level)

8:25–8:30 a.m.

NASS Working for You: Coding Update

Theater B

Moderators: R. Dale Blasier, MD, FRCS(C), MBA and William J. Sullivan, MD

8:30–10:00 a.m.

**Symposium:
Evolving Concepts of Value in Our New Healthcare System: Who is Going to Get the Money?**

Theater B

Moderator: David A. Wong, MD, MS

With the results of last year's election, we have a firmer idea of the concepts embedded in the Patient Protection and Affordable Care Act (PPACA) which will guide future priorities for medical practice in the United States. One of the critical concepts which will be a key to the allocation of health care dollars in the future is the evolution of how the "value" of a procedure, medication, investigation or new technology etc. will be established.

This symposium introduces and details the new reimbursement models such as Accountable Care Organizations (ACOs) and the options for spine care providers to engage with these models. Experience to date with novel reimbursement organizations which are already operating is reviewed. The "value" of physician extenders and allied health professionals within the system is discussed. How value can be calculated using specific predictors of cost for spinal surgery is explained. Specific examples of value decisions involving some common spine treatments, surgical procedures and new technology are outlined. These cases will be used to illustrate both positive and negative aspects related to implementation of Comparative Effectiveness Research (CER) in establishing the "value" of various treatment options.

It is critical that physicians understand the new "rules of engagement" as spine care competes with other pathologies for funding. This symposium represents a significant educational opportunity for attendees to develop awareness and understanding of the "value" issues.

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

- Identify the new reimbursement models to be implemented under the PPACA;
- Comprehend the options for healthcare professionals to engage the new reimbursement models;
- Recognize positive and negative aspects related to implementation of CER in establishing the “value” of various treatment options.

Agenda

- **Introduction: Overview of Criteria for “Value” and New Reimbursement Models in the New Healthcare System**
David A. Wong, MD, MS
- **Details of Reimbursement Models Important to Spine Care and Update on Experience with Existing and Evolving Models**
David W. Polly Jr., MD
- **Value of Allied Health and Physician Extenders in the New Healthcare System**
Matthew J. Smith, MD
- **Determining Value Through Identification of Independent Predictors of Cost for Spine Surgery**
Sigurd H. Berven, MD
- **Specific Examples of Comparative Effectiveness Research (CER) Establishing Value for Reimbursement Decisions: Epidural Steroids, Fusion, Instrumentation, Disc Arthroplasty**
David A. Wong, MD, MS
- **Discussion, Q&A**

FDA Device/Drug Status:

David A. Wong, MD, MS: BMP, Pedicle Screws, Interbody Cages, Disc Arthroplasty, Epidural Steroids, Interspinous Spacers, Vertebroplasty/Kyphoplasty (All approved for this indication); BMP Off Label (Approved/Investigational/Not Approved for this indication)

David W. Polly Jr., MD: This presentation does not discuss or include any applicable devices or drugs.

Matthew J. Smith, MD: This presentation does not discuss or include any applicable devices or drugs.

Sigurd H. Berven, MD: This presentation does not discuss or include any applicable devices or drugs.

8:30–10:00 a.m.

Symposium:

State-of-the-Art World Spine Care: A Review of Practices from Different Regions of the World

Theater C

Moderator: Raj D. Rao, MD

Leaders in spine care from different nations will provide an overview of spine care practices and present a balanced viewpoint of the policy and financial landscape of practice in their nations, followed by an in-depth review of the medical practice of spine care.

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

- Recognize practice variations in operative and nonoperative spine care across the globe.
- Facilitate dissemination of global spine care practices.

Agenda

- **Welcome/Introduction**
Raj Rao, MD
- **A Review of Practices in China**
Wei Tan, MD
- **A Review of Practices in Ghana**
Harry Akoto, MD
- **A Review of Practices in Japan**
Kiyoshi Kaneda, MD
- **A Review of Practices in Sweden**
Peter Fritzell, MD
- **Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.



9:00 a.m.–12:00 p.m.

Young Spine Surgeons Forum

Room 275/276

Moderators: Saad Chaudhary, MD, MBA and Sheeraz Qureshi, MD, MBA

The transition from training to practice is a difficult time. With the best interest of young surgeons in mind, NASS has developed a symposium 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 three critical topics: 1) Early Practice Perspectives and Finding a Job—Resource utilization, appealing practice characteristics and self-promotion will be highlighted including interview pearls; 2) Seasoned Perspectives on Career Paths—Distinguished speakers provide mature perspectives on various issues relevant to early practice; 3) Practice Enhancement and Pearls—Critical issues in developing a strong and busy clinical practice. 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 timing and pitfalls of incorporating new technologies into the young surgeon’s practice.

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

Introduction to NASS Leadership

- **Future of Spine Practice**
William C. Watters III, MD

Early Career Decision Making and Job Search

Moderator: Saad Chaudhary, MD, MBA

- **Finding an Academic Job**
Kris Radcliff, MD
- **Private Practice Perspectives**
Paul R. Gause, MD
- **Panel Discussion/Q&A**

Practice Enhancement

Moderator: Rock Patel, MD

- **Marketing in a Competitive Environment**
Han Jo Kim, MD
- **Understanding Billing and Coding**
Michael C. Gerling, MD
- **Developing a Niche Practice**
Justin Bird, MD

How to Get Involved

Moderator: Sheeraz Qureshi, MD, MBA

- **Getting Involved in Industry**
Steven C. Ludwig, MD
- **Getting Involved in Societies**
Alpesh A. Patel, MD
- **Getting Involved in Policy**
Alok D. Sharan, MD
- **Research/Intellectual Property Development**
Wellington K. Hsu, MD

Seasoned Career Path

Moderator: Saad Chaudhary

- **Academic Career Path**
Jeffrey C. Wang, MD
- **Private Practice Career Path**
Choll W. Kim, MD

Panel Discussion/Q&A

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

9:00 a.m.–1:30 p.m.

Technical Exhibition Open

Technical Exhibition

10:00–10:25 a.m.

Networking Break (Beverage Service)

Technical Exhibition, Aisles 400 and 2100

Practical Theater: Selecting and Implementing EHRs

Technical Exhibition, Booth 2900

10:25–10:30 a.m.

Spine Safety Update

Theater B

10:30–10:55 a.m.

NASS Research Award Presentations

Theater B

Moderator: Daniel K. Resnick, MD, MS

10:30–10:35 a.m.

2011 Award Winner

Potential of Link-N to Stimulate Repair in the Degenerated Human Intervertebral Discs

Fackson Mwale, PhD¹; Rahul Gawri, MBBS¹; John Antoniou, MD, PhD¹; Jean Ouellet, MD^{1,2}; Waleed Awwad, MD^{1,2}; Thomas Steffen, MD, PhD, MBA^{1,3}; Peter Roughley, PhD^{1,3}; Lisbet Haglund, PhD^{1,2}

¹McGill University, Montreal, Canada; ²McGill Scoliosis and Spine Center, Montreal, Canada; ³Shriners Hospital for Children, Montreal, Canada

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

10:35–10:40 a.m.

2011 Award Winner

Activation of the Unfolded Protein Response Enhances Motor Recovery After Spinal Cord Injury

Claudio Hetz, PhD^{1,3,4,6}; Vicente Valenzuela, MSc^{1,2,3}; Eileen Collyer, PhD²; Donna Armentano⁵; Geoffrey Parsons, PhD⁵; Felipe A. Court, PhD^{2,6}

¹Biomedical Neuroscience Institute, Faculty of Medicine, University of Chile, Santiago, Chile; ²Millennium Nucleus for Regenerative Biology, Faculty of Biology, P. Catholic University of Chile, Santiago, Chile; ³Center for Molecular Studies of the Cell, Institute of Biomedical Sciences, University of Chile, Santiago, Chile; ⁴Department of Immunology and Infectious diseases, Harvard School of Public Health, Boston MA, US; ⁵Department of Molecular Biology, Genzyme Corporation, Framingham, MA, US; ⁶Neurounion Biomedical Foundation, Santiago, Chile

FDA Device/Drug Status: AAV XBP1s/GFP (Investigational/Not approved)

10:40–10:45 a.m.

2011 Award Winner

Correlation of Pain with Intradiscal Cytokine Expression Using a Novel Functional Assay System for Patients Undergoing Anterior Lumbar Interbody Fusion

D. Greg Anderson, MD; Christopher K. Kepler, MD, MBA; Dessimilava Z. Markova, PhD; Chiu-Ming Chen, MD; Joseph Mendelis, BA

Department of Orthopaedic Surgery, Thomas Jefferson University, Philadelphia, PA, US

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

10:45–10:50 a.m.

Discussion/Questions

10:50–10:55 a.m.

2013 Research Grants and Fellowship Awards Presentation

10:55–11:00 a.m.

NASS Recognition Awards

Theater B

Presented by Charles A. Mick, MD and William C. Watters III, MD

2013 Leon Wiltse Award:

Lawrence G. Lenke, MD

2013 David Selby Award:

Marjorie L. Eskay-Auerbach, MD, JD

2013 Henry Farfan Award:

Michael G. Fehlings, MD, PhD, FRCSC

11:00 a.m.–12:00 p.m.

Concurrent Session: Deformity

Theater A

Moderators: Todd F. Alemin, MD and Frank J. Schwab, MD

11:00–11:06 a.m.

112. Vitamin A Deficiency Induces Congenital Spinal Deformities in Rats

Jianxiong Shen, MD

Peking Union Medical College Hospital, Beijing, China

FDA Device/Drug Status: Modified AIN-93G diet without any source of Vitamin A (Investigational/Not approved)

11:06–11:12 a.m.

113. Neurofibromatosis Type 1 and Dystrophic Scoliosis: A Multicenter Study of Accuracy of Surgeons' Radiographic Assessment

Charles Gerald T. Ledonio, MD¹; David W. Polly Jr., MD²; Ann M. Brearley, PhD³; A. Noelle Larson, MD¹; Daniel J. Sucato, MD⁴; Leah Y. Carreon, MD, MSc⁵; Alvin Crawford, MD, FACS⁶; David A. Stevenson, MD⁷; Michael G. Vitale⁸; Christopher L. Moertel, MD⁹

¹Minneapolis, MN, US; ²University of Minnesota Physicians, Minneapolis, MN, US; ³Biostatistical Design and Analysis Center, University of Minnesota, Minneapolis, MN, US; ⁴Texas Scottish Rite Hospital for Children, Dallas, TX, US; ⁵Spine Institute, Louisville, KY, US; ⁶Children's Hospital Medical Center, Cincinnati, OH, US; ⁷University of Utah Hospital, Salt Lake City, UT, US; ⁸Columbia University Medical Center, New York, NY, US; ⁹University of Minnesota, Minneapolis, MN, US

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



11:12–11:18 a.m.

114. Anterior Shift of the Lumbar Plexus Within the Surgical Corridor in Scoliotic Spines: Considerations During the Transpoas Approach to the Lumbar Spine

Qais Naziri, MD¹; Ashish Patel, MD²; Srinivas Kolla, MD¹; Dante M. Leven, DO³; Jason Oh, MD³; Carl Paulino³

¹SUNY Downstate Medical Center, Brooklyn, NY, US; ²New York, NY, US; ³Brooklyn, NY, US

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

11:18–11:24 a.m.

115. Upper Thoracic Versus Lower Thoracic Upper Instrumented Vertebrae Endpoints Have Similar Outcomes and Complications in Adult Scoliosis at Two-Year Follow-Up

International Spine Study Group¹; Han Jo Kim, MD²; Oheneba Boachie-Adjei, MD³; Justin K. Scheer⁴; Richard A. Hostin, MD⁵; Khaled M. Kebaish, MD⁶; Justin S. Smith, MD, PhD⁷; Gregory M. Mundis Jr., MD⁸; Frank J. Schwab, MD⁹; Virginie Lafage, PhD⁹; Robert A. Hart, MD¹⁰; R. Shay Bess, MD¹¹; Vedat Deviren, MD¹²; Christopher I. Shaffrey, MD¹³; Christopher P. Ames, MD¹²

¹Brighton, CO, US; ²Washington University Orthopedics, New York, NY, US; ³Hospital for Special Surgery, New York, NY, US; ⁴San Francisco General Hospital, San Diego, CA, US; ⁵Southwest Scoliosis Institute, Plano, TX, US; ⁶Baltimore, MD, US; ⁷UVA Health System, Charlottesville, VA, US; ⁸San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁹NYU Hospital for Joint Diseases, New York, NY, US; ¹⁰Oregon Health & Science University, Portland, OR, US; ¹¹Rocky Mountain Scoliosis and Spine, Denver, CO, US; ¹²University of California San Francisco, San Francisco, CA, US; ¹³University of Virginia Department of Neurosurgery, Charlottesville, VA, US

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

11:24–11:30 a.m.

116. Complications and Intercenter Variability of Three Column Osteotomies for Spinal Deformity Surgery: A Retrospective Review of 423 Patients

International Spine Study Group¹; Kristina Bianco, BA²; Frank J. Schwab, MD³; Robert P. Norton, MD⁴; Justin S. Smith, MD, PhD⁵; Ibrahim Obeid⁶; Gregory M. Mundis Jr., MD⁷; Khaled M. Kebaish, MD⁸; Richard A. Hostin, MD⁹; Robert A. Hart, MD¹⁰; Douglas C. Burton, MD¹¹; Christopher P. Ames, MD¹²; Oheneba Boachie-Adjei, MD¹³; Themistocles S. Protopsaltis, MD¹⁴; Virginie Lafage, PhD³

¹Brighton, CO, US; ²Spine Research Center, NYU Hospital for Joint Diseases, New York, NY, US; ³NYU Hospital for Joint Diseases, New York, NY, US; ⁴New York, NY, US; ⁵UVA Health System, Charlottesville, VA, US; ⁶France; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸Baltimore, MD, US; ⁹Southwest Scoliosis Institute, Plano, TX, US; ¹⁰Oregon Health & Science University, Portland, OR, US; ¹¹University of Kansas Medical Center, Kansas City, KS, US; ¹²University of California San Francisco, San Francisco, CA, US; ¹³Hospital for Special Surgery, New York, NY, US; ¹⁴NYU Langone Medical Center, Hospital for Joint Diseases, New 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.

117. The T1 Pelvic Angle (TPA), a Novel Radiographic Parameter of Sagittal Deformity, Correlates Strongly with Clinical Measures of Disability

International Spine Study Group¹; Themistocles S. Protopsaltis, MD²; Frank J. Schwab, MD³; Justin S. Smith, MD, PhD⁴; Eric O. Klineberg, MD⁵; Gregory M. Mundis Jr., MD⁶; Richard A. Hostin, MD⁷; Robert A. Hart, MD⁸; Douglas C. Burton, MD⁹; Christopher P. Ames, MD¹⁰; Christopher I. Shaffrey, MD¹¹; R. Shay Bess, MD¹²; Thomas J. Errico, MD¹³; Virginie Lafage, PhD³

¹Brighton, CO, US; ²NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, US; ³NYU Hospital for Joint Diseases, New York, NY, US; ⁴UVA Health System, Charlottesville, VA, US; ⁵University of California Davis School of Medicine, Sacramento, CA, US; ⁶San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁷Southwest Scoliosis Institute, Plano, TX, US; ⁸Oregon Health & Science University, Portland, OR, US; ⁹University of Kansas Medical Center, Kansas City, KS, US; ¹⁰University of California San Francisco, San Francisco, CA, US; ¹¹University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹²Rocky Mountain Scoliosis and Spine, Denver, CO, US; ¹³New York University Medical Center, 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.

118. The Biomechanical Consequences of Rod Reduction Following Thoracic Ponte Osteotomy and Lumbar Facetectomy

Ronald A. Lehman Jr., MD¹; Daniel G. Kang, MD²; Adam Bevevino²; Rachel E. Gaume, BS³; Robert W. Tracey, MD⁴; John P. Cody, MD⁵; Melvin D. Helgeson, MD⁶; Anton E. Dmitriev, PhD⁷

¹Potomac, MD, US; ²Bethesda, MD, US; ³Walter Reed National Military Medical Center, Bethesda, MD, US; ⁴Rockville, MD, US; ⁵Washington, DC, US; ⁶North Potomac, MD, US; ⁷Clarksville, MD, US

FDA Device/Drug Status: Thoracic pedicle screws (Approved for this indication)

11:42 a.m.–12:00 p.m.

Discussion

11:00 a.m.–12:00 p.m.

**Concurrent Session:
Thoracolumbar Surgery**

Theater B

Moderators: Daniel K. Resnick, MD, MS and Jeffrey C. Wang, MD

11:00–11:06 a.m.

119. Relationship Between Dysplasia and Sagittal Sacropelvic Balance in Adolescents with Spondylolisthesis

Abhijit Y. Pawar, MD¹; Hubert Labelle, MD²; Jean-Marc Mac-Thiong, MD, PhD³

¹New York, NY, US; ²Hôpital Sainte-Justine, Département d'Orthopédie, Montreal, QC, Canada; ³Hopital du Sacre-Coeur de Montreal, Montreal, QC, Canada

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

11:06–11:12 a.m.

120. Radiographic Effects of Cage Width and Fixation on Subsidence Following XLIF

Antoine Tohmeh, MD¹; Derek Khorsand, BS²; Xavier J. Zielinski, MD³

¹Northwest Orthopaedic Specialists, Spokane, WA, US; ²Seattle, WA, US; ³Inland Imaging, Spokane Valley, WA, US

FDA Device/Drug Status: CoRoent XL (Approved for this indication), XLW (Approved for this indication), SpheRx DBR (Approved for this indication)

11:12–11:18 a.m.

121. Life Quality Improvement and Patient Satisfaction After Instrumented Lumbar Fusion in the Elderly Compared with Young Population.

Luis Alvarez, MD¹; Angel R. Pinera, MD²; Felix Tome-Bermejo, MD, PhD³; Carmen Duran, PA²; Belen Lopez-San Roman, PA²; Maria Daniela Vlad, PhD³; Ignacio Mahillo-Fernandez, PhD⁴

¹Fundación Jimenez Díaz-Traumatología, Madrid, Spain; ²Fundacion Jimenez Diaz, Madrid, Spain; ³Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain; ⁴Madrid, Spain

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

11:18–11:24 a.m.

122. Neurologic Outcomes of Two Different Techniques Using the Lateral Approach for Lumbar Interbody Arthrodesis

Michael R. Briseno, MD¹; Robert T. Arrigo, BS²; Shashank Ravi³; Navpreet Bains²; Andrew Tran⁴; Stefan A. Mindea, MD²; Ivan Cheng, MD⁵

¹San Jose, CA, US; ²Stanford Hospital & Clinics, Palo Alto, CA, US; ³Madison, WI, US; ⁴Stanford University School of Medicine, Palo Alto, CA, US; ⁵Stanford University Medical Hospital, Stanford, CA, US; ⁶Stanford University, Menlo Park, CA, US

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

11:24–11:30 a.m.

123. Clinical Benefit After Lumbar Interbody Fusion: A Prospective, Multi-Institutional Comparative Effectiveness Study of Outcomes After TLIF Versus XLIF

Owoicho Adogwa, MD, MPH¹; Paul Thompson, BS²; Kemp T. Knott, BS³; Kevin Huang, BA³; Ulysses Toche, BS³; Joseph S. Cheng, MD⁴; Robert E. Isaacs, MD³

¹Vanderbilt University, Nashville, TN, US; ²Durham, NC, US; ³Duke University Medical Center, Durham, NC, 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.

11:30–11:36 a.m.

124. Elevated Patient BMI Does Not Negatively Affect Self-Reported Outcomes of Thoracolumbar Surgery

Alana J. Green, BA¹; Neil A. Manson, MD, FRCSC²; Melissa D. McKeon, MSc³; Edward P. Abraham, MD²

¹Saint John, NB, Canada; ²Saint John Regional Hospital, Saint John, NB, Canada; ³Canada East Spine Centre, Saint John, NB, Canada

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

11:36–11:42 a.m.

125. The National Neurosurgery Quality and Outcomes Database (N2QOD) Pilot: Interim Analysis of Registry Feasibility, Data Integrity and the Safety and Effectiveness of Surgical Spine Care

Matthew J. McGirt, MD¹; Steven D. Glassman, MD²; Nicholas Theodore, MD³; Oren N. Gottfried, MD⁴; Saad A. Khairi, MD⁵; Meic H. Schmidt, MD⁶; Maxwell Boakye, MD⁷; Steven N. Kalkanis, MD⁸; Doron Rabin, MD⁹; Timothy C. Ryken, MD¹⁰; Gregory W. Balturshot, MD¹¹; Thomas B. Briggs, MD¹²; Thomas W. Grahm, MD¹³; James F. Harrington Jr., MD¹⁴; Christopher I. Shaffrey, MD¹⁵; Clarence B. Watridge, MD¹⁶; Anthony Asher, MD, FACS¹⁷

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Norton Leatherman Spine Center, Louisville, KY, US; ³Barrow Neurosurgical Associates, Phoenix, AZ, US; ⁴Chapel Hill, NC, US; ⁵Goodman Campbell Brain & Spine, Indianapolis, IN, US; ⁶University of Utah, Department of Neurosurgery, Salt Lake City, UT, US; ⁷Frazier Rehabilitation Institute, Louisville, KY, US; ⁸Bloomfield Hills, MI, US; ⁹London, ON, Canada; ¹⁰Spine and Brain Institute, Waterloo City, IA, US; ¹¹Dublin, OH, US; ¹²Springfield Neurological Institute, Springfield, MO, US; ¹³Tyler Neurosurgical Associates, Tyler, TX, US; ¹⁴University of New Mexico, Albuquerque, NM, US; ¹⁵University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹⁶Memphis, TN, US; ¹⁷Carolina Neurosurgery & Spine Association, Charlotte, 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.

**Concurrent Session:
Complications**

Theater C

Moderators: Anthony F. Guanciale, MD and William C. Watters III, MD

11:00–11:06 a.m.

126. Trends in Complications After Cervical Spine Surgery from 2002-2009

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; **Kern Singh, MD³**

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

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

11:06–11:12 a.m.

127. Incidence and Mortality of Thromboembolic Events After Cervical Spine Surgery

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; **Kern Singh, MD³**

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

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

11:12–11:18 a.m.

128. Incidence and Risk Factors for Dysphagia After Anterior Cervical Fusion

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Alpesh A. Patel, MD, FACS⁴; **Kern Singh, MD³**

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: Infuse (Investigational/Not approved)

11:18–11:24 a.m.

129. Prospective, Multicenter Assessment of Acute Neurologic Complications Following Complex Adult Spinal Deformity Surgery: The Scolio-Risk-1 Trial

Lawrence G. Lenke, MD¹; Michael G. Fehlings, MD, PhD, FRCS²; Christopher I. Shaffrey, MD³; Kenneth M. Cheung, MD, FRCS⁴; Leah Y. Carreon, MD, MSc⁵

¹Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ²Toronto Western Hospital, Toronto, ON, Canada; ³University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁴Queen Mary Hospital, Hong Kong; ⁵Spine Institute, Louisville, KY, US

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

11:24–11:30 a.m.

130. Hospital Outcomes and Complications of Anterior and Posterior Cervical Fusion with Bone Morphogenic Protein

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; **Kern Singh, MD³**

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

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

11:30–11:36 a.m.

131. Paraspinal Muscle Atrophy After Lumbar Surgery: What is the Evidence?

Sina Pourtaheri, MD¹; Kimona Issa, MD²; Arash Emami, MD³; Kumar G. Sinha, MD³; Eiman Shafa, MD⁴; Ki S. Hwang, MD³

¹Teaneck, NJ, US; ²Baltimore, MD, US; ³University Place Spine Center, Wayne, NJ, US; ⁴Saddle Brook, NJ, US

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

132. Moved to Value Abstract Award Session

**11:36 a.m.–12:00 p.m.
Discussion**

11:00 a.m.–12:00 p.m.

**Concurrent Session:
Tumor**

Room 266/267

Moderators: Charles G. Fisher, MD and Alok D. Sharan, MD

11:00–11:06 a.m.

133. En Bloc Resection in Combination with High Dose Radiation Improves Patient Survival in Mobile Spine Chordoma

Polina Osler, MS¹; Kathryn A. Hess²; Thomas F. DeLaney, MD²; Al Ferreira, RN²; Francis J. Hornicek Jr., MD, PhD³; Joseph H. Schwab, MD²

¹East Boston, MA, US; ²Massachusetts General Hospital, Boston, MA, US; ³Boston, MA, US

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

11:06–11:12 a.m.

134. Thirty Day Mortality Rate in the Surgical Treatment of Patients with Metastatic Spinal Cord Compression

Nasir A. Quraishi, MD¹; Sakthivel Rajan Rajaram Manoharan, MS¹; Georgios Arealis, MD, PhD¹; Broniek M. Boszczyk, MD²

¹Queen's Medical Centre, Nottingham, UK; ²The Centre for Spinal Studies and Surgery, Nottingham, UK

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

11:12–11:18 a.m.

135. A Novel Evidence-Based Medicine Model for Rare and Often Neglected Neoplastic Conditions: AOSpine International Knowledge Forum Tumor Database for Primary Tumors of the Spine

Niccole M. Germscheid, MSc¹; Charles G. Fisher, MD²; Stefano Boriani, MD³; Peter P. Varga, MD⁴; Michael G. Fehlings, MD, PhD, FRCS⁵; Mark H. Bilsky, MD⁶; Mark B. Dekutoski, MD⁷; Richard P. Williams, MD⁸; Sigurd H. Berven, MD⁹; Dean Chou, MD¹⁰; Jeremy J. Reynolds, FRCS, MBBS, BS¹¹; Nasir A. Quraishi, MD¹²; Laurence D. Rhines, MD¹³; Chetan Bettegowda, MD, PhD¹⁴; Ziya L. Gokaslan, MD, FACS¹⁵

¹AOSpine International, Davos, Switzerland; ²Vancouver General Hospital, Vancouver, BC, Canada; ³Rizzoli Inst, Bologna, Italy; ⁴National Center for Spinal Disorders, Budapest, Hungary; ⁵Toronto Western Hospital, Toronto, ON, Canada; ⁶Memorial Sloan-Kettering Cancer Center, New York, NY, US; ⁷The CORE Institute, Sun City West, AZ, US; ⁸Brisbane, Australia; ⁹University of California San Francisco, Department of Orthopaedic Surgery, San Francisco, CA, US; ¹⁰University of California San Francisco, San Francisco, CA, US; ¹¹Oxford University Hospitals NHS Trust, Oxford, UK; ¹²Queens Medical Centre, Nottingham, UK; ¹³Houston, TX, US; ¹⁴Johns Hopkins Medicine, Baltimore, MD, US; ¹⁵Johns Hopkins University, Department of Neurosurgery, Baltimore, MD, US

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

11:18–11:24 a.m.

136. Post-Kyphoplasty Vertebral Refracture in Metastatic Disease: The Wailing Wall Effect

Josh E. Schroeder, MD¹; Mark H. Bilsky, MD²; Eric Lis²; Leon Kaplan, MD³; Andrew A. Sama, MD⁴; Ilya Laufer, MD²

¹New York, NY, US; ²Memorial Sloan-Kettering Cancer Center, New York, NY, US; ³Hadassah Medical Center, Jerusalem, Israel; ⁴Hospital for Special Surgery, New York, NY, US

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

11:24–11:30 a.m.

137. Maintenance of Bowel and Bladder Function One Year After Sacrectomy

Patricia L. Zadnik¹; Dane Moran¹; Ziya L. Gokaslan, MD, FACS²; Daniel M. Sciubba, MD³

¹Johns Hopkins Medicine, Baltimore, MD, US; ²Johns Hopkins University, Department of Neurosurgery, Baltimore, MD, US; ³Johns Hopkins University, School of Medicine, Baltimore, MD, US

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

11:30–11:36 a.m.

138. Reoperation Rates in the Surgical Treatment of Metastatic Spinal Cord Compression

Nasir A. Quraishi, MD¹; Sakthivel Rajan Rajaram Manoharan, MS¹; Ashish Khurana, MS, MSc, FRCS¹; Hossein Mehdian, FRCS²; Broniek M. Boszczyk, MD³

¹Queens Medical Centre, Nottingham, UK; ²Nottingham, England, UK; ³The Centre for Spinal Studies and Surgery, Nottingham, UK

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

**11:36 a.m.–12:00 p.m.
Discussion**

11:00 a.m.–12:00 p.m.**Concurrent Session:
Biologics BMP**

Room 278/279

Moderators: Jean-Jacques Abitbol, MD and Francis H. Shen, MD

11:00–11:06 a.m.**139. BMP-2 Direct- and Indirect-Binding Nanogels Designed for Bone Regeneration: A Comparison of Spinal Fusion Capacity**John T. Nelson, MD¹; Sohaib Hashmi²; Sungsoo S. Lee, PhD³; Jason H. Ghodasra⁴; Michael S. Nickoli, MD⁴; Amruta Ashtekar¹; Christian Park, BS¹; Erin L. Hsu, PhD³; Wellington K. Hsu, MD³; **Kevin A. Sonn, BS¹**¹Northwestern University School of Medicine, Chicago, IL, US;²University of Toledo Medical Center, Toledo, OH, US; ³Northwestern University, Chicago, IL, US; ⁴Chicago, IL, US

FDA Device/Drug Status: HBPA/HS/ACS/rhBMP-2 (Investigational/Not approved), BMP-2PA/rhBMP-2 (Investigational/Not approved)

11:06–11:12 a.m.**140. Allogeneic, BMP6 Gene-Modified, Bone Marrow MSCs Induce Vertebral Fracture Repair in a Porcine Model: A Pilot Study**Dmitriy Sheyn, PhD, MSc¹; Wafa Tawackoli, PhD²; Zulma Gazit, PhD²; Gadi Pelled, PhD²; **Hyun W. Bae, MD³**; Dan Gazit, PhD⁴¹Cedars-Sinai Medical Center, West Hollywood, CA, US; ²Cedars-Sinai Medical Center, Los Angeles, CA, US; ³Spine Institute St. John's Health Center, Los Angeles, CA, US; ⁴Hadassah Medical Center, Jerusalem, Israel

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

11:12–11:18 a.m.**141. The Effect of Aging on Healing of Posterolateral Lumbar Fusion in a Rodent Model Using BMP2****Michael D. Daubs, MD¹**; Tetsuo Hayashi, MD²; Kevin Phan, BS²; Akinobu Suzuki, MD, PhD²; Jing Li Sr., MD²; Haijun Tian, MD²; Trevor Scott, MD³; Kunal B. Sukhija²; Bryan A. Bean²; Jeffrey C. Wang, MD⁴¹Santa Monica, CA, US; ²Los Angeles, CA, US; ³University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ⁴University of California Los Angeles School of Medicine, Santa Monica, CA, US

FDA Device/Drug Status: rh-BMP2 (Approved for this indication)

11:18–11:24 a.m.**142. Modulating the Effect of BMP2 Through Delivery in a Nanocapsule****Haijun Tian, MD¹**; Michael D. Daubs, MD²; Juanjuan Du, PhD¹; Scott R. Montgomery, MD³; Trevor Scott, MD⁴; Bayan Aghdasi, BA⁵; Kevin Phan, BS¹; Gil Weintraub; Chengjie Xiong, MD¹; Akinobu Suzuki, MD, PhD¹; Monchai Ruangchainikom, MD⁷; Tetsuo Hayashi, MD¹; Jeffrey C. Wang, MD⁷¹Los Angeles, CA, US; ²Santa Monica, CA, US; ³Venice, CA, US;⁴University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ⁵Clovis, CA, US; ⁶Encino, CA, US;⁷University of California Los Angeles School of Medicine, Santa Monica, CA, US

FDA Device/Drug Status: BMP2 (Not approved for this indication)

11:24–11:30 a.m.**143. The Anti-Inflammatory Effects of Perioperative Methylprednisolone on the Soft Tissue Inflammation Induced by rhBMP-2**Kevin Phan, BS¹; Chengjie Xiong, MD¹; **Michael D. Daubs, MD²**; Haijun Tian, MD¹; Scott R. Montgomery, MD³; Bayan Aghdasi, BA⁴; Akinobu Suzuki, MD, PhD¹; Jing Li Sr., MD¹; Trevor Scott, MD⁵; Jeffrey C. Wang, MD⁶¹Los Angeles, CA, US; ²Santa Monica, CA, US; ³Venice, CA, US; ⁴Clovis, CA, US; ⁵University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ⁶University of California Los Angeles School of Medicine, Santa Monica, CA, US

FDA Device/Drug Status: rh-BMP2 (Approved for this indication)

11:30–11:36 a.m.**144. Comparison of an Oxysterol Molecule and rhBMP2 Fusion Rates in a Rabbit Posterolateral Lumbar Spine Model****Trevor Scott, MD¹**; Kevin Phan, BS²; Akinobu Suzuki, MD, PhD²; Haijun Tian, MD²; Michael D. Daubs, MD²; Farhad Parhami, PhD⁴; Jeffrey C. Wang, MD⁵¹University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ²Los Angeles, CA, US; ³Santa Monica, CA, US; ⁴University of California Los Angeles, Los Angeles, CA, US; ⁵University of California Los Angeles School of Medicine, Santa Monica, CA, US

FDA Device/Drug Status: rhBMP2 (Approved for this indication), oxysterol 133 (Investigational/Not approved)

11:36–11:42 a.m.**145. Efficacy of BMP2 for the Treatment of Lumbar Pseudarthrosis in a Rodent Spine Model**Kevin Phan, BS¹; Jing Li Sr., MD¹; **Michael D. Daubs, MD²**; Tetsuo Hayashi, MD¹; Akinobu Suzuki, MD, PhD¹; Haijun Tian, MD¹; Trevor Scott, MD³; Jeffrey C. Wang, MD⁴¹Los Angeles, CA, US; ²Santa Monica, CA, US; ³University of California Los Angeles Department of Orthopedic Surgery, Santa Monica, CA, US; ⁴University of California Los Angeles School of Medicine, Santa Monica, CA, US

FDA Device/Drug Status: rh-BMP2 (Approved for this indication)

**11:42 a.m.–12:00 p.m.
Discussion**

11:00 a.m.–12:00 p.m.

**Collaborative Concepts in Spine Care Session:
Rehabilitation Breakout: Neck/Shoulder:
Differential Diagnosis**

Room 268

Moderators: Gregory L. Whitcomb, DC and Rick J. Placide, MD, PT

There is increasing recognition of the relationship between axial neck pain/dysfunction and the shoulder. The complex anatomical, biomechanical and referred pain patterns unique to the neck/shoulder complex necessitate a comprehensive understanding and approach to the effective evaluation, differential diagnosis and management of patients presenting for spine specialty care.

This session enhances the attendee's knowledge of regional anatomy, biomechanics, pathology and disease mimickers through panel presentation and interactive case presentation and examination.

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

- Recognize the anatomic and biomechanical relationship between the neck and shoulder;
- Review anatomical, physiological and biomechanical considerations relative to patient evaluation and treatment;
- Discuss differential diagnosis as it applies to the patient with neck and/or shoulder complaints;
- Explain and demonstrate physical exam techniques and maneuvers in the differential diagnosis of neck and shoulder conditions.

Agenda

- Introduction
- Anatomy/Biomechanics
- Axial Neck Pain
- Shoulder Pain
- Discussion
- Differential Diagnosis
- Case Presentation Including History and Physical Exam

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.

**Collaborative Concepts in Spine Care Session:
RN/PA/NP Breakout: Medical Necessity:
When to Treat or Not to Treat**

Room 269

Moderators: Michael L. Reed, PT, DPT, OCS, MTC and Kathleen Prussian, CRNP

Value-based initiatives are moving the field of medicine toward a model of reimbursement based upon the quality of the outcomes achieved. One factor that can dramatically impact the provision of care, dosage, duration, and anticipated outcomes is the determination of medical necessity. The dilemma strikes at the first encounter and, now more than ever before, patient expectations must be managed while determining the absolute necessity of any intervention. Cost-effective management will rule the day; however, there exists a broad lack of consensus with respect to established objective criteria for the determination of appropriate treatment corridors and the threshold at which those portals should be opened for entry. This session explores the foundational definitions of medical necessity specific to various aspects of nonoperative and surgical spine care. Treatment appropriateness and patient demand are considered in the context of developing metric-driven predictive modeling, evidence-based algorithms, cost-effectiveness, and outcomes-dependent reimbursement.

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

- Define the various levels of medical necessity and the factors that might influence the determination for the provision of care;
- Discuss objective metric-driven approaches to determining medical necessity in spine care;
- Gain insight into the association between medical necessity determination and the potential for securing an optimal;
- Review a cost-neutral healthcare system and how the future of determining medical necessity, and the provision of care, may change as financial resources vary.

Agenda

- **Defining Medical Necessity and the Factors Influencing the Determination for the Provision of Care**
Simon Dagenais, DC, PhD
- **Metric-Driven Evaluations and the Future of Predictive Modeling**
Kathleen Prussian, CRNP
- **Predicting and Securing Optimal Outcomes before the Onset of Care: Expectation Alignment**
Michael L. Reed, PT, DPT, OCS, MTC



- Financial Resources, The Payer and the Determination of Medical Necessity: The Slippery Slope
Simon Dagenais, DC, PhD
- Discussion
All Faculty

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.

**Global Spine Forum:
Turkish Spine Society**

Room 280/281

Turkish Spine Society Curriculum

Alpaslan Senkoylu, MD and Cagatay Ozturk, MD

11:00 a.m.–1:30 p.m.

NASS Bistro Lunch Service

Technical Exhibition, Back of Hall

12:00–1:00 p.m.

Complimentary Box Lunch (Attendees Only)

Technical Exhibition, Back of Hall

Solution Showcase

Technical Exhibition, Booth 1849

12:00: Invibio Biomaterial Solutions

1:00–1:05 p.m.

NASS Working for You: NASS Coverage Task Force and Professional, Economic and Regulatory Committee (PERC) Update

Theater B

Moderator: Christopher M. Bono, MD

1:00–1:30 p.m.

**Global Spine Forum:
World Spine Care Project**

Room 280/281

Moderator: Scott Haldeman, MD

1:05–2:35 p.m.

**Symposium:
Section on Radiology: Controversies in Spine Imaging**

Theater B

Moderator: Daniel M. Sciubba, MD

Although imaging can provide the clinician with substantial information to guide decision making, there are numerous clinical scenarios in which imaging can be confusing or controversial. Such dilemmas may delay treatment or conversely suggest aggressive intervention. Subsequent decisions may thus have significant impact on patient care and medicolegal liability. In this symposium, radiological review of controversial imaging clinical scenarios is reviewed to provide guidance for practicing clinicians during these challenging scenarios.

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

- Review clinical scenarios in which radiographic modalities may not clearly delineate pathological versus non-pathological conditions;
- Expose participants to radiographic techniques to clarify controversial spinal imaging scenarios;
- Integrate best care with current state-of-the-art imaging modalities.

Agenda

- Radiographic-Clinical Controversies
Daniel M. Sciubba, MD
- A Systematic Approach to the Review of Spine Imaging Studies
A. Jay Khanna, MD
- Lumbar Disectomy: Fibrosis Versus Recurrent Disc Herniation
Walter S. Bartynski, MD
- Spinal Cord Signal Change: Inflammation Versus Tumor
Daniel M. Sciubba, MD
- Vertebral Lesions: Benign Hemangiomas Versus Malignancy
John Carrino, MD, MPH
- Evaluation of Instrumented Spine: MRI Versus CT Myelogram
Mark Mikhael, MD
- Spondylosis: What is Normal Age-Related Degeneration?
Joseph Gjolaj, MD
- Postoperative Collection: Infection Versus Seroma
John Carrino, MD, MPH
- Discussion
Faculty Panel

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:05–2:35 p.m.

**Symposium:
How Mobile Technology is Changing
Spine Care**

Theater C

Moderator: Matthew Smuck, MD

Mobile technologies are rapidly expanding into the health care arena, with anticipated exponential growth in the coming years. The impact on spine care is broad and extends well beyond improvements in communication and information exchange. Sophisticated biosensors are standard hardware in our ubiquitous mobile devices. For instance, a downloadable application can convert a smartphone into a wearable activity monitor, akin to the multiple commercially available devices. Such devices can record real-life physical efforts and daily activities. Already, spine care providers and researchers are using these tools to better define baseline functional limitations, stratify disease severity, monitor disease progression and establish normative treatment response curves. They are producing new insights into spine diseases, they are motivating patients with meaningful feedback, and they are being used to develop more specific and individualized rehabilitation goals.

What was once science fiction is now reality. As the use and capabilities of mobile devices will continue to increase in the coming years, spine care providers need to be aware of how this is changing the landscape of outcomes research and patient care. This symposium will outline the current status and future directions of mobile technology's impact on spine research and spine care, from physical therapy to surgery.

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

- Discuss the current and anticipated future health care impact of mobile technologies;
- Review the role of mobile technologies in advancing medical science;
- Recognize the benefits of universal, objective and quantifiable measures that mobile technologies provide;
- Outline the current and future applications of these technologies in conservative and surgical spine care.

Agenda

- **Introduction**
Matthew Smuck, MD
- **Quantified-Self and the Big Data Revolution**
Ming-Chih Kao, MD, PhD
- **The Objective Outcomes Movement**
Christy C. Tomkins-Lane, PhD

- **Monitoring to Motivate**
Michael L. Reed, PT, DPT, OCS, MTC
- **Impact on Clinical and Surgical Care**
Matthew Smuck, MD
- **Devices and Apps for You and Your Patients**
Alok D. Sharan, MD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:05–2:35 p.m.

**Collaborative Concepts in Spine Care
Session:
Integrated Care Case Studies**

Room 268

Moderator: Evan Johnson, PT, DPT, OCS

Help us sort through the challenges encountered when caring for individuals with complex spine cases in the current health care environment. This session is designed to allow for a robust, interactive, and instructive encounter with expert practitioners who specialize in the clinical management of patients with spinal disorders. Clinical decision making and triage of complex spine patients is becoming increasingly difficult in a rapidly changing healthcare environment. Come join your colleagues and our expert panel as we sort through carefully selected cases that bring to light some of the difficulties we all encounter in caring for and triaging patients. Participants are encouraged to ask questions and contribute their expertise to clinical reasoning paradigms, as the panel and participants examine how the triage process and clinical decisions succeeded and failed in the selected complex spine cases.

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

- Integrate current evidence and clinical findings to facilitate optimal triage of patients with complex spine conditions in a manner consistent with best practice;
- Explain the advantages of an evidence-based multi-disciplinary approach to triaging patients with complex spine conditions;
- Recognize distinctive characteristics of the history and physical examination of individuals who present with pain and disability arising from non-spinal structures that may mimic spinal pain;
- Identify the evolving roles of allied healthcare professionals in spine triage in our rapidly changing health care environment.



Faculty Panel

Simon Dagenais, DC, PhD
 Halena M. Gazelka, MD
 Emily Karlen, MPT
 Alison A. Stout, DO

Agenda

- Introduction
- Cervical Radiculopathy Versus Thoracic Outlet Syndrome in 52-Year Old Veterinarian
- Q&A
- Lumbar Spine HNP Versus Hamstrings Strain with Facet Joint Syndrome in 24-Year Old Professional Baseball Player
- Q&A
- Postoperative Lumbar Spondylosis and Stenosis Versus Spinal Instability in 70-Year Old Physician
- Q&A

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

1:30–2:30 p.m.

**Global Spine Forum:
 AOSpine**

Room 280/281

Moderator: Joseph Cheng, MD

Thoracolumbar Trauma Update

- Moderator, Welcome and Case Presentation
 Joseph Cheng, MD
- Thoracolumbar Trauma Evaluation and Classification (including new AO System)
 Carlo Bellabarba, MD
- Surgical Treatment of TL Trauma: The Evidence
 Alpesh Patel, MD
- TL Trauma Complications and Complication Management
 Richard Bransford, MD
- Q&A

2:30–3:30 p.m.

**Global Spine Forum:
 Brazilian Spine Society**

Room 280/281

Moderator: Alexandre Fogaça Cristante, MD, PhD, BSS President

Agenda

- Degenerative Scoliosis
 - » Indications for Long or Short Fusion
 Luis Carelli, MD
 - » Approaching Stenosis in Patients with DS
 Fernando Façanha Filho, MD
 - » Importance of Sagittal Balance on DS
 Sergio Hennemann, MD
- Degenerative Cervical Spine
 - » Cervical Disc Replacement
 Carlos Henrique Ribeiro, MD
 - » Cervical Stenosis
 Aluizio Arantes Jr., MD
- Discussion
 Alexandre Fogaça Cristante, MD, PhD

2:35–3:00 p.m.

Networking Break (Beverage Service)
 Theater Lobby (2nd Level)

3:00–3:05 p.m.

Spine Safety Alert

Theater B

3:05–3:35 p.m.

Value Abstract Awards Presentations

Theater B

Moderators: Christopher J. Standaert, MD and David A. Wong, MD, MS

3:05–3:11 p.m.

132. Understanding the Effect of Surgical Complication on the Value of Surgical Spine Care: Evolution of the Healthcare Value Equation

Scott L. Parker, MD¹; Scott L. Zuckerman, MD²; Saniya S. Godil, MD³; Matthew J. McGirt, MD³

¹Vanderbilt University, Nashville, TN, US; ²Nashville, TN, US;

³Vanderbilt University Medical Center, Nashville, TN, US

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

3:11–3:17 p.m.

168. The Utility of Postoperative Radiographic Surveillance After Anterior Lumbar Interbody Fusion

Andrew K. Simpson, MD¹; Kirkham B. Wood, MD²

¹Boston, MA, US; ²Massachusetts General Hospital, Boston, MA, US

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

3:17–3:23 p.m.

193. Calculating and Defining Minimally Important Clinical Difference (MCID) and Substantial Clinical Benefit (SCB) Values for Adult Spinal Deformity (ASD): A Robust Methodology for Consistent Data Reporting

International Spine Study Group¹; Ian McCarthy, PhD²; R. Shay Bess, MD³; Breton Line⁴; Michael O'Brien, MD⁵; Frank J. Schwab, MD⁶; Eric O. Klineberg, MD⁷; Christopher I. Shaffrey, MD⁸; Munish C. Gupta, MD⁹; Virginie Lafage, PhD⁶; Christopher P. Ames, MD¹⁰; Richard A. Hostin, MD⁵

¹Brighton, CO, US; ²Baylor Health Care System, Plano, TX, US; ³Rocky Mountain Scoliosis and Spine, Denver, CO, US; ⁴Denver, CO, US; ⁵Southwest Scoliosis Institute, Plano, TX, US; ⁶NYU Hospital for Joint Diseases, New York, NY, US; ⁷University of California Davis School of Medicine, Sacramento, CA, US; ⁸University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁹University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ¹⁰University of California San Francisco, San Francisco, CA, US

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

3:23–3:35 p.m.

Discussion

3:30–4:30 p.m.

Global Spine Forum: Chinese Orthopaedic Association

Room 280/281

Moderators: Wei Tian, MD and Dingjun Hao, MD

Agenda

- **CAMISS Based Spinal Surgery**
Prof. Wei Tian, Beijing Jishuitan Hospital
- **Morphology of the Atlas Pedicle Revisited: A Morphometric CT-based Study on 120 Patients**
Prof. Dingjun Hao, Hong Hui Hospital, Xi'an
- **Anterior Surgery For Subaxial Cervical Dislocation**
Prof. Fang Zhou, Peking University Third Hospital
- **The Impact Factor of the CADR Motion: A Long Term Follow-up Study**
Prof. Da He, Beijing Jishuitan Hospital

3:40–4:40 p.m.

Concurrent Session: Implants and Fixation

Theater A

Moderators: Dilip K. Sengupta, MD and Alexander R. Vaccaro, MD, PhD

3:40–3:46 p.m.

146. Anatomic Parameters for Intralaminar Screw Repair of Spondylolysis

Emmanuel N. Menga, MD¹; Amit Jain, MD²; Khaled M. Kebaish, MD³; Stefan L. Zimmerman, MD⁴; Paul D. Sponseller, MD³

¹John Hopkins University Department of Orthopedic Surgery, Baltimore, MD, US; ²Portland, OR, US; ³Baltimore, MD, US; ⁴Johns Hopkins University School of Medicine, Baltimore, MD, US

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

3:46–3:52 p.m.

147. Pedicle Screw Hubbing in the Adult and Immature Thoracic Spine: A Biomechanical and Micro-Computed Tomography Evaluation

Ronald A. Lehman Jr., MD¹; Daniel G. Kang, MD²; Adam Bevevino²; Robert W. Tracey, MD³; John P. Cody, MD⁴; Rachel E. Gaume, BS⁵; Haines Paik, MD⁶; Anton E. Dmitriev, PhD⁷; Lawrence G. Lenke, MD⁸

¹Potomac, MD, US; ²Bethesda, MD, US; ³Rockville, MD, US; ⁴Washington, DC, US; ⁵Walter Reed National Military Medical Center, Bethesda, MD, US; ⁶Fairfax, VA, US; ⁷Clarksville, MD, US; ⁸University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US

FDA Device/Drug Status: Thoracic pedicle screws (Approved for this indication)

3:52–3:58 p.m.

148. Pedicle Screw Reinsertion Using Previous Pilot Hole and Trajectory Does Not Reduce Fixation Strength

Ronald A. Lehman Jr., MD¹; Daniel G. Kang, MD²; Adam Bevevino²; Rachel E. Gaume, BS³; Robert W. Tracey, MD⁴; John P. Cody, MD⁵; Divya V. Ambati, MSc, BS⁶; Anton E. Dmitriev, PhD⁷

¹Potomac, MD, US; ²Bethesda, MD, US; ³Walter Reed National Military Medical Center, Bethesda, MD, US; ⁴Rockville, MD, US; ⁵Washington, DC, US; ⁶McLean, VA, US; ⁷Clarksville, MD, US

FDA Device/Drug Status: Thoracic pedicle screws (Approved for this indication)

3:58–4:04 p.m.

149. Clinical Results and Functional Outcomes After Direct Intralaminar Screw Repair of Spondylolysis

Emmanuel N. Menga, MD¹; Khaled M. Kebaish, MD²; Amit Jain, MD³; John A. Carrino, MD, MPH⁴; Paul D. Sponseller, MD²

¹John Hopkins University Department of Orthopedic Surgery, Baltimore, MD, US; ²Baltimore, MD, US; ³Portland, OR, US; ⁴Johns Hopkins Outpatient Center, Baltimore, MD, US

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



4:04–4:10 p.m.

150. Tapping Insertional Torque Predicts Better Pedicle Screw Fixation and Optimal Screw Size Selection

Ronald A. Lehman Jr., MD¹; Daniel G. Kang, MD²; Melvin D. Helgeson, MD³; Robert W. Tracey, MD⁴; John P. Cody, MD⁵; Anton E. Dmitriev, PhD⁶; Scott J. Luhmann, MD⁷

¹Potomac, MD, US; ²Bethesda, MD, US; ³North Potomac, MD, US; ⁴Rockville, MD, US; ⁵Washington, DC, US; ⁶Clarksville, MD, US; ⁷Washington University School of Medicine, St. Louis, MO, US

FDA Device/Drug Status: Thoracic pedicle screws (Approved for this indication)

4:10–4:16 p.m.

151. Demands on Posterior Fusion Hardware During Lordosis Restoration Procedures

Jeremi M. Leasure, MS

The Taylor Laboratories, San Francisco, CA, US

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

4:16–4:22 p.m.

152. Cortical Screw Fixation Versus Pedicle Screw Fixation for the Lumbar Spine in Non-Osteoporotic Bone: A Biomechanical Analysis

Graham Calvert, MD¹; Brandon D. Lawrence, MD²; Kent N. Bachus, PhD³; Darrel S. Brodke, MD⁴

¹University of Utah Hospital, Salt Lake City, UT, US; ²University of Utah Orthopaedics, Salt Lake City, UT, US; ³University of Utah Orthopaedic Center Orthopaedic Research Laboratory, Salt Lake City, UT, US; ⁴University Orthopaedic Center, Salt Lake City, UT, US

FDA Device/Drug Status: Medtronic CD Horizon Solera Pedicle Screws (Approved for this indication), Medtronic CD Horizon Solera Cortical Screws (Approved for this indication)

**4:22–4:40 p.m.
Discussion**

3:40–4:40 p.m.

**Concurrent Session:
Predicting and Preventing Complications**

Room 266/267

Moderators: Christopher D. Chaput, MD and F. Todd Wetzel, MD

3:40–3:46 p.m.

153. Increased Preoperative Narcotic Use and its Association with Postoperative Complications and Length of Hospital Stay in Patients Undergoing Spine Surgery

Dennis S. Lee, MD¹; Sheyan J. Armaghani, MD²; Jesse E. Bible, MD²; David N. Shau, BS¹; Harrison F. Kay²; Chi Zhang²; Matthew J. McGirt, MD¹; Clinton J. Devin, MD²

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Nashville, TN, US

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

3:46–3:52 p.m.

154. Obese Class III Patients at Significantly Greater Risk of Multiple Complications After Lumbar Surgery: An Analysis of 10,387 Patients in the ACS-NSQIP Database

Rafael A. Buerba¹; Michael Fu²; Jordan A. Gruskay³; Jonathan N. Grauer, MD¹

¹Yale University School of Medicine, New Haven, CT, US; ²New Haven, CT, US; ³Rothman Institute, Philadelphia, PA, US

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

3:52–3:58 p.m.

155. Does Obesity Increase the Complication Rate of Spinal Surgery: A Meta-Analysis

Jin Jiang; Yayi Xia, MD; Yuanjun Teng

Lanzhou, China

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

3:58–4:04 p.m.

156. Complications of Anterior and Posterior Lumbar Fusion with Use of Bone Morphogenic Proteins

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: BMP, only approved for anterior lumbar fusion (Not approved for this indication)

4:04–4:10 p.m.

157. An Evaluation of the Efficacy and Safety of Pharmacologic VTE Prophylaxis After Spine Surgery

David Lunardini, BS, MD¹; Omar M. Ayyash, BA, BS²; Chinedu O. Nwasike³; **Nicholas T. Spina III, MD¹**; Antonia F. Chen, MD, MBA¹; James D. Kang, MD³; Joon Y. Lee, MD³

¹Pittsburgh, PA, US; ²Wexford, PA, US; ³University of Pittsburgh Medical Center, Pittsburgh, PA, US

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

4:10–4:16 p.m.

158. Efficacy of Tranexamic Acid and Aminocaproic Acid on Bleeding in Spine Surgery: A Meta-Analysis

Thomas Cheriyan, MD; Kristina Bianco, BA; Stephen P. Maier II, BA; Kseniya Slobodyanyuk; Frank J. Schwab, MD; Baron S. Lonner, MD; Virginie Lafage, PhD; Thomas J. Errico, MD

Spine Research Institute, Hospital for Joint Disease, New York University Medical Center, New York, NY, US

FDA Device/Drug Status: Tranexamic Acid (Not approved for this indication), Aminocaproic Acid (Not approved for this indication)

4:16–4:22 p.m.

159. Complication Rates are Reduced for Revision Adult Spine Deformity Surgery Among High Volume Hospitals and Surgeons

Baron S. Lonner, MD¹; Justin C. Paul, MD, PhD¹; Vadim Goz, BA²; Jeffrey H. Weinreb, BS³; Raj Karia, MPH⁴; Courtney Toombs⁵; Thomas J. Errico, MD⁵

¹New York, NY, US; ²Spine Research Institute, Hospital for Joint Disease, New York, NY, US; ³New York University Hospital for Joint Diseases, New York, NY, US; ⁴NYU Langone Medical Center, Hospital for Joint Diseases, New York City, NY, USA; ⁵New York University Medical Center, New York, NY, US

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

4:22–4:40 p.m.

Discussion

3:40–4:40 p.m.

Concurrent Session: Epidemiology

Room 269

Moderators: Christopher M. Bono, MD and Way Yin, MD

3:40–3:46 p.m.

160. Utilization Trends of Cervical Artificial Disc Replacement After FDA Approval Compared to Anterior Cervical Fusion: Adoption of New Technology

Young Lu, BA¹; Samuel K. Cho, MD²; Andrew Hecht, MD¹; Sheeraz A. Qureshi, MD, MBA²

¹New York, NY, US; ²Mount Sinai School of Medicine, New York, NY, US

FDA Device/Drug Status: Prestige (Approved for this indication), Bryan (Approved for this indication) ProDisc-C (Approved for this indication)

3:46–3:52 p.m.

161. Ensuring Homogenous Study Groups: Is a Power Analysis Enough for Randomized Trials in Spine?

Christopher M. Bono, MD¹; Rachel Deering, BS, MPH²; **Kevin L. Ju, MD²**; Daffang Zhang, MD²; John S. Clapp, MD³; Mitchel Harris, MD, FACS²

¹Brigham & Women's Hospital, Department of Orthopedic Surgery, Boston, MA, US; ²Brigham & Women's Hospital, Boston, MA, US; ³Augusta, GA, US

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

3:52–3:58 p.m.

162. Prevalence and Distribution of Intervertebral Disc Degeneration Over the Entire Spine in a Population-Based Cohort: The Wakayama Spine Study

Masatoshi Teraguchi, MD

Wakayama Medical University, Wakayama, Japan

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

3:58–4:04 p.m.

163. The Relationship of Symptomatic Thoracolumbar Disc Herniation and Scheuermann's Disease

Ning Liu, MD

Peking University Third Hospital, Beijing, China

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



4:04–4:10 p.m.

164. Medical Marijuana Use Characteristics in Patients with Chronic Spine Pain Disorders

Emily M. Lindley, PhD¹; Devin Razavi-Shearer, BA¹; Vikas V. Patel, MD²; Sarah E. Henry, MPH¹; Zachary McBeth, BS¹; Evalina L. Burger, MD³; Christopher M. Cain, MD, FRACS⁴; Michael A. Finn, MD⁵

¹University of Colorado Denver, Aurora, CO, US; ²Denver, CO, US; ³University of Colorado Denver, Department of Orthopaedics, Aurora, CO, US; ⁴Aurora, CO, US; ⁵University of Colorado, Neurosurgery, Aurora, CO, US

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

4:10–4:16 p.m.

165. Epidemiological Trends in Lumbar Spine Surgery Between 2002-2009

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

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

4:16–4:22 p.m.

166. The Application of the National Institutes of Health Patient-Reported Outcome Measurement Information System (PROMIS) to Spine Medicine

Armando S. Miciano, MD¹; Jacqueline Derhousoff¹; Chad Cross, PhD²

¹Nevada Rehabilitation Institute, Las Vegas, NV, US; ²Crossroads Wellness, Las Vegas, NV, US

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

4:22–4:40 p.m.

Discussion

3:40–4:40 p.m.

Concurrent Session: Imaging

Theater C

Moderators: Charles H. Cho, MD, MBA and Daniel M. Sciubba, MD

3:40–3:46 p.m.

167. Imaging Characteristics of “Dynamic” Versus “Static” Spondylolisthesis: Analysis Using Magnetic Resonance Imaging and Flexion/Extension Films

Jesse L. Even, MD¹; Antonia F. Chen, MD, MBA²; Joon Y. Lee, MD³

¹Arlington Orthopedic Associates, Arlington, TX, US; ²Pittsburgh, PA, US; ³University of Pittsburgh Medical Center, Pittsburgh, PA, US

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

168. Moved to Value Abstract Award Session

3:46–3:52 p.m.

169. Diagnostic Misclassification of Lumbar Instability and Post-Fusion Pseudoarthrosis from Standard Bending Radiographs

Boyle C. Cheng, PhD¹; Chip Wade, PhD²; Edward R. Probst, MD³

¹Mars, PA, US; ²Auburn University, Austin, TX, US; ³Pittsburgh, PA, US

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

3:52–3:58 p.m.

170. Correlation Between Cervical Spinal Stenosis and the Morphology of Congenital Lumbar Stenosis

Nicholas T. Spina III¹; Jesse L. Even, MD²; Joon Y. Lee, MD³

¹Pittsburgh, PA, US; ²Arlington Orthopedic Associates, Arlington, TX, US; ³University of Pittsburgh Medical Center, Pittsburgh, PA, US

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

3:58–4:04 p.m.

171. Incidence Patterns for Spinal Meningioma: A Surveillance, Epidemiology and End Results (SEER) Study

James L. West, BS¹; Sergio M. Gonzalez-Arias, MD, PhD, FACS²

¹Palm City, FL, US; ²Miami, FL, US

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

4:04–4:10 p.m.

172. Lumbar Spine Posterior Subcutaneous Fat Wound Depth is a Risk Factor for Surgical Site Infection

Khalid I. Odeh, BA¹; John J. Lee, MD²; Rakesh (Rock) D. Patel, MD¹; Gregory P. Graziano, MD³

¹University of Michigan, Ann Arbor, MI, US; ²University of Michigan, Department of Orthopaedic Surgery, Ann Arbor, MI, US; ³University of Michigan Health System, Ann Arbor, MI, US

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

4:10–4:16 p.m.

173. Selective Densitometry of the Lumbar Spine

Jeremi M. Leasure, MS; Bryant Chu, BS

The Taylor Laboratories, San Francisco, CA, US

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

4:16–4:40 p.m.

Discussion

3:40–4:40 p.m.

**Concurrent Session:
Osteoporosis**

Room 278/279

Moderators: Theodore J. Choma, MD and Yu-Po Lee, MD

3:40–3:46 p.m.

174. The Effects of Bone Growth Stimulator Treatments on Vertebral Bone Mass in an Osteoporosis Model

Ronald J. Midura, PhD¹; Caroline Androjna, PhD²; Maciej Zborowski, PhD²

¹Cleveland Clinic Foundation, Cleveland, OH, US; ²The Cleveland Clinic, Cleveland, OH, US

FDA Device/Drug Status: Stimulator, Bone Growth, Non-Invasive (Approved for this indication)

3:46–3:52 p.m.

175. Chronic Steroid Therapy Increases Mortality Rate in Patients with Osteoporotic Compression Fractures

Alex V. Boiwka¹; Nicholas U. Ahn, MD²

¹Cleveland, OH, US; ²University Hospital of Cleveland, Department of Orthopedic Surgery, Cleveland, OH, US

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

3:52–3:58 p.m.

176. Vertebroplasty and Kyphoplasty: National Outcomes and Trends in Utilization from 2005 Through 2010

Vadim Goz, BA¹; Thomas J. Errico, MD²; Jeffrey H. Weinreb, BS³; Steven M. Koehler, MD⁴; Andrew Hecht, MD⁵; Virginie Lafage, PhD³; Sheeraz A. Qureshi, MD, MBA⁶

¹Spine Research Institute, Hospital for Joint Disease, New York, NY, US; ²New York University Medical Center, New York, NY, US; ³New York University Hospital for Joint Diseases, New York, NY, US; ⁴Mount Sinai Medical Center, New York, NY, US; ⁵New York, NY, US; ⁶Mount Sinai School of Medicine, New York, NY, US

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

3:58–4:04 p.m.

177. Identification of Risk Factors for the Occurrence of Cement Leakage During Percutaneous Vertebroplasty for Painful Osteoporotic or Malignant Vertebral Fracture

Felix Tome-Bermejo, MD, PhD¹; Luis Alvarez, MD²; Angel R. Pinera, MD³; Carmen Duran, PA³; Belen Lopez-San Roman, PA³; Maria Daniela Vlad, PhD¹; Ignacio Mahillo-Fernandez, PhD⁴

¹Hospital Universitario Fundacion Jimenez Diaz, Madrid, Spain; ²Fundación Jimenez Diaz-Traumatología, Madrid, Spain; ³Fundacion Jimenez Diaz, Madrid, Spain; ⁴Madrid, Spain

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

4:04–4:10 p.m.

178. Percutaneous Kyphoplasty Versus Conservative Treatment in Acute and Subacute Osteoporotic Vertebral Compression Fractures (OVCF): A Double-Blinded, Randomized Controlled Clinical Trial (RCT) in the Population of Western China

Xie En, MD¹; Ding-Jun Hao, MD²

¹Hong Hui Hospital, Xi'an Jiaotong University College of Medicine, Xi'an, Shan Xi, China; ²Xian Red Cross Hospital, Xian, Shaanxi, China

FDA Device/Drug Status: PKP balloon kyphoplasty system (Approved for this indication), Bone cement (Approved for this indication)

4:10–4:16 p.m.

179. Augmentation of Pedicle Screws with Cement Helps to Prevent Mechanical Failure in Elderly Patients with >5 Levels Instrumentation: A CT Analysis of 688 Pedicle Screws

Sinan Kahraman, MD¹; Meric Enercan, MD¹; Cagatay Ozturk, MD¹; Gurkan Gumussuyu, MD¹; Tunay Sanli, MA¹; Bekir Yavuz Ucar, MD²; Levent Ulusoy, MD¹; Azmi Hamzaoglu, MD³; Ahmet Alanay, MD⁴

¹Istanbul Spine Center, Istanbul, Turkey; ²Istanbul Spine Center, Diyarbakir, Turkey; ³Istanbul, Turkey; ⁴Florence Nightingale Hospital, Istanbul, Turkey

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

4:16–4:22 p.m.

180. Prophylactic Vertebroplasty of Adjacent Non-Fused Segment(s): Its Effect on Adjacent Discs and the Influence of Sagittal Malalignment on its Efficacy? An MRI Study

Sinan Kahraman, MD¹; Meric Enercan, MD¹; Gurkan Gumussuyu, MD¹; Cagatay Ozturk, MD¹; Tunay Sanli, MA¹; Fethi Ceylan, MD²; Levent Ulusoy, MD¹; Azmi Hamzaoglu, MD³; Ahmet Alanay, MD⁴

¹Istanbul Spine Center, Istanbul, Turkey; ²Van Yuzuncuyil Universitesi, Van, Turkey; ³Istanbul, Turkey; ⁴Florence Nightingale Hospital, Istanbul, Turkey

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

4:22–4:40 p.m.

Discussion



3:40–4:40 p.m.

Collaborative Concepts in Spine Care Session: Neck/Shoulder Workshop

Room 268

Moderator: Heidi Prather, DO

This workshop is a continuation of the Neck Shoulder session on Friday morning. This session gives participants a hands-on experience in a workshop setting focused on effective history taking, physical examination procedures, clinical decision-making and care plan development strategies.

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

- Recognize the anatomic and biomechanical relationship between the neck and shoulder;
- Review anatomical, physiological and biomechanical considerations relative to patient evaluation and treatment;
- Discuss differential diagnosis as it applies to the patient with neck and/or shoulder complaints;
- Explain and demonstrate physical exam techniques and maneuvers in the differential diagnosis of neck and shoulder conditions.

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

3:40–4:40 p.m.

Focused Discussion: Section on Biologics and Basic Science: Update on rhBMP-2—Current Usage, YODA Findings and Risk Management

Theater B

Moderator: Scott D. Daffner, MD

This focused discussion emphasizes recent updates on rhBMP-2 usage trends, critical reviews of safety and efficacy, and potential medicolegal implications. A discussion of the findings of the NASS member survey regarding usage of BMP is presented. Faculty will summarize the findings of the recent YODA reviews of clinical studies of rhBMP-2. Lastly, a discussion of the potential medicolegal concerns including the role of informed consent with the faculty panel also will be presented.

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

- Identify potential clinical benefits of rhBMP-2 use in various applications (on- and off-label);
- Identify potential risks and complications associated with rhBMP-2 use;
- Review the existing data that has been published and discuss the studies that still need to be performed in order to establish the safety and efficacy of rhBMP-2;
- Acknowledge the potential economic implications of rhBMP-2 use;
- Formulate potential criteria to be applied in clinical practice to determine if rhBMP-2 use is appropriate in any given patient.

Agenda

- **Introduction/Update on BMP**
Scott D. Daffner, MD
- **Results of the NASS Member Survey of BMP Usage**
Vikas V. Patel, MD
- **YODA Studies: Methodology, Findings and Implications**
Alpesh A. Patel, MD, FACS
- **Medicolegal Concerns and Informed Consent**
- **Discussion**
Faculty Panel

FDA Device/Drug Status:

- Scott D. Daffner, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- Vikas V. Patel, MD:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)
- Alpesh A. Patel, MD, FACS:** Threaded cage BMP-2 single lumbar anterior fusion (Approved for this indication), all other BMP-2 use (Investigational/Not approved for this indication)

Summer Spine Meeting
July 23-26, 2014
Amelia Island, FL

Submit an abstract for ePoster consideration at <http://sms.spine.org>.

Electronic submission deadline:
December 20, 2013

3:40–4:40 p.m.

**Focused Discussion:
Activity Monitoring Patients with Lumbar
Spinal Stenosis**

Room 275/276

Moderator: Matthew Smuck, MD

Impaired mobility is a hallmark feature of lumbar spinal stenosis. This impairment can be quantified in a patient's real-life using digital activity monitors. This discussion will review emerging studies using activity monitors to demonstrate the impact of spinal stenosis on patient activity, and improvements in physical activity following treatment of spinal stenosis.

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

- Discuss the value of activity monitoring as an objective performance measure in spinal stenosis and your research experience;
- Appreciate the need to move away from the traditional activity monitoring data analysis and toward measures that are more specific to spine research, including research to validate activity monitoring in MSK research;
- Distinguish the differences between subjective outcomes and activity monitoring;
- Review the potential future impact of activity monitoring for spinal stenosis.

Agenda

- **Measuring Physical Performance**
Christy Tomkins-Lane, PhD
- **Evaluating Monitoring Information**
Matthew Smuck, MD
- **Applications and Implications for Spinal Stenosis**
Ming Chih-Kao, MD, PhD
- **Discussion, Q&A**

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

4:30–5:30 p.m.

International Reception (Open to all attendees)
Mid-house Level Lobby

**Submit Abstracts and
Proposals for the NASS
29th Annual Meeting
in San Francisco**

**Electronic Abstract
Submission Deadline:
February 5, 2014**

Go to <http://sms.spine.org>
for electronic submission.





Saturday, October 12

7:30 a.m.–12:00 p.m.

Attendee Registration

Lobby H (1st Level)

NASS Resource Center Open

Lobby H (1st Level)

ePosters Open for Viewing

Lobby H (1st Level)

7:30–9:00 a.m.

Continental Breakfast

Theater Lobby (2nd Level)

7:55–8:00 a.m.

Announcements

Room 266/267

8:00–8:05 a.m.

Check Presentation to Shriners's Hospital for Children

Room 266/267

8:05–9:30 a.m.

Symposium: Spine Injuries in Contact Sports

Room 266/267

Moderator: Wellington K. Hsu, MD

This symposium evaluates current concepts regarding diagnosis, management, treatment, and return-to-play criteria of common cervical and lumbar spinal injuries from contact sports such as American football, basketball, and hockey. The latest evidence-based literature regarding treatment principles of spine injuries in athletes is reviewed. Case studies also are presented to elucidate important treatment algorithm principles based on age, sport played, and symptom profile.

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

- Manage acute lumbar spondylolysis in the contact sport athlete;
- Evaluate the treatment options for a cervical disc herniation in an elite athlete;
- Manage cervical fractures and transient quadriparesis;
- Set patient expectations depending on sport played and other mitigating factors.

Agenda

- Introduction/Welcome
- Management of Lumbar Disc Herniation in the Elite Athlete
Robert G. Watkins III, MD
- Sports-Related Lumbar Fractures
Andrew Dossett, MD
- Diagnosis/Management of Burners/Stingers
Stanley A. Herring, MD
- On-field Acute Management of Spinal Cord Injury/
Transient Quadriparesis
Andrew Hecht, MD
- Recent Advances in Protective Equipment for the Central Nervous System
Edward C. Benzel, MD
- Case Study: Acute Pars Fracture in 14-Year Old Male
Wellington K. Hsu, MD
- Case Study: Cervical Disc Herniation in 22-Year Old Male
Chad J. Prusmack, MD
- Case Discussion
Faculty Panel
- Q&A

FDA Device/Drug Status:

All presenters: These presentations do not discuss or include any applicable devices or drugs.

10:00–11:00 a.m.

**Concurrent Session:
Motion Preservation**

Room 266/267

Moderators: Scott L. Blumenthal, MD, and Clinton J. Devin, MD

10:00–10:06 a.m.

181. A Prospective, Randomized Clinical Investigation of the PCM Cervical Disc: Five-Year Results from the US IDE Study

Frank M. Phillips, MD¹; Fred Geisler, MD, PhD²; Christopher D. Chaput, MD³; John G. DeVine, MD⁴; Kye Gilder, PhD⁵; Christopher J. Reah, PhD⁵; Kelli Howell⁵; Paul C. McAfee, MD, MBA⁶

¹Midwest Orthopaedics at Rush, Chicago, IL, US; ²Chicago, IL, US, US; ³Scott & White Hospital, Temple, TX, US; ⁴Eisenhower Army Medical Center, Fort Gordon, GA, US; ⁵NuVasive, San Diego, CA, US; ⁶Orthopaedic Associates of Towson, Towson, MD, US

FDA Device/Drug Status: PCM Cervical Disc[®] (Approved for this indication)

10:06–10:12 a.m.

182. Five-Year Follow-Up of a Prospective, Randomized FDA IDE Trial Comparing Two Lumbar Total Disc Replacements: Clinical Outcome and Serum Ion Level Analysis for a Metal-on-Metal Device

Richard D. Guyer, MD¹; Kenneth A. Pettine, MD²; Domagoj Coric, MD³; Donna D. Ohnmeiss, PhD⁴

¹Texas Back Institute, Plano, TX, US; ²Rocky Mountain Associates in Orthopedic Medicine, Loveland, CO, US; ³Carolina Neurosurgery & Spine Associates, Charlotte, NC, US; ⁴Texas Back Institute Research Foundation, Plano, TX, US

FDA Device/Drug Status: Kiniflex-L (Investigational/Not approved), Charite (Approved for this indication)

10:12–10:18 a.m.

183. Comparison of Outcomes Up to 48 Months After One- or Two-Level Total Disc Replacement: Results from an Investigational Device Exemption Trial

Hyun W. Bae, MD¹; Reginald J. Davis, MD, FACS²; Gregory A. Hoffman, MD³; Ralph F. Rashbaum, MD⁴; Pierce D. Nunley, MD⁵

¹Spine Institute St. John's Health Center, Los Angeles, CA, US; ²Greater Baltimore Neurosurgical Assoc., Baltimore, MD, US; ³Orthopaedics NorthEast, Fort Wayne, IN, US; ⁴Texas Back Institute, Plano, TX, US; ⁵Spine Institute of Louisiana, Shreveport, LA, US

FDA Device/Drug Status: Mobi-C (Investigational/Not approved)

10:18–10:24 a.m.

184. SECURE[®]-C Cervical Artificial Disc IDE Study: Outcomes at Five Years

Jeffrey McConnell, MD¹; Joseph Marzluff, MD²; Ildemaro Volcan, MD³; Paul Asdourian, MD⁴; David McKee⁵; Jacqueline Myer⁵; Kelly Baker, PhD⁵

¹Orthopaedic Specialists, Allentown, PA, US; ²Charleston Brain and Spine, Charleston, SC, US; ³West Augusta Spine Specialists, Augusta, GA, US; ⁴Greater Chesapeake Orthopedic Associates, Baltimore, MD, US; ⁵Globus Medical, Audubon, PA, US

FDA Device/Drug Status: SECURE-C Cervical Artificial Disc (Approved for this indication)

10:24–10:30 a.m.

185. Predictors of Success After Cervical Disc Arthroplasty

Matthew F. Gornet, MD¹; Francine W. Schranck, RN, BSN²; Brett A. Taylor, MD³; Branko Kopjar, MD, PhD⁴

¹The Orthopedic Center of St. Louis, St. Louis, MO, US; ²SPIRITT, St. Louis, MO, US; ³The Orthopedic Center of St. Louis, Chesterfield, MO, US; ⁴Mercer Island, WA, US

FDA Device/Drug Status: Prestige ST (Not approved for this indication), Prestige LP (Investigational/Not approved)

10:30–10:36 a.m.

186. Optimizing Success with Lumbar Disc Arthroplasty

Matthew F. Gornet, MD¹; Francine W. Schranck, RN, BSN²; Nicholas D. Wharton, MS³; John A. Hipp, PhD⁴

¹The Orthopedic Center of St. Louis, St. Louis, MO, US; ²SPIRITT, St. Louis, MO, US; ³Medical Metrics, Houston, TX, US; ⁴Manvel, TX, US

FDA Device/Drug Status: Maverick (Investigational/Not approved)

10:36–10:42 a.m.

187. Long-Term Evaluation of Reoperation Rates for Lumbar Total Disc Replacement and Fusion: Analysis of 1,237 Patients

Scott L. Blumenthal, MD¹; Donna D. Ohnmeiss, PhD²; Richard D. Guyer, MD¹; Jack E. Zigler, MD¹

¹Texas Back Institute, Plano, TX, US; ²Texas Back Institute Research Foundation, Plano, TX, US

FDA Device/Drug Status: Charite, ProDisc-L single-level (Approved for this indication), ProDisc-L 2 level; Kiniflex-L, Freedom, Activ-L (Investigational/Not approved), Charite 2-level; Charite or ProDisc hybrid (Not approved for this indication)

10:42–11:00 a.m.

Discussion



10:00–11:00 a.m.

**Concurrent Session:
Socioeconomics of Deformity**

Room 278/279

Moderators: Christopher P. Ames, MD and Isador H. Lieberman, MD, FRCSC, MBA

10:00–10:06 a.m.

188. Total Hospital Costs of Surgical Treatment for Adult Spinal Deformity: An Extended Follow-Up Study

International Spine Study Group¹; Ian McCarthy, PhD²; Michael O'Brien, MD³; Christopher P. Ames, MD⁴; Han Jo Kim, MD⁵; Justin S. Smith, MD, PhD⁶; Oheneba Boachie-Adjei, MD⁷; Frank J. Schwab, MD⁸; Eric O. Klineberg, MD⁹; Christopher I. Shaffrey, MD¹⁰; Munish C. Gupta, MD¹¹; David W. Polly Jr., MD¹²; Richard A. Hostin, MD³

¹Brighton, CO, US; ²Baylor Health Care System, Plano, TX, US; ³Southwest Scoliosis Institute, Plano, TX, US; ⁴University of California San Francisco, San Francisco, CA, US; ⁵Washington University Orthopedics, New York, NY, US; ⁶UVA Health System, Charlottesville, VA, US; ⁷Hospital for Special Surgery, New York, NY, US; ⁸NYU Hospital for Joint Diseases, New York, NY, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹¹University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ¹²University of Minnesota Physicians, Minneapolis, MN, US

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

10:06–10:12 a.m.

189. Recent Trends in Surgical Treatment of Adult Scoliosis: A Review of 7,570 Cases from the Scoliosis Research Society Database 2001-2008

Samuel K. Cho, MD¹; Keith H. Bridwell, MD²; Lawrence G. Lenke, MD³; John M. Caridi, MD⁴; Yongjung J. Kim⁵

¹Mount Sinai School of Medicine, New York, NY, US; ²Washington University in St. Louis School of Medicine, St. Louis, MO, US; ³Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ⁴Mount Sinai Medical Center, New York, NY, US; ⁵Seongnam-si, South Korea

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

10:12–10:18 a.m.

190. Incremental Cost-Effectiveness of Adult Spinal Deformity Surgery: Observed QALYs with Surgery Compared to Predicted QALYs Without Surgery

International Spine Study Group¹; Ian McCarthy, PhD²; Michael O'Brien, MD³; Christopher P. Ames, MD⁴; Thomas J. Errico, MD⁵; Han Jo Kim, MD⁶; Justin S. Smith, MD, PhD⁷; Frank J. Schwab, MD⁸; Eric O. Klineberg, MD⁹; Christopher I. Shaffrey, MD¹⁰; Munish C. Gupta, MD¹¹; David W. Polly Jr., MD¹²; Richard A. Hostin, MD³

¹Brighton, CO, US; ²Baylor Health Care System, Plano, TX, US; ³Southwest Scoliosis Institute, Plano, TX, US; ⁴University of California San Francisco, San Francisco, CA, US; ⁵New York University Medical Center, New York, NY, US; ⁶Washington University Orthopedics, New York, NY, US; ⁷UVA Health System, Charlottesville, VA, US; ⁸NYU Hospital for Joint Diseases, New York, NY, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹¹University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ¹²University of Minnesota Physicians, Minneapolis, MN, US

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

10:18–10:24 a.m.

191. Quantifying the Role of Baseline Quality-of-Life and Readmissions on the Incremental Cost-Effectiveness of Surgical Treatment for Adult Spinal Deformity (ASD)

International Spine Study Group¹; Ian McCarthy, PhD²; Michael O'Brien, MD³; Christopher P. Ames, MD⁴; Thomas J. Errico, MD⁵; Han Jo Kim, MD⁶; Gregory M. Mundis Jr., MD⁷; Frank J. Schwab, MD⁸; Eric O. Klineberg, MD⁹; Christopher I. Shaffrey, MD¹⁰; Munish C. Gupta, MD¹¹; David W. Polly Jr., MD¹²; Richard A. Hostin, MD³

¹Brighton, CO, US; ²Baylor Health Care System, Plano, TX, US; ³Southwest Scoliosis Institute, Plano, TX, US; ⁴University of California San Francisco, San Francisco, CA, US; ⁵New York University Medical Center, New York, NY, US; ⁶Washington University Orthopedics, New York, NY, US; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸NYU Hospital for Joint Diseases, New York, NY, US; ⁹University of California Davis School of Medicine, Sacramento, CA, US; ¹⁰University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹¹University of California Davis Orthopaedic Surgery, Sacramento, CA, US; ¹²University of Minnesota Physicians, Minneapolis, MN, US

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

10:24–10:30 a.m.

192. How the Neck Affects the Back: Changes in Regional Cervical Sagittal Alignment Correlate to HRQL Improvement in Adult Thoracolumbar Deformity Patients at Two-Year Follow-Up

International Spine Study Group¹; Themistocles S. Protopsaltis, MD²; Justin K. Scheer³; Jamie S. Terran⁴; Justin S. Smith, MD, PhD⁵; Han Jo Kim, MD⁶; Gregory M. Mundis Jr., MD⁷; Robert A. Hart, MD⁸; Ian McCarthy, PhD⁹; Eric O. Klineberg, MD¹⁰; Virginie Lafage, PhD¹¹; R. Shay Bess, MD¹²; Frank J. Schwab, MD¹¹; Christopher I. Shaffrey, MD¹³; Christopher P. Ames, MD¹⁴

¹Brighton, CO, US; ²NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, US; ³San Francisco General Hospital, San Diego, CA, US; ⁴New York, NY, US; ⁵UVA Health System, Charlottesville, VA, US; ⁶Washington University Orthopedics, New York, NY, US; ⁷San Diego Center for Spinal Disorders, La Jolla, CA, US; ⁸Oregon Health & Science University, Portland, OR, US; ⁹Baylor Health Care System, Plano, TX, US; ¹⁰University of California Davis School of Medicine, Sacramento, CA, US; ¹¹NYU Hospital for Joint Diseases, New York, NY, US; ¹²Rocky Mountain Scoliosis and Spine, Denver, CO, US; ¹³University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹⁴University of California San Francisco, San Francisco, CA, US

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

193. Moved to Value Abstract Award Session

10:30–10:36 a.m.

194. Cost-Effectiveness of Lumbar Spendylolisthesis Surgery at Two-Year Follow-Up

Ryan Cassilly, MD¹; Charla R. Fischer, MD²; Austin Peters, BS³; Yuriy Trimba, BA⁴; Jeffrey A. Goldstein, MD⁴; Jeffrey M. Spivak, MD³; John A. Bendo, MD⁴

¹Department of Orthopaedic Surgery, New York, NY, US; ²Columbia Orthopaedics, New York, NY, US; ³New York, NY, US; ⁴NYU Hospital for Joint Diseases, New York, NY, US

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

10:36–11:00 a.m. Discussion

10:00–11:00 a.m.

Concurrent Session: Basic Science of Bone and Disc

Room 280/281

Moderators: Kenneth S. Yonemura, MD and Avinash G. Patwardhan, PhD

10:00–10:06 a.m.

195. Osteoinductivity of Allograft Cellular Bone Matrix

Gregory M. Williams, PhD; Timothy A. Moseley, PhD

NuVasive, San Diego, CA, US

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

10:06–10:12 a.m.

196. Pulsed Electromagnetic Field Stimulates Human Osteoblastic Cells and Inhibits Human Osteoclastic Cells

Nicola C. Partridge, PhD

New York University College of Dentistry, New York, NY, US

FDA Device/Drug Status: Spinal-Stim p.m.A P850007. Cervical-Stim p.m.A P030034. (Approved for this indication)

10:12–10:18 a.m.

197. Smoking-Mediated Inhibition of Bone Healing: Mechanistic Role of Dioxin

Sohaib Hashmi¹; Amruta Ashtekar²; John T. Nelson, MD²; Christian Park, BS²; Jason H. Ghodasra³; Michael S. Nickoli, MD³; Mark LaBelle³; Wellington K. Hsu, MD⁴; Erin L. Hsu, PhD⁴

¹University of Toledo Medical Center, Toledo, OH, US; ²Northwestern University School of Medicine, Chicago, IL, US; ³Chicago, IL, US;

⁴Northwestern University, Chicago, IL, US

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

10:18–10:24 a.m.

198. Postural Compensation and Disc Mechanics in Forward Head Posture: A Novel Laboratory Model of Cervical Sagittal Balance

Avinash G. Patwardhan, PhD^{1,2}; Robert M. Havey, BS^{1,2}; Muturi Muriuki, PhD²; Ngoc-lam Nguyen, MD¹; Leonard I. Voronov, MD, PhD^{1,2}; Alpesh A. Patel, MD, FACS³; Michael R. Zindrick, MD¹; Gerard Carandang²; Dale Schuit, PhD⁴; Alexander J. Ghanayem, MD¹

¹Loyola University Medical Center Department of Orthopaedic Surgery, Maywood, IL, US; ²Edward Hines Jr. VA Hospital, Hines, IL, US; ³Northwestern University, Department of Orthopaedics, Chicago, IL, US; ⁴Governors State University, University Park, IL, US

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



10:24–10:30 a.m.

199. Intervertebral Disc Local Biochemistry and Mechanics are Correlated with Quantitative T2* MRI Mapping

Arin M. Ellingson, PhD¹; David W. Polly Jr., MD²; Tina M. Nagel, MS¹; Jutta Ellermann, MD³; David J. Nuckley, PhD¹

¹University of Minnesota, Minneapolis, MN, US; ²University of Minnesota Physicians, Minneapolis, MN, US; ³University of Minnesota Medical Center, Minneapolis, MN, US

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

10:30–10:36 a.m.

200. Single Voxel MR Spectroscopy Distinguishes Non-Herniated Painful from Herniated Painful and Non-Painful Lumbar Discs

Jeffrey C. Lotz, PhD¹; Matthew F. Gornet, MD²; James C. Peacock III³; Serena S. Hu, MD¹; Francine W. Schranck, RN, BSN⁴; Dawn Stewart, RT²; Sigurd H. Berven, MD⁵

¹University of California San Francisco, San Francisco, CA, US; ²Orthopedic Center of St. Louis, St Louis, MO, US; ³Nocimed, Redwood City, CA, US; ⁴SPIRITT, St. Louis, MO, US; ⁵University 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.

10:36–10:42 a.m.

201. The Effects of Lumbosacral Fusion on Sacroiliac Joint Biomechanics

Robert P. Norton, MD¹; Ronald W. Lindsey, MD²; Dinah Baria, PhD³; David Kaimrajh, MS⁴; Edward L. Milne, BS⁴; Loren Latta, PhD⁵

¹New York, NY, US; ²Rebecca Sealy Hospital, Galveston, TX, US; ³Arlington, VA, US; ⁴Max Biedermann Institute for Biomechanics, Miami Beach, FL, US; ⁵Plantation, FL, US

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

10:42–11:00 a.m.

Discussion

11:00 a.m.–12:00 p.m.

**Workshop:
Who's to Blame? When Physicians Rely on Medical Device Representatives For Instruction**

Room 266/267

Moderator: Joseph Cheng, MD

Medical devices are growing increasingly sophisticated, with complex rules in their approvals for usage and reimbursements. Disputes have begun to arise between doctors and medical device manufacturers over who bears the responsibility not only when a patient is injured, but for financial penalties during a coding audit. This workshop encourages discussion on the conflicting theories of culpability: medical malpractice versus product liability, billing fraud versus incorrect coding education.

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

- Determine the need for a strategic response to the topic of physician-representative relationship to be elevated to the Health Policy Council committees for further review and action.

12:00 p.m.

Meeting Adjourns

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Hours:

Wednesday, October 9 6:30 a.m.–5:30 p.m.
 Thursday–Friday, October 10–11 7:00 a.m.–5:00 p.m.
 Saturday, October 12 7:30 a.m.–12:00 p.m.



P1. Sagittal Alignment Two Years After Selective and Nonselective Thoracic Fusion for Lenke 1C Adolescent Idiopathic Scoliosis

Paul C. Celestre, MD¹; Leah Y. Carreon, MD, MSc²; Lawrence G. Lenke, MD³; Daniel J. Sucato, MD⁴; Steven D. Glassman, MD⁵

¹Louisville, KY, US; ²Spine Institute, Louisville, KY, US; ³Washington University Medical Center Department of Orthopedic Surgery, St. Louis, MO, US; ⁴Texas Scottish Rite Hospital for Children, Dallas, TX, US; ⁵Norton Leatherman Spine Center, Louisville, KY, US

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

P2. Magnetic Resonance Imaging in Follow-Up Assessment of Sciatica

Abdelilah El Barzouhi, MD, MSc¹; Carmen Vleggeert-Lankamp, MD, PhD²; Wilco C. Jacobs, MS¹; Wilco C. Peul, MD, PhD¹

¹Leiden University Medical Center, Leiden, Netherlands; ²Netherlands

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

P3. T1 Intralaminar Screws: An Anatomic, Morphologic Study of 112 Cadaveric Specimens and the Feasibility of T1 Intralaminar Screw Placement

John Weaver¹; Jason Eubanks, MD²

¹Warren, OH, US; ²Willoughby Hills, OH, US

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

P4. Comparison Between Cervical Total Disc Replacement and Anterior Cervical Discectomy and Fusion of 1-2 Levels from 2002-2009

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

¹Chicago, IL, US; ²Midwest Orthopaedics at Rush University Medical Center, Chicago, IL, US; ³Rush University Medical Center, Chicago, IL, US; ⁴Northwestern Department of Orthopaedics, Chicago, IL, US

FDA Device/Drug Status: Bryan Disc (Approved for this indication), Prestige Disc (Approved for this indication), ProDisc-C (Approved for this indication), PCM disc (Approved for this indication)

P5. Risk Factors for Urinary Complications After Cervical Spine Surgery

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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

P6. The Insertion Technique of Translaminar Screws in the Lumbar Spine: CT and Cadaveric Validation

Woojin Cho, MD, PhD¹; Jason T. Le²; Adam L. Shimer, MD³; Brian C. Werner, MD⁴; John A. Glaser, MD⁵; Francis H. Shen, MD⁶

¹Sutton Terrace, New York, NY, US; ²Fairfax, VA, US; ³University of Virginia School of Medicine, Department of Orthopaedic Surgery, Charlottesville, VA, US; ⁴Charlottesville, VA, US; ⁵Medical University of South Carolina, Charleston, SC, US; ⁶University of Virginia, Charlottesville, VA, US

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

P7. The Value of the Military Spine Surgeon: Prognostications Regarding Incidence Rates and Risk Factors for Spinal Trauma in the Combat Environment

Andrew J. Schoenfeld, MD¹; Julia Bader, PhD²; Philip J. Belmont Jr., MD²

¹Canutillo, TX, US; ²El Paso, TX, US

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

P8. Impact of Hospital Employment on Surgical Coding and Fee Collection

Devender Singh, PhD¹; Eric Truumees, MD¹; Matthew J. Geck, MD¹; John Stokes, MD²; Viet Tran, MD³

¹Seton Spine & Scoliosis Center, Austin, TX, US; ²Austin Brain and Surgery, Austin, TX, US; ³Spine and Rehabilitation Center, Austin, TX, US

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

P9. Perioperative Complications and Mortality After Spinal Fusions: Analysis of Trends and Risk Factors

Vadim Goz, BA¹; Jeffrey H. Weinreb, BS²; Virginie Lafage, PhD²; Thomas J. Errico, MD³

¹Spine Research Institute, Hospital for Joint Diseases, New York, NY, US; ²New York University Hospital for Joint Diseases, New 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.

P10. Venous Thromboembolic Events in Spine Surgery Patients: Which Patients Are High Risk?

Vadim Goz, BA¹; Kai Dallas²; Jeffrey H. Weinreb, BS³; John A. Bendo, MD⁴; Virginie Lafage, PhD³; Thomas J. Errico, MD⁵

¹Spine Research Institute, Hospital for Joint Diseases, New York, NY, US; ²New York, NY, US; ³New York University Hospital for Joint Diseases, New York, NY, US; ⁴New York University Hospital for Joint Diseases Spine Center, New York, NY, US; ⁵New York University Medical Center, New York, NY, US

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

P11. Cervical Disc Arthroplasty Versus Anterior Cervical Discectomy and Fusion: Analysis of Perioperative Outcomes and Trends in Utilization

Vadim Goz, BA¹; Jeffrey H. Weinreb, BS²; Kai Dallas³; Justin C. Paul, MD, PhD²; Virginie Lafage, PhD²; Thomas J. Errico, MD⁴

¹Spine Research Institute, Hospital for Joint Diseases, New York, NY, US; ²New York University Hospital for Joint Diseases, New York, NY, US; ³New 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.

P12. Do Operative Outcomes for Adults with Spinal Deformity Differ Based on the Relative Severity of Back and Leg Pain Prior to Surgery?

International Spine Study Group¹; Robert K. Eastlack, MD²; Justin K. Scheer³; Han Jo Kim, MD⁴; Oheneba Boachie-Adjei, MD⁵; Vedat Deviren, MD⁶; Justin S. Smith, MD, PhD⁷; Robert A. Hart, MD⁸; R. Shay Bess, MD⁹; Gregory M. Mundis Jr., MD¹⁰; Virginie Lafage, PhD¹¹; Frank J. Schwab, MD¹¹; Christopher I. Shaffrey, MD¹²; Douglas C. Burton, MD¹³; Christopher P. Ames, MD⁶

¹Brighton, CO, US; ²Scripps Clinic, San Diego, CA, US; ³San Francisco General Hospital, San Diego, CA, US; ⁴Washington University Orthopedics, New York, NY, US; ⁵Hospital for Special Surgery, New York, NY, US; ⁶University of California San Francisco, San Francisco, CA, US; ⁷UVA Health System, Charlottesville, VA, US; ⁸Oregon Health & Science University, Portland, OR, US; ⁹Rocky Mountain Scoliosis and Spine, Denver, CO, US; ¹⁰San Diego Center for Spinal Disorders, La Jolla, CA, US; ¹¹New York University Hospital for Joint Diseases, New York, NY, US; ¹²University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ¹³University of Kansas Medical Center, Kansas City, KS, US

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

P13. Cost-Utility Analysis of Surgical Treatment for Adult Spinal Deformity

International Spine Study Group¹; Ian McCarthy, PhD²; Michael O'Brien, MD³; Christopher P. Ames, MD⁴; Thomas J. Errico, MD⁵; Han Jo Kim, MD⁶; Gregory M. Mundis Jr., MD⁷; Frank J. Schwab, MD⁸; Eric O. Klineberg, MD⁹; Christopher I. Shaffrey, MD¹⁰; Munish C. Gupta, MD¹¹; David W. Polly Jr., MD¹²; Richard A. Hostin, MD³

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

P14. The Cost of Implants in the Surgical Treatment of Adult Spinal Deformity (ASD)

International Spine Study Group¹; Ian McCarthy, PhD²; Michael O'Brien, MD³; Elaheh Naseri⁴; Erin McCullough⁴; Christopher P. Ames, MD⁵; Han Jo Kim, MD⁶; Oheneba Boachie-Adjei, MD⁷; Christopher I. Shaffrey, MD⁸; Munish C. Gupta, MD⁹; Richard A. Hostin, MD³

¹Brighton, CO, US; ²Baylor Health Care System, Plano, TX, US; ³Southwest Scoliosis Institute, Plano, TX, US; ⁴Baylor Health Care System, Dallas, TX, US; ⁵University of California San Francisco, San Francisco, CA, US; ⁶Washington University Orthopedics, New York, NY, US; ⁷Hospital for Special Surgery, New York, NY, US; ⁸University of Virginia Department of Neurosurgery, Charlottesville, VA, US; ⁹University of California Davis Orthopaedic Surgery, Sacramento, CA, US

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

P15. Assistance with Reduction of High-Grade Spondylolisthesis Using Temporary Alar Distraction Rods and Sacral Dome Osteotomy in Correcting High-Grade Spondylolisthesis: Technique, Complications and Outcomes

Dennis G. Crandall, MD

Sonoran Spine Center, Mesa, AZ, US

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

P16. Recombinant Human Bone Morphogenetic Protein-2 (BMP) Use in Adult Spinal Deformity (ASD) Does Not Increase Major, Infectious or Neurological Complications and May Decrease Return to Surgery at One Year: A Prospective, Multicenter Analysis

International Spine Study Group¹; R. Shay Bess, MD²; Breton Line³; Christopher I. Shaffrey, MD⁴; Virginie Lafage, PhD⁵; Frank J. Schwab, MD⁶; Behrooz A. Akbarnia, MD⁶; Christopher P. Ames, MD⁷; Oheneba Boachie-Adjei, MD⁸; Douglas C. Burton, MD⁹; Vedat Deviren, MD⁷; Jacob M. Buchowski, MD, MS¹⁰; Robert A. Hart, MD¹¹; Khaled M. Kebaish, MD¹²; Eric O. Klineberg, MD¹³; Munish C. Gupta, MD¹⁴; Thomas J. Errico, MD¹⁵; Gregory M. Mundis Jr., MD⁶; Richard A. Hostin, MD¹⁶; Justin S. Smith, MD, PhD¹⁷

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FDA Device/Drug Status: Recombinant Human Bone Morphogenetic Protein-2 (Investigational/not approved)

P17. Disease State Correlates for Pain and Disability in Adult Spinal Deformity (ASD); Assessment Guidelines for Health Care Providers

International Spine Study Group¹; R. Shay Bess, MD²; Kai-Ming G. Fu, MD, PhD³; Virginie Lafage, PhD⁴; Frank J. Schwab, MD⁴; Christopher I. Shaffrey, MD⁵; Christopher P. Ames, MD⁶; Robert A. Hart, MD⁷; Munish C. Gupta, MD⁸; Eric O. Klineberg, MD⁹; Vedat Deviren, MD⁶; Behrooz A. Akbarnia, MD¹⁰; Gregory M. Mundis Jr., MD¹⁰; Richard A. Hostin, MD¹¹; Michael O'Brien, MD¹¹; Douglas C. Burton, MD¹²; Khaled M. Kebaish, MD¹³; Oheneba Boachie-Adjei, MD¹⁴; Justin S. Smith, MD, PhD¹⁵

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

P18. The Selection of the Distal Instrumentation Level in Lenke Type 1A Curves Using Segmental Screw Fixation: The Nottingham Experience

Hossein Mehdian, FRCS; Georgios Arealis, MD, PhD; Nasir A. Quraishi, MD; Sherief Elsayed, FRCS, MbChB

Queen's Medical Centre, Nottingham, UK

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

19. V-Y Vertebral Body Osteotomy for the Treatment of Fixed Flexion Deformity of the Spine

Hossein Mehdian, FRCS; Georgios Arealis, MD, PhD; Sherief Elsayed, FRCS, MbChB; Nasir A. Quraishi, MD; Arun Ranganathan, FRCS, MD, MBBS²

¹Queen's Medical Centre, Nottingham, UK; ²Toronto Western Hospital, Toronto, ON, Canada

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

P20. Preoperative Autologous Blood Donation Does Not Affect Pre-Incision Hematocrit in AIS Patients: A Retrospective Cohort of a Prospective Randomized Trial

Austin Peters, BS; Kushagra Verma²; Christopher Diefenbach³; Christian M. Hoelscher, BS⁴; Tessa K. Huncke⁵; Kirsten Boenigk, MD, PhD; Thomas J. Errico, MD⁴; Baron S. Lonner, MD¹

¹New York, NY, US; ²New York University School of Medicine, Philadelphia, PA, US; ³Erie, PA, US; ⁴New York University Medical Center, New York, NY, US; ⁵New York University Department of Anesthesiology, New York, NY, US

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

P21. Return to Surgery Does Not Worsen Health Related Quality of Life (HRQOL) or Patient Satisfaction at 2 Years: An Analysis of Incidence and Risk Factors for Secondary Surgery in Adult Spinal Deformity (ASD)

International Spine Study Group¹; R. Shay Bess, MD²; Breton Line³; Behrooz A. Akbarnia, MD⁴; Christopher P. Ames, MD⁵; Oheneba Boachie-Adjei, MD⁶; Douglas C. Burton, MD⁷; Vedat Deviren, MD⁸; Kai-Ming G. Fu, MD, PhD⁹; Munish C. Gupta, MD⁹; Robert A. Hart, MD¹⁰; Richard A. Hostin, MD¹¹; Khaled M. Kebaish, MD¹²; Eric O. Klineberg, MD¹³; Virginie Lafage, PhD¹⁴; Gregory M. Mundis Jr., MD⁴; Michael O'Brien, MD¹¹; Frank J. Schwab, MD¹⁴; Christopher I. Shaffrey, MD¹⁵; Justin S. Smith, MD, PhD¹⁶

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

P22. Modeling Thoracic Volume for Adolescent Idiopathic Scoliosis

Charles Gerald T. Ledonio, MD¹; David W. Polly Jr., MD²; Ben Rosenstein, BS¹; A. Noelle Larson, MD¹

¹Minneapolis, MN, US; ²University of Minnesota Physicians, Minneapolis, MN, US

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

P23. Patient and Surgeon Radiation Exposure Varies Widely in Orthopaedic Spine Surgery: Fluoroscopy, Radiography and Intra-Operative CT

Elisha M. Nelson¹; Eric O. Klineberg, MD²

¹Woodland, CA, US; ²University 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.

P24. Complications, Outcomes and Need for Fusion Following Minimally Invasive Posterior Cervical Foraminotomy and Microdiscectomy

Branko Skovrlj, MD¹; Yakov Gologorsky, MD²; Raqeeb M. Haque, MD³; Richard G. Fessler, MD, PhD⁴; Sheeraz A. Qureshi, MD, MBA²

¹Mount Sinai School of Medicine Department of Neurosurgery, New York, NY, US; ²Mount Sinai School of Medicine, New York, NY, US; ³Chicago, IL, US; ⁴Northwestern University, Feinberg School of Medicine, Chicago, IL, US

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

P25. Trends in Bone Morphogenetic Protein (BMP) Usage Since the US Food and Drug (FDA) Advisory in 2008: What Happens to Physician Practices When the FDA Issues an Advisory?

Janay Mckie, MD¹; Sheeraz A. Qureshi, MD, MBA²; James C. Iatridis, PhD³; Natalia N. Egorova, PhD, MPH⁴; Samuel K. Cho, MD²; Andrew Hecht, MD¹

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

P26. An Expandable Crescent Shaped TLIF Cage to Improve Segmental Lordosis: Radiograph Analysis, Safety, Efficacy and Early Clinical Outcomes

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FDA Device/Drug Status: Interbody fusion cage (Approved for this indication)

P27. Evaluation of Dysphagia and Dysphonia with the PCM Cervical Disc Compared to ACDF in a Prospective Randomized Clinical Trial: Two-Year Results from the US IDE Study

Kye Gilder, PhD¹; Paul C. McAfee, MD, MBA²; Kelli Howell³; Fred Geisler, MD, PhD⁴; Frank M. Phillips, MD⁵; Christopher D. Chaput, MD⁶; John G. DeVine, MD⁷; Christopher J. Reah, PhD¹

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FDA Device/Drug Status: PCM Cervical Disc (Approved for this indication)

P28. Long-Term Evaluation of Dysphasia (Bazaz) with the PCM Cervical Disc Compared to ACDF in a Prospective Randomized Clinical Trial: Five-Year Results from the US IDE Study

Kye Gilder, PhD¹; Paul C. McAfee, MD, MBA²; Kelli Howell³; Fred Geisler, MD, PhD⁴; Frank M. Phillips, MD⁵; Christopher D. Chaput, MD⁶; John G. DeVine, MD⁷; Christopher J. Reah, PhD¹

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FDA Device/Drug Status: PCM[®] Cervical Disc (Approved for this indication)

P29. Surgical Treatment of Pathological Loss of Lumbar Lordosis (Flatback) in the Setting of Normal Sagittal Vertical Axis (SVA) Achieves Similar Clinical Improvement as Surgical Treatment for Elevated SVA

International Spine Study Group¹; Manish Singh, MD²; Justin S. Smith, MD, PhD³; Eric O. Klineberg, MD⁴; Christopher I. Shaffrey, MD⁵; Virginie Lafage, PhD⁶; Frank J. Schwab, MD⁶; Themistocles S. Protopsaltis, MD⁷; Kai-Ming G. Fu, MD, PhD⁸; Munish C. Gupta, MD⁹; Jacob M. Buchowski, MD, MS¹⁰; David M. Ibrahim, MD²; Gregory M. Mundis Jr., MD¹¹; Richard A. Hostin, MD¹²; Vedat Deviren, MD¹³; Douglas C. Burton, MD¹⁴; R. Shay Bess, MD¹⁵; Robert A. Hart, MD¹⁶; Christopher P. Ames, MD¹³

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

P30. Health Impact Comparison of Cervical Sagittal Deformity and Thoracolumbar Sagittal Deformity on Baseline Disability and Surgical Outcomes: Cervical PSO Versus Lumbar PSO

International Spine Study Group¹; Justin K. Scheer²; Themistocles S. Protopsaltis, MD³; Han Jo Kim, MD⁴; Richard A. Hostin, MD⁵; Khaled M. Kebaish, MD⁶; Justin S. Smith, MD, PhD⁷; Gregory M. Mundis Jr., MD⁸; Frank J. Schwab, MD⁹; Virginie Lafage, PhD⁹; Robert A. Hart, MD¹⁰; R. Shay Bess, MD¹¹; Christopher I. Shaffrey, MD¹²; Vedat Deviren, MD¹³; Christopher P. Ames, MD¹³

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

P31. Prevalence and Type of Cervical Deformity Among 470 Adults with Thoracolumbar Deformity

International Spine Study Group¹; Justin S. Smith, MD, PhD²; Christopher I. Shaffrey, MD³; Virginie Lafage, PhD⁴; Frank J. Schwab, MD⁴; Themistocles S. Protopsaltis, MD⁵; Eric O. Klineberg, MD⁶; Munish C. Gupta, MD⁷; Justin K. Scheer⁸; Kai-Ming G. Fu, MD, PhD⁹; Richard A. Hostin, MD¹⁰; Vedat Deviren, MD¹¹; Robert A. Hart, MD¹²; Douglas C. Burton, MD¹³; R. Shay Bess, MD¹⁴; Christopher P. Ames, MD¹¹

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

P32. Early and Late Thoracic Kyphosis Following 104 Lumbar Pedicle Subtraction Osteotomies with Unfused Thoracic Spine

International Spine Study Group¹; Eric O. Klineberg, MD²; Virginie Lafage, PhD³; Jamie S. Terran⁴; Christopher P. Ames, MD⁵; Douglas C. Burton, MD⁶; Robert A. Hart, MD⁷; Justin S. Smith, MD, PhD⁸; Christopher I. Shaffrey, MD⁹; Oheneba Boachie-Adjei, MD¹⁰; Kai-Ming G. Fu, MD, PhD¹¹; Themistocles S. Protopsaltis, MD¹²; Frank J. Schwab, MD³; Khaled M. Kebaish, MD¹³; Gregory M. Mundis Jr., MD¹⁴; Vedat Deviren, MD⁵; Munish C. Gupta, MD¹⁵

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

P33. Neurofibromatosis Type I and Scoliosis: A Multicenter Study to Determine Radiographic Predictors of Dystrophic Scoliosis

Charles Gerald T. Ledonio, MD¹; David W. Polly Jr., MD²; Ann M. Brearley, PhD³; A. Noelle Larson, MD¹; Daniel J. Sucato, MD⁴; Alvin Crawford, MD, FACS⁵; Leah Y. Carreon, MD, MSc⁶; David A. Stevenson, MD⁷; Michael G. Vitale⁸; Christopher L. Moertel, MD⁹

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

P34. Neuropathic Pain Components in Patients with Lumbar Spinal Stenosis

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

P35. Harvest of Iliac Crest Autograft Not Associated with Localized Pain

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

P36. Cervical Spondylosis Surgery Level and Age: A Comparative Analysis

Mohsin Ali, BHSc; Edward Kachur, MD; Michael R. Bennardo, MSc; Asma'a A. Yassin, MD; Kesava K. Reddy, MD; Aleksa Cenic, MD, MSc

Division of Neurosurgery, Department of Surgery, Michael G. DeGroot School of Medicine, McMaster University, Hamilton, Ontario, Canada

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

P37. Mechanical Versus Chemical Prophylaxis for Deep Venous Thrombosis in Patients Undergoing Lumbar Spinal Fusion: Comparative Effectiveness and Cost-Benefit

Saniya S. Godil, MD¹; Michael C. Dewan, MD¹; Scott L. Parker, MD²; Clinton J. Devin, MD³; Matthew J. McGirt, MD¹

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

P38. Transcranial Direct Current Stimulation (tDCS) in the Management of Acute Post-Spine Surgery Pain: A Prospective Randomized Controlled Trial

Jeffrey J. Borckardt, PhD¹; John A. Glaser, MD¹; Keith C. Carver²; Scott T. Reeves, MD³; Mark S. George, MD⁴; Sarah Fredrich⁵; John Hohenberger³

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FDA Device/Drug Status: Transcranial Direct Current Stimulation (Not approved for this indication)

P39. Cervical Posterior Foraminotomy's Effect on Segmental Range of Motion in the Setting of Total Disc Arthroplasty

Ronald A. Lehman Jr., MD¹; Adam Bevevino²; Daniel G. Kang, MD²; Divya V. Ambati, MSc, BS³; Rachel E. Gaume, BS⁴; David E. Gwinn, MD; Anton E. Dmitriev, PhD⁵

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FDA Device/Drug Status: Prestige Cervical Disc (Approved for this indication)

P40. The Effect of Three Column Spinal Osteotomy on Anterior Pelvic Plane and Acetabular Component Position in Total Hip Replacement

Josh E. Schroeder, MD¹; Federico P. Girardi, MD²; Andrew A. Sama, MD²; Leon Kaplan, MD³; Darren R. Lebl, MD¹

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

P41. Cost-Utility Analysis of Anterior Cervical Discectomy and Fusion with Plating (ACDFP) Versus Posterior Cervical Foraminotomy (PCF) for Patients with Single-Level Cervical Radiculopathy

Matthew D. Alvin¹; Daniel Lubelski, BA²; Kalil G. Abdullah, MD³; Robert G. Whitmore, MD⁴; Edward C. Benzel, MD¹; Thomas E. Mroz, MD¹

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

P42. Factors Predictive of Proximal Failure After Thoracolumbar Instrumented Fusion

Jayne R. Hiratzka, MD¹; Paolo Antonio R. Punsalan, MD²; Natalie L. Zusman¹; Keegan J. McClary¹; Travis C. Philipp, BA³; Alexander C. Ching, MD³; Jung U. Yoo, MD¹

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

P43. The Effect of Increasing Pedicle Screw Diameter on Thoracic Spinal Canal Dimensions: An Anatomic Study

Samuel K. Cho, MD¹; Young Lu, BA²; Branko Skovrlj, MD³; John M. Caridi, MD⁴; Lawrence G. Lenke, MD⁵

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

P44. HRQoL Scores and Radiographic Parameters Do Not Drive Patient Satisfaction After Adult Spinal Deformity Surgery

International Spine Study Group¹; D. Kojo Hamilton, MD²; Jayme R. Hiratzka, MD²; R. Shay Bess, MD³; Frank J. Schwab, MD⁴; Christopher I. Shaffrey, MD⁵; Christopher P. Ames, MD⁶; Gregory M. Mundis Jr., MD⁷; Virginie Lafage, PhD⁴; Vedat Deviren, MD⁶; Justin S. Smith, MD, PhD⁸; Eric O. Klineberg, MD⁹; Oheneba Boachie-Adjei, MD¹⁰; Douglas C. Burton, MD¹¹; Robert A. Hart, MD²

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

P45. Recent Trends in Surgical Management of Adolescent Idiopathic Scoliosis: A Review of 17,412 Cases from the Scoliosis Research Society Database 2001-2008

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

P46. Comparative Analysis of Osteotomies During Adult Spinal Fusions: A Retrospective Review of 3,990 Cases from the Scoliosis Research Society Morbidity and Mortality Database

Samuel K. Cho, MD¹; Natalia N. Egorova, PhD, MPH²; Keith H. Bridwell, MD³; Lawrence G. Lenke, MD⁴; John M. Caridi, MD⁵; Yongjung J. Kim⁶

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

P47. Perioperative Effects Associated with the Surgical Treatment of Degenerative Spondylolisthesis: Interbody Versus No Interbody

Brandon D. Lawrence, MD¹; Lon M. Baronne II, MD²; Prokopis Annis, MD³; Darrel S. Brodke, MD⁴

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

P48. The Component of Electrodiagnostic Studies to Predict Outcome After Transforaminal Epidural Steroid Injection for Lumbar Radiculopathy

Jae Min Kim, MD

Department of Rehabilitation Medicine, Catholic University of Korea, Incheon, South Korea

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

P49. Clinical Correlation of Cervical Myelopathy and the Hyperactive Pectoralis Reflex

Permsak Paholpak, MD; Kitti Jirattanaphochai, MD, PhD; Surachai Sae-Jung, MD, PhD, FICS; Kriangkrai Wittayapairoj, MD

Department of Orthopaedics, Faculty of Medicine, Khon Kaen University, Thailand

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

P50. Minimally Invasive TLIF Using Tubular Retractor Versus Mini-Open TLIF: Which Procedure is Less Invasive?

Akihito Wada¹; Yasuhiro Inoue, MD²; Yuichiro Yokoyama, MD³; Terajima Fumiaki, MD³; Hiroshi Takahashi, MD³

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FDA Device/Drug Status: METRx 22 mm tubular retractor system (Approved for this indication), CD Horizon Sextant system (Approved for this indication)

P51. Relationship Between Surgical Technique and the Incidence of Adjacent Level Pathology in Lumbar Spine Fusion: Open Traditional Approach (OTA) Versus Minimally Invasive Transforaminal Interbody Fusion and Percutaneous Screws (MIS TLIF/PPS)

Hazem Nicola, MD¹; Manuel Da Silva, MD²; Irwing J. Aranguren, RN²

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

P52. Cement Augmentation of Intact Vertebral Bodies Using Percutaneous Unilateral Transpedicular Balloon Kyphoplasty for the Mid & Upper Thoracic Spine: Three-Dimensional Analysis of Cement Distribution in the Different Vertebral Body's Zones

Leonard I. Voronov, MD, PhD¹; Georgios Vastardis, MD²; Brian Dial, BS³; Michael Stojanovic, BS³; Anna Marjan, BS³; Tejaswy Potluri⁴; Gerard Carandang⁵; Alexander Hadjipavlou, MD⁶; Michael R. Zindrick, MD⁷; Avinash G. Patwardhan, PhD⁸

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FDA Device/Drug Status: AVAflex (Approved for this indication), AVAmax (Approved for this indication)

P53. Analysis of Surgeon Reimbursement for Scoliosis Surgery: Hourly Pay for Medicare Versus the 2010 Affordable Care Act

Dennis G. Crandall, MD¹; Melissa A. Gebhardt, PA-C¹; Michael S. Chang, MD²; Jason C. Datta, MD¹

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

P54. Complications and Length of Stay Following Elective Anterior Cervical Discectomy and Fusion: A NSQIP Database Study

Jordan A. Gruskay¹; Michael Fu²; Bryce Basques²; Rafael A. Buerba³; Matthew L. Webb³; Daniel D. Bohl, MPH³; Jonathan N. Grauer, MD³

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

P55. Biomechanical Analysis of Pedicle Screw Fixation Constructs for Stabilization of Thoracolumbar Burst Fractures

Matthew McDonnell, MD¹; David Paller, MSN²; Alan Daniels, MD³; Sarath Koruprolu⁴; Nikhil A. Thakur, MD⁵; Mark A. Palumbo, MD⁶

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FDA Device/Drug Status: Pedicle screws/rods (Approved for this indication)

P56. A Prospective Propensity Matched Cohort Analysis of Minimally Invasive (MIS), Hybrid (HYB), and Open Spine Surgery (OPEN) for the Treatment of Adult Spinal Deformity (ASD)

International Spine Study Group¹; Gregory M. Mundis Jr., MD²; Virginie Lafage, PhD³; Jamie S. Terran⁴; Behrooz A. Akbarnia, MD²; Robert K. Eastlack, MD⁵; Michael Y. Wang, MD⁶; Juan S. Uribe, MD⁷; Neel Anand, MD⁸; Paul Park, MD⁹; Raqeeb M. Haque, MD¹⁰; David O. Okonkwo, MD¹¹; Adam S. Kanter, MD¹²; Frank LaMarca, MD¹³; Richard G. Fessler, MD, PhD¹⁴; Christopher P. Ames, MD¹⁵; Eric O. Klineberg, MD¹⁶; Christopher I. Shaffrey, MD¹⁷; Vedat Deviren, MD¹⁵

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

P57. Prevalence and Impact of Back Pain in a Deployed Military Population in Iraq

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

P58. MRI Assessment of the Psoas Muscle and Its Relationship with Lumbar Plexus and the Lumbar L4-L5 Disc: A Guideline in Surgical Planning for Patient with Indication of Lateral Approach: A Prospective Study

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

P59. Reduced Lateral Center of Mass Sway During Gait After AIS Fusion Surgery

Vadim Goz, BA¹; Ashish Patel, MD²; Justin C. Paul, MD, PhD²; Ellen M. Godwin, PT, PhD³; Kristina Bianco, BA⁴; Nicholas H. Post, MD⁵; Qais Naziri, MD³; Thomas J. Errico, MD⁶; Virginie Lafage, PhD⁷; Carl Paulino⁸

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

P60. The Unknown Primary Tumour Presenting as Metastatic Spinal Cord Compression

Nasir A. Quraishi, MD¹; Sakthivel Rajan Rajaram Manoharan, MS¹; Georgios Arealis, MD, PhD¹; Hossein Mehdiian, FRCS²; Bronek M. Boszczyk, MD³

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

P61. Hospital Outcomes of Multiple-Level Anterior and Posterior Cervical Fusions from 2002-2009

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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

P62. Outcomes of Cervical Spine Surgery in Teaching and Non-Teaching Hospitals

Alejandro Marquez-Lara, MD¹; Steven J. Fineberg, MD²; Sreeharsha V. Nandyala, BA³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD¹

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

P63. Epidemiological Trends in Cervical Spine Surgery Between 2002-2009

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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

P64. Posterior Vertebral Column Resection for Adult Spinal Disorders: Efficacy, Complications and Risk Factors

Sinan Kahraman, MD¹; Meric Enercan, MD¹; Gurkan Gumussuyu, MD¹; Cagatay Ozturk, MD¹; Tunay Sanli, MA¹; Bekir Yavuz Ucar, MD²; Mercan Sarier¹; Ramazan Soydan, MD¹; Alaa Zakout, MD¹; Azmi Hamzaoglu, MD³; Ahmet Alanay, MD⁴

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

P65. Incidence and Mortality of Thromboembolic Events After Lumbar Spine Surgery

Steven J. Fineberg, MD¹; Sreeharsha V. Nandyala, BA²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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

P66. Risk Factors for Hematomas and Neurologic Complications After Lumbar Spine Surgery

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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

P67. Epidemiological Trends in Interspinous Process, Pedicle-Based Dynamic Stabilization and Facet Replacement Devices Between 2007-2009

Sreeharsha V. Nandyala, BA¹; Steven J. Fineberg, MD²; Alejandro Marquez-Lara, MD³; Matthew W. Oglesby, BA²; Miguel A. Pelton, BS²; Alpesh A. Patel, MD, FACS⁴; Kern Singh, MD³

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FDA Device/Drug Status: Facet replacement devices (Investigational/Not approved)

P68. Measures of an Intracanal, Endoscopic Transforaminal Decompression Technique

Joseph A. Sciafani, MD¹; Kamshad Raiszadeh, MD²; Choll W. Kim, MD, PhD²

¹University of California San Diego, San Diego, CA, US; ²Spine Institute of San Diego, San Diego, CA, US

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

P69. Modified Growing Rod Technique for the Treatment of Early-Onset Idiopathic Scoliosis

Sinan Kahraman, MD¹; Meric Enercan, MD¹; Cagatay Ozturk, MD¹; Gurkan Gumussuyu, MD¹; Alaa Zakout, MD¹; Azmi Hamzaoglu, MD²

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

P70. Changes in Objectively Measured Walking Performance, Function and Pain Following Surgery for Spondylolisthesis with Lumbar Spinal Stenosis

Christy C. Tomkins-Lane, PhD

Mount Royal University, Calgary, AB, Canada

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

P71. Hemivertebra Resection Via Posterior Approach In Children Under Age of Five Years with More Than Five-Years Follow-Up

Sinan Kahraman, MD¹; Meric Enercan, MD¹; Cagatay Ozturk, MD¹; Gurkan Gumussuyu, MD¹; Wael Alkasem, MD¹; Azmi Hamzaoglu, MD²

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

P72. Does the Thoracolumbar Upper Instrumented Vertebra (UIV) Level Make a Difference in Proximal Junctional Kyphosis (PJK) with Circumferential Minimally Invasive Surgical (CMIS) Correction of Adult Spinal Deformity (ASD)?

Neel Anand, MD¹; Babak Khandehroo, MD²; Keyi Yu, MD³; Sheila Kahwaty, PA-C; Eli M. Baron, MD⁴

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FDA Device/Drug Status: RhBMP2 (Not approved for this indication), Multilevel lateral transposas interbody Peek device (Not approved for this indication)

P73. Fusion Rate of Stand Alone Anterior Lumbar Interbody Fusion with Recombinant Human Bone Morphogenetic Protein-2 for the Treatment of Degenerative Disc Disease With and Without Spondylolisthesis

Eyal Behrbalk, MD¹; Bronek M. Boszczyk, MD²

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FDA Device/Drug Status: SynFix-LR Cage (Approved for this indication), BMP-2 (Approved for this indication)

P74. Segmental Self-Growing Rod Constructs in the Management of Early Onset Neuromuscular Scoliosis

Hossein Mehdiyan, FRCS; Georgios Arealis, MD, PhD; Nasir A. Quraishi, MD; Sherief Elsayed, FRCS, MbChB

Queen's Medical Centre, Nottingham, UK

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

P75. Prestige ST Cervical Artificial Disc Results with Up to Three-Year Follow-Up

Kenneth A. Pettine, MD

Rocky Mountain Associates in Orthopedic Medicine, Loveland, CO, US

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

P76. Prospective Evaluation of Surgical Planning in Adult Sagittal Realignment: Root Cause Analysis of Failure

Jamie S. Terran¹; Bertrand Moal, MS¹; Frank J. Schwab, MD²; Justin C. Paul, MD, PhD¹; Themistocles S. Protopsaltis, MD³; Thomas J. Errico, MD⁴; Virginie Lafage, PhD²

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

P77. The Compensatory Relationship of Upper and Subaxial Cervical Motion in the Presence of Cervical Spondylosis

Tetsuo Hayashi, MD¹; Michael D. Daubs, MD²; Akinobu Suzuki, MD, PhD³; Kevin Phan, BS³; Trevor Scott, MD⁴; Bayan Aghdasi, BA⁵; Monchai Ruangchainikom, MD³; Xueyu Hu, MD, PhD⁶; Christopher J. Lee³; Jeffrey C. Wang, MD⁷

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

P78. Midterm Outcomes of a Prospective Multicenter Randomized Controlled Trial Comparing the Clinical Efficacy of Interspinous Spacers as a Treatment for Moderate Lumbar Spinal Stenosis

Peter G. Whang, MD¹; Vikas V. Patel, MD²; W. Daniel Bradley, MD³; Jon E. Block, PhD⁴

¹Yale University School of Medicine, New Haven, CT, US; ²Denver, CO, US; ³Texas Back Institute, Denton, TX, US; ⁴The Jon Block Group, San Francisco, CA, US

FDA Device/Drug Status: Vertiflex (Investigational/Not approved), X-Stop (Approved for this indication)

P79. Establishment of a Thoracic Torg Ratio to Predict Congenital Thoracic Stenosis: A Study of 620 Postmortem Subjects

Navkirat Bajwa¹; Nicholas U. Ahn, MD²

¹Cleveland, OH, US; ²University Hospital of Cleveland, Department of Orthopedic Surgery, Cleveland, OH, US

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

P80. A Therapeutic Efficacy of the Transpedicular Intracorporeal Bone Graft with Short-Segmental Posterior Instrumentation in Osteonecrosis of Vertebral Body: A Minimum Five-Year Follow-Up Study

Gun Woo Lee, MD¹; Bo Gun Suh, MD²

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

P81. Preoperative Narcotic Use Predicts Worse Postoperative Self-Reported Outcomes in Patients Undergoing Spine Surgery

Dennis S. Lee, MD¹; Sheyan J. Armaghani, MD²; Jesse E. Bible, MD²; David N. Shau, BS¹; Harrison F. Kay²; Chi Zhang²; Kristin Archer, PhD, DPT¹; Matthew J. McGirt, MD¹; Clinton J. Devin, MD²

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Nashville, TN, US

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

P82. Preoperative Narcotic Use and its Relation to Anxiety, Depression and Payer Status in Patients Undergoing Spine Surgery

Dennis S. Lee, MD¹; Sheyan J. Armaghani, MD²; Jesse E. Bible, MD²; David N. Shau, BS¹; Harrison F. Kay²; Chi Zhang²; Matthew J. McGirt, MD¹; Clinton J. Devin, MD²

¹Vanderbilt University Medical Center, Nashville, TN, US; ²Nashville, TN, US

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

P83. The Relationship Between Lumbar Spine Facet Joint Arthritis and Dynamic and Static Low Back Pain. Which Level of Lumbar Spine Facet Joint Arthritis is Most Influenced on the Static or Dynamic Low Back Pain?

Sang-Bong Ko, MD

Cherry Hill, NJ, US

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

P84. Electronic Health Records Have Negligible Impact on Outpatient Volume and Coded Level of Service: A Report from Two Departments in an Academic Medical Group

Matthew L. Webb¹; Daniel D. Bohl, MPH¹; Jordan A. Gruskay²; Jonathan N. Grauer, MD¹

¹Yale University School of Medicine, New Haven, CT, US; ²Rothman Institute, Philadelphia, PA, US

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

P85. Cortical Screw as Rescue for Failed Lumbar Pedicle Screw Construct: A Biomechanical Analysis

Graham Calvert, MD¹; Brandon D. Lawrence, MD²; Kent N. Bachus, PhD³; Darrel S. Brodke, MD⁴

¹University of Utah Hospital, Salt Lake City, UT, US; ²University of Utah Orthopaedics, Salt Lake City, UT, US; ³University of Utah Orthopaedic Center Orthopaedic Research Laboratory, Salt Lake City, UT, US; ⁴University Orthopaedic Center, Salt Lake City, UT, US

FDA Device/Drug Status: Medtronic CD Horizon Solera Pedicle Screws (Approved for this indication), Medtronic CD Horizon Solera Cortical Screws (Approved for this indication)

P86. Pharmacological Anxiolysis with Promethazine as an Adjunctive Therapy for Acute Low Back Pain in the Adult Emergency Department

Eyal Behrbalk, MD¹; Bronek M. Boszczyk, MD²

¹Nottingham, UK; ²The Centre for Spinal Studies and Surgery, Nottingham, UK

FDA Device/Drug Status: Morphine (Approved for this indication), Promethazine (Approved for this indication)

P87. Cervical Sagittal Alignment After Multilevel Disc Replacement with a Semi-Constrained Prosthesis

Lucie Aubourg, PhD¹; Pierre Bernard, MD²; Thierry Vila, MD³; Jacques Beaurain, MD⁴; Thierry Dufour, MD⁵; Jean Huppert, MD⁶; Jean-Paul Steib, MD⁷; Phong Dam Hieu, MD, PhD⁸; Jean-Marc Vital, MD⁹

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FDA Device/Drug Status: Mobi-C (Investigational/Not approved)

P88. Clinical Results and Functional Outcome of Revision Surgery for Symptomatic Proximal Junctional Kyphosis in Adult Spinal Deformity

Haruki Funao, MD, PhD¹; Floreana Naef, MD²; Khaled M. Kebaish, MD²

¹Department of Orthopedic Surgery, The Johns Hopkins Hospital, Baltimore, MD, US; ²Baltimore, MD, US

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

P89. Poor Psychosocial Profile Reported by SF 36, SRS 22r and DRAM Does Not Predict Outcome Following Adult Spinal Deformity Surgery

International Spine Study Group¹; Jamie S. Terran²; Frank J. Schwab, MD³; Gregory M. Mundis Jr., MD⁴; Eric O. Klineberg, MD⁵; Jacob M. Buchowski, MD, MS⁶; Robert A. Hart, MD⁷; Richard A. Hostin, MD⁸; Munish C. Gupta, MD⁹; Christopher P. Ames, MD¹⁰; Justin S. Smith, MD, PhD¹¹; Christopher I. Shaffrey, MD¹²; Virginie Lafage, PhD³; R. Shay Bess, MD¹³; Douglas C. Burton, MD¹⁴

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

P90. Identifying Determinants of Low Back Pain Behaviors

Shira S. Weiner, PhD, PT¹; Mandi W. Gibbons, MS¹; Sherri Weiser, PhD²; Dorice L. Vieira²

¹New York, NY, US; ²New York University Medical Center, New York, NY, US

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

P91. Pedicle Screws Allow Maintenance of Thoracic Kyphosis in AIS, But Ability to Improve Hypokyphosis is Limited

Vishal Sarwahi, MD¹; Adam L. Wollowick, MD²; Preethi M. Kulkarni, MD³; Aviva Dworkin³; Terry D. Amaral, MD²; Yungtai Lo, PhD⁴

¹New York, NY, US; ²Bronx, NY, US; ³Montefiore Medical Center, Bronx, NY, US; ⁴Albert Einstein College of Medicine, Bronx, NY, US

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

P92. Pedicle Screws Can Eliminate the Need for Hemivertebrae Excision in Late Presenting Congenital Scoliosis or Kyphosis

Vishal Sarwahi, MD¹; Terry D. Amaral, MD²; Aviva Dworkin³; Abhijit Y. Pawar, MD¹; Adam L. Wollowick, MD²

¹New York, NY, US; ²Bronx, NY, US; ³Montefiore Medical Center, Bronx, NY, US

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

P93. Fusion Rates and Cost Analysis of Stand-Alone Anterior Lumbar Interbody Fusion Versus Anterior Lumbar Interbody Fusion with Supplemental Anterior or Posterior Instrumentation

Ali Zahrai, MD¹; Joe W. Chiles III, BS²; Nikhil A. Thakur, MD³; Scott D. Boden, MD⁴; John G. Heller, MD⁴; Daniel Refai, MD⁵

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

P94. Clinical Improvement Through Nonoperative Treatment of Adult Spinal Deformity: Who is Likely to Benefit?

International Spine Study Group¹; Caroline E. Poorman, BA²; Kseniya Slobodyanyuk³; Justin S. Smith, MD, PhD⁴; Themistocles S. Protopsaltis, MD⁵; Richard A. Hostin, MD⁶; R. Shay Bess, MD⁷; Gregory M. Mundis Jr., MD⁸; Frank J. Schwab, MD²; Virginie Lafage, PhD²

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

P95. Radiation Exposure to the Surgeon and the Patient During Low Thoracic and Lumbar Spine Instrumentation, A Prospective Comparison of Navigation Versus Free-Hand Technique

Jimmy Villard, MD, MSc

Lausanne, VD, Switzerland

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

P96. New Data on the Growth Patterns of the Pediatric Spinal Canal

Complex Spine Study Group¹; Richard Schwend, MD²; Shyam Kishan, MD³; Laurel Blakemore, MD⁴; John A. Ferguson, FRACS⁵; Julie L. Reigut, MS¹; John A. Schmidt¹; Behrooz A. Akbarnia, MD⁶

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

P97. Preliminary Three-Year Outcomes Utilizing the ACADIA® Facet Replacement System

Thomas B. Briggs, MD¹; Morgan P. Lorio, MD, FACS²; Charles A. Hartjen, MD³; Kevin A. Rahn, MD⁴; Jacqueline Myer⁵; Kelly Baker, PhD⁵

¹Springfield Neurological Institute, Springfield, MO, US; ²NeuroSpine Solutions, Bristol, TN, US; ³Owings Mills, MD, US; ⁴Ft. Wayne Orthopaedics, Fort Wayne, IN, US; ⁵Globus Medical, Audubon, PA, US

FDA Device/Drug Status: ACADIA Facet Replacement System (Investigational/Not approved)

P98. Is There a Limitation to Correction of Sagittal Balance with Circumferential Minimally Invasive Surgical (CMIS) Correction of Adult Spinal Deformity (ASD)?

Neel Anand, MD¹; Babak Khandehroo, MD²; Sheila Kahwaty, PA-C¹; Eli M. Baron, MD³

¹Cedars-Sinai Medical Center Spine Center, Los Angeles, CA, US; ²Cedars-Sinai Medical Center, Los Angeles, CA, US; ³Cedars-Sinai Institute for Spinal Disorders, Los Angeles, CA, US

FDA Device/Drug Status: Multilevel lateral transposas interbody Peek device (Not approved for this indication), RhBMP (Not approved for this indication)

P99. Sacrectomy and Adjuvant Radiotherapy for the Treatment of Sacral Chordomas: A Single Centre Experience Over 27 Years

Arjun Dhawale, MD¹; Joseph P. Gjolaj, MD²; Laurens Holmes Jr., PhD, MPH³; H. T. Temple, MD⁴; Frank J. Eismont, MD⁵

¹South Miami, FL, US; ²Charlottesville, VA, US; ³Nemours/A.I. duPont Hospital for Children, Wilmington, DE, US; ⁴University of Miami, Department of Orthopaedics, Miami, FL, US; ⁵University of Miami School of Medicine Department of Orthopedic Rehabilitation, Miami, FL, US

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

P100. Does Treatment with the ACADIA® Facet Replacement Device Provide Sustained Relief of Stenotic Leg Pain?

Jim A. Youssef, MD¹; Farhan N. Siddiqi, MD²; Jacqueline Myer³; Kelly Baker, PhD³

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FDA Device/Drug Status: ACADIA Facet Replacement System (Investigational/Not approved)

P101. Avoidable and Unavoidable Complications in Spine Surgery: A Survey of Spine Fellowship Directors

Katiri Wagner, BS¹; Mohammed A. Khaleel, MD²; Christopher M. Bono, MD³; Andrew P. White, MD⁴; Kirkham B. Wood, MD⁵; Mitchel Harris, MD, FACS⁶; Kevin J. McGuire, MD¹

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

P102. Patients with Back Pain Have Inferior Results Following Hip Arthroscopy: A Minimum Two-Year Follow-Up Match-Paired Study

Benjamin Domb, MD¹; Itamar B. Botser, MD²; Christine Stake²

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

P103. Bone Density and Donor Age Are Not Needed to Predict Femoral Ring Allograft Mechanical Performance

Robert A. Hart, MD¹; Bala Krishnamoorthy, PhD²

¹Oregon Health & Science University, Portland, OR, US; ²Washington State University, Pullman, WA, US

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

P104. Early Proximal Junctional Failure in Patients with Preoperative Sagittal Imbalance

Micah W. Smith, MD¹; Prokopis Annis, MD²; Brandon D. Lawrence, MD³; Michael D. Daubs, MD⁴; Darrel S. Brodke, MD⁵

¹Salt Lake City, UT, US; ²University of Utah, Salt Lake City, UT, US; ³University of Utah Orthopaedics, Salt Lake City, UT, US; ⁴Santa Monica, CA, US; ⁵University Orthopaedic Center, Salt Lake City, UT, US

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

P105. Revision Rate Following Thoracolumbar Fusion for Adult Deformity: Upper Versus Lower Thoracic UIV

Prokopis Annis, MD¹; Brandon D. Lawrence, MD²; Michael D. Daubs, MD³; Darrel S. Brodke, MD⁴

¹University of Utah, Salt Lake City, UT, US; ²University of Utah Orthopaedics, Salt Lake City, UT, US; ³Santa Monica, CA, US; ⁴University Orthopaedic Center, Salt Lake City, UT, US

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

P106. Minimally Invasive Transforaminal Lumbar Interbody Fusion: Return to Duty in Active Duty US Army Patients

Anthony Barcia, MD¹; Joseph Orchowski, MD²

¹Tripler Army Medical Center-Orthopaedic Surgery, Honolulu, HI, US; ²Tripler Army Medical Center, Honolulu, HI, US

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

P107. Does Spanning the Ring Apophysis Affect Lateral Lumbar Interbody Fusion Rates: A Preliminary Report

Bradford S. Waddell, MD¹; Joseph M. Zavatsky, MD²

¹Ochsner Orthopaedics, New Orleans, LA, US; ²Ochsner Medical Center, New Orleans, LA, US

FDA Device/Drug Status: Lateral Interbody Cage (Approved for this indication), Percutaneous Pedicle Screw System (Approved for this indication)

P108. Anterior and Posterior Cervical Fusion in Patients with High Body Mass Index Appear Safe Overall: An Analysis of 4,071 Patients in the ACS-NSQIP Database

Rafael A. Buerba¹; Michael Fu²; Jordan A. Gruskay³; Jonathan N. Grauer, MD¹

¹Yale University School of Medicine, New Haven, CT, US; ²New Haven, CT, US; ³Rothman Institute, Philadelphia, PA, US

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

P109. Measurement of Intraoperative Spinal Cord Blood Flow Using High Resolution Laser Doppler: The Value of Cord Neurophysiological Monitoring

Jesus Burgos-Flores, PhD

Orthopedic Pediatric Department, Madrid, Spain

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

P110. Comparative Clinical and Economic Outcomes of Minimally Invasive Surgery for Posterior Lumbar Fusion: A Systematic Review and Meta-Analysis

Raja Y. Rampersaud, MD, FRCSC¹; Christina L. Goldstein, MD, FRCSC²; Kevin Macwan³; Kala Sundararajan, MSc¹

¹Toronto Western Hospital, Toronto, ON, Canada; ²Hamilton, Canada; ³Mississauga, Canada

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

P111. Sacro-Pelvic Fixation Using the S2 Alar-Iliac (S2AI) Screws in Adult Deformity Surgery: A Prospective Study with Minimum Five-Year Follow-Up

Hamid Hassanzadeh, MD¹; Sophia Strike, MD²; Floreana Naef, MD¹; Paul D. Sponseller, MD¹; Khaled M. Kebaish, MD¹

¹Baltimore, MD, US; ²Johns Hopkins Orthopaedic Surgery, Baltimore, MD, US

FDA Device/Drug Status: S2 Alar-Iliac screw (Approved for this indication)

P112. Feasibility of Balloon Kyphoplasty Using Unilateral Transpedicular Approach for the Mid & Upper Thoracic Spine: A Laboratory Study

Leonard I. Voronov, MD, PhD¹; Georgios Vastardis, MD²; Anna Marjan, BS³; Michael Stojanovic, BS³; Brian Dial, BS³; Tejaswy Potluri⁴; Gerard Carandang⁵; Alexander Hadjipavlou, MD⁶; Michael R. Zindrick, MD⁷; Avinash G. Patwardhan, PhD⁸

¹Willowbrook, IL, US; ²Hinsdale, IL, US; ³Maywood, IL, US; ⁴The University of Toledo, Hines, IL, US; ⁵Hines VA Hospital, Hines, IL, US; ⁶Heraklion, Greece; ⁷Hinsdale Orthopaedics, Hinsdale, IL, US; ⁸Loyola University Medical Center Department of Orthopaedic Surgery, Maywood, IL, US

FDA Device/Drug Status: AVAmax (Approved for this indication), AVAflex (Approved for this indication)

P113. Cervical Sagittal Alignment, Motion and Segmental Contribution: Radiographic Outcomes of One- and Two-Level Disc Replacement with NuNec and Prestige LP Implants

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FDA Device/Drug Status: NuNec Cervical Disc Replacement (Investigational/Not approved), Prestige LP Cervical Disc Replacement (Investigational/Not approved)

P114. Incidental Durotomy: A Multivariate Analysis for Risk Factors and Clinical Prediction Profile

Jerry Y. Du¹; Alexander Aichmair²; Joseph Nguyen, MPH³; Federico P. Girardi, MD⁴; Frank P. Cammisia Jr., MD⁴; Darren R. Lebl, MD³

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

P115. Subsidence and Fusion Rates Comparing PEEK to Titanium (Ti) Interbody Devices in Minimally Invasive Transforaminal Lumbar Interbody Fusion (MITLIF)

Walter W. Eckman, MD; Lynda G. Hester, PT; Michelle McMillen, RN
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FDA Device/Drug Status: Unilateral pedicle fixation (Not approved for this indication), "PLIF type" Titanium and PEEK devices (Not approved for this indication), Titanium Geo Structure (Unknown), TiSD device (Approved for this indication), BMP2 (Not approved for this indication), SiHA (Not approved for this indication)

P116. Degenerative Changes in the Lumbar Spine Correlate with Spino-Pelvic Alignment in Patients with Low Back Pain

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

P117. Postoperative Mechanical Lumbar Radiculopathy Caused by Pedicle Screws with Intraoperative Normal t-EMG Thresholds: The Value of Probe Stimulation at the Pedicular Mid-Track

Vicente Garcia, MD¹; Jesus Burgos-Flores, PhD²; Carlos Barrios, MD³; Eduardo Hevia, MD⁴; Gema De Blas, MD⁵

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

P118. Hounsfield Unit Determination of Relative Risk for Incidental Durotomy by Quantitative Computed Tomography

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

P119. The Utility of Cultures in the Treatment of Osteomyelitis of the Spine

Sina Pourtaheri, MD¹; Arash Emami, MD²; Mark J. Ruoff, MD³; Tyler N. Stewart⁴; Kimona Issa, MD⁵; Eiman Shafa, MD⁶; Ki S. Hwang, MD⁷; Kumar G. Sinha, MD²

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

P120. Two-Level Coflex® Interlaminar Stabilization Compared to Two-Level Lumbar Spinal Fusion for the Treatment of Spinal Stenosis with Low-Grade Spondylolisthesis

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

P121. Safety of Instrumentation in Vertebral Osteomyelitis

Sina Pourtaheri, MD¹; Arash Emami, MD²; Eiman Shafa, MD³; Mark J. Ruoff, MD⁴; Ki S. Hwang, MD⁵; Tyler N. Stewart⁶; Kimona Issa, MD⁷; Kumar G. Sinha, MD²

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

P122. Pulmonary Function Following Adult Spinal Deformity Surgery: Minimum Two-Year Follow-Up

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

P123. Comparison of Pulmonary Function in Adults Younger and Older than Age 60 Undergoing Spinal Deformity Surgery

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

P124. Biomechanical Contribution of Transverse Connectors in the Setting of a Thoracic Pedicle Subtraction Osteotomy

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FDA Device/Drug Status: Thoracic pedicle screws (Approved for this indication)

P125. Stand-Alone ALIF for Supplementation of Long Posterior Lumbosacral Fusion Constructs

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

P126. Postoperative Complications After Anterior Lumbar Interspinous Fusion in Patients with History of Prior Abdominal Surgery

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

P127. Three Stages of Awareness (Awake, Sedated, Intubated) During VEP and EEG Recordings

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

P128. Outcomes After ALIF Versus TLIF For Treatment of Symptomatic L5-S1 Spondylolisthesis: A Prospective, Multi-Institutional Comparative Effectiveness Study

Paul Thompson, BS¹; Owoicho Adogwa, MPH²; Kemp T. Knott, BS³; Ulysses Toche, BS³; Kevin Huang, BA³; Joseph S. Cheng, MD⁴; Robert E. Isaacs, MD³

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

P129. A Prospective, Multi-Institutional Comparative Effectiveness Study of Lumbar Spine Surgery in Morbidly Obese Patients: Does Minimally Invasive TLIF Result in Superior Outcomes

Paul Thompson, BS¹; Owoicho Adogwa, MPH²; Ulysses Toche, BS³; Kemp T. Knott, BS³; Kevin Huang, BA³; Joseph S. Cheng, MD⁴; Robert E. Isaacs, MD³

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

P130. Two-Year Outcomes After Lateral Lumbar Interbody Fusion Versus Minimally Invasive Transforaminal Lumbar: A Comparative Effectiveness Analysis

Paul Thompson, BS¹; Owoicho Adogwa, MPH²; Ulysses Toche, BS³; Kevin Huang, BA³; Kemp T. Knott, BS³; Joseph S. Cheng, MD⁴; Robert E. Isaacs, MD³

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

P131. When Does Pain, Paresthesia and Numbness Resolves Following Nerve Root Decompression in Cervical and Lumbar Radiculopathy: A Prospective Study with Patients Self-Reported Data

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

P132. Degenerative Spondylolisthesis: An Analysis of Trends Within the National Inpatient Sample (NIS) Database

Christopher S. Klifto, MD¹; Robert P. Norton, MD²; Vadim Goz, BA³; John A. Bendo, MD⁴

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

P133. Long-Term Results of Endoscopic Dorsal Ramus Rhizotomy and Anatomic Variations of the Painful Lumbar Facet Joint

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

P134. Lumbar Spine Posterior Subcutaneous Fat Depth: Correlation with Body Mass Index

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

P135. Diagnosis and Treatment of Cauda Equina Syndrome

Mark E. Tantorski, DO, PT¹; Scott G. Tromanhauser, MD, MBA²; Stephen Parazin, MD³; Brian Kwon, MD⁴; Eric P. Carkner, MD⁵; David H. Kim, MD⁶

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

P136. Exploring the Efficacy of a Self-Sterilizing Orthobiologic PEEK as a Viable Biomaterial for Spinal Surgery

Robert K. Eastlack, MD¹; Sriram Sankar, MSc²; Nitin N. Bhatia, MD³; Jami Hafiz, PhD²

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

P137. Rod Fractures in Spinal Deformity Surgery: Does Cobalt Chrome Really Fracture Less Often?

Michael D. Hellman, MD¹; Bryan Haughom, MD²; Nathan Wetters, MD³; Mark F. Kurd, MD²; Kasra Ahmadiania, MD²

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FDA Device/Drug Status: Stryker Xia (Approved for this indication), DePuy Expedium (Approved for this indication)

P138. Infection as a Cause of Lumbar Disc Herniation: Colonization or Sample Contamination?

Vicente Ballesteros, MD; Miguel Angel Lecaros, MD; Javier I. Lecaros Bahamondes, MD; Sebastian Abusleme Demian, MD; Francesca A. Truffa, RN; Juan J. Zamorano, MD; Alejandro Urzua; Francisco Ilabaca, MD; Jose Fleiderman, MD; Ratko Yurac, MD; Milan A. Munjin, MD; Carlos M. Tapia Sr., MD; Sergio A. Ramirez, MD

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

P139. Risk Factors and Clinical Outcomes of Patients with Adjacent Segment Degeneration After CDA or ACDF at Two Levels

Reginald J. Davis, MD, FACS¹; Gregory A. Hoffman, MD²; Hyun W. Bae, MD³; Michael S. Hisey, MD⁴; Ralph F. Rashbaum, MD⁵; Pierce D. Nunley, MD⁶; Daniel L. Peterson, MD⁷; John Stokes, MD⁸

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FDA Device/Drug Status: Mobi-C[®] Cervical Disc Prosthesis (Investigational/Not approved)

P140. Cervical Disc Arthroplasty Results in Fewer Secondary Surgeries Through 48 Months Compared to ACDF: Results for a Prospective Randomized IDE Study for Two-Level Use

Reginald J. Davis, MD, FACS¹; Gregory A. Hoffman, MD²; Hyun W. Bae, MD³; Michael S. Hisey, MD⁴; Ralph F. Rashbaum, MD⁵; Pierce D. Nunley, MD⁶; Daniel L. Peterson, MD⁷; John Stokes, MD⁸

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FDA Device/Drug Status: Mobi-C[®] Cervical Disc Prosthesis (Investigational/Not approved)

P141. Two-Year Patient Outcomes After Single Versus Multilevel Cervical Disc Arthroplasty

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FDA Device/Drug Status: Prestige ST (Not approved for this indication), Prestige LP (Investigational/Not approved), Prodisc-C (Not approved for this indication)

P142. Multicenter US Clinical Evaluation of Minimally Invasive Targeted RF Ablation of Metastatic Spinal Tumors Using a Novel Bipolar Navigational Device

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FDA Device/Drug Status: DFINE STAR targeted radiofrequency ablation system (Approved for this indication)

P143. Validity of Scoliosis Information Available on the Internet

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

P144. Do Residents Know Evidence-Based Guidelines for Cervical Spine Clearance in Blunt Trauma Patients?

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

P145. Clinical Outcome Following Cervical Disc Arthroplasty in an Active Duty Military Population

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

P146. Correlation Between Intraoperative Endplate Breach and Subsidence of Polyetheretherketone Intervertebral Cages in Minimally Invasive Extreme Lateral Lumbar Interbody Fusion

Vijay Agarwal, MD¹; Jacob H. Bagley, BS²; Kemp T. Knott, BS²; Timothy R. Owens, MD³; Christopher R. Brown, MD⁴; Robert E. Isaacs, MD²

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FDA Device/Drug Status: PEEK Intervertebral Cage (Approved for this indication)

P147. Fluoroscopist Awareness Affects Radiation Exposure in Lumbar Localizing Films

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

P148. Obstacles to Early Mobilization After Spinal Fusion and Effect on Hospital Length of Stay

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

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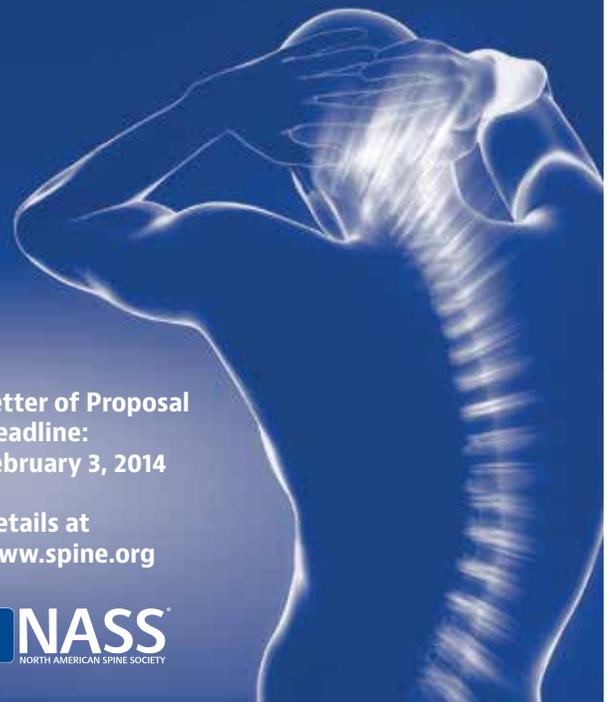
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Aluizio, Arantes A.: Not available at time of publication.

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 (B).

Amaral, Terry D.: Research Support (Staff and/or Materials): DePuy Spine (B, Paid directly to institution/employer), K2M (B, Paid directly to institution/employer), Stryker Spine (C, Paid directly to institution/employer).

Ames, Christopher P.: Royalties: Aesculap (C, Paid directly to institution/employer), Stryker (E, Paid directly to institution/ employer), Lanx (E, Paid directly to institution/employer); Stock Ownership: Trans1 (1%, Paid directly to institution/ employer), Doctors Research Group (1%, Paid directly to institution/employer), Visualase (1%, Paid directly to institution/employer); Consulting: Medtronic (B, Paid directly to institution/employer), DePuy (C), Stryker (B).

An, Howard S.: Royalties: U&I (C); Stock Ownership: Articular Engineering (18%); Private Investments: Anulex (C); Consulting: Advanced Biologics (B, Biologic Scientific Advisory Board), Globus (B, Biologics Advisory Board), Zimmer Spine (B, Biologic Scientific Advisory Board, Cervical Spine Instrumentation), Pioneer (B); Board of Directors: Articular Engineering (Board of Directors, 18%); Scientific Advisory Board: Pioneer (Biologic Scientific Advisory Board, 15,000 shares), Spinal Kinetics (Scientific Advisory Board, 10,000 shares), Medyssey (Scientific Advisory Board, B); Other Office: International Society for the Study of the Lumbar Spine (President-Elect Board of Directors); Endowments: Rush University Medical Center (D); Grants: SpinalCyte (F, Paid directly to institution/employer); Fellowship Support: Orthopaedic Research Education Foundation (E, Paid directly to institution/employer).

Anand, Neel: Royalties: Medtronic (F), NuVasive (E), Globus Medical (C); Stock Ownership: Trans1 (Unknown), Globus (Unknown); Private Investments: Paradigm Spine (Unknown), Bonovo Orthopaedics (1%), Pearl Diver (1%); Consulting: NuVasive (None); Speaking and/or teaching arrangements: Medtronic (D), Globus Medical (C), Trans1 (C); Trips/travel: Medtronic (Consulting disclosed); Scientific Advisory Board: Medtronic (Consulting disclosed), Atlas Spine (10,000 options), Globus Medical (150,000 stocks).

Anderson, D. Greg: Consulting: Globus (B), Spinicity (None); Board of Directors: Society of Minimally Invasive Spinal Surgery (None); Other Office: Society for Minimally Invasive Spinal Surgery (Past President).

Anderson, Paul A.: Royalties: Stryker (C); Consulting: Pioneer (C), Medtronic (F); Other: Aesculap (C).

Androjna, Caroline: Grants: Orthofix (F, Paid directly to institution/employer).

Antoniou, John: Consulting: DePuy Johnson & Johnson (C).

- Araghi, Ali:** Private Investments: PDP (<1%), AMS (<1%), Benovo (<1%), Pioneer (<1%), K2M (<1%), Surgifile (<1%), Oroboros (<1%), Disc Motion Technologies (<1%); Consulting: Pioneer (None), Alphatec Spine (B), Integra Spine (B); Board of Directors: American Board of Spine Surgery (None).
- Armentano, Donna:** Other: Genzyme (Salary).
- Arnold, Paul M.:** Stock Ownership: Z-plasty (Unknown); Private Investments: Z-plasty (Unknown); Consulting: Stryker Spine (B), LifeSpine (A), Medtronic Sofamor Danek (B), Integra Life Sciences (B), Spine Wave (B), AOSpine North America (C), Cerapedics (B); Board of Directors: AOSpine (Amount not disclosed).
- Asdourian, Paul L.:** Royalties: Alphatec Spine (F), Globus (B); Stock Ownership: Globus (<1%); Private Investments: Paradigm Spine (.25%), Vertebral Technologies (9%); Consulting: Theken Spine/Integra (C), Globus (C); Board of Directors: Vertebral Technologies (100,000 shares); Scientific Advisory Board: Vertebral Technology (50,000 shares).
- Asher, Anthony:** Board of Directors: NeuroPoint Alliance (Travel expenses); Other Office: Board of Directors, American Association of Neurological Surgeons (Travel expenses); Relationships Outside the One Year Requirement: NeuroPoint Alliance (Board of Directors, Travel expenses).
- Atlas, Steven J.:** Royalties: UpToDate (B).
- Aubourg, Lucie:** Scientific Advisory Board: LDR Medical (Salary).
- Auerbach, Joshua D.:** Royalties: Medacta International (None); Consulting: Synthes Spine (C), Simpirica Spine (None), Paradigm Spine (F), Medacta International (C), Medical Metrics (B); Research Support (Staff and/or Materials): Paradigm Spine (C).
- Bae, Hyun W.:** Royalties: Stryker (F), NuVasive (F), Zimmer (B), Biomet (B); Stock Ownership: DiFusion (120,000 shares), Spinal Restoration (10,000 shares); Private Investments: Ascent (20%); Consulting: Stryker (C); Speaking and/or teaching arrangements: Synthes (C); Board of Directors: Prosidian (Stock); Scientific Advisory Board: Spinal Restoration (Stock), DiFusion (Stock).
- Baker, Kelly:** Other Office: Globus Medical (Salary).
- Baker, Ray M.:** Stock Ownership: Relieva MedSystems (0.09%); Private Investments: Nocimed (1.78%), Laurimed (0.5%); Consulting: Medtronic (Chair of AVAIL Global Post Approval Network Scientific Advisory Board); Board of Directors: ISIS (Immediate Past President); Scientific Advisory Board: Collaborative Spine Research Foundation (Board Member), Spine-Health.com (None).
- Barbagallo, Giuseppe:** Consulting: DePuy (A, Paid directly to institution/employer), Synthes (A, Paid directly to institution/employer); Speaking and/or teaching arrangements: DePuy (None), Synthes (None); Trips/travel: DePuy Synthes (Travel expenses); Grants: DePuy (None), Synthes (None).
- Beaurain, Jacques:** Device or Biologic Distributorship (Physician-Owned Distributorship): LDR Medical (E); Royalties: LDR Medical (E); Speaking and/or teaching arrangements: LDR Medical (Amount not disclosed); Trips/travel: LDR Medical (Travel expenses).
- Bederman, S. Samuel:** Royalties: SpineArt (D); Consulting: SpineArt (B), Alphatec Spine (B), Biomet Spine (B).
- Bellabarba, Carlo:** Relationships Outside the One Year Requirement: Synthes (Dissolved 10/2010, Speaking and/or Teaching Arrangement, B).
- Belmont, Philip J.:** Royalties: SLACK (None, Paid directly to institution/employer).
- Bendo, John A.:** Relationships Outside the One Year Requirement: Synthes Spine (Dissolved 11/2009, Consulting, 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 (Stock ownership disclosed), Turning Point (Amount not disclosed).
- Bernard, Pierre:** Royalties: Scient'x (E), Medicea (B), LDR Spine (E); Stock Ownership: LDR Spine (<1%), Spineart (<1%); Private Investments: LDR Spine (<1%), Spineart (<1%); Consulting: Scient'x (B); Speaking and/or teaching arrangements: Alphatec (B), Scient'x (B); Trips/travel: Medtronic (B), LDR Spine (B); Research Support (Investigator Salary): Medicea (A).
- Berven, Sigurd H.:** Royalties: Medtronic (C); Stock Ownership: Baxano (1%), AccuLIF (1%), Simpirica Spine (1%); Consulting: Medtronic (C); Speaking and/or teaching arrangements: Medtronic (C), Globus Medical (C); Trips/travel: Scoliosis Research Society (Travel expenses, Paid directly to institution/employer); Scientific Advisory Board: Medtronic Spine (B); Grants: AOSpine (E, Paid directly to institution/employer), Globus (D, Paid directly to institution/employer); Fellowship Support: Globus Medical (D).
- Bess, R. Shay:** Royalties: Pioneer (B); Consulting: AlloSource, DePuy Spine (B), Alphatec (B), Medtronic (B); Speaking and/or teaching arrangements: DePuy Spine (B), Medtronic (B); Trips/travel: DePuy Spine (B), Medtronic (B), Alphatec (B); Scientific Advisory Board: AlloSource (B); Research Support (Investigator Salary): DePuy Spine (B), Medtronic (B); Grants: Orthopedic Research and Education Foundation (C).
- Bhatia, Nitin N.:** Royalties: Alphatec Spine (D), SeaSpine (F), Biomet (C), Stryker (A); Stock Ownership: DiFusion (1%); Consulting: Biomet Spine (B), Stryker Spine (C), Alphatec Spine (B), SeaSpine (B), Spineart (D); Scientific Advisory Board: DiFusion (Stock).
- Bible, Jesse E.:** Other Office: American Journal of Orthopaedics Resident Advisory Board (None).
- Bilsky, Mark H.:** Royalties: DePuy Spine (A); Consulting: Spine Wave (B); Scientific Advisory Board: Medtronic (A).
- Blakemore, Laurel:** Consulting: K2M (B); Speaking and/or teaching arrangements: Stryker (C); Board of Directors: POSNA (Travel expenses); Scientific Advisory Board: K2M (B).
- Blasier, R. Dale:** Consulting: Synthes Spine (B); Speaking and/or teaching arrangements: Synthes Spine (B).
- Block, Jon E.:** Consulting: VertiFlex (D, Paid directly to institution/employer).
- Blumenthal, Scott L.:** Stock Ownership: Spinal Motion (1%), Veriflex (1%), Anulex (1%), Fziomed (1%), Centinel Spine (1%), Ranier Technology (1%); Consulting: Orthofix (D), Fziomed (C); Speaking and/or teaching arrangements: DePuy (D); Scientific Advisory Board: Orthofix (D), Anulex (B), Fziomed (B), VertiFlex (C).
- Boachie-Adjei, Oheneba:** Royalties: K2M (D), DePuy (D); Consulting: K2M (E), Trans1 (C), DePuy (B); 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).

- Boden, Scott D.:** Royalties: Medtronic (F); Private Investments: SkelRegen (22%); Board of Directors: American Orthopaedic Association (Travel expenses); Scientific Advisory Board: Osteogenix (Stock); Grants: NIH/VA (F); Fellowship Support: Synthes (E, Paid directly to institution/employer), OMEGA (D, Paid directly to institution/employer); Relationships Outside the One Year Requirement: Medtronic (Dissolved 8/2008, Other).
- Bono, Christopher M.:** Royalties: Wolters Kluwer (B), Informa Healthcare (A); Consulting: Harvard Clinical Research Institute (C), United Health Care (Advisory Board); Board of Directors: North American Spine Society (Treasurer); Other Office: Intrinsic Therapeutics (B), JAAOS (B, Deputy Editor), The Spine Journal (Deputy Editor).
- Borckardt, Jeffrey J.:** Research Support (Investigator Salary): NIH (F, Paid directly to institution/employer); Research Support (Staff and/or Materials): NIH (D, Paid directly to institution/employer); Grants: NIH (F, Paid directly to institution/employer), North American Spine Society (C, Paid directly to institution/employer).
- Boszczyk, Broniek M.:** Consulting: Alphatec (Amount not disclosed), Aesculap (Amount not disclosed); Research Support (Staff and/or Materials): Surgi-C (B, Paid directly to institution/employer), Synthes (D, Paid directly to institution/employer), Scient'x (B, Paid directly to institution/employer), Macromed (B, Paid directly to institution/employer); Fellowship Support: DePuy (D, Paid directly to institution/employer).
- Bradley, W. Daniel:** Device or Biologic Distributorship (Physician-Owned Distributorship): North Texas Surgical Services (None); Royalties: NuVasive (C), Alphatec (B); Stock Ownership: LDR Spine USA (1%), TranS1 (1%); Consulting: Alphatec (B); Speaking and/or teaching arrangements: Zimmer (None), TranS1 (None); Trips/travel: VertiFlex (B).
- Bransford, Richard J.:** Speaking and/or teaching arrangements: Synthes (B), AOSpine North America (C); Grants: Synthes (B, Paid directly to institution/employer); Fellowship Support: DePuy (E, Paid directly to institution/employer), AOSpine (E, Paid directly to institution/employer).
- Breitbart, Eric:** Other: Shionogi (Spouse salary).
- Bridwell, Keith H.:** Consulting: DePuy Spine (B); Grants: NIH (G, Paid directly to institution/employer).
- Briggs, Thomas B.:** Private Investments: Doctors Research Group (<1%).
- Brodke, Darrel S.:** Royalties: Amedica (E), DePuy (G); Stock Ownership: Amedica (<0.5%), Pioneer (<0.1%), VertiFlex (<0.1%); Board of Directors: CSRS (None), FOSA (None); Fellowship Support: AOSpine (E, Paid directly to institution/employer).
- Brown, Christopher R.:** Royalties: NuVasive (C); Consulting: NuVasive (E); Speaking and/or teaching arrangements: NuVasive (Consulting disclosed); Trips/travel: NuVasive (Consulting disclosed); Fellowship Support: NuVasive (E).
- Buchowski, Jacob M.:** Consulting: Stryker (B), CoreLink (B), Globus Medical (C), Medtronic (B); Speaking and/or teaching arrangements: Stryker (C), Globus Medical (C), DePuy (C); Trips/travel: Global Spine Tumor Study Group (Travel expenses), International Spine Study Group (Travel expenses), Scoliosis Research Society (Travel expenses); Board of Directors: Spine Deformity (Associate Editor), Journal of Bone and Joint Surgery Orthopaedic Highlights: Spine (Associate Editor), Complex Spine Study Group (Advisory Board Member, Tumor/Trauma Section Chair), St. Louis Spine Society (President); Grants: CSSG/K2M (D, Paid directly to institution/employer); Other: Expert Testimony (D).
- Burger, Evalina L.:** Consulting: Medicea (D, Paid directly to institution/employer); Trips/travel: Medicea (Amount not disclosed, Paid directly to institution/employer).
- Burton, Douglas C.:** Royalties: DePuy Spine (B); Consulting: DePuy Spine (B); Board of Directors: Kansas University Physicians (None), International Spine Study Group (None); Research Support (Investigator Salary): DePuy Spine (C).
- Byrd, J. Abbott:** Royalties: Biomet Spine (G); Stock Ownership: CoAlign (1%); Board of Directors: Atlantic Orthopaedic Specialists (E); Scientific Advisory Board: CoAlign (Stock ownership disclosed).
- Cahill, Patrick J.:** Consulting: DePuy Synthes Spine (B); Speaking and/or teaching arrangements: DePuy Spine (B); Trips/travel: DePuy Spine (B); Grants: Chest Wall and Spinal Deformity Study Group (C, Paid directly to institution/employer).
- Cain, Christopher M.:** Royalties: Synthes (H); Consulting: Synthes (D, Paid directly to institution/employer); Speaking and/or teaching arrangements: AOSpine (B, Paid directly to institution/employer).
- Cammisa, Frank P.:** Device or Biologic Distributorship (Physician-Owned Distributorship): PinnacleCare (A), Orthovita (B), Alphatec (B); Royalties: NuVasive (D); Stock Ownership: Alphatec Spine (88,021 shares), NuVasive (14,580 shares), Paradigm Spine (40,469 shares); Private Investments: Ivy Healthcare I and II (Amount not disclosed), Pearl Diver (Amount not disclosed), Bonovo Orthopedic (Amount not disclosed), HealthCare Capital Partners I, II and III (Amount not disclosed), Spinal Kinetics (Amount not disclosed), NuVasive (Royalties disclosed); Consulting: Alphatec Spine (B), Hydrocision (Amount not disclosed), NuVasive (Royalties disclosed), Paradigm Spine (Amount not disclosed); Scientific Advisory Board: Alphatec (Amount not disclosed), HealthpointCapital Partners (Amount not disclosed), Ivy Healthcare Partners (Amount not disclosed), Mazor Surgical Technologies (Amount not disclosed).
- Campbell, David R.:** Stock Ownership: Cytonics (1%), Atlas Spine (10%).
- Campbell, Mitchell:** Consulting: Medtronic Sofamor Danek (D), Alphatec (B), DePuy (B); Speaking and/or teaching arrangements: DePuy (B), Alphatec (B), Medtronic Sofamor Danek (D).
- Caralli, Luis E.:** Not available at time of publication.
- Carkner, Eric P.:** Device or Biologic Distributorship (Physician-Owned Distributorship): Paradigm Medical (None); Consulting: DePuy (B); Speaking and/or teaching arrangements: Stryker (B).
- Carragee, Eugene J.:** Board of Directors: North American Spine Society (E, 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: Orthopedic Research and Educational Fund (A), University of Louisville Institutional Review Board (A), Association for Collaborative Spine Research (A); Other Office: Norton Healthcare (Salary), Association of Collaborative Spine Research (Database Oversight Committee Association of Collaborative Spine Research); Research Support (Staff and/or Materials): Norton Healthcare (Amount not disclosed, Paid directly to institution/employer); Grants: Norton HealthCare (F, Paid directly to institution/employer); Other: NuVasive (None), National Institutes of Health (Amount not disclosed).

- Carrino, John A.:** Consulting: Abbott (B), Medtronic (A), Best Doctors (A); Scientific Advisory Board: Siemens Medical Systems Syngo (Travel expenses), Carestream Healthcare (Travel expenses), GE Pain Management (Travel expenses), Merge Healthcare (Stocks); Research Support (Investigator Salary): Carestream (B, Paid directly to institution/employer), MedImmune (B, Paid directly to institution/employer); Grants: Siemens Medical Systems (E, Paid directly to institution/employer), Integra (D, Paid directly to institution/employer), Toshiba Medical Systems (D, Paid directly to institution/employer).
- Chang, Michael S.:** Consulting: Globus (B); Speaking and/or teaching arrangements: Stryker (B), Globus (B), Medtronic (B).
- Chapman, Jens R.:** Consulting: HansJoerg Wyss Foundation (Amount not disclosed, Paid directly to institution/employer); Speaking and/or Teaching Arrangements: AOSpine North America (B); Trips/Travel: Synthes (None); Board of Directors: AOSpine North America (C); Scientific Advisory Board: AOSpine Foundation (B); Endowments: AO TK (B); Research Support (Investigator Salary): Alseres Pharmaceuticals (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): Paradigm Spine (A, Paid directly to institution/employer); Fellowship Support: Medtronic (A, Paid directly to institution/employer); Other: Johnson & Johnson (E, Paid directly to institution/employer); Relationships Outside the One-Year Requirement: Journals of Spine, JSDT, JBJS, Trauma, Evidence Based Spine Surgery (Royalties, C, Editorial Board/Reviewer).
- Chaput, Christopher D.:** Speaking and/or teaching arrangements: NuVasive (B); Trips/travel: Facet-Link (B); Research Support (Staff and/or Materials): Medtronic (C, Paid directly to institution/employer), NuVasive (C, Paid directly to institution/employer).
- Chaudhary, Saad B.:** Speaking and/or teaching arrangements: Medtronic (B); Scientific Advisory Board: U & I Corporation (A).
- Cheng, Boyle C.:** Stock Ownership: Medtronic (202 shares); Private Investments: Ortho Kinematics (10,000 shares); Consulting: Ortho Kinematics (B), Rachiotek (B); Speaking and/or teaching arrangements: Medtronic (B); Scientific Advisory Board: Ortho Kinematics (None); Grants: IMDS (E, Paid directly to institution/employer), Olympus Biotech (F, Paid directly to institution/employer).
- Cheng, Ivan:** Royalties: NuVasive (None); Speaking and/or teaching arrangements: Stryker Spine (Amount not disclosed); Grants: Stryker Spine (D).
- Cheng, Joseph S.:** Board of Directors: AANS/CNS Section on Spinal Disorders (Chairperson).
- Cheung, Kenneth M.:** Board of Directors: Scoliosis Research Society (Travel expenses); Research Support (Staff and/or Materials): Research Grants Council (F, Paid directly to institution/employer); Grants: Ellipse Technologies (B, Paid directly to institution/employer), AOE (I, Paid directly to institution/employer); Fellowship Support: Synthes (None).
- Ching, Alexander C.:** Consulting: DePuy Spine (C), Atlas Spine (B); Fellowship Support: Synthes Spine (E, Paid directly to institution/employer).
- Choma, Theodore J.:** Stock Ownership: Gentis (20,000 shares); Consulting: Stryker Spine (B); Scientific Advisory Board: Gentis (B); Research Support (Staff and/or Materials): Stryker Spine (C); Grants: DePuy Spine (D).
- Chou, Dean:** Consulting: Stryker (B).
- Chutkan, Norman B.:** Board of Directors: Walton Rehabilitation Hospital (None).
- Clements, David H.:** Royalties: DePuy Spine (E); Consulting: DePuy Spine (B); Speaking and/or teaching arrangements: DePuy Spine (B); Trips/travel: DePuy Spine (A); Board of Directors: Scoliosis Research Society (A); Research Support (Investigator Salary): Setting Scoliosis Straight Foundation (I, Paid directly to institution/employer); Research Support (Staff and/or Materials): Setting Scoliosis Straight Foundation (None).
- Coe, Jeffrey D.:** Stock Ownership: Phygen (1%), Implantium (3%); Consulting: NuVasive (E), Medtronic (A), TranS1 (None), SI Bone (B), Benvenue Medical (A); Speaking and/or teaching arrangements: NuVasive (Consulting disclosed), SI Bone (Consulting disclosed); Board of Directors: Implantium (None), California Orthopaedic Association (A); Research Support (Staff and/or Materials): Medtronic Sofamor Danek (B), NuVasive (B), Benvenue Medical (A), NuTech (None); Grants: CSRS (C, Paid directly to institution/employer).
- Connolly, Patrick J.:** Device or Biologic Distributorship (Physician-Owned Distributorship): K2M (C, Paid directly to institution/employer); Consulting: ApaTech (None); Scientific Advisory Board: K2M (C); Grants: ApaTech (None).
- Cook, James L.:** Royalties: Arthrex (E); Consulting: Arthrex (B), Schwartz Biomedical (B); Speaking and/or teaching arrangements: Arthrex (B); Research Support (Investigator Salary): NIH (C, Paid directly to institution/employer), Arthrex (B, Paid directly to institution/employer), ACELL (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): NIH (D, Paid directly to institution/employer).
- Corbin, Terry P.:** Royalties: Quality Medical Publishing (A); Private Investments: Spinal Therapies (3%), Amedica Corporation (1,218 shares); Consulting: Kinetic Concepts (A), Amedica Corporation (E), Synthes Trauma (B), Pabban Development (D), Acumen Healthcare Solutions (B), Signus Medizintechnik (B); Trips/Travel: Amedica (B), World Congress Research (A); Research Support (Staff/Materials): Amedica Corporation (B).
- Coric, Domagoj:** Royalties: Spine Wave (F), Pioneer Surgical (B); Stock Ownership: Spine Wave (<1%), Spinal Motion (<1%), Pioneer Surgical (<1%); Consulting: Medtronic (B), United Healthcare (B), Spine Wave (B), Pioneer Surgical (C); Speaking and/or teaching arrangements: Globus Medical (B); Scientific Advisory Board: United Healthcare (B).
- Crandall, Dennis G.:** Royalties: Medtronic (F); Stock Ownership: KSpine (25,000 shares), CoAlign (25,000 shares); Consulting: Medtronic (E); Fellowship Support: Medtronic (E).
- Crawford, Charles H.:** Consulting: Medtronic (D), Alphatec (B); Speaking and/or teaching arrangements: Synthes (B); Other Office: Scoliosis Research Society (Committee Member).
- Cross, Chad:** Stock Ownership: Lucine Biotechnology (Scientific Advisory Board); Consulting: Crossroads Wellness (50%); Speaking and/or teaching arrangements: University of Nevada Las Vegas/College of Southern Nevada (Adjunct Faculty); Scientific Advisory Board: Lucine Biotechnology (None); Other Office: Crossroads Wellness (50%); Grants: University of Nevada Las Vegas (B).
- Daffner, Scott D.:** Stock Ownership: Pfizer (Unknown), Amgen (Unknown); 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).

- Dagenais, Simon:** Private Investments: Palladian Health (<2%); Consulting: University of South Florida (D), New York University (None), Palladian Health (None), Foundation for Chiropractic Progress (B), Gerson Lehman Group (A).
- Dailey, Andrew T.:** Royalties: Biomet (B); Consulting: Biomet (B); Speaking and/or teaching arrangements: AOSpine North America (B); Research Support (Staff and/or Materials): Stryker (C); Relationships Outside the One Year Requirement: Biomet (Dissolved 2008, Teaching, B).
- Daniels, Alan:** Trips/travel: Synthes Spine (B, Paid directly to institution/employer), Stryker (B); Other: Flexuspine (Implant Donation), Synthes Spine (Implant Donation).
- Daubs, Michael D.:** Royalties: Synthes Spine (F); Consulting: DePuy Synthes Spine (B); Speaking and/or teaching arrangements: AOSpine North America (B); Board of Directors: AOSpine North America (B); Grants: Stryker Spine (C, Paid directly to institution/employer); Fellowship Support: AOSpine North America (D, Paid directly to institution/employer).
- Davey, Roderick:** Royalties: Biomet (E); Consulting: Biomet (Amount not disclosed); Speaking and/or teaching arrangements: Exactech (None); Fellowship Support: Biomet (F), Smith & Nephew (F).
- 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 Spine (B).
- de Kleuver, Marinus:** Consulting: DePuy Spine EU (B); Speaking and/or teaching arrangements: DePuy Spine (B).
- Dekutoski, Mark B.:** Royalties: Mayo Office of IP/Medtronic (E, Paid directly to institution/employer); Consulting: Mayo Medical Ventures/Medtronic (B, Paid directly to institution/employer); Speaking and/or teaching arrangements: Mayo Medical Ventures/Medtronic (B); Scientific Advisory Board: Broadwater Associates (B, Paid directly to institution/employer); Fellowship Support: AO Foundation (E, Paid directly to institution/employer).
- Delamarter, Rick B.:** Royalties: Stryker (G), Synthes (G); Consulting: Synthes (C); Research Support (Investigator Salary): Synthes (D); Fellowship Support: Medtronic (E).
- DeLaney, Thomas F.:** Royalties: Wolters Kluwer/Lippincott Williams and Wilkins (A), UpToDate (B), Oakstone Medical Publishing (A); Stock Ownership: GlaxoSmithKline (<1%); Consulting: Amgen Global Giant Cell Tumor Advisory Board (B); Trips/travel: Amgen Global Giant Cell Tumor Advisory Board (A); Scientific Advisory Board: Chordoma Foundation (Scientific Advisory Board); Fellowship Support: ProCure (D, Paid directly to institution/employer); Relationships Outside the One Year Requirement: IBA Proton Therapy (Dissolved 6/2008, Speaking and/or Teaching Arrangement, A).
- Deutsch, Harel:** Royalties: Pioneer (D); Consulting: Zimmer (B).
- Devin, Clinton J.:** Relationships Outside the One Year Requirement: DePuy & Stryker (Dissolved 8/2011, Research Support: Staff and/or Materials, D).
- Deviren, Vedat:** Consulting: Stryker (B), Medtronic (B), NuVasive (B), Guidepoint (A); Speaking and/or teaching arrangements: NuVasive (B), Stryker (B); Research Support (Staff and/or Materials): NuVasive (B); Fellowship Support: NuVasive (D, Paid directly to institution/employer), Globus (E, Paid directly to institution/employer).
- DeWald, Christopher J.:** Consulting: Zimmer (Level D), Integra (C).
- DiPaola, Christian P.:** Consulting: Allen Medical (B), DePuy Spine (D); Research Support (Staff and/or Materials): Medtronic (None).
- Djurasovic, Mladen:** Consulting: Medtronic Sofamor Danek (F).
- Dohring, Edward J.:** Consulting: Vertiflex (B, Paid directly to institution/employer).
- Domb, Benjamin:** Consulting: Arthrex (B), MAKO Surgical Corp. (B); Board of Directors: American Hip Institute (None); Research Support (Investigator Salary): Arthrex (E, Paid directly to institution/employer); Research Support (Staff and/or Materials): MAKO Surgical Corp. (B, Paid directly to institution/employer); Grants: MedWest (B, Paid directly to institution/employer); Fellowship Support: Adventist Hinsdale Hospital (B, Paid directly to institution/employer).
- Dossett, Andrew:** Not available at time of publication.
- Dreisinger, Thomas E.:** Consulting: Scientific Exercise (E, Executive Vice President of Outcomes Research); Board of Directors: McKenzie Institute International (B).
- Dryer, Randall F.:** Royalties: NuVasive (F), Medtronic (F).
- Dufour, Thierry:** Royalties: LDR Medical (E); Trips/travel: Synthes (A).
- Eastlack, Robert K.:** Royalties: Globus Medical (A), NuTech (None); Stock Ownership: NuVasive (<1%), Alphatec (<1%); Private Investments: Top Doctors Labs (1%), Nocimed (1%); Consulting: Stryker (None), NuVasive (B), Aesculap (B), NuTech (None), Life Spine (None), Pioneer (C), Trinity (A), Synthes (B), Globus Medical (C); Speaking and/or teaching arrangements: Aesculap (A), Synthes/DePuy (B), Eli Lilly (B), NuVasive (C), Pioneer (B); Trips/travel: NuVasive (A); Board of Directors: San Diego Spine Foundation (None), Top Doctors Labs (20,000 shares); Scientific Advisory Board: Phygen (B), DiFusion (10,000 shares), Top Doctors Labs (5,000 shares), Aesculap (B); Other Office: Top Doctors Labs (Chief Medical Officer, 100,000 options); Research Support (Staff and/or Materials): NuVasive (C, Paid directly to institution/employer), Pioneer Surgical (C, Paid directly to institution/employer), Lanx (B), Baxano (B); Grants: Integra (D); Fellowship Support: Pioneer (E, Paid directly to institution/employer), NuVasive (E, Paid directly to institution/employer).
- Eckman, Walter W.:** Speaking and/or teaching arrangements: Baxter (A); Trips/travel: SpineSelect (Designer/Inventor Member).
- Edwards, Charles C.:** Board of Directors: Millennium Spine (F), Renovis (B), Calvary Spine (F); Scientific Advisory Board: Renovis (B).
- Eismont, Frank J.:** Royalties: Alphatec Spine Company (E); Stock Ownership: Alphatec Spine Company (50,000 shares); Consulting: Alphatec Spine Company (B); Scientific Advisory Board: Alphatec Spine Company (B).
- Errico, Thomas J.:** Royalties: K2M (F); Private Investments: Fastenetix (33%); Speaking and/or teaching arrangements: K2M (B); Board of Directors: Setting Scoliosis Straight (None); Research Support (Staff and/or Materials): Paradigm (F, Paid directly to institution/employer); Grants: Fridolin Trust (None, Paid directly to institution/employer); Fellowship Support: AOSpine (E), OREF (E, Paid directly to institution/employer), OMEGA (E, Paid directly to institution/employer).
- Facanha Filho, Fernando A.:** Not available at time of publication.
- Fehlings, Michael G.:** Royalties: DePuy Spine (D); Consulting: DePuy Spine (B); Fellowship Support: DePuy Spine (E).
- Ferguson, John A.:** Consulting: K2M (B); Speaking and/or teaching arrangements: K2M (C).
- Fessler, Richard G.:** Royalties: Stryker (B), DePuy (B), Medtronic (B); Consulting: Lanx (A); Scientific Advisory Board: Lanx (None).

- Field, Justin S.:** Royalties: Globus (B); Consulting: NuVasive (C, Paid directly to institution/employer); Speaking and/or teaching arrangements: NuVasive (B); Scientific Advisory Board: Advanced Biologics (Amount not disclosed).
- Finkenberg, John G.:** Board of Directors: Satori World Medical (Medical Advisor), North American Spine Society (Advocacy Chair); Other Office: Triad Healthcare (Surgical Utilization Reviewer); Other: Seikagaku (Chairman of FDA DSMB).
- 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 (D); Consulting: Medtronic (F, Paid directly to institution/employer); Speaking and/or teaching arrangements: Medtronic (Amount not disclosed, Paid directly to institution/employer), DePuy (Amount not disclosed, Paid directly to institution/employer), AOSpine (Amount not disclosed, Paid directly to institution/ employer); Trips/travel: Medtronic (Travel expenses), AOSpine (Travel expenses), DePuy (Travel expenses); Research Support (Staff and/or Materials): Medtronic (E, Paid directly to institution/employer), DePuy (E, Paid directly to institution/ employer); Fellowship Support: Medtronic (F, Paid directly to institution/employer), Synthes (F, Paid directly to institution/ employer).
- Fishman, Scott:** Not available at time of publication.
- Foley, Kevin:** Royalties: ArthroCare (B), Medtronic (I); Stock Ownership: Medtronic (H), NuVasive (H); Private Investments: Discgenics (13%), SpineWave (753,000 shares), TrueVision (5%), BioD (Unknown); Consulting: Medtronic (D), NuVasive (A); Board of Directors: MERI (None), Discgenics (None), BioD (None), TrueVision (None).
- France, John C.:** Speaking and/or teaching arrangements: AOSpine (Amount not disclosed); Other Office: AOSpine (Education Committee); Fellowship Support: AO Foundation (E, Paid directly to institution/employer).
- Franklin, Gary M.:** Not available at time of publication.
- Freedman, Brett A.:** Relationships Outside the One Year Requirement: Medtronic (Dissolved 8/2010, Speaking and/or Teaching Arrangement, B).
- Friesem, Tai S.:** Royalties: Medtronic (C); Speaking and/or teaching arrangements: Pioneer Surgical (B), Globus (B); Trips/ travel: MBA (Travel expenses); Research Support (Staff and/or Materials): Pioneer Surgical (None, Paid directly to institution/ employer).
- Gatchel, Robert J.:** Royalties: Guilford Press (B), Springer (B), APA Press (B); Stock Ownership: American Pain Solutions (Stock); Consulting: PRIDE (D); Scientific Advisory Board: Palladian Health Care (B); Endowments: Nancy P.& John G. Penson Endowed Professorship (B, Paid directly to institution/ employer); Grants: National Institutes of Health (D), Department of Defense (D).
- Gause, Paul R.:** Consulting: Biomet (B, Paid directly to institution/employer); Speaking and/or teaching arrangements: Medtronic (B, Paid directly to institution/ employer).
- Geck, Matthew J.:** Royalties: Zimmer (D); Stock Ownership: DiFusion (2%); Private Investments: DiFusion (Former holder convertible debt note); Consulting: Globus (B); Board of Directors: SpineHope (None); Research Support (Staff and/or Materials): K2M (D, Paid directly to institution/employer).
- Geisler, Fred:** Royalties: Aesculap (C), Rhausler (B); Stock Ownership: Rhausler (34%, Chief Medical Officer), Surgitech (2%); Private Investments: Spinal Integration (None); Consulting: Spinal Restoration (B), Spinal Motion (B), Medtronic (A), Mesoblast (B), VertiFlex (B), Aesculap (B), NuVasive (A); Speaking and/or teaching arrangements: Aesculap (B); Research Support (Staff and/or Materials): Spinal Motion (None).
- Georgy, Bassem A.:** Stock Ownership: Osseon (1%), Spine Works (1%), DFINE Spine (1%); Consulting: DFINE Spine (Amount not disclosed), DePuy (Amount not disclosed); Speaking and/or teaching arrangements: DePuy Spine (Amount not disclosed); Trips/travel: ArthroCare (Amount not disclosed); Scientific Advisory Board: Osseon and Spine Work (Stock).
- Gerling, Michael C.:** Consulting: Paradigm Spine (B).
- Ghanayem, Alexander J.:** Board of Directors: Loyola University Physicians Foundation (None), LSRS (None); Other Office: Omega (Grant Committee), AOA Investment Committee (Chair); Research Support (Staff and/or Materials): Synthes Spine (E, Paid directly to institution/employer); Relationships Outside the One Year Requirement: Department of Veterans Affairs (Dissolved 3/2010, Grant, G).
- Ghiselli, Gary:** Private Investments: DiFusion (9%); Consulting: Biomet (B); Scientific Advisory Board: DiFusion (Stock).
- Hogawala, Zoher:** Board of Directors: American Association of Neurological Surgeons Neuropoint Alliance (None), Congress of Neurological Surgeons (Executive Committee), Collaborative Spine Research Foundation (None), North American Spine Society (Clinical Research Development Chair); Grants: NIH (A, Dissolved).
- Gilder, Kye:** Stock Ownership: NuVasive (2,100 shares, Paid directly to institution/employer).
- Girardi, Federico P.:** Royalties: NuVasive (E), Ortho Development (E), DePuy (E); Stock Ownership: NuVasive (1%), Orthovita (1%), LifeSpine (1%), Centinel Spine (1%), Spinal Kinetics (1%); Consulting: Lanx (I), Ortho Development Corp. (I), Spineart USA (I); Speaking and/or teaching arrangements: Pharmawrite (B); Scientific Advisory Board: Scient'x (Amount not disclosed), Spinal Kinetics (Amount not disclosed), Centinel Spine (Amount not disclosed), Spineart USA (Amount not disclosed), HealthpointCapital (Amount not disclosed), Paradigm Spine (Amount not disclosed).
- Glaser, John A.:** Consulting: DePuy Spine (A, Paid directly to institution/employer); Speaking and/or teaching arrangements: SI Bone (None); Trips/travel: SI Bone (A).
- Glassman, Steven D.:** Royalties: Medtronic (None); Board of Directors: Scoliosis Research Society (President-Elect); Scientific Advisory Board: N2QOD (Scientific Advisory Board); Research Support (Staff and/or Materials): Norton Healthcare (Amount not disclosed, Paid directly to institution/employer); Other: NuVasive (None).
- Gokaslan, Ziya L.:** Stock Ownership: Spinal Kinetics (5%), U.S. Spinal Tech (5%); Speaking and/or teaching arrangements: Stryker (B, Paid directly to institution/employer), DePuy (B, Paid directly to institution/employer); Board of Directors: AOSpine North America (Amount not disclosed); Scientific Advisory Board: Spinal Kinetics (Stock); Research Support (Staff and/or Materials): AOSpine North America (F, Paid directly to institution/employer), DePuy (E, Paid directly to institution/employer), NREF (D, Paid directly to institution/ employer), AOSpine (B, Paid directly to institution/employer), AOSpine Clinical Trial (E, Paid directly to institution/employer); Fellowship Support: AOSpine North America (E, Paid directly to institution/employer).
- Goldstein, Jeffrey A.:** Private Investments: K2M (5%), Physician Fellowship Partners (5%); Consulting: NuVasive (None), K2M



- (None); Board of Directors: ISASS (None); Research Support (Staff and/or Materials): Axiomed (None, Paid directly to institution/employer); Fellowship Support: AOSpine (E, Paid directly to institution/employer).
- Golish, S. Raymond:** Stock Ownership: Cytonics (150,000 shares); Consulting: Cytonics (E), FDA Medical Device Advisory Committee (B); Trips/Travel: Cytonics (B); Other Office: Cytonics (Stock ownership disclosed); Relationships Outside the One Year Requirement: Victory Pharma (Dissolved 1/2007, Consulting, B).
- Gornet, Matthew F.:** Royalties: K2M (D), Medtronic (G), Stryker (B), Pioneer (B); Private Investments: Bonovo (2%), K2M (100,000 shares), Ouroboros (453,460 shares), International Spine & Orthopedic Institute (6%), Nocimed (4%), Paradigm Spine (2%).
- Gottfried, Oren N.:** Consulting: Lanx (B, Paid directly to institution/employer); Speaking and/or teaching arrangements: Lanx (B, Paid directly to institution/employer).
- Grauer, Jonathan N.:** Consulting: Stryker (D), Affinergy (A), Alphatec (B), DePuy (B), Harvard Clinical Research Institute (C), Powered Research (A); Grants: Smith & Nephew (None); Other: Legal consulting (Amount not disclosed).
- Graziano, Gregory P.:** Consulting: Sofamor Danek (None); Other: Multiple Firms (Expert witness review).
- Green, Alana J.:** Consulting: Canada East Spine Centre (D); Trips/travel: Canada East Spine Centre (B).
- Gupta, Munish C.:** Royalties: DePuy (G); Stock Ownership: Pioneer (18,000 shares), Johnson & Johnson (100 shares), Proctor & Gamble (100 shares), Pfizer (100 shares); Private Investments: Spinal Ventures (2%); Consulting: DePuy (C), Medtronic (C), Orthofix (B); Speaking and/or teaching arrangements: DePuy (None), Medtronic (B); Trips/travel: DePuy Spine (B), Medtronic (B); Board of Directors: FOSA (Treasurer); Scientific Advisory Board: SRS Committee (SRS Committee Member); Other Office: FOSA Treasurer (None).
- Guyer, Richard D.:** Royalties: Alphatec (B), Life Spine (B); Stock Ownership: Spinal Motion (<1%); Private Investments: Spinal Ventures I and II (5%); Consulting: DePuy (B); Speaking and/or teaching arrangements: Synthes (C); Scientific Advisory Board: K2M (B), Flexuspine (Stock), Spinal Kinetics (Stock), Nanovis (B), Crocker Technologies (B), MiMedix (B), Life Spine (None); Fellowship Support: OREF (E, Paid directly to institution/employer), AOSpine (E, Paid directly to institution/employer), Medtronic Neurological Division (C, Paid directly to institution/employer), Alphatec (D, Paid directly to institution/employer).
- Haber, L.L.:** Consulting: Orthopediatrics (None), NuVasive Spine (B); Other: DePuy Spine (None, relationship dissolved).
- Harrington, James F.:** Speaking and/or teaching arrangements: Zimmer Spine (C).
- Harris, Mitchel:** Consulting: Harvard Clinical Research Institute (Amount not disclosed, Paid directly to institution/employer), Medtronic (Amount not disclosed, Paid directly to institution/employer); Board of Directors: North American Spine Society (Governance Committee Chair).
- Hart, Robert A.:** Royalties: SeaSpine (E), DePuy (B); Stock Ownership: SpineConnect (Unknown); Consulting: DePuy (C), Eli Lilly (B), Medtronic (B); Speaking and/or teaching arrangements: DePuy (B), Kyphon (None), Medtronic (B), Synthes (None); Trips/travel: Synthes (A), K2M (A); Other Office: AAOS (Assistant Editor), CSRS Editorial Committee (Editorial Board), Spine (Assistant Editorial Board), AAOS (Chair, Instructional Course Committee), American Orthopaedic Association (Member, Leadership Development Committee), Cervical Spine Research Society (Member, Program Committee; Member, Nominating Committee), Lumbar Spine Research Society (Member, Membership Committee), North American Spine Society (Member, Governance Committee), Oregon Association of Orthopaedics (Board Member), OREF (Member, Review Committee, Prospective Clinical Grant Research), Scoliosis Research Society (Member, Adult Deformity Committee); Research Support (Staff and/or Materials): DePuy (D), Medtronic (D); Fellowship Support: OREF (E), Synthes (E); Relationships Outside the One Year Requirement: Medtronic (Dissolved 12/2007, Grant, D), DePuy (Dissolved 7/2010, Fellowship Support, E), AOSpine (Dissolved 12/2005, Speaking and/or Teaching Arrangement, B).
- Hartjen, Charles A.:** Research Support (Staff and/or Materials): Globus Medical (B, Paid directly to institution/employer).
- Hartl, Roger:** Consulting: Synthes (B); Speaking and/or teaching arrangements: Spine Wave (B); Board of Directors: AOSpine (B).
- Hayes, Victor:** Royalties: LifeSpine (D); Stock Ownership: Implanet (1%); Consulting: Globus (Amount not disclosed); Speaking and/or teaching arrangements: LifeSpine (Amount not disclosed).
- Hecht, Andrew:** Royalties: Zimmer Spine (None, Paid directly to institution/employer); Consulting: Stryker spine (None), Zimmer Spine (C, Paid directly to institution/employer); Speaking and/or teaching arrangements: Medtronic (None); Scientific Advisory Board: Musculoskeletal Transplant Foundation (None); Other: Journal of Spinal Disorders (Editorial Review Board).
- Heggeness, Michael H.:** Other: North American Spine Society (Immediate Past President, E).
- Heller, John G.:** Royalties: Medtronic (F); Stock Ownership: Medtronic (1,500 shares); Consulting: Medtronic (None); Board of Directors: CSRS (None); Fellowship Support: OREF (D, Paid directly to institution/employer), Omega (F, Paid directly to institution/employer).
- Hennemann, Sergio A.:** Not available at time of publication.
- Hilibrand, Alan S.:** Royalties: Biomet Spine (F), Alphatec Spine (F), Stryker (C), Amedica (C), Aesculap (B); Stock Ownership: Amedica (<1%), Lifespine (<1%), Spinal Ventures (<3%); Private Investments: Benvenue (Unknown), Nexgen (Unknown), Paradigm Spine (Unknown), Pioneer (<1%), PSD (Unknown), Vertiflex (Unknown); Scientific Advisory Board: Amedica (C); Other Office: CSRS (Vice President).
- Hipp, John A.:** Stock Ownership: Medical Metrics (8%, Scientific Founder, Chief Scientist); Other Office: Medical Metrics (Chief Scientist).
- Hisey, Michael S.:** Device or Biologic Distributorship (Physician-Owned Distributorship): NTSS (B); Royalties: Zimmer Spine (D), LDR Spine (B); Stock Ownership: Spine Wave (1%); Private Investments: Medical Venture Fund (Unknown); Consulting: Zimmer Spine (B); Board of Directors: Texas Health Presbyterian Hospital of Flower Mound (Investor), Spine Mark CRO at TBI (Investor); Scientific Advisory Board: Zimmer Spine (Travel expenses).
- Hoffman, Gregory A.:** Royalties: LDR Spine (B); Stock Ownership: LDR Spine (D); Private Investments: Path 4 Venture Capital Fund (3%); Consulting: LDR Spine (C); Speaking and/or teaching arrangements: LDR Spine (B); Trips/travel: LDR Spine (Speaking and/or teaching arrangements disclosed); Scientific Advisory Board: LDR Spine (Medical Advisor); Research Support (Staff and/or Materials): LDR Spine (D).

- Hornicek, Francis J.:** Consulting: Stryker Corporation (B), Biomed Valley Discoveries (B); Speaking and/or teaching arrangements: Stryker Spine (B), Stryker Corporation (B); Board of Directors: AATB (None); Scientific Advisory Board: DTRF (Amount not disclosed), Chordoma Foundation (Amount not disclosed); Grants: SPORE NIH (None).
- Hostin, Richard A.:** Consulting: DePuy Spine (B); Trips/travel: DePuy Spine (B); Research Support (Staff and/or Materials): DePuy Spine (E).
- Howell, Kelli:** Stock Ownership: NuVasive (10,000 shares); Board of Directors: Society of Lateral Access Surgery (None); Other Office: NuVasive (Salary).
- Hsieh, Patrick C.:** Consulting: DePuy Spine (C), Medtronic (C).
- Hsu, Erin L.:** Grants: Baxter Healthcare (E, Paid directly to institution/employer).
- Hsu, Wellington K.:** Consulting: Stryker (C, Paid directly to institution/employer), Medtronic (C, Paid directly to institution/employer), Pioneer (B, Paid directly to institution/employer), Terumo (B), LifeNet (B, Paid directly to institution/employer); Board of Directors: Lumbar Spine Research Society (None); Grants: Pioneer Surgical (E).
- Hu, Serena S.:** Royalties: NuVasive (None); Consulting: Medtronic (B); Speaking and/or teaching arrangements: Medtronic (B); Trips/travel: Synthes, Medtronic (B); Board of Directors: ISSLS (None); Fellowship Support: Globus (E, Paid directly to institution/employer), NuVasive (D, Paid directly to institution/employer).
- Hughes, Alexander P.:** Consulting: NuVasive (B).
- Huppert, Jean:** Royalties: LDR Medical France (F); Stock Ownership: LDR Medical (1%).
- Isaacs, Robert E.:** Stock Ownership: Vilaspine (100%), BioShape Solutions (10,000 shares), Baxano (10,000 shares), SafeWire (33,334 shares); Private Investments: SafeWire (30,000 shares); Trips/travel: Synthes (B); Board of Directors: SafeWire (Stock); Scientific Advisory Board: BioShape Solutions (Stock); Research Support (Staff and/or Materials): NuVasive (B, Paid directly to institution/employer).
- Ito, Manabu:** Research Support (Staff and/or Materials): Robert-Reid (E); Grants: Synthes (B), Hoya Pentax (B), Pfizer (B).
- Johnston, Charles E.:** Royalties: Medtronic (B); Consulting: Medtronic (A).
- Kaimrajh, David:** Research Support (Investigator Salary): Toby Orthopedics (B, Paid directly to institution/employer), Advanced Orthopedic Solutions (D, Paid directly to institution/employer), Medtronic (B, Paid directly to institution/employer), FxDevices (B), Paragon28 (B); Research Support (Staff and/or Materials): University of Miami (A).
- Kahraman, Serdar:** Not available at time of publication.
- Kalfas, Iain H.:** Royalties: Mako Surgical (C).
- Kalkanis, Steven N.:** Consulting: Biomet Spine (A).
- Kaneda, Kiyoshi:** Not available at time of publication.
- Kang, James D.:** Research Support (Staff and/or Materials): Stryker (E, Paid directly to institution/employer).
- Kang, Kyung-Chung:** Grants: Samsung Medical Center (C).
- Kanter, Adam S.:** Speaking and/or teaching arrangements: NuVasive (Lab proctor).
- Kaplan, Leon:** Speaking and/or teaching arrangements: Medtronic (Amount not disclosed); Trips/travel: Alphatec (Amount not disclosed); Scientific Advisory Board: The European Spine Research Group (Board member, travel expenses).
- Kauffman, Christopher P.:** Board of Directors: North American Spine Society (Professional, Economic and Regulatory Chair).
- Kebaish, Khaled M.:** Trips/travel: K2M (B, Paid directly to institution/employer).
- Kelly, Michael P.:** Consulting: Advanced Medical (B); Trips/travel: AOSpine (B).
- Khairi, Saad A.:** Stock Ownership: Lanx (Unknown); Consulting: Medtronic (C).
- Khanna, A. Jay:** Private Investments: New Era Orthopaedics (20%), Cortical Concepts (16%), Boss Medical (9%); Consulting: Orthofix Spine (C); 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, Choll W.:** Royalties: Globus (C); Stock Ownership: SpineView (1%); Consulting: Medtronic (Amount not disclosed), Globus (Amount not disclosed), Synthes (Amount not disclosed), Joimax (Amount not disclosed); Speaking and/or teaching arrangements: Medtronic (Amount not disclosed); Trips/travel: Stryker (Amount not disclosed), Globus (Amount not disclosed); Board of Directors: SMISS (Executive Director); Scientific Advisory Board: Globus (Amount not disclosed).
- Kim, David H.:** Consulting: Pioneer (B); Scientific Advisory Board: New England Baptist Hospital (None); Research Support (Staff and/or Materials): New England Baptist Hospital (D).
- Kim, Han Jo:** Royalties: World Scientific Publishers (None); Scientific Advisory Board: Spine Innovation Advisory Board, Medtronic (B).
- Kirschner, Kristi L.:** Board of Directors: Access Living of Chicago (None); Other Office: Community Care Alliance of Illinois (Board Member, Chief Medical Office for Physical Disability).
- Kishan, Shyam:** Consulting: K2M (B), Globus (B); Speaking and/or teaching arrangements: Medtronic (None); Trips/travel: K2M (B).
- Klineberg, Eric O.:** Consulting: Synthes/DePuy (B), AOSpine (B); Grants: AOSpine (D, Research Grant, Paid directly to institution/employer); Fellowship Support: OREF (E, Paid directly to institution/employer), Synthes (E, Paid directly to institution/employer).
- Knox, Jeffrey B.:** Stock Ownership: SNN (10 shares).
- Kopjar, Branko:** Consulting: Sensory Medical (C), Smith & Nephew (E), Cerapedics (B), SpineSmith (C), Salt Creek Medical (C).
- Koski, Tyler R.:** Consulting: NuVasive (B), MB innovations (None), Spine Wave (None), Globus (B); Speaking and/or teaching arrangements: Medtronic (Consulting disclosed); Trips/travel: Medtronic (B), Globus (B), NuVasive (A); Scientific Advisory Board: SpineCME (None); Research Support (Staff and/or Materials): Medtronic (B, Paid directly to institution/employer); Grants: Medtronic (C, Paid directly to institution/employer).
- Kraemer, Paul E.:** Not available at time of publication.
- Kwon, Brian:** Stock Ownership: ETEX (1%, Medical director, Tissue Bank Director); Consulting: Stryker Spine (Amount not disclosed), DePuy Spine (Amount not disclosed), Medtronic (Amount not disclosed); Speaking and/or teaching arrangements: Stryker Spine (Amount not disclosed), DePuy Spine (Amount not disclosed), Medtronic (Amount not disclosed); Trips/travel: Stryker Spine (A), DePuy Spine (A), Medtronic (A); Other Office: ETEX (Salary).
- Labelle, Hubert:** Board of Directors: Scoliosis Research Society (A); Fellowship Support: DePuy (D, Paid directly to institution/employer); Relationships Outside the One-Year Requirement: Medtronic Sofamor Danek (Dissolved 3/2009, Research Support: Staff and/or Materials, D).

- Lafage, Virginia:** Stock Ownership: Nemaris (20%); Consulting: Medtronic (A); Speaking and/or teaching arrangements: Medtronic (B), DePuy Spine (B); Board of Directors: Nemaris (None); Grants: Scoliosis Research Society (C, Paid directly to institution/employer).
- Lahey, Donna M.:** Consulting: SpineGuard (A, Paid directly to institution/employer).
- LaMarca, Frank:** Royalties: Globus (B), Stryker (B); Private Investments: TRS (5%); Consulting: Globus (D), Lanx (None), Biomet (B); Board of Directors: TRS (Co-founder); Scientific Advisory Board: TRS (Co-founder); Other Office: AANS/CNS Spine Section (Executive Board Member); Grants: Globus (None, Paid directly to institution/employer); Fellowship Support: NREF (E, Paid directly to institution/employer).
- Lapinsky, Anthony S.:** Royalties: Pioneer Surgical Systems (A); Consulting: Orthofix (Amount not disclosed).
- Latta, Loren:** Scientific Advisory Board: MAKO Surgical Corp. (B); Research Support (Staff and/or Materials): Synthes (B, Paid directly to institution/employer), Medtronic (C, Paid directly to institution/employer), Biedermann Motech (F, Paid directly to institution/employer), Advanced Orthopedic Solutions (E, Paid directly to institution/employer), Fx Devices (B, Paid directly to institution/employer), Toby Orthopaedics (B, Paid directly to institution/employer), University of Alabama Birmingham (B, Paid directly to institution/employer).
- Laufer, Ilya:** Consulting: Spine Wave (B).
- Ledet, Eric H.:** Private Investments: Revivo Medical (33%), ProActive Innovations (15%), I/O Surgical (25%); Consulting: Medicea (B), Ranier (B), CardioMEMS (B); Speaking and/or teaching arrangements: DePuy Spine (A); Scientific Advisory Board: CardioMEMS (None); Grants: DePuy Spine (C, Paid directly to institution/employer).
- Ledonio, Charles Gerald T.:** Research Support (Investigator Salary): Medtronic (C, Paid directly to institution/employer), Scoliosis Research Society (C, Paid directly to institution/employer), DOD Neurofibromatosis Research Program (C, Paid directly to institution/employer); Research Support (Staff and/or Materials): Medtronic (C, Paid directly to institution/employer); Grants: Department of Defense (C, Paid directly to institution/employer), Department of Defense (D, Paid directly to institution/employer).
- Lee, Joon Y.:** Research Support (Staff and/or Materials): Stryker (B, Paid directly to institution/employer).
- Lee, Michael J.:** Consulting: Stryker Spine (C), L&K Biomed (B); Speaking and/or teaching arrangements: AOSpine (B), St. Louis University (A); Research Support (Staff and/or Materials): AOSpine (D, Paid directly to institution/employer); Fellowship Support: AOSpine (E).
- Lee, Yu-Po:** Consulting: DePuy (C), Stryker (B); Fellowship Support: Synthes (E, Paid directly to institution/employer).
- Legatt, Alan D.:** Consulting: Various Law Firms (Amount not disclosed); Speaking and/or teaching arrangements: American Academy of Neurology (A), Albert Einstein College of Medicine (A), American Clinical Neurophysiology Society (B).
- Lehman, Ronald A.:** Grants: DARPA (G, Paid directly to institution/employer), Centinel Spine (E, Paid directly to institution/employer), DePuy Synthes Spine (C, Paid directly to Institution for procurement of cadavers and supplied, 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 and/or Materials): DePuy (B, Paid directly to institution/employer).
- Lento, Paul H.:** Speaking and/or teaching arrangements: Terson (Amount not disclosed, Paid directly to institution/employer).
- Lewis, Stephen J.:** Consulting: Medtronic (D); Speaking and/or teaching arrangements: Stryker (C), Medtronic (C); Trips/travel: Stryker (B); Fellowship Support: Medtronic (D, Paid directly to institution/employer), Johnson & Johnson (D, Paid directly to institution/employer).
- Lieberman, Isador H.:** Device or Biologic Distributorship (Physician-Owned Distributorship): North Texas Surgical Services (B); Private Investments: Axiomed Spine Corp (1%); Consulting: Mazor Surgical (C), Trans1 (B), Axiomed (C); Board of Directors: Merlot Orthopedix (Founder, Inventor, 32% ownership).
- Lin, Sheldon S.:** Private Investments: Cre Osso (42%, Founder); Consulting: TissueGene (C); Board of Directors: AOFAS (Member-at-Large); Other Office: Foot Ankle International (Associate Editor).
- Lindley, Emily M.:** Research Support (Staff and/or Materials): Synthes (C).
- Lonner, Baron S.:** Royalties: DePuy Spine (A); Stock Ownership: K2M (57,250 shares), Paradigm Spine (12,203 shares); Consulting: DePuy Spine (D); Speaking and/or teaching arrangements: DePuy Spine (C), K2M (None); Scientific Advisory Board: DePuy Spine (None); Grants: DePuy Spine (C).
- Lorio, Morgan P.:** Royalties: Alphatec (B, Paid directly to institution/employer), Alphatec (Amount not disclosed); Stock Ownership: Surgitech (None, Paid directly to institution/employer), Chart (Loan to company); Private Investments: Surgitech (None, Paid directly to institution/employer), Chart (Loan to company, Paid directly to institution/employer); Consulting: Ortho Kinematics (E, Paid directly to institution/employer), Alphatec (F), Lanx (Amount not disclosed, Paid directly to institution/employer); Speaking and/or teaching arrangements: ETSU (Assistant Clinical Professor), Lincoln Memorial University (Debusk College of Osteopathic Medicine Adjunct Clinical Professor), South College in Knoxville (Adjunct Clinical Professor); Trips/travel: Alphatec (Amount not disclosed, Paid directly to institution/employer), Lanx (Amount not disclosed, Paid directly to institution/employer); Scientific Advisory Board: Lanx (Amount not disclosed, Paid directly to institution/employer), Ortho Kinematics (E, Paid directly to institution/employer); Endowments: Lanx (None, Paid directly to institution/employer), Alphatec (B, Paid directly to institution/employer); Research Support (Investigator Salary): Exactech (None, Paid directly to institution/employer), Pioneer Surgical (B, Paid directly to institution/employer), Alphatec (None, Paid directly to institution/employer).
- Lotz, Jeffrey C.:** Royalties: University of California (B); Stock Ownership: Spinal Restoration (1%), Relievant (30%), Spinal Motion (125,000 shares), ISTO Technologies (5,000 shares), Nocimed (15%, Founder), Simpirica (18,750 shares), Aleeva Medical (133,333 shares), SMC Biotech (30,000 shares); Consulting: Applied Biomechanics (Amount not disclosed); Board of Directors: Nocimed (Stock); Scientific Advisory Board: Spinal Restoration (Stock), Relievant (Stock), ISTO Technologies (B), SMC Biotech (Stock); Grants: Relievant (E, Paid directly to institution/employer), Orthofix (E, Paid directly to institution/employer).

- Ludwig, Steven C.:** Royalties: DePuy Spine (G), Globus Medical (A); Stock Ownership: Globus Medical (1%); Private Investments: Advanced Spinal Intellectual Properties (29%), Spincity/ISD (34%); Consulting: DePuy Spine (F); Speaking and/or teaching arrangements: AOSpine (A); Board of Directors: Advanced Spinal Intellectual Properties (C); Scientific Advisory Board: Globus Medical (B); Fellowship Support: OREF Grant (E, Paid directly to institution/employer).
- Luhmann, Scott J.:** Royalties: Globus Medical (A); Consulting: Medtronic (B); Speaking and/or teaching arrangements: Stryker Spine (B).
- Lurie, Jon D.:** Stock Ownership: NewVert (1%); Consulting: Foundation for Informed Medical Decision Making (None), Fziomed (C), NewVert (Stock Ownership disclosed), Baxano (None).
- Mac Millan, Michael:** Consulting: Medtronic (C, Paid directly to institution/employer); Scientific Advisory Board: Surgical Advisory Board (None, Paid directly to institution/employer).
- Mac-Thiong, Jean-Marc:** Royalties: MMDS Medical (A, Paid directly to institution/employer); Stock Ownership: Spinologics (30%); Private Investments: Spinologics (30%); Consulting: Medtronic (E, Paid directly to institution/employer); Speaking and/or teaching arrangements: Spinologics (Co-founder); Trips/travel: Spinologics (Co-founder); Board of Directors: Spinologics (30%); Scientific Advisory Board: Spinologics (30%); Other Office: Spinologics (30%); 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).
- Mahomed, Nizar:** Speaking and/or teaching arrangements: Smith & Nephew (B); Fellowship Support: Smith & Nephew (E, Paid directly to institution/employer).
- Manson, Neil A.:** Speaking and/or teaching arrangements: Medtronic (B); Trips/travel: Medtronic (Travel expenses); Research Support (Staff and/or Materials): Medtronic (E).
- Marzluff, Joseph M.:** Consulting: Globus Medical (Amount not disclosed); Speaking and/or teaching arrangements: Globus Medical (Amount not disclosed); Trips/travel: Globus Medical (B); Scientific Advisory Board: Globus Medical (None).
- Massicotte, Eric M.:** Consulting: Globalview point (Amount not disclosed, Paid directly to institution/employer); Speaking and/or teaching arrangements: AOSpine North America (Travel expenses); Scientific Advisory Board: Canadian Neuroscience Federation society (Scientific Committee).
- Maxwell, James H.:** Stock Ownership: Zimmer (2,000 shares), Medtronic (2,000 shares), NuVasive (10,000 shares); Private Investments: AMS (100 shares).
- McAfee, Paul C.:** Royalties: Globus Medical (F); Stock Ownership: Breakaway Imaging Medtronic (50%); Private Investments: Globus Medical (50%), 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: Impliant (E); Fellowship Support: Globus Medical (E).
- McCarthy, Ian:** Trips/travel: DePuy Spine (Amount not disclosed); Grants: NuVasive (F, Paid directly to institution/employer), DJO Global (E, Paid directly to institution/employer), NIH-AHRQ (F, Paid directly to institution/employer).
- McConnell, Jeffrey R.:** Consulting: Globus Medical (D), Vertical Spine (A), Lanx (A).
- McGirt, Matthew J.:** Consulting: Codman (Editorial Support); Research Support (Staff and/or Materials): Stryker Spine (E, Paid directly to institution/employer), DePuy (E, Paid directly to institution/employer).
- McKee, David:** Other Office: Globus Medical (Salary).
- Metzger, Melodie:** Research Support (Investigator Salary): Stryker Spine (E), Medtronic (D); Research Support (Staff and/or Materials): Scoliosis Research Society (B).
- Mick, Charles A.:** Board of Directors: North American Spine Society (President, D).
- Midura, Ronald J.:** Grants: Orthofix (F, Paid directly to institution/employer).
- Mikhael, Mark M.:** Consulting: Biomet (D), DePuy/Synthes (A).
- Milne, Edward L.:** Stock Ownership: Stryker Corp. (9 shares); Research Support (Investigator Salary): Advanced Orthopedic Solutions (D, Paid directly to institution/employer); Research Support (Staff and/or Materials): Toby Orthopedics (A, Paid directly to institution/employer), Paragon 28 (A), Advanced Orthopedic Solutions (D), Medtronic Corp. (B), Biedermann-Motech (E).
- Mindea, Stefan A.:** Speaking and/or teaching arrangements: Synthes (A), Globus (A), Medtronic (D), DePuy (B); Trips/travel: Stryker (None).
- Mirza, Sohail K.:** Grants: NIH/NIA/NIAMS/AHRQ (G, Paid directly to institution/employer).
- Mitchell, William:** Private Investments: South Jersey Cyberknife (None); Board of Directors: North American Spine Society (Section Development Chair).
- Moal, Bertrand:** Research Support (Investigator Salary): Nemaris (B, Paid directly to institution/employer); Other: Fondation ParisTech (B, Paid directly to institution/employer).
- Moen, Erik P.:** Consulting: Retul (Website Advisor); Other Office: American Physical Therapy Association (B, Paid directly to institution/employer).
- Moseley, Timothy A.:** Stock Ownership: NuVasive (2,500 shares); Other Office: Entity not disclosed (Salary).
- Mroz, Thomas E.:** Stock Ownership: PearlDiver (10,000 shares); Consulting: Globus Medical (B); Speaking and/or teaching arrangements: AOSpine (B); Board of Directors: AOSpine North America (Board member).
- Muehlbauer, Eric J.:** Board of Directors: North American Spine Society (Executive Director); Other Office: World Spine Care (Advisor).
- Mundis, Gregory M.:** Royalties: NuVasive (None); Consulting: NuVasive (D), K2M (B); Speaking and/or teaching arrangements: NuVasive (D), K2M (B); Trips/travel: NuVasive (A), K2M (A), DePuy (A); Research Support (Staff and/or Materials): NuVasive (D, Paid directly to institution/employer), K2M (D, Paid directly to institution/employer), DePuy (B, Paid directly to institution/employer); Fellowship Support: Integra (E, Paid directly to institution/employer), OREF (E, Paid directly to institution/employer).
- Myer, Jacqueline:** Other Office: Globus Medical (Salary).
- Nijeholt, Geert J. Lycklama à:** Grant: ZonMW (Amount not disclosed, Paid to institution/employer).
- Nunley, Pierce D.:** Royalties: Biomet/EBI (B), Osprey Biomedical (B), LDR Spine (D), K2M (C); Stock Ownership: Amedica (1%), Paradigm Spine (1%), Spineology (1%); Speaking and/or teaching arrangements: K2M (D); Scientific Advisory Board: K2M (B), Nanovis (B), Spinal Motion (10,000 shares).
- Nottmeier, Eric W.:** Royalties: Globus (B, Paid directly to institution/employer); Consulting: Medtronic Navigation (B); Speaking and/or teaching arrangements: Depuy/Synthes (B),

BrainLAB (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).

- Obeid, Ibrahim:** Consulting: Medtronic (B); Speaking and/or teaching arrangements: DePuy Synthes Spine (B).
- O'Brien, David R.:** Board of Directors: North American Spine Society (Education Publishing Chair); Other Office: ISIS (Socioeconomic Council Vice-Chair, Coding Chair).
- O'Brien, Joseph R.:** Royalties: NuVasive (B), Globus (0); Stock Ownership: Doctors Research Group (1%); Private Investments: Spinicity (1%); Consulting: Globus (D), NuVasive (D), Stryker (C), Relievant (E); Trips/travel: Relievant (B); Scientific Advisory Board: Doctors Research Group (Stock Ownership disclosed); Research Support (Staff and/or Materials): Globus (B), NuVasive (B); Grants: Stryker (B, Paid directly to institution/ employer).
- O'Brien, Michael:** Royalties: DePuy Spine (F), Medtronic Sofamor Danek (D); Consulting: DePuy Spine (D), Medtronic Sofamor Danek (), Osteotech (B); Trips/travel: DePuy Spine (B).
- O'Donnell, Casey:** Consulting: VertiFlex (B).
- Ogon, Michael:** Consulting: DePuy Synthes (Amount not disclosed), Medtronic (Amount not disclosed); Speaking and/or teaching arrangements: AOSpine (Amount not disclosed); Board of Directors: ISASS (Travel expenses).
- Ohnmeiss, Donna D.:** Other Office: International Society for the Study of the Lumbar Spine (Executive Committee); Research Support (Staff and/or Materials): Trans1 (B, Paid directly to institution/employer), University of Minnesota (C, Paid directly to institution/employer), Spinal Motion (None, Paid directly to institution/employer), VertiFlex (B, Paid directly to institution/employer), Alphatec (B, Paid directly to institution/ employer); Grants: Orthofix (E, Paid directly to institution/ employer); Fellowship Support: OREF (E, Paid directly to institution/employer), Orthofix (D, Paid directly to institution/ employer), AOSpine (E, Paid directly to institution/employer), Medtronic Neurological (C, Paid directly to institution/ employer), NuVasive (C, Paid directly to institution/employer), Omega (C, Paid directly to institution/employer), Alphatec (D, Paid directly to institution/employer); Other: Mazor Surgical Technologies (E, Paid directly to institution/employer).
- Okonkwo, David O.:** Consulting: Medtronic (A), Synthes (B), Lanx (B); Speaking and/or teaching arrangements: Synthes (B), Medtronic (A).
- O'Neill, Conor:** Stock Ownership: Relievant (17%), Nocimed (70%); Private Investments: Nocimed (63,229 shares); Consulting: SpineView (B), ISTO (D), Alleeva (B); Scientific Advisory Board: Relievant (Stock ownership disclosed).
- Ouellet, Jean A.:** Consulting: DePuy Synthes Spine (B); Grants: AO Foundation (E); Fellowship Support: AOSpine North America (E, Paid directly to institution/employer).
- Palumbo, Mark A.:** Consulting: Globus (B); Speaking and/or teaching arrangements: Medtronic (A); Trips/travel: Stryker (F).
- Parazin, Stephen:** Device or Biologic Distributorship (Physician-Owned Distributorship): Paradigm Medical Solutions (None); Consulting: Allen Medical (B), DePuy Spine (B); Scientific Advisory Board: Soteira (Stock); Fellowship Support: OREF (E).
- Parent, Stefan:** Private Investments: Spinologics (30%); Consulting: Medtronic (B); Speaking and/or teaching arrangements: DePuy Spine (B); Trips/travel: Medtronic (B), EOS Imaging (Amount not disclosed); Endowments: DePuy Spine (F, Paid directly to institution/employer); Research Support (Staff and/or Materials): DePuy Spine (B, Paid directly

- to institution/employer); Fellowship Support: DePuy Spine (D, Paid directly to institution/employer), Medtronic (D, Paid directly to institution/employer).
- Park, Paul:** Consulting: Globus Medical (B), Medtronic (B); Speaking and/or teaching arrangements: Globus Medical (C); Scientific Advisory Board: Neuralstem (B); Grants: NIH (B, Paid directly to institution/employer), SMISS (B, Paid directly to institution/employer); Relationships Outside the One Year Requirement: DePuy (Dissolved 8/2011, Speaking and/or Teaching Arrangement, B).
- Parsons, Geoffrey:** Other: Genzyme (Salary).
- Partridge, Nicola C.:** Consulting: Orthofix (B); Trips/travel: Orthofix (A); Research Support (Investigator Salary): Orthofix (C, Paid directly to institution/employer); Research Support (Staff and/or Materials): Orthofix (E, Paid directly to institution/employer).
- Patel, Alpesh A.:** Royalties: Amedica (B); Consulting: Amedica (B), Stryker (B), Biomet (B), GE Healthcare (B); Board of Directors: Lumbar Spine Research Society (None), Cervical Spine Research Society (None), Indo-American Spine Alliance (None); Other: Amedica (<1%), Cytonics (<1%), Trinity Orthopaedics (<1%), Nocimed (<1%), Holorad (<1%).
- Patel, Chetan K.:** Consulting: Globus (B), Stryker Spine (D), Medtronic Spine (C); Scientific Advisory Board: Medtronic Navigation (B).
- Patel, Vikas V.:** Royalties: Aesculap (B, Paid directly to institution/employer), Biomet (B, Paid directly to institution/ employer); Private Investments: Cerapedics (<1%); Consulting: Aesculap (B), SI-BONE (B, Paid directly to institution/employer), Baxter Healthcare (B), Lanx (B, Paid directly to institution/employer); Speaking and/or teaching arrangements: Synthes (B), Lanx (B), Baxter Healthcare (B); Scientific Advisory Board: Aesculap (B, Paid directly to institution/employer), Lanx (B, Paid directly to institution/ employer); Research Support (Staff and/or Materials): Synthes (D, Research Grant, Paid directly to institution/employer); Grants: Synthes (B, Paid directly to institution/employer), Stryker (B, Paid directly to institution/employer); Fellowship Support: OREF (D, Paid directly to institution/employer).
- Patwardhan, Avinash G.:** Stock Ownership: Spinal Kinetics (10,000 shares); Trips/travel: Spinal Kinetics (B); Scientific Advisory Board: Ortho Kinematics (Stock), Axiomed (Stock), Spinal Kinetics (Stock); Research Support (Staff and/or Materials): Department of Veterans Affairs (F, Paid directly to institution/employer); Grants: NIH-NCOMP (F, Paid directly to institution/employer).
- Paulino, Carl:** Consulting: Ethicon (B); Speaking and/or teaching arrangements: DePuy/Johnson & Johnson (B); Trips/travel: Ethicon (B).
- Peacock, James C.:** Stock Ownership: Nocimed (12%), Relievant Medsystems (1%); Private Investments: Nocimed (1%); Consulting: Nocimed (F); Board of Directors: Nocimed (Consulting disclosed); Other Office: Nocimed (Consulting disclosed).
- Pekmezci, Murat:** Speaking and/or teaching arrangements: NuVasive (B); Research Support (Staff and/or Materials): Stryker (C, Paid directly to institution/employer); Grants: Orthofix (C).
- Peterson, Daniel L.:** Private Investments: Path4 Ventures (1%); Consulting: LDR Spine (50,000 shares); Speaking and/or teaching arrangements: Stryker Spine (B).

- Pettine, Kenneth A.:** Royalties: Medtronic (B); Stock Ownership: Paradigm (5%); Consulting: Paradigm (C); Speaking and/or teaching arrangements: Spinal Motion (Travel expenses); Trips/travel: Spinal Motion (Travel expenses); Research Support (Staff and/or Materials): Paradigm (B), Spinal Motion (B), Medtronic (B), NuVasive (B).
- Peul, Wilco C.:** Speaking and/or teaching arrangements: Spine Society of Europe (A, Paid directly to institution/employer); Trips/travel: European Association of Neurological Surgeons (A, Paid directly to institution/employer), European Spine Foundation (B, Paid directly to institution/employer), SpineWeek Committee (B); Board of Directors: European Spine Foundation (Amount not disclosed, Paid directly to institution/employer), EANS Spine Section, Spine Education Committee Chair (Travel expenses, Paid directly to institution/employer), Dutch Board of Neurosurgeons (Travel expenses, Paid directly to institution/employer); Scientific Advisory Board: European Spine Journal Editorial Board (Travel expenses, Paid directly to institution/employer), Cochrane Back Review Group, Editorial Board (Travel expenses, Paid directly to institution/employer); Other Office: Dutch Health Organization for Medical Doctors (Travel expenses, Paid directly to institution/employer), UEMS (Travel expenses, Paid directly to institution/employer); Research Support (Investigator Salary): ZonMW (F, Paid directly to institution/employer); Research Support (Staff and/or Materials): Medtronic (C, Paid directly to institution/employer), Paradigm Spine (E, Paid directly to institution/employer); Grants: CVZ (B, Paid directly to institution/employer); Fellowship Support: EANS (B, Paid directly to institution/employer).
- Phillips, Frank M.:** Royalties: NuVasive (F), DePuy Spine (D); Stock Ownership: NuVasive (<1%), Flexuspine (<1%), Axiomed (<1%), Crosstrees (<1%), Baxano (<1%), Spinal Motion (<1%), Spinal Kinetics (<1%), Facet Solutions (<1%), SI Bone (<1%), Bonova (2%), Pearl Diver (<1%); Private Investments: BioAssets (<1%); Consulting: Kyphon (B), Stryker (C).
- Placide, Rick:** Speaking and/or teaching arrangements: DePuy Spine (Amount not disclosed, Paid directly to institution/employer); Trips/Travel: DePuy Spine (Travel expenses), North American Spine Society (Travel expenses).
- Polly, David W.:** Other Office: Scoliosis Research Society (Travel expenses), Dubai Spine Masters (Co-Chair, B); Grants: Department of Defense (G, Paid directly to institution/employer), OREF (D, Paid directly to institution/employer), Pediatric Spine and Chest Wall Foundation (C, Paid directly to institution/employer), Scoliosis Research Society (B, Paid directly to institution/employer); Relationships Outside the One Year Requirement: Medtronic (Dissolved 6/2010, Consulting).
- Post, Nicholas H.:** Consulting: Aesculap (Amount not disclosed).
- Potts, Eric A.:** Royalties: Medtronic (F); Stock Ownership: Lanx (Unknown); Private Investments: Remedy Pharmaceuticals (Unknown); Consulting: Lanx (B), Medtronic (B); Board of Directors: Goodman Campbell Brain and Spine (B).
- Powell, Dawn:** Other: Dfine, K2M, Stryker, Osseon, A-Spine, Baxter, Invibio, Ziehm Imaging, LDR, Medtronic, Mazor Robotics, SpineGuard, Misonix, Trans1, Ackermann Group, Alphatec Spine, LifeSpine, ArthroCare, Benvenue Medical, and Rainer (Amount not disclosed, Paid to institution/employer); Other Office: Spinal News International (Editor).
- Prasad, Srinivas K.:** Consulting: Stryker Spine (C), Medtronic (B); Board of Directors: AKOS Health Systems (None).
- Prather, Heidi:** Board of Directors: North American Spine Society (Second Vice President); Other Office: American Academy of Physical Medicine and Rehabilitation (C, Paid directly to institution/employer).
- Prostko, Edward R.:** Stock Ownership: Ortho Kinematics (1%); Consulting: Ortho Kinematics (B); Scientific Advisory Board: (Consulting disclosed).
- Protosaltis, Themistocles S.:** Speaking and/or teaching arrangements: K2M (B), Nemaris (B).
- Prusmack, Chad J.:** Royalties: Globus (F), Integra (B); Stock Ownership: Globus (F); Consulting: Globus (D); Speaking and/or teaching arrangements: Globus (B); Trips/Travel: Globus (B, Paid directly to institution/employer); Scientific Advisory Board: Globus (B).
- Prussian, Kathleen H.:** Not available at time of publication.
- Przybylski, Gregory J.:** Private Investments: South Jersey CK Leasing (.2%); Consulting: Magellan (A); Other Office: Eli Research Advisory Editor (B), Medicare APC Committee (Travel expenses), Warren Township Board of Education (None).
- Quraishi, Nasir A.:** Speaking and/or teaching arrangements: Medtronic (E, Paid directly to institution/employer); Trips/travel: Medtronic (B), MBA (B), AOSpine (A), Baxter (A), Lindare Medical (B); Other Office: AOSpine (Faculty); 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 (None, Paid directly to institution/employer); Consulting: Stryker Spine (B), Zimmer Spine (C, Paid directly to institution/employer); Speaking and/or teaching arrangements: Stryker Spine (None), Medtronic (C), Zimmer Spine (C); Board of Directors: Musculoskeletal Transplant Foundation (B, Paid directly to institution/employer); Scientific Advisory Board: Zimmer Spine (None), Orthofix (None), Pioneer Surgical (B); Other Office: Cervical Spine Research Society (Research Committee), North American Spine Society (Evidence-Based Guidelines Committee), American Academy of Orthopaedic Surgeons (Evaluations Committee).
- Radcliff, Kris:** Royalties: Globus Medical (None); Consulting: Globus Medical (B); Trips/travel: Relieva Medsystems (B), Globus Medical (A), DePuy Synthes (A), Stryker Spine (A), Medtronic (A); Grants: DePuy Synthes (None).
- Rahn, Kevin A.:** Stock Ownership: Titan (A).
- Raiszadeh, Kamshad:** Device or Biologic Distributorship (Physician-Owned Distributorship): Bridge Spine (F); Royalties: Medtronic (None); Stock Ownership: NuVasive (25%).
- Rampersaud, Raja Y.:** Consulting: Medtronic Spine (E); Scientific Advisory Board: Surgical Navigation Technologies (B).
- Rao, Raj D.:** Board of Directors: North American Spine Society (CME Committee Chair), Lumbar Spine Research Society (None); Other Office: American Academy of Orthopaedic Surgeons (Chairman, Diversity Advisory Board, Travel expenses), Medicare Evidence Development and Coverage Advisory Commission (Voting Member of US Centers for Medicare and Medicaid Services); Grants: United States Department of Defense—Navy (G, Paid directly to institution/employer), United States 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), Editorial Board of JBJS Reviews (None), Seminars in Spine Surgery (A).

- Rashbaum, Ralph F.:** Device or Biologic Distributorship (Physician-Owned Distributorship): PDP (None); Stock Ownership: Medtronic (5,700 shares); Private Investments: Enterhealth (4%); Consulting: Medtronic (B), SI Bone (None), St. Jude (None), LDR Medical (None), Relievant (None), Nocimed (None), Spinal Regeneration (None), Stimwave (None); Speaking and/or teaching arrangements: Medtronic (B), St. Jude (B), SI Bone (B); Board of Directors: Texas Pain Society (None); Scientific Advisory Board: Spinal Regeneration (None); Fellowship Support: Medtronic (D, Paid directly to institution/employer).
- Rasouli, Alexandre:** Speaking and/or teaching arrangements: DePuy (B), Medtronic (B).
- Rawlins, Bernard A.:** Royalties: Medtronic Sofamor Danek (B).
- Ray, Wilson Z.:** Consulting: Ulrich Medical (B); Speaking and/or teaching arrangements: DePuy/Synthes Spine (C).
- Reah, Christopher J.:** Stock Ownership: NuVasive (12,500 shares); Other: NuVasive (Salary).
- Refai, Daniel:** Consulting: Aesculap (Amount not disclosed); Speaking and/or teaching arrangements: DePuy (Amount not disclosed), Stryker (Amount not disclosed).
- Reigrut, Julie L.:** Other Office: K2M (Salary).
- Reitman, Charles A.:** Board of Directors: North American Spine Society (Research Compilation & Analysis Chair).
- Resnick, Daniel K.:** Board of Directors: North American Spine Society (Research Council Director); CNS (President-Elect).
- Reynolds, Jeremy J.:** Consulting: Medtronic (B, Paid directly to institution/employer); Speaking and/or teaching arrangements: DePuy Synthes (B); Trips/travel: NuVasive (B); Fellowship Support: DePuy Synthes (D, Paid directly to institution/employer).
- Rhee, John M.:** Royalties: Biomet Spine (D); Stock Ownership: Phygen (1%); Private Investments: Phygen (1%); Consulting: Synthes Spine (C); Speaking and/or teaching arrangements: DePuy Spine (C).
- Rhines, Laurence D.:** Consulting: Medtronic (Amount not disclosed), Stryker (Amount not disclosed).
- Ribeiro, Carlos Henrique:** Not available at time of publication.
- Rihn, Jeffrey A.:** Other Office: Federation of Spine Associations (President); Grants: DePuy Spine (D, Paid directly to institution/employer).
- Robinson, Samuel T.:** Research Support (Staff and/or Materials): Stryker (E), Medtronic (D); Grants: Scoliosis Research Society (B).
- Rothman, David:** Board of Directors: North American Spine Society (Ethics Consultant); Relationships Outside the One-Year Requirement: State of Texas/Sheller (Dissolved 3/2012, Other, E).
- Ruoff, Mark J.:** Speaking and/or teaching arrangements: Baxano (C, Paid directly to institution/employer).
- Russo, Scott S.:** Private Investments: SP Micromachines (3%, Paid directly to institution/employer); Consulting: Bespa (None); Speaking and/or teaching arrangements: Medtronic Spine (C, Paid directly to institution/employer); Board of Directors: Orthopaedic Associates of Michigan (None).
- Ryken, Timothy C.:** Speaking and/or teaching arrangements: Eisai (C), Merck (B).
- Sama, Andrew A.:** Royalties: Ortho Development Corporation (E), LifeSpine (0), DePuy (D); Stock Ownership: Paradigm Spine (1%); Private Investments: Small Bone Innovations (1%); Consulting: Ortho Development (B), Osteotech (None), HydroCision (None), LifeSpine (None), DePuy (B), Sentio (None); Speaking and/or teaching arrangements: DePuy Spine (D); Other: Mesoblast (Amount not disclosed, Paid directly to institution/employer).
- Sankar, Sriram:** Stock Ownership: Difusion Technologies (150,000 shares, Paid directly to institution/employer); Other Office: DiFusion Technologies (Salary).
- Santa, John:** Other: Consumer Reports (Salary).
- Sarwahi, Vishal:** Consulting: DePuy Spine (B), Medtronic (C); Grants: DePuy Spine (E, Paid directly to institution/employer), Stryker Spine (D, Paid directly to institution/employer).
- Sasso, Rick C.:** Royalties: Medtronic (I); Stock Ownership: Biomet (200,000 shares); Private Investments: Trans1 (2,000 shares); Consulting: United States Department of Justice (C); Board of Directors: Cervical Spine Research Society (None); Research Support (Staff and/or Materials): Medtronic (B, Paid directly to institution/employer), Trans1 (B, Paid directly to institution/employer), Stryker (D, Paid directly to institution/employer), Cerapedics (E, Paid directly to institution/employer), Smith & Nephew (D, Paid directly to institution/employer), Baxano (B, Paid directly to institution/employer).
- Schmidt, John A.:** Stock Ownership: K2M (<1%); Trips/travel: K2M (Travel expenses); Other Office: K2M (Salary).
- Schmidt, Meic H.:** Consulting: Aesculap (B).
- 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); Other: American Academy of Orthopaedic Surgeons (Adult Spine Evaluation Committee).
- Schofferman, Jerome:** Board of Directors: North American Spine Society (Ethics Chair).
- Schwab, Frank J.:** Royalties: MSB (D); Stock Ownership: Nemaris (30%); Consulting: MSD (F); Speaking and/or teaching arrangements: DePuy spine (D); Trips/travel: MSD (C); Board of Directors: Nemaris (Stock); Other Office: Entity not disclosed (President); Research Support (Staff and/or Materials): MSD (E); Grants: SRS (C).
- Schwab, Joseph H.:** Consulting: Stryker Spine (Travel expenses); Scientific Advisory Board: Biom Up (Amount not disclosed); Fellowship Support: Globus Spine (E, Paid directly to institution/employer).
- Schwend, Richard:** Trips/travel: Complex Spine Study Group (B); Board of Directors: Pediatric Orthopaedic Society of North America (A), Chair, AAP Orthopaedic Section (B), Miracle Feet (None), Project Perfect World (B).
- Sciubba, Daniel M.:** Consulting: NuVasive (C, Paid directly to institution/employer); Speaking and/or teaching arrangements: Medtronic (C), DePuy (C), Globus (C).
- Scuderi, Gaetano J.:** Stock Ownership: Cytonics (37%); Private Investments: K2M (<1%); Board of Directors: Cytonics (Founder); Scientific Advisory Board: Cytonics (D); Other Office: Entity not disclosed (Chairman).
- Scully, Thomas B.:** Royalties: LifeSpine (B); Private Investments: Langford (3%); Consulting: Brainlab (B); Board of Directors: Langford (None).
- Sengupta, Dilip K.:** Royalties: Globus Medical (D); Stock Ownership: Globus Medical (<1%); Consulting: Globus Medical (None); Scientific Advisory Board: Globus Medical (Travel expenses); Research Support (Staff and/or Materials): Globus Medical (D, Paid directly to institution/employer); Fellowship Support: Globus Medical (B, Paid directly to institution/employer); Other: Globus Medical (Amount not disclosed, Paid directly to institution/employer).

- Shaffer, William O.:** Trips/Travel: TranS1 (Travel expenses); Relationships Outside the One Year Requirement: DePuy Spine (Dissolved 1/2007, Royalties, C).
- Shaffrey, Christopher I.:** Royalties: Medtronic (H), Biomet (C); Consulting: Biomet (C), Globus (D), NuVasive (D); Speaking and/or teaching arrangements: NuVasive (C); Trips/travel: Medtronic (B); Board of Directors: CSRS (None), NREF (None), AANS (None), SRS (None); Research Support (Investigator Salary): NIH (B, Paid directly to institution/employer); Grants: Department of Defense (F, Paid directly to institution/employer); Fellowship Support: AOSpine (E, Paid directly to institution/employer).
- Shah, Suken A.:** Royalties: DePuy Spine (F); Stock Ownership: KSpine (1%); Consulting: DePuy Spine (D); Speaking and/or teaching arrangements: DePuy Spine (B); Board of Directors: Scoliosis Research Society (None); Scientific Advisory Board: KSpine (Travel expenses); Research Support (Staff and/or Materials): DePuy Spine (D).
- Sharan, Alok D.:** Consulting: Paradigm Spine (B).
- Shen, Francis H.:** Royalties: Elsevier Publishing (B); Consulting: Synthes Spine (B), DePuy Spine (B); Speaking and/or teaching arrangements: DePuy Spine (B); Board of Directors: Musculoskeletal Transplant Foundation (B, Paid directly to institution/employer); Scientific Advisory Board: Kuros (None); Fellowship Support: AOSpine (D).
- Siddiqi, Farhan N.:** Royalties: Globus (A); Consulting: Globus (B); Speaking and/or teaching arrangements: Wolf (B); Grants: Wolf (B).
- Singh, Kern:** Royalties: Stryker (B), Pioneer (B), Zimmer (B); Consulting: Stryker Spine (B), DePuy (B), Zimmer (B).
- Skolasky, Richard L.:** Research Support (Investigator Salary): DePuy Spine (C, Paid directly to institution/employer); Research Support (Staff and/or Materials): DePuy Spine (D, Paid directly to institution/employer).
- Sliva, Christopher D.:** Not available at time of publication.
- Smith, Justin:** Consulting: Medtronic (B), Biomet (C), DePuy (None); Speaking and/or teaching arrangements: DePuy (B), Medtronic (B), Globus (B), Biomet (B); Research Support (Staff and/or Materials): DePuy (Amount not disclosed).
- Smith, Justin S.:** Consulting: Axial Biotech (None); Speaking and/or teaching arrangements: Medtronic (B), Biomet (B).
- Smith, Matthew J.:** Consulting: Kent Hospital (D, Paid directly to institution/employer); Board of Directors: Rhode Island Pain Society (President).
- Smuck, Matthew:** Consulting: ArthroCare (B), EMKinetics (A); Other Office: The Spine Journal (Deputy Editor); Research Support (Investigator Salary): Cytonics Corporation (C, Paid directly to institution/employer); Research Support (Staff and/or Materials): Cytonics Corporation (D, Paid directly to institution/employer); Grants: International Spine Interventions Society (C, Dissolved 12/2012, Paid directly to institution/employer).
- Spengler, Dan M.:** Not available at time of publication.
- Spivak, Jeffrey M.:** Royalties: Titan Spine (D); Stock Ownership: Titan Spine (5%), Etex (1%), Paradigm Spine (5%); Consulting: Titan Spine (B); Speaking and/or teaching arrangements: Synthes Spine (B); Scientific Advisory Board: Titan Spine (None).
- Sponseller, Paul D.:** Royalties: Globus Spine (B), DePuy Synthes Spine (E); Consulting: DePuy Spine (B); Speaking and/or teaching arrangements: DePuy Spine (None); Trips/travel: DePuy Synthes Spine (A); Board of Directors: Scoliosis Research Society (None); Research Support (Staff and/or Materials): DePuy Synthes Spine (C); Grants: DePuy Synthes Spine (C); Fellowship Support: OREF (E).
- Stake, Christine:** Research Support (Investigator Salary): MAKO Surgical Corp. (D, Paid directly to institution/employer).
- Standaert, Christopher J.:** Consulting: Washington State Health Care Authority Health Technology Clinical Committee (C); Board of Directors: North American Spine Society (Health Policy Council Director).
- Steffen, Thomas:** Device or Biologic Distributorship (Physician-Owned Distributorship): Kuros Biosurgery AG (A), Ranier Technology (A), Vexim SA (A); Consulting: Vexim (None), Ranier (C); Board of Directors: Altavance AG (None), Mont Royal Orthopaedic Research Ibc (None), Scient'x GmbH (Salary).
- Steib, Jean-Paul:** Royalties: Alphatec (D), LDR Spine (C), Medtronic (B); Consulting: Alphatec (D), Clariance (B); Speaking and/or teaching arrangements: DePuy (B), Integra (B), LDR Spine (Travel expenses), Alphatec (Travel expenses); Trips/travel: LDR Spine (Travel expenses), Alphatec (Travel expenses); Scientific Advisory Board: Clariance (B); Endowments: Alphatec (B), Medtronic (B).
- Steinmetz, Michael P.:** Consulting: Biomet Spine (B), Medtronic (B), Synthes Spine (A); Speaking and/or teaching arrangements: Synthes Spine (A); Board of Directors: Congress of Neurological Surgeons (Executive Committee); Relationships Outside the One Year Requirement: Stryker Spine (Dissolved 1/0110, Speaking and/or Teaching Arrangement, B).
- Stevens, William R.:** Speaking and/or teaching arrangements: Medtronic (B); Trips/travel: DePuy (A).
- Stevenson, David A.:** Consulting: Lineagen (Amount not disclosed, Paid directly to institution/employer); Scientific Advisory Board: PWSA (None).
- Stewart, Geoffrey:** Stock Ownership: RBI (7%); Private Investments: RBI (7%); Consulting: Theken Spine (D); Scientific Advisory Board: RBI (Stock); Research Support (Investigator Salary): Isto Technologies (B).
- Stokes, John:** Royalties: Genesys Spine (E); Stock Ownership: LDR Spine (.05%), DiFusion Technologies (75,000 options); Scientific Advisory Board: DiFusion Technologies (15,000 options); Research Support (Staff and/or Materials): LDR Spine (Unknown).
- Sucato, Daniel J.:** Other: Elsevier/Saunders (B), AAOS (B).
- Sullivan, William J.:** Trips/Travel: Emerging Technologies Education Summit (B), Maadi Military Hospital (B); Other Office: AAPM&R (B), North American Spine Society (RUC Advisor, Coding Committee Co-Chair, Registry Committee, SpineLine Editorial Committee, B).
- Swartz, Karin R.:** Grants: NIH (None, Paid directly to institution/employer).
- Theodore, Brian R.:** Grants: United States Army Medical Research Acquisition Activity (F, Paid directly to institution/employer).
- Theodore, Nicholas:** Royalties: Stryker Spine (D), Synthes Spine (F); Consulting: Stryker Spine (B), Synthes Spine (C); Speaking and/or teaching arrangements: Synthes (B); Research Support (Staff and/or Materials): Synthes Spine (E, Paid directly to institution/employer); Grants: Stryker Spine (D, Paid directly to institution/employer); Fellowship Support: Synthes Spine (Research support disclosed); Relationships Outside the One Year Requirement: Stryker Spine (Dissolved 1/2008, Royalties, E), Synthes Spine (Dissolved 1/2008, Royalties, E).

- Thomas, Kenneth C.:** Research Support (Staff and/or Materials): Medtronic (C), Synthes (C); Fellowship Support: Medtronic (C), AOSpine (E).
- Tohneh, Antoine:** Royalties: NuVasive (F); Stock Ownership: NuVasive (6,300 shares); Consulting: NuVasive (Amount not disclosed); Speaking and/or teaching arrangements: NuVasive (B); Trips/travel: NuVasive (Travel expenses); Other Office: The Orthopaedic Surgery Center (Partner); Research Support (Investigator Salary): NuVasive (E); Research Support (Staff and/or Materials): Spine Research Institute (E).
- Tolo, Vernon:** Royalties: Wolters Kluwer (A); Other: Journal of Bone and Joint (Editor in Chief, F).
- Tribus, Clifford B.:** Private Investments: ESM Technologies (100%); Consulting: Stryker Spine (C), US Spine (B), Kyphon (B); Other Office: ESM Technologies (Owner).
- Tromanhauser, Scott G.:** Stock Ownership: Soteira (34,374 shares); Trips/travel: Synthes Spine (A), NuVasive (A); Other Office: Best Doctors Occupational Health Institute (E); Research Support (Staff and/or Materials): Synthes Spine (B, Paid directly to institution/employer), DePuy Spine (B, Paid directly to institution/employer); Fellowship Support: ORIF (D, Paid directly to institution/employer).
- Truumees, Eric:** Royalties: Stryker Spine (C); Stock Ownership: Doctor's Research Group (<1%); Private Investments: IP Evolutions (33%, Dissolved 1/2012); Board of Directors: North American Spine Society (Administrative & Development Council Director); Research Support (Staff and/or Materials): Globus (Amount not disclosed).
- Uribe, Juan S.:** Consulting: NuVasive (E); Speaking and/or teaching arrangements: Orthofix (C); Research Support (Investigator Salary): NuVasive (D, Paid directly to institution/employer); Research Support (Staff and/or Materials): NuVasive (C, Paid directly to institution/employer); Grants: NuVasive (B, Paid directly to institution/employer); Fellowship Support: NuVasive (D, Paid directly to institution/employer).
- Vaccaro, Alexander R.:** Royalties: DePuy Spine (C), NuVasive (None), Biomet Spine (E), Globus (F), Medtronic (H), Aesculap (B), Book royalties (C), Stryker Spine (H); Stock Ownership: K2M (Dissolved), Gamma Spine (Dissolved), Innovative Surgical Design (Unknown), ElectroCore (Unknown), Rothman Institute and related holdings (Partner), Cytonics (Unknown), Location Based Intelligence (20%), Progressive Spinal Technology (Unknown), Computational Biodynamics (Unknown), Stout Medical (Unknown), Bonovo Orthopaedics (Unknown), Flagship Surgical (Unknown), In Vivo (Unknown), Small Bone Innovations (Unknown), Neucore (Unknown), Cross Current (Unknown), Syndicom (Unknown), Paradigm Spine (Unknown), Spinology (Unknown), Replication Medica (Unknown), Globus (Unknown), FlowPharma (Unknown), Advanced Spinal Intellectual Properties (30%), Spine Medica (Unknown), R.S.I. (Unknown), Spinicity (Unknown); Consulting: Gerson Lehrman Group (B), ICON Clinical Research (B), Innovative Surgical Design (O), Stout Medical (A), Guidepoint Global (B), Medacorp (A); Trips/travel: Company Sponsored Travel (B); Board of Directors: AOSpine (None), Association of Collaborative Spine Research (None), Innovative Surgical Design (None), Spinicity (None), ASIA (Past President), North American Spine Society (Past Program Committee Co-Chairman); Research Support (Staff and/or Materials): P15 Cerapedics (C), Cerapedics (C); Other: Employment: Rothman Institute (None), Honorarium for Lectures (Amount not disclosed), Grants: NuVasive (None), Cerapedics (None), Stryker Spine (None), Expert Testimony: Legal Testimony (None).
- Van den Hout, Wilbert B.:** Grant: ZonMW (Amount not disclosed, Paid to institution/employer).
- Van der Kallen, Bas F.:** Grant: ZonMW (Amount not disclosed, Paid to institution/employer).
- Vila, Thierry:** Stock Ownership: LDR Spine (30,000 shares); Consulting: LDR Spine (F); Speaking and/or teaching arrangements: LDR Spine (Consulting disclosed); Scientific Advisory Board: LDR Spine (Consulting disclosed).
- Villavicencio, Alan:** Device or Biologic Distributorship (Physician-Owned Distributorship): Leading Edge Spinal Implants (A); Board of Directors: Justin Parker Neurological Institute (None); Other Office: Boulder Neurosurgical Associates (Managing Partner).
- Vitale, Michael G.:** Device or Biologic Distributorship (Physician-Owned Distributorship): Stryker Spine (C); Royalties: Biomet Spine (D); Consulting: Biomet Spine (C); Board of Directors: AAP Section on Orthopaedics (None), CWSDSG (C); Research Support (Staff and/or Materials): AOSpine (B); Grants: CWSDSG (D, Paid directly to institution/employer), POSNA (C, Paid directly to institution/employer), SRS (D, Paid directly to institution/employer), OREF (D, Paid directly to institution/employer).
- Vives, Michael J.:** Private Investments: Accelalox (1%); Speaking and/or teaching arrangements: Musculoskeletal Transplant Foundation (B); Other Office: AAOS (Chairman, AAOS Spine Program Committee); Relationships Outside the One Year Requirement: Zimmer (Dissolved 12/2009, Research Support: Staff and/or Materials, D).
- Vleggeert-Lankamp, Carmen:** Speaking and/or teaching arrangements: Bbraun Aesculap (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): Medtronic (F, Paid directly to institution/employer), Bbraun (F, Paid directly to institution/employer), Paradigm Spine (F, Paid directly to institution/employer); Grants: National Health Organization (F, Paid directly to institution/employer).
- Volcan, Ildemaro:** Royalties: Globus Medical (B); Speaking and/or teaching arrangements: Globus Medical (E), Boston Scientific (B), NuVasive (D); Trips/travel: Boston Scientific (B); Scientific Advisory Board: NuVasive (B); Research Support (Investigator Salary): NuVasive (C).
- Wade, Chip:** Relationships Outside the One Year Requirement: (Dissolved 2/2013, Consulting, C).
- 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: Promethean Spine (<1%), Paradigm Spine (<1%), Benvenue (<1%), Nexgen (<1%), K2M (<1%), Pioneer (<1%), Amedica (<1%), VertiFlex (<1%), ElectroCore (<1%), Surgitech (<1%), Axionmed (<1%); Board of Directors: North American Spine Society (Education Council Director), Cervical Spine Research Society (Travel expenses), AOSpine/AO Foundation (C), 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%).
- Wang, Marjorie:** Research Support (Staff and/or Materials): AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves (C, Paid directly to institution/employer).

- Wang, Michael Y.:** Royalties: DePuy Spine (G); Consulting: DePuy Spine (E), Aesculap (B); Speaking and/or teaching arrangements: DePuy Spine (C); Scientific Advisory Board: ISD (Unknown); Grants: Department of Defense (None, Paid directly to institution/employer).
- Watkins, Robert G.:** Royalties: Pioneer (None); Private Investments: ISOI (1%); Consulting: Pioneer (C); Speaking and/or teaching arrangements: Pioneer (E), BrainLAB (B), Medtronic (E); Trips/Travel: Pioneer (B), Medtronic (B); Board of Directors: Marina Spine Center (F).
- Watridge, Clarence B.:** Trips/travel: Brain Lab (A); Board of Directors: Medical Education & Research Institute (Amount not disclosed); Research Support (Investigator Salary): Medtronic (A, Paid directly to institution/employer).
- Watters, William C.:** Board of Directors: North American Spine Society (First Vice President), World Spine Care (None), American College of Spine Surgeons (None); Other: The Spine Journal (Assistant Editor), Spine Arthroplasty Journal (Assistant Editor), Spine (Reviewer), Kirby Glenn Surgical Center (1/22nd minority interest ownership).
- Wetzel, F. Todd:** Board of Directors: McKenzie Institute International (B), North American Spine Society (Secretary).
- Whang, Peter G.:** Stock Ownership: DiFusion (1%); Consulting: Stryker Spine (C), Musculoskeletal Transplant Foundation (B), Smith & Nephew (B), Medtronic (D); Speaking and/or teaching arrangements: Baxter (C); Scientific Advisory Board: DiFusion (Stock); Other Office: Paradigm Spine (C), Cerapedics (B), Relieva (C); Research Support (Staff and/or Materials): VertiFlex (B, Paid directly to institution/employer).
- Wharton, Nicholas D.:** Stock Ownership: Medical Metrics (4%).
- White, Andrew P.:** Consulting: DePuy (B); Speaking and/or teaching arrangements: Globus Medical (B).
- Williams, Gregory M.:** Stock Ownership: NuVasive (1,000 shares); Other Office: NuVasive (Salary).
- Wollowick, Adam L.:** Consulting: Stryker Spine (B), DePuy Spine (C).
- Wong, David A.:** Consulting: Anulex (B), United Healthcare (B).
- Wood, Kirkham B.:** Stock Ownership: TranS1 (10,000 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 Corp. (E, Paid directly to institution/employer), NIH (E, Paid directly to institution/employer), Medtronic (D); Fellowship Support: OREF (E), Globus (E), AOSpine (E); Synthes (E).
- Yaszay, Burt:** Royalties: Orthopediatrics (B); Consulting: K2M (C); Speaking and/or teaching arrangements: DePuy Spine (B); Trips/travel: DePuy Spine (B), K2M (B); Other Office: Scoliosis Research Society (Committee Appointment), POSNA (Committee Appointment), AAOS (Committee Appointment); Research Support (Staff and/or Materials): DePuy Spine (B); Fellowship Support: DePuy Spine (B).
- Yeung, Christopher A.:** Not available at time of publication.
- Yin, Way:** Consulting: Spinal Restoration (Amount not disclosed); Board of Directors: International Spinal Intervention Society (Immediate Past President); Grants: International Spine Intervention Society (A).
- Yonemura, Kenneth S.:** Private Investments: Cottonwood Surgical Center (4%); Consulting: SpineGuard (B), Spineology (A), Crocker Spinal Technologies (A), Magnifi (A), K2M (None), Pioneer Surgical (A).
- Yoo, Jung U.:** Royalties: Osiris Therapeutics (B, Paid directly to institution/employer); Fellowship Support: Synthes (D).
- Yoon, S. Tim:** Royalties: Stryker Spine (None, Paid directly to institution/employer), Meditech Advisors (C); Stock Ownership: Phygen (<1%); Consulting: Meditech Advisors (B); Speaking and/or teaching arrangements: Stryker (Amount not disclosed); Trips/travel: The Spine Journal (A); Board of Directors: ISSLS (Prize Committee); Other Office: The Spine Journal (Deputy Editor); Grants: Biomet Spine (E, Paid directly to institution/employer).
- Youssef, Jim A.:** Royalties: NuVasive (F), Aesculap (F), Osprey Medical (F), Amedica (F); Stock Ownership: Amedica (<1%), Benvenue Medical (<1%), NuVasive (<1%), Paradigm Spine (<1%), Pioneer (<1%), Promethean Surgical Devices (<1%), Spinal Ventures (<1%), VertiFlex (<1%), Spinicity (<1%), ISD (<1%); Private Investments: Amedica (<1%), VertiFlex (<1%), Benvenue (<1%), Pioneer (<1%), NuVasive (<1%), Nexgen (<1%); Consulting: Integra (Amount not disclosed), NuVasive (Amount not disclosed); 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), Stryker Spine (C, Paid directly to institution/employer), VertiFlex (C, Paid directly to institution/employer), Bioset (C, Paid directly to institution/employer), Axial Biotech (C, Paid directly to institution/employer), ATRM (C, Paid directly to institution/employer).
- Yu, Warren D.:** Royalties: Spineart (C); Stock Ownership: SpineFrontier (<0.01%); Consulting: Integra Spine (B), Interventional Spine (B); Scientific Advisory Board: SpineFrontier (None).
- Yukawa, Yasutsugu:** Speaking and/or teaching arrangements: AOSpine (A, Paid directly to institution/employer).
- Zavatsky, Joseph M.:** Consulting: DePuy Synthes Spine (D); Speaking and/or teaching arrangements: Biomet Spine (A).
- Zborowski, Maciej:** Consulting: Orthofix (Amount not disclosed, Paid directly to institution/employer); Trips/travel: Orthofix (B); Research Support (Investigator Salary): Orthofix (B, Paid directly to institution/employer); Research Support (Staff and/or Materials): Orthofix (None, Paid directly to institution/employer); Grants: Orthofix (F, Paid directly to institution/employer).
- Zigler, Jack E.:** Device or Biologic Distributorship (Physician-Owned Distributorship): PDP (None); Royalties: Zimmer Spine (C); Stock Ownership: Expanding Orthopedics (<1%), Flexuspine (<1%); Consulting: Synthes Spine (C); Speaking and/or teaching arrangements: Synthes Spine (C); Scientific Advisory Board: Spineart (None); Research Support (Staff and/or Materials): Entity not disclosed (D); Fellowship Support: Johnson & Johnson (D), Synthes (D), Medtronic (D).
- Zigler, Jeffrey D.:** Other: Musculoskeletal Clinical Regulatory Advisers (Salary).
- Zindrick, Michael R.:** Royalties: DePuy (C), Orthofix (E); Consulting: Orthofix (Amount not disclosed); Scientific Advisory Board: Entity not disclosed (Amount not disclosed); Research Support (Staff and/or Materials): Orthofix (E, Paid directly to institution/employer); Fellowship Support: Orthofix (D, Paid directly to institution/employer).

The following participants have nothing to disclose:

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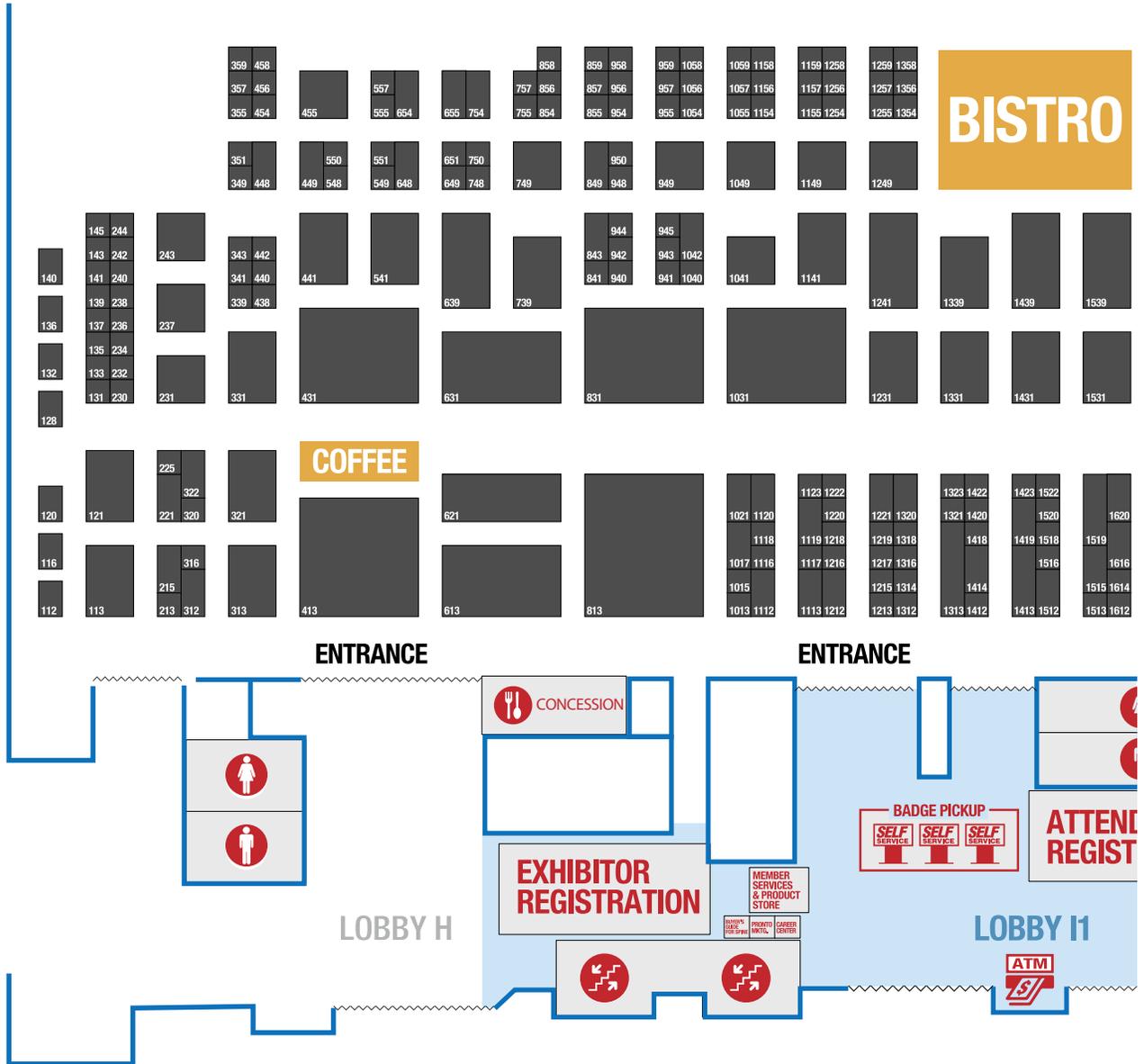
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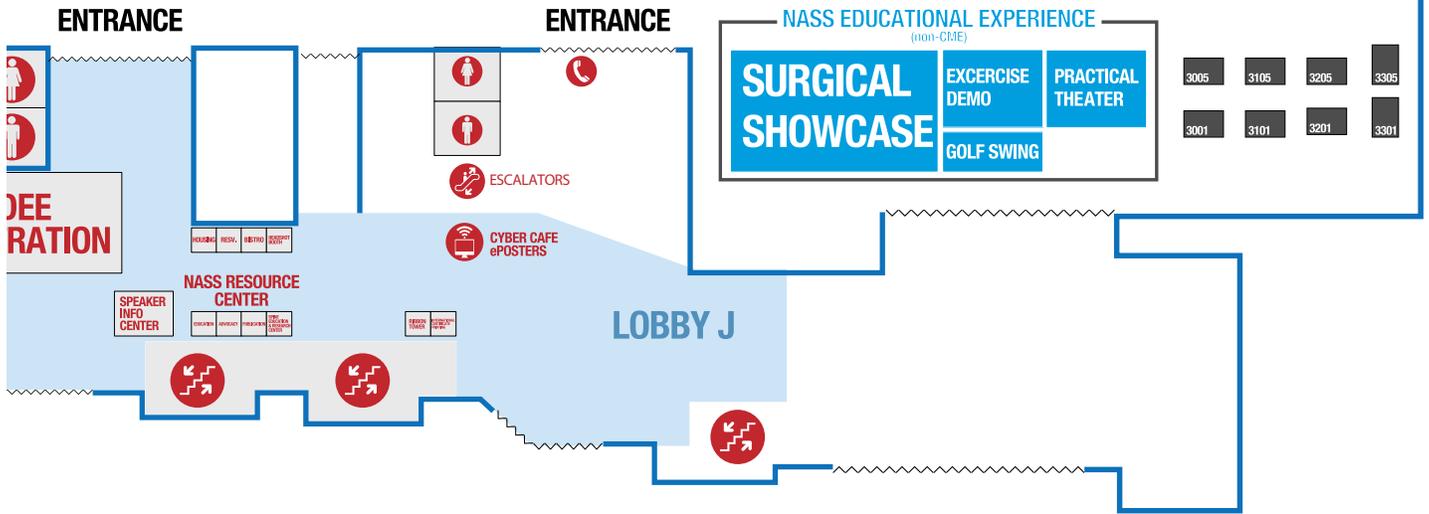
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www.coluna.com.br

The Brazilian Spine Society is an entity that represents around of 860 spine surgeons of Brazil (orthopedists and neurosurgeons). The current president is the Dr. Carlos Henrique Ribeiro. The Brazilian Society of Column is hosted in the city of São Paulo, Brazil. The telephone/fax is: (11) 3088-6615

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Cadwell Laboratories, Inc. 2840
www.cadwell.com

Cadwell has been focused on the development of useful and innovative devices for physiatrists, neurologists, neurophysiologists and technologists who want the very best devices to provide superior patient care since 1979. Based in Kennewick, WA, our products include the Cascade family for IONM, the Easy family for routine, ambulatory, LTM, and critical care EEG and PSG for in-lab and HST and the Sierra family for EMG, NCV and EP for both research and practice environments.

Captiva Spine 1931
www.captivaspine.com

Captiva Spine is committed to creating and maintaining sincere, honest, collaborative relationships in the spine industry for the advancement of products, technologies and outcomes. We seek to provide smart, elegant and intuitive solutions for patients, surgeons, distributors and healthcare facilities. These principles are evident in our TowerLOX MIS system, our Pivotec articulating TLIF, our SmartLOX Cervical Plate, and the rest of our full line of spine products.

Cardinal Spine 3014
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.

CareFusion 1423
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.

Carl Zeiss Meditec, Inc. 1212
www.zeiss.com

Carl Zeiss Meditec (www.meditec.zeiss.com/us) 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.

Cell and Gene Biotechnology 1149

World health care provider innovative solution of CG Bio Inc. has been offering range of human tissues and medical devices especially designed for bone and wound healing. With CG Bio's extensive research activity on growth factors, CG Bio Inc. has been developing combined medical devices such as BMP-2 containing bone grafts, EGF-containing wound dressings, CG Bio has state of the art facility with class 10 clean rooms and purified water system for human tissue processing.

CellRight Technologies LLC 1740
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.

Centinel Spine 2423
www.centinelspine.com



Centinel Spine is a global medical device company focused on providing PEEK-OPTIMA® STALIF MIDLINE® lumbar and STALIF C® cervical technologies for No-Profile® interbody fusion procedures. The STALIF® family of Integrated Interbody Fusion® technologies and surgeon designed instrumentation have an unequalled clinical heritage dating from 1987, and have been implanted in almost 20,000 patients worldwide. The Company is dedicated to "Transforming Spine Surgeons' Ideas into Tomorrow's Technology".

Century Pharmacy **244**
www.cp-rx.com

Century Pharmacy LLC is a compounding-only pharmacy. The art and science of compounding creates customized medications that offer a host of benefits for patients. Our trained pharmacists utilize state-of-the-art equipment in our laboratory for precise formulations designed to the physician's exact specifications. The result is a compound medication tailored specifically to the patient for a more targeted approach to an individual's well-being.

Cerapedics, Inc. **2440**
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 Solutions **2913**
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.

Choice Spine **313**
www.choicespine.net

ChoiceSpine is committed to bringing superior products to orthopedic and neurosurgeon specialists who focus on the treatment of spinal disorders and deformities, through operative intervention. We are committed to meeting the needs of our customers through new product offerings, existing product enhancement, and continued product research and development. By working closely with physicians and maintaining service-focused distribution, we will continue to bring technically-superior spinal products to the market.

Clariance **3117**
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.

CoAlign Innovations, Inc. **1915**
www.coalign.com

CoAlign Innovations, Inc. is delivering the next generation of expandable interbody implants for lower lumbar procedures. We are working to enable safer, faster, less invasive and more anatomically correct surgical procedures through the development of the next generation of implants. We are leading the development of hydraulic expansion technologies that provide us with the ability to deliver a low-profile form factor, combined with precise control.

Collaborative Spine Research Foundation **3041**
www.csrfoundation.net

The Collaborative Spine Research Foundation was founded to advance the science and practice of the highest-quality spine care through the collaborative funding and support of clinical research.

Collagen Matrix Inc. **1017**
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.

Collect Rx **1941**
www.collectrx.com

Collect Rx, Inc. - Your out-of-network experts!

Covidien **1613**
www.covidien.com

Covidien is a leading global healthcare products company that creates innovative medical solutions for better patient outcomes and delivers value through clinical leadership and excellence. Please visit www.covidien.com to learn more

CTE Solutions **3223**
www.culvertool.com

CTE Solutions (Culver Tool & Engineering) has supplied to orthopedic OEMs serving the Spine industry for over 27 years by building enduring partnerships with our clients. Our aim is a culture of excellence, based upon integrity. Specializing in Spine Rods, related implants and instruments from prototypes, customs or production quantities, we offer single-source solutions. CTE Solutions is ISO 13485 certified, FDA registered and accredited with Japan as a foreign medical device manufacturer.



Custom Spine, Inc. 1813
www.customspine.com

Custom Spine, Inc. with 29 patents issued and 41 patents pending, continually seeks to create surgeon-friendly products which provide the patient with added benefits over other products in the market. Products include Securis MIS screw system with low profile screw head that features a 5.0mm chrome cobalt rod, Regent ACP low profile anterior cervical plate, ISSYS LP complete lumbar fixation system, and Pathway interbody fusion devices for both the lumbar and cervical spine.

Cutting Edge Laser Technologies 3145
www.celasers.com

Cutting Edge offers a full line of patented and clinically validated therapy lasers for the progressive practitioner.

Cutting Edge Spine, LLC 1920
www.cutting-edge-spine.com

Structural implant design with load sharing in mind A 510K approved family of spinal interbody systems, encompassing five different forms of Peek Optima® LT1 interbody spacers; with forms specific to anterior, posterior, lateral and transforaminal approaches and offering comprehensive instrumentation.

Cybertech Medical 1021
www.cybertechmedical.com

Cybertech, the industry leader in abdominal compression for spinal support, offers a complete line of Spinal Immobilization and Support for the cervical thoracic and lumbar spine. Superior performance, superior comfort, superior compliance. Cybertech

Danco Anodizing 940
www.danco.net

Danco provides anodizing of titanium implants and aluminum medical instruments and devices. Finishing capabilities include mechanical deburring, hand polishing, graining, blasting and electro polishing. 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.

DePuy Synthes Spine, Companies of Johnson & Johnson 2113
Suites 3001, 3101
www.depuy spine.com



DePuy Synthes Spine has one of the largest and most diverse portfolios of products and services in spine and is a global leader in traditional and minimally invasive treatment. We offer procedural solutions for the spectrum of spinal disorders including deformity, spinal stenosis, trauma and degenerative disc disease. DePuy Synthes Spine is part of DePuy Synthes Companies of Johnson & Johnson, the largest provider of orthopaedic and neurological solutions in the world.
www.depuy synthes.com

Designs for Vision, Inc. 1320
www.designsforvision.com

Just See It™ with Designs for Vision's lightweight custom-made Surgical Telescopes – now available with Nike® frames. See It Even Better™ with the L.E.D. Daylite®, the new UltraMini L.E.D. Daylite® or Twin Beam®, L.E.D. Daylite® providing the brightest and safest un-tethered illumination.

DFine 1737
www.dfineinc.com

DFINE is the developer of minimally invasive radiofrequency (RF) targeted therapies for the treatment of vertebral pathologies. Our devices are built on an extensible RF platform that currently covers two procedural applications: The treatment of vertebral compression fractures (VCFs) with the StabiliT Vertebral Augmentation System, and the palliative treatment of metastatic vertebral body lesions with the STAR Tumor Ablation System.

Dio Medical Co., Ltd. 2140
www.diomedical.com

Dio medical is a professional medical equipment manufacturing firm for orthopedic. Based on continuous improvement concept of our firm, we are seeking for the "Actualization of customer satisfaction by acquiring the best products and safety" Our customer satisfaction concept reflects the philosophy of Dio medical, which emphasizes the safety. Safety is the most important part of medical equipment and we think of it as the most important goal to acquire competitiveness in technology.

Disc Disease Solutions 3233
www.ddsbelt.com

Disc Disease Solutions is a revolutionary approach in the treatment of lower back and neck pain due to spinal diseases and injuries. A unique and patented air traction design sets it apart from all other ambulatory supports. DDS is thin, lightweight and easy to use; it offers a high degree of mobility, alleviating as well as preventing back and neck pain.

DiscGenics, Inc. 2642
www.discgenics.com

DiscGenics™ is a spinal therapeutics company developing novel treatments for patients suffering from intervertebral disc diseases. Back pain is the second most common reason to visit one's doctor, and costs the US an estimated \$100 billion each year. From our patented culture method comes the Discosphere™, a therapeutic cluster of stem/progenitor cells shown to excrete the biological components needed to regenerate an intervertebral disc.

DJO Global 1620
www.djoglobal.com

DJO 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. DJO's brands include Aircast®, DonJoy®, ProCare®, CMF™, Empi®, Saunders®, Chattanooga Group™, DJO Surgical, Cefar®-Compex® and Ormed®, Dr. Comfort, Bell Horn
www.DJOGlobal.com

Dynamic Disc Designs Corp. 1117
www.dynamicdiscdesigns.com

Dynamic Disc Designs Corp. (ddd) is a 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. Now, many more spinal conditions can be explained easily in a dynamic platform to improve spinal education to help improve your clinical outcomes.

Eisertech, LLC 2815
www.eisertech.com

Eisertech, LLC produces spinal implants for direct sale to hospitals and surgery centers. Please visit our website at www.eisertech.com to see our product offering.

Elliquence LLC 1721
www.elliquence.com

Elliquence manufactures patented Radiowave technology. Disc-FX® represents an innovative product for mini-microdiscectomies using manual instruments and the Surgi-Max® Plus energy source with navigational Trigger-Flex®, which permit annulus modulation and nucleus ablation. A full line of accessories offers applications for all spinal procedures, sparing healthy tissue while precisely treating pathology.

Elsevier, Inc. 2439
www.elsevierhealth.com

ELSEVIER presents *The Spine Journal*, the official journal of the North American Spine Society. Please stop by our booth to view the latest issue of the journal and browse our other books and journals.

Eminent Spine 243
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 Testing Corp. 1623
www.empiricaltesting.com

With nearly 15 years of experience, ETC holds A2LA accreditation for the largest number of medical device testing methods in the United States. Alongside new sterilization and distribution validation services, our ISO/IEC 17025:2005 accreditation, custom protocol development, "submission-ready" reports, and tailored communications from your dedicated Partnership Manager are all part of our commitment to your success. We look forward to serving you.

Enova Illumination 440
www.enovaillumination.com

Enova model D-200 is the world's brightest LED surgical headlight and Enova model XLT-125 is brightest LED headlight with adjustable spot and co-axial alignment. Pure white illumination, light-weight and comfortable too. Up to 24 hrs battery life! 5 year warranty on LED and made in USA. Both models are popular with spine surgeons worldwide.



Ensinger, Inc. 1614
www.ensinger-ind.com

Autoclavable plastic shapes in a variety of colors supported with ISO 10993 testing for the intended use of surgical instruments in contact with blood and tissue. Radiolucent carbon composites with high stiffness and radio opaque grades for safety and to accommodate MIS procedures.

EOS Imaging 1119
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.

EPTAM Plastics 2741
www.eptam.com

EPTAM Plastics is ISO:13485:2003 certified and registered. EPTAMs' advanced machining technologies and quality systems deliver the highest quality components from materials such as Invibio PEEK OPTIMA®. EPTAM offers: Multi-axis – dry Machining technology, Microblast Deburring insures critical components are burr free. In-house Laser Marking and Automated "Marker"/ Pin manufacturing

Esaote North America, Inc. 1837
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

Etex Corporation 1912
www.etexcorp.com

Nanocrystalline calcium phosphate biomaterials that are moldable, injectable and set hard. ETEX offers both porous, osteoconductive synthetics and combination osteoconductive & osteoinductive materials that are cleared for use in posterolateral fusion.

Evonik Corporation 1816
www.evonik.com/vestakeep

Evonik, a global leader in specialty chemicals, supplies a wide range of implant grade materials for permanent and temporary implants. Evonik's polyetheretherketone (PEEK) products are known as VESTAKEEP® PEEK and include VESTAKEEP® PEEK powders, VESTAKEEP® PEEK resin/granules, VESTAKEEP® PEEK stock shapes.

Exactech, Inc. 2523
www.exac.com Suite 3205

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. 1519
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.

Flagship Surgical, LLC 1116
www.flagshipsurgical.com

FLAGSHIP SURGICAL prides itself on providing comfortable, safe and economical products engineered to ensure a more focused and comfortable surgical experience for surgeons, nurses and OR technicians. The Surgical Mat™, The Mini Mat™ & The Suctioner™ are the only patented, anti-microbial disposable Surgical Mats addressing 3 important operating room issues: surgical comfort, fluid management and OR ergonomics.

Folio Insurance Management 2042
www.folioadmin.com

Folio Insurance Management is a boutique, multi-jurisdictional Insurance Management practice, specializing in the formation and management of captive (re)insurance companies. We are strategically licensed in most of the world's major captive jurisdictions and, unlike most of our competitors, we focus on providing tailored solutions depending on the specific needs and domicile of your Company.

FTGU Medical Consulting, LLC 3143
ftgumedical.com

Solution Showcase: Thursday, October 10, 12:30–12:50 p.m.

At FTGU, we focus on getting doctors paid. Through our two primary services – Insurance A/R Recovery and Secondary Claims Management – we pursue unpaid insurance claims and utilize our proven recovery methodology to collect on every claim. That methodology includes tracking EVERY unpaid claim to a final resolution; either the claim gets paid or we tell you why. That is what makes us different and that is what makes us remarkably effective.

FzioMed, Inc. 438
www.fziomed.com

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.

G6 Spine 448
www.g6spine.com

G6 Spine is dedicated to being a “global leader” in the spine industry through the development of advanced and innovative spine technologies. Focus on optimal treatment of advanced conditions. This will include motion preservation, minimal invasive techniques and the enhancement of current fusion treatments. G6 Spine will utilize extensive surgeon collaboration and research to assist in obtaining excellent spinal surgery outcomes; early mobilization, and a fast patient recovery.

Gallini 3213
www.gallinimedical.com

Gallini has been providing exceptional quality for over 20 years. Years of research, testing, and perfecting our products has lead Gallini to be a global leader. In millions of procedures worldwide, physicians have trusted the Gallini name. We are confident you will too. We are now excited to enter the market of bone biopsy, vertebroplasty and percutaneous discectomy. Come and let us show you our what we have to offer!

Gauthier Biomedical, Inc. 2831
www.gauthierbiomedical.com

Gauthier Biomedical, Inc. is a proud manufacturer of high-quality instruments, off-the-shelf and contract manufacturing, for spine, trauma, hip, shoulder, knee, ankle and small bone surgical applications. At the core of Gauthier Biomedical instrumentation is our patent pending multi-color silicone overmolding product capability. We are a one-stop shop that offers in-house engineering and industrial design support. At Gauthier we pride ourselves on validations and high quality standards.

Gibraltar Laboratories, Inc. 3243
www.gibraltarlabsinc.com

Gibraltar Laboratories is a 43 year old, highly respected, FDA registered, ISO 17025 certified laboratory specializing in studies for the spinal implant/surgical instrument industries: Sterilization Validation (ST77/ST79) Cleaning Validation (Protein, Hemoglobin, Carbohydrate, Bioburden, Cytotoxicity) Sterility testing Endotoxin Reprocessing Environmental Monitoring GBL has been an annual recipient of the top awards in customer satisfaction from the American Council of Independent Laboratories.

Globus Medical Inc. 431
www.globusmedical.com

Surgical Showcase: Wednesday, October 9, 1:00–4:00 p.m.

Globus Medical, the world's largest privately held spinal company, is driving significant technological advancements across a complete suite of spinal products. Founded in 2003, Globus' single-minded focus on advancing spinal surgery has made it the fastest growing company in the history of orthopedics.

Greatbatch Medical, Inc. 2442
www.greatbatchmedical.com

The orthopaedics division of Greatbatch Medical™ focuses on the design, development and manufacture of critical technologies for the orthopaedic market. We provide a wide range of products and services including the contract manufacture of implants and instruments, with sterile packaging and hydroxyapatite (HA) coating technology, as well as the design and manufacture of delivery systems and single use surgical instruments.

GS Medical Co., Ltd. 3031
www.gsmedi.com

GS Medical designs, manufactures and sells a comprehensive line of spinal implants and instrumentation to address the needs of neuro and orthopedic spine surgeons. We are committed to advancing these technologies through our collaborative relationships with surgeons and engineers.

gSource LLC 1612
www.gsource.com

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.



Haag-Streit USA **449**
www.haag-streit-usa.com

As an innovator of surgical microscopes, we are happy to introduce Haag-Streit Surgical, formerly Moeller-Wedel, and our high quality products made in Germany. Through years of experience our focus is developing surgical microscopes that will fit today's as well as future standards in optics, movement, ergonomics, and video imaging.

Halifax Biomedical Inc. **3242**
www.halifaxbiomedical.com

Halifax Biomedical Inc. provides unique and innovative solutions addressing some of the greatest challenges in orthopaedics: 1) assessing spine instability pre-operatively, 2) complications from a delay in bone healing and 3) loosening of implants from bone. To meet these challenges, HBI has developed and clinically implemented HALIFAX, a comprehensive Radiostereometric Analysis (RSA) program providing surgeons with highly accurate anatomical measurements. HALIFAX is 20X more precise than CT.

Hans Biomed USA Inc. **2937**
www.hansbiomed.com

Hans Biomed USA is the FDA registered and AATB accredited processing Tissue Bank. We are introducing our 510K cleared DBM Gel & Putty "SureFuse & ExFuse" and looking for distributors and private partners.

Harvest Technologies Corp **1819**
www.harvesttech.com

Developing Technologies for Accelerating Healing, Naturally(R), Harvest manufactures the SmartPREP(R) 2 BMAC(TM) System. SmartPREP BMAC is designed for rapid, point-of-care preparation of Stem Cell Concentration from Bone Marrow. In minutes, SmartPREP produces a predictable Concentrate enriched with multiple Cells and Growth Factors

Hensler Surgical Products **748**
www.henslersurgical.com

Founded in May 2011, Hensler Surgical Products, LLC is a Wilmington, N.C.-based medical device company. Sean Hensler, a Neurosurgical Physician Assistant, and Dr. Thomas Melin, Neurosurgeon, formed Hensler Surgical as a way to conceive, develop and introduce leading surgical innovations into the medical field. Hensler Surgical's first product to market is the Hensler Bone Press, an innovative device designed to harvest valuable autologous bone during surgical grafting procedures.

HydroCision, Inc. **1922**
www.hydrocision.com

HydroCision is the leading developer, manufacturer and marketer of fluidjet based surgical tools for the spine market. The SpineJet products cut and aspirate tissue at the same time allowing surgeons to quickly and precisely prepare the disc space for fusion and discectomy. The high-velocity, non-thermal fluid jet cuts tissue continuously, reducing procedure time and surgeon fatigue. The power of the fluidjet easily cuts and removes tissue without damaging surrounding cartilage and bone.

IHI Ionbond Inc. **213**
www.ionbond.com

Ionbond provides the highest performance PVD, CVD and PACVD wear protection, low friction and decorative coatings as well as coating equipment. Our expertise goes far beyond our industry-leading CVD coating services and equipment with extensive coating portfolios based on PVD and PACVD technologies as well. Ionbond provides both high quality standard coating portfolios for the cutting, molding and forming tool market and to offer customized solutions for our customers making OEM components.

IMEDICOM Co., Ltd. **1420**
www.imedicom.co.kr

IMEDICOM Co., Ltd. is one of fast growing orthopaedic company that manufactures Balloon kyphoplasty system, Epidural catheter and Surgical power tools with Saw blades. All products of IMEDICOM are in compliance with CE, FDA regulations and ISO9001, ISO13485.

Implanet **3140**
www.implanet.com

IMPLANET America, a spine company providing IMPLANET "Made in France" solutions. Carrying over 20 years of experience and more than 80 patents in surgical implants, our team uses cutting edge technologies to design, develop, manufacture, control and trace our products. Provided in GS1 ready-single sterile packaging, our solutions allow surgeons and hospital staffs to help their patients to return to a normal, productive and pain free life.

IMRIS Inc. **441**
www.imris.com

IMRIS provides an optimized fully integrated image guided therapy environment that delivers timely information to clinicians for use during surgical or interventional procedures. The VISIUS Surgical Theatre incorporates magnetic resonance imaging, CT and fluoroscopy into multi-purpose surgical suites to provide truly intra-operative imaging for specific medical applications.

Infinite Therapeutics **3218**
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!

Innomed, Inc. **320**
www.innomed.net

Innomed, Inc. will feature right angle rongeurs, right angle standard & needle nose pliers, ultra thin osteotomes, combination needle driver/suture scissors, bone grafting forceps, easy grip mallets and other instruments for spine surgery.

Innovasis, Inc. **2031**
www.innovasis.com

Innovasis is committed to the constant innovation of Spinal Implants and other related products. We Innovate. We Involve. We Invent.

InTech Medical **2638**
www.intech-medical.com

InTech Medical is a leading custom contract manufacturer specialized in spinal and joints instruments and implants. Based in the USA and Europe, InTech Medical is internationally renowned for its high quality standard, its capacity to deliver innovative and intuitive designs. Swing by our booth to check out designs including our MIS retractor. Stay tuned online with our latest instruments [www.intechmedical.com].

Integra Spine **2431**
www.integralife.com **Suite 3339**

Integra is a leading provider of spinal and orthobiologics solutions with a comprehensive product line from occiput to sacrum. Integra is a fully integrated medical device company targeting medical specialties worldwide. Products include surgical implants, regenerative technologies, orthobiologics and medical instruments used in neurosurgery, spinal, orthopedic and general surgery. Integra Spine is expanding its technology portfolio with the launch of Nanometalene.

Intelligent Implant Systems **1414**
www.intelligentimplantsystems.com

Intelligent Implant Systems, LLC specializes in next generation implants for spinal surgery. We are developing implant systems for enhancing fusion, non-fusion, and scoliosis. Active Screw™, cleared by the FDA for sale in the U.S., is the first bone screw that actively adjusts to changing bone conditions. As a platform technology, it can be used in spine, orthopedic, and dental applications. The Marauder™ System utilizes torqueless locking to address posterior fixation from the Occiput to S1.

IntelliRod Spine **3119**
www.intellirodspine.com

IntelliRod Spine is developing a wireless implantable microelectronic spine fusion sensor. This innovative diagnostic system will allow spine surgeons to assess the success of spinal fusion and eliminate the need for unnecessary exploratory surgery while accelerating patients' return to work after surgery. The IntelliRod system will provide objective postoperative data complementing surgeon data currently collected from flexion extension x-rays and costly high radiation CT scans.

International Biologics **1254**
www.internationalbiologics.com

Specialty Allografts for Spine Surgery IB manufacturers' frozen, freeze-dried, saline packaged, and demineralized allografts primarily for orthopedic (spine) applications. With custom manufacturing for specialty allografts; traditional bone, soft tissue, and DBM allografts for distribution or private labeling to increase brand awareness. IB's team has a proven history of providing personalized and quality services to customers.

International Precious Metals **1249**
www.preciousmetals.com

International Precious Metals is an Industry leader in the precious metals market. We have been delivering a world of Quality and Service since 1995. We are a U.S. Mint recognized National Dealer and we have assisted 1000's of clients with their precious metals needs for the last 2 decades.

Interventix **3236**
www.interventix.com

Interventix is dedicated to the development of novel devices and methods for the performance of spinal fusion procedures.

Intrinsic Therapeutics, Inc. **1213**
www.in-thera.com

Intrinsic Therapeutics' Barricaid® implant is designed to reconstruct anular defects, which lead to disc herniations, sciatica, and back pain. The resulting ~1,000,000 discectomies annually have high rates of clinical failure in patients with tall discs and/or large anular defects. Intrinsic's Barricaid® securely replaces damaged anulus to prevent reherniations.



Invio Bio Biomaterial Solutions **1120**
www.invio.com **Suite 128**

Solution Showcase: Friday, October 11, 12:00–12:20 p.m.

In 1999 Invio revolutionized spinal device design by introducing the breakthrough implantable polymer PEEK-OPTIMA, which has become the standard for spinal interbody fusion. Since then, we have continued to pioneer spinal industry innovation driven by clinical need and our customers' desire to continually improve patient outcomes. Whether your program objectives focus on new product development, improving production efficiencies, or accessing new markets, Invio can help you meet your goals.

Invuity, Inc. **749**
www.invuity.com

Invuity develops advanced medical devices to dramatically improve access and visualization in minimally invasive and minimal access surgery. The company's products incorporate its proprietary Eigr™ technology into sophisticated hand-held illumination devices and access systems for a variety of surgical specialties including spine, orthopedics, breast and thyroid oncologic, plastic and general surgery.

ISTO Technologies, Inc. **1843**
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.

Jewel Precision **550**
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 **3136**
www.myjjonline.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 # 3136 and experience their innovative instruments with INTERNATIONAL QUALITY @ INDIAN PRICE!

JMT Co., Ltd. **3212**
www.jmtmed.com

JMT Co., Ltd. is a specialty medical device company that develops and markets products primarily for the Orthopedics and Neurosurgery. We strive to provide superior benefits to professionals and patients through the development of reliable products.

Joimax, Inc. **231**
www.joimax.com

joimax® is the leading developer and provider of complete systems for minimally invasive spine surgery which allows surgeons to operate on herniated discs, spinal stenosis and other pathologies with minimal anatomical and surgical trauma. Our fully integrated visualization, documentation and tissue removal technologies enable surgeons to perform true minimally invasive spine surgery through a single small incision, under local anaesthetic and on an outpatient basis.

Journal of Bone and Joint Surgery **1716**
jbjs.com

The Journal of Bone and Joint Surgery, Inc., is the publisher of The Journal of Bone & Joint Surgery, JBJS Essential Surgical Techniques, JBJS Case Connector, and JBJS Reviews.

K2M **2413**
www.k2m.com **Suite 3105**

K2M, Inc. is the largest privately held spinal device company in the world focused on the research, development, and commercialization of innovative solutions for the treatment of complex spinal pathologies and minimally invasive procedures. The company is recognized as a global leader in providing unique technologies for the treatment of deformity, degenerative, trauma, and tumor spinal patients.

Karl Storz Endoscopy America **442**
www.ksea.com

KARL STORZ Endoscopy-America, Inc., a leader in diagnostic and operative endoscopy technologies, markets a comprehensive range of products for minimally invasive spine surgery. Among our solutions is the new SpineTIP System, a pure endoscopic system for lumbar discectomy that offers the flexibility of three surgical approaches: transforaminal, interlaminar and posterolateral.

Kelyniam Global Inc. **2545**
www.kelyniam.com

Kelyniam Customized PEEK Cranial/Facial Implants

Kimberly-Clark **1219**
www.kchealthcare.com

Kimberly-Clark provides a complete line of quality pain management procedural needles, catheters, and kits as well as a wide range of regional anesthesia products, radiofrequency lesioning equipment and supplies.

Kirwan Surgical Products Inc. **1412**
www.ksp.com

Kirwan Surgical Products LLC is dedicated to creating and developing high-quality specialty electro-surgical instruments and accessories. An innovator in the field of electro surgery, we offer a full range of reusable and disposable bipolar forceps and bipolar cords. Our AURA Elite non-stick bipolar forceps employ the physics of high conductivity to achieve the non-stick effect during coagulation. Highlighting our product line is the AURA 70-Watt Irrigating Bipolar Electro-surgical Generator.

Knight Mechanical Testing **2842**
www.knighttesting.com

Knight Mechanical Testing (KMT) is an ISO/IEC 17025 accredited laboratory specializing in static and dynamic mechanical testing for orthopedic implants and instruments. KMT provides world class testing facilities and superior guidance on the appropriate test methods for your device. With expertise in spine, extremities, sports medicine, trauma, large joint, dental, and cranial/maxillofacial repair, KMT has you covered, literally, from head to toe.

Koros USA, Inc. **2012**
www.korosusa.com

For the past 33 years Koros USA has manufactured and distributed state of the art surgical instruments such as our Cervical Black Belt Retractor & Lumbar Super Slide and ALIF Polaris retractors, along with our rotating Osteopunch & Ejector Punch Plus rongeurs. Our devices provide ergonomically controlled movement and stability.

Kyungwon Medical Co., Ltd. **2341**
www.kyungwonmedical.com

Kyungwonmedical Co., Ltd. is a leading manufacturer and distributor in orthopedic spinal system business in Korea. The company was established in 1991 and started to specialize in spinal fusion, osteoporosis treatment, and bone graft. We provide high-quality products such as PolyBone (Calcium Phosphate Bone Substitute), Tyche Series (Total Cage \$ Screw Fusion System), that are manufactured under well-organized and advanced technology medical device manufacturing system.

L3 Healthcare Design Architects **242**
www.l3hASC.com

L3 designs Surgery Centers, ASC's, Specialty Clinics and offices. Our Innovative designs focus on caseload and energy efficiency and maximizing long term profitability. Operational functionality and efficiency is where years of design experience matters. Developing great Surgery Centers is not just our business, it's our passion!

Lanx, Inc. **2631**
www.lanx.com **Suite 3325**

Solution Showcase: Wednesday, October 9, 12:00–12:20 p.m.
Surgical Showcase: Thursday, October 10, 5:00–8:00 p.m.

LANX® partners with leading orthopedic and neuro spine surgeons to develop unique, cutting-edge spinal solutions designed to provide improved care through less invasive procedures. LANX offers a comprehensive, continually expanding portfolio of innovative, rapidly deployed solutions backed by state-of-the-art engineering and sound clinical evidence.

LDR Spine **1031**
www.ldrspine.com **Suites 132, 136**

Surgical Showcase: Thursday, October 10, 9:00 a.m.–12:00 p.m.

LDR was founded in 2000 by partners Christophe Lavigne, Hervé Dinville, and Patrick Richard in Troyes, France with a singular focus on the development of innovative technology for spinal procedures. All LDR resources today are dedicated to this highly specialized segment of the orthopaedic and neurosurgical markets. Novel implantable spine devices and instrumentation from LDR are designed to support the clinical goals of surgery and patient outcomes, while making procedures easier to perform.

Leica Microsystems **1123**
www.leica-microsystems.com

The Best just got Better. Introducing innovations to the Leica M525 OH4 spine surgical microscope with more brilliant illumination at a greater working distance, specially designed for METRX cases. See and capture more detail than ever before with new brilliant 400 watt illumination and the Leica HDC100 high definition camera.

LH Medical Corporation **349**
www.lhindustries.com

LH Medical Corporation a division of LH Industries a privately held company that has been providing manufacturing answers and solutions for over 47 years. LH Medical your strategic partner for implant and device solutions. We provide proven experience and turnkey solutions as a contract manufacture. From general instruments to complex mechanical assemblies. From Implants to prototypes. Machining all types of metals, plastics and peek. LH Medical providing answers and solutions to our clients.



Life Instrument Corporation 1313
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 1531
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 1215
lifelinktb.org

LifeLink Tissue Bank, the largest not-for-profit tissue bank in the south east, 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 1431
www.accesslifenethealth.org

Founded in 1982 and headquartered in Virginia Beach, VA, LifeNet Health Inc. is a leading biomedical alloengineering organization and organ and tissue donation agency whose mission is saving lives and restoring health.

Lilly USA, LLC 3131
www.lilly.com

Lilly, a leading innovation driven corporation, is developing a growing portfolio of pharmaceutical products by applying the latest research from its own worldwide laboratories and from collaborations with eminent scientific organizations. Headquartered in Indianapolis, Ind., Lilly provides answers - through medicines and information - for some of the world's most urgent medical needs.

Lippincott Williams & Wilkins 1512
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 1512 to review Spine, the most cited journal in the field of spinal deformity.

LISI Medical 1154
www.lisi-medical.com

Lowell, Inc. 942
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 1817
www.lumitexmd.com

Lumitex Medical Devices creates, manufactures and distributes unique devices for medical illumination. LightMat Surgical Illuminator provides cool, shadowless deep cavity lighting. Flexible or malleable, it may be placed onto most retractors or instruments. VersaLight Multifunctional Surgical Illuminator illuminates, irrigates, aspirates and provides moderate blunt retraction in one easy to use hand held surgical tool. www.lumitexmd.com 800-969-5483

Mazor Robotics 1539
www.mazorrobotics.com

Surgical Showcase: Friday, October 11, 9:00 a.m.-12:00 p.m.; Saturday, October 12, 1:00-4:00 p.m. and 5:00-8:00 p.m.

Mazor Robotics (TASE:MZOR) is dedicated to the development and marketing of innovative surgical robots and complementing products that provide a safer surgical environment for patients, surgeons and OR staff. Mazor's flagship product, Renaissance™, is a specifically designed surgical robotic system that enables surgeons to conduct spine surgeries in an accurate and secure manner. The system has been successfully used in the placement of thousands of implants in the US and Europe. Multiple peer-reviewed publications and presentations at leading scientific conferences have validated the accuracy, usability and clinical advantages of SpineAssist. For more information, please visit www.mazorrobotics.com.

Mazur Marketing **2644**
www.newrongeur.com

MAZUR MARKETING provides physician designed surgical instruments used primarily in spine surgery. The premier instrument is the New Mazur Rongeur with angled concave and asymmetrical tips for accurately, quickly, and efficiently shaping and smoothing all bony surfaces, especially the anterior cervical spine. It has a unique non-clogging tip. It is made with the highest quality German stainless steel and German manufacturing craftsmanship.

MD Logic EHR **1516**
www.mdlogic.com

MD Logic is the leading U.S. provider of High Performance Electronic Health Records Solutions empowering healthcare providers the technology to document care "real time" in the exam room. Since 1994, MD Logic has been successfully installing Electronic Health Records in healthcare clinics from coast to coast. With the MD Logic World Wide EHR you eliminate dictation and go home after the last patient is seen. Call us today and learn why MD Logic is unmatched in speed, efficiency and value.

MDI - Medical Device & Implants, LLC **948**
www.mdi-llc.net

MDI is an ISO-13485 certified ultra precision contract manufacturer with full in-house capabilities for the manufacturing and complete finishing of spinal and small bone implant systems, including but not limited to: mono- & poly-axial screws, solid & canulated screws, straight or prebent rods. We offer titanium anodization, validated implant cleaning, passivation, electropolish.

Medacta International **1049**
www.medacta.com

Medacta International, a Swiss company, develops, manufactures and distributes orthopedic 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.

MedAffinity EHR **3043**
medaffinity.com

MedAffinity Corporation provides electronic health records (EHR) software to physicians. Founded in 2005, MedAffinity is inspired by physicians who have experienced frustration with first-generation electronic medical records systems. Our company offers software informed by over a decade of experience in the EHR field. With state-of-the-industry technology and user-friendly design, the MedAffinity EHR is designed from the ground up to facilitate a highly efficient workflow within any practice.

MedCure, Inc. **2744**
www.medicure.org

MedCure is the leader in non-transplant, anatomical specimen services and state-of-the-art surgical training facilities in Oregon, Nevada and New England. We have the most educated, innovative and customer focused team to work with you in fulfilling your requests.

Medfix International, LLC **113**
www.medfix.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.

MEDICREA USA Corp. **321**
www.medicrea.com

MEDICREA is a fully-dedicated spinal implant company focused on introducing reliable and innovative technologies to the global marketplace. With over 19 years of experience, MEDICREA provides a full range a full range of patented products that are conceived, developed and manufactured to advance patient outcomes and support the work of medical professional.

Medmix Systems AG **2737**
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 bonecement 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.



Medtronic 613
www.medtronic.com Suites 3301, 3305



At Medtronic (www.medtronic.com), we're committed to Innovating for life by pushing the boundaries of medical technology and changing the way the world treats chronic disease. To do that, we're thinking beyond products and beyond the status quo - to continually find more ways to help people live better, longer.

Medyssey Spine 2837
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.

Meridian Surgical Partners 3013
www.meridiansurgicalpartners.com

Meridian Surgical Partners specializes in acquisition, development, and management of multi-specialty and spine-driven ambulatory surgery centers. Physician benefits include excellent ROI, decreased management burden, and improved quality of life.

Metal Craft & Riverside Machine & Engineering 750
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 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.

MiMedx 843
www.mimedx.com

MiMedx® is an integrated developer, processor, manufacturer and marketer of patent protected biomaterial products and tissues. AmnioFix® is a biologic Dehydrated Human Amniotic Membrane implant specifically processed to offer a wide variety of barrier and surgical reconstructive options for spinal procedures. MiMedx®'s PURION® Process results in an allograft that is minimally manipulated, safe and effective.

Misonix 2441
www.misonix.inc

Surgical Showcase: Friday, October 11, 9:00 a.m.–12:00 p.m.

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. A reduction in bleeding is generally observed by its users and has been reported to be 30-40% in multilevel spinal osteotomies. Please visit us at NASS 2013 at booth # 2441 for more information.

Mizuho OSI 1231
www.mizuhosi.com

Mizuho OSI designs and markets Specialty Surgical Tables for spinal, orthopedic trauma and joint replacement procedures. The Spinal Table System (STS), proAXIS® & INSITE® provide three 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.

Mobitor Corporation 2836
www.mobitor.com

SOPIC for Medical Device Logistics is a Best-of-Breed, Single-Vendor, mobile and cloud-based suite for field sales automation, supply chain workflow, resource fulfillment, consigned inventory management and fully automated implant billing.

MTS Systems Corp. 1713
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 221
www.mcra.com

MCRA, LLC is the leading neuro-musculoskeletal consulting firm assisting established and emerging companies in the development and commercialization of their technologies. MCRA's consultants are industry leaders who support Clinical, Regulatory, Quality Assurance, Reimbursement, and Intellectual Property initiatives. MCRA's integration of these key value creating initiatives, as well as its focused specialization, creates unparalleled expertise to its clientele.

Musculoskeletal Transplant Foundation (MTF) **1921**
www.mtf.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 over 90 thousand donors and has maintained an exemplary safety record while delivering a broad range of tissue forms.

Nadia International, Inc. **1422**
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 75 countries collecting his fine works of art. They are displayed at the Smithsonian and various medical universities all over the world.

Nascent Surgical, LLC **3237**
www.nascentsurgical.com

Nascent Surgical, LLC, presents Squair and MiniSquair. The first surgical smoke capture system proven to capture 99.5% of plume. Surgical plume contains large numbers of nanoparticles and represents a serious risk to the health of the OR team. These particles pass through surgical masks and lungs to translocate to all parts of the body and are associated with many chronic diseases. Squair and MiniSquair eliminate this threat doing so without altering surgical protocols. Latex, DEHP and BPA free

Neuro Alert Monitoring Services **1054**
www.neuroalert.com

Neuro Alert is a provider of Intraoperative Neuromonitoring Services (IONM) . We have a depth of clinical expertise including skull based, spine and NIR procedures. Our founding physician has been providing IONM since 1982. Our Neurotechnologists are supervised by Board Certified Physicians that remotely monitor all surgeries in real-time.

NeuroLogica **331**
www.neurologica.com

NeuroLogica Corporation, located in the Boston metro area, conceives, designs, engineers, manufactures and markets innovative medical imaging equipment for healthcare facilities and private practices worldwide.

Nordson Micromedics **1937**
www.nordsonmicromedics.com

Nordson Micromedics is the partner of choice for biomaterial delivery solutions with innovative development and design expertise, comprehensive global regulatory support, and broad manufacturing and packaging capabilities. For over 30 years, Micromedics has developed and manufactured single-use devices for optimal delivery of single or multi-component biomaterials for topical and endoscopic surgical procedures. All backed by Nordson, a global leading producer of precision dispensing equipment.

Norman Noble, Inc. **1318**
www.nnoble.com/index.htm

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.

NovaBone Products, LLC **339**
www.novabone.com

NovaBone Products provides a best in class synthetic bone graft substitute. The unique bioactive grafting technology delivers an osteoconductive matrix while signaling and stimulation osteoblastic activity to the site. For ease of use, and surgical convenience, NovaBone is available in a variety of forms and sizes.

Novid Surgical, LLC **1218**
www.novidsurgical.com

Novid Surgical, LLC is pleased to present the Swiss-Made FISSO line of Quick Fixation positioning arm systems. Available in numerous weight capacities and lengths, we can provide a stable mounting platform for a myriad of applications. These include endoscopes, instruments, and retractors among others. Due to modular design, numerous configurations are possible to meet your exact needs. OEM inquiries are welcome.

NSI **1617**
www.nsi-healthsystems.com

NSI specializes in the development, manufacturing and distribution of innovative medical devices and technologies.



Nueterra 1641
www.nueterra.com

Nueterra is the largest U.S. private-sector organization specializing in joint venture partnerships with health systems, governments, hospitals and physicians. The company's development and management of surgical facilities and community hospitals, created through domestic and global partnership and patient care and coordination, provide quality healthcare solutions for patients and providers.
www.nueterra.com

Nutech 2713
www.nutechspine.com

Surgical Showcase: Thursday, October 10, 5:00–8:00 p.m.

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 2019
www.nuvasive.com Suite 3005



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. NuVasive offers a comprehensive spine portfolio of over 80 unique products developed to improve spine surgery and patient outcomes. The Company's principal procedural solution is its Maximum Access Surgery, or MAS[®] platform for lateral spine fusion. MAS provides safe, reproducible, and clinically proven outcomes, and is a highly differentiated solution with fully integrated neuromonitoring, customizable exposure, and a broad offering of application-specific implants and fixation devices designed to address a variety of pathologies

Oberg Medical 230
www.obergmedical.com

Oberg Medical, an Oberg Industries Company, is a full-service contract manufacturing partner supporting medical device OEMs focusing on metal and plastic implants, instruments and assemblies for many medical device segments specializing on orthopedic, spine, extremity, endoscopic/laparoscopic and cardiac rhythm management markets.

Olympus Biotech Corporation 2813
www.olympusbiotech.com

Olympus Biotech Corporation is focused on leading regenerative medicines and providing biomaterials that help to stimulate the regeneration of bone. The company provides a variety of orthopaedic biologic products including: OP-1[®] Putty, approved in the US under Humanitarian Device Exemption for the treatment of posterolateral lumbar pseudoarthrosis, BioVERSE[™] Allograft Sponge, and BioEZE[™] Demineralized Bone Matrix.

Optec USA, Inc. 841
www.optecusa.com

OPTEC USA as a central fabricator/manufacturer of custom and prefab, spinal and lower limb orthosis, we're available 24/7/365. For 16 years we have offered the highest level of quality and service available, from our EZ Step Leather Ankle Gauntlet to our newest line of Stealth Air and Venum braces.

Oquendo Center 651
www.oquendocenter.org

THE TURNKEY SOLUTION FOR YOUR NEXT MEDICAL EVENT. The clinical capabilities and astounding amenities of the Oquendo Center make it an incomparable event solution. Even with 66,000 square feet to work with, our attention to detail is staggering. It starts with our capacity for up to 30 fully-equipped clinical lab stations, allowing for more simultaneous, hands-on learning. This means more opportunity to practice and perfect each new skill.

Orchid Orthopedic Solutions 2817
www.orchid-ortho.com

From our employees, to our customers, to surgeons performing surgery and ultimately, to the patients that receive care using the products we make, Orchid strives to affect people's lives in a positive manner. We feel very fortunate and are proud to be working in an industry that has the ability to impact lives in such a profound and positive way.

Ortho Development Corporation 1015
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 full complement of PEEK, as well as a cervical plate and a lumbar pedicle screw system. Distribution opportunities are available.

Ortho Kinematics **949**
www.orthokinematics.com

Ortho Kinematics, Inc. (OKI) is an imaging informatics company focused on spinal diagnostics. OKI's Vertebral Motion Analysis (VMA) test is the first and only functional spine diagnostic on the market today. The VMA uses fluoroscopy imaging and proprietary analytical software to generate accurate and precise measurements of spine function for the detection of spinal instability. The VMA is FDA-cleared and can be used to assess instability in both the lumbar and cervical spine.

Orthofix, Inc. **2131**
www.orthofix.com **Suite 3331**



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. **225**
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—OSC **3217**
www.ms-osc.eu

Orthopedic Design & Technology **2838**
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.

Orthopedic Design Consultants, Inc. **2742**
www.orthopedicdesigninc.com

Orthopedic Design Consultants, Inc. provide orthopedic implant and instrument systems engineering and business development services for entrepreneurs, surgeons, medical device distributors, start-up companies, and corporations of any size. Our mission is to minimize product development time and costs, while we optimize the performance of the products we develop for our partners. We combine our creative and technical expertise to generate innovative solutions and turn them into viable products.

Orthopedic Sciences, Inc. **2919**
www.orthopedicsciences.com

Orthopedic Sciences, Inc. promotes the harvest and use of autologous bone and growth factors taken from the iliac crest using a minimally invasive technique. The company offers a patented vacuum assisted bone and marrow (mesenchymal cells/autologous growth factors) harvesting surgical instruments. The Bone Tool Bone™ for vacuum assisted bone grafting The OT-A™ Large Volume Marrow Harvesting System

Orthopedics Today and Healio.com by Slack Inc. **1323**
www.healio.com/orthopaedics

SLACK Incorporated, delivering the best in health care information and education worldwide, invites you to booth 1323. Pick up a free issue of Orthopedics Today and Orthopedics. Sign up for the free news wire at Healio.com/orthopedics.

Orthoworld Inc. **1718**
www.orthoworld.com

Founded in 1992, ORTHOWORLD is a highly specialized publishing firm offering strategic intelligence, integrated advertising and educational conferences exclusively to the global orthopaedic market. Its singular mission is helping orthopaedic companies and individuals improve their performance.

**Osprey Biomedical Corp./
Skye Orthobiologics** **2142**
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.



Osseon Therapeutics Inc. **232**
www.osseon.com

Osseon® Therapeutics, Inc. develops, markets, and distributes minimally invasive devices for the treatment of vertebral compression fractures (VCF). Headquartered in Santa Rosa, CA, the company's groundbreaking technology 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 **941**
www.ossur.com

Össur, a leader in Spinal 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.

OsteoMed, LLC **739**
www.osteomed.com

From the first polyaxial interspinous device, to the first lateral interbody system featuring internal dilation; OsteoMed is a leading global innovator, developer and manufacturer of specialty medical devices and implants for the spine. OsteoMed focuses on improved patient outcomes through minimally disruptive, innovative technology. The OsteoMed portfolio includes PrimaLOK SP, PrimaLOK FF, PrimaGRAFT and now PrimaLIF LLIF.

OsteoNovus **551**
www.osteonovus.com

OsteoNovus is an early stage orthopedic medical device company focused on the development of biologic materials to support and regenerate bone. Our innovative technology encompasses novel synthetic calcium phosphate based cements suitable for bone voids, treatment of various fractures and spinal disorders. The product is available as putty (injectable and moldable), granules and structural blocks for spine, trauma and orthopedic surgery.

Pacific Instruments, Inc. **1943**
www.pacificinstruments.biz

As a globally recognized contract manufacturer, Pacific Instruments does more than just deliver surgical instruments. We're a one-stop company for "Total Instrument Management." We manage, so you can focus on your core business. With over 20 years of experience in the orthopedic industry, and being ISO 13485:2003 certified, we possess the expertise to help design, choose materials, quality inspect, and deliver on time. Above all, customer service is our edge. We focus on you and WE CARE.

PAK Manufacturing, Inc. **1316**
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. FDA registered.

Pan Medical **3123**
www.pan-medical.co.uk

Pan Medical has specialised in the development of cutting edge products and innovations for almost a quarter of a century. The company has become a leader in the worldwide spine market with an impressive product portfolio, which is seen as an affordable alternative in the field of Kyphoplasty with no compromise on quality. Please visit our booth and learn more about our products and discover the key attributes of our company that ensure an outstanding level of service.

PARADIGM BioDevices, Inc. **1222**
www.paradigmbiodesives.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 **1241**
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.

Paragon Medical **1637**
www.paragonmedical.com

Paragon Medical offers turnkey solutions to the medical device marketplace and partners with its customers to share best practices and jointly develop and implement world-class methods of engineering and manufacturing. Paragon designs, validates, and manufactures delivery systems and reusable & single use surgical instrumentation and implantable components in strategic centers of manufacturing excellence throughout the United States, Europe, and China.

Paramed Medical Systems, Inc. **943**
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.

PeriOptix, Inc. **1720**
www.perioptix.com

The Panoramic™ flip ups from PeriOptix feature completely new optics matched to Adidas™ sports frames. We designed a new waterproof wide-angle lens and eliminated protruding adjustment knobs for improved over-the-top visibility. These Panoramics are lighter weight, offer better visibility and come with more frame choices than ever. Contact PeriOptix, a DenMat company at 888-775-3424 or info@denmat.com

Phillips Precision Medcraft **240**
www.phillipsmedcraft.com

We are pleased offer our customers a single-source solution. From advanced orthopedic implants and instrumentation to sophisticated sterilization delivery systems, cases and trays. With a focus on supply chain optimization and our own unique brand of DFM (design for manufacturing), we're pleased to provide our customers with sophisticated products of exceptional quality and service.

Pinnacle Spine Group **3016**
www.pinnaclespinegroup.com

Surgical Showcase: Thursday, October 10, 9:00 a.m.–12:00 p.m.

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.

Pioneer Surgical (See RTI Surgical) **621**
Piper Plastics Inc. **3037**
www.piperplastics.com

Materials processing, machining, and polymer development company. ISO 9001 and 13485 certified. Specializing in innovative polymer-based products: implantable and medical grades of PEEK, CF PEEK, PrimoSpire, Ultem and Radel. Global support in Arizona, Illinois, China and Thailand. Medical polymers for orthopedic implants and trials, devices, instruments, imaging components and assemblies.

Practice Partners in Healthcare, Inc. **1055**
www.practicepartners.org

Practice Partners in Healthcare (PPH) is a developer, manager and minority equity partner in ambulatory surgery centers. Practice Partners brings success-proven management expertise to the operational, clinical, financial and regulatory performance of new and existing surgery centers. Experienced in both CON and non-CON states, PPH charges no development fees for de novo projects, which allows Practice Partners' centers to incur less debt and move to profitability faster.

Precision Medical Technologies, Inc. **1220**
www.premedtec.com

As a Contract Manufacturer of Instruments and Implants serving the Orthopedic OEM's we have a strong focus on the Spinal Market. Our Engineers work directly with our Customers' Design Teams to select the production process that will yield the highest-quality products. We understand the exacting requirements of the Spinal Market; the need for Customs, Prototypes, and Short Lead-Times. We Find Solutions!

Precision Spine Inc. **2943**
www.precisionspineinc.com

Take a Closer Look at Precision Spine. See the new ReForm™ Pedicle Screw System for thoracolumbar correction, and Mini-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.

Prescott's Inc. **744**
www.surgicalmicroscopes.com

Prescott's Inc. is dedicated to offering the finest in reconditioned and new microscopes. Depending on your budget requirements, we can provide any brand of microscope system that you may need. Prescott's also offers a complete service program supported by technicians around the country.

Pro-Dex Inc. **1919**
www.pro-dex.com

Pro-Dex is focused on developing and manufacturing powered surgical devices, for leading OEMs that withstand the harshest environments. Saline, high pH chemicals, extreme heat, and moisture challenge the safety and reliability of today's medical devices. The Pro-Dex team successfully designs and develops processes that protect devices against these elements. ISO 13485-certified, Pro-Dex compresses time to market while enabling Med Device OEMs to focus on their core businesses.



ProNerve, LLC 1643
www.pronerve.com

Since its founding in 2008, ProNerve has provided patients with intraoperative neurophysiologic monitoring, or IOM. The company offers a complete turnkey IOM service offering, as well as additional service capabilities in the neuroscience field. During surgery, IOM uses a variety of electro-physiological monitoring procedures to allow for early warning and the avoidance of injury to the nervous system structures. We know you have a choice when it comes to IOM services.

Protech Leaded Eyewear 945
www.protecheyewear.com

PPE such as radiation reducing apparel is OSHA required. Come visit with the leading supplier of Radiation Safety Products. We've got you covered, literally. We have an extensive line of radiation reducing eyewear, apparel and the best surgical radiation protective gloves on the market. Special discount to be granted if you place an order at the show. Protect yourself with PROTECH!

Providence Medical Technology 215
www.providencemt.com

PROVIDENCE MEDICAL TECHNOLOGY is a privately held medical device company developing minimally invasive solutions addressing the \$1 billion worldwide cervical fusion market. We are commercializing the DTRAX platform of posterior cervical devices, which are used to provide indirect decompression and fusion in patients suffering from cervical degenerative disease.

Pyxidis 944
www.pyxidis-medical.com

Number one in Europe and present worldwide. Pyxidis covers all segments of the market in custom sterilizable trays for surgical instruments and implants. In constant pursuit of excellence, Pyxidis continues to advance by demonstrating its distinctive values: reactivity, durability, and technology.

**QTC Medical Services,
A Lockheed Martin Company** 3245
www.qtcm.com

QTC is the largest private provider of government-outsourced occupational health and disability examination services in the nation. Our more than 30-year history has been marked by a focus on delivering technology-driven examination solutions for our customers.

Qualgenix, LLC 3219
www.qualgenix.com

Qualgenix – saving you money as your private label manufacturer of high-quality, standardized spine implants & instruments. Our implants have been used thousands of times and their standardized designs can be trusted to deliver the same quality outcomes you are used to, while helping you deal with shrinking reimbursements.

Quality Medical Publishing Inc. 1722
www.qmp.com

Quality Medical Publishing, Inc. produces spine surgery books, newsletters, and digital media. Stop by the booth to check out our newest publications: "Cervical Spine Surgery: Current Trends and Challenges," edited by Drs. Mummaneni, Kanter, Wang, and Haid; "Spine and Spinal Cord Tumors: Advanced Management and Operative Techniques," edited by Drs. Ames, Boriani, and Jandial; and "Handbook of Minimally Invasive and Percutaneous Spine Surgery," edited by Drs. Wang, Anderson, Ludwig, and Mummaneni.

Quinn Medical 1155
www.quinnmedical.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 1155 to learn more about Quinn Medical and our revolutionary SLEEQ™ Spinal Therapy System.

Renovis Surgical Technologies 2740
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 2013 is our Tesera Stand-alone ALIF cage, with integrated screws and locking cover plate.

Replication Medical, Inc. 1916
www.replicationmedical.com

Using proprietary, shape memory hydrogels, Replication Medical develops and manufactures innovative products to treat spine conditions. The products, GelStix, and GelFix implanted using percutaneous or minimally invasive procedures and EnGuard (used in combination with open anterior spine surgery) are designed to improve patient outcomes and satisfaction, minimize surgical time and costs while preserving options for future treatment.

Richard Wolf Medical Instruments 2013
richardwolfusa.com

Richard Wolf is the world leader in spine endoscopy, featuring high-definition working-channel endoscopes enabling revolutionary surgeries of the lumbar and cervical spine. A comprehensive system of instrumentation - including the new 10mm Central Stenosis Set - facilitates a range of MIS procedures including endoscopic discectomy, foraminoplasty, rhizotomy, fusion, and central canal decompression.

RMI 1118
www.rmi.us.com

RMI is an innovative, full service contract manufacturer. With a new 33,000 square foot facility and extensive investment in capital equipment and personnel, RMI can meet the production, prototyping, concurrent engineering, and product launch demands of the medical marketplace. With ISO 13485:2003, FDA registration, and our status as an SBA Small Business concern, RMI can satisfy an extensive range of customer sourcing requirements.

rms Surgical 3112
www.rmssurgical.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 and Spectralytics.

Rose Micro Solutions LLC 3019, 343
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) 3019 & 3043 to see for yourself. Visit us online @ www.rosemicrosolutions.com 716-608-0009

RTI Surgical 621
www.rtix.com Suite 120


RTI Surgical is a leading global surgical implant company providing surgeons with high quality biologic, metal and synthetic implants. RTI provides a complete portfolio of spinal products focusing on minimally invasive and lateral solutions for surgeons and patients and are distributed in nearly 50 countries.

Safe Orthopaedics 2912
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.

Safe Passage Neuromonitoring 2043
www.safepassagenm.com

Safe Passage Neuromonitoring is a professional Medical Services firm specialized in Pre, Peri and Intraoperative Monitoring (IOM) services. Through an experienced and highly certified team of IOM professionals, Safe Passage aims to provide the highest quality in IOM services with patient safety and surgeon satisfaction as the highest priorities. Our neurophysiologists are all CNIM-certified and most have advanced degrees and professional certifications.

Safe Wire 2542
www.safe-wire.com

SafeWire is a spine and orthopedic instrument company committed to improving MIS procedures. It is our goal to bring new technology and materials into the arena of MIS surgery, replacing common instruments and techniques still being utilized from earlier open procedures.

Sawbones/Pacific Research Labs 1823
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.

Scanlan International Inc. 3012
www.scanlaninternational.com

Highest quality surgical products designed and manufactured by the Scanlan family since 1921. Stainless Steel and Titanium instrumentation, Loftus™ ACDF Distractor, Loftus™ Endarterectomy Set, Super Cut™ Microsurgical Knives, Abdulrauf® ECIC By-Pass instruments, Dura Closure Set, Sundt™ Graduated Suction System, Heifetz™ Temporary Occlusion Clips, SUPER CUT™ Scissors and single-use Biopsy Needles.



Schaerer Medical USA 3114
www.schaerermedicalusa.com

Schaerer Medical designs & sells general & specialty tables & accessories. The heavy duty Arcus is the latest release in the over 100 year history of Schaerer Medical. The Chick LP is the ultimate fracture table. The Chick MIS Extension is designed for anterior approach hip replacement. The Chick 7300 table can turn into an orthopedic, spine, or pain management tables. We are pleased to introduce the Stille II imaging table & our new line of Clear Access Spine Tables and spine surgery positioning products.

Seabrook International, LLC 2918
seabrookinternational.com

Seabrook International is a leading contract manufacturer of highly-engineered precision instruments, implants, and other devices primarily for the orthopaedic implant industry. We have a strong technical staff to provide value-added engineering and design support services to complement our rapid manufacturing of prototypes, customs & specials, instrument modification, and production-volume manufacturing services.

Sentio, LLC 1935
www.sentiommg.com

SentioMMG™ is a proprietary FDA-approved intraoperative nerve mapping device based on MMG smart-sensor technology. SentioMMG™ is resilient to electrical interference, does not require complex filtering or expert interpretation, resulting in a system simple to setup and interpret, providing the surgeon with real-time feedback of precise nerve location.

SHOWA IKA Kohgyou Co., Ltd. 740
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

SI-BONE Inc. 2843
www.si-bone.com Suite 3335



Solution Showcase: Wednesday, October 9, 12:30–12:50 p.m.; Thursday, October 10, 12:00–12:20 p.m.

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 Medical Solutions USA, Inc. 1717
www.usa.siemens.com/healthcare

Siemens Healthcare is one of the world's largest suppliers to the healthcare industry and the first full-service diagnostics company. The company is known for bringing together innovative medical technologies, healthcare information systems, management consulting, and support services, to help customers achieve tangible, sustainable, clinical, and financial outcomes.

Signus Medical, LLC 643
www.signusmedical.com

SIGNUS Medical has a worldwide reputation for developing, marketing and selling unique spinal implants using cutting-edge technology. Vastly differentiated spinal fusion products are now being designed from Endless Carbon Fiber PEEK. SIGNUS is also spearheading the diagnosis and treatment for the problematic indication of SI pain.

Simpirica Spine, Inc. 1742
simpirica.com

Simpirica Spine develops minimally invasive, flexion-restricting stabilization devices. The company's lead product, the LimiFlex™ Spinal Stabilization System, is a paraspinous tension band and is typically used outside the U.S. with a surgical decompression for treatment of lumbar spinal stenosis with or without degenerative spondylolisthesis, providing an alternative to traditional screw-based stabilization. U.S.: Investigational use only

Sintea Plustek, LLC **1221**
www.sinteaplustek.com

Established in 1987 near Milano-Italy, 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 product lines include: Posterior-Lumber-System, Dorsolumbar-Somatic-Cages, Anterior-Cervical-Plates. Ongoing Developments in Systems for: -Cervical-Arthroplasty -Kyphoplasty -Posterior-dynamic-stabilization

SOCRATES **1354**
www.socratesortho.com

Socrates is Orthopaedic software that facilitates following outcomes and research. It includes over 40 commonly used patient and surgeon spine scores and patient history surveys which can be filled in on line by patients. It also captures surgery details, history and examination, complications, and surgery planning. Operation and examination reports, patient medical and spine history, surgery plans and score summaries can be generated from the data input into the program.

Solvay Specialty Polymers **1515**
www.SolvaySpecialtyPolymers.com **Suite 3343**

Solvay manufactures high-performance plastics and biomaterials. 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. Zeniva® PEEK is offered for use in implantable devices.

Soothe **2641**
www.soothe-pharmacy.com

We believe there should be options for people needing customized medicine. We understand that one size doesn't fit all; by providing customized compounded medications and DNA/Genetic Testing, we allow your patients to be the healthiest version of themselves. Soothe – A Different Way to Look at Medicine.

Southern Spine LLC **3215**
www.southernspine.net

Southern Spine features the new StabiLink® MIS Spinal Fixation along with the innovative, patented PG™ Precision Guided Inserter/Compressor, that redefines "ease of use". StabiLink is the new standard in minimally invasive spinal fusion, filling the "void" between conservative therapy and more traditional, invasive spinal fusion procedures. StabiLink should be a part of every surgeon's armamentarium.

Spinal Balance **742**
www.spinalbalance.us

Spinal Balance is committed to developing and manufacturing implants and instruments that will enhance surgeon experience, improve patient outcomes, and help to reduce procedural costs. Intuitive instruments, intelligent packaging and innovative processes.

Spinal Elements, Inc. **2623**
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); Mosaic® Cervical Implant; Magnum+® Stand-Alone ALIF; Sapphire® Anterior Cervical Plate; Mercury® Classic Pedicle Screw and Mercury MIS System; and Lotus® Posterior Cervical/Thoracic System.

Spinal Kinetics **1321**
www.spinalkinetics.com

Spinal Kinetics develops and manufactures innovative motion preservation technologies to treat degenerative diseases of the spine. The company's M6 series of artificial discs is currently the only prosthesis designed to replicate the anatomic structure and biomechanical performance of a natural disc. The M6 incorporates an artificial nucleus for axial compression, and a woven fiber annulus for controlled range of motion.

Spinal News International **2917**
www.cxvascular.com/spinalnews

Spinal News International Spinal News International is a 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, LLC **312**
www.spinalsimplicity.com

Spinal Simplicity products are designed to further enhance patient care while providing physicians with a greater array of minimally invasive solutions. The Minuteman® interspinous inter-laminar fusion device is currently available in the European Union*. *Devices not cleared by the FDA for sale in the United States



Spinal Ventures 641
www.spinalventures.com

A development stage orthopedic device company having a unique technology for repairing, reinforcing and rebuilding bone weakened by osteoporosis. The company is focused on developing and commercializing the first bone reinforcement device of its kind; Z-Fix.

SpinalMotion, Inc. 1112
www.spinalmotion.com

SpinalMotion, Inc. is a developer of investigational lumbar and cervical artificial discs for spine surgeons to treat patients with degenerative disc disease. SpinalMotion's artificial discs are designed using a proprietary technology, called Kineflex Technology and have been implanted in thousands of patients worldwide. In June of 2007, SpinalMotion completed enrollment of its Kineflex|C Cervical clinical trial under and Investigational Device Exemption Study.

Spine Soft Fusion 236
www.spinesoftfusion.com

We are introducing on the market not only a new device the Translaminar Facet Peek Screws, that can be used for C1/C2 and odontoid fractures, but also a new per cutaneous approach, based on a per op planning and an alignment sensor, and also a new concept the Soft Fusion. A load sharing concept One of our slogan is Working in Between. Not so rigid as pedicle screws and not so mobile as lumbar TDR

Spine Surgical Innovation - Holmed 1113
www.spinesurgicalinnovation.com

The Holmed full line of Spine and Orthopedic Instruments, including the new Disposable "One Per Case" Torque Limiters and Rod Deburrers, are designed for ease of use, high quality and high value.

Spine View Inc. 1743
www.spineview.com

SpineView™ Revolutionizing MIS Spine Surgery

Spine Wave 1041
www.spinewave.com

Surgical Showcase: Thursday, October 10, 1:00–4:00 p.m.

Spine Wave develops and markets clinical solutions for several market segments, including nuclear augmentation, tumor, trauma, and spinal fusion. The company's product portfolio includes NuCore® Injectable Nucleus, StaXx® XD and XDL (Lateral) Expandable Devices, CapSure® PS3 Spine System, Sniper® Spine System, and Cervical Plate and Spacer.

Spineart 2823
www.spineart.com Suite 3321

Spineart delivers pioneer, safe and efficient solutions to spine surgeons and patients. Spineart offers a full range of Fusion, Motion and MIS spinal implants worldwide, focusing on simplicity and safety of use. Spineart markets a unique solution combining barcoded sterile packed implants with ultra-compact instruments sets. Spineart is thereby proudly promoting higher safety, cost-efficiency and compliance at the hospital.

SpineCraft 121
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. 2539
www.spineguard.com

Hear and feel what you cannot see! PediGuard® is the first wireless device that can detect possible vertebral cortex perforations during pedicle preparation by accurately analyzing the electrical conductivity of the surrounding tissues in real-time. PediGuard has assisted both neuro spine surgeons and orthopedic surgeons in over 25,000 surgeries worldwide.

SpineNet, LLC 1639
www.spinenetllc.com

SpineNet is a complete solutions provider of spine fusion devices. SpineNet offers an extensive line of state of the art fusion systems. Our company has united with key surgeon champions, proven industry leaders and a world class development team to form a Partnership for Success.

Spineology Inc. 1731
www.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 LLC 1418
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.

SpineSelect, LLC 955
www.spineselect.com

SpineVision 1820
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.

Stability Biologics 3118
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 813
www.stryker.com Suite 112



Stryker is one of the world's leading medical technology companies and is dedicated to helping healthcare professionals perform their jobs more efficiently while enhancing patient care. The Company offers a diverse array of innovative medical technologies, including reconstructive, medical and surgical, and neurotechnology and spine products to help people lead more active and more satisfying lives. For more information about Stryker, please visit www.stryker.com.

Surgitel/General Scientific Corp 1312
www.surgitel.com

SurgiTel'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. SurgiTel'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 SurgiTel.

Swarm Interactive, Inc. 3017
www.swarminteractive.com

Swarm Interactive is the developer of ViewMedica, a Web-based patient information system designed to help medical professionals explain complex surgical topics to their patients. We specialize in patient education, medical website development and custom interactive projects.

Symmetry Medical Inc. 1522
www.symmetrymedical.com

Symmetry Medical is a leading provider of products to the global orthopedic device industry. The company produces implants (customer specifications) instruments and containers for the medical device markets including spine. Additional specialization exists in product development, high precision manufacturing and project management. With Symmetry's Total Solutions® every detail of product development, from idea generation through quality assurance is managed by Symmetry saving you time and money.

Tap EMR 3244
www.tapemr.com

tapEMR was designed specifically for spine and pain management physicians making it the only cloud based specialty specific EMR system on the market. tapEMR has everything a spine or pain management physician needs in an EMR system and nothing that they do not need. tapEMR also has the ability to make small custom changes to adapt to each practices. Please stop by booth 3244 to learn more.

Target Tape Inc. 3141
www.target-tape.com

The novel Target Tape surgical aid can allow for faster and easier site localization, reducing the dependency on fluoroscopy. It may reduce incision sizes, save time and decrease radiation exposure. Target Tape is a simple grid sticker applied to the skin, it creates a grid pattern on both the medical scan as well as on the patient, to allow for fast and accurate correlation. This scan may be preoperative, done weeks in advance, or performed during the procedure.



Tecomet 322
www.tecomet.com

Tecomet is a leading contract manufacturing, engineering and technology company specializing in net shape forging, precision machining, photochemical etching, surface texturing, vacuum brazing, laser and electron beam welding, and rapid prototyping. Tecomet is ISO13485-ISO9001 and supplies precision engineered components, assemblies and instrumentation to the medical and aerospace/defense markets, with special emphasis on orthopedic, cranial maxillofacial, trauma, and spinal implants.

TeDan Surgical Innovations, LLC 1339
www.tedansurgical.com

TeDan Surgical Innovations specializes in retractors and instrumentation for use in Spine Surgery. The Phantom Series Cervical and Lumbar retractor systems are designed to meet the diverse demands of the operating room. Our innovative minimally invasive lumbar (Phantom ML) and extreme lateral (Phantom XL) retractors maximize exposure without enlarging the incision.

Teknimed 1042
www.teknimed.com

TEKNIMED is recognized as the reference in BIOMATERIALS devices for Orthopaedics and Spine. TEKNIMED designs, develops and manufactures more than 100 items, including: 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 Publishers 1913
www.thieme.com

Thieme is an award-winning international medical and science publisher serving health professionals and students for more than 125 years. Thieme promotes the latest advancements in clinical practice, publishes the latest research findings, advocates medical education and is known for the high quality and didactic nature of its books, journals, and electronic products. Major specialty areas include neurosurgery, radiology, otolaryngology, and orthopedics.

Thompson Surgical Instruments Inc. 2020
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. In addition, Thompson now offers spinal implant devices through its Thompson MIS division specializing in accelerated fusion technologies.

Tides Medical 3015
www.tidesmedical.com

Tides Medical is committed to bringing the latest products in regenerative medicine to market. Our focus is on our customers by providing our patients with safe, effective therapies, our physicians with quality surgical products, and our distributors and hospitals with reliable inventory and personalized service. Our products have proven clinical safety and efficacy. We also offer assistance with health outcomes research to support clinicians conducting surgical outcome studies of our products.

Titan Spine 2016
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.

Trimedyn, Inc. 2041
www.trimedyn.com

Trimedyn's economical, reliable and precise spinal and arthroscopy laser devices provide unexcelled clinical results and offer the best value for your money.

U&I Corporation 1616
www.youic.com/

U first & I second U&I can't spell success without you.

Vertebral Technologies **3214**
www.vti-spine.com

Vertebral Technologies has created breakthrough implantable spinal devices based on a proprietary intra-operative assembly™ technology. A Large, Customized, Anatomical Footprint. A Familiar, Less Invasive, Posterior Implant Approach.

Vertical Spine, LLC **549**
www.verticalspine.com

Vertical Spine is a commercial stage orthobiologics company with a unique high yield system providing intra-procedural collection and highly consistent preparation of autologous Platelet Rich Plasma and Fibrin in the form of a unique membrane and surgeon-defined graft that facilitate targeted placement in the spine. The FIBRINET® System provides biologic signals and physical characteristics (cells, signals and scaffold) necessary for angiogenesis, chemotaxis, mitogenic and cell proliferation.

VG Innovations, LLC **1419**
www.VGIinnovations.com

Founded in 2007, VG Innovations, LLC, (VGI) is a privately held medical device company headquartered in St. Petersburg, FL. VG Innovations is focused on developing a broad range of spinal implants and surgical instrument systems through industry knowledge, creative thinking and engineering prowess. VGI is extremely dedicated to research and development, focusing on spine biomechanics to address spinal disorders in ways that have been previously overlooked.

Vikon Surgical **1255**
www.vikonsurgical.com

Vikon Surgical is a medical device company, specializing in cutting edge technology for the spinal market. At NASS we are showcasing the Quick Release Kerrison Rongeur and introducing the One Headlit. The One Headlit system is tether free and provides the brightest, purest light in the operating room.

Weigao Orthopaedic Device Co.,Ltd. **3039**
wegortho.en.alibaba.com

Chinese spine implants and instrument manufacturer

Westlake Plastics **3231**
www.westlakeplastics.com

Westlake Plastics Company has been fabricating plastic products for over 60 years in the USA. The company is a world-leading manufacturer in extrusion and compression molding technologies of high performance thermoplastics. Westlake Plastics pioneered the market for the use of USP6 engineering thermoplastics in life sciences. Westlake Plastics, an ISO-13485 and 9001:2008 registered company continues to offer and expand a full line of USP Class 6 and FDA regulatory compliant products.

Whale Imaging USA **3238**
www.whaleimaging.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 **1619**
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.

IV World Congress of Minimally Invasive Spine Surgery and Techniques **2036**
www.spineparis2014.com

IV WCMISST Paris June 11-14th 2014 will be a unique event, the meeting of Spine innovation, with a large scope including Endoscopies, Vertebral augmentation, Minimally Invasive Fusion, Pain management, Percutaneous fixation, Motion sparing (arthroplasty, interspinous), Biology (BMP, Stem Cells).

X-Spine Systems, Inc. **541**
www.x-spine.com

Surgical Showcase: Wednesday, October 9, 9:00 a.m.–12:00 p.m. and 1:00–4:00 p.m.

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.

Ziehm Imaging, Inc. **849**
www.ziehm.com

Ziehm Imaging specializes in the development, manufacturing and worldwide marketing of mobile X-ray based imaging solutions. Ziehm Imaging products are known for their outstanding versatility and their easy handling for a wide variety of medical applications. Please visit www.ziehm.com for more information.



Zigg Design LLC 1918
www.ziggdesign.com

Zigg Design provides turn-key design and manufacturing solutions that meet the needs of a wide variety of clients ranging from the inventive health professional with a great idea to medical device OEMs and start-ups with outsource engineering and manufacturing needs. Visit our booth to discuss how you can leverage our team's product development experience to help you bring the next generation of innovative, robust medical devices to market.

Zimmer Spine 413
www.zimmerspine.com

Zimmer Spine develops, produces and markets high quality spine products and services that repair, replace and regenerate spine health. Zimmer constructs highly competitive fusion and non-fusion spine systems, instrumentation systems, cervical plates, allograft bone filler and Trabecular Metal™ Technologies. We value continuous surgeon education, building confidence and enhancing patient outcomes.

Zyga 3137
www.zyga.com

Zyga is dedicated to the research, development and commercialization of solutions that provide empirical clinical and economic value in the treatment of under-served conditions of the spine. Zyga has developed the Glyder® Facet Restoration Device, which is currently being studied in Europe. Zyga markets the Slimmetry® Sacroiliac Joint Fusion System, the only minimally invasive system designed to provide a true arthrodesis of the SI Joint, including joint decortication and bone graft delivery.

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Allen Medical Systems	2931
Meridian Surgical Partners	3013
Practice Partners in Healthcare, Inc.	1055

Association/Nonprofit

AlloSource	2923
American Board of Spine Surgery	1518
AOSpine North America	2030
Musculoskeletal Transplant Foundation (MTF)	1921

Biomaterials

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Bacterin	2731, 1513
Baxano Surgical	3201, 1831
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CellRight Technologies LLC	1740
Cerapedics, Inc.	2440
DiscGenics, Inc.	2642
Eisertech, LLC	2815
Hans Biomed USA Inc.	2937
Harvest Technologies Corp.	1819
Innovasis, Inc.	2031
InTech Medical	2638
Invibio Biomaterial Solutions	128, 1120
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OsteoNovus	551
Precision Spine Inc.	2943
Replication Medical, Inc.	1916
Spineology Inc.	1731
Teknimed	1042
Tides Medical	3015

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Bacterin	2731, 1513
Berkeley Advanced Biomaterials, Inc.	1812
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Orthofix, Inc.	3331, 2131
PARADIGM BioDevices, Inc.	1222
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Teknimed	1042

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About the North American Spine Society



Education Council

The NASS Education Council oversees all educational programming. The NASS 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.

Spine Education & 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 12 station bio-skills lab, classroom and multimedia center with videoconferencing and webcasting capabilities. Members receive special discounted registration fees for all NASS-sponsored educational programs.

Research Council

The NASS Research Council promotes high quality spine care and offers numerous clinical and research resources to spine care providers and their patients, including clinical guidelines, performance measurement information, patient safety information and tools, and more. NASS' Research Grant and Fellowship Program supports the best of spine research applications every year and has provided more than \$2.6 million in research funding to date.

Health Policy Council

The NASS Health Policy Council promotes sound health care policies for fair and reasonable payment systems 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. NASS provides numerous diverse practice management resources.

National Association of Spine Specialists

To pursue its advocacy agenda, NASS established the National Association of Spine Specialists, a trade association 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.



Education Publishing

The NASS Education Publishing program is responsible for several periodicals, publications and online resources as well as 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 NASS Annual Meeting. *TSJ* also recognizes its top-rated paper each year with the Editors' Choice Award, also presented at the Annual Meeting. Published online and printed monthly by Elsevier, Inc., *The Spine Journal* holds the highest Impact Factor among spine publications and is the third-ranked orthopedic journal 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.
- NASS' 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.

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NASS Membership



About NASS 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).

Today, 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 NASS Resource Center in the lobby for more information about membership, to renew your membership for 2014, 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: \$595.00

Includes print and online subscriptions to *The Spine Journal (TSJ)* and *SpineLine*

Associate members are Board-eligible MDs and DOs, PhD candidates, 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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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 membership directory)

Company Name: _____

Address: _____

City: _____ State/Province: _____ Postal Code: _____ Country: _____

Phone: _____ Fax: _____ Email: _____

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Office Manager Email: _____ Office Manager Phone: _____

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

Percentage of professional activities spent in: _____ % Academic _____ % Clinical _____ % Research

Primary Employer: Hospital Private Practice Academic Institution Other: _____

Has your license to practice ever been revoked or otherwise suspended? No Yes (if yes, please attach explanation)

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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Future NASS Meetings



EVIDENCE & TECHNOLOGY SPINE SUMMIT
February 27-March 1, 2014 | Park City, UT



31ST ANNUAL MEETING
October 26-29, 2016 | Boston, MA



SUMMER SPINE MEETING
July 23-26, 2014 | Amelia Island, FL



32ND ANNUAL MEETING
October 25-28, 2017 | Orlando, FL



29TH ANNUAL MEETING
November 12-15, 2014 | San Francisco, CA



33RD ANNUAL MEETING
September 26-29, 2018 | Los Angeles, CA



SPINE ACROSS THE SEA
Dates TBD, 2015 | Hawaii location TBD



34TH ANNUAL MEETING
September 25-28, 2019 | Chicago, IL



30TH ANNUAL MEETING
October 14-17, 2015 | Chicago, IL



35TH ANNUAL MEETING
October 7-10, 2020 | San Diego, CA