FORTY-SEVENTH ANNUAL MEETING
OF THE
CERVICAL SPINE RESEARCH SOCIETY

FOUNDED 1973

November 21 – 23, 2019
The Marriott Marquis
New York City, NY

Alexander Vaccaro, MD, PhD, MBA, President
Gregory D. Schroeder, MD and Justin Smith, MD, Scientific Program Co-Chairs

Scientific Meeting Objectives

• Present the results of current cervical spine research data.
• Promote discussion of new developments and techniques.
• Foster research concerning the diagnosis and treatment of cervical spine injury and disease.
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<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Moderators</th>
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<tbody>
<tr>
<td>7:00 am - 7:10 am</td>
<td>Welcome and Announcements</td>
<td>Gregory D Schroeder, MD and Justin S Smith, MD, PhD</td>
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<tr>
<td>7:11 am - 7:51 am</td>
<td>Session I: Outcomes I, Cervical Myelopathy</td>
<td>Kazuhiro Chiba, MD, Michael Fehlings, MD, PhD and Jefferson Wilson, MD</td>
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<tr>
<td>7:11 am - 7:16 am</td>
<td>Presentation #1</td>
<td>The Impact Of Older Age On Functional Recovery After Surgical Decompression For Degenerative Cervical Myelopathy: Results From An International, Multicentre, Prospective Dataset In 757 Patients</td>
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<td>7:17 am - 7:22 am</td>
<td>Presentation #2</td>
<td>Surgical Treatment Of Cervical Spondylotic Myelopathy Leads To Functional Improvement In Hand Strength And Dexterity: A Prospective Quantitative Study</td>
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<tr>
<td>7:23 am - 7:28 am</td>
<td>Presentation #3</td>
<td>Neck Pain Improvement After Operative Intervention In Patients With Degenerative Cervical Myelopathy: Results From An International Multicenter Ambispective Study Of 664 Patients</td>
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<tr>
<td>7:29 am - 7:34 am</td>
<td>Presentation #4</td>
<td>Comparison Of Three Anterior Techniques In The Surgical Treatment Of Three-Level Cervical Spondylotic Myelopathy With Intramedullary T2-Weighted Increased Signal Intensity</td>
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<td>7:35 am - 7:39 am</td>
<td>Presentation #5</td>
<td>Comparison Of Laminoplasty And Posterior Decompression With Fusion For Cervical Spondylotic Myelopathy Accompanying Local Kyphosis: A Matched Analysis Using Propensity Scores</td>
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<td>7:40 am - 7:51 am</td>
<td>Discussion</td>
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<td>Time</td>
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| 7:52 am - 8:33 am | **Session II: Complications I**  
Moderators: K Daniel Riew, MD and Vincent Traynelis, MD |
| 7:52 am - 7:57 am | Presentation #6  
**Clinical And Radiological Analysis Of C5 Palsy In Cervical Spine Surgery Patients: A Korean Cervical Spine Study Group (Kcssg) Multicenter Study**  
*Ho Jin Lee, MD; Jae Keun Oh, MD, PhD; Dong Ho Kang, MD, PhD; Ki-Jeong Kim, MD, PhD; Jung-Woo Hur; Seong Yi, PhD, MD; Jun Jae Shin; Sun Ho Lee; Kyung Chul Choi; Kyung Hyun Kim; Dae-Chul Cho; Yong Jun Jin; In Ho Han; Chun Kee Chung; Jae Taek Hong* |
| 7:58 am - 8:03 am | Presentation #7  
**Which Intraoperative Neuromonitoring Characteristics Are Important For Predicting Neurologic Outcome In Cervical Spine Surgery?**  
*Srikanth N Divi, MD; Dhruv K C Goyal, BA; John Mangan, MD, MHA; Justin Stull, MD; Matthew Galetta, BA; Nathan V Houlihan, BS; Ryan Matthew Godinez, BS, MS; Tristan Fried, BS; Jeffrey A Rihn, MD; Mark F Kurd, MD; D Greg Anderson, MD; Alan S Hilibrand, MBA, MD; Alexander Vaccaro, MD, PhD, MBA; Christopher Kepler, MD; Gregory Douglas Schroeder, MD* |
| 8:04 am - 8:09 am | Presentation #8  
**Therapeutic Impact Of Traction Release After C5 Nerve Root Motor Evoked Potential Alerts In Cervical Spine Surgery**  
*W Bryan Wilent, PhD; Thomas Epplin-Zapf, MA, MS; Mitali Bose, MS; Eric Tesdahl; Jeffrey Cohen, MD, PhD; Anthony K Sestokas, PhD* |
| 8:10 am - 8:15 am | Presentation #9  
**Predicting Risk Of Post-Operative C5 Palsy Among Patients Undergoing Posterior Cervical Spine Surgery**  
*Daniel Lubelski, MD; Adam D'sa BA; Erick Westbroek MD; A Karim Ahmed BS; Timothy Witham, BS, FACS, MD; Nicholas Theodore, FAANS, FACS, MD; Daniel Sciubba, MD* |
| 8:16 am - 8:21 am | Presentation #10  
**Cord Float Back Does Not Predict The Occurrence Of C5 Palsy Amongst Patients Undergoing Posterior Cervical Spine Surgery**  
*Daniel Lubelski, MD; Adam D'Sa BA; Erick M Westbroek MD; A Karim Ahmed BS; Timothy Witham, BS, FACS, MD; Nicholas Theodore, FAANS, FACS, MD; Daniel Sciubba, MD* |
| 8:21 am - 8:33 am | Discussion |

Individual Disclosures can be found in the Disclosure Index pages 41-69.
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Thursday, November 21  Broadway Ballroom, 6th Floor

10:18 am - 10:28 am  Which Patients with Central Cord Need Urgent Surgery?
   W Ryan Spiker, MD

10:29 am - 10:39 am  Management of Cervical Spine Fractures in an Ankylosed Spine
   Addisu Mesfin, MD

10:39 am - 10:49 am  Discussion

10:50 am - 11:25 am  Presidential Introduction and Address

10:50 am – 10:55 am  Introduction of CSRS President
   Rick Sasso, MD

10:55 am - 11:25 am  Presidential Address
   Alexander Vaccaro, MD, PhD, MBA

Industry Workshops
Lunch Available for Workshop Attendees Only, Prior Registration Not Required, No CME Credits

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<tr>
<td>11:30 am - 1:30 pm</td>
<td>Shubert/Uris, 6th Floor</td>
<td>Majestic/Music Box, 6th Floor</td>
<td>Ziegfield, 4th Floor</td>
<td>Oneill, 4th Floor</td>
<td>Wilder, 4th Floor</td>
<td>Odets, 4th Floor</td>
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1:35 pm - 2:38 pm  Symposium II: Pearls from the Experts
   Moderators: Andrew Dailey, MD, FAANS and Justin S Smith, MD, PhD

1:35 pm - 1:45 pm  How to Achieve Good Outcomes with 4-Level ACDF
   Alan S Hilibrand, MD

1:46 pm - 1:56 pm  How and When to Use Cervical Pedicle Screws
   Sang Hun Lee, MD

1:56 pm - 2:06 pm  Discussion

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Thursday, November 21
Broadway Ballroom, 6th Floor

2:07 pm - 2:17 pm  Pearls for Instrumentation and Reconstructive Techniques in the Pediatric Cervical Spine
Heiko Koller, PhD, MD

2:18 pm - 2:28 pm  En Bloc Cervical Tumor Resection: Surgical Technique and Pearls for Optimizing Outcomes
Christopher Ames, MD

2:28 pm - 2:38 pm  Discussion

2:39 pm - 3:24 pm  Session IV: Cervical Deformity
Moderators: Jacob Buchowski, MD and Jason Savage, MD

2:39 pm - 2:44 pm  Presentation #16
What Drives Disability In Cervical Deformity: Novel Patient Generated Outcome Versus Legacy Hrql
Nicholas D Stekas, MS; Ethan W Ayres, MPH; Mohamed A Moawad, MPH; Brooke K O’Connell; Dainn Woo, BS; Michael L Smith, MD; Yong H Kim, MD; Aaron James Buckland, FRACS, MBBS; Themistocles S Protopsaltis, MD

2:45 pm - 2:50 pm  Presentation #17
Intraoperative Alignment Goals For Severe Cervical Deformity To Achieve Optimal Improvements In Health-Related Quality Of Life Measures
Sohrab Virk, MD; Peter Gust Passias, MD; Renaud Lafage; Eric O Klineberg, MD; Gregory Michael Mundis Jr, MD; Themistocles Stavros Protopsaltis, MD; Christopher I Shaffrey, MD; Robert Shay Bess, MD; Han Jo Kim, MD; Christopher Ames, MD; Frank J Schwab, MD; Justin S Smith, MD; Virginie Lafage, PhD

2:51 pm - 2:56 pm  Presentation #18
Improvement In Cervical Lordosis And Sagittal Alignment After Vertebral Body Sliding Osteotomy In Patients With Spondylotic Cervical Myelopathy And Kyphosis
Dong-Ho Lee, MD; Jae Hwan Cho; Jae-Woo Park, MD; Chul-Gie Hong; Jung-Gi Ha

2:57 pm - 3:02 pm  Presentation #19
Pre-Operative Extension Lateral Cervical Radiographs Are Associated With Osteotomy Type, Approach And Post-Operative Cervical Alignment Following Cervical Deformity Surgery
Eric O Klineberg, MD; Renaud Lafage; Munish C Gupta, MD; Peter Gust Passias, MD; Virginie Lafage, PhD; Justin S Smith, MD; Han Jo Kim, MD; Themistocles Stavros Protopsaltis, MD; Douglas C Burton, MD; Gregory Michael Mundis Jr, MD; Frank J Schwab, MD; Robert A Hart, MD; Christopher I Shaffrey, MD; Christopher Ames, MD

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Thursday, November 21  Broadway Ballroom, 6th Floor

3:03 pm - 3:08 pm  Presentation #20
Simulated Corrections Of Cervical Deformity Using In-Construct Measures Demonstrate That Insufficient Corrections Result In Djk Themistocles S Protopsaltis, MD; Dainn Woo, BS; Anand Segar, MD; Renaud Lafage; Gregory Michael Mundis Jr, MD; Justin S Smith, MD; Eric O Klineberg, MD; Peter Gust Passias, MD; Robert Shay Bess, MD; Christopher I Shaffrey, MD; Frank J Schwab, MD; Virginie Lafage, PhD; Christopher Ames, MD

3:09 pm - 3:14 pm  Presentation #21
Comparison Of Perioperative Complications Following Posterior Column Osteotomies Versus Posterior Based Three Column Osteotomy For Correction Of Severe Cervical Sagittal Deformity In 95 Patients: A Single Center Study Darryl Lau, MD; Vedat Deviren, MD; Christopher Ames, MD

3:14 pm - 3:24 pm  Discussion

3:25 pm - 3:55 pm  Exhibit Hall, Westside Ballroom, 5th Floor
Break

3:56 pm - 4:59 pm  Session V: Complications II
Moderators: Alan S Hilibrand, MD and Alpesh Patel, MD, FACS

3:56 pm - 4:01 pm  Presentation #22
Effect Of Local Retropharyngeal Steroids On Fusion Rate After Anterior Cervical Discectomy And Fusion Sapan D Gandhi, MD; Steven Wahlmeier, MD; Philip Louie, MD; Ryan Sauber, MD; Trevor Tooley, BS; Kevin C Baker, PhD; Daniel K Park, MD

4:02 pm - 4:07 pm  Presentation #23
Effect Of Topical Steroid On Swallowing Following Acdf: Results Of A Prospective Randomized Double Blind Control Trial Daniel Stein, BS; Han Jo Kim, MD; Darren Richard Lebl, MD; Russel C Huang, MD; Renaud Lafage; Todd J Albert, MD

4:08 pm - 4:13 pm  Presentation #24
A Prospective Cohort Study Of Dysphagia After Subaxial Cervical Surgery Kenichiro Sakai, MD, PhD; Toshitaka Yoshii; Takashi Hirai; Yoshiyasu Arai, MD, PhD; Atsushi Okawa, MD, PhD

4:14 pm - 4:19 pm  Presentation #25
Association Between The Severity Of Dysphagia And Various Parameters Of The Cervical Spine; Videofluoroscopic Analysis In Neutral And Retraction Position Of The Normal Volunteers Jae Taek Hong, MD, PhD; Seong Hoon Lim; Dong Hoon Lee; Jun Seong Kim

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7:00 am - 7:10 am  Welcome and Announcements  
Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD

7:11 am - 7:58 am  Session VI: Outcomes IV  
Moderators: Howard S An, MD and Kris Radcliff, MD

7:11 am - 7:16 am  Presentation #30  
Nonoperative Management Of Asymptomatic Cervical Spinal Stenosis: A Long-Term Follow-Up Study  
*Michael P Kelly, MD, MSc; Lukas Peter Zebala, MD; K Daniel Riew, MD*

7:17 am - 7:22 am  Presentation #31  
Prospective Evaluation Of Degenerative Cervical Myelopathy In Asymptomatic Patients Over 60 Years  
*Samuel Adams, MD; Sara Holmes; Letterio Salvatore Politi, MD; Patrick J Connolly, MD; Michael Paul Stauff, MD*

7:23 am - 7:28 am  Presentation #32  
Home Versus Standard Physical Therapy After Acdf Surgery: Preliminary Results Of Health-Related Quality Of Life Outcomes From A Randomized Controlled Trial  
*Srikanth Divi, MD; Dhruv K C Goyal, BA; Matthew Galetta, BA; Justin Stull, MD; John Mangan, MD, MHA; Jeffrey A Rihn, MD; Mark F Kurd, MD; D Greg Anderson, MD; Barrett Ivory Woods, MD; Kristen E Radcliff, MD; Ian Kaye, MD; Alan S Hillbrand, MBA, MD; Alexander Vaccaro, MD, PhD; MBA; Christopher Kepler, MD; Gregory D Schroeder, MD*

7:29 am - 7:34 am  Presentation #33  
Effectiveness Of Surgical Treatment In Reducing Falls And Fall-Related Neurological Deterioration In Patients With Degenerative Cervical Myelopathy: A Multi-Institutional Prospective Study  
*Atsushi Kimura, MD, PhD; Hirokazu Inoue, MD, PhD; Yasuyuki Shiraishi; Katsushi Takeda, MD, PhD; Atsushi Okawa*

7:35 am - 7:40 am  Presentation #34  
Improvement In Cervicogenic Headaches After Laminoplasty: A Single Institutional Study Of 143 Adult Patients  
*Owoicho Adogwa, MD, MPH; K Daniel Riew, MD; Gaurang Gupte; Maksim Shlykov, MD; Lukas Peter Zebala, MD; Colleen M Peters, MA; Jacob M Buchowski, MD, MS; Michael Patrick Kelly, MD*

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8:39 am - 9:20 am  Research Grant Session
Brandon Lawrence, MD and Zoher Ghogawala, MD

8:39 am - 8:48 am  Announcement - 2019 Research Grant Winners

8:49 am - 8:50 am  Introduction - Research Grant Updates

8:51 am - 8:53 am  2018 21st Century Grant
New Approaches in Salamanders as Platforms for Uncovering Spinal Cord Regeneration Factors
Hani Singer

8:54 am - 8:56 am  2018 Medtronic Grant
Spinal Cord Perfusion Pressure Management in Acute Cervical SCI
Brian Kwon, MD, PhD, FRCSC

8:56 am - 8:59 am  2018 Resident Fellow Grant
Advanced Quantitative MRI to Measure Cervical Cord Tissue Injury and Predict Outcomes
Muhammad Ali Akbar, MD

9:00 am - 9:02 am  2018 Resident Fellow Grant
Evaluating the Influence of Impaired Cervical Cord Blood Perfusion on Clinical Severity of Cervical Myelopathy Using Intravoxel Incoherent Motion MRI
Shuo Niu, MD, PhD

9:03 am - 9:05 am  2018 Seed Starter Grant
Morphological, Biochemical and Biomechanical Characterization of Human Cervical Endplate in Degenerated Disc
Yongren Wu, PhD

9:06 am - 9:08 am  2018 Seed Starter Grant
Is vaporized nicotine as detrimental to spinal fusions as cigarette smoke?
Jesse Bible, MD

9:09 am - 9:11 am  2018 Seed Starter Grant
CT Osteoabsorbptiometry assessment of subchondral bone density predicts intervertebral subsidence in a human cadaver model
Matthew Colman, MD

9:12 am - 9:14 am  2018 Seed Starter Grant
Reorganization of Brain Architecture and Networks as Biomarkers for Cervical Myelopathy
Ammar Hawasli, MD, PhD

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<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:15 am</td>
<td>2018 Seed Starter Grant Assessment of Variation in Preoperative Expectations and Subsequent Fulfillment for Patients Undergoing Elective Cervical Spine Surgery</td>
<td>Broadway Ballroom, 6th Floor</td>
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<tr>
<td>9:18 am</td>
<td>Discussion</td>
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<td>9:20 am</td>
<td>Exhibit Hall, Westside Ballroom, 5th Floor</td>
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<tr>
<td>9:55 am</td>
<td>Presidential Guest Lecture</td>
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<td>9:55 am - 10:00 am</td>
<td>Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA</td>
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<tr>
<td>10:00 am - 10:45 am</td>
<td>Henry Bohlman Presidential Guest Speaker: “Healthcare in America”</td>
<td>Broadway Ballroom, 5th Floor</td>
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<td>10:45 am - 11:01 am</td>
<td>Discussion</td>
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<tr>
<td>11:02 am - 12:05 pm</td>
<td>Symposium III: Concussions, Spine Injury, and Return to Play</td>
<td>Exhibit Hall, Westside Ballroom, 5th Floor</td>
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<tr>
<td>11:02 am - 11:09 am</td>
<td>Prevention and Evaluation of Concussions in the NFL</td>
<td>Broadway Ballroom, 5th Floor</td>
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<tr>
<td>11:10 am - 11:17 am</td>
<td>Sideline Evaluation: When Does a Player Need to be Removed From Play?</td>
<td>Broadway Ballroom, 5th Floor</td>
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<td>11:26 am - 11:33 am</td>
<td>Two- and Three-Level Disease: When Can a Patient Return to Play after Multilevel Anterior and Posterior Procedures?</td>
<td>Broadway Ballroom, 5th Floor</td>
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<td>11:34 am - 11:41 am</td>
<td>Asymptomatic Spinal Cord Compression: Is Surgery Necessary to Allow Return to Play?</td>
<td>Broadway Ballroom, 5th Floor</td>
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<td>11:41 am - 11:49 am</td>
<td>Discussion</td>
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<tr>
<td>11:49 am - 12:05 pm</td>
<td>Review of CSRS Survey on Return to Play and a Modified Delphi Method Establishing CSRS Return to Play Guidelines</td>
<td>Broadway Ballroom, 5th Floor</td>
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<td>12:05 pm - 1:05 pm</td>
<td>Exhibit Hall, Westside Ballroom, 5th Floor Lunch</td>
<td>Broadway Ballroom, 5th Floor</td>
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<tr>
<td>1:10 pm - 1:36 pm</td>
<td>Traveling Fellowship Report and Meeting Previews</td>
<td>Broadway Ballroom, 5th Floor</td>
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1:10 pm - 1:18 pm  Traveling Fellowship Report  
Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D.

1:19 pm - 1:24 pm  Preview CSRS 2020 Annual Meeting in Las Vegas, NV  
Michael Daubs, MD, 2020 Meeting Local Host

1:25 pm - 1:30 pm  Preview CSRS Asia Pacific Section 2020 Annual Meeting  
Kyung-Soo Suk, MD, President CSRS - AP

1:31 pm - 1:36 pm  Preview CSRS European Section 2020 Annual Meeting  
Björn Zoëga, MD, President CSRS - EU

1:37 pm - 2:24 pm  Session VIII: Motion Preservation  
Moderators: Frank Phillips, MD and Rick Sasso, MD

1:37 pm - 1:42 pm  Presentation #41  
Two-Level Cervical Disc Arthroplasty Vs. Anterior Cervical Discectomy And Fusion: Ten-Year Outcomes Of A Prospective, Randomized Ide Clinical Trial  
Jeffrey R McConnell, MD; Matthew F Gornet, MD; Todd Hopkins Lanman, MD, FACS; J Kenneth Burkus, MD; Randall F Dryer, MD; Scott D Hodges, DO; Francine Schranck, RN, BSN

1:43 pm - 1:48 pm  Presentation #42  
Single-Level Cervical Arthroplasty With Prodisc-C Artificial Disc: 10-Year Follow-Up Results In One Center  
Yanbin Zhao, MD; Yu Sun, MD

1:49 pm - 1:54 pm  Presentation #43  
Unintended Fusion In Cervical Artificial Disc Replacement: A Prospective Study On Heterotopic Ossification, Evolution Through Time, And Clinical Outcome, With 5 Years Follow-Up  
Catarina Marques, MD; Anna Marianne Mac Dowall, MD; Martin Skeppholm; Nuno Canto Moreira, MD, PhD; Claes Olerud, MD

1:55 pm - 2:00 pm  Presentation #44  
Does Positioning Of Cervical Disc Arthroplasty Implant Affect Postoperative Outcome  
Yahya Azhar Othman Othman; Philip York, MD; Russel C Huang, MD; Avani Vaishnav, MBBS; Steven McAnany, MD; Sravisht Iyer, MD; Todd J Albert, MD; Catherine Himo Gang, MPH; Sheeraz Qureshi, MD

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3:14 pm - 3:19 pm  Presentation #50
The Impact Of Post-Operative Physical Therapy On Patient-Reported Outcomes At 1-Year After Cervical Spine Surgery
Kristin R Archer, PhD; Emily Oleisky; Jacquelyn S Pennings, PhD; Inamullah Khan, MBBS; Rogelio Adrian Coronado, PhD, PT; Clinton J Devin, MD

3:19 pm - 3:27 pm  Discussion

3:28 pm - 3:33 pm  Presentation #51
Asymptomatic Acdf Non-Unions Underestimate The True Prevalence Of Radiographic Pseudoarthrosis
Charles Hopkins Crawford III, MD; Leah Yacat Carreon, MD; Praveen V Mummaneni; Steven D Glassman, MD

3:34 pm - 3:39 pm  Presentation #52
Does Chronic Preoperative Opioid Use Affect Patient Outcomes After Acdf Surgery
John Mangan, MD, MHA; Srikanth Divi, MD; Dhruv K C Goyal, BA; Justin Stull, MD; Matthew Galetta, BA; Jeffrey A Rihn, MD; Mark F Kurd, MD; D Greg Anderson, MD; Barrett Ivory Woods, MD; Kristen E Radcliff, MD; Ian Kaye, MD; Alan S Hilibrand, MBA, MD; Alexander Vaccaro, MD, PhD, MBA; Christopher Kepler, MD; Gregory Douglas Schroeder, MD

3:40 pm - 3:45 pm  Presentation #53
Can We Predict A Patient's Arm Pain, Neck Pain, And Disability Level One Year After Cervical Spine Surgery For Radiculopathy?
Ahilan Sivaganesan, MD; Inamullah Khan, MBBS; Hui Nian, PhD; Frank E Harrell Jr, PhD; Jacquelyn S Pennings, PhD; Mohamad Bydon, MD; Anthony Asher; Kristin Archer, PhD; Clinton J Devin, MD

3:46 pm - 3:51 pm  Presentation #54
Preliminary Results From The Multi-Center Prospective, Randomized Csm-S Study: Overall Quality Of Life Improvement, Complications, And Return To Work
Zoher Ghogawala, MD, FACS; Adam Kanter, MD; Praveen V Mummaneni; Erica Fay Bisson, MD, MPH; James S Harrop, MD; Subu Magge; Robert F Heary, FAANS, MD; Michael P Steinmetz, MD; Michael Fehlings, MD; Todd J Albert, MD; Paul M Arnold, MD, FACS; K Daniel Riew, MD; Marjorie Wang, FAANS, MD, MPH; John G Heller, MD; Edward Benzle, MD

3:51 pm - 3:59 pm  Discussion

4:00 pm - 4:30 pm  CSRS Membership Meeting

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Saturday, November 23

**Presentation #60**
Assessing Radiographic Fusion Rates Following A Stand-Alone Interbody Cage Versus An Anterior Plate Construct For Adjacent Segment Disease After Anterior Cervical Discectomy And Fusion
Sapan D Gandhi, MD; Adam Fahs, MD; Steven Wahlmeier, MD; Philip Louie, MD; Daniel Robert Possley, DO; Jad Khalil, MD; Kevin C Baker, PhD; Daniel K Park, MD

7:55 am - 8:00 am **Presentation #61**
Sagittal Parameters Poorly Predict Clinical Outcomes Following Anterior Cervical Discectomy And Fusion
Bryce A Basques, MD; Jannat Khan; Michael T Nolte, MD; Philip Louie, MD; Kamran Movassaghi, MD; Jonathan S Markowitz, BS; Edward Jay Goldberg, MD; Howard An

8:01 am - 8:06 am **Presentation #62**
Discrepancies In The Surgical Management Of Central Cord Syndrome: Assessment Of Non-Operative, Surgical, And Crossover To Surgery Patients
Peter Passias, MD; Cole Bortz, BA; Katherine E Pierce; Haddy Alas, BS; Avery Eugene Brown; Nicholas Shepard, MD; M Burhan Janjua, MD; John Buza, MD; Alexandra Soroceanu, MD; Rafael De La Garza Ramos, MD; Daniel Sciubba, MD; Dennis Vasquez-Montes, MS; Bassel Diebo, MD; Michael C Gerling, MD

8:06 am - 8:14 am Discussion

8:15 am - 9:18 am **Session XI: Surgical Techniques and Imaging Parameters**
Moderators: Paul Arnold, MD and John Rhee, MD

8:15 am - 8:20 am **Presentation #63**
Microendoscopic Laminotomy Versus Conventional Laminoplasty For Cervical Spondylotic Myelopathy - A 5-Year Follow-Up Study
Akihito Minamide, MD, PhD; Andrew K Simpson, MD; Yukihiro Nakagawa; Motohiro Okada; Hiroshi Iwasaki; Shunji Tsutsui, MD, PhD; Masanari Takami, MD; Ryo Taiji; Shizumasa Murata; Takuhei Kozaki Jr, MRCPCH, MRCPe, MRCSed, MS, MSA, MSc, MSN; Hiroshi Hashizume, MD; Yasutsugu Yukawa; Munehito Yoshida; Hiroshi Yamada, MD

8:21 am - 8:26 am **Presentation #64**
Effect Of C3 Laminectomy In Cervical Laminoplasty For Degenerative Cervical Myelopathy: C3 Laminectomy Vs. C3 Laminoplasty
Koji Nakajima, MD; Toru Doi; So Kato, MD; Sakae Tanaka, MD, PhD; Yasushi Oshima, MD, PhD

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<th>Speaker(s)</th>
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<tr>
<td>9:19 am - 10:22 am</td>
<td>Symposium IV: Cervical Deformity and Complex Cervical Reconstruction</td>
<td>Moderators: Christopher Ames, MD and Han Jo Kim, MD</td>
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<tr>
<td>9:19 am - 9:29 am</td>
<td>Alignment Planning for Deformity Correction</td>
<td>Themistocles S Protosaltis, MD</td>
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<tr>
<td>9:30 am - 9:40 am</td>
<td>Management of Cervical Deformity Resulting from Trauma</td>
<td>Heiko Koller, PhD, MD</td>
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<tr>
<td>9:40 am - 9:50 am</td>
<td>Discussion</td>
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<tr>
<td>9:51 am - 10:01 am</td>
<td>Three-Column Osteotomies for Deformity Correction: Technique and Video Demonstration</td>
<td>Christopher Ames, MD</td>
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<tr>
<td>10:02 am - 10:12 am</td>
<td>Complications Associated with Complex Cervical Reconstruction: Occurrence and Techniques for Avoidance</td>
<td>Peter Passias, MD</td>
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<tr>
<td>10:12 am - 10:22 am</td>
<td>Discussion</td>
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<td>10:22 am - 10:28 am</td>
<td>Announcement of Abstract and E-Poster Award Winners</td>
<td>Jeffrey D Coe, MD, Awards Committee Chair</td>
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<tr>
<td>10:28 am - 10:33 am</td>
<td>Presentation of CSRS Medallion to Incoming President Rick Sasso, MD</td>
<td>Alexander Vaccaro, MD, PhD, MBA</td>
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<td>10:34 am - 11:14 am</td>
<td>Session XII: Economics, Safety, and Health Policy</td>
<td>Moderators: Michael P Kelly, MD, MSc and Michael Steinmetz, MD</td>
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<td>10:34 am - 10:39 am</td>
<td>Presentation #71 Effect Of Opioid-Limiting Legislation On Postoperative Prescription Patterns Following Anterior Cervical Decompression And Fusion</td>
<td>Daniel B C Reid, MD, MPH; Kalpit Nimish Shah, MD; Benjamin Shapiro, MS; Jack H Ruddell, BA; Edward Akelman, MD; Mark A Palumbo, MD; Alan H Daniels, MD</td>
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<td>10:40 am - 10:45 am</td>
<td>Presentation #72 Perioperative Spending In Single-Level Anterior Cervical Discectomy And Fusion For Degenerative Pathology</td>
<td>Majd Marrache, MD; Andrew Harris, BS; Varun Puvanesarajah, MD; Micheal Raad, MD; Amit Jain, MD</td>
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10:46 am - 10:51 am  Presentation #73
**The Fault Within Our “Drgs”: Refining Risk-Adjustment For Bundled Payment Models In Cervical Fusions**
Azeem Tariq Malik, MBBS; Frank M Phillips, MD; Sheldon Michael Retchin, MD, MSPH; Wendy Xu; Elizabeth M Yu, MD; Jeffery D Kim, MD; Safdar N Khan, MD

10:52 am - 10:57 am  Presentation #74
**Anterior Cervical Discectomy And Fusions (Acdfs) At Physician Owned Hospitals – Is It Time To Reconsider The Sanctions Of The Affordable Care Act (Aca)?**
Azeem Tariq Malik, MBBS; Sheldon Michael Retchin, MD, MSPH; Wendy Xu; Frank M Phillips, MD; Safdar N Khan, MD

10:58 am - 11:03 am  Presentation #75
Tyler J Jenkins, MD; Ryan D Snowden, MD; Joseph Douglas Smucker, MD; Wellington K Hsu, MD; K Daniel Riew, MD; Rick C Sasso, MD

11:03 am - 11:14 am  Discussion

11:15 am - 11:29 am  Broadway Ballroom Foyer, 6th Floor
Break

11:29 am - 12:44 pm  Session XIII: Focused Podium Presentations
Moderators: Michael Daubs, MD and Robert Hart, MD

11:29 am - 11:31 am  Presentation #76
**Anterior Cord Compression Is Associated With Neurologic Deficit In Patients With Degenerative Cervical Myelopathy. Does It Have Evidence?**
Kyung Chung Kang, MD; Jung-Hee Lee, MD; Ki Young Lee; Hyoungmin Kim; Sang Kyu Im; Jong-Beom Park

11:32 am - 11:34 am  Presentation #77
**Cervical Bone Mineral Density Measured By Qct In Patients Undergoing Anterior Cervical Spine Surgery**
Stephan N Salzmann, MD; Courtney Ortiz Miller, BA; Ichiro Okano, MD; Fabian Winter; Jennifer Shue, MS; John Anthony Carrino, MD; Andrew A Sama, MD; Frank P Cammisa Jr, MD; Federico P Girardi, MD; Alexander P Hughes, MD

11:35 am - 11:37 am  Presentation #78
**Continuous Optical Monitoring Of Spinal Cord Hemodynamics During The First 7 Days Post-Injury In A Porcine Model Of Acute Spinal Cord Injury**
Brian K Kwon, MD, PhD, FRCSC; Neda Manouchehri; So Kitty; Cheung Amanda; Streijger Femke; Macnab Andrew; Shadgan Babak

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Saturday, November 23

11:38 am - 11:40 am  Presentation #79

**Risk Factors Associated With Vertebral Artery Anomalies In The Subaxial Cervical Spine**

Erika Chiapparelli Harb, MD; Stephan N Salzmann, MD; Colleen Rentenberger; Jennifer Shue, MS; Ichiro Okano, MD; Andrew A Sama, MD; Federico P Girardi, MD; Frank P Cammisa Jr, MD; Alexander P Hughes, MD

11:41 am - 11:43 am  Presentation #80

**Therapeutic Impact Of Grafted Oligodendrogenic-Neural Progenitor Cells Combined With Sustained Delivery Of Chondroitinase Abc Using An Innovative Methylcellulose Biomaterial For Chronic Spinal Cord Injury**

Satoshi Nori, MD, PhD; Mohamad Khazaei, PhD; Kazuya Yokota, MD, PhD; Jan-Eric Ahlfors; Shinsuke Shibata, MD, PhD; Morio Matsumoto, MD; Masaya Nakamura, MD; Molly Shoichet; Michael Fehlings, MD

11:43 am - 11:53 am  Discussion

11:54 am - 11:56 am  Presentation #81

**Establishing Maximal Medical Improvement Following Anterior Cervical Discectomy And Fusion**

Dil V Patel, BS; Joon Sung Yoo, BA; Benjamin Khechen, BA; Anirudh K Gowd; Eric H Lamoutte, BS; Sailee S Karmarkar, BS; Joseph Liu, MD; Kern Singh, MD; Nathaniel W Jenkins, MS; James M Parrish, MPH

11:57 am - 11:59 am  Presentation #82

**Does Neurologic Diagnosis Affect Improvement In Neck Pain After Acdf Surgery?**

Justin Stull, MD; Srikanth Divi, MD; John Mangan, MD, MHA; Dhruv K C Goyal, BA; Matthew Galetta, BA; Jeffrey A Rihn, MD; Mark F Kurd, MD; D Greg Anderson, MD; Barrett Ivory Woods, MD; Kristen E Radcliff, MD; Ian Kaye, MD; Alexander Vaccaro, MD, PhD, MBA; Christopher Kepler, MD; Gregory Douglas Schroeder, MD; Alan S Hilibrand, MBA, MD

12:00 pm - 12:02 pm  Presentation #83

**Predictive Models For Long-Term Patient-Reported Outcomes After Cervical Spine Surgery For Myelopathy: A National Study Of 2717 Patients**

Inamullah Khan, MBBS; Hui Nian, PhD; Frank E Harrell Jr, PhD; Jacquelyn S Pennings, PhD; Mohamad Bydon, MD; Anthony Asher; Kristin Archer, PhD; Clinton J Devin, MD

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12:03 pm - 12:05 pm   Presentation #84
**How Much Do Patients With Predominantly Neck Pain Improve After Acdf Surgery For Cervical Radiculopathy?**
*Srikanth N Divi, MD; Justin Stull, MD; John Mangan, MD, MHA; Dhruv K C Goyal, BA; Matthew Galetta, BA; Jeffrey A Rihn, MD; Mark F Kurd, MD; D Greg Anderson, MD; Barrett Ivory Woods, MD; Alan S Hillibrand, MBA, MD; Ian Kaye, MD; Alexander Vaccaro, MD, PhD, MBA; Christopher Kepler, MD; Gregory Douglas Schroeder, MD; Kristen E Radcliff, MD

12:06 pm - 12:08 pm   Presentation #85
**Functional Range Of Motion Of The Cervical Spine In Posterior Cervical Discectomy And Fusion Patients During Activities Of Daily Living**
*Sebastian Murati; Abenezer Alemu; Marcus Allen; Riffitts Michelle; Anna Bailes; Malcolm Dombrowski, MD; Joon Yung Lee, MD; William F Donaldson III, MD; William W Clark, PhD; Kevin Michael Bell, PhD

12:09 pm - 12:19 pm   Discussion
12:20 pm - 12:22 pm   Presentation #86
**Which Topical Agent Is More Efficacious In Diminishing Postoperative Drainage Following Multi-Level Cervical Laminoplasty/Laminectiony: Tranexamic Acid- Versus Thrombin-Soaked Collagen Sponge?**
*Jiwon Park, MD; Haolin Zheng; Jin-Sup Yeom, MD, PhD; Jae Won Lee; Ho-Joong Kim, MD, PhD; Sang-Min Park; Bong-Soon Chang, MD, PhD; Choon-Ki Lee, MD, PhD

12:23 pm - 12:25 pm   Presentation #87
**Pseudoarthrosis Rates After Anterior Cervical Discectomy And Fusion (Acdf) Using Polyetheretherketone (Peek) Or Structural Allograft For Interbody Grafting: Minimum 2-Year Follow Up**
*Minghao Wang, MD, PhD; Dean Chou, MD; Chih-Chang Chang, MD; YILIN LIU, MD; Ankit Hirpara; Praveen V Mummaneni

12:26 pm - 12:28 pm   Presentation #88
**CTA In Addition To MRI May Not Be Necessary In Detecting Subaxial Vertebral Artery Anomalies In Anterior Cervical Spine Surgery**
*Ichiro Okano, MD; Stephan N Salzmann, MD; Colleen Rentenberger; Jennifer Shue, MS; Andrew A Sama, MD; Federico P Girardi, MD; Frank P Cammisa Jr, MD; Alexander P Hughes, MD

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12:29 pm - 12:31 pm  Presentation #89  
**Can Reinforcing Lateral Mass Screw With Multiple Points Of Fixation Improve Anchoring Performance And Reduce Screw Pullout?**  
*Franck Le Naveaux, PhD; Bahe Hachem; Kevin Fun Lee, MS; Jean-Marc Mac-Thiong, MD; Hyun W Bae, MD; Christopher Ames, MD; Masashi Neo, MD, PhD; Julien Clin*

12:32 pm - 12:34 pm  Presentation #90  
**The Effect Of Arthrodesis On Neuroforaminal Area**  
*Clarissa Levasseur, MS; Samuel William Pitcairn, BS; Jeremy Dewitt Shaw, MD, MS; William F Donaldson III, MD; Joon Yung Lee, MD; William Anderst, PhD*

12:34 pm - 12:44 pm  Discussion

12:45 pm - 12:46 pm  **Closing Remarks**  
*Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD*

12:47 pm - 12:48 pm  **Adjourning Notices**  
*Rick Sasso, MD*