



CSRS 42nd Annual Meeting

December 4 - 6, 2014
Hyatt Regency Grand Cypress Hotel
Orlando, FL

Program Chairs – Wellington K. Hsu, MD &
 Ronald A. Lehman, Jr., MD
 President – Bruce V. Darden, II, MD

Revised 11-13-14

Thursday, Dec 4, 2014
Grand Cypress Ballrooms DEF

7:00–7:10 am	Welcome and Announcements Wellington K. Hsu, MD and Ronald A. Lehman, Jr., MD
7:11–7:59 am Moderators:	Session I: Best Paper I Bradford L. Currier, MD and Clinton J. Devin, MD
7:11–7:17 am Paper #1	Clinical and Surgical Predictors of Perioperative Complications in Patients with Degenerative Cervical Myelopathy: Results from the Multicenter, Prospective AOSpine International Study on 479 Patients Lindsay Tetreault, HBSc, Michael G. Fehlings, MD, PhD, Branko Kopjar, MD, PhD, MS, Paul M. Arnold, MD, Gamaliel Tan, MBBS, FRCS, Pierre Cote, CD, PhD, and Nabeel S. Alshafai, MBBS, FRCS, FEAN
7:18–7:24 am Paper #2	Abnormal Magnetic Resonance Image's Findings of the Cervical Spine in Over 1200 Asymptomatic Subjects. A Prospective Investigation Hiroaki Nakashima, MD, Yasutsugu Yukawa, MD, PhD, Kota Suda, MD, Masaaki Yamagata, MD, Takayoshi Ueta, MD, and Fumihiko Kato, MD, PhD
7:25–7:31 am Paper #3	Surgical Timing for Cervical and Upper Thoracic Injuries in the Polytrauma Patient Daniel Lubelski, BA, Michael P. Steinmetz, MD, John J. Como, MD, MPH, Suzanne Tharin, MD, PhD, Heather A. Vallier, MD, and Timothy A. Moore, MD
7:32–7:38 am Paper #4	Riluzole Attenuates the Decompression Induced Ischemia Reperfusion Injury and Enhances the Beneficial Impact of Decompression in Cervical Spondylotic Myelopathy Spyridon K. Karadimas, MD, PhD, Alex Laliberte, Young Sun Chung, MD, PhD, Warren Foltz, and Michael G. Fehlings, MD, PhD
7:39–7:45 am Paper #5	High Post-Operative C2-7 SVA is Associated with Proximal Junctional Kyphosis Han Jo Kim, MD, Themistocles S. Protopsaltis, MD, Stacie Nguyen, MS, Matthew E. Cunningham, MD, PhD, Peter Passias, MD, Justin S. Smith, MD, PhD, Christopher I. Shaffrey, MD, Frank J. Schwab, MD, Gregory M. Mundis, MD, Eric O. Klineberg, MD, Munish C. Gupta, MD, Robert A. Hart, MD, Shay Bess, MD, and Christopher P. Ames, MD
7:46–7:59 am	Discussion
8:00–8:48 am Moderators:	Session II: Myelopathy Kazuhiro Chiba, MD, PhD and Eeric Truumees, MD
8:00–8:06 am Paper #6	Geographical Variations in Degenerative Cervical Myelopathy Presentation and Surgical Treatment Outcomes: Results of a Prospective International, Multicenter AOSpine International Study (CSM-I) Michael G. Fehlings, MD, PhD, Ahmed Ibrahim, MD, Branko Kopjar, MD, PhD, MS, Lindsay Tetreault, HSBc, Eric M. Massicotte, MD, MSc, FRCSC, Helton L. Defino, MD, Ronald Bartels, MD, Qiang Zhou, MD, Paul M. Arnold, MD, Mehmet Zileli, MD, Gamaliel Tan, MBBS, FRCS, Yasutsugu Yukawa, MD, Osmar J. S. Moraes, MD, Giuseppe Barbagallo, MD, Massimo Scerrati, MD, Masato Tanaka, MD, Tomoaki Toyone, MD, PhD, Ciaran Bolger, MD, Shashank S. Kale, MD, and Manuel A. Alvarado, MD
8:07–8:13 am Paper #7	Novel Classification of Cervical Myelopathy - Clinical Features and Surgical Response Takanori Niimura, MD, Hisanori Mihara, MD, Yohei Ito, MD, and Takaaki Morii, MD

8:14–8:20 am Paper #8	A Prospective, Randomized Study Comparing Selective Laminectomy and Conventional Laminoplasty for Cervical Spondylotic Myelopathy: Minimum 2-year Follow-up Toshitaka Yoshii, MD, PhD, Tsuyoshi Kato, MD, PhD, Kenichiro Sakai, Takashi Hirai, MD, PhD, Satoshi Sumiya, Shigenori Kawabata, MD, PhD, Yoshiyasu Arai, MD, PhD, Atsushi Okawa, MD, PhD, and Kenichi Shinomiya, MD
8:21–8:27 am Paper #9	Surgical Results for Cervical Myelopathy Accompanied with Athetoid Cerebral Palsy in 170 Patients Hisanori Mihara, MD, Takanori Niimura, MD, Yohei Ito, MD, and Takaaki Morii, MD
8:28–8:34 am Paper #10	The Diagnosis and Prognosis Value of the Ratio of Apparent Diffusion Coefficient and Fractional Anisotropy, Diffusion Tensor Tractography of Diffusion Tensor Imaging for Cervical Spondylotic Myelopathy Hongxing Shen, MD, Kun Wang, MD, and Qingxin Song, MD
8:35–8:48 am	Discussion
8:49–9:32 am Moderator:	Symposium I: Predictors of Outcome in Cervical Spinal Conditions Jonathan N. Grauer, MD
8:49–8:59 am	Cervical Spondylotic Myelopathy Michael G. Fehlings, MD, PhD
9:00–9:10 am	Ossification of the Posterior Longitudinal Ligament Howard S. An, MD
9:11–9:21 am	Spinal Cord Injury Brian K. Kwon, MD, PhD, FRCSC
9:22–9:30 am	Discussion
9:31–9:40 am	Recognition of CSRS 21st Century Research & Education Premier Donors Aesculap, DePuy Synthes Spine, Medtronic, and Stryker Spine
9:41–10:03 am	Break - Regency Hall
10:04–10:52 am Moderators:	Session III: Complications R. Alden Milam, IV, MD and TBD
10:04–10:10 am Paper #11	Risk Factors for Surgical Site Infection after Posterior Cervical Spine Surgery: Analysis from the ACS-NSQIP 2005-2012 Arjun S. Sebastian, MD, Sanjeev Kakar, MD, Elizabeth B. Habermann, PhD, Amy Wagie, BS, Paul M. Huddleston, MD, Michael J. Yaszemski, MD, PhD, and Ahmad Nassr, MD
10:11–10:17 am Paper #12	Can Dysphagia following Anterior Cervical Fusions with rhBMP-2 be reduced with Local Depomedrol Application? A Prospective, Randomized, Placebo-Controlled, Double-Blind Trial Charles Edwards, II, MD, David Phillips, BA, Charles Edwards, I, MD, and Clayton L. Dean, MD
10:18–10:24 am Paper #13	The Utility of Obtaining Routine Hematologic Laboratory Values following Anterior Cervical Discectomy and Fusion Blaine T. Manning, BS, Junyoung Ahn, BS, Hamid Hassanzadeh, MD, Sreeharsha Nandyala, Alejandro Marquez-Lara, Islam Elboghdady, and Kern Singh, MD
10:25–10:31 am Paper #14	The Association between Psychiatric Factors and the Development of Chronic Dysphagia after Anterior Cervical Spine Surgery Jung Sub Lee, MD, PhD, Sung Shik Kang, MD, Jong Ki Shin, MD, and Tae Sik Goh, MD
10:32–10:38 am Paper #15	Reoperation Rates after Anterior Cervical Discectomy and Fusion Versus Posterior Cervical Foraminotomy: A Propensity Matched Analysis Daniel Lubelski, BA, Andrew T. Healy, MD, Michael P. Silverstein, MD, Edward C. Benzel, MD, FAANS, Michael P. Steinmetz, MD, Todd B. Francis, MD, and Thomas E. Mroz, MD
10:39–10:52 am	Discussion
10:53–11:03 am	Introduction of Henry H. Bohlman Presidential Guest Speaker Bruce V. Darden, II, MD

11:04–11:54 am	Henry H. Bohlman Presidential Guest Lecture - Sean B. Carroll, PhD “Brave Genius: A Scientist’s Journey from the French Resistance to the Nobel Prize”
11:55 am–12:55 pm	Non-Member Lunch - Regency Hall
11:55 am–12:55 pm	Member Lunch - La Coquina (1st Floor)
12:56–1:49 pm Moderator:	Session IV: Research Session John J.M. Rhee, MD
12:56–1:12 pm	Announcement of 2014 ~ 21st Century Premier Donor Research Grant Winners Funded by CSRS 21st Century Research & Education Premier Donors Aesculap DePuy Synthes Spine Medtronic Stryker Spine
	21st Century Research and Education Grants
	Seed Starter Research and Education Grants
	Resident Fellow Research and Education Grants
1:13–1:14 pm	Introduction – Research Grant Updates
1:15–1:20 pm	<u>21st Century Research and Education Grant</u> Therapeutic Approaches to Protect Against Ischemia/Reperfusion Injury Following Surgical Decompression for Cervical Spondylotic Myelopathy: A Potential Solution to Attenuate Perioperative Neurological Complication following Decompressive Surgery Michael G. Fehlings, MD, PhD
1:21–1:26 pm	<u>Seed Starter Grants</u> Evaluating Cervical Spondylotic Myelopathy (CSM) through Novel Sensitive Upper Limb and Gait Assessments: Elucidating the Mechanisms of Disrupted Manual Dexterity and Locomotion in Humans Sukhvinder K. Kalsi-Ryan, MD, Spyridon K. Karadimas, MD, PhD, and Michael G. Fehlings, MD, PhD
1:27–1:32 pm	Osteogenic Gene Expression of Autograft Bone Harvested during Spine Surgery and after In Vitro Culture Brandon D. Lawrence, MD, Darrel S. Brodke, MD, and Sarina Sinclair, PhD
1:33–1:38 pm	C2 Fractures in the Elderly: Complications, Costs and Regional Variations Adam Pearson, MD, Brook I. Martin, PhD, MPH, and Todd J. Albert, MD
1:39–1:49 pm	Discussion
1:50–2:28 pm Moderators:	Session V: Basic Science Peter G. Whang, MD, FACS and Christopher D. Chaput, MD
1:50–1:56 pm Paper #16	Vertebral Body Sliding Technique: A Novel Anterior Decompression Procedure for Ossification of the Posterior Longitudinal Ligament of the Cervical Spine Dong-Ho Lee, MD, PhD, Professor Seung-Chul Rhim, Jung-Ki Ha, Jae Hwan Cho, MD, Changju Hwang, K. Daniel Riew, MD, and Choon-Sung Lee, MD
1:57–2:03 pm Paper #17	Intra-Articular Nerve Growth Factor Initiates Pain and Associated Spinal Neuronal Hyperexcitability from Cervical Joint Pain Beth A. Winkelstein, PhD and Jeffrey Kras, BSE
2:04–2:10 pm Paper #18	Inhibition of Osteogenic Differentiation and Spine Fusion by Dioxin, A Cigarette Smoke Constituent Abhishek Kannan, BS, Sharath S. Bellary, MD, Kevin Sonn, MD, Chawon Yun, PhD, Sohaib Hashmi, MD, John T. Nelson, MD, Stuart R. Stock, PhD, Amruta Ashtekar, MS, Michael S. Nickoli, MD, Marco Mendoza, Jason H. Ghodasra, MD, MSCI, Erin L. Hsu, PhD, and Wellington K. Hsu, MD

2:11–2:17 pm Paper #19	Effect of Combined Therapy with Neural Stem Cell Transplantation and Treadmill Training for Chronic Spinal Cord Injury in Mice Syoichi Tashiro, MD , Soraya Nishimura, MD, PhD, Hiroki Iwai, MD, PhD, Go Itakura, Keiko Hori, Munehisa Shinozaki, Akio Iwanami, MD, PhD, Yoshiaki Toyama, Meigen Liu, Hideyuki Okano, MD, PhD, and Masaya Nakamura, MD, PhD
2:18–2:28 pm	Discussion
2:29–2:59 pm	Break - Regency Hall
3:00–4:21 pm Moderator:	Case Debates: Failed Type II Odontoid Fracture with Myelopathic Symptoms Wellington K. Hsu, MD
3:03–3:10 pm	Posterior Fusion Alexander R. Vaccaro, MD, PhD
3:11–3:18 pm	Anterior Odontoid Fixation Ronald I. Apfelbaum, MD, FAANS(L)
3:19–3:26 pm	Nonoperative Care Thomas A. Zdeblick, MD
3:27–3:40 pm	Discussion
3:41–3:43 pm	C6/7 Posterolateral HNP in a NFL Running Back
3:44–3:51 pm	Posterior Foraminotomy Thomas E. Mroz, MD
3:52–3:59 pm	Anterior Cervical Discectomy and Fusion (ACDF) Andrew C. Hecht, MD
4:00–4:07 pm	Total Disc Arthroplasty (TDA) Ronald A. Lehman, Jr., MD
4:08–4:21 pm	Discussion
4:22–5:17 pm Moderators:	Session VI: Fusion Serena S. Hu, MD and Jose M. Casamitjana, MD
4:22–4:28 pm Paper #20	Surgeon Specialty Differences in Single-Level Anterior Cervical Discectomy and Fusion Shobhit V. Minhas, BA, Ian Chow, BA, John Y. Kim, MD, and Alpesh A. Patel, MD, FACS
4:29–4:35 pm Paper #21	Differences in Outcomes following ACDF in Patients with One and Two Level Symptomatic Cervical Disc Disease: Follow-up at Four Years in a Prospectively Collected Series of 186 Patients Jack E. Zigler, MD , Roger W. Rogers, DO, and Donna D. Ohnmeiss, MD
4:36–4:42 pm Paper #22	ACDF in the Outpatient Ambulatory Surgery Setting: Analysis of 1000 Consecutive Cases and Comparison to Hospital Inpatient ACDF Saniya S. Godil, MD , Stephen K. Mendenhall, BS, Clinton J. Devin, MD, and Matthew J. McGirt, MD
4:43–4:49 pm Paper #23	Influence of the Number of Cervical Fusion Level on the Cervical Spine Motion and Health-Related Quality of Life Sang-Hun Lee, MD, PhD , Jin Young Kim, MD, Ryoji Tauchi, MD, and K. Daniel Riew, MD
4:50–4:56 pm Paper #24	Outpatient vs. Inpatient ACDF is Associated with Improved Surgical Quality: Analysis of 7,288 Patients from NSQIP Database Clinton J. Devin, MD, Matthew J. McGirt, MD, and Saniya S. Godil, MD
4:57–5:03 pm	Special Projects Committee Report - Radiologic Determination of Post-Operative Cervical Fusion: A Systematic Review John J.M. Rhee, MD , Jens R. Chapman, MD, Daniel C. Norvell, PT, Justin S. Smith, MD, PhD, Ned A. Sherry, and K. Daniel Riew, MD
5:04–5:17 pm	Discussion

5:17 pm Adjourn

5:30–7:30 pm Welcome Reception – Regency Hall

Friday, Dec 5, 2014
Grand Cypress Ballrooms DEF

7:00–7:10 am **Welcome and Announcements**
Wellington K. Hsu, MD and Ronald A. Lehman, Jr., MD

7:11–7:49 am **Session VII: Trauma**
Moderators: **Carlo Bellabarba, MD and Charles A. Reitman, MD**

7:11–7:17 am **Biomechanical Comparison of Methods of Halo Vest Application including Introduction of a New Technique**
Paper #25 **Mark L. Prasarn, MD, Caleb Behrend, MD, MaryBeth Horodyski, EdD, LAT, FNATA, Rex A.W. Marco, MD, and Glenn R. Rechtine, II, MD**

7:18–7:24 am **Type II Odontoid Fractures: Predictive Factors for Operative versus Non-Operative Treatment**
Paper #26 **Jordan D. Walters, BS, John P. Birkedal, MD, and Ishaq Y. Syed, MD, MS**

7:25–7:31 am **Nonoperative Management of Unilateral Cervical Facet Fractures**
Paper #27 **Stephen F. Pehler, MD, James R. Bowman, MD, PhD, William E. Neway, DO, and Steven M. Theiss, MD**

7:32–7:38 am **Safety-Focused Extrication of Vehicular Accident Patients with Cervical Spine Injuries**
Paper #28 **MaryBeth Horodyski, EdD, LAT, FNATA, Mark L. Prasarn, MD, Laura Ann Zdziarski, Dewayne DuBose, MS Robert Marschall, and Glenn R. Rechtine, II, MD**

7:39–7:49 am **Discussion**

7:50–8:28 am **Session VIII: Best Paper II**
Moderators: **John S. Kirkpatrick, MD and Kuniyoshi Abumi, MD**

7:50–7:56 am **The Correlation Patterns and Time-Dependent Changes of the Upper Arm Performance Tests (10-second Test and STEF), JOA Score and a Newly Developed Patient-Based Outcome Measure (JOACMEQ) in Surgically Treated Patients with Cervical Myelopathy. An Analysis of Prospective Study.**
Paper #29 **Hiroyasu Fujiwara, MD, Takashi Kaito, MD, PhD, Takahiro Makino, MD, Hirotsugu Honda, MD, PhD, and Kazuo Yonenobu, MD**

7:57–8:03 am **Impact of Axial Pain on Quality of Life in Patients undergoing Cervical Laminoplasty**
Paper #30 **Atsushi Kimura, MD, PhD, Teruaki Endo, MD, Hirokazu Inoue, MD, Atsushi Seichi, MD, and Katsushi Takeshita, MD**

8:04–8:10 am **Is Cervical Sagittal Imbalance an Independent Risk Factor for Adjacent Segment Disease?**
Paper #31 **Avinash G. Patwardhan, PhD, Saeed Khayatzaeh, MS, Ngoc-Lam Nguyen, MD, Robert M. Havey, BS, Leonard I. Voronov, MD, PhD, Muturi Muriuki, PhD, Gerard Carandang, MS, Alexander J. Ghanayem, MD, Alpesh A. Patel, MD, FACS, Zachary A. Smith, MD, and William R. Sears, FRACS**

8:11–8:17 am **Smoking and Other Risk Factors for Persistent Dysphagia after Anterior Cervical Spine Surgery**
Paper #32 **Erik C. Olsson, MD, Meghan Jobson, PhD, and Moe R. Lim, MD**

8:18–8:28 am **Discussion**

8:29–9:17 am **Symposium II: Cervical Deformity**
Moderator: **James D. Kang, MD**

8:29–8:39 am **What does a Cervical Spine Surgeon need to Know about Deformity?**
Christopher P. Ames, MD

8:40–8:50 am **How Preoperative Measurements affect Surgical Decision-Making**
K. Daniel Riew, MD

8:51–9:01 am	Perioperative Considerations/Complications in Cervical Deformity Surgery TBD
9:02–9:17 am	Discussion
9:18–9:28 am	Introduction of CSRS President - Alan S. Hilibrand, MD
9:29–9:59 am	PRESIDENTIAL ADDRESS - Bruce V. Darden, II, MD
10:00–10:30 am	BREAK - Regency Hall
10:31–11:16 am Moderators:	Session IX: Diagnostics I Jeffrey C. Wang, MD and Tateru Shiraishi, MD, PhD
10:31–10:37 am Paper #33	Age-Related and Degenerative Changes in Osseous Anatomy, Alignment, and Range of Motion of the Cervical Spine: A Comparative Study of Radiographic Data from 1200 Asymptomatic Subjects and 1016 Patients with Cervical Spondylotic Myelopathy Masaaki Machino, MD, Yasutsugu Yukawa, MD, Tomohiro Matsumoto, MD, Jun Ouchida, and Shiro Imagama, MD, PhD
10:38–10:44 am Paper #34	Grip Weakness: Not Just a C8 or T1 Problem Brian J. Neuman, MD, Jin Young Kim, MD, Han Jo Kim, MD, and K. Daniel Riew, MD
10:45–10:51 am Paper #35	Characteristic Findings of Imaging in Cervical Canal Stenosis without Symptoms - Analysis of Dynamic MRI and X-ray Photography in 100 Asymptomatic Volunteers Ryoma Aoyama, MD, PhD, Tateru Shiraishi, MD, PhD, Masahiro Kato, MD, Junichi Yamane, MD, PhD, Ken Ninomiya, MD, PhD, Kazuya Kitamura, MD, PhD, Satoshi Nori, MD, PhD, Toshiki Okubo, Ukei Anazawa, MD, PhD, and Hiraku Hotta, MD, PhD
10:52–10:58 am Paper #36	Vertebral Artery Variations and Osseous Anomaly at the C1-2 Level Diagnosed by 3-D CT Angiography in Normal Patients - Results of Consecutive 480 Cases Norimitsu Wakao, MD, PhD, Mikinobu Takeuchi, MD, PhD, Mitsuhiro Kamiya, MD, PhD, Shiro Imagama, MD, PhD, and K. Daniel Riew, MD
10:59–11:05 am Paper #37	The Evaluation and Observation of "Hidden" Hypertrophy of Cervical Ligamentum Flavum, Cervical Canal and Related Factors using Kinetic MRI Jian Xiong, MD, Cheng Zeng, MD, and Jeffrey C. Wang, MD
11:06–11:19 am	Discussion
11:20–11:25 am	Preview CSRS 2015 Annual Meeting in San Diego, California Alan S. Hilibrand, MD
11:26–11:31 am	Preview CSRS Asia Pacific Section 2015 Annual Meeting in Yokohama, Japan Tateru Shiraishi, MD, PhD
11:32–11:37 am	Preview CSRS European Section 2015 Annual Meeting in London, United Kingdom Andre Jackowski, MD
11:37 am	Adjourn

ADDITIONAL REGISTRATION FEE REQUIRED ~ CME ACCREDITED SYMPOSIUM.

6:30–8:40 pm	Optional Dinner Symposium “The Presidential Town Hall” – Grand Cypress Ballrooms GHI
Moderator:	Welcome - Wellington K. Hsu, MD
6:35–6:40 pm	Introductions
	Panel:
	Todd J. Albert, MD
	Paul A. Anderson, MD
	John G. Heller, MD
	K. Daniel Riew, MD
	Kazuhiro Chiba, MD, PhD
	Dinner Service
6:41–7:11 pm	Case #1: 3-Level Severe Stenosis in 35 year old with Radicular Pain and Early Myelopathy
7:12–7:42 pm	Case #2: 77 year old Female with Radicular Pain after C26 ACDF with ASD at C7T1, T12
7:43–8:13 pm	Lessons Learned after a Life in Cervical Spine Surgery
	Panel:
	Ronald I. Apfelbaum, MD, FAANS(L)
	Edward C. Benzel, MD, FAANS
8:14–8:39 pm	Open Forum / Questions
Moderator:	Ronald A. Lehman, Jr., MD
8:40 pm	Adjourn

7:00–7:05 am	Welcome and Announcements
	Wellington K. Hsu, MD and Ronald A. Lehman, Jr., MD
7:06–7:54 am	Session X: Posterior
Moderators:	Ahmad Nassr, MD and Andrew T. Dailey, MD, FAANS
7:06–7:12 am	Comparison of Fatigue Strength of C2 Pedicle Screws, C2 Pars Screws, and a Hybrid Construct
Paper #38	in C1-2 Fixation
	Brian W. Su, MD, Adam L. Shimer, MD , Suresh Chinthakunta, MS, Christopher P. Ames, MD, Alexander R. Vaccaro, MD, and Brandon Bucklen, PhD
7:13–7:19 am	Outcomes and Related Factors of C5 Palsy following Cervical Laminectomy with Instrumented Fusion: Comparison with Laminoplasty Group
Paper #39	Sang-Hun Lee, MD, PhD, Kyung-Soo Suk, MD, PhD, Kyung-Chung Kang, MD , Seong-Woo Cho, MD, Jung-Hee Lee, MD, PhD, and Ki-Tack Kim, MD, PhD
7:20–7:26 am	The Incidence of Instrumentation Failure and Reoperation after Posterior Cervical Fusion that Terminates Cranial or Caudal to the Cervical-Thoracic Junction
Paper #40	Peter J. Wagner, MD, MMS, Samuel Adams, MD, Patrick J. Connolly, MD, Christian P. DiPaola, MD, and Michael P. Stauff, MD

7:27–7:33 am Paper #41	Indirect Posterior Cervical Decompression and Fusion using Expandable Facet Joint Implant for Single Level Radiculopathy - Results in 53 Patients at 2-Years Bruce M. McCormack, MD, Frank M. Phillips, MD, Marcin Tyrakowski, MD, PhD, and Kris B. Siemionow, MD
7:34–7:40 am Paper #42	Screw Perforation Features in 129 Consecutive Patients Performed Computer-Guided Cervical Pedicle Screw Insertion Masashi Uehara, MD , Jun Takahashi, MD, Shota Ikegami, MD, Kuraishi Shugo, MD, Masayuki Shimizu, MD, Toshimasa Futatsugi, MD, and Hiroyuki Kato, MD
7:41–7:54 am	Discussion
7:55–8:33 am Moderators:	Session XI: Deformity Vo Van Thanh, MD, PhD and Sheeraz A. Qureshi, MD, MBA
7:55–8:01 am Paper #43	Maintaining Chin Brow Vertical Angle (CBVA) and Horizontal Gaze in Lumbar Fatback Deformity: Full Body Analysis of the Chain of Compensation from the Cervical Spine to the Feet Virginie C. Lafage, PhD , Emmanuelle Ferrero, MD, Renaud Lafage, MS, Vincent Challier, MD, Barthelemy Liabaud, MD, Bassel G Diebo, MD, Shian Liu, BS, Eric O. Klineberg, MD, Peter Passias, MD, Christopher P. Ames, MD, Justin S. Smith, MD, PhD, Themistocles S. Protopsaltis, MD, Thomas J. Errico, MD, and Frank J. Schwab, MD
8:02–8:08 am Paper #44	Increased C2-C7 SVA (Sagittal Vertical Axis) after Laminoplasty causes Axial Neck Pain Yoshihiro Inui, MD , Koki Uno, PhD, Kohei Kawakita, PhD, Teppei Suzuki, PhD, and Hiroshi Miyamoto, PhD
8:09–8:15 am Paper #45	Cervical Spine Compensation in Adolescent Idiopathic Scoliosis Elizabeth P. Norheim, MD , Leah Y. Carreon, MD, MSc, Daniel J. Sucato, MD, Lawrence G. Lenke, MD, and Steven D. Glassman, MD
8:16–8:22 am Paper #46	A Radiation-Free Cervical Screw Navigation Procedure with the Screw Guide Template System Shuichi Kaneyama, MD , Taku Sugawara, MD, PhD, Masatoshi Sumi, MD, Naoki Higashiyama, MD, and Masato Takabatake, MD
8:23–8:33 am	Discussion
8:34–9:22 am Moderators:	Session XII: Outcomes I Joseph R. O'Brien, MD, MPH and William F. Donaldson, III, MD
8:34–8:40 am Paper #47	What Patient Characteristics could Potentially affect your Patient Satisfaction Scores during Spine Clinic? Jesse E. Bible, MD , Harrison F. Kay, BS, David N. Shau, Kevin R. O'Neill, MD, Paul B. Segebarth, MD, and Clinton J. Devin, MD
8:41–8:47 am Paper #48	Does the Level and Type of Cervical Disc Surgery affect Performance-Based Outcomes in National Football League Athletes? Robert J. Burgmeier, BS , Joseph C. Maroon, MD, Andrew C. Hecht, MD, Alpesh A. Patel, MD, FACS, Jason W. Savage, MD, and Wellington K. Hsu, MD
8:48–8:54 am Paper #49	Does Preoperative Neck Pain decrease after Cervical Laminoplasty? Yasushi Oshima, MD, PhD , Katsushi Takeshita, MD, and Hirotaka Chikuda, MD, PhD
8:55–9:01 am Paper #50	Obstacles to Early Mobilization after Spinal Fusion and Effect on Hospital Length of Stay Jason R. Ferrel, MD , Jared C. Bentley, MD, Roger E. Wiltfong, MD, and David N. Hannallah, MD
9:02–9:08 am Paper #51	Are Low Patient Satisfaction Scores always Due to the Provider? Determinants of Patient Satisfaction Scores during Spine Clinic Visits Jesse E. Bible, MD , David N. Shau, Harrison F. Kay, BS, Kevin R. O'Neill, MD, Paul B. Segebarth, MD, and Clinton J. Devin, MD
9:09–9:22 am	Discussion
9:23–9:43 am	BREAK - Grand Cypress Ballroom Foyer
9:44–10:22 am Moderators:	Session XIII: Diagnostics II Andre Jackowski, MD and Scott D. Daffner, MD

9:44–9:50 am Paper #52	Can We Rely on Clinical Tests for C1-2 Rotation? A Study on the Reliability of Clinical Techniques to Assess Atlantoaxial Rotation. Heiko Koller, PhD, MD and Michael Mayer, MD
9:51–9:57 am Paper #53	The Effect of an Oblique/Transforaminal Magnetic Resonance Imaging Sequence on Surgical Decision-Making for Patients with Cervical Radiculopathy Gregory D. Schroeder, MD , Linda I. Suleiman, MD, Michael A. Chioffe, MD, Jason W. Savage, MD, Wellington K. Hsu, MD, and Alpesh A. Patel, MD, FACS
9:58–10:04 am Paper #54	Diagnosing Congenital Cervical Stenosis on Lateral Radiographs: The Utility of Laminar Depth Jeffrey L. Gum, MD , Leah Y. Carreon, MD, MSc, David B. Bumpass, MD, Patrick A. Sugrue, MD, Melissa Wright, BS, Sam Q. Sun, BS, Michael P. Kelly, MD, Isaac O. Karikari, MD, and K. Daniel Riew, MD
10:05–10:11 am Paper #55	Diffusion Basis Spectrum Imaging (DBSI) measures Axonal Integrity after Spinal Cord Injury Paul G. Gamble, BS, Rory Murphy, Peng Sun, PhD, Sheng-Kwei Song, PhD, and Wilson Z. Ray, MD
10:12–10:22 am	Discussion
10:23–10:28 am	Announcement of Poster Award Winners
10:29–10:34 am	Presentation of CSRS Medallion to Alan S. Hilibrand, MD
10:34–11:02 am Moderators:	Session XIV: Highlight Posters Ravi K. Ponnappan, MD and Glenn R. Rehtine, II, MD
10:34–10:37 am Poster #1	Neurological Recovery of the Upper Limb after Traumatic Cervical Spinal Cord Injury (SCI): Novel Findings to Inform Benchmarks for Clinical Trials. Sukhvinder K. Kalsi-Ryan, BScPT, MSc, PhD and Michael G. Fehlings, MD, PhD
10:38–10:41 am Poster #2	Wide Laminectomy and C4/5 Foraminal Stenosis were the Risk Factors of C5 Palsy: Analysis of 206 Cervical Spondylotic Myelopathy Patients after Selective Laminectomy/Laminoplasty Satoshi Nori, MD , Tateru Shiraishi, MD, PhD, Ryoma Aoyama, MD, PhD, Ken Ninomiya, MD, PhD, Junichi Yamane, and Kazuya Kitamura, MD, PhD
10:42–10:45 am Poster #3	Investigation of Segmental Motor Paralysis after Cervical Laminoplasty using Intraoperative Spinal Cord Monitoring. Nobuhiro Tanaka, MD, PhD , Kazuyoshi Nakanishi, MD, Naosuke Kamei, MD, Takeshi Hiramatsu, MD, Satoshi Ujigo, MD, Norihiko Sumiyoshi, MD, Takanori Rikita, MD, and Mitsuo Ochi, MD
10:46–10:49 am Poster #4	High Glucose-Induced Oxidative Stress accelerates Premature Stress-Induced Senescence of Young Intervertebral Disc Cells of Rats through Mitochondrial Damage Jong-Beom Park, MD, PhD and Eun-Young Park, PhD
10:50–10:53 am Poster #5	Automated Detection of Occipitocervical Complex Injuries Gerardo M. Myrin, MD , Christopher D. Chaput, MD, Brian A. Garner, PhD, and Jacob Hoffman, BS
10:54–11:02 am	Discussion
11:03–11:32 am Moderators:	Session XV: Outcomes II Timothy A. Moore, MD and Mark Bernhardt, MD
11:03–11:09 am Paper #56	Surgical Outcomes of Cervical Disc Herniation Causing Deltoid Palsy: Multi-Center Study Jong-Beom Park, MD, PhD , Jae-Yoon Chung, MD, PhD, Kyung-Jin Song, MD, PhD, and Han Chang, MD, PhD
11:10–11:16 am Paper #57	Incidence, Comorbidities and Risk of Perioperative Complications in HIV-Positive Patients Undergoing Cervical Spine Surgery Javier Z. Guzman, BS, Branko Skovrlj, MD, Andrew J. Lovy, MD, MS , Andrew C. Hecht, MD, Samuel K. Cho, MD, and Sheeraz A. Qureshi, MD, MBA
11:17–11:23 am Paper #58	Cervical Total Disc Arthroplasty does not Protect against Subsequent Cervical Procedures: An Analysis of 52,395 Cases Michael P. Kelly, MD , K. Daniel Riew, MD, Claire Eliasberg, BA, Christopher P. Ames, MD, Wilson Z. Ray, MD, and Nelson Soo Hoo, MD

11:24–11:32 am	Discussion
11:32–11:37 am	Closing Remarks - Alan S. Hilibrand, MD
11:37 am	Adjourn

Poster Catalog

Poster boards

Poster board #6	Impact of Apex Angle of Anterior Compressing Factor and Preoperative C2-C7 Alignment on Postoperative Spinal Cord Alignment and C2-C7 Alignment Shinya Kato, MD, Hisanori Mihara, PhD, and Kenichi Watanabe, MD
Poster board #7	An In-depth Comprehensive Evaluation of the Level of Evidence (LoE) of CSRS Annual Meeting Presentations (2001-10) Nanjundappa S. Harshavardhana, MD, MS, Dip. SICOT, Harshad Dabke, MD, FRCS, and John P. Dormans, MD, FACS
Poster board #8	Responsiveness and Minimally Detectable Differences of a Clinical Impairment Measure Specific for Traumatic Tetraplegia: A Canadian Multi-Centre Assessment of the GRASSP Version 1.0 Sukhvinder K. Kalsi-Ryan, BSc, PT, MSc, PhD and Michael G. Fehlings, MD, PhD
Poster board #9	Full Body Eos Analysis of the Maintenance of Functional CBVA and Horizontal Gaze among Hypo-lordotic verses Hyper-lordotic Patients Vincent Challier, MD, Renaud Lafage, MS, Emmanuelle Ferrero, MD, Barthelemy Liabaud, MD, Bassel G. Diebo, MD, Shian Liu, BS, Justin S. Smith, MD, PhD, Christopher P. Ames, MD, Eric O. Klineberg, MD, Peter Passias, MD, Themistocles S. Protopsaltis, MD, Thomas J. Errico, MD, Frank J. Schwab, MD, and Virginie C. Lafage, PhD
Poster board #10	Validation of Correlation between Chin Brow Vertical Angle (CBVA), Slope of Line of Sight (SLS), and McGregor's Slope (McGS) for Cervical Disability. Renaud Lafage, MS, Vincent Challier, MD, Emmanuelle Ferrero, MD, Barthelemy Liabaud, MD, Bassel G. Diebo, MD, Shian Liu, BS, Eric O. Klineberg, MD, Peter Passias, MD, Christopher P. Ames, MD, Justin S. Smith, MD, PhD, Themistocles S. Protopsaltis, MD, Thomas J. Errico, MD, Frank J. Schwab, MD, and Virginie C. Lafage, PhD
Poster board #11	Cervical Alignment changes and Clinical Outcomes after Surgeries for Cervical Myelopathy Caused by Ossification of the Posterior Longitudinal Ligament with a Focus on Cervical Sagittal Balance Kenichiro Sakai, MD, PhD, Toshitaka Yoshii, MD, PhD, Yoshiyasu Arai, MD, PhD, and Atsushi Okawa, MD, PhD
Poster board #12	Clinical Results and Complications of Posterior Indirect Decompression with Kyphosis Correction and Fusion for Cervical Myelopathy Caused by Ossification of Posterior Longitudinal Ligament Masahiko Takahata, MD and Kuniyoshi Abumi, MD
Poster board #13	Cellular Bone Matrices: Viable Stem Cell-Containing Bone Graft Substitutes Branko Skovrlj, MD, Javier Z. Guzman, BS, Motasem Al Maaieh, MD, Samuel K. Cho, MD, and Sheeraz A. Qureshi, MD, MBA
Poster board #14	One-Level Treatment with Total Disc Replacement and ACDF: 5-year Results from a Prospective Randomized Clinical Trial Michael S. Hisey, MD, FAAOS, Hyun W. Bae, MD, Reginald J. Davis, MD, and Donna D. Ohnmeiss, Dr.Med.
Poster board #15	The Effect of Retropharyngeal Steroids on Post-Operative Swelling and Dysphagia follow Anterior Cervical Surgery Theodore D. Koreckij, MD, Kevin C. Baker, PhD, and Daniel K. Park, MD

E-posters

E-poster #16

WITHDRAWN

E-poster #17

Progressive Cervical Spinal Cord Compression induces Compensatory Neuroplasticity of the Spinal Respiratory Circuitry
Kajana Satkunendrarajah, PhD, Spyridon K. Karadimas, MD, PhD, and Michael G. Fehlings, MD, PhD

E-poster #18

Restabilization of the Occipitocervical Junction after a Complete Unilateral Condylectomy: A Biomechanical Comparison of Unilateral and Bilateral Fixation Techniques.
Marcus D. Mazur, MD, Darrel S. Brodke, MD, and **Andrew T. Dailey, MD**

E-poster #19

What Specific Questions are Responsible in driving NDI Superiority of Two-Level CDA over Two-Level Fusion. Post Hoc Item Analysis of Self-Reported Outcomes of Two- Level Cervical Disc Arthroplasty (cdr, Mobi-c®) vs. Two-Level ACDF treated Patients from the Ide Usrct.
Ashley T. Simela, DO, Linda Kanim, MA, Janice Kim, BA, and Hyun W Bae, MD

E-poster #20

Venous Thromboembolism following Cervical Spine Surgery: Analysis from the ACS-NSQIP 2005-2012
Arjun S. Sebastian, MD, Sanjeev Kakar, MD, Elizabeth B. Habermann, PhD, Amy Wagie, BS, Bradford L. Currier, MD, Michelle J. Clarke, MD, and Ahmad Nassr, MD

E-poster #21

Patterns of Cervical Disc Degeneration - Analysis of Magnetic Resonance Imaging of over 1,000 Symptomatic Subjects.
Akinobu Suzuki, MD, PhD, Michael D. Daubs, MD, Tetsuo Hayashi, MD, PhD, Monchai Ruangchainikom, MD, Chengjie Xiong, MD, Kevin Phan, MD, Trevor P. Scott, MD, and Jeffrey C. Wang, MD

E-poster #22

Relationship between the Timing of Reduction of Cervical Spine Dislocations and Neurological Recovery.
Kazunari Takeda, MD, Takesi Kikuti, MD, and Yasuo Ito, MD

E-poster #23

Analysis of Cervical Screw Placement Accuracy and Fixation in 137 Patients with Focus on Patients with Cervical Deformity using an Electrical Conductivity Device (ECD)
Heiko Koller, PhD, MD and Michael Mayer, MD

E-poster #24

The Safety and Accuracy of Freehand Pedicle Screw Placement in the Subaxial Cervical Spine: A Series of 60 Consecutive Patients
Jeoung Hee Kim, RN and **Jin Hoon Park, MD, PhD**

E-poster #25

Redefining High-Riding Vertebral Artery from the Perspective of the Trajectory of C2 Pedicle Screw
Satoshi Maki, MD, Masao Koda, MD, PhD, Koshiro Kamiya, Mitsutoshi Ota, Taigo Inada, Takeo Furuya, MD, PhD, Kazuhisa Takahashi, MD, and Masashi Yamazaki

E-poster #26

Reliability Assessment of a Novel Cervical Deformity Classification System
Justin S. Smith, MD, PhD, Robert K. Eastlack, MD, Donald Blaskiewicz, MD, Christopher I. Shaffrey, MD, Frank J. Schwab, MD, Shay Bess, MD, Han Jo Kim, MD, Gregory M. Mundis, MD, Eric O. Klineberg, MD, Munish C. Gupta, MD, Michael F. O'Brien, MD, Richard A. Hostin, Jr., MD, Justin K. Scheer, BS, Themistocles S. Protopsaltis, MD, Kai-Ming G. Fu, MD, PhD, Robert A. Hart, MD, Todd J. Albert, MD, K. Daniel Riew, MD, Michael G. Fehlings, MD, PhD, Virginie C. Lafage, PhD, Christopher P. Ames, MD, and ISSG

E-poster #27

Full Spine Analysis of Posterior Cervical Decompression and Fusion vs Laminoplasty Correlated to HRQOL
Anthony J. Boniello, BS, **Themistocles S. Protopsaltis, MD**, Vincent Challier, MD, Amir Amati, MD, Renaud Lafage, MS, Yuriy Trimba, BA, Barthelemy Liabaud, MD, Michael L. Smith, MD, Peter Passias, MD, Yong Kim, MD, Afshin E. Razi, MD, Frank J. Schwab, MD, Virginie C. Lafage, PhD, and Ronald Moskovich, MD

E-poster #28

Modified K Line in MRI is a Powerful Tool to Predict Clinical Outcomes in Patients with Non-lordotic Alignment after Laminoplasty for a Treatment of Cervical Spondylotic Myelopathy
Takashi Hirai, MD, PhD, Takashi Taniyama, MD, Toshitaka Yoshii, MD, PhD, Tsuyoshi Yamada, Hiroyuki Inose, Tsuyoshi Kato, MD, PhD, Shigenori Kawabata, MD, PhD, Yoshiyasu Arai, MD, PhD, Atsushi Okawa, MD, PhD, and Kenichi Shinomiya, MD

- E-poster #29 **Results of a Prospective, Multicentre, AOSpine International Study in 479 Patients on the Surgical Management of Cervical Spondylotic Myelopathy**
Michael G. Fehlings, MD, PhD, Ahmed Ibrahim, MBBS, FRCS, PhD, Branko Kopjar, MD, PhD, MS, Helton L. Defino, MD, Shashank S. Kale, MD, Giuseppe Barbagallo, MD, Ronald Bartels, MD, Qiang Zhou, MD, Paul M. Arnold, MD, Gamaliel Tan, MBBS, FRCS, Mehmet Zileli, MD, Yasutsugu Yukawa, MD, Osmar J. S. Moraes, MD, Massimo Scerrati, MD, Masato Tanaka, MD, Tomoaki Toyone, MD, PhD, Ciaran Bolger, MD, and Manuel A. Alvarado, MD
- E-poster #30 **The Loss of Manual Dexterity and Related Upper Limb Disability in Cervical Spondylotic Myelopathy (CSM): Defining the Role of Upper Limb Assessment**
Sukhvinder K. Kalsi-Ryan, BSc, PT, MSc, PhD, Spyridon K. Karadimas, MD, PhD, Eric M. Massicotte, MD, MSc, FRCSC, and Michael G. Fehlings, MD, PhD
- E-poster #31 **WITHDRAWN**
- E-poster #32 **Maintenance of Overall Success in Patients treated with Cervical Disc Arthroplasty and ACDF at One or Two Levels: Five-Year Results from an Investigational Device Exemption Trial**
Reginald J. Davis, MD, Gregory A. Hoffman, MD, Hyun W. Bae, MD, Michael S. Hisey, MD, Kee D. Kim, MD, Steven E. Gaede, MD, and Pierce D. Nunley, MD
- E-poster #33 **The Anatomical Footprint of the C1 Pedicle Relative to the Lateral Mass as a Guide for C1 Lateral Mass Fixation**
Brian W. Su, MD, Robert H. Byers, MD, **Adam L. Shimer, MD**, Alexander Theologis, MD, and Bobby Tay, MD
- E-poster #34 **Bowstring Effect of Longus Colli Secondary to Severe Spondylosis of Left Luschka Joint: A Potential Factor contribute to Cervical Angina**
Hongxing Shen, MD, Fan Zhang, MD, and Qingxin Song, MD
- E-poster #35 **Preoperative Opioid Usage and Anxiety are Associated with Increased Non-Surgeon visits for Spine-Related Pain within Postoperative Global Period**
Jesse E. Bible, MD, Harrison F. Kay, BA, David N. Shau, BA, Kevin R. O'Neill, MD, Matthew J. McGirt, MD, and Clinton J. Devin, MD
- E-poster #36 **Non-Operative Treatment Modalities Prior to Cervical Surgery affects Patient Outcomes: An Analysis of 1818 Patients**
Robert E. Isaacs, MD, Michael C. Gerling, MD, Anthony J. Boniello, BS, Sun Yang, BA, Kristina Bianco, BA, Peter Passias, MD, Kristen E. Radcliff, MD, and Alexander R. Vaccaro, MD
- E-poster #37 **Current Surgical Practice for Traumatic Spinal Cord Injury in Central Cord Patients in Canada.**
Jerome Paquet, MD, Brian M. Drew, MD, **Michael G. Fehlings, MD, PhD**, Henry Ahn, MD, Najmedden Attabib, MD, Christopher S. Bailey, MD, Sean D. Christie, MD, Neil Duggal, MD, Joel Finkelstein, MD, Daryl R. Fourney, R. John Hurlbert, MD, Michael G. Johnson, MD, Brian K. Kwon, MD, PhD, Stefan Parent, MD, Eve C. Tsai, Vanessa K. Noonan, PhD, Carly S. Rivers, PhD, Tian Shen, Marcel F. Dvorak, MD, and RHSCIR Network
- E-poster #38 **Surgical Training using Three-Dimensional Simulation in Placement of Cervical Lateral Mass Screws: A Blinded Randomized Control Trial**
Michael B. Gottschalk, MD, **Tim Yoon, MD, PhD**, Daniel K. Park, MD, John J.M. Rhee, MD, and Phillip M. Mitchell, MD
- E-poster #39 **A New Skull Clamp Positioning System for Posterior Cervical Surgery: Clinical Impact on Cervical Sagittal Alignment**
Nodoka Manabe, MD, Takachika Shimizu, MD, Tetsu Tanouchi, MD, Keisuke Fueki, MD, Masatake Ino, MD, Naofumi Toda, MD, and Kanako Itoh, MD
- E-poster #40 **Effect of rhBMP-2 on Lung Cancer Spine Metastasis in Rodents**
Abhishek Kannan, BS, Kevin Sonn, MD, Sharath S. Bellary, MD, Chawon Yun, PhD, Sohaib Hashmi, MD, John T. Nelson, MD, Amruta Ashtekar, MS, Anjan Ghosh, Nicholas Shawen, BS, Michael S. Nickoli, MD, Jason H. Ghodasra, MD, MSCI, Michael Okoli, Stuart Stock, PhD, Erin L. Hsu, PhD, and Wellington K. Hsu, MD
- E-poster #41 **Contiguous Spinal Instability due to Tri-Phasic Kinematics from Underbody Blast Loading**
Narayan Yoganandan, PhD, John R. Humm, MS, Frank A. Pintar, PhD, Michael Mumert, MD, and Dennis J. Maiman, MD, PhD
- E-poster #42 **WITHDRAWN**

- E-poster #43 **Risk of Adjacent Segment Breakdown at the Cervico-Thoracic Junction: Where should We Stop?**
Brian J. Neuman, MD, Kevin R. O'Neill, MD, MS, and Alim Ramji
- E-poster #44 **Comparison of the Japanese Orthopaedic Association (JOA) Score and Modified JOA (mJOA) Score for the Assessment of Cervical Myelopathy**
So Kato, MD, Yasushi Oshima, MD, PhD, Yujiro Takeshita, MD, Kota Miyoshi, Naohiro Kawamura, MD, PhD, Kazuhiro Masuda, Junichi Kunogi, Rentaro Okazaki, MD, PhD, Seiichi Azuma, Nobuhiro Hara, and Katsushi Takeshita, MD, PhD
- E-poster #45 **Economic Considerations in the Management of Spine Fracture Patients with Ankylosing Spondylitis**
Abhishek Kannan, BS, Wellington K. Hsu, MD, Marco Mendoza, MD, Robert J. Burgmeier, BS, Jason W. Savage, MD, and Alpesh A. Patel, MD, FACS
- E-poster #46 **Comprehensive Assessment of Traumatic Atlanto-Occipital Dissociation in Survivors at a Single Institution over 15 Years**
Ahilan J. Sivaganesan, MD, Stephen K. Mendenhall, BS, Akshitkumar Mistry, Priya G. Sivasubramaniam, Matthew J. McGirt, MD, and Clinton J. Devin, MD
- E-poster #47 **Immunogenicity of Human Induced Pluripotent Stem Cells-Derived Neural Stem Cells as a Cell Source for the Treatment of Spinal Cord Injury**
Masahiro Ozaki, MD, Go Itakura, Hiroki Iwai, Jun Kohyama, Akio Iwanami, Hideyuki Okano, MD, PhD, Yoshiaki Toyama, and Masaya Nakamura, MD, PhD
- E-poster #48 **ACDF with Total En Bloc Resection of Uncinate in Foraminal Stenosis of the Cervical Spine; Comparison with Conventional ACDF**
Kyung-Soo Suk, MD, PhD, Hak-Sun Kim, MD, Seong-Hwan Moon, MD, Hwan-Mo Lee, MD, Jin-O Park, MD, Jeong Ho Seo, MD, and Jin-Soo Kim, MD
- E-poster #49 **Area Under the Curve: Analysis of Approach Related Recovery Time in 166 Operative Cervical Spondylotic Myelopathy Patients with 2 Year Follow-Up**
Vincent Challier, MD, Justin S. Smith, MD, PhD, Christopher I. Shaffrey, MD, PhD, Han Jo Kim, MD, Paul M. Arnold, MD, Shian Liu, BS, Justin K. Scheer, BS, Jens R. Chapman, MD, Themistocles S. Protopsaltis, MD, Virginie C. Lafage, PhD, Frank J. Schwab, MD, Eric M. Massicotte, MD, MSc, FRCSC, Tim Yoon, MD, PhD, Michael G. Fehlings, MD, PhD, and **Christopher P. Ames, MD**
- E-poster #50 **Effect of Preoperative Sagittal Balance on Cervical Laminoplasty Outcomes in Elderly Patients Aged ≥65 Years**
Yasushi Oshima, MD, PhD, Katsushi Takeshita, MD and Hirotaka Chikuda, MD, PhD
- E-poster #51 **Significance of Various Radiological Parameters to Predict Dysphagia and Dyspnea after Occipitocervical Fixation - Radiological Analysis**
Jae Taek Hong, MD, PhD
- E-poster #52 **Comparison of Allograft and Polyetheretherketone (PEEK) Cage in Anterior Cervical Discectomy and Fusion (ACDF)**
Edward R. G. Santos, MD, **Sharon C. Yson, MD,** and Jonathan N. Sembrano, MD
- E-poster #53 **Dose Preoperative T1 Slope affect Radiologic and Functional Outcomes following Cervical Laminoplasty?**
Jae Hwan Cho, MD, Jung-Ki Ha, Dae Geun Kim, MD, Chang Ju Hwang, Choon Sung Lee, MD, and Dong-Ho Lee, MD, PhD