

CERVICAL SPINE RESEARCH SOCIETY



FOUNDED 1973

FINAL PROGRAM



San Diego

November 16-19, 2022

President

James S. Harrop, MD, MSHQS

Scientific Program Co-Chairs

Zoher Ghogawala, MD, FACS • Brian K. Kwon, MD, PhD, FRCSC • Neill M. Wright, MD

Instructional Course Program Co-Chairs

Thomas E. Mroz, MD • Jefferson Wilson, MD, PhD, FRCSC

DOWNLOAD THE CSRS ANNUAL MEETING MOBILE APP

View the meeting schedule by session

Add sessions to your personal dashboard

Take notes for each session on your phone

Communicate with other attendees

To access the mobile app:

1. Search & download the **Eventsential** app in the Apple App Store or Google Play Store
2. Once the app is downloaded enter the event code: **JTD517C2**
3. Allow push notifications to see the latest updates
4. Complete Your Profile: Update your profile information by selecting “Edit Profile Details” or edit “Basic Details”

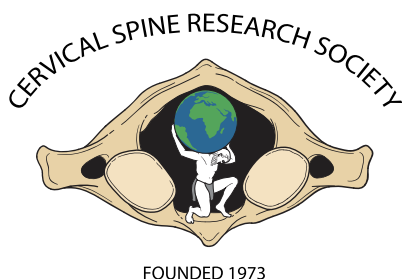


Access the meeting program on your desktop by going to
www.csr.org/meetings/am22/program




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Cervical Spine Research Society
 555 E Wells St. Suite 1100
 Milwaukee, WI 53202
 Phone: 414-918-9834
www.csrs.org
 Email: info@csrs.org

No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters or Technical Exhibits.



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Hands on breakfast and lunch workshops

Thursday, November 17, 2022

Hillcrest CD, 3rd Level,
Seaport Tower

For important product safety information,
please visit [nuvasive.com/eFU](https://www.nuvasive.com/eFU).

6:30–7:15 a.m. PT

cTDR: What are you waiting for?—Fantasy vs. Reality

Ali Mesiwala, M.D., FAANS

11:30 a.m.–12:30 p.m. PT

Approaching cervico-thoracic kyphotic deformities—anterior, posterior, and 360

Rick Sasso, M.D., Todd Albert, M.D.,
and John Shin, M.D.

[nuvasive.com/C360](https://www.nuvasive.com/C360)



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WELCOME



I am excited to welcome you to San Diego and to the 50th Anniversary Meeting of the Cervical Spine Research Society. This year's meeting marks a milestone in our society's history and I am glad that you are able to celebrate with us.

Zoher Ghogawala, Brian Kwon and Neill Wright have put together a tremendous meeting highlighting the past, present and future of scientific research in cervical spine. In addition to carefully curated symposia sessions, CSRS will feature virtual sessions from our CSRS Europe and CSRS Asia Pacific societies. These pre-conference sessions of the Annual Meeting will be a great way to connect with the global spine community!



The Henry Bohlman Presidential guest speaker this year is James R. Waters. He is an internationally-recognized security and counterterrorism expert with more than four decades of experience in municipal, domestic, and international security affairs, law enforcement, and emergency management. He will be speaking on, "Lessons in Leadership from a Law Enforcement Veteran: Bleeding Blue."

In addition to the annual meeting, the CSRS Instructional Course is celebrating its 27th year. This course has been designed by Tom Mroz and Jefferson Wilson, and will offer both live-virtual as well as a live in-person session this year. This course is being offered on-demand at no cost to anyone as we promote our societies education to all! A registration fee is only assessed if you would like to claim CME for the course.

Once, again, welcome to San Diego! I can't wait for all the 50th Annual Meeting and 27th Instructional Course has in store.

Sincerely,

James S. Harrop, MD, MSHQS
President, CSRS

CSRS 27TH INSTRUCTIONAL COURSE SCHEDULE

all times are in Pacific time zone

Monday, November 14		In-Person Location	Virtual Option
4:00pm-4:45pm	Trauma Part 1		Live Zoom webinar & On-Demand*
4:45pm-5:30pm	Tumor Part 1		Live Zoom webinar & On-Demand*
5:30pm-6:15pm	Degenerative Part 1		Live Zoom webinar & On-Demand*

Tuesday, November 15		In-Person Location	Virtual Option
4:00pm-4:45pm	Complications Part 1		Live Zoom webinar & On-Demand*
4:45pm-5:30pm	Deformity Part 1		Live Zoom webinar & On-Demand*
5:30pm-6:15pm	Infection Part 1		Live Zoom webinar & On-Demand*

Wednesday, November 16		In-Person Location	Virtual Option
3:30pm-4:00pm	Trauma Part 2	Harbor Ballroom G-I	On-Demand*
4:00pm-4:30pm	Tumor Part 2	Harbor Ballroom G-I	On-Demand*
4:30pm-5:00pm	Degenerative Part 2	Harbor Ballroom G-I	On-Demand*
5:00pm-5:15pm	Break	Harbor Foyer	
5:15pm-5:45pm	Complications Part 2	Harbor Ballroom G-I	On-Demand*
5:45pm-6:15pm	Deformity Part 2	Harbor Ballroom G-I	On-Demand*
6:15pm-6:45pm	Infection Part 2	Harbor Ballroom G-I	On-Demand*
7:00pm-8:00pm	Global Welcome Celebration	Marina Courtyard, Outside	

*On-demand content available Nov. 22, 2022-Jan. 31, 2023

50TH ANNUAL MEETING SCHEDULE

all times are in Pacific time zone

Monday, November 14		In-Person Location	Virtual Option
6:00am - 7:00am	Surgical Management for Intractable Cases of Cervical Disorder		Live Zoom Webinar & On-Demand*
7:30am - 8:30am	Different Faces of Cervical Scoliosis - Case-Based Digital Symposium		Live Zoom Webinar & On-Demand*
Wednesday, November 16		In-Person Location	Virtual Option
1:00pm-7:00pm	Registration	Harbor Foyer	
2:00pm-3:30pm	Medtronic's Young Surgeons Course: Invited Participants Only	Mission Beach AB	
7:00pm-8:00pm	Global Welcome Celebration: All Attendees	Marina Courtyard	
Thursday, November 17		In-Person Location	Virtual Option
6:00am-7:00pm	Registration	Harbor Foyer	
6:30am-7:15am	Industry Hands-on Breakfast Workshops	Third Level	
6:45am-8:45am	Breakfast	Harbor Foyer	
7:15am-7:20am	Welcome	Harbor Ballroom G-I	
7:20am-8:40am	Abstract Session 1: Trauma	Harbor Ballroom G-I	
8:00am-10:00am	Guest Breakfast and Lounge	Bankers Hill, Seaport tower	
8:40am-9:40am	Symposia 1: Trauma in the Aging Spine	Harbor Ballroom G-I	On-Demand*
9:00am-7:30pm	Exhibit Hall Open	Harbor Ballroom A-F	
9:40am-10:05am	Morning Coffee Break	Harbor Ballroom G-I	
10:05am-11:25am	Abstract Session 2: Outcomes I	Harbor Ballroom G-I	
11:30am-12:45pm	Industry Lunch Workshops	Third Level	
12:45pm-1:45pm	Abstract Session 3: Complications - Avoidance and Management	Harbor Ballroom G-I	
1:45pm-3:05pm	Symposia 2: Depression - Mental Health and Spine Surgery	Harbor Ballroom G-I	On-Demand*
3:05pm-3:25pm	Afternoon Coffee Break	Harbor Ballroom A-F	
3:25pm-4:45pm	Abstract Session 4: Diagnostics - Imaging	Harbor Ballroom G-I	
4:45pm-5:45pm	Henry H. Bohlman Presidential Guest Lecture	Harbor Ballroom G-I	
5:45pm-7:30pm	50th Annual Meeting Reception sponsored by NuVasive	Harbor Ballroom A-F	

50TH ANNUAL MEETING SCHEDULE

all times are in Pacific time zone

6:00pm-6:25pm	Debate 1: Early Myelopathy - To Operate or Not?	Harbor Ballroom A-F	
6:45pm-7:10pm	Debate 2: Arthroplasty vs. Fusion – What's Better in the Long Run?	Harbor Ballroom A-F	
Friday, November 18		In-Person Location	Virtual Option
6:30am-5:00pm	Registration	Harbor Foyer	
6:45am-8:45am	Breakfast	Harbor Foyer	
7:15am-7:20am	Welcome	Harbor Ballroom G-I	
7:20am-8:40am	Abstract Session 5: Deformity	Harbor Ballroom G-I	
8:00am-10:00am	Guest Breakfast and Lounge	Bankers Hill, Seaport tower	
8:40am-9:40am	Symposia 3: Myelopathy	Harbor Ballroom G-I	On-Demand*
9:30am-1:30pm	Exhibit Hall Open	Harbor Ballroom A-F	
9:40am-10:05am	Morning Coffee Break	Harbor Ballroom G-I	
10:05am-10:45am	Presidential Address	Harbor Ballroom G-I	
10:45am-12:15pm	Abstract Session 6: Top Abstracts	Harbor Ballroom G-I	On-Demand*
12:15pm-12:30pm	2023 Cervical Spine Meeting Previews	Harbor Ballroom G-I	
12:30-1:30pm	Members Business Meeting and Lunch	Cortez Hill ABC, Seaport Tower	
12:30-1:30pm	Lunch in exhibit hall	Harbor Ballroom A-F	
1:45pm-2:45pm	Symposia 4: Research	Harbor Ballroom G-I	On-Demand*
2:45pm-3:15pm	Awards Session	Harbor Ballroom G-I	
3:15pm-3:30pm	Afternoon Coffee Break	Harbor Foyer	
3:30pm-5:00pm	Abstract Session 7: Motion Preservation and Outcomes	Harbor Ballroom G-I	
7:00pm-10:00pm	NuVasive Industry Sponsored Dinner	Offsite	

50TH ANNUAL MEETING SCHEDULE

all times are in Pacific time zone

Saturday, November 19		In-Person Location	Virtual Option
7:00am-9:00am	Registration	Harbor Foyer	
6:30am-7:15am	New Member Breakfast	Cortez Hill ABC, Seaport Tower	
6:45am-8:45am	Breakfast	Harbor Foyer	
7:15am-7:20am	Welcome	Harbor Ballroom G-I	
7:20am-8:25am	2022 Research Grant Awards and Past Research Grant Updates	Harbor Ballroom G-I	On-Demand*
8:00am-10:00am	Guest Breakfast and Lounge	Bankers Hill, Seaport tower	
8:25am-8:35am	2023 CSRS Presidential Induction Ceremony	Harbor Ballroom G-I	
8:35am-9:35am	Symposia 5: What's on the Horizon for Cervical Spine Care?	Harbor Ballroom G-I	On-Demand*
9:35am-10:55am	Abstract Session 8: Science, Outcomes, and Effectiveness	Harbor Ballroom G-I	
10:55am-11:00am	Annual Meeting Farewell	Harbor Ballroom G-I	



CSRS
Membership

Application open
May 1-September 15, 2023
www.csrs.org/membership





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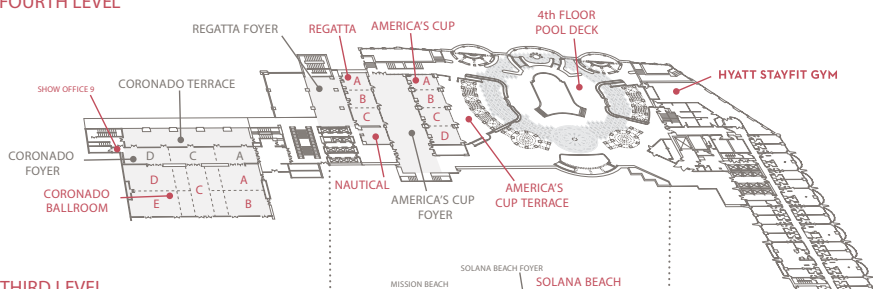
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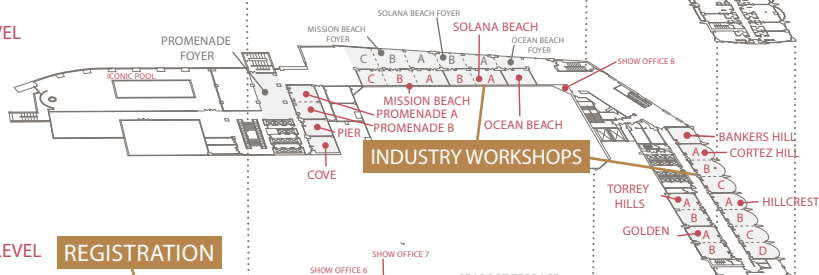


CSRS MEETING SPACE AND WIFI

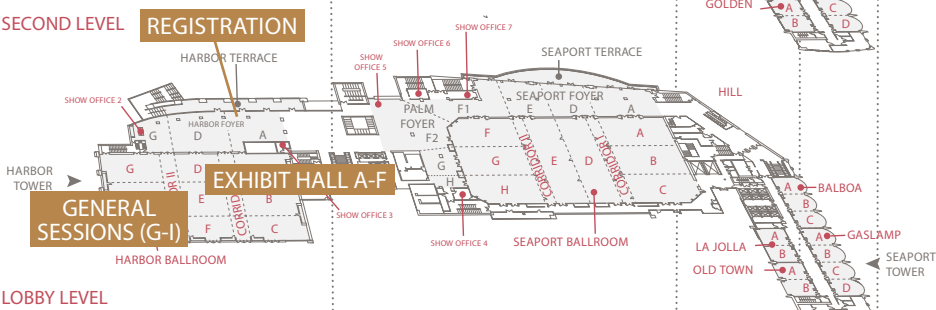
FOURTH LEVEL



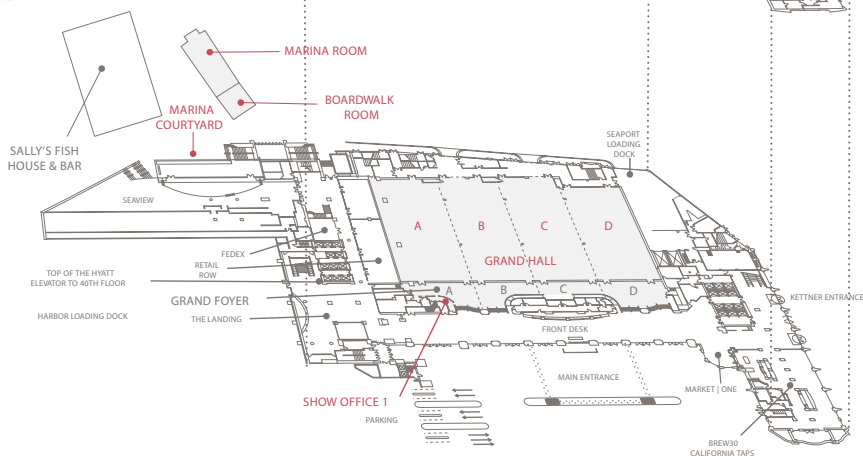
THIRD LEVEL



SECOND LEVEL



LOBBY LEVEL



WIFI

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ABOUT CSRS

Origins of the Society

The Cervical Spine Research Society is an organization of individuals interested in clinical and research problems of the cervical spine. Its purpose is the exchange and development of ideas and philosophy regarding the diagnosis and treatment of cervical spine injury and disease.

The concept of a sub-specialty group devoted to the cervical spine was first considered in 1966. As interest in this area grew, a preliminary meeting to consider the formation of such an organization was held in Las Vegas, Nevada, in February, 1973, during the annual meeting of the American Academy of Orthopaedic Surgeons.

Present at the meeting were Edward H. Simmons and Ian McNab of Toronto; Richard Rothman and Henry H. Sherk of Philadelphia; Lee H. Riley, Jr. of Baltimore; Alice L. Garrett of West Haverstraw, New York; and Bernard Jacobs and J. William Fielding of New York City.

The name "Cervical Spine Research Society" was agreed upon and annual meetings were planned. The first such meeting was held in New York City in November, 1973. Since that time, yearly meetings have taken place at various locations within the North American continent.

Since the primary purpose of the organization is to carry out research and develop and exchange information on the cervical spine, international participation has been encouraged.

To provide a wide range of interest, it was felt that the composition of the membership should reflect the varying specialties and disciplines dealing with the cervical spine; biomechanical engineering, neurology, neurosurgery, radiology, orthopaedic surgery, and others. Qualifications for membership were to include demonstration of continued interest in the cervical spine and its related structures.

The organization has developed projects and has continued to grow. Current members are encouraged to seek out individuals, with appropriate interests, for membership to ensure the Society's future.

J. William Fielding, MD



MISSION STATEMENT

The Cervical Spine Research Society is a multidisciplinary organization that provides a forum for the exchange of ideas and promotes clinical and basic science research of the cervical spine. The organization values collegial interaction and strong scientific principles.

27TH

TWENTY-SEVENTH INSTRUCTIONAL COURSE

of the



FOUNDED 1973

LIVE-VIRTUAL: NOVEMBER 14-15, 2022

IN-PERSON: NOVEMBER 16, 2022

MANCHESTER GRAND HYATT SAN DIEGO, CA

On-Demand recordings of scientific sessions available
November 22, 2022 – January 31, 2023

President James S. Harrop, MD, MSHQS

Instructional Course Program Co-Chairs Thomas E. Mroz, MD • Jefferson Wilson, MD, PhD, FRCSC

Instructional Course Sub-committee: Jesse E. Bible, MD • Maxwell Boakye, MD, FAANS • Darrel Brodke, MD • Charles H. Crawford, III, MD • Wellington Hsu, MD • Brian K. Kwon, MD, PhD, FRCSC • Sang Hun Lee, MD • Themistocles S. Protopsaltis, MD • Jason Savage, MD • Gregory D. Schroeder, MD • Michael P. Steinmetz, MD • Neill M. Wright, MD

Course Objectives

- Review appropriate anatomy of the cervical spine.
- Compare the methods for diagnosis of neck disorders.
- Evaluate operative and non-operative treatment options for cervical spine disorders.
- Recognize and respond to complications of surgical treatment.
- Exchange information on cervical spine research, diagnosis and treatment with both US and international surgeons.

Monday
11/14/2022

4:00pm - 4:45pm
Trauma Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Jesse E. Bible, MD; Maxwell Boakye, MD, FAANS

4:00pm - 4:02pm

ICL Welcome

Thomas E. Mroz, MD

4:02pm - 4:03pm

Introduction

Jesse E. Bible, MD; Maxwell Boakye, MD, FAANS

4:03pm - 4:11pm

Spinal Cord Injury: Imaging Advancements and Prognostication

Maxwell Boakye, MD, FAANS

4:11pm - 4:19pm

Spinal Cord Injury: Timing of Surgery in Central Cord Syndrome

Jefferson R. Wilson, MD, PhD

4:19pm - 4:27pm

Spinal Cord Injury: Hemodynamic Management

Brian K. Kwon, MD, PhD, FRCSC

4:27pm - 4:35pm

Positioning Techniques for Unstable Cervical Spine

Ryan Spiker, MD

4:35pm - 4:45pm

Discussion

4:45pm - 5:30pm
Tumor Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Charles H. Crawford, III, MD; Darrel S. Brodke, MD

4:45pm - 4:47pm

Introduction

Charles H. Crawford, III, MD; Darrel S. Brodke, MD

5:08pm - 5:20pm

Evaluation and Treatment of Metastatic Cervical Spine Tumors

Matthew L. Goodwin, MD, PhD

4:47pm - 4:56pm

Epidemiology of Cervical Spine Tumors: Community Practice Versus Cancer Center

Stuart H. Hershman, MD

4:56pm - 5:08pm

Evaluation and Treatment of Primary Cervical Spine Tumors

Daniel M. Sciubba, MD

5:20pm - 5:30pm

Discussion

Monday
11/14/2022

5:30pm - 6:15pm
Degenerative Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Michael Steinmetz, MD; Wellington K. Hsu, MD

5:30pm - 5:32pm

Introduction

Michael Steinmetz, MD; Wellington K. Hsu, MD

5:32pm - 5:42pm

ASD Above Prior Fusion-Treatment Options

Alan S. Hilibrand, MD

5:42pm - 5:52pm

Positioning for Posterior Surgery-Minimizing Poor Outcomes

Christopher Kepler, MD

5:52pm - 6:02pm

Cage vs. Bone-How Do I Decide in Multi-level ACDF

Brandon D. Lawrence, MD

6:02pm - 6:12pm

Why Lamioplasty is Better Than the Rest

Zoher Ghogawala, MD, FACS

6:12pm - 6:15pm

Discussion

Tuesday
11/15/2022

4:00pm - 4:45pm
Complications Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Brian K. Kwon, MD, PhD, FRCSC; Michael Steinmetz, MD

4:00pm - 4:02pm

ICL Welcome

Jefferson Wilson, MD, PhD, FRCSC

4:02pm - 4:04pm

Introduction

Brian K. Kwon, MD, PhD, FRCSC; Michael Steinmetz, MD

4:04pm - 4:12pm

Malalignment After Anterior or Posterior Cervical Fusion Surgery - Pre-operative Planning and Intra-operative Techniques for Avoiding

Michael Gerling, MD

4:12pm - 4:20pm

The C5 Nerve Root - An Update on Etiology, Management, and Avoidance

Thomas E. Mroz, MD

4:20pm - 4:28pm

Swallowing Difficulties After Anterior Cervical Surgery – Detecting, Avoiding, and Managing an Underestimated Problem

Erica F. Bisson, MD, MPH

4:28pm - 4:36pm

Non-Union in Multi-Level Anterior Cervical Fusion – Can this be Overcome with Cages and Biologics?

Steven C. Ludwig, MD

4:36pm - 4:45pm

Discussion

Tuesday
11/15/2022

4:45pm - 5:30pm
Deformity Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Jason W. Savage, MD; Sang Hun Lee, MD

4:45pm - 4:47pm

Introduction

Jason W. Savage, MD; Sang Hun Lee, MD

4:47pm - 4:54pm

Radiographic Evaluation & Classification of Cervical Deformity
Han Jo Kim, MD

4:54pm - 5:01pm

Pre-operative Planning: Treatment Algorithm and Optimization
John M. Rhee, MD

5:01pm - 5:08pm

Posterior 3 Column Osteotomy
Robert A. Hart, MD

5:08pm - 5:15pm

Anterior Osteotomy for Rigid Subaxial Cervical Deformity
Peter G. Passias, MD

5:15pm - 5:30pm

Discussion

5:30pm - 6:15pm
Infection Part 1

Live Zoom Webinar & On-Demand*

Moderator(s): Gregory Schroeder, MD; Neill M. Wright, MD

5:30pm - 5:32pm

Introduction

Gregory Schroeder, MD; Neill M. Wright, MD

5:32pm - 5:40pm

Pre-operative Prevention Strategies- Optimizing Patients to Reduce Risk of Infection
Jason W. Savage, MD

5:40pm - 5:48pm

Intra-operative Prevention Strategies
Samuel K. Cho, MD

5:48pm - 5:56pm

Surgical Treatment of Cervical Osteomyelitis- Which Type of Implants to Use and What Approaches?
Michael D. Daubs, MD

5:56pm - 6:04pm

Management of a Spontaneous Cervical Epidural Abscess
Eric Nottmeier, MD

6:04pm - 6:15pm

Discussion

Wednesday 11/16/2022		3:30pm - 4:00pm Trauma Part 2	Harbor Ballroom G-I
		Moderator(s): <i>Jesse E. Bible, MD; Maxwell Boakye, MD, FAANS</i>	
3:30pm - 3:32pm		CSRS Welcome <i>James S. Harrop, MD, MSHQS</i>	
3:32pm - 3:34pm		Introduction <i>Jesse E. Bible, MD; Maxwell Boakye, MD, FAANS</i>	
3:34pm - 3:43pm		Cervical Spine Injuries in Athletes <i>Wellington K. Hsu, MD</i>	
3:43pm - 3:47pm		Discussion	
3:47pm - 3:56pm		"Snakes in the Corner": Lessons I Learned the Hard Way in Cervical Trauma <i>Joon Y. Lee, MD</i>	
3:56pm - 4:00pm		Discussion	
		4:00pm - 4:30pm Tumor Part 2	Harbor Ballroom G-I
		Moderator(s): <i>Charles H. Crawford, III, MD; Darrel S. Brodke, MD</i>	
4:00pm - 4:02pm		Introduction <i>Charles H. Crawford, III, MD; Darrel S. Brodke, MD</i>	
4:02pm - 4:12pm		Urgent/Emergent "On-call" Evaluation of the Cervical Spine Tumor Patient <i>Ziya L. Gokaslan, MD, FAANS, FACS</i>	
4:12pm - 4:22pm		Determinants of Outcome in Cervical Spine Tumors: When to Refer <i>Jean-Paul Wolinsky, MD</i>	
4:22pm - 4:30pm		Discussion	
		4:30pm - 5:00pm Degenerative Part 2	Harbor Ballroom G-I
		Moderator(s): <i>Michael Steinmetz, MD; Wellington K. Hsu, MD</i>	
4:30pm - 4:32pm		Introduction <i>Michael Steinmetz, MD; Wellington K. Hsu, MD</i>	
4:32pm - 4:40pm		Treatment of Failed TDA <i>Joseph A. Osorio, MD, PhD</i>	
4:40pm - 4:48pm		Master Class: How Do I Decide to Stop at C7 vs. Upper Thoracic Spine? (Stop at C7) <i>Rick C. Sasso, MD</i>	
4:48pm - 4:56pm		Master Class: How Do I Decide to Stop at C7 vs. Upper Thoracic Spine? (Stop at T1/2) <i>Alpesh A. Patel, MD, MBA, FACS</i>	
4:56pm - 5:00pm		Discussion	

Wednesday 11/16/2022	5:00pm - 5:15pm Break	Harbor Foyer
	5:15pm - 5:45pm Complications Part 2	Harbor Ballroom G-I
	Moderator(s): <i>Brian K. Kwon, MD, PhD, FRCSC; Michael Steinmetz, MD</i>	
5:15pm - 5:17pm	Introduction <i>Brian K. Kwon, MD, PhD, FRCSC; Michael Steinmetz, MD</i>	
5:17pm - 5:25pm	Esophageal Injury in Anterior Cervical Surgery – Detection and Management <i>Michael Steinmetz, MD</i>	
5:25pm - 5:33pm	Peri-operative Spinal Cord Injury During the Surgical Management of Degenerative Cervical Myelopathy – What Should I Do Now? <i>Michael G. Fehlings, MD, PhD</i>	
5:33pm - 5:41pm	Vertebral Artery Injury During Anterior or Posterior Cervical Surgery – Management Techniques <i>K. Daniel Riew, MD</i>	
5:41pm - 5:45pm	Discussion	
	5:45pm - 6:15pm Deformity Part 2	Harbor Ballroom G-I
	Moderator(s): <i>Jason W. Savage, MD; Sang Hun Lee, MD</i>	
5:45pm - 5:46pm	Introduction <i>Jason W. Savage, MD; Sang Hun Lee, MD</i>	
5:46pm - 5:54pm	Upper Cervical Deformity: Surgical Technique to Correct Upper Cervical Deformity <i>Sang Hun Lee, MD</i>	
5:54pm - 6:02pm	Complication Avoidance in Cervical Deformity Surgery: Posterior Osteotomies (PCO, 3CO) <i>Christopher P. Ames, MD</i>	
6:02pm - 6:10pm	Complication Avoidance in Cervical Deformity Surgery: Anterior Approaches for Cervical Deformity <i>K. Daniel Riew, MD</i>	
6:10pm - 6:15pm	Discussion	

<i>Wednesday</i> 11/16/2022		6:15pm - 6:45pm Infection Part 2	Harbor Ballroom G-I
		Moderator(s): Gregory Schroeder, MD; Neill M. Wright, MD	
6:15pm - 6:20pm	Introduction		Gregory Schroeder, MD; Neill M. Wright, MD
6:20pm - 6:30pm	Early Surgery vs. Medical Treatment in Neurologically Intact Patient with Cervical Epidural Abscess		Jeffrey C. Wang, MD
6:30pm - 6:40pm	Early Surgery vs. Medical Treatment in Neurologically Intact Patient with Cervical Epidural Abscess		Alan S. Hilibrand, MD
6:40pm - 6:45pm	Discussion		
		7:00pm - 8:00pm Global Welcome Celebration for all Attendees	Marina Courtyard, Outside



2022 CORPORATE SUPPORTERS

The continued success and increased impact of the Cervical Spine Research Society's research and education effort is dependent upon industry support.

Diamond Level (\$100,000+)

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Bronze Level (\$15,000-\$29,999)



In-Kind Media Sponsor





CSRS EXHIBITORS


Exhibit Hall Open

Thursday, November 17 • 9:00am-7:30pm



Friday, November 18 • 9:30am-1:30pm

Company	Booth	Company Description
Additive Implants	511	Additive Implants utilizes the latest additive manufacturing techniques to develop three unique titanium cervical spacers unlike anything on the market today. The optimization of these designs can be felt during implantation and confirmed throughout the healing process. The SureMAX™ spacers offer perhaps the widest range of sizes in the industry.
 ATEC	113	ATEC is more than a medical technology company. We are an Organic Innovation Machine™ Revolutionizing the Approach to Spine Surgery. We are committed to creating clinical distinction by developing new approaches that integrate seamlessly with the Alpha InformatiX™ System to achieve the goals of spine surgery. Our ultimate vision is to be The Standard Bearer in Spine.
Biologica Technology	208	Biologica was spun out of the 3-time, Orthopedic This Week New Tech Award winner, Advanced Biologics. Our core proprietary technology is a unique process that captures and makes bioavailable the naturally occurring growth factors found in allograft. ProteiOS growth, OsseoGEN CBM and ProGraft are our current product offerings!
Centinel Spine	212	
Cerapedics	508	Cerapedics is an advanced orthobiologics company with i-FACTOR® Peptide Enhanced Bone Graft (P-15/ABM) the second FDA PMA approved bone graft on the market, its novel mechanism of action (Attract, Attach, Activate) has shown to be statistically superior to local autograft through an IDE trial on single-level ACDFs.
 DePuy Synthes <small>THE ORTHOPAEDICS COMPANY OF Johnson & Johnson</small>	109	DePuy Synthes, the Orthopaedics Company of Johnson & Johnson, provides one of the most comprehensive orthopaedics portfolios in the world that helps heal and restore movement for the millions of patients we serve.
Elevation Spine	507	Elevation Spine is a medical device company with a proprietary technology platform, Saber Technology, which is an advanced and differentiated approach to traditional fusion.
Eminent Spine, LLC	200	



CSRS EXHIBITORS

Company	Booth	Company Description
	409	Globus Medical, a leading musculoskeletal solutions company is driving significant technological advancements across a complete suite of products ranging from spinal, trauma and orthopedics therapies to robotics, navigation and imaging. Founded in 2003, Globus' single-minded focus on advancing spinal surgery has made it the fastest growing company in the history of orthopedics.
Innovasis	509	Innovasis is engaged in the research, development, manufacturing, and marketing of spinal implant devices and related products. With a strong commitment to furthering implant materials and improving outcomes, Innovasis offers a spinal product line with bioactive implants and proven instruments that address the major pathologies and focus areas of traditional spinal surgery.
Kuros Biosciences	107	We help patients live fuller, more active lives by giving surgeons the technology they need to eliminate non-unions. We achieve this with a unique surface design called NeedleGrip that's proven to unlock the untapped power of the body's immune system by growing new bone throughout the graft - for more predictable fusions.
Life Instruments	413	Life Instrument Corporation is dedicated to serving neurosurgeons and orthopedic surgeons with the highest quality surgical instruments. Handcrafted from the finest materials, our instruments provide maximum comfort and better control. Perfectly balanced for excellent feel and ease of use, Life Instruments are an extension of the surgeon's hands. We carry a large selection of disc prep instruments that include Curettes, Elevators, Rongeurs, Retractors, Osteotomes, Gouges and many more.
Medtronic	405	<p>Medtronic is a proud Diamond Partner of 50th Annual CSRS Meeting!</p> <p>Experience our full suite of cervical solutions to fit your patients needs. Visit us at booth #405</p> <p>Learn More: https://www.medtronic.com/us-en/healthcare-professionals.html </p>
Mighty Oak Medical, Inc	514	Mighty Oak, the leader in patient-specific solutions for screw placement, introduces the FIREFLY Cervical Navigation Guide platform. It features a concierge presurgical plan, patient-specific navigation guides, a 3D printed anatomically accurate bone model, and depth-controlled drill – designed around safety, accuracy, ease of use, and improved surgical outcomes for the patient. FIREFLY's cervical platform, designed for the placement of pedicle screws in the posterior cervical spine, is a recipient of the 2022 Spine Technology Award.
MiRus	504	

CSRS EXHIBITORS

Company	Booth	Company Description
NanoHive Medical	506	NanoHive Medical is the pioneer in 3D printed spinal interbody fusion implants. The Hive™ portfolio of interbody fusion devices provide ideal biomechanical elastic modulus properties, clear and precise diagnostic imaging capability, osteoblast cell attraction and integration – all features that lead to strong fusion constructs and efficacious clinical experiences.
 NUVASIVE	105, 204	NuVasive is a world leader in minimally invasive, procedurally integrated spine solutions. From complex spinal deformity to degenerative spinal conditions, NuVasive is transforming spine surgery with innovative technologies designed to deliver reproducible and clinically proven surgical outcomes.
 ORTHOFIX	512	Orthofix Medical Inc. is a global medical device company with a spine and orthopedics focus. Orthofix's spine and orthopedics products are distributed in more than 60 countries via the Company's sales representatives and distributors. For more information, please visit www.Orthofix.com
Providence Medical Technology	505	Our purpose is to improve clinical outcomes for high-risk patients and prevent surgical failures of the cervical spine.
SeaSpine	501, 503	SeaSpine® is a global medical technology company focused on the design, development and commercialization of surgical solutions for the treatment of patients suffering from spinal disorders. SeaSpine has a comprehensive portfolio of orthobiologics, spinal implants, and surgical navigation system solutions. Please visit www.seaspine.com for more information.
SensiBand	407	Sensiband Metal Allergy Test for Implants. The Sensiband Tests for sensitivities to Ni, Co, Cr, Cu, Al, Mo, Ti BEFORE Implantation. Find Out First. Protect your Patients and your Practice with SENSIBAND. In the presence of a Systemic Allergy, the Sensiband will cause a Contact Dermatitis Reaction in 5 to 7 Days.
Spartan Medical	214	
Spinal Elements	415	Spinal Elements is a leading designer, developer and manufacturer of surgical solutions for spinal disorders. Spinal Elements' mission is to improve the lives of those who rely on our technology by being a trusted provider of innovation, quality, service, and value to those delivering care to spine surgery patients.

CSRS EXHIBITORS

Company	Booth	Company Description
 stryker	206	Stryker is one of the world's leading medical technology companies and, together with its customers, is driven to make healthcare better. The company offers innovative products and services in Medical and Surgical, Neurotechnology, Orthopaedics and Spine that help improve patient and healthcare outcomes. Alongside its customers around the world, Stryker impacts more than 100 million patients annually. More information is available at www.stryker.com .
Sure Retractors	216	Sure radiolucent retractors are surgery ready, sterile packed, easy to use, single-use retractors that allow you to maximize surgical volume. Each retractor (Cervical & Lumbar) and all the blades come in 1 sterile packed box. With Sure Retractors, you can maximize your operational and logistical efficiency, which can help you plan more cases with certainty.
Surgalign	100	Surgalign is a global medical technology company investing to develop and harness the incredible possibilities of digital health to redefine the very idea of "personalized medicine." Dedicated to advancing care and elevating patient outcomes, the company also offers health providers a broad portfolio of spinal hardware devices and orthobiologic materials.
Tobra Medical	417	Autograft Collection Franchise- Tobra Bone Basket and Specimen Basket
 ZimVie	104	ZimVie Spine is dedicated to restoring daily life for patients through comprehensive spinal solutions with a focus on education, training, and clinical support for surgeons. Along with cervical disc replacement, vertebral body tethering, comprehensive spinal fixation, and fusion implants, ZimVie Spine offers minimally invasive procedural solutions and a complete suite of biologic solutions.
4 Web Medical	516	4WEB Medical is an orthopedic implant company focused on developing innovative implants with an Advanced Structural Design that utilizes its proprietary Truss Implant Technology™. This technology leverages a mechanobiological mechanism inherent to its truss design that may stimulate an osteogenic response to facilitate fusion.

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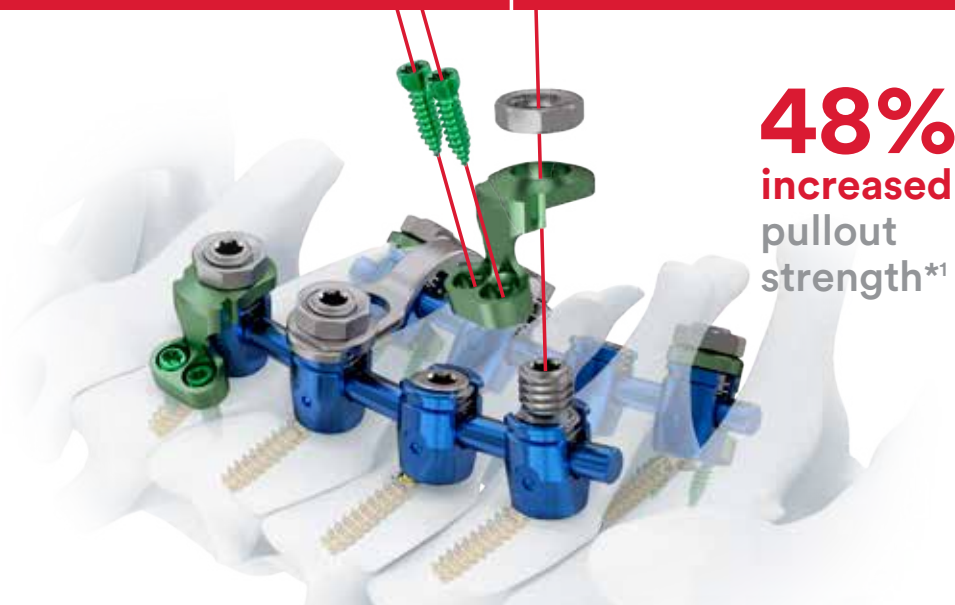


www.linkedin.com/company/spinal-news-international/



SYMPHONY™ OCT SYSTEM

MULTIPOINT SECURE™



48%
increased
pullout
strength*1

*Lateral Mass with MULTIPOINT SECURE™ 2 Screw Fixation as compared to a SYMPHONY Lateral Mass Screw alone

Please refer to the instructions for use for a complete list of indications, contraindications, warnings and precautions.

The SYMPHONY™ OCT System is contraindicated for osteoporosis and relatively contraindicated for osteopenia.

1 DePuy Synthes Spine Cataloging Symphony Evidence Generation Project. 11-19-2020. ADAPTIV 103584004

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THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

50TH

FIFTIETH ANNUAL MEETING

of the



FOUNDED 1973

NOVEMBER 16-19, 2022

MANCHESTER GRAND HYATT SAN DIEGO, CA

On-Demand recordings of scientific sessions available
November 22, 2022 – January 31, 2023

President James S. Harrop, MD, MSHQS

Scientific Program Co-Chairs: Zoher Ghogawala, MD, FACS • Brian K. Kwon, MD, PhD, FRCSC • Neill M. Wright, MD

Abstract Review Committee: Alexander C. Ching, MD • Samuel K. Cho, MD • Matthew W. Colman, MD • Srikanth N. Divi, MD • Julio C. Furlan, MD, LLB, MBA, MSc, PhD • Ben J. Garrido, MD • Regis W. Haid, MD, FAANS • Stuart H. Hershman, MD • John K. Houten, MD, FAANS • Alexander P. Hughes, MD • Craig A. Kuhns, MD • Philip K. Louie, MD • Sergio A. Mendoza-Lattes, MD • Justin W. Miller, MD • Don K. Moore, MD • Praveen V. Mummaneni, MD • Ahmad Nassr, MD • Venu M. Nemani, MD, PHD • Daniel K. Park, MD • Jeffrey A. Rihn, MD • Carlo Santaguida, MD, FRCSC • Jason W. Savage, MD • Arjun S. Sebastian, MD, MSc • Jonathan N. Sembrano, MD • Brian W. Su, MD • Christopher D. Witiw, MD, MS • Barrett I. Woods, MD • Elizabeth M. Yu, MD

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.

No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters, Industry Workshops, or Technical Exhibits.

50TH ANNUAL MEETING PRE-CONFERENCE SESSIONS

all times are in Pacific time zone

Monday
11/14/2022**6:00am - 7:00am**
Surgical Management for Intractable
Cases of Cervical DisorderLive Zoom
Webinar &
On-Demand***CSRS Asia Pacific President: Hisanori Mihara, MD, PhD***Moderator(s): Hisanori Mihara, MD*

6:00am - 6:01am

CSRS Welcome*James S. Harrop, MD, MSHQS*

6:01am - 6:06am

Introduction*Hisanori Mihara, MD*

6:06am - 6:14am

Infectious Diseases in Cervical Spine*Shanmuganathan Rajasekaran, MD*

6:14am - 6:16am

Discussion: Infectious Diseases in Cervical Spine

6:16am - 6:24am

Severe Deformity*Kyung-Soo Suk, MD, PhD*

6:24am - 6:26am

Discussion: Severe Deformity

6:26am - 6:34am

Hyperkinetic Cervical Spine (Athetoid CP)*Hisanori Mihara, MD*

6:34am - 6:36am

Discussion: Hyperkinetic Cervical Spine (Athetoid CP)

6:36am - 6:44am

Drop Head Syndrome*Ken Ki. Ishii, MD, PhD*

6:44am - 6:46am

Discussion: Drop Head Syndrome

6:46am - 6:54am

Tumors including of metastasis at Cervical Spine*Feng Wei, MD*

6:54am - 6:56am

Discussion: Tumors including of metastasis at Cervical Spine

50TH ANNUAL MEETING PRE-CONFERENCE SESSIONS

all times are in Pacific time zone

Monday
11/14/2022

7:30am - 8:30am Different Faces of Cervical Scoliosis - Case-Based Digital Symposium

Live Zoom
Webinar &
On-Demand*



CSRS Europe President: Heiko Koller, MD

Moderator(s): Heiko Koller, MD

7:30am - 7:32 am

CSRS Welcome

James S. Harrop, MD, MSHQS

7:32 am - 7:37 am

Introduction

Heiko Koller, MD

7:37am - 7:44am

Case Presentation I

Heiko Koller, MD

7:44am - 7:47am

Discussion I

7:47am - 7:54am

Case Presentation II

Themistocles S. Protopsaltis, MD

7:54am - 7:57am

Discussion II

7:57am - 8:04am

Case Presentation III

K. Daniel Riew, MD

8:04am - 8:07am

Discussion III

8:07am - 8:14am

Case Presentation IV

Yong Qui, MD

8:14am - 8:17am

Discussion IV

Medtronic

Engineering the extraordinary

Cervical Ecosystem

Experience our full suite of solutions
to fit your patients needs



Infinity™ OCT System and UNiD™ Rods

Partnering with you to bring your surgical plan to life
with patient-specific rods for the cervical spine.



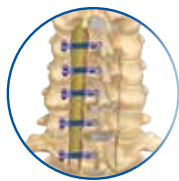
Endoskeleton TC™ Interbody Fusion Implants

The design incorporates “windows” through the implant to permit visualization of the graft material and over time formation of new bone.



Endoskeleton TCS™ Interbody Fusion Device

The implant system includes integrated fixation screws for stabilizing the implant when placed in the interbody space and a large hollow region in the center to house bone graft material.



Centerpiece™ 2.0 Plate Fixation System

The system incorporates a variety of pre-cut, precontoured plate designs and offers a complete and versatile solution for laminoplasty procedures.

Clearance of devices named and shown applies to planning, enabling, and providing immobilization and stabilization of spinal segments in fusion and non-fusion procedures for various acute and chronic instabilities of the craniocervical junction, the cervical spine (C1 to C7), and the thoracic spine from T1-T3 and where bony voids or gaps of the skeletal system exist.

Visit us at booth #405 or visit [medtronic.com/infinity](https://www.medtronic.com/infinity) to learn more.

Wednesday
11/16/2022

1:00pm - 7:00pm
Registration Opens

Harbor Foyer

1:00pm - 7:00pm
Speaker Resource Room Open

Show Office 2

2:00pm - 3:30pm
Medtronic's Young Surgeons
Course for invited participants

Mission Beach AB

Incorporating Cervical Disc Replacement into Your Practice as a Young Surgeon

Lee Tan, MD; Daniel Cho, MD

CSRS Annual Meeting Scholarship Recipients

Sponsored, in part, by Medtronic

CSRS is collaborating again with Medtronic to fully fund ten qualified individuals with travel, hotel and complimentary meeting registrations.

Congratulations to our top scholarship recipients, sponsored, in part, by Medtronic.

John Burke, MD, PhD • Anirudh Gowd, MD • Anna Lebouille-Veldman, BSc • Harry Lightsey, MD • Mohamed Macki, MD, MPH • Dustin Massel, MD • Akash Shah, MD • Peter Swiatek, MD • Grace Xiong, MD

CSRS will also help to fund additional qualified individuals with hotel and/or complimentary meeting registration fees.

CSRS Scholarship Recipients

Abduljabbar Alhammoud, MD, MSc • Bejan Alvandi, MD • Ahmed Maamoun Ashour, MD, PhD • Tej Azad MD, MS • Stephen Barchick, MD • Landon Bulloch, MD • Magalie Cadieux, MD, MMSc, FRCSC • Lee-Onn Chieng, MD • Timothy Chryssikos, MD, PhD • John Clohisy, MD • Zachary Crawford, MD, PharmD • Diana Douleh, MD • Mark Feger, MD, PhD • Miles Fisher, MD • Erik Gerlach, MD • Lauren Hachem, MD • Varan Haghshenas, MD • Taylor Jackson, MD • Ghanshyam Kakadiya, M.S Ortho, DNB Ortho, MNAMS, FISS • Nora Kim, MD • Andrew Meyers, DO • Ali Moghaddamjou, MD • John Ngo, DO • Scott Nimmons, MD • Matthew Philippi, MD • Vishwajeet Singh, MD • Quante Singleton, MD • Michael Spitnale, MD • Alan Stein, MD • Evan Trapana, MD • Stephen Wanner, DO • Joseph Weiner, MD • Joseph Wick, MD • Ivan Zapolsky MD, MS • Emily Zielinski, MD

Medtronic will host all accepted scholarship recipients in San Diego with a special young surgeon's course and dinner. Last year CSRS and Medtronic together funded 40 individuals with some type of meeting assistance.



2021 Annual Meeting Scholarship Recipients

Wednesday
11/16/2022

7:00pm - 8:00pm
Global Welcome Celebration
for all Attendees

Marina Courtyard



GLOBAL WELCOME CELEBRATION

WEDNESDAY, NOVEMBER 16, 2022

7:00PM - 8:00PM

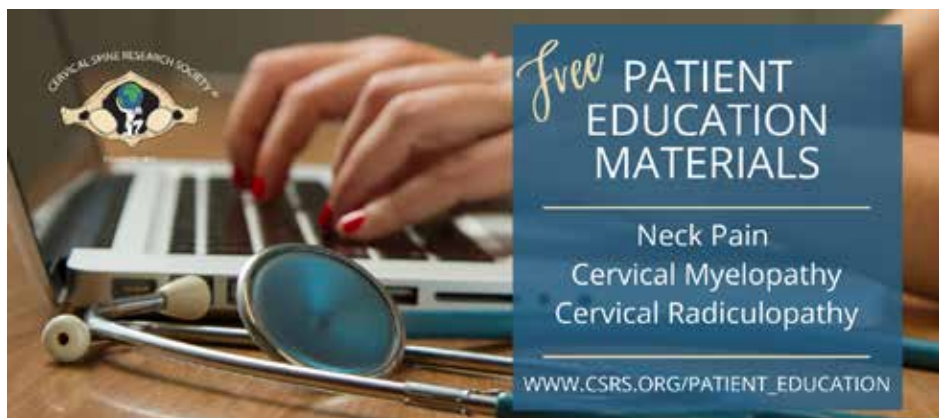
MARINA COURTYARD



Free **PATIENT
EDUCATION
MATERIALS**

Neck Pain
Cervical Myelopathy
Cervical Radiculopathy

WWW.CSRS.ORG/PATIENT_EDUCATION



Thursday
11/17/2022

6:00am - 7:00pm
Registration Open

Harbor Foyer

1:00pm - 7:00pm
Speaker Resource Room Open

Show Office 2

6:30am - 7:15am
Industry Breakfast Workshops

ATEC Spine	Cervical Decision Making: Anterior, Posterior, or 360° <i>Keith Michael, MD; Daniel Cavanaugh, MD</i>	Torrey Hills AB
Medtronic	What is new in Laminoplasty <i>John Heller, MD</i>	Hillcrest AB
NuVasive	cTDR: What are you waiting for? – Fantasy vs. Reality <i>Ali Mesiwala, MD</i>	Hillcrest CD



6:45am - 8:45am
Breakfast

Harbor Foyer



7:15am - 7:20am
Annual Meeting Welcome

Harbor Ballroom G-I

7:15am - 7:20am	<i>Neill M. Wright, MD; Brian K. Kwon, MD, PhD, FRCSC; Zoher Ghogawala, MD, FACS</i>
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7:20am - 8:40am
Abstract Session 1: Trauma

Harbor Ballroom G-I

	<i>Moderator(s): Gregory Schroeder, MD; Jefferson R. Wilson, MD, PhD</i>
7:20am - 7:25am	Introduction <i>Gregory Schroeder, MD; Jefferson R. Wilson, MD, PhD</i>
7:25am - 7:30am	PAPER #1 The Impact of Frailty on Patient Reported Outcomes After Cervical Spine Surgery <i>Saad Javeed, MD</i>
7:30am - 7:35am	PAPER #2 Surgeon Experience and Subspecialty Do Not Affect the Reliability of the AO Spine Upper Cervical Injury Classification <i>Mark J. Lambrechts, MD</i>
7:35am - 7:40am	PAPER #3 Prognostic Factors for Cervical Spinal Cord Injury Without Major Bone Injury in Patients Aged 65 years or Older: Japan Association of Spine Surgeons with Ambition (JASA) Multicenter Study <i>Hideaki Nakajima, MD</i>

Thursday
11/17/2022

Continued
Abstract Session 1: Trauma

7:40am - 7:45am	PAPER #4 Unilateral Cervical Spine Facet Fractures: Radiographic Predictors of Instability <i>Erisha K. Tashakori, MD</i>
7:45am - 7:50am	PAPER #5 A Machine Learning Model Predicting Ambulation in Patients With Spinal Cord Injury Based on Data From 3196 Cases <i>Satoshi Maki, MD, PhD</i>
7:50am - 8:02am	Discussion
8:02am - 8:07am	PAPER #6 Association Between Geriatric Odontoid Fractures and In-Hospital Outcomes: Analysis From the American College of Surgeons Trauma Quality Improvement Program <i>Zamir Merali, MD, MSc</i>
8:07am - 8:12am	PAPER #7 Intraoperative Sensory Signals Predict Prognosis for Patients with Traumatic Cervical Spinal Cord Injury <i>John R. Renshan, MD</i>
8:12am - 8:17am	PAPER #8 To Operate or Not to Operate? Mortality in Unstable Cervical Spine Fractures in the Elderly Population <i>Karen Malacon, BS</i>
8:17am - 8:22am	PAPER #9 Utility of Novel Acute Spinal Cord MRI Protocol at Level-1 Trauma Center <i>Sohaib Hashmi, MD</i>
8:22am - 8:27am	PAPER #10 Anticoagulation Therapy in Cervical Spine Fractures: Insights From a Large Healthcare Database Analysis <i>Neil Patel, BS</i>
8:27am - 8:40am	Discussion

8:40am - 9:40am

Harbor Ballroom G-I

Symposia 1: Trauma in the Aging Spine

Moderator(s): Michael Steinmetz, MD; Erica F. Bisson, MD, MPH

8:40am - 8:41am	Introduction <i>Michael Steinmetz, MD; Erica F. Bisson, MD, MPH</i>
8:41am - 8:51am	Frailty and Impact on Timing and Overall Treatment of Elderly Cervical Fractures <i>Corinna Zygorakis, MD</i>
8:51am - 9:01am	Optimal Treatment of Central Cord Syndrome in the Elderly <i>Alpesh A. Patel, MD, MBA, FACS</i>

Thursday
11/17/2022

**Continued
Symposia 1: Trauma in the Aging Spine**

9:01am - 9:11am	Treatment of Osteoporosis in the Elderly Trauma Patient <i>Wellington K. Hsu, MD</i>
9:11am - 9:21am	Impact of Transfer to a Tertiary Care Center <i>Tim Moore, MD</i>
9:21am - 9:31am	Shifting Paradigm: Treatment of Elderly Odontoid Fractures <i>Erica F. Bisson, MD, MPH</i>
9:31am - 9:40am	Discussion

**9:00am - 7:30pm
Exhibit Hall Open**

Harbor Ballroom A-F



**9:40am - 10:05am
Coffee Break**

Harbor Ballroom A-F

**10:05am - 11:25am
Abstract Session 2: Outcomes I**

Harbor Ballroom G-I

Moderator(s): John G. Heller, MD; Elizabeth M. Yu, MD

10:05am - 10:10am	Introduction <i>John G. Heller, MD; Elizabeth M. Yu, MD</i>
10:10am - 10:15am	PAPER #11 Which Radiographic Parameter Can Aid in Deciding Optimal Allograft Height Used for Anterior Cervical Discectomy and Fusion? <i>Sehan Park, MD</i>
10:15am - 10:20am	PAPER #12 Nerve Transfers in Spinal Cord Injury: Analysis of Factors Influencing Motor Recovery <i>Saad Javeed, MD</i>
10:20am - 10:25am	PAPER #13 Expectations of Clinical Improvement Following Corrective Surgery for Adult Cervical Deformity Based on Functional Disability at Presentation <i>Peter G. Passias, MD</i>
10:25am - 10:30am	PAPER #14 Sleep Impairment in CSM: Prevalence and Postoperative Outcomes – An Analysis from the QOD <i>Praveen V. Mummaneni, MD</i>
10:30am - 10:39am	Discussion

Thursday
11/17/2022

Continued
Abstract Session 2: Outcomes I

10:39am - 10:44am	PAPER #15 Metabolic Bone Disorders are Predictors for Two-Year Adverse Outcomes in Patients Undergoing 2-3-Level Anterior Cervical Discectomy and Fusion for Cervical Radiculopathy or Myelopathy <i>Niel V. Shah, MD</i>
10:44am - 10:49am	PAPER #16 Unemployment and Education Level Are Important Drivers of 90-day Readmission Rates after PCDF. <i>Samuel Reyes, BS</i>
10:49am - 10:54am	PAPER #17 Identifying Clinical Predictors of Increased Postoperative Health Utilization After ACDF Using a Machine Learning Approach <i>Rushmin Khazanchi, BA</i>
10:54am - 10:59am	PAPER #18 Does Posterior Longitudinal Ligament Resection During Cervical Artificial Disc Replacement Affect Clinical or Radiographic Outcome? <i>Hyun Wook Gwak, MD</i>
10:59am - 11:04am	PAPER #19 Two-Level Anterior Cervical Discectomy and Fusion Versus Anterior Cervical Corpectomy: Does One Treatment Strategy Demonstrate Superiority? <i>Stephen R. Barchick, MD</i>
11:04am - 11:09am	PAPER #20 Clinical Significance of C2 Slope After Multilevel Cervical Spine Fusion Surgery <i>Namhoo Kim, MD</i>
11:09am - 11:14am	PAPER #84 Long-Term Survivorship of Cervical Spine Procedures; a Survivorship Meta-Analysis and Meta-Regression <i>Markian Pahuta, MD</i>
11:14am - 11:25am	Discussion

Thursday
11/17/2022

11:30am - 12:30pm
Industry Lunch Workshops

ATEC Spine	Addressing Complex Cervical Pathologies <i>S. Tim Yoon, MD, PhD; John Rhee, MD; Alpesh Patel, MD, MBA, FACS</i>	Torrey Hills AB
DePuy Synthes	Complex Cervical: Case Discussion & Complication Avoidance <i>Christopher Ames, MD; Joseph Osorio, MD, PhD</i>	Golden Hill AB
Medtronic	Leveraging Data and AI in the Cervical Spine <i>Lee Tan, MD; Venu Nemani, MD, PhD</i>	Hillcrest AB
NuVasive	Approaching cervico-thoracic kyphotic deformities – anterior, posterior, and 360 <i>John Shin, MD; Rick Sasso, MD; Todd Albert, MD</i>	Hillcrest CD
Orthofix	Total Solutions for Cervical Spine	Solana Beach AB

12:45pm - 1:45pm
Abstract Session 3: Complications - Avoidance and Management

Harbor Ballroom G-I

Moderator(s): Barrett I. Woods, MD; James S. Harrop, MD, MSHQS

12:45pm - 12:46pm	Introduction <i>Barrett I. Woods, MD; James S. Harrop, MD, MSHQS</i>
12:46pm - 12:51pm	PAPER #21 Accuracy of Cervical Pedicle Screw Insertion Using the Freehand Technique: The Deviation Rate for C7 is Unexpectedly High <i>Masataka M. Miura, MD</i>
12:51pm - 12:56pm	PAPER #22 Are All Cervical Cages Created Equal? A Comprehensive Analysis of a Decade of Adverse Event Reports in the US <i>Victor Ungurean, Jr., HSDG</i>
12:56pm - 1:01pm	PAPER #23 Spinal Cord Shift May Not Be a Cause of C5 Palsy After Cervical Laminoplasty: Protective Effect of Medial Gutter <i>Woon Tak Yuh, MD</i>
1:01pm - 1:06pm	PAPER #24 Epidural Steroid Injection and Infection Risk Following Posterior Cervical Surgery <i>Tara Shelby, BS</i>
1:06pm - 1:11pm	PAPER #25 Optimal Timing of Referral for Nerve Transfer Surgery for Postoperative C5 Palsy <i>Yamaan S. Saadeh, MD</i>
1:11pm - 1:15pm	Discussion

Thursday
11/17/2022

Continued
**Abstract Session 3: Complications -
Avoidance and Management**

1:15pm - 1:20pm	PAPER #26 Risk Factors, Incidence and Mortality of Patients of Vertebral Artery Injury in Patients Undergoing Anterior Cervical Corpectomy: A Retrospective Large National Data Base Study <i>Jamila Godil, BS</i>
1:20pm - 1:25pm	PAPER #27 Surgical Complications and Insufficient Canal Widening of the Vertebral Body Sliding Osteotomy for the Treatment of Cervical Myelopathy <i>Sung Tan Cho, MD</i>
1:25pm - 1:30pm	PAPER #28 Low Preoperative Serum Calcium Levels Predict Perioperative Medical Complications and Healthcare Utilization in Patients Undergoing ACDF <i>Anitesh Bajaj, BS</i>
1:30pm - 1:35pm	PAPER #29 Is Complete Correction of Cervical Sagittal Malalignment Necessary During 4-Level Anterior Cervical Discectomy and Fusion Surgery in Patients With Kyphosis? <i>Qingxin Song, MD</i>
1:35pm - 1:40pm	PAPER #30 Identifying the Impact of Body Mass Index on Surgical and Patient Outcomes for Cervical Spine Surgery <i>Anant Naik, BS</i>
1:40pm - 1:45pm	Discussion

1:45pm - 3:05pm
**Symposia 2: Depression -
Mental Health and Spine Surgery**

Harbor Ballroom G-I

Moderator(s): Steven R. Garfin, MD; Addisu Mesfin, MD

1:45pm - 1:50pm	Introduction <i>Steven R. Garfin, MD; Addisu Mesfin, MD</i>
1:50pm - 2:05pm	Pre- and Post-op Behavioral Health Considerations: A Psychiatrist's Perspective <i>Jeff Daskalakis, MD, PhD, FRCP</i>
2:05pm - 2:12pm	Pre-operative Management of Anxiety and Depression in Cervical Spine Patients <i>Lee Riley, MD</i>
2:12pm - 2:19pm	Post-operative Management of Anxiety and Depression in Cervical Spine Patients <i>Anna MacDowall, MD, PhD</i>

Thursday
11/17/2022

**Continued
Symposia 2: Depression -
Mental Health and Spine Surgery**

2:19pm - 2:44pm



What Spine Pain Can Do to Your Life: A Perspective From a Very Tough Person

Bill Walton, American television sportscaster and former professional basketball player

In February 2008, after climbing to the top of every mountain he ever tried, Bill Walton suffered a catastrophic spinal collapse – the culmination of a lifetime of injuries – that left him in excruciating, debilitating, and unrelenting pain. Unable to walk, he underwent pioneering surgery and slowly recovered. The ordeal tested Walton to the fullest, but with extraordinary patience, fortitude, determination, and sacrifice, he recovered.

Bill Walton, *Back from the Dead*, 2018, Simon and Schuster Paperbacks, Back Cover

2:44pm - 3:05pm

Discussion



**3:05pm - 3:25pm
Coffee Break**

Harbor Ballroom A-F

**3:25pm - 4:45pm
Abstract Session 4: Diagnostics - Imaging**

Harbor Ballroom G-I

Moderator(s): Sanford E. Emery, MD, MBA

3:25pm - 3:30pm

Introduction

Sanford E. Emery, MD, MBA

3:30pm - 3:35pm

PAPER #31

Adverse Clinical Outcomes After Anterior Cervical Discectomy and Fusion Correlate Better with Degree of Facet Distraction Measured Using Computed Tomography Than Using Radiography

JooYoung Lee, MD

3:35pm - 3:40pm

PAPER #32

Analysis of the Implications of Cervical Spine Alignment on Lumbopelvic Alignment

Taryn Ludwig, MD, PhD

3:40pm - 3:45pm

PAPER #33

Surgical Threshold Measurements for Cervical Spinal Stenosis: Post-Myelogram Computed Tomography Versus Magnetic Resonance Imaging

Charles H. Crawford, III, MD

3:45pm - 3:50pm

PAPER #34

Evaluation of Axonal Injury With Filtered Diffusion Weighted Magnetic Resonance Imaging in Cervical Spondylotic Myelopathy

Saman Shabani, MD

Thursday
11/17/2022

Continued

Abstract Session 4: Diagnostics - Imaging

3:50pm - 3:55pm	PAPER #35 Hounsfield Unit Measurement Method and Related Factors That Most Appropriately Reflect Bone Mineral Density on Cervical Spine Computed Tomography <i>Ho Jin Lee, MD, PhD</i>
4:00pm - 4:07pm	Discussion
4:07pm - 4:12pm	PAPER #36 Analysis of Parameters That Can Predict the Cervical Sagittal Vertical Axis in Cervical Fusion Surgery <i>Ho Jin Lee, MD, PhD</i>
4:12pm - 4:17pm	PAPER #37 Real-Time Operative Radiation Exposure Levels of Spine Surgeons <i>Hasan Ahmad, BS</i>
4:17pm - 4:22pm	PAPER #38 Linking Patterns of Intraoperative Neuromonitoring (IONM) Alerts to the Odds of a New Postoperative Neurological Deficit: Analysis of 27,808 Cervical Spine Procedures From a National Multi-institutional Database <i>William B. Wilent, PhD</i>
4:22pm - 4:27pm	PAPER #39 Diffusion Basis Spectrum Imaging Predicts Comprehensive Clinical Outcomes Following Surgery For Cervical Spondylotic Myelopathy <i>Justin K. Zhang, BS</i>
4:27pm - 4:32pm	PAPER #40 Diffusion Basis Spectrum Imaging Correlates with Baseline Severity and Long-Term Clinical Outcomes in Cervical Spondylotic Myelopathy <i>Justin K. Zhang, BS</i>
4:42pm - 4:45pm	Discussion

Thursday
11/17/2022

4:45pm - 5:45pm

Harbor Ballroom G-I

Henry H. Bohlman Presidential Guest Lecture

4:45pm - 4:50pm

Introduction

James S. Harrop, MD, MSHQS

4:50pm - 5:25pm

Lessons in Leadership from a Law Enforcement Veteran: Bleeding Blue

James Waters



With nearly forty years in law enforcement, Waters saw just about everything. What really sticks with him are the days in between: when ordinary people stepped up to perform in extraordinary ways. From walking the midnight patrol, to meeting Presidents and Popes as a senior law enforcement executive of the largest police department in the country. From learning to swim in his brother's backyard to competing in Ironman triathlons. From working the McDonald's grill to leading complex organizations amidst our nation's most challenging times - and inspiring others to do the same.

In *Bleeding Blue*, Waters will regale the audience with behind-the-badge insights into protecting the largest city in America. Through the eyes of a seasoned law enforcement officer-turned-endurance athlete, Waters will break down that it means to be an integrity-minded leader of people, organizations, and most importantly, yourself.

Bleeding Blue explores the not-so-secret recipe for success in some of the most dangerous places: on the beat, at the starting line, in the operating room, and in your own head.

5:25pm - 5:45pm

Discussion

Henry H. Bohlman, MD



Henry H. Bohlman, MD was a pioneer of modern cervical spine surgery and a founding member of CSRS. He served as President in 1989.

In addition to being a leader, he was a teacher and a mentor to more than 120 Fellows and Residents, many of whom have established their own Fellowships as well as significant academic careers. He trained more CSRS Presidents than anyone in the history of the Society.

Given his influence on our organization, CSRS leadership established a guest lectureship in his name in 2010.

Thursday
11/17/2022

5:45pm - 7:30pm
50th Annual Meeting Reception
sponsored, in part, by NuVasive

Harbor Ballroom A-F



6:00pm - 6:25pm

Harbor Ballroom A-F

Debate 1: Early Myelopathy - To Operate or Not?

Moderator(s): Todd J. Albert, MD

6:00pm - 6:02pm

Introduction

Todd J. Albert, MD

6:02pm - 6:07pm

Surgical Treatment for Early Myelopathy is Best

John M. Rhee, MD

6:07pm - 6:12pm

Non-op Treatment for Early Myelopathy is Best

Darrel S. Brodke, MD

6:45pm - 7:10pm

Harbor Ballroom A-F

**Debate 2: Arthroplasty vs. Fusion -
What's Better in the Long Run?**

Moderator(s): Todd J. Albert, MD

6:45pm - 6:47pm

Introduction

Todd J. Albert, MD

6:47pm - 6:52pm

Arthroplasty vs. Fusion – What's Better in the Long Run (Total Disk Replacement)

Pierce D. Nunley, MD

6:52pm - 6:57pm

Arthroplasty vs. Fusion – What's Better in the Long Run (ACDF)

K. Daniel Riew, MD

Friday
11/18/2022

6:30am - 5:00pm
Registration Open

Harbor Foyer

6:30am - 7:00pm
Speaker Resource Room

Show Office 2



6:45am - 8:45am
Breakfast

Harbor Foyer



7:15am - 7:20am
Morning Welcome

Harbor Ballroom G-I

Neill M. Wright, MD; Brian K. Kwon, MD, PhD, FRCSC; Zoher Ghogawala, MD, FACS

7:20am - 8:40am
Abstract Session 5: Deformity

Harbor Ballroom G-I

Moderator(s): Christopher P. Ames, MD; Han Jo Kim, MD

7:20am - 7:25am

Introduction

Christopher P. Ames, MD; Han Jo Kim, MD

7:25am - 7:30am

PAPER #41

Which Patients Benefit From a Combined Anterior-Posterior Approach in Cervical Deformity Surgery?

Shaleen Vira, MD

7:30am - 7:35am

PAPER #42

Comparative Analysis of the Occurrence and Clinical Impact of Dramatic Global Kyphosis in the Unfused Thoracic Spine Relative to Distal Junctional Failure Following Adult Cervical Deformity Surgery

Virginie Lafage, PhD

7:35am - 7:40am

PAPER #43

Best Realignment Strategies in the Radiographic Parameter Toolbox: Hierarchical Approach to Surgical Planning in Adult Cervical Deformity Surgery

Virginie Lafage, PhD

7:40am - 7:45am

PAPER #44

Predictive Survival Analysis of Adult Cervical Deformity Patients with Ten-Year Follow-Up

Peter Tretiakov, BS

7:45am - 7:50am

PAPER #45

The Additional Burden of the Existence of Baseline Cervical Deformity When Undergoing Thoracolumbar Adult Spinal Deformity Corrective Surgery

Heiko Koller, MD

7:50am - 8:02am

Discussion

Friday
11/18/2022

Continued
Abstract Session 5: Deformity

8:02am - 8:07am	PAPER #46 Achievement and Maintenance of Optimal Alignment and Functional Improvement Following Cervical Deformity Surgery: A 2-Year Outcome Analysis <i>Renaud Lafage, MS</i>
8:07am - 8:12am	PAPER #47 Surgical Management of Adult Cervical Deformity: Are We Getting Better at Optimal Realignment? <i>Peter G. Passias, MD</i>
8:12am - 8:17am	PAPER #48 Semispinalis Cervicis Sarcopenia is Associated With Worsening Cervical Sagittal Balance and Junctional Alignment Following Posterior Cervical Fusion for Myelopathy <i>Zachariah W. Pinter, MD</i>
8:17am - 8:22am	PAPER #49 Surgical Treatment of Dropped Head Syndrome: Range of Fixations and Postoperative Complications <i>Tetsutyu Mitsuyama, MD, PhD</i>
8:22am - 8:27am	PAPER #50 Do Flare-Ups in Systemic Disease Activity Correlate to Cervical Deformity in Patients With Rheumatoid Arthritis? <i>Anna Baukje Veldman, BSc</i>
8:27am - 8:40am	Discussion

8:40am - 9:40am
Symposia 3: Myelopathy

Harbor Ballroom G-I

Moderator(s): Michael G. Fehlings, MD, PhD; Jeffrey C. Wang, MD

8:40am - 8:44am	Introduction <i>Michael G. Fehlings, MD, PhD; Jeffrey C. Wang, MD</i>
8:44am - 8:53am	The Case for Surgical Intervention in Mild DCM <i>Michael G. Fehlings, MD, PhD</i>
8:53am - 9:02am	The Case for Observation and Nonoperative Management in Mild DCM <i>Jefferson R. Wilson, MD, PhD</i>
9:02am - 9:11am	Best Clinical Diagnostic Tools to Detect and Monitor Progression in Mild DCM <i>Jean-Jacques Abitbol, MD</i>
9:11am - 9:20am	Microstructural MRI as a Tool to Assist in Decision Making in Mild DCM <i>Allan R. Martin, MD, PhD, FRCSC</i>
9:20am - 9:25am	Case Resolution <i>Jeffrey C. Wang, MD</i>
9:25am - 9:40am	Discussion

Friday
11/18/2022

9:00am - 1:30pm
Exhibit Hall Open

Harbor Ballroom A-F



9:40am – 10:05am
Coffee Break

Harbor Ballroom A-F

10:05am - 10:45am
Presidential Address

Harbor Ballroom G-I

10:05am - 10:15am **Presidential Introduction**

Michael D. Daubs, MD

10:15am - 10:45am **Presidential Address**

James S. Harrop, MD, MSHQS

10:45am - 12:15pm
Abstract Session 6: Top 10 Papers

Harbor Ballroom G-I

Moderator(s): Zoher Ghogawala, MD, FACS; Neill M. Wright, MD

10:45am - 10:49am **Introduction**

Zoher Ghogawala, MD, FACS; Neill M. Wright, MD

10:49am - 10:54am **FIRST PLACE RESIDENT/FELLOW RESEARCH AWARD**
PAPER #51

Do Patients With Preoperative Marijuana Use Have Similar Outcomes Following Anterior Cervical Discectomy and Fusions?

Mark J. Lambrechts, MD

10:54am - 10:59am **FIRST PLACE CLINICAL RESEARCH AWARD**
PAPER #52

Long-term Outcomes of Vertebral Body Sliding Osteotomy for the Treatment of Cervical Myelopathy: A Minimum of 5-year Follow-Up

Dong-Ho Lee, MD, PhD

10:59am - 11:04am **FIRST PLACE BASIC SCIENCE AWARD**
PAPER #53

Serum GFAP and NF-L are Biomarkers of Injury Severity and Predictors of Recovery After Acute Cervical Spinal Cord Injury

Brian K. Kwon, MD, PhD, FRCSC

11:04am - 11:09am **THIRD PLACE RESIDENT/FELLOW RESEARCH AWARD**
PAPER #54

Motorized Robotic Cervical Traction: Proof of Concept

Brandon A. Sherrod, MD

11:09am - 11:14am **SECOND PLACE RESIDENT/FELLOW RESEARCH AWARD**
PAPER #55

Comparing Those Most Satisfied Versus Least Satisfied Following Surgery for Cervical Spondylotic Myelopathy: Are there Differences in Baseline Characteristics?

Andrew Chan, MD

11:14am - 11:32am **Discussion**

Friday
11/18/2022

Continued
Abstract Session 6: Top 10 Papers

- 11:32am - 11:37am  **SECOND PLACE BASIC SCIENCE AWARD**
PAPER #56
Spinal Cord Reconstitution of Chronic Complete Injury by
Hepatocyte Growth Factor-Releasing Scaffold and Human
Stem Cell Enhances Functional Recovery
Shogo Hashimoto, MD
- 11:37am - 11:42am  **THIRD PLACE BASIC SCIENCE AWARD**
PAPER #57
Circulating microRNAs May be Predictive of Degenerative
Cervical Myelopathy
Srikanth Divi, MD
- 11:42am - 11:47am  **SECOND PLACE CLINICAL RESEARCH AWARD**
PAPER #58
A Multi-Center, Randomized, Placebo-Controlled, Double-
Blinded Trial of Efficacy and Safety of Riluzole in Acute Spinal
Cord Injury Study (RISCIS)
Michael G. Fehlings, MD, PhD
- 11:47am - 11:52am  **THIRD PLACE CLINICAL RESEARCH AWARD**
PAPER #59
Contemporary Practice Patterns in the Treatment of Cervical
Stenosis and Central Cord Syndrome: A Survey of the Cervical
Spine Research Society
Erick Kazarian, MD
- 11:52am - 11:57am **PAPER #60**
Current Practice Patterns of Surgical-Site Drain Usage in
Cervical Spine Surgery: A Survey of the Cervical Spine
Research Society
Sonal Sodha, MD
- 11:57am - 12:15pm **Discussion**

12:15pm - 12:30pm
2023 CSRS Meeting Previews

Harbor Ballroom G-I

- 12:15pm - 12:20pm **CSRS Europe**
Heiko Koller, MD
- 12:20pm - 12:25pm **CSRS Asia Pacific**
Hisanori Mihara, MD
- 12:25pm - 12:30pm **CSRS Annual Meeting: Las Vegas**
Michael D. Daubs, MD



12:30pm - 1:30pm
Lunch in Exhibit Hall

Harbor Ballroom A-F

Friday
11/18/2022

12:30pm - 1:30pm Members Business Meeting & Lunch

Cortez Hill ABC,
Seaport Tower

1:45pm - 2:45pm Symposia 4: Research

Harbor Ballroom G-I

Moderator(s): Serena S. Hu, MD; Wilson Z. Ray, MD

1:45pm - 1:46pm

Introduction

Serena S. Hu, MD; Wilson Z. Ray, MD

1:46pm - 1:56pm

How to Set Up an Academic Career in Spinal Surgery Doing Basic Science Research: The Clinician Scientist

Brian K. Kwon, MD, PhD, FRCSC

1:56pm - 2:06pm

Navigating Clinical Practice and Research Careers in Spinal Surgery

Michael P. Kelly, MD

2:06pm - 2:16pm

Funding for Spinal Surgery Research: Options and Opportunities

Suzanne Tharin, MD, PhD

2:16pm - 2:26pm

Pathways to Leadership in Spine Surgery and Mentoring Those That Follow

Daniel M. Sciubba, MD

2:26pm - 2:36pm

How to Build a Successful Academic Practice

S. Tim Yoon, MD, PhD

2:36pm - 2:45pm

Discussion

Comprehensive Cervical Solutions



MOTION PRESERVATION



Mobi-C[®]
Cervical Disc

POSTERIOR FIXATION



Virage[®] OCT

ANTERIOR FIXATION



InVizia[®]



MaxAn[®]



Trinica[®] and Trinica[®] Select

STAND ALONE FIXATION



Optio-C[®]



ROI-C[®]



TrellOss[®]-C SA

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TM-S

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Friday
11/18/2022

2:45pm - 3:15pm
**Awards Session: Top Papers, Scholarship
Recipients & Lifetime Achievement Award**

Harbor Ballroom G-I

2:45pm - 3:00pm

Top Papers & Scholarship Recipients

John M. Rhee, MD

3:00pm - 3:05pm

Lifetime Achievement Award Introduction

John M. Rhee, MD

3:05pm - 3:15pm

Lifetime Achievement Award Recipient



Paul Anderson, MD



CSRS proudly awards Paul A. Anderson, MD as the 2022 recipient of the Lifetime Achievement Award. In granting this award, CSRS recognizes his exemplary career in cervical spine surgery as a researcher, educator, innovator, and global leader spanning four decades. Dr. Anderson influenced the course and direction of CSRS in countless ways, including as President from 2001-2002, as well as Vice President and Treasurer.

Dr. Anderson has worked vigorously throughout his career to evolve the field of cervical spine surgery. His research contributions have been highly impactful, with hundreds of publications on both clinical and basic science topics ranging from trauma, degenerative, biomechanical, and molecular biological studies. His body of cervical spine research has been remarkable, authoritative, and broad. To say that Dr. Anderson is a Renaissance Man in cervical spine surgery is truly an understatement.

In addition, his commitment to cervical spine education has been profound. It has been said of Dr. Anderson that, "there is no greater educator in cervical spine disorders." For example, he continues to teach hands-on cervical spine courses for young surgeons with humble and enthusiastic dedication. Countless students, residents, fellows, and peers have benefitted from his cogent teaching ability during his illustrious career at the University of Washington, University of Wisconsin, and as a leader of CSRS.

For all this and more, CSRS is honored to present Dr. Paul A. Anderson with the 2022 Lifetime Achievement Award. We congratulate Dr. Anderson not only for his remarkable academic accomplishments, but also for what those accomplishments have done to advance both our field and the society that we so cherish. We are confident that his example will serve as a lofty inspiration to our members for generations to come.

Friday
11/18/2022

3:15pm - 3:30pm
Coffee Break

Harbor Lobby

3:30pm - 5:00pm
Abstract Session 7: Motion
Preservation and Outcomes

Harbor Ballroom G-I

Moderator(s): Andrew C. Hecht, MD; Rex A.W. Marco, MD

3:30pm - 3:35pm

Introduction

Andrew C. Hecht, MD; Rex A.W. Marco, MD

3:35pm - 3:40pm

PAPER # 61

Revisions and Removals of Cervical Total Disc Replacement Devices in a Single Institution Consecutive Series of 1,473 Patients Beginning With the First Case Experience in 2003

Jack E. Zigler, MD

3:40pm - 3:45pm

PAPER # 62

Which Open Side is Better in Cervical Unilateral Open-Door Laminoplasty, Compressive Side or Symptomatic Side?

Kyung-Chung Kang, MD

3:45pm - 3:50pm

PAPER # 63

Accuracy of Navigation Assisted Pedicle Screw Placement in Cervical Spine

Kentaro Yamane, MD

3:50pm - 3:55pm

PAPER # 64

Complications, Readmissions, Reoperations and Patient-Reported Outcomes in Patients with Multiple Sclerosis Undergoing Elective Cervical Spine Surgery- a Propensity Matched Analysis

Amir M. Abtahi, MD

4:00pm - 4:05pm

PAPER # 66

Is Severe Mechanical Neck Pain a Contraindication to Performing Laminoplasty in Patients with Cervical Spondylotic Myelopathy?

Zachariah W. Pinter, MD

4:05pm - 4:20pm

Discussion

4:20pm - 4:25pm

PAPER # 67

Prosthesis Design and Likelihood of Achieving Physiological Range of Motion After Cervical Disc Arthroplasty: Analysis of Data From Seven IDE Clinical Trials

Avinash G. Patwardhan, PhD

4:25pm - 4:30pm

PAPER # 68

The Impact of Motion on Adjacent Level Degeneration After Cervical Disc Arthroplasty: Results of Post-hoc Analysis From a Prospective Study With 7-Year Follow-up

Alexander M. Satin, MD

Friday
11/18/2022

Continued
**Abstract Session 7: Motion
Preservation and Outcomes**

4:30pm - 4:35pm

PAPER # 69

Analysis of the Effects of Intraoperative Neurophysiological Monitoring on Anterior Cervical Surgery: A Michigan Spine Surgery Improvement Collaborative (MSSIC) Study

Philip Zakko, MD

4:35pm - 4:40pm

PAPER # 70

3-Level vs. 4-Level Anterior Cervical Discectomy and Fusion: Differences in Complications and Perioperative Characteristics

Samuel K. Cho, MD

4:40pm - 4:45pm

PAPER # 71

Change in Physical and Mental Well-Being Between the Short and Mid-term Periods After Cervical Surgery for Myelopathy: A Retrospective Cohort Study With Minimum 5 Year Follow-up

Koji Tamai, MD, PhD

4:45pm - 5:00pm

Discussion

7:00pm - 10:00pm
NuVasive Industry Sponsored Dinner

Join NuVasive for an evening of collaboration and discussions during CSRS

Cervical sommeliers: A perfect blend of collaborative leadership and excellence

Surgeon moderator: Dr. Todd Albert

Friday, November 18, 2022

7:00 – 10:00 p.m.

Location: San Diego Wine and Culinary Center
200 Harbor Drive, Suite 120, San Diego, CA 92101



RSVP to: <https://forms.gle/2ZQnUt9szaoeRWFVA> or email Natalie Norket at nnorket@nuvasive.com

Space will be limited so RSVP now to secure your seat at the table.

Saturday
11/19/2022

6:30am - 7:15am
New Member Breakfast

Cortez Hill ABC



6:45am - 8:45am
Breakfast

Harbor Foyer

7:00am - 9:00am
Registration Open

Harbor Foyer

7:00am - 9:00am
Speaker Resource Room

Show Office 2



7:15am - 7:20am
Morning Welcome

Harbor Ballroom G-I

Neill M. Wright, MD; Brian K. Kwon, MD, PhD, FRCSC; Zoher Ghogawala, MD, FACS

7:20am - 8:25am
2022 Research Grant Awards
& Past Research Grant Presentations

Harbor Ballroom G-I

Moderator(s): Wellington K. Hsu, MD

7:20am - 7:45am

Introduction and Recognition of 2022 Research Grant Award Winners

Wellington K. Hsu, MD

7:45am - 7:48am

Development of an Innovative Diagnostic Tool for Cervical Spondylotic Myelopathy Using Somatosensory Evoked Potentials Elicited by Proprioceptive Stimulation: A Proof-of-concept Pilot Study

Julio C. Furlan, MD, LLB, MBA, MSc, PhD

7:48am - 7:51am

Prediction of Admission Costs Following Anterior Cervical Discectomy and Fusion Utilizing Machine Learning

Anirudh K. Gowd, MD

Saturday
11/19/2022

Continued
**2022 Research Grant Awards
& Past Research Grant Presentations**

7:51am - 7:54am	Assessing Global Upper Extremity Function Before and After Decompressive Surgery in Patients With Degenerative Cervical Myelopathy (DCM) <i>Angie Zhang, MD</i>
7:54am - 7:57am	Conventional-Therapy & FES-Therapy In-Veritas Effects Study (C-FIVE Study): Rehabilitation of the Upper Extremity for New Persistent C5 Palsy After Surgical Treatment of Patients With Degenerative Cervical Myelopathy <i>Julio C. Furlan, MD, LLB, MBA, MSc, PhD</i>
7:57am - 8:00am	Using Ecological Momentary Assessment and Digital Phenotyping to Create a Novel Cervical Radiculopathy Disease Profile <i>Jacob K. Greenberg, MD, MSCI</i>
8:00am - 8:05am	Discussion
8:05am - 8:08am	Osteogenic Effects of Varenicline: An In Vitro Study of Human Mesenchymal Stromal Cells and Osteoblasts <i>Brian A. Karamian, MD</i>
8:08am - 8:11am	The Impact of Timing of Surgery on Neurological and Functional Outcome in Traumatic Spinal Cord Injury: A Prospective, Observational Multicenter Study (D-SCIRET: Database of Spinal Cord Injury on Recovery and Evaluation of Timing) <i>Wilco Peul, MD, PhD</i>
8:11am - 8:14am	A Patient Centered Quantitative Analysis of Preoperative Expectations and Postoperative Satisfaction in Cervical Fusion <i>Nicholas Arpey, MD</i>
8:14am - 8:17am	Space Available for the Cord During Pre-hospital Management of the Cervical Spine Injured Patient <i>MaryBeth Horodyski, Ed.D., ATC, LAT, FNATA</i>
8:17am - 8:20am	The Effect of Cervical Orthoses on Intervertebral Kinematics <i>Jeremy D. Shaw, MD, MS</i>
8:20am - 8:25am	Discussion

**8:25am - 8:35am
Presidential Farewell &
Induction of New President**

Harbor Ballroom G-I

8:25am - 8:30am	<i>James S. Harrop, MD, MSHQS</i>
8:30am - 8:35am	<i>Michael D. Daubs, MD</i>

2022 CSRS RESEARCH GRANT AWARD WINNERS

21st Century Grant Awards

Analysis of Piezo1-Dependent Mechanotransduction in Spinal Fusion and Pseudoarthrosis

Massachusetts General Hospital, Harvard Medical School

Primary Investigator: Ganesh M. Shankar, MD

Spinal Cord Injury Grant Award

Therapeutic Effect of Immunoreceptor CD300a Blockade for Acute Spinal Cord Injury

University of Tsukuba

Primary Investigator: Hiroshi Takahashi, MD, PhD

Seed Starter Grant Award

Sleep Quality in Patients With Cervical Radiculopathy

Texas Back Institute

Primary Investigator: Alexander M. Satin

Quantifying and Classifying Quality-Associated Waste in the Care of Cervical Myelopathy

Thomas Jefferson University Hospital

Primary Investigator: Ahilan Sivaganesan, MD

Resident/Fellow Grant Awards

Patient Preoperative Health Confidence and Postoperative Outcomes After Cervical Spine Surgery: A Quantitative Analysis

Northwestern University

Primary Investigator: Erik Gerlach, MD

Minimal Clinically Important Difference (MCID) in Cervical Spine Surgery: Establishing MCID for NIH PROMIS Assessments and Development of Machine Learning Algorithms For Prediction of MCID After Cervical Spine Surgery

Massachusetts General Hospital

Primary Investigator: Aditya V. Karhade, MD

The Comparative Effect of NSAIDs and Opioids on Spinal Fusion: A Rodent Model

Rothman Orthopaedic Institute

Primary Investigator: Mark J. Lambrechts, MD

Motorized Cervical Traction Versus Weight and Pulley Traction: A Cadaveric Biomechanical Comparison

University of Utah

Primary Investigator: Brandon A. Sherrod, MD

*Special thanks to Irene Hay for her special contribution to
CSRS for the Spinal Cord Injury Grant*

Saturday
11/19/2022

8:35am - 9:35am
Symposia 5: What's on the Horizon
for Cervical Spine Care?

Harbor Ballroom G-I

Moderator(s): Michael D. Daubs, MD; Wellington K. Hsu, MD

8:35am - 8:40am

Introduction

Michael D. Daubs, MD; Wellington K. Hsu, MD

8:40am - 8:50am

Total Disc Arthroplasty in the Elite Athlete - Considerations for Outcomes, Stability, Wear Debris, etc.

K. Daniel Riew, MD

8:50am - 9:00am

Advanced Imaging Techniques of Cervical Spine

Michael G. Fehlings, MD, PhD

9:00am - 9:10am

What's New in Interbody Cage Materials? - PEEK, PEKK

Gregory Schroeder, MD

9:20am - 9:35am

Discussion

9:35am - 10:55am
Abstract Session 8: Science,
Outcomes, & Effectiveness

Harbor Ballroom G-I

Moderator(s): Andrew T. Dailey, MD, FAANS; Eeric Truumees, MD

9:35am - 9:37am

Introduction

Andrew T. Dailey, MD, FAANS; Eeric Truumees, MD

9:37am - 9:42am

PAPER # 72

Risk Factors for Progression of Ossification of Posterior Longitudinal Ligament in Asymptomatic Subjects

Toru Doi, PhD

9:42am - 9:47am

PAPER # 73

The Association of the Time-Dependent Response of Microglia Activation at the Injured Spinal Cord and Brain With Neuropathic Pain After Spinal Cord Injury

Arisa Kubota, MD

9:47am - 9:52am

PAPER # 74

Prevalence and Prognosis of Gait Dysfunction in Patients Operated for Cervical Spondylotic Myelopathy

Andrew Chan, MD

9:52am - 9:57am

PAPER # 75

Earlier Tracheostomy Reduces Complications in Complete Cervical Spinal Cord Injury: Analysis of a Multi-Center Cohort of 2004 Patients

Christopher Witiw, MD, MSc, FRCSC

9:57am - 10:02am

PAPER # 76

Similar Rates of Revision Surgery After Anterior Cervical Discectomy and Fusion Using Interbody Cage and Structural Allograft

Joshua Olexa, MD

Saturday
11/19/2022

Continued
**Abstract Session 8: Science,
Outcomes, & Effectiveness**

10:02am - 10:07am	<p>PAPER # 77</p> <p>Elective Primary Anterior Cervical Decompression and Fusion for Degenerative Spondylotic Cervical Myelopathy is Associated With Decreased Resource Utilization Versus Posterior Cervical Decompression and Fusion</p> <p><i>Jerry Y. Du, MD</i></p>
10:07am - 10:16am	<p>Discussion</p>
10:16am - 10:21am	<p>PAPER # 78</p> <p>Vitamin K Supplementation Reduces Spinal Hyperostosis and Amerliorates Locomotor Impairment in a Mouse Model of Cervical Ossification of the Posterior Longitudinal Ligament</p> <p><i>Atsushi Kimura, MD, PhD</i></p>
10:21am - 10:26am	<p>PAPER # 79</p> <p>Reducing Opioid Prescriptions for 707 Patients Following Cervical Spine Surgery Using a Novel, Patient-Centric, Individualized Calculation Tool</p> <p><i>Vijay Letchuman, BA</i></p>
10:26am - 10:31am	<p>PAPER # 80</p> <p>Glutamate Activates a Proliferative and Astroglial Program in Spinal Cord Ependymal Stem Cells: Implications for Regenerative Therapeutic Translation</p> <p><i>Laureen D. Hachem, MD</i></p>
10:31am - 10:36am	<p>PAPER # 81</p> <p>Assessing Correlations Between NASS Patient Satisfaction Index and Patient-Reported Outcomes (PROs) at 3-month, 12-month, and 24-month Timepoints in Patients Undergoing Cervical Spine Surgery Using the QOD Registry</p> <p><i>Mark M. Zaki, MD</i></p>
10:36am - 10:41am	<p>PAPER # 82</p> <p>Therapeutic Effects of Combined hiPSC-NS/PCs Transplantation and Rehabilitative Training in Chronic Spinal Cord Injury</p> <p><i>Takahiro Shibata, MD</i></p>
10:41am - 10:46am	<p>PAPER # 83</p> <p>The Effect of Posterior Cervical Laminoplasty With Dome Laminotomy on Cervical Alignment and Disability in Patients with Cervical Spondylotic Myelopathy Patients</p> <p><i>Sung Hoon Choi, MD, PhD</i></p>
10:46am - 10:55am	<p>Discussion</p>

Saturday
11/19/2022

10:55am - 11:00am
Annual Meeting Farewell

Neill M. Wright, MD; Brian K. Kwon, MD, PhD, FRCSC; Zoher Ghogawala, MD, FACS

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The full list of e-poster titles and authors are available on the CSRS website as well as in the CSRS Annual Meeting abstract book.

E-Poster Awards

GENERAL E-POSTER AWARD

Impact of social deprivation on physical and mental health outcomes in patients following cervical spine fusion surgery

Justin Zhang, BS

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Severe Semispinalis Cervicis Sarcopenia is Associated with Worse Patient Reported Outcomes following Laminoplasty for Myelopathy

Zachariah Pinter, MD



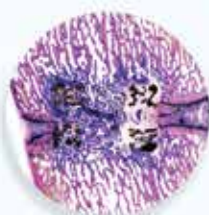
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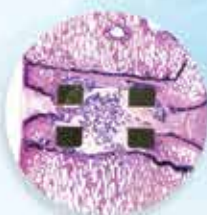
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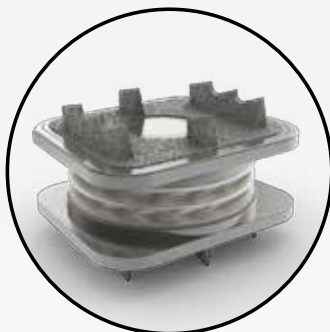
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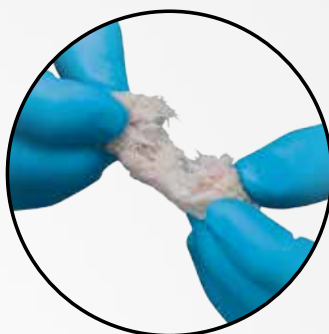
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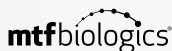
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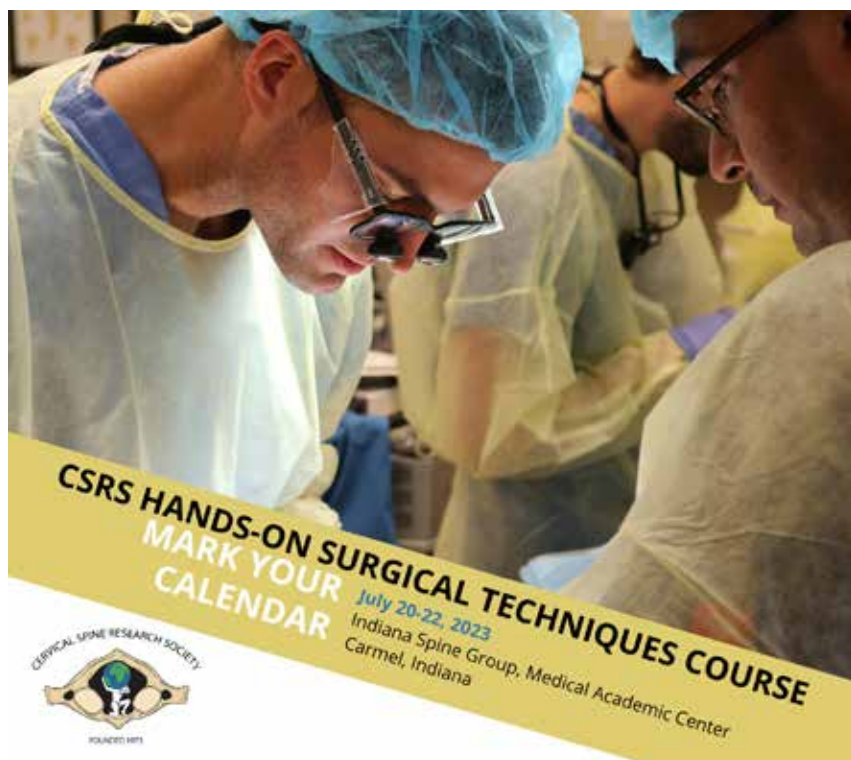
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