

May 16-20  
2016  
Singapore  
**SpineWeek**

Marina Bay Sands Convention Centre

**Final Program**



**General**



**General**

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## Welcome by AOSpine - Advancing spine care worldwide

We are very pleased to participate in SpineWeek 2016 in Singapore. As a leading global academic spine society, AOSpine is honored to partner with other major spine societies in this prestigious event. Thanks to its truly global membership, AOSpine will present a program that highlights the most significant advances in clinical spine research, along with findings from our multi-center research groups throughout the world.

The AOSpine Knowledge Forums, comprising of global spine leaders, are gathering prospective data on some of the most interesting and challenging spinal problems, and publishing meaningful clinical research that will advance patient care worldwide. At SpineWeek 2016, AOSpine will present clinical research findings and the most contemporary patient management protocols in the areas of spinal trauma, spinal cord injury, spinal tumors, spinal deformity, and degenerative spinal conditions and biologics.

This AOSpine abstract review process of over 190 submitted abstracts to AOSpine, was completed by 104 reviewers from across the globe.

On behalf of AOSpine, I would like to thank each single reviewer for his time and efforts in going through this review process.

**K. Daniel Riew**  
Chair of the International Board



## Welcome by APSS - Asia Pacific Spine Society

Dear Friends and Colleagues,

The Asia Pacific Spine Society is very grateful to be able to participate and join the other prestigious spine societies in this event for the first time. This meeting will bring the latest update on spine care education, research and innovation. It will also provide us with the opportunity to exchange ideas with various expert faculties from different parts of the world. The Spine Week 2016 will offer a platform for all Asia Pacific spine surgeons to contribute to the advancement of the global spine care by sharing their experience and research especially with regard to the spine problems which are distinctive to this region.

A meeting together with other major societies will encourage social and formal networking with spine surgeons from all over the world.

On behalf of APSS, I would like to thank you for participating in Spine Week 2016.

**Kuniyoshi Abumi**  
Chairman of APSS



## Welcome by ASSI - Association of Spine Surgeons of India

It is our great pleasure to invite you to the SpineWeek 2016 and to the ASSI Sessions. The ASSI is the premier body of spine surgeons in India and has more than 600 life members, both orthopaedic and neurosurgeons spread across the country. The Association has two meetings every year - the Annual meeting and an Instructional course which is usually conducted in association with other major spine societies around the world. In addition, ASSI members form a prominent faculty in instructional courses and symposia all around the country in many regional and state meetings. At the Annual Meeting, the Association grants three national awards: one each in Clinical Science, Basic Science and for the Best Publication.

The SpineWeek offers great opportunities for delegates from many countries and all spine societies to showcase their regional talent and share their high quality academics and research with members of other societies. Apart from the great educational opportunity, there will also be ample opportunities for fellowship, making new friends and strengthening old relationships.

We look forward to seeing you in Singapore.

**Dr. Ram Chaddha**  
President

**Dr. H.S. Chhabra**  
Secretary

**Dr. S. Rajasekaran**  
SpineWeek Co-ordinator



## Welcome by Africa Spine

AfricaSpine was founded on June 2014 by African spine leaders from 12 countries, meeting successfully in Agadir, Morocco. The aim was to create a specialised association for sharing knowledge and experience on Spinal pathologies, which cause big handicaps in the Continent.

This African Spine Society creation appeared as an urgent necessity due to the numerous spine issues, diseases, deformities and infections, etc. ... In addition, another motivation was the frequent spine traumas mainly resulting from the high rate of Road Traffic injuries and the lack of important spine care centres.

It is our honor and privilege to be part of SpineWeek 2016, the most important global spinal meeting, and we are proud to actively contribute to the high quality spine care and research worldwide. Our programme will include Instructional Lectures, Oral and Poster Presentations. We are seeking at participating with very interesting topics on Spine deformities, infections, trauma, tumours and degenerative lesions.

All African Spine Surgeons and SpineWeek attendees are most welcome to join us and support our young and very promising Association.

**Thami Benzakour, MD**  
AfricaSpine President



## Welcome by CAOS - Chinese Association of Orthopedic Surgeons

Dear Members and Friends,

On behalf of Chinese Association of Orthopedic Surgeons (CAOS) we are honored to welcome you to Spine Week 2016 in Singapore.

As the official body of Chinese orthopedics, CAOS provides a whole set of services to Chinese orthopaedic surgeons including speciality entry exam, residency training and CME, sociability of members, events & conferences, humanistic caring & young leadership program.

We are so grateful to join and work with other prestigious spine societies. We believe this meeting will provide us a valuable opportunity to learn the newest outcomes, exchange the up-to-date concepts on spine care education from all Asia Pacific surgeons and over the world.

We are looking forward to seeing you in the beautiful city, Singapore!

**Prof. Yan Wang**  
President of Chinese Association of Orthopedic Surgeons



## Welcome by ESJ - European Spine Journal

The European Spine Journal, one of the leading spine journals internationally, has always been much more than just a European publication.

The journal has a strong presence all over the world, especially in Asia. Not only do we get many manuscript submissions originating from Asia, but we also are proud to have a large number of reviewers in that part of the globe.

That is why the European Spine Journal is glad to see SpineWeek being held in Singapore. The European Spine Journal will be organising workshops on how to write a paper to maximise the chances of being accepted and also on how to do reviews for a scientific journal.

The Editors of the European Spine Journal look forward to meeting all their authors, reviewers and readers during the SpineWeek meeting in 2016.

**Robert Gunzburg, MD, PhD**  
Editor-in-Chief, European Spine Journal



## Welcome by F-Marc - FIFA Medical and Research Centre

The FIFA Medical Assessment and Research Centre (F-MARC) will support and actively participate at the 4th Spine week, by contributing to the interdisciplinary approach in the management of spinal disorders and problems from a football/sports medical perspective. As a central organ of the musculoskeletal system, the spine has been neglected for a long time by football players including their medical staff.

F-MARC has acknowledged these deficiencies based upon large epidemiological studies performed in the mid-nineties and taking the results into consideration, developed and performed the "FIFA 11+" preventative program. The objective of the "FIFA 11+" program is to reduce non-contact injuries but also musculoskeletal symptoms and signs including the spine. An integrated part of the complete warm-up programme are several exercises which are well perceived by the spinal community.

Large prospective randomized studies have presented results justifying the global implementation amongst the football community. Personally for me, it is not only a challenge but a great honour to share my experience of F-MARC, based upon research over the past 20 years in conjunction with leading spine societies to which I have contributed prior to my "football career". No doubt, the partnership of both, the spine and the sporting/football medical group will benefit from each other at such a joint and major event to the advantage of those athletes in our care. The main objective is to promote sport as a health enhancing leisure activity.

**Prof. Jiří Dvořák, MD**  
(Chairman F-MARC / Founding member and former President of the European Spine Society / Member of the International ISSLS / Deputy Editor of Spine / Senior Editor of BJSM)



## Welcome by ICSG - International Consortium for Scoliosis Genetics

Welcome to the 5th meeting of the International Consortium for Scoliosis Genetics.

The International Consortium for Scoliosis Genetics (ICSG) is very pleased to be able to participate in SpineWeek 2016.

The cause of scoliosis continues to be an enigma. ICSG is a unique multidisciplinary group focused on understanding the genetic causes of scoliosis. Our goal is to work together by sharing resources, ideas, and expertise to make new discoveries that would not be achievable through individual efforts. In this way, we will provide answers about the causes of scoliosis and possibilities for new treatments that will benefit patients and their families worldwide. We welcome participation by anybody interested to help unravel this great mystery.

During SpineWeek, ICSG experts will conduct a multidisciplinary instructional course to enhance the understanding of spine care professionals on the aetiology of scoliosis, as well as a scientific symposium on the latest cutting edge research.

**Kenneth M.C. Cheung, MD**  
Co-Chair, International Consortium for Scoliosis Genetics

**Carol Wise, PhD**  
Co-Chair, International Consortium for Scoliosis Genetics





## Welcome by ISASS - The International Society for the Advancement of Spine Surgery

The International Society for the Advancement of Spine Surgery (ISASS) extends to you its inaugural invitation to join the Society at SpineWeek 2016.

In Singapore, our members will be part of a global event, in congruity with our mission to be a global network of professionals advancing the field of spine surgery by means of education and policy relating to the newest techniques and technologies in spine surgery.

With two of the ISASS Board members, Hee Kit Wong, MD, PhD and Marek Szpalski on the steering committee, we look forward to the excellent level of programming.

We look forward to learning from you, teaching you, and fostering further knowledge exchange by our colleagues across the globe.

Together, we can build a better world for spine patients and spine practitioners alike.

**Gunnar Andersson, MD PhD**  
President ISASS



## Welcome by ISSLS - The International Society for the Study of the Lumbar Spine

Dear ISSLS members and guests,

As a rule our annual meeting rotates around the world between Northern America, Europe and Asia. We were in Singapore before, and it is a pleasure to come back to Singapore after all these years. ISSLS is a truly multidisciplinary society, welcoming all those involved in the study of the lumbar spine.

This goes from diagnostics over conservative treatment -including manipulation- to surgery, from biomechanics and psychology, basic science and epidemiology to outcome and health care analyses. Our membership reflects the truly international character of the society with many members being Asian. Of course we hope to attract many clinicians and scientists at our sessions. The highlights of our meeting are the ISSLS Prize Paper presentations and the Presidential and presidential Guest speakers' addresses. We invite all registrants from all societies to join us for these sessions.

The ISSLS annual meetings are more than scientific gatherings, but are also famous for their social program where delegates mingle with accompanying persons and we hope that many will choose to register to SpineWeek via the ISSLS channel, so profiting from this particular aspect of ISSLS. It is my pleasure to invite you all to the ISSLS meeting at SpineWeek 2016 in Singapore.

**James D. Kang**  
ISSLS President 2015-2016



## Welcome by KSSS - Korean Society of Spine Surgery

It is a great honor the Korean Society of Spine Surgery (KSSS) participates in the upcoming 2016 SpineWeek along with other prestigious societies.

The SpineWeek is known to be the one of biggest spine meetings in the world. As a major spine society in Korea, the KSSS is pleased to be able to provide a 1 day comprehensive program.

The KSSS will actively participate in the 2016 SpineWeek in order to help providing an excellent educational and social meeting.

Singapore is a great venue for Asian and International conferences.

**Kyu-Yeol Lee, MD**  
President 2015-2016



## Welcome by NASS - North American Spine Society

Dear Spine Care Professionals,

The North American Spine Society (NASS) welcomes you to participate in SpineWeek 2016 where NASS will present the latest developments in multidisciplinary spine care education, research and innovation.

During this meeting, you will have an opportunity to exchange ideas with expert faculty and attend sessions on timely updates and significant outcomes in the world of spine care. Over the years, NASS has strategically developed and offered pertinent educational programs in partnership with regional spine societies worldwide. These collaborative efforts have allowed NASS to foster superior spine care globally.

NASS is driven by a mission to help spine care providers and patients by fostering the highest quality, evidence-based and ethical spine care. To achieve that mission, NASS is committed to providing the educational programs and professional resources needed to improve spine care practice across various regions of the world.

On behalf of NASS, I invite you to contribute to the advancement of the global spine care community through your participation in SpineWeek 2016.

**Christopher M. Bono, MD**  
President 2016



## Welcome by NSpine - Innovative Spine Education

NSpine provides independent multidisciplinary spine healthcare education on the entire range of spinal conditions including topics not covered in depth by the traditional academic societies. The focus in NSpine events is on technical aspects and translation of knowledge into real world clinical applications presented by masters in their field.

NSpine is delighted to be participating at SpineWeek and is proud to host:

Sex and the Spine  
all you ever wanted to know about sex and the spine but were afraid to ask -

The symposium is multidisciplinary in nature and will provide ample time for discussions. The content is of an adult nature - please consider this prior to attending as discussions will be encouraged to be very open.

Learning objectives: Through the "Sex and the Spine" symposium delegates will gain knowledge of:

- o the physiology of male and female sexuality
- o the impact on sexual health by spinal conditions and sexual history
- o current treatment concepts in sexual therapy relevant to spinal disorders

**Broniek Boszczyk**  
Spinal Surgeon & Director NSpine



## Welcome by SBC - Sociedade Brasileira de Coluna

Dear SBC Associates,

The Brazilian Spine Society is honored by the invitation to join SpineWeek 2016 in Singapore. We would like to welcome all spine surgeons colleagues and invite them to attend the event.

This is a great opportunity to show the Brazilian experience in the treatment of diseases affecting the spine along with other representative societies around the world. In the event we can share and openly discuss clinical cases with surgeons of great experience and common sense, perfecting and consolidating knowledge in patient care.

There will be space for the presentation of free themes.

We welcome you at SpineWeek 2016.

**Dr. Mauro dos Santos Volpi**  
Presidente SBC



## Welcome by PASS - Pan Arab Spine Society

The PASS is pleased to participate in the upcoming 2016 International SpineWeek along with other prestigious spine societies from all over the world in its 1st time.

PASS was founded in the year 1999, bringing together all the Arab spine societies and institutes in Spine field. It is a great honor and opportunity to share our knowledge and experience with such great international societies.

The purpose of international Spine week 2016 is to synchronize the annual meetings of leading spine societies in one location. This intense collaboration will certainly guarantee a pleasant and successful meeting of extreme quality.

The various topics of the meeting organized by PASS will be in the area of trauma degenerative spine problems, infection, tumor, deformity, osteoporosis and rehabilitation of spine. The main topics will be covered by a number of eminent guest speakers, free papers section and poster presentations.

It is our great honor to welcome you in the fabulous, extremely beautiful Singapore.

**Abdelfettah Abushaala**  
PASS Secretary General



## Welcome by SILACO - La Sociedad Ibero Latinoamericana de Columna

Dear Colleagues,

The Ibero-Latin American Spine Society (SILACO) is pleased to extend an invitation to join us in SpineWeek 2016 which takes place in the city of Singapore. As in previous occasions, SILACO is participating in the World Congress with the most prestigious World Spine Societies.

As you well know, SILACO is composed by all Latin Americans' Spine Societies and the Iberian Peninsula (Spain and Portugal), joined by their sociocultural roots and with two official languages, Spanish and Portuguese.

In the last SpineWeek - celebrated in Amsterdam - we presented 49 communications and 23 posters, which were being very well attended, even breaking records over previous SpineWeek participations. I hope that this edition will follow the same trend. You are cordially invited to participate in the Singapore SpineWeek 2016.

**Dr. Helton DeÁno**  
Presidente de SILACO en 2016



## Welcome by SMISS - Society for Minimally Invasive Spine Surgery

The Society for Minimally Invasive Spine Surgery (SMISS) is honored to have the opportunity to participate in SpineWeek 2016 in Singapore. We welcome you to join us in our first Global Forum outside of the United States.

SMISS (not to be confused with ISMISS) is a relatively new academic society founded by true minimally invasive spine surgery thought leaders. SMISS is the only society dedicated solely to Minimally Invasive Spine Surgery. The society provides a forum for the exchange of ideas, expertise, and goodwill, where all MIS surgeons will feel welcome and benefit from connecting and engaging.

In Singapore, you will participate in an exciting program that highlights the latest advances in education, research, and technology specifically related to minimally invasive spine surgery treatments while actively engaging with the global community of MIS experts from around the world.

We are eager to share our vision and engage surgeons interested in getting involved in our global SMISS initiatives: Continuous Professional Development, Patient-driven Research, Communities of Practice, and Centers of Excellence. SpineWeek 2016 will be an excellent opportunity for you to meet your peers, colleagues as well as SMISS.

We invite you to get involved in improving the health of patients with spinal disorders by advancing the highest quality of minimally invasive spinal care.

**Greg Anderson, MD**  
Chairperson SMISS International



## Welcome by SOLAS - Society of Lateral Access Surgery

Dear members and friends of SOLAS,

We are honored that the Society of Lateral Access Surgery is included in the list of societies participating in the 2016 Spine Week. With a meeting every four years and a global focus, Spine Week is the "World Cup" of Spine Surgery.

2016 is a significant year for SOLAS as we celebrate 10 years as a society contributing to the advancement of patient care and safer spine surgery. Since 2006, we have over 300 active members across the globe from over 30 countries. It is also our first year as an independent non-profit organization in the Netherlands. Our mission continues to be advancing minimally disruptive lateral access spine surgery techniques through clinical research, peer-to-peer education, and membership initiatives.

The SOLAS meeting at Spine Week is scheduled for the afternoon of Thursday May 19. We understand there is interest from our global membership and we look forward to welcoming any SOLAS members who are planning to attend this "world class" global spine event!

**Frank M. Phillips, MD**  
President, SOLAS

### Download SpineWeek on your mobile phone

and have the most relevant and up-to-date conference information at hand:

- Program
- General and practical information
- Bookmark your favorite sessions
- Abstracts of invited talks & oral presentations
- Info of speakers, chairs & sponsors
- Floor plan
- Twitter feed
- Survey
- ...

The SpineWeek 2016 App will be available in the App Store & Google Play.



## Program at a glance

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
<b>Monday</b>	ASSI	F-MARC	PASS	CAOS	AFRICA SPINE
	Break				
	ASSI	NSpine	PASS	CAOS	AFRICA SPINE
	Lunch break + Industry workshops				
	ASSI	NSpine	PASS		AFRICA SPINE
<b>Tuesday</b>	ASSI	KSSS	PASS	ESJ	ISSLS FOCUS GROUP
	Break				
	ASSI	KSSS	PASS	ESJ	ISSLS FOCUS GROUP
	Lunch break + Industry workshops				
	ASSI	ISSLS	PASS	SBC & SILACO	SMISS
<b>Wednesday</b>	APSS	ISSLS	PASS	NASS	ISASS
	Break				
	ASSI & APSS	ISSLS	PASS	NASS	ISASS
	Lunch break + Industry workshops				
	ASSI & APSS	ISSLS	ICSG	AOSPINE	SMISS

## Program at a glance

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
<b>Thursday</b>	APSS	ISSLS	ICSG	NASS	SMISS
	Break				
	APSS & SMISS	ISSLS	ICSG	NASS	SMISS & ISASS
	Break + Industry workshops				
	APSS	SOLAS	ISASS & SMISS	AOSPINE	SMISS & ISASS
<b>Friday</b>	APSS	ISSLS	AOSPINE	NASS	
	Break				
	APSS	ISSLS	AOSPINE	NASS	
	Break + Industry workshops				
	APSS	ISSLS	ISASS		

### Abstracts of invited lectures and oral presentations

The abstracts of invited lectures and oral presentations can be consulted via the mobile App or on the SpineWeek website. Registered participants have received a password to access these abstracts.

# Monday, May 16 Scientific Program

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
10.00	ASSI	F-MARC	PASS	CAOS	AFRICA SPINE
	Break				
12.30	ASSI	NSpine	PASS	CAOS	AFRICA SPINE
	Lunch break + Industry workshops				
16.00	ASSI	NSpine	PASS		AFRICA SPINE
	Break				
	ASSI	NSpine	PASS		AFRICA SPINE

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### Room 1

## ASSI Association of Spine Surgeons of India

### Session 1: Trauma

Chairs: Srivastava S. (IN) & Ingalthalikar V.T. (IN)

- 08.00 11 The thoracolumbar AOSpine injury score  
Vialle L. (BR)
- 08.12 12 Role of MISS in thoracolumbar fractures – Is there any advantage?  
Hartl R. (US)
- 08.24 13 Burst fracture without neurodeÀit – Is there role of surgery at all?  
Kekre P. (IN)
- 08.34 14 Neglected cervical facet dislocations – How to go about it  
Mulukutta R. (IN)
- 08.42 Discussion

### ASSI position statement

Chair: Chhabra H.S. (IN)

- 09.00 Protocol for radiological evaluation in SCI – Working towards a consensus  
Rajasekaran S., Kailash K., Acharya S., Kumar G.R.V., Khujrekar I., Parasnis R. (IN)
- 10.00 Break

### Session 2: Lumbar degenerative

Chairs: Dalvie S. (IN) & Kekre P. (IN)

- 10.30 15 Lateral approach for lumbar interbody arthrodesis – Indications, techniques and adverse events  
Bains R. (US)
- 10.42 16 Choice of fusion levels in complex lumbar canal stenosis – The importance of sagittal parameters  
Wong C.C. (MY)
- 10.54 17 Current classification systems for spondylolisthesis and treatment recommendations  
Chadda R. (IN)
- 11.06 18 Sacropelvic instrumentations – What has changed in the recent years?  
Lamartina C. (IT)
- 11.18 Discussion
- 11.30 Case Discussions - Sangondimath G., Ray A., Chahal (IN)

### Free papers I:

#### Lumbar degenerative/minimally invasive spine surgery

Chairs: Dalvie S. (IN) & Ingalthalikar V.T. (IN)

- 12.00 01 Comparative study of various minimally invasive lumbar discectomy procedures and open discectomy based on clinical outcome, muscle injury markers and postoperative imaging changes  
Venkata Ramesh C.V., Chandramowlishwara P.B., Ravi K., Lakshmi A.Y., Venkataramana B. (IN)

### Room 1

## ASSI Association of Spine Surgeons of India

- 12.04 02 Minimally invasive lumbar TLIF surgeries without use of dedicated percutaneous implant system – A feasibility study  
See Harsha C.K., Venkata Ramakrishna T. (IN)

- 12.08 03 Osteotomy of the spinous process to approach spinal canal  
Rajamani A.A., Pritam A.R. (IN)

- 12.12 04 Reduction of high grade spondylolisthesis: A technique by posterior only approach using monosegmental, non-reduction polyaxial pedicle screw instrumentation  
Upendra B.N., Sekharappa V., Mahesh B.H., Arun K. (IN)

- 12.16 05 Endoscopic lumbar discectomy – A simplified approach  
Dey P.C. (IN)

- 12.20 Discussion

- 12.30 Lunch break + Industry workshops

### Session 3: Tumor/Research

Chairs: Basu S. (IN) & Mulukutta R.D. (IN)

- 14.00 19 Management algorithm for the metastatic spine – When should surgery be avoided  
Kumar N. (SG)

- 14.08 110 Spinal tumors in children – Presentation, evaluation and treatment  
Chatterjee S. (IN)

- 14.16 111 Vertebral hamangiomatous lesions – Evaluation and guidelines of management  
Kanna R. (IN)

- 14.24 Discussion

- 14.32 112 Most cited papers from India  
Garg B. (IN)

- 14.38 113 International Research Awards won by Indians  
Upendra B.N. (IN)

- 14.44 114 How to build up a database for spinal research  
Agarwal D. (IN)

- 14.50 Discussion

# ASSI Association of Spine Surgeons of India

## Free papers II: Miscellaneous

- 15.00 O6 **Are we ready for transfusing intraoperative salvaged blood in metastatic spine tumour surgery**  
Kumar N., Zaw A.S., Ahmed Q., Lee V., Kumar A., Wong H.K. (SG)
- 15.04 O7 **Cageplasty: A novel technique for the trans-pedicular reconstruction of central body lesions**  
Shethna S.P., Agnivesh T., Dalvie S.S., Saini P., Shah Y. (IN)
- 15.08 O8 **Do thoracolumbar fractures warrant more than Axation**  
Kumar A., Satish K., Sachin K., Selvamani M. (IN)
- 15.12 O9 **Vacuum Assisted Closure (V.A.C.) in postoperative infections after instrumented spine surgery**  
Padalkar P. (IN)
- 15.16 O10 **Challenges in comprehensive management of SCI in India & Asia: Findings of a survey of experts, patients and consumers**  
Verma S., Chhabra H.S. (IN)
- 15.20 **Discussion**
- Free papers III: Complications in spine surgery**
- 15.30 O11 **A case report of rod migration into cerebellum through foramen magnum after lateral mass Axation of cervical spine**  
Sharma A., Belsare K. (IN)
- 15.34 O12 **Complications of transforaminal lumbar interbody fusion (TLIF)**  
Kundnani V., Patil S.N., Gujrathi G., Ruparel S. (IN)
- 15.38 O13 **Perforations and angulations of 324 cervical medial cortical pedicle screws: A possible guide to avoid lateral perforations with use of pedicle screws in lower cervical spine**  
Upendra B., Bijawara M., Sekharappa V., Kumar A.G.C. (IN)
- 15.42 O14 **Comparison of incidence of adjacent segment pathology between single level posterolateral & interbody fusion group of patients**  
Mehata H., Bhojraj S., Chaddha R., Nene A., Nagad P., Patel P., Kashikar A., Akbary K., Kumar N. (IN)
- 15.46 O15 **Lumbar fusion in elderly with comorbidities, is it safe?**  
Upendra B.N., Sekharappa V., Bijawara M., Kumar A. (IN)
- 15.50 **Discussion**
- 16.00 **Break**



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# ASSI Association of Spine Surgeons of India

## Session 4: Cervical spine

Chairs: Volefi S.P. (IN) & Acharya S. (IN)

- 16.30 I15 **Congenital AAI and basilar invagination - Related embryology, evaluation and current treatment protocols**  
Srivastava S. (IN)
- 16.38 I16 **CS palsies after cervical decompressions - Incidence, pathogenesis, prognosis and tips of prevention**  
Acharya S. (IN)
- 16.46 I17 **Access related complications of anterior cervical surgery**  
Babu N. (IN)
- 16.54 I18 **Choice of surgery in OPLL - How to deal with the surgical complications?**  
Kawaguchi Y. (JP)
- 17.06 **Discussion**
- Debate**
- 17.15 **Free hand pedicle screws in the cervical spine is absolutely safe - For and against**  
Bijawara M. (IN) & Kumar V. (IN)
- Free papers IV: Cervical spine**
- 17.30 O16 **Predictors/ Risk factors of poor outcome following an anterior cervical discectomy and fusion - A study of 498 patients**  
Sethi G., McLaughlin S.I., Rajat V., Naveed Y., Saeed M., Irfan S. (IN & UK)
- 17.34 O17 **Identification and validation of self-screening tests for endemic cervical myelopathy**  
Naresh-Babu J., Neelima G., Priyadarshini A., Shabnam A., Anil-Babu P. (IN)
- 17.38 O18 **Transforaminal approach in the cervical spine along with use of cervical pedicle screws - Is it safe?**  
Upendra B., Bijawara M., Sekharappa V., Kumar A.G.C. (IN)
- 17.42 O19 **Is lordosis mandatory for planning a posterior decompressive laminectomy in multilevel cervical spondylotic myelopathy? Evaluation of results with respect to cord shift, postoperative kyphosis and neurological recovery - Minimum 5 yr follow-up**  
Kashikar A.K., Patel P.M., Bhojraj S.Y., Nagad P., Kumar N., Akbary K., Prasad G., Hrushikesh M., Jain A. (IN)
- 17.46 O20 **Evaluation of spinal cord compression on T2-weighted sequences in patients with cervical spondylotic myelopathy using Axion-extension MRI**  
Phadke K., Moolya S., Chhabra H.S. (IN)
- 17.50 **Discussion**



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# ASSI Association of Spine Surgeons of India

## Free papers V: Cervical spine

- 18.00 O21 **Fusion subsidence and alignment in cervical stand alone cage up to 3 levels**  
Shethna S., Dalvie S., Kothari M.K., Tikoo A., Saini P., Shah Y. (IN)
- 18.04 O22 **Accuracy of a dynamic surgical guidance probe for screw insertion in the cervical spine: A cadaveric study**  
Weismann K., Dixon D., Darden B., Casamitjana J., Powell D., Baluch D. (USA & CL)
- 18.08 O23 **Transarticular Axation in paediatric population (< 8 yrs) - A new challenge!**  
Kundnani V., Patil S.N., Gujrathi G., Ruparel S. (IN)
- 18.12 O24 **Socio-economic impact of cervical spinal cord injury operated in patients with lower income group**  
Goel S.A., Modi H., Dave B., Patel P. (IN)
- 18.16 O25 **Algorithms for the effective management of various sub-axial cervical fracture types: Experts clinical consensus**  
Yelamrthy P.K.K., Chhabra H.S., Raghavendra V. (IN)
- 18.20 **Discussion**



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# FIFA Medical and Research Centre

## Symposium: Spine & Football

Chairs: Dvorak J. (CH) & Mayer M. (DE)

- 08.00 I19 **Medicine & science within football / FIFA**  
Dvorak J. (CH)
- 08.10 I20 **Epidemiology of head, neck and trunk injuries in FIFA competitions**  
Junge A. (DE)
- 08.25 I21 **On pitch management of head and neck injuries (Incl. concussion)**  
Feddemann N. (DE), Dvorak J. (CH)
- 08.40 I22 **Epidemiology of back pain in youth soccer players and risk assessment for back pain in soccer**  
Schneider Ch., Mayer M., Dvorak J. (DE & CH)
- 08.55 I23 **The prevalence of back pain in retired professional footballers compared with the general UK male population**  
Fernandes G.S., Parekh S.M., Fuller C.W., Batt M.E., Zhang W., Doherty M. (UK)
- 09.10 I24 **Disc herniations in professional football players**  
Mayer M. (DE)
- 09.20 I25 **Spondylolysis - The hidden pathology in youth football players**  
Mayer M. (DE)
- 09.30 I26 **Concept and background of FIFA 11+ prevention programme, RCT's on male, female and children population**  
Bizzini M. (CH), Dvorak J. (CH)
- 09.45 I27 **Evaluation of the effect of the "FIFA 11+" training programme on isometric force and functional balance of the trunk**  
Schneider Ch., Mayer M. (DE)
- 10.00 **Break**



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## NSpine

### Symposium: Sex and the spine

All you ever wanted to know about sex and the spine but were afraid to ask

#### Session 1

Chair: Boszczyk B. (UK)

- 10.00 Welcome and introduction to sexual health  
Boszczyk B. (UK) & Lee M. (SG)
- 10.20 **I26** History taking using validated sexual health assessment forms in clinical practice  
Dunstan E. (UK)
- 10.40 **I29** Cultural barriers to sexual history taking  
Ismael M. (IT)
- 11.00 **I30** Sexual health in adolescents with idiopathic scoliosis  
Soh R. (SG)
- 11.20 **I31** Body image and sexual health  
Lee M. (SG)
- 11.40 **I32** Surgical scars matter – The impact on body image and sexual health in women  
Hernandez-Sanchez I. (UK) & Czyz M. (UK)
- 12.00 Panel discussion
- 12.30 **Lunch break + Industry workshops**

#### Session 2

Chair: Dunstan E. (UK)

- 14.00 **I33** Sexual dysfunction and low back pain – An underdiagnosed problem?  
Dunstan E. (UK)
- 14.20 **I34** Spinal biomechanics of sex  
Ismael M. (IT)
- 14.40 **I35** Returning to sexual activity following spinal surgery  
Dunstan E. (UK)
- 15.00 **I36** Positional aids and techniques to minimise spinal impact during sexual activity  
Lee M. (SG)
- 15.20 Panel discussion
- 15.40 **Break**



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## Room 3



## Pan Arab Spine Society

### Session 1: Degenerative lumbar

Chairs: Abushaala A. (LY) & Salah H. (EG)

- 08.00 **I43** Lecture: MIS lumbar spine  
Alves O. (PT)
- 08.15 **O26** **Free papers**  
Mini open lumbar discectomy, long term follow up  
Benzakour T., Benzakour A. (MA)
- 08.23 **O27** Instrumented reduction and TLIF for adult grade four isthmic spondylolisthesis  
Salah H. (EG)
- 08.31 **O28** 6 Years results with interlaminar disc assistance implant "IntraSPINE"  
Guizzardi G. (IT)
- 08.39 **Discussion**
- Debate: Low grade spondylolisthesis – Interbody fusion needed? Always...** – Alves O. (PT)
- 09.00 **Sometimes...** – Salah H. (EG)
- Case scenarios**  
Abushaala A. (LY)
- 09.10 **Presentation of 2 cases**
- 09.40 **Break**
- Session 2: Tumors**  
Chairs: Batterjee K. (SA) & Elzoubi Z. (JO)
- 10.30 **I44** Lecture: En-bloc vertebrectomy – When & how  
Salah H. (EG)
- 10.45 **O29** **Free papers**  
Complete intra-lesional resection for aneurysmal bone cyst of the spine - A personal experience of 15 consecutive patients  
Salah H. (EG)
- 10.53 **O30** Metastatic spinal tumors - Surgical strategy  
Brodzinsky Z. (AE)
- 11.01 **Discussion**
- Debate: Thoracolumbar metastases: Corpectomy? Commonly needed** - Emran I. (EG)
- 11.20 **Rarely needed** - Salah H. (EG)



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## NSpine

### Session 3

Chair: Tsegaye M. (UK)

- 16.00 **I37** Physiology of female and male sexuality  
Lee M. (SG)
- 16.20 **I38** Understanding anterior spinal surgery hypogastric plexus lesions in men and women  
Boszczyk B. (UK)
- 16.40 **I39** Survey results on female sexual disorders arising from anterior spinal surgery  
Hernandez-Sanchez I. (UK) & Czyz M. (UK)
- 17.00 **I40** Cauda equina syndrome and sexual health  
Tsegaye M. (UK)
- 17.20 **I41** Treatment options in men with sexual dysfunction arising from neural injury  
Tan R. (SG)
- 17.40 **I42** Treatment concepts and techniques in sexual therapy  
Lee M. (SG)
- 18.00 **Panel discussion**
- 18.20 **Close**



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## Room 3



## Pan Arab Spine Society

### Case scenarios

Salah H. (EG)

- 11.30 **Presentation of 2 cases**
- 12.00 **Lunch break + Industry workshops**
- Session 3: Spinal infections**  
Chairs: Kharat K. (LB) & Salah H. (EG)
- 14.00 **I45** Lecture: Spinal TB management challenges – Past to present  
Salah H. (EG)
- 14.15 **O31** **Free paper**  
Management of postoperative spine wound infections using vacuum assisted closure (VAC) therapy  
Lee R.S., Street J., Boyd M.C., Kwon B., Dvorak M., Fisher C., Paquette S. (UK & CA)
- 14.23 **Discussion**
- Debate: Surgery for thoracolumbar spinal TB: Anterior vs posterior surgery**  
Anterior surgery - Alzobi Z. (JO)
- 14.30 **Posterior surgery** - Elsebae H. (EG)
- 14.40 **Combined anterior & posterior surgery** - Batterjee K. (SA)
- Case scenarios**  
Emran I. (EG)
- 15.00 **Presentation of 2 cases**
- 15.30 **Break**
- Session 4: Complications**  
Chairs: Alves O. (PT) & Elsebae H. (EG)
- Debate: Local vancomycin for infection prevention**  
For - Batterjee K. (SA)
- 16.30 **Against** - Lee R. (UK)
- 16.40 **My worst case**  
Salah H. (EG)
- 16.50 **Presentation of 2 cases**
- 17.30 **Wrap up & Adjourn**



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## Chinese Association of Orthopedic Surgeons

- 08:00 Welcoming address & introduction of CAOS  
Liang Y. (CN)
- Session 1**  
Chairs: Rong L. (CN) & Zhao J. (CN)
- 08:10 **I46** The fate of L5/S1 disc after long fusion to L5 in degenerative scoliosis  
Hai Y. (CN)
- 08:22 **I47** Minimally invasive correction of degenerative deformity: Preliminary EOS study  
Liang Y. (CN)
- 08:34 **I48** Selective thoracic fusion for scoliosis with Chiari malformation and syringomyelia: 2-11 Years follow-up  
Yu K. (CN)
- 08:46 **I49** Adult scoliosis patients with pre-operative frontal imbalance: Options for surgical management  
Liu Z. (CN)
- 08:58 **I50** Posterior unilateral pedicle subtraction osteotomy of hemivertebra and short segment fusion for correction of the adolescent/adult congenital spinal surgery  
Li X. (CN)
- 09:10 Discussion
- 09:20 **Break**
- Session 2**  
Chairs: Hai Y. (CN) & Wang H. (CN)
- 09:30 **I51** The anatomical studies of bony structures atlas and options for the internal fixation  
Wang H. (CN)
- 09:42 **I52** Measurement of lumbar intervertebral space height in normal adults and definition of high lumbar intervertebral space  
Zhao J. (CN)
- 09:54 **I53** Postoperative contralateral radiculopathy following MIS-TLIF  
Rong L. (CN)
- 10:06 **I54** Disc herniation resorption after cervical laminoplasty  
Wu W. (CN)
- 10:18 **I55** Percutaneous anterior odontoid screw fixation: Technique and long-term results in 122 patients  
Wang X.Y., Chi Y.L., Xu H.Z., Lin Y. (CN)
- 10:30 Discussion



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## Africa Spine

- 08:30 Introduction of the AfricaSpine sessions  
Benzakour T. (MA), Otsyeno F. (KE), Moumouni A.E.K. (TG), N'dri Oka D. (CI), Hamidani M. (DZ)
- Welcome presentation  
Benzakour T. (MA)
- Session 1: Trauma**  
Chairs: Benzakour T. (MA), Moumouni A.E.K. (TG) & Elnoamany H. (EG)
- 08:45 **O36** Treatment of odontoid fractures by anterior odontoid screw fixation  
Salah H., Bhawary Y. (EG)
- 09:00 **O37** Thoracolumbar fractures, posterior fixation  
Benzakour T., Benzakour A. (MA)
- 09:15 **O38** Percutaneous stabilization of thoracic and lumbar spine fractures  
Salah H., Bhawary Y. (EG)
- 09:30 Panel discussion
- 09:45 **Break**
- Session 2: Degenerative & deformity**  
Chairs: Abushaala A. (LY), Guizzardi G. (IT) & Sharma A. (IN)
- 10:15 **O39** Management of early aggressive scoliosis  
Alzoubi Z.M. (JO)
- 10:30 **O40** Study of functional outcome of anterior cervical decompression and fusion using tricortical iliac bone graft for degenerative cervical spondylotic myelopathy with modified Japanese orthopedic association score  
Sharma A., Singh V. (IN)
- 10:45 **O41** Interspinous vs new interlaminar device in the lumbar DDD  
Guizzardi G. (IT)
- 11:00 Panel discussion



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## Chinese Association of Orthopedic Surgeons

- Session 3: Free papers**  
Chairs: Hai Y. (CN) & Wang H. (CN)
- 10:40 **O32** Unilateral posterior vertebral column resection for severe thoracolumbar kyphotic deformity caused by old compressive vertebrae fracture  
Wang H., Ding W.Y. (CN)
- 10:52 **O33** Unplanned reoperation of lumbar spinal surgery during the primary admission: A multicenter study based on a large patient population  
Huang S.H., Liu Z.L., Liu J.M., Deng H.L. (CN)
- 11:04 **O34** Biomechanical study of using translaminar facet screw coupled with unilateral pedicle screw in transforaminal lumbar interbody fusion  
Zhang W., Mo J.Q., Luo Z.P. (CN)
- 11:16 **O35** The therapeutic strategy for degenerative deformity: Is correction necessary?  
Liu B., Han W., Wang L., Cui W., Kang W. (CN)
- 11:28 Discussion
- 11:45 Closing remarks  
Liang Y. (CN)
- 12:30 **Lunch break + Industry workshops**



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## Africa Spine

- Session 3: Spinal tumors**  
Chairs: N'dri Oka D. (CI) & Naresh-Babu J. (IN)
- 11:15 **O42** Solitary plasmacytoma of the spine: Piecemeal excision followed by radiotherapy  
Abdel-Wanis M.E. (EG)
- 11:30 **O43** En-block sacrectomy by combined anterior and posterior approach for sacral chordoma  
Bhani M., Naresh-Babu J., Anil-Babu P. (IN)
- 11:45 Panel discussion
- Session 4: Keynote invited speaker lecture**  
Chairs: Benzakour T. (MA) & Otsyeno F. (KE)
- 12:00 **I56** Spinal tuberculosis in Africa, the third killer  
Salah H. (EG)
- 12:30 **Lunch break + Industry workshops**
- Session 5: Spinal infections**  
Chairs: Otsyeno F. (KE) & Vishnu Prasad C.S. (IN)
- 14:00 **O44** Implant infections: Comparison between the use of stainless steel and titanium spinal implants  
Otsyeno F., Mwangi G.P. (KE)
- 14:15 **O45** Single stage posterior only approach in surgical treatment of spinal tuberculosis  
Vishnu Prasad C.S. (IN)
- 14:30 **O46** Combined anterior and posterior versus all posterior approach for surgical treatment of thoracolumbar tuberculosis: An analysis of our outcomes  
Otsyeno F., Mwangi P. (KE)
- 14:45 Panel discussion
- 15:00 **Break**



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**Africa Spine**

**Session 6: Symposium on "spinal metastases": Diagnosis & treatment**  
 Chairs: Hamidani M. (DZ), Abdel-Wanis M.E. (EG) & Alzoubi Z.M. (JO)

- 15:30 Introduction and fundamental issues  
Benzakour T. (MA)
- 15:35 157 Clinical diagnosis and imaging  
Otsyeno F. (KE)
- 15:50 158 Treatment of spinal metastases: Chemotherapy and radiotherapy / Posterior and anterior surgical approaches  
Abdel-Wanis M.E. (EG)
- 16:10 159 Surgical cementoplasty on metastasis management / Vertebroplasty kyphoplasty  
N'dri Oka D. (CI)
- 16:20 147 Percutaneous selective vertebroplasty: State-of-the-art management in well contained metastatic vertebral lesions  
Enoamany H. (EG)
- 16:35 148 Results of treatment / Prognosis and indications  
Hamidani M. (DZ)
- 16:55 Conclusions  
Benzakour T. (MA)
- 17:00 Panel discussion
- 17:15 Adjoin of the AfricaSpine sessions  
Benzakour T. (MA), Otsyeno F. (KE), N'dri Oka D. (CI), Mougouni A.E.K. (TG), Hamidani M. (DZ)

Tuesday, May 17  
 ScientiAc Program

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
	ASSI	KSSS	PASS	ESJ	ISSLS FOCUS GROUP
10.00	Break				
	ASSI	KSSS	PASS	ESJ	ISSLS FOCUS GROUP
12.30	Lunch break + Industry workshops				
	ASSI	ISSLS	PASS	SBC & SILACO	SMISS
16.00	Break				
	ASSI	ISSLS	PASS	SBC & SILACO	SMISS

**ASSI Association of Spine Surgeons of India**

**Session 1: ASSI Award presentations**  
 Chairs: Chaddha R. (IN) & Chhabra H.S. (IN)

- 08:00 144 ASSI - Publication Award - Best Paper: Genetic susceptibility of lumbar degenerative disc disease in young Indian adults  
Rajasekaran S. (IN)
- 08:10 161 ASSI - Clinical Research Award: Validation of simplified sub axial cervical and thoraco lumbar spine fracture classification systems  
Chhabra H.S. (IN)
- 08:20 153 ASSI - Basic Science Research Award: Role of human umbilical cord blood stem cells and neural stem cells in neuronal regeneration and functional restoration: A comparative study in male adult rats with acute spinal cord injuries  
Sinha S. (IN)
- 08:30 168 ASSI - Young Investigators Award: Analysis of spinopelvic parameters with L5 is the new sacrum after fusion in high grade spondylolisthesis - An explanation of satisfactory results with in-situ fusion  
Aiyer S.N. (IN)
- 08:40 144 IASA/ASSI - Research Award: Correlation of Diffusion Tensor Imaging (DTI) tractography with neurological status in patients with dorsal spine tuberculosis with neurodeAcit and its role in predicting postoperative neurological recovery  
Kumar K. (IN)
- 08:50 ASSI Presidential Oration: Introduction  
Chadda R. (IN)
- 08:55 165 ASSI Presidential Oration: Spine surgery in the next decade - Challenges and solutions  
Rajasekaran S. (IN)
- VII Gold Medal Papers**
- 09:10 149 How does the sagittal profile change with lumbar surgical decompression without fusion? A preliminary report of an ongoing prospective study  
Pithwa Y.K. (IN)
- 09:18 150 Analysis of sagittal alignment of spinal column at the apex during VCR in rigid post tubercular kyphosis  
Sivastava S.K., Aggarwal R.A. (IN)
- 09:26 151 Single stage reduction and stabilization of subaxial cervical facet dislocations by posterior only approach using pedicle screws  
Upendra B.N., Sekharappa V., Bijawara M., Upendra B., Kumar A. (IN)
- 09:34 152 Prediction of posterior ligamentous complex injury in thoraco-lumbar fractures using non-MRI imaging techniques  
Aiyer S.N., Maheswaran A., Kanna R.M., Shetty A.P., Rajasekaran S. (IN)
- 09:42 153 Computed tomography based study on feasibility of C1 posterior arch screw Axation  
Gururaj G., Chhabra H.S. (IN)
- 09:50 154 Is healing on MRI mandatory for discontinuing ATT in tuberculosis of spine?  
Murugan Y., Krishnan V., Amritanand R. (IN)
- 10:00 Break

**ASSI Association of Spine Surgeons of India**

**Session 2: Choice of surgery**  
 Chairs: Kumar V. (IN) & Nene A. (IN)

- 10:30 164 EOS - Rib to spine vs spine to spine constructs  
Voleti S.P. (IN)
- 10:38 157 Cervical disc prolapse with radiculopathy - ACDF vs TDR  
Kulkarni A. (IN)
- 10:46 166 Monosegmental vs polysegmental fusion in high grade spondylolisthesis  
Amritanand R. (IN)
- 10:54 169 Vertebroplasty vs kyphoplasty  
Dalvie S. (IN)
- 11:02 176 Fixed AAD with BI - Post alone vs ant + post surgery  
Bapat M. (IN)
- 11:10 Discussion
- 11:30 171 **How I do it - Videos**  
C1/C2 fusion, VATS for thoracic TB, Transpedicular discectomy for DL junction disc prolapse, arthro-endoscopic decompression in degenerative LCS  
Kundnani V., Singh R., Bhatote H.S., Kaushal M. (IN)
- Free papers VI: Spinal deformity/osteoporosis**
- 12:00 155 Management of severe and rigid scoliosis by less invasive release and osteotomies  
Jhala A.C., Mistry M., Patel D.K. (IN)
- 12:04 156 Development of database for scoliosis patients: Early results from a tertiary care spinal deformity centre  
Kandwal P., Vijayaraghavan G., Ragu Kuma S.N., Jayaswal A. (IN)
- 12:08 157 Operative treatment of plasmacytoma, multiple myeloma - An experience of 27 patients  
Kashikar A.K., Bhojraj S.Y., Mohite S., Nagad P., Patel P., Kumar N., Akbary K., Mehata H.
- 12:12 158 Analysis of cement leakage in 140 consecutive patients of Percutaneous Vertebroplasty (VTP) for osteoporotic Vertebral Compression Fractures (VCF) by a single surgeon in a single centre - Does surgeon experience play a role?  
Suri T., Basu S., Ahmed R., Kondety S.K.C., Biswas A., Kesharwani S. (IN)
- 12:16 159 Use of sublamina wires and spinal loop rectangle in the management of osteoporotic vertebral fractures with neurological deAcit or instability  
Kashikar A.K., Kumar N., Patel P.M., Bhojraj S.Y., Nagad P., Akbary K., Prasad G., Hrushikesh M. (IN)
- 12:20 Discussion
- 12:30 Lunch break + Industry workshops

Monday  
 Tuesday  
 Wednesday  
 Thursday  
 Friday  
 Posters  
 Workshops  
 Monday  
 Tuesday  
 Wednesday  
 Thursday  
 Friday  
 Posters  
 Meetings

# ASSI Association of Spine Surgeons of India

## Session 3: Adult deformity

Chairs: Jayaswal A. (IN) & Ahmed A. (IN)

- 14.00 **065** MIS options in adult spinal deformity - Magic or gimmick  
Mehta J. (IN)
- 14.12 **063** Chin on chest deformity revisited  
Abumi K. (JP)
- 14.24 **064** Sagittal and sacropelvic parameters in adult spinal deformity - Do they have any clinical relevance?  
Lamartina C. (IT)
- 14.36 **068** Osteotomies in the spine, classification, usage, techniques and complications  
Berjano P. (IT)
- 15.00 **069** Case Discussion - Nanda A., Suri T., Srinivasan P. (IN)

## Free papers VII: Spinal deformity

- 15.30 **061** Comparison of thoracoscopic assisted anterior instrumentation with posterior all hooks / hybrid and all pedicle screw instrumentation for treatment of adolescent idiopathic scoliosis: Surgical & radiological outcome with minimum 5-year follow-up  
Kandwal P., Ruiz J.N.M., Lu G., Liang Z.C., Wong H.K. (IN & SG)
- 15.34 **061** Outcome of selective lumbar fusion and anterior instrumentation in lumbar scoliosis  
Kandwal P., Vijayaraghavan G., Ankur Goswami A., Jayswal A. (IN)
- 15.38 **062** Correlation of scoliosis curve correction with implant density in 36 cases of adolescent idiopathic scoliosis  
Jhala A.C., Mistry M., Patel D.K. (IN)
- 15.42 **063** Use of three column osteotomies in severe, rigid kyphotic spinal deformities  
Garg B. (IN)
- 15.46 **064** Prevention of PJK and PJF - Biomechanics research  
Basankin I.V., Takhmazyan K.K., Afaunov A.A., Shapovalov V.K., Malakhov S.B., Ponkina O.N. (RU)

Discussion

16.00 **Break**

## Session 4: Pediatric deformity

Chairs: Kailash K. (IN) & Jhala A. (IN)

- 16.30 **076** Physiology of growth of the spine and thorax - Its correlation of the management of paediatric deformities  
Basu S. (IN)
- 16.40 **077** Lenke 5 C curves - Ant vs post surgery  
Wong H.K. (SG)
- 16.52 **078** How does the Lenke Classification provide a template for selective thoracic / lumbar fusion  
Luk K. (HK)
- 17.04 **079** Complications of growing rods - Has the Magec Rod overcome all of it?  
Cheung K. (HK)
- 17.16 **Discussion**
- 17.40 **GB meeting**



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# Korean Society of Spine Surgery

- 08.42 **076** Efficacy of ankle brachial index in determining peripheral arterial occlusive disease in patients with lumbar spinal stenosis  
Park S.Y., Suh S.W., Hong J.Y., Lee H.M. (KR)
- 08.46 **077** Hand grip strength correlates with surgical outcome in female patients with lumbar spinal stenosis  
Kim T.H., Yang J.H., Moon S.H., Ki C.H., Hong S.H., Suk K.S., Kim H.S., Lee H.M., Kang Y.M., Kim J.H., Choi H.J. (KR)
- 08.50 **Discussion**

## Free paper session 4: Lumbar spine II

Chairs: Lee H.M. (KR) & Jeon C.H. (KR)

- 09.00 **080** Analysis of risk factors for early adjacent segment disease underwent revision surgery within 5 years after lumbar spinal fusion  
Soh J., Kim H., Lee J.C., Shin B.J. (KR)
- 09.04 **079** Relation between adjacent superior segmental disease and facet joint violations after lumbar fusion  
Kim M.W., Lee K.Y. (KR)
- 09.08 **080** Comparison of posterior lumbar interbody fusion and posterolateral lumbar fusion in monosegmental vacuum phenomenon within an intervertebral disc  
Baik J.M., An K.C., Park D.H., Kim J.G. (KR)
- 09.12 **081** Infection following percutaneous vertebral augmentation with polymethylmethacrylate  
Lee H.J., Chang B.S., Park S.M., Park J.W., Kwon Y.E., Kim H., Lee C.K. (KR)
- 09.16 **Discussion**

## Free paper session 5: Pediatric spinal deformity

Chairs: Cho K.J. (KR) & Kim H.S. (KR)

- 09.30 **082** Comparative analysis of shoulder balance by different surgical methods in the treatment of double thoracic AIS  
Chang D.G., Kim J.H., Na K.H., Lee J.H., Lim D.J., Suk S.I. (KR)
- 09.34 **083** Is it enough to stop distal fusion at L3 in adolescent idiopathic scoliosis with major thoraco lumbar/lumbar curves?  
Lee C.S., Ha J.K., Hwang C.J., Lee D.H., Cho J.H. (KR)
- 09.38 **084** Clinical and radiological changes observed during long-term follow-up of pediatric scoliosis patients treated with growing rod technique  
Kim H.S., Suk K.S., Jin S.Y., Park S.J., Lee H.M., Moon S.H., Ahn K.C., Shin D.E. (KR)
- 09.42 **085** Indigenous growing rod technique for early onset scoliosis: Radiological outcome and technical considerations  
Nares-Babu J., Cheekatla S., Anil-Babu P., Bihani M. (IN)



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# Korean Society of Spine Surgery

## Free paper session 1:

Cervical spine I - Diagnosis & radiographic evaluation

Chairs: Park H.J. (KR) & Park J.B. (KR)

- 07.30 **065** Inter- and intraobserver reliability between 3 types classification system of cervical spinal stenosis  
Ko S., Kim M., An J. (KR)
- 07.35 **066** What is the most accurate radiographic anterior cervical fusion criteria?  
Song K. (KR)
- 07.40 **067** Radiographic dimensional analysis of open door laminoplasty with pre-contoured plate in cervical spondylotic myelopathy  
Min W.K. (KR)
- 07.45 **068** Efficacy and safety of drain after anterior cervical discectomy and fusion in degenerative cervical spinal diseases  
Ko J.H., Kwon T.Y., Song K.J. (KR)
- 07.50 **Discussion**

## Free paper session 2: Cervical spine II - Surgical technique

Chairs: Suk K.S. (KR) & Yeom J.S. (KR)

- 08.00 **069** Distraction arthrodesis of the atlantoaxial facet joint with preservation of the C2 root for the management of intractable occipital neuralgia caused by C2 root compression  
Oh S.C., Kang S.S., Rew K.D., Yi J., Lee G.W., Yeom A., Li Q.Y., Han H.S., Ahn H., Chang B., Lee C., Kim H., Yeom J.S. (KR)
- 08.05 **070** Reoperation rates after anterior cervical discectomy and fusion for cervical spondylotic radiculopathy and myelopathy: A national population-based study  
Park M.S., Ju Y.S., Moon S.H., Kim T.H., Oh J.K., Makhni M.C., Rew K.D. (KR & US)
- 08.10 **071** 540° cervical realignment procedure for extensive cervical OPLL with kyphotic deformity  
Lee S.H., Kim K.T., Kang K.C., Lee J.H., Hwang S.P., Jang S.J., Lee W.G. A.B. (KR)
- 08.15 **072** Can we prevent a postoperative spinal epidural hematoma by using larger diameter suction drains?  
Ahn D.K., Chang B.K., Lee J.I. (KR)
- 08.20 **Discussion**

## Free paper session 3: Lumbar spine I

Chairs: Shin B.J. (KR) & Chang B.S. (KR)

- 08.30 **073** Preemptive multimodal analgesia for postoperative pain management after lumbar fusion surgery: A randomized controlled trial  
Oh I.S., Kim S.I., Kim Y.H., Ha K.Y. (KR)
- 08.34 **074** Efficacy and safety of demineralized bone matrix for lumbar posterolateral fusion  
Ahn J.S., Lee H.J., Park E., Shin B., Song K.S. (KR)
- 08.38 **075** An in-vivo animal model of paraspinal muscle weakness induced by botulinum toxin for a study of disc degeneration  
Han S.K., Kim Y., Lee S.R., Chang K.T., Chun K. (KR)



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# Korean Society of Spine Surgery

- 09.46 **086** Adolescent idiopathic scoliosis surgery using minimal invasive surgery technique: A case series study  
Suh S.W., Yang J.H., Chang D.G., Kim S.H., Ham C.H. (KR)
- 09.50 **Discussion**
- 10.00 **Break**

## Free paper session 6: Adult spinal deformity

Chairs: Kee-Yong Ha K.Y. (KR) & Lee C.S. (KR)

- 10.30 **087** Jack-knife posture after correction surgery for degenerative sagittal imbalance - Is it always caused by spinopelvic malalignment?  
Kim S.I., Ha K.Y., Kim Y.H. (KR)
- 10.34 **088** Different risk factors of proximal junctional kyphosis (PJK) and proximal junctional failure (PJF) following long instrumented fusion to the sacrum for degenerative adult spinal deformity: Survivorship analysis of 160 patients  
Park S.J., Lee C.S., Chung S.S., Park H.J. (KR)
- 10.38 **089** Validation of current spinopelvic parameters using inter-observer and CT-radiography based variability  
Park S.A., Kwak D.S., Kim J.Y. (KR)
- 10.42 **090** Anterior & posterior fusion versus posterior fusion only for adult degenerative lumbar scoliosis  
Cho K.J., Kim Y.T., Hong T.H. (KR)
- 10.46 **091** Effect of the contracted flexed osteoarthritic knee on the sagittal alignment of spine and pelvis  
Kim Y.B.B., Kang G., Lee Y., Ko Y. (KR)
- 10.50 **Discussion**
- Symposium I: Endoscopic spinal surgery**  
Chairs: Kim W.J. (KR) & Yung Park Y. (KR)
- 11.00 **080** Can posterior full endoscopic surgery replace open surgery for cervical disc herniation?  
Shin K.H. (KR)
- 11.08 **081** Selection of lumbar endoscopic approach according to the various type of disc herniation  
Kwon Y.S. (KR)
- 11.16 **Discussion**



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**Korean Society of Spine Surgery**

**Symposium II: Minimally Invasive Spinal Fusion**  
Chairs: Rhyu K.W. (KR) & Jun D.S. (KR)

- 11.20 165 Posterior surgical options after minimally invasive multi-level anterolateral interbody fusion for adult spinal deformity - Open versus percutaneous pedicle screw instrumentation  
Park S.J. (KR)
- 11.28 166 Is indirect neural decompression sufficient after lateral lumbar interbody fusion? Indication for additional direct posterior decompression  
Hong J.Y. (KR)
- 11.36 167 L5-S1 fusion options after multi-level minimally invasive lateral interbody fusion: Open PLIF, MIS TLIF, or OLIF  
Lee J.C. (KR)
- 11.44 168 Best case scenario for cortical screw fixation in the treatment of various lumbar diseases  
Kim S.W. (KR)
- 11.52 Discussion
- 12.00 Adjourn
- 12.30 Lunch break + Industry workshops

**The International Society for the Study of the Lumbar Spine**

- 14.00 Welcome  
Local Hosts
- 14.05 Report from program chairman  
Roberts S. (UK)
- Session 1: Disc herniation**  
Chairs: Kang J. (US) & Yoon T. (US)
- 14.15 092 Different loading combinations are associated with different injury risk of the intervertebral disc  
Wilke H.J., Berger-Roscher N., Casaroli G., Rasche V., Galbusera F. (DE)
- 14.22 093 Structural properties and failure mechanisms of the human intervertebral disc-vertebra interface  
Berg-Johansen B., Fields A., Lotz J. (US)
- 14.29 094 Diffusion tensor imaging of lumbar spinal nerves in patients with lumbar disc herniation  
Chiou S.Y., Hellyer P., Sharp D., Newbould R., Strutton P. (UK)
- 14.36 Discussion
- 14.45 095 Short (2 weeks) vs. long (6 weeks) postoperative restrictions following lumbar discectomy: A prospective randomized control study  
Bono C.M., Leonard D.A., Schoenfeld A.J., Cha T.D., McGuire K.J., Harris M.B. (US)
- 14.52 096 Introduction of the Barricaid annular closure device - Caution with new technology  
Licina P., Johnston E. (AU)
- 14.59 097 Effectiveness and cost-effectiveness of referral for early rehabilitation after lumbar discectomy  
van Tulder M., Oosterhuis T., Ostelo R., van Dongen J., Peul W., de Boer M., Vleggeert-Lankamp C., Arts M. (NL)
- 15.06 Discussion
- Session 2: Mechanics & ligamentum flavum**  
Chairs: Hashizume H. (JP) & Oxland T. (CA)
- 15.15 098 Simulating the unique, nonlinear dynamics of the human lumbar intervertebral disc during vibration  
Ferguson S., Marini G., Huber G., Püschel K. (CH)
- 15.22 099 Compression-torsion mechanical properties of the human intervertebral disc joint  
O'Connell G., Bezi S. (US)
- 15.29 100 A paradigm shift of ligamentum flavum hypertrophy analysis: The hypertrophic activity  
Hur J.W., Lee J.B., Cho T.H., Chung Y.G., Park J.Y. (KR)
- 15.36 Discussion
- 15.45 Break

**The International Society for the Study of the Lumbar Spine**

**Session 3: Osteoporosis**  
Chairs: Blumenthal S. (US) & Orita S. (JP)

- 16.15 101 Lateral measurement of lumbar bone mineral density can potentially improve the estimation of fracture risk in early postmenopausal women and patients with severe osteoporosis - A study of 2281 cases  
Ishikawa T., Aramomi M. (JP)
- 16.22 102 Osteoporosis-related radiating pain following ovariectomy in mice is attenuated by pregabalin and bisphosphonates  
Suzuki M., Millecamps M., Ohtori S., Mori C., Stone LS. (JP)
- 16.29 103 Characteristic and natural course of MR findings in osteoporotic vertebral fracture - A multicenter prospective cohort study between 2012 and 2015  
Takahashi S., Hoshino M., Toyoda H., Takayama K., Iseki K., Tsujio T., Sasaoka R., Yasuda R., Kanematsu F., Kohno H., Nakamura H. (JP)
- 16.36 104 Changes in the incidence of vertebral fractures in a population-based cohort study of the elderly  
Yamada J., Akeda K., Nakase K., Sudo A. (JP)
- 16.43 105 The effect of teriparatide on fracture healing of vertebral compression fracture in postmenopausal women  
Park S.Y., Suh S., Hong J.Y., Kim Y.R. (KR)
- 16.48 Discussion
- Invited lecture 1  
Chair: Hu S. (US)
- 17.00 186 Reversing ageing is inevitable  
Tucker S. (SG)
- 17.30 First business meeting (members only)

**Pan Arab Spine Society**

**Session 5: Early onset scoliosis**  
Chairs: Kharat K. (LB) & Ventura N. (ES)

- 08.00 187 Lecture: Casting for early onset scoliosis - A role to play  
Ventura N. (ES)
- 08.15 106 Free paper  
The results of Shilla technique growing rod in juvenile scoliosis  
Kharat K., Ghosine B., Sebaaly A., Kreichati G. (LB)
- 08.23 Discussion
- 08.30 Debate: Selection of instrumentation for early onset scoliosis  
Growing rods - Ebebae H. (EG)
- 08.40 Trolley (Shilla) - Kharat K. (LB)
- 08.50 VEPR - Ventura N. (ES)
- 09.00 The 3 hook construct - Azmy A. (PS)
- Case scenarios  
Azmy A. (PS)
- 09.10 Presentation of 2 cases
- 09.40 Break
- Session 6: AIS**  
Chairs: Benzakour T. (MA) & Salah H. (EG)
- 10.30 188 Lecture: Surgical strategies in AIS  
Ventura N. (ES)
- Free papers  
The choice of lower instrumented vertebra in AIS - Comparison of Lenke, Suk and Dubouset criteria  
Kharat K., Rizkallah M., Sebaaly A., Kreichati G. (LB)
- 10.53 108 Surgical management of difficult and rigid scoliosis with 100 patients in the Arab world  
Alzoubi Z. (JO)
- 11.01 Discussion
- Debate: Instrumentation for AIS - How dense does it need to be?  
Higher density, the better  
Ventura N. (ES)
- 11.20 Less density gives equal results  
Ebebae H. (EG)



## Pan Arab Spine Society

Case scenarios  
Kharat K. (LB)

11.30 Presentation of 2 cases

12.00 Lunch break + Industry workshops

Session 7: Adult deformity

Chairs: Elsebae H. (EG) & Alves O. (PT)

14.00 189 Lecture: Pelvic parameters & sagittal balance  
Emran I. (EG)

Free paper

14.15 1109 Surgical management of adult presenting congenital spine deformities  
Salah H. (EG)

14.25 Discussion

Case scenarios  
Abushala A. (LY)

14.45 Presentation of 2 cases

15.15 Break

Session 8: Spinal osteotomies

Chairs: Batterjee K. (SA) & Elkoubi Z. (JO)

16.30 190 Lecture: Spinal osteotomies – An overview  
Salah H. (EG)

16.45 191 Lecture: PSO – Tips and tricks  
Salah H. (EG)

17.00 Discussion

Case scenarios  
Salah H. (EG)

17.10 Presentation of 2 cases

17.40 Wrap up & adjourn



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## Room 4



## La Sociedad Ibero Latinoamericana de Columna Sociedade Brasileira de Coluna

Session 1

Chair: Fogaça A. (BR)

14.00 1110 Distraction lengthening plus dynamic self-growing instrumentation for early onset scoliosis (EOS) in neuromuscular patients  
Segal ED., Couto J.C. (AR)

14.08 1111 Triggered EMG threshold from axillary chest wall electrodes for upper thoracic pedicle screws: Preliminary data  
Weissmann K.A., Descaseaux F., Costa M., Huaquilaf C., Zarate A., Baraza G. (CL)

14.16 1112 Underfunding of spinal deformities treatment and its consequences  
DeAño H., Nunes A.A., Bressan Neto M. (BR)

14.24 1113 Primary spinal tumors in children and young adults – Twenty eight patients with a minimum of one year of follow-up  
Tavares Canto F.R., Lajolo P., Alves A., Chioatto M., Reggiani R., Pinheiro C., Bueno M. (BR)

14.32 1114 Isolated fracture of transverse process of lumbar vertebra in professional soccer player: Case report and literature review  
Vaz de Lima M. (BR)

Session 2

Chair: Volpi M. (BR)

14.40 0115 Three-dimensional anatomical study of Ligamentum Flavum in cervical spine  
Rahmani S.M., Terai H., Suzuki A., Toyoda H., Hoshino M., Tamai K., Akhgar J., Hayashi K., Nakamura H. (JP)

14.48 0116 Effect of hypovolemia on traumatic spinal cord injury  
DeAño H., Sampaio O.C., Guimarães EADBB (BR)

14.56 0117 The relationship between central motor conduction time and spinal cord compression in patients with cervical spondylotic myelopathy  
Rikita T., Tanaka N., Nakanishi K., Kamei N., Sumiyoshi N., Kotaka S., Ochi M. (JP)

15.04 0118 Invertebrate atlanto-axial subluxation treated conservatively: Experience in 3 cases and review of the literature  
Weissmann K.A., Huaquilaf C., Costa M., Descaseaux F. (CL)

15.12 0119 The use of teriparatide in delayed case of type odontoid fractures - A case report  
Ura K., Kuroki K., Kanayama M., Oha F., Shimamura Y., Hisada Y., Tashiro K., Suzuki Y., Hashimoto T., Iwasaki N. (JP)



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## European Spine Journal

Spine science forum: Meet the experts

Osteotomies and alternative techniques in the correction of adult deformity

Chairs: Lamartina C. (IT) & Berjano P. (IT)

Session 1: Cervicalthoracic deformity

08.00 192 Opening lecture: Cervical alignment – What parameters should we consider?  
Le Huec J.C. (FR)

08.20 Discussion

Case-based topic discussions

08.30 Topic 1 - Cervical osteotomies in sagittal imbalance  
Viale L. (BR)

09.20 Topic 2 - Osteotomies in the upper thoracic spine  
Le Huec J.C. (FR)

10.10 Break

Session 2: Thoracolumbar deformity

10.30 193 Opening lecture: Open standing MRI for the evaluation adult and adolescent deformity  
Zerbi A. (IT)

10.45 Discussion

Case-based topic discussions

10.55 Topic 3 - Anterior techniques and percutaneous posterior instrumentation for sagittal malalignment  
Berjano P. (IT)

11.45 Topic 4 - PSO avoidance with anterior release techniques in revision cases with sagittal imbalance  
Lamartina C. (IT)

12.35 Closing remarks

12.45 Lunch break + Industry workshops



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## Room 4



## La Sociedad Ibero Latinoamericana de Columna Sociedade Brasileira de Coluna

Session 3

Chair: DeAño H. (BR)

15.20 1115 Prospective analysis of cages self-blocker stand alone for use in cervical degenerative diseases  
Santana Carvalho F., Goncalves de oliveira S., Franco T.R., Viana Simoes M., Cantisani Neto J. (BR)

15.28 1116 Treatment of symptomatic lumbar stenosis with endoscopy  
Ramirez J.F., Prada N., Ramirez C., Rugeles J.G., Alonso G.O. (CO)

15.36 1117 Cervical endoscopy for degenerative disc disease  
Ramirez J.F., Prada N., Ramirez C., Rugeles J.G., Alonso G.O. (CO)

15.44 1118 Non-endoscopic anterior percutaneous thermocoagulation for cervical discogenic pain – Description of the modified technique and results after six year follow-up  
Ramirez J.F., Prada N., Ramirez C., Rugeles J.G., Alonso G.O. (CO)

15.52 1119 Complications from non-endoscopic percutaneous thermocoagulation for the treatment of discogenic LBP - Comparison of laser vs radiofrequency in 21 years of experience  
Ramirez J.F., Prada N., Ramirez C., Rugeles J.G., Alonso G.O. (CO)

16.00 Break

Session 4

Chair: Ramirez J.F. (CO)

16.30 0125 Modic type 1 signal change on the posterior elements of the lumbar spine  
Sugiura K., Sakai T., Abe M., Yamashita K., Takata Y., Higashino K., Nagamachi A., Saiyori K. (JP)

16.38 0126 Treatment of low back pain secondary to facet osteoarthritis - 8 Years of experience of 360° facet rhizotomy assisted by radiofrequency  
Ramirez J.F., Prada N., Ramirez C., Rugeles J.G., Alonso G.O. (CO)

16.46 0127 Sagittal plane spinal alignment association with lumbar disc degeneration in young asymptomatic adults  
DeAño H., Menezes-Reis R., Bonugli G.P., Dalto V., Herrero C.F.D.S., Nogueira-Barbosa M.H. (BR)

16.54 0128 Lumbar disc herniation in adolescents: Cases series and literature review  
Weissmann K.A., Martínez J.P., Huaquilaf C., Costa M., Zarate A., Descaseaux F. (CL)

17.02 0129 Lateral lumbar interbody fusion for symptomatic adjacent disc disease  
Santana Carvalho F., Franco T.R., Motta Filho R., Batista Filho G. (BR)



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Monday

Tuesday

Wednesday

Thursday

Friday

Posters

Meetings

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Monday

Tuesday

Wednesday

Thursday

Friday

Posters

Meetings

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**La Sociedad Ibero Latinoamericana de Columna  
Sociedade Brasileira de Coluna**

**Session 5**

Chair: Mahdi H. (ES)

- 17.10 **190** **Comparative study of TUF techniques and MINI OPEN for degenerative diseases of the lumbar spine**  
Santana Carvalho F., Anacleto V.R., Santos Araújo A.B., Bcalho Maluf F., Goncalves de Oliveira S. (BR)
- 17.18 **190** **Spine surgery at an ambulatory surgery center (ASC). Is it feasible, safe and cost effective? A prospective evaluation of 2942 consecutive cases**  
Vaz de Lima M., Pettine K., Tschy F. (BR)
- 17.26 **190** **Does the use of dynamic surgical guidance assist with accurate pedicle screw placement in patients with osteoporosis or osteopenia?**  
DeAño H., Williams J., da Silva Herrero C.F., Betz R., Powell D., Gaughan J. (BR & US)
- 17.34 **190** **The electromyography threshold for accurate placement of cannulated pedicle screws**  
Zarate A., Weissmann K.A., Costa M., Huaquilar C., Barraza G. (CL)
- 17.42 **190** **Advantages of navigation in posterior cervical fusion**  
Godino-Martinez O., Lopez-Obando L., Plans-Ahricart G., Gabarrós-Canals A. (ES)

**Session 6**

Chair: Weissmann K. (CL)

- 17.48 **O135** **Autogenous bone marrow concentrate (BMC) Injection to treat 1 and 2 level symptomatic degenerated lumbar discs - A prospective controlled study, with a minimum 24 month follow up**  
Vaz de Lima M., Pettine K., Tschy F. (BR)
- 17.56 **O136** **Anterior lumbar interbody fusion for the treatment of surgical infection on posterior instrumented spinal approach for degenerative diseases**  
Santana Carvalho F., Siqueira A., Franco T.R., Smoes M.V., Batista G. (BR)
- 18.02 **O137** **Evaluation of individuals with and without chronic low back pain during bridge exercise**  
Vaz de Lima M., Fernandes Byk F., Antunes Bicalho L.A., Barela J.A., Forti Barela A. (BR)
- 18.10 **O138** **Tethered cord syndrome caused by spinal dysraphism: Long term outcome of tethered cord release**  
Kotaka S., Tanaka N., Nakanishi K., Kamei N., Sumiyoshi N., Rikita T., Ochi M. (JP)
- 18.18 **Discussion**
- 18.30 **Adjourn**



**The International Society for the Study of the Lumbar Spine**

**Focus Group meeting**

**Best practices for conducting and reporting spine research involving registry-enhanced administrative data**

This Focus Group will identify best practices for conducting, reporting and reviewing research involving the analysis of administrative data. The group will sample existing literature to identify best practices and common obstacles involving the analysis of administrative data. It will summarize the validity and reliability of administrative algorithms based on codes from the International Classification of Disease and the AMA's Current Procedural Terminology, including classifying spine-related ICD-10 codes. Finally, the group will seek to develop consensus.

12.30 **Lunch break + Industry workshops**



**Society for Minimally Invasive Spine Surgery**

**Session 1: MISS - Spinal degenerative disease**

Chairs: Tan S.B. (SG) & Singh K. (US)

Panel: Pennings F. (US), Khoo L. (US), Taylor W. (US), Yue W.M. (SG), Wu J.C. (TW) & Nene A. (IN)

- 14.00 **Welcome**  
Tan S.B. (SG) & Singh K. (US)
- 14.10 **194** **Special lecture: MISS in Asia: Past, present, and the challenges that lay ahead**  
Tan S.B. (SG)
- 14.20 **195** **Update on bone and fusion biologics in spinal surgery**  
Yue W.M. (SG)
- 14.30 **196** **Update on intradiscal biologic therapy**  
Háttl R. (US)
- 14.40 **Q&A**
- 14.50 **Case: Grade 1 spondylolisthesis with stenosis L4-L5**: Yue W.M. (SG)
- 14.54 **MIS TUF**: Kwon B. (US)
- 14.58 **Lateral / ALIF**: Pennings F. (US)
- 15.02 **Interspinous process**: Nene A. (IN)
- 15.06 **How case was treated**: Yue W.M. (SG)
- 15.10 **Discussion**
- 15.15 **Case: High grade L5-S1 isthmic spondylolisthesis**: Khoo L. (US)
- 15.19 **Open TUF**: Nene A. (IN)
- 15.23 **MIS TUF**: Wu J.C. (TW)
- 15.27 **Anterior - posterior**: Pennings F. (US)
- 15.31 **How case was treated**: Khoo L. (US)
- 15.35 **Discussion**
- 15.40 **Case: Multi level degenerative spine, with multi-level stenosis and recurrent HNP**: Taylor W. (US)
- 15.44 **Decompression without fusion**: Yue W.M. (SG)
- 15.48 **Multi-level TUF**: Khoo L. (US)
- 15.52 **Lateral**: Pennings F. (US)
- 15.56 **How case was treated**: Taylor W. (US)
- 16.00 **Discussion**
- 16.05 **Break**



**Society for Minimally Invasive Spine Surgery**

**Session 2: MISS - Lateral techniques**

Chairs: Taylor W. (US) & Ishii K. (JP)

Panel: Kim J.S. (KR), Pimenta L. (BR), Singh K. (US), Guo C.M. (SG) & Wu J.C. (TW)

- 16.30 **Welcome**  
Taylor W. (US) & Ishii K. (JP)
- 16.35 **197** **Contemporary neuromonitoring for transposo surgical procedures**  
Taylor W. (US)
- 16.50 **198** **Complications avoidance in lateral transposo surgery**  
Pimenta L. (BR)
- 17.05 **199** **Complications avoidance in MIS oblique lumbar interbody fusion**  
Kim J.S. (KR)
- 17.20 **Discussion**
- 17.30 **Case: Grade 1 or 2 spondylolisthesis with stenosis L4-L5**: Kim J.S. (KR)
- 17.34 **Stand alone**: Pimenta L. (BR)
- 17.38 **Direct versus indirect decompression**: Guo C.M. (SG)
- 17.42 **Anterior - posterior**: Singh K. (US)
- 17.46 **How case was treated**: Kim J.S. (KR)
- 17.50 **Discussion**
- 17.55 **Case: Thoracic HNP with cord compression**: Singh K. (US)
- 17.59 **MIS/Tubular**: Wu J.C. (TW)
- 18.03 **Open**: Guo C.M. (SG)
- 18.07 **How case was treated**: Singh K. (US)
- 18.11 **Discussion**
- 18.30 **Adjourn**

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# Wednesday, May 18 Scientific Program

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
	APSS	ISSLS	PASS	NASS	ISASS
10.00	Break				
	ASSI & APSS	ISSLS	PASS	NASS	ISASS
12.30	Lunch break + Industry workshops				
	ASSI & APSS	ISSLS	ICSG	AOSPINE	SMISS
16.00	Break				
	APSS	ISSLS	ICSG	AOSPINE	SMISS

## Room 1

Asia Pacific Spine Society	
	<b>APSS Opening Ceremony</b> Chair: Liu G. (SG)
08.30	<b>Program Introduction</b> Liu G. (SG)
08.35	<b>Presidential welcome address by APSS chairman</b> Abumi K. (JP)
08.40	<b>APSS: Past and present</b> Shanmugam KS. (MY)
	<b>Spinal tumour</b> Chair: Kwan M.K. (MY)
08.50   1100	<b>Multilevel spinal metastasis: Conservative or surgery?</b> Wong Y.W. (HK)
09.05   1101	<b>Spinal tumour reconstruction: Anterior or posterior or both?</b> Chung J.Y. (KR)
09.20   1102	<b>Bisphosphoname &amp; denosumab in Treatment of GCT of spine</b> Jayaswal A. (IN)
09.35   1103	<b>Recycling intraoperative spinal tumour blood: A myth or a fact?</b> Kumar N. (SG)
09.50	<b>Q&amp;A session</b>
10.00	<b>Break</b>
Asia Pacific Spine Society Association of Spine Surgeons of India	
	<b>ASSI/APSS Joint Session 1: Nontubercular infection</b> Chairs: Rajasekaran S. (IN) & Thaug M. (MM)
10.30   1104	<b>Surgical site infections - Current viewpoints of pathogenesis and prevention</b> Dahl B. (DK)
10.45   1105	<b>Controversies in the surgical management of SSI</b> Ignacio J.M.F. (PH)
11.00   1106	<b>Spinal epidural abscess - Presentation, diagnosis and management</b> Khan M.A. (PK)
11.15	<b>Discussion</b>
	<b>Debate</b> <b>Postoperative infections in spine - Whether to retain or remove implants?</b> Ahmed A. (IN) & Krishnan A. (IN)
	<b>Case discussion</b> Case discussants: Khan M.A. (PK), Sohail M.T. (PK), Ignacio J.M.F. (PH), Dahl B. (DK), Ahmed A. (IN) & Krishnan A. (IN)
11.50	<b>Case 1: Pyogenic infection of spine - Thaug M. (MM)</b>
12.10	<b>Case 2: Postoperative discitis - Rajasekaran S. (IN)</b>

## Room 1

Asia Pacific Spine Society Association of Spine Surgeons of India	
12.30	<b>Lunch break + Industry workshops</b>
	<b>ASSI/APSS Joint Session 2: Tubercular infection</b> Chairs: Chaddha R. (IN) & Liu G. (SG)
14.00   1107	<b>Clinical and MRI features of various stages of healing of TB spine</b> Alam Md.S. (BD)
14.10   1108	<b>MDR TB in the spine - Incidence, evaluation and treatment protocols</b> Nene A. (IN)
14.20   1109	<b>Cranio-cervical and lumbosacral tuberculosis - How is it different?</b> Sohail M.T. (PK)
14.30   1110	<b>The role of MIS in surgery for TB spine</b> Jayaswal A. (IN)
14.40	<b>Discussion</b>
	<b>Debate</b> <b>Anterior surgery has no role for the surgical management of Dorsal/Dorsolumbar TB - For and against</b> Jhala A. & Krishnan A. (IN)
15.10	<b>Case discussion</b> Verma R., Mohite S., Kujrekar K. (IN)
	<b>Free papers VIII: Tuberculosis</b>
15.30   O139	<b>Diagnostic protocol in management of tuberculosis of spine based on retrospective analysis of 262 cases</b> Sharma A., Chhabra H.S., Mahajan R. (IN)
15.34   O140	<b>Surgical algorithm in pediatric tubercular spondylitis with myelopathy</b> Dhawale A., Shah A., Shah I., Mehta R., Nene A. (IN)
15.38   O141	<b>Multi drug resistant tubercular spondylodiscitis - A social challenge in developing countries</b> Amritanand R., Arockiaraj J., Karthik R., Krishnan V., David KS. (IN)
15.42   O142	<b>Posterior approach in thoracolumbar tuberculosis: A clinical and radiological review of 67 operated cases</b> Prabhoo T.R., Nene A.M. (IN)
15.46   O143	<b>Transpedicular decompression / debridement and posterior spinal fusion with instrumentation for single level thoracic spinal tuberculosis with myelopathy - Is anterior column reconstruction necessary?</b> Kondety SKC., Basu S., Biswas A., Ahmed R., Suri T., Keshawani S. (IN)
15.50	<b>Discussion</b>
16.00	<b>Break</b>



Asia Pacific Spine Society

Free papers: Spinal tumour & Infections

Session 1: Trauma & Tumour

Chairs: Tiksnadi B. (ID) & Alam Md.S. (BD)

- 16.30 Metastatic spine tumour surgery: A comparative study of minimally invasive approach using percutaneous pedicle screws Axation versus open approach  
Kumar N., Maharajan K., Zaw A.S., Malhotra R., Kumar A. (SG)
- 16.34 Dumbbell score: A new scoring system for the differential diagnosis of malignant and benign spinal dumbbell tumors  
Matsumoto Y., Harimaya K., Kawaguchi K., Hayashida M., Okada S., Iwamoto Y. (JP)
- 16.38 Total en bloc spondylectomy for spinal metastasis of lung cancer  
Takahashi N., Murakami H., Demura S., Kato S., Yoshioka K., Yokogawa N., Fujii M., Igarashi T., Yonezawa N., Tsuchiya H. (JP)
- 16.42 Flowcytometric evaluation of intraoperative salvaged blood Altered with leucocyte depletion Alter in metastatic spine tumour surgery  
Kumar N., Zaw A.S., Lam R., Kumar A. (SG)
- 16.46 Serum Interleukin-12 as a prognostic factor for spinal metastases  
Hayashi H., Murakami H., Demura S., Kato S., Yoshioka K., Yokogawa N., Tsuchiya H. (JP)
- 16.50 To treat the metastatic spinal tumor following the classification in use, is it the best standard?  
Ishii K., Sasaki K., Watanabe M. (JP)
- 16.54 Thromboembolism following lumbar fusion surgery in patients using tranexamic acid  
Cho K.J., Kim Y.T. (KR)
- 16.58 Is intrawound application of vancomycin effective for the prophylaxis of surgical site infection? A multi-center cohort study using propensity score matching  
Horii C., Azuma S., Oka H., Okazaki R., Okamoto N., Yamazaki T. (JP)
- 17.02 Q&A

Session 2: MIS spine surgery

Chairs: Khan M.A. (PK) & Yang S.H. (TW)

- 17.12 Two-year clinical outcomes of multilevel extreme lateral lumbar interbody fusion (XLIF®) with or without minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF) versus isolated open transforaminal lumbar interbody fusion (TLIF) for degenerative scoliosis and spondylolisthesis: A matched comparison study  
Jiang L., Ng Y.H., Guo C.M., Tan S.B., Yeo W., Chen J.L.T., Fong P.L., Siddiqui M.A. (SG)
- 17.16 Fluoroscopic guided percutaneous thoracic and lumbosacral pedicle screws, is it safe for Asians?  
Chan C.Y.W., Chiu C.K., Kwan M.K. (MY)
- 17.20 Mechanism of radiculopathy contralateral to the side of disc herniation - Microendoscopic investigations  
Hayashi N., Makiyama K., Ohnaru K., Kano K., Iba H., Nakanishi K., Hasegawa T. (JP)
- 17.24 Intraoperative radiation exposure to surgeons in single- and multi-level minimally invasive transforaminal lumbar interbody fusion  
Funao H., Momoshima S., Isogai N., Shiono Y., Fujita N., Hikata T., Iwanami A., Watanabe K., Koyanagi T., Nakamura M., Matsumoto M., Ishii K. (JP)



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Session 4: Special emphasis poster session 1 (spine area)

Session 5: Disc cell biology

Chairs: Kim J. (KR) & Nam V. (US)

- 08.45 Notochordal cell-rich nucleus pulposus matrix as a potential agent for nucleus pulposus regeneration  
De Vries S., Van Doeseelaar M., Meij B., Tryfonidou M., Ito K. (NL)
- 08.52 Mechanistic determination of notochordal cell-induced anti-apoptotic signaling in human nucleus pulposus cells  
Mehrkens A., Karim M.Z., Matta A., Kim S., Fehlings M.G., Schaefer S., Erwin W.M. (CH)
- 08.59 Protective role of Prostaglandin E1 for disc degeneration by reciprocally regulating collagenases and their endogenous inhibitor TIMP-3 in human intervertebral disc cells  
Sawaji Y., Suzuki H., Endo K., Tanaka H., Nishimura H., Kosaka T., Yamamoto K. (JP)
- 09.06 Discussion
- 09.15 Selective interference of mTOR signaling is protective against human disc cellular apoptosis, senescence, and extracellular matrix degradation with autophagy induction  
Ito M., Yurube T., Kakutani K., Maeno K., Takada T., Miyazaki S., Terashima Y., Kakiuchi Y., Kurosaka M., Nishida K. (JP)
- 09.22 JAK/STAT inhibitor has potential to inhibit intervertebral disc degeneration  
Suzuki S., Fujita N., Watanabe K., Tsuji T., Ishii K., Honuchi K., Miyamoto T., Nakamura M., Matsumoto M. (JP)
- 09.29 Expression, regulation and relevance of hyaluronidases in the intervertebral disc  
Wuertz-Kozak K., Greutert H., Kupkova O., Grantenbein B., Boos N., Ferguson S.J. (CH)
- 09.36 Discussion
- 09.45 Break

Session 6: Disc degeneration

Chairs: Berlemann U. (CH) & Mannion A. (CH)

- 10.15 Natural history of lumbar disc degeneration and other spinal phenotypes on MRI: A prospective, comparative 8-year longitudinal study  
Sarmatzis D., Karpainen J., Cheung J., Bow C., Luk K., Cheung K. (HK)
- 10.22 Measuring lumbar disc degeneration and pathology  
Battie M., Videman T., Gibbons L., Gill K. (CA)
- 10.29 Diabetes mellitus is a significant risk factor for lumbar disc degeneration in a longitudinal population-based cohort: The Wakayama Spine Study  
Teraguchi M., Hashizume H., Yoshimura N., Muraki S., Yamada H., Oka H., Minamide A., Nagata K., Ishimoto Y., Kagotani R., Yoshida M. (JP)
- 10.36 Discussion



Asia Pacific Spine Society

- 17.28 New minimum invasive technique for lateral lumbar interbody fusion  
Sasaki K., Ishii K., Watanabe M. (JP)
- 17.32 Safety entry point, size and direction for placement of thoracic pedicle screw - A cadaveric study  
Bunmaprasert T., Roobsoong A., Pongmanee S., Khunsee S., Laowatthanaphong S. (TH)
- 17.36 Q&A
- Session 3: Spine fracture, vertebraloplasty & basic science  
Chairs: Kwan K.Y.H. (HK), Kandwal P. (IN) & Pradhan R. (NP)
- 17.46 A prospective multicentric observational study on the use of intravertebral implants for traumatic vertebral compression fracture treatment: 12 Months follow-up results  
Noriega D.C., Ardura F., Baud J., Ekerlein H., Foulongne E., Francaviglia N., Gumpert R., Hassel F., Huet H., Kinsky A., Maestretti G., Ould Simane M., Perot G., Plasencia M., Queinnee S., Renaud C., Sabatier P., Theumann N. (FR, DE, IT, AT, CH, ES)
- 17.50 Percutaneous vertebraloplasty for osteoporotic vertebral fracture with intravertebral cleft: Analysis of poor clinical outcome  
Nakamae T., Fujimoto Y., Yamada K., Hiramatsu T., Hashimoto T., Suzuki O., Tsuchikawa Y. (JP)
- 17.54 Surgical outcome of balloon kyphoplasty for painful osteoporotic vertebral fracture  
Yamada K., Fujimoto Y., Nakamae T., Hiramatsu T., Hashimoto T., Suzuki O., Tsuchikawa Y. (JP)
- 17.58 Using the regional eggshell technique during Kyphoplasty to prevent cement leakage in various vertebral walls injuries  
Io H., Chen H.M. (TW)
- 18.02 The association between lumbosacral transitional vertebrae and lumbosacral nerve root asymmetry  
Ohno T., Tarukado K., Tono O., Doi T. (JP)
- 18.06 Vertebral compression fractures treatment - 4 Years retrospective study  
Noriega D.C., Ardura F., Hernandez R. (ES)
- 18.10 Identification of life style factors affecting onset of adolescent idiopathic scoliosis  
Watanabe K., Michikawa T., Yonezawa I., Takaso M., Minami S., Soshi S., Okada E., Asakura K., Nishiwaki Y., Matsumoto M. (JP)
- 18.14 Aging change of the paravertebral muscles and psoas muscles of the lumbar spine and relation to the low back pain in a general population - The Wakayama Spine Study  
Hashizume H., Yamada H., Oka H., Teraguchi M., Iwahashi H., Sasaki T., Shinto K., Muraki S., Matsuda K., Minamide A., Nakagawa Y., Yoshimura N., Yoshida M. (JP)
- 18.18 The contribution of the ribcage to thoracolumbar spine biomechanics in a sheep model: The significance of the intercostal connections  
Grant C., Newell N., Booker B., Pearcy M.J., Little J.P. (AU)
- 18.22 Q&A



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- 10.45 Incidence and pain characteristics of disc degeneration accompanied with early-stage lumbar spondylolysis in adolescent patients  
Aoki Y., Sugiura S., Watanabe A., Nakajima T., Takazawa M., Ohtori S., Takahashi K., Nishikawa S. (JP)
- 10.52 Heterochronic parabiosis: Is it possible to interrupt the process of age-associated intervertebral disc degeneration?  
Colangelo D., Pola E., Ramesh Prashanti P., Nasto L.A., Niedemhofer L., Robbins P., Vo N. (IT)
- 10.59 Vertebral trabeculae adjacent to the disc are higher quality in the cranial than caudal side in the upper lumbar spine, and are unrelated to age or disc degeneration  
Ge Y., Crites-Battie M., Videman T., Boyd S., Yue W. (CN & CA)
- 11.06 Discussion
- 11.18 Harry Farfan presidential lecture: The use of acupuncture for musculoskeletal pain  
Introduction - Kang J. (US)  
Guest Speaker: Tai Leang L. (SG)
- 11.55 Presidential address: Zen and the art of spine maintenance  
Introduction - Yoon T. (US)  
Speaker: Kang J. (US)
- 12.35 Lunch break + Industry workshops
- Session 7: Low back pain  
Chairs: Athala J. (IN) & Strömquist B. (SE)
- 14.00 Family history of low back pain is a significant predictor of pain and disability between extreme stages of lumbar disc degeneration  
Sarmatzis D., Bow C., Karpainen J., Luk K., Cheung B., Cheung K. (JP & HK)
- 14.07 The association between the cross-sectional area of the dural sac and low back pain in a large population: The Wakayama Spine Study  
Iwahashi H., Yoshimura N., Hashizume H., Yamada H., Oka H., Yoshida M. (JP)
- 14.14 Low back pain and functional limitations in adult population of the united states  
Nordin M., Yang H., Haldeman S. (US)
- 14.21 Discussion
- 14.30 The interrelation of Modic changes, other imaging findings and back pain in men  
Battie M., Wang Y., Gibbons L., Videman T., Gill K. (CA)
- 14.37 Does RA patient have lumbar lesion or low back pain more frequently than healthy population? - Cross sectional analysis in cohort study with age and sex matched healthy volunteer  
Suzuki A., Tamai K., Akhgar J., Terai H., Hoshino M., Toyoda H., Hayashi K., Ohyama S., Nakamura H. (JP)
- 14.44 The influence of lumbar degeneration on the treatment outcome of individuals with low back pain following spinal manipulation  
Wong A., Parent E., Dhillon S., Prasad N., Sarmatzis D., Kawchuk G. (HK)
- 14.51 Discussion



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## The International Society for the Study of the Lumbar Spine

### Session 8: Fusion

Chairs: Tanaka N. (JP) & Yabuki S. (JP)

- 15:00 **1116** Lateral interbody fusion as a tool in adult spinal deformity surgery: Correction and complications with hybrid versus posterior-only approach  
Deviren V., Strom R., Bae J., Mizutani J., Valone F., Ames C. (US)
- 15:07 **1114** Effectiveness of decompression with fusion compared with decompression alone for lumbar spinal canal stenosis in patients aged 80 years  
Kimura A., Takeshita K. (JP)
- 15:14 **1119** Effect of bioactive pedicle screws with hydroxyapatite-forming potential in the canine lumbar spine  
Akedo K., Yamaguchi S., Matsushita T., Kokubo T., Murata K., Takegami N., Yamada J., Sudo A. (JP)
- 15:21 Discussion
- 15:30 Break

### Symposium I: Muscle

Chair: Hodges P. (AU)

- 1113 Changes in back muscles as a result of pain/injury  
Danneels L. (BE)
- 1114 Relationship between muscle changes on imaging and pathology  
Battie M. (CA)
- 1115 Contribution of muscle control to pain/injury  
Hodges P. (AU)
- 1116 Muscle as a source of pain: Physiology of muscle nociceptors  
Cairns B. (CA)

### Session 9: Deformity

Chairs: Deviren V. (US) & Togawa D. (JP)

- 17:00 **1188** Characterization of the gait pattern and the disability in adult spinal deformity patients - Factors affecting the gait abnormality  
Yagi M., Kaneko S., Yato Y., Machida M., Asazuma T. (JP)
- 17:07 **1189** Lumbar disc degeneration and Modic change 35 years after surgery for adolescent idiopathic scoliosis: Long-term MRI follow-up  
Akazawa T., Kotani T., Sakuma T., Minami S., Takaso M., Inoue G., Miyagi M., Aoki Y., Orita S., Takahashi K., Ohtori S. (JP)
- 17:14 **1190** Spinal alignment of Parkinson's disease patients with chronic low back pain: Comparison with adult spinal deformity  
Watanabe K., Hirano T., Ohashi M., Shoji H., Endo N., Nishizawa M., Shimohata T. (JP)
- 17:21 Discussion



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- 17:30 **1191** Novel virtual modeling of alignment following ASD surgery: Establishing relationships between compensatory changes and overcorrection due to proximal junctional kyphosis  
Lafage R., Bess S., Glassan S., Ames C., Burton D., Diebo B., Hart R., Kim H., Klineberg E., Line B., Scheer J., Protopsaltis T., Schwab F., Lafage V. (US)
- 17:37 **1199** Sagittal imbalance in degenerative scoliosis can be corrected by addressing only the symptomatic levels  
Presciutti S., Louie P., Johnson S., Hellman M., An H. (US)
- 17:44 **1198** How to restore an optimal pelvic position in elderly patients with adult spinal deformity  
Yamato Y., Hasegawa T., Kobayashi S., Togawa D., Yasuda T., Matsuyama Y., Ida T., Matsumura A., Hosogane N., Matsumoto M. (JP)
- 17:51 Discussion



## Pan Arab Spine Society

### Session 9: Degenerative cervical

Chairs: Alves O. (PT) & Salah H. (EG)

- 08:00 **1117** Lecture: CSM – Anterior, posterior or combined approach  
Alves O. (PT)
- 08:15 Discussion
- 08:30 Debate: Posterior surgery for CSM – is instrumented fusion always needed?  
Yes- Alves O. (PT)
- 08:40 Occasionally needed - Emran I. (EG)
- Case scenarios  
Salah H. (EG)
- 08:50 Presentation of 2 cases
- 09:20 Break
- Session 10: Complications in deformity surgery  
Chairs: Ventura N. (ES) & Elsebae H. (EG)
- 10:30 **1118** Lecture: Strategies in prevention of neurological complications in AIS Surgery  
Salah H. (EG)
- 10:45 **1119** Lecture: Neuro signals are fading away – What do I do?  
Ventura N. (ES)
- 11:00 **1120** Lecture: Complications with growing rods – Prevention & management  
Elsebae H. (EG)
- 11:15 **1121** Lecture: Complications with VEPTR like devices  
Azmy A. (PS)
- 11:30 Discussion
- My worst deformity complication  
Salah H. (EG)
- 11:40 Presentation of 2 cases
- 12:10 Adjourn
- 12:30 Lunch break + Industry workshops



## International Consortium for Scoliosis Genetics

### Session I

- 14:00 **1164** Invited lecture: Why study scoliosis genetics? A surgeon's perspective  
Cheung K. (HK)
- 14:10 **1173** Invited lecture: Why study scoliosis genetics? A geneticist's perspective  
Ikegawa S. (JP)
- 14:20 Discussion
- 14:25 **1188** Linkage analysis and exome sequencing suggest a variant in CELSR2 as a cause of idiopathic scoliosis in an extended Swedish pedigree  
Grauers A., Einarsdottir E., Kere M., Gerdhem P. (SE & FI)
- 14:40 **1199** Genome-wide association study for AIS in Japan  
Watanabe K., Takeda K., Ogura Y., Takahashi Y., Kono K., Kawakami N., Uno K., Ito M., Minami S., Yanagida H., Taneichi H., Yonezawa I., Tsuji T., Suzuki T., Sudo H., Kotani T., Toyama Y., Matsumoto M., Ikegawa S. (JP)
- 14:55 **1198** Regulation and function of the Lbx1 gene in spinal development using the mouse model: implications for adolescent idiopathic scoliosis  
Wilson M.J., Rios J., Wise C.A. (US)
- 15:10 **1124** Invited lecture: Are congenital scoliosis and AIS etiologically related?  
Wise C. (US)
- 15:20 **1125** Invited lecture: The disc in scoliosis-- current knowledge  
Chan D. (HK)
- 15:30 Discussion
- 15:45 Break
- Session 2
- 16:15 **1126** Invited lecture: Studies in the ALSPAC cohort  
Fairbank J. (UK)
- 16:35 **1197** mRNA expression of Lbx1 in paravertebral muscles and vertebra of patients with adolescent idiopathic scoliosis  
Man G.C.W., Tang N.L.S., Lee W.Y.W., Xu L.L., Qiu Y., Cheng J.C.Y. (CN)
- 16:50 **1198** SPINE-GEL: A global expression library for the developing nucleus pulposus  
Au T., Cheah K., Niu B., Chan D., Zhang M.Q. (CN & US)
- 17:05 **1199** Spine surgery in achondroplasts: One center's experience  
Raggio C.L., Manio J., Carter E., Farmer J. (US)
- 17:20 **1127** Invited lecture: Scolioscore – Is it useful?  
Raggio C. (US)
- 17:40 Discussion





## NASS North American Spine Society

- 07.30 **Welcome**
- Paper presentations: Cervical spondylotic myelopathy**  
Chairs: Bono C.M. (US) & Darwano B. (IN)
- 07.35 **Total disc replacement in cervical spondylotic myelopathy, an obstacle to clinical improvement?**  
Dufour Th., Loret J.E., Chailier V., Lafage R., Lafage V. (FR & US)
- 07.41 **Clinical assessment using MRI/18F-FDG PET fusion imaging for patients with cervical compressive myelopathy**  
Horjoh K., Nakajima H., Takahashi A., Kitade M., Izubuchi Y., Yamamoto Y. (JP)
- 07.47 **The analysis of dysfunctions of lower extremities using knee joint position sense and kinesthesia in cervical myelopathy patients**  
Tanaka N., Nakanishi K., Kamei N., Hiramoto T., Sumiyoshi N., Rkita T., Ochi M. (JP)
- 07.53 **Efficacy of Riluzole in the treatment of early cervical spondylotic myelopathy using diffusion tensor imaging - A double blinded, placebo-controlled randomised controlled trial**  
Rajasekaran S., Aiyer S.N., Kanna R., Shetty A.P. (IN)
- 07.59 **Cord signal changes after anterior cervical discectomy and fusion and its association with neurological recovery - A prospective single centre study over 10 years**  
Chatterjee S., Kondety S.K.C. (IN)
- 08.05 **Course of change in patient-rated outcome up to 5 years after surgery for cervical myelopathy: An analysis of prospectively collected data in a large, consecutive group of patients**  
Mannion A.F., Porchet F., Tok S., Becker H.J., Jeszenszky D., Fekete T.F., Kleinstück F.S. (CH)
- 08.11 **Patient satisfaction with posterior decompression surgery for cervical ossification of the posterior longitudinal ligament: Prognostic radiographic factors and patient-reported outcomes for the effectiveness of surgical treatment**  
Ohya J., Oshima Y., Oka H., Saki F., Taniguchi Y., Matsubayashi Y., Tanaka S., Chikuda H., Takeshita K. (JP)
- 08.15 **Discussion**
- Paper presentations: Axial pain disorders**  
Chairs: Heggenes M. (US) & Thng P. (SG)
- 08.30 **Results of a prospective, multicenter, observational study of total lumbar disc replacement with 2 year follow up: Impact on return to work**  
Litrico S., Vardon D., Assaker R., Ritter-Lang K., Fuentes S., Putzier M., Franke J., Jarzem P., Guigui P., Nakach G., Le Huec J.C. (FR, CA & DE)
- 08.36 **Quantifying the spatial distribution of fat content in lumbar paravertebral muscles on T1-weighted MRI: A novel method and reliability analysis**  
Crawford R.J., Ni Mhuiris A., Volken T., Elliott J.M., Hoggarth M., Samartzis D. (CH, US, AU & CN)



Room 4

## NASS North American Spine Society

- 08.42 **Which clinical tests can better discern differences in lumbar multi-Adus activity between people with and without low back pain?**  
Wong A.Y.L., Chan S.N.S., Chung M.T.K., LURK.W., Lo J., Ng T.K.Y., Nougrou F. (CN & CA)
- 08.48 **Do high levels of neck pain influence the outcome of cervical arthroplasty?**  
Tok S., Mannion A.F., Mutter U., Becker H.J., Porchet F. (CH)
- 08.54 **Psychological distress in cervical arthroplasty**  
Hammett T.C., Solanki S., Ashpole R.D. (UK)
- 09.00 **Discussion**
- 09.30 **break**
- Paper presentations: Basic science**  
Chairs: Wetzel F.T. (US) & Kawaguchi Y. (JP)
- 10.00 **Evaluating the osseointegration of a deeply porous titanium scaffold through comparison with PEEK implants and allograft: Biomechanical assessment using a porcine skull model**  
Guyer R.D., Abitbol J.J., Ohnmetsch D.D., Yao C. (US)
- 10.06 **Diffusion characteristics of human annulus fibrosus - A study documenting the dependence of annulus fibrosus on endplate for diffusion**  
Naresh-Babu J., Neelima G., Reshma-Begum S.K. (IN)
- 10.12 **FK506, independent of calcineurin inhibition, induces TGF-1 $\beta$ /smad3 pathway for preventing intervertebral disc degeneration**  
Zou J., Wu C., Yang H. (CN)
- 10.18 **Does disc injury lead to progression of cervical disc degeneration? Histological analysis in an ovine model**  
Colloca C.J., Kuliwaba J.S., Freeman B.J.C., Gunzburg R., Hegazy A.A.M., Hinrichs R.N. (US, AU & BE)
- 10.24 **Hyperbaric oxygen intervention reduces secondary spinal cord injury in rats via regulation of HMGB1/TLR4/NF- $\kappa$ B signaling pathway**  
Kang N., Hai Y., Yang J., Liang F., Gao C.J. (CN)
- 10.30 **Treatment of degenerative disc disease with mesenchymal stem cells. Results from clinical trials with autologous and allogeneic cells**  
Noriega D., Ardura F., Hernández-Ramajo R., Martín-Ferrero M.A., Orozco L., Soler R., Alberca M., Sánchez A., García-Sánchez J. (ES)
- 10.36 **Discussion**
- Low back pain diagnosis and treatment: What is the future?**  
Chair: Wetzel F.T. (US)
- 11.00 **Introduction**  
Wetzel F.T. (US)
- 11.05 **Objective measurement: Success key to nonspecific low back pain**  
Dreisinger T. (xx)



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Room 4

## NASS North American Spine Society

- 11.15 **First line diagnostics: When to order what and why**  
Kawaguchi Y. (JP)
- 11.25 **Mechanism of BMP2 action on peripheral nerves**  
Heggenes M.H. (US)
- 11.35 **Panel discussion**
- 11.45 **Rare intervention 1- Motion Preservation**  
Darwano B. (IN)
- 11.55 **Rare intervention 2- Motion Preservation**  
Wetzel F.T. (US)
- 12.05 **Panel discussion**
- 12.15 **Intraosseus nerve**  
Heggenes M.H. (US)
- 12.25 **Panel discussion and conclusion**
- 12.30 **Lunch break + industry workshops**



Room 4

## AOSpine AOSpine

- Session 1: Deformity**  
Chair: Lamartina C. (IT)
- 14.00 **Key opening lecture: Adult deformity**  
Lamartina C. (IT)
- 14.30 **Upright, prone and supine spinal morphology in adolescent idiopathic scoliosis**  
Brink R.C., Schlosser T.P.C., Colo D., Vincken K.L., Van Stralen M., Hui S.C.N., Chu W.C.W., Cheng J.C.Y., Castelein R.M. (NL & CN)
- 14.34 **Instrumentation following decompression for spinal metastases - is there a need for fusion in addition to internal fixation?**  
Fenton E., Mercier P., Bains I., Jacobs W.B. (CA & US)
- 14.38 **Concomitant isthmus spondylolisthesis does not influence the curve pattern of scoliosis in young patients**  
Schlenzka D., Ylikoski M., Yrjönen T., Lund T., Österman H., Poussa M. (FI)
- 14.42 **Oblique lateral interbody fusion combined with posterior spinal fixation using transfacial pedicle screws in adult spinal deformity**  
Chazono M., Takaaki T., Shun Y., Keishi M. (JP)
- 14.46 **Comparison of autograft versus allograft in patients undergoing posterior instrumentation and fusion for adolescent idiopathic scoliosis**  
Schlenzka D., Puisto V., Yrjönen T., Österman H., Lund T., Laine T. (FI)
- 14.50 **Group discussion**
- 15.00 **Near pre-operative shoulder and trunk range of motion during gait after surgical correction of adolescent idiopathic scoliosis**  
Holewijn R.M., Kingma I., De Kleuver M., Schimmel J., Keijsers N. (NL)
- 15.04 **Prospective investigation of perioperative complications after correction surgery for spinal deformity**  
Takahashi Y., Suzuki S., Nishida M., Fujita N., Yagi M., Kaneko S., Hosogane N., Ishikawa M., Kono H., Fukuda K., Okada E., Hikata T., Nakamura M., Matsumoto M., Watanabe K. (JP)
- 15.08 **Does spinopelvic alignment affect residual low back pain after lumbar spinal fusion?**  
Tashiro K., Kanayama M., Oha F., Shimamura Y., Kuroki K., Hisada Y., Suzuki Y., Hashimoto T., Kaneko K. (JP)
- 15.12 **Health related quality of life in 1252 adults with idiopathic scoliosis - A comparison of untreated, brace treated and surgically treated patients**  
Diabakerli E., Grauers A., Danielsson A., Gerdhem P. (SE)
- 15.16 **Results of the modern Luque Trolley in the 21st century - A self-growing, guided rod system**  
Hammett T.C., Glanz LG., Kumara A., Grevitt M.P., Shafay M., Mehdian S.M. (UK)
- 15.20 **Group discussion**
- 15.30 **The choice of upper instrumented vertebra in AIS and shoulder balance**  
Khanat K., Khouri G., Sebaaly A., Ghosn E., Keichati G. (LB)



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**AOSPINE AOSpine**

- 15.34 **O232** Risk factors and role of bone cement augmentation for adjacent vertebrae fracture after multilevel adult deformity fusion with low bone mass  
Plashnikov D.A., Masevnikov S.V., Michailov D.A., Smekalenkov O.A., Zaborovskii N.S., Lapaeva O. (RU)
- 15.38 **O233** Which is the best indicator to evaluate craniocervical balance?  
CCG, CISVA or C2SVA  
Tamai K., Suzuki A., Takahashi S., Terai H., Toyoda H., Hoshino M., Hayashi K., Oyama S., Akhgar J., Suhrab M., Ahmad SA., Nakamura H. (JP)
- 15.42 **O234** The use of rhBMP-7 in surgical treatment of paediatric patients affected by symptomatic grade I lumbar spondylolisthesis: A 7-years follow-up study  
Oggiano L., La Rosa G. (IT)
- 15.46 **Group discussion**
- 16.00 **Break**
- Session 2: Degenerative lumbar**  
**Chair: Berjano P. (IT)**
- 16.30 **O235** Key opening lecture: Continuum from adult degeneration to deformity  
Berjano P. (IT)
- 17.00 **O232** Autologous disc chondrocyte transplantation in lumbar spine disc degeneration disease – A prospective, controlled, randomized study  
Hohaus C., Ditzel F., Meise H.J. (DE)
- 17.05 **O233** When does compensation for lumbar stenosis become a deformity?  
Lafage R., Buckland A., Vira S., Oren J., Lafage V., Liabaud B., Spiegel M., Diebo B., Protospatitis T., Schwab F., Bendo J. (US)
- 17.10 **O234** Spinal surgery without laboratory investigations – A preliminary report  
Czyz M., Parks R.M., Behralk E., Nowicki R., Chrystal M., Boszczyk B.M. (UK)
- 17.15 **Group discussion**
- 17.30 **O235** Relationship between in vivo screw insertion torque and postoperative screw loosening in posterior instrumented fixation for lumbar degenerative diseases - Comparison study between cortical bone trajectory screw and traditional pedicle screw  
Takahashi T., Hanakita J., Kawaoka T., Ohtake Y. (JP)
- 17.35 **O236** The natural polyphenol epigallocatechin gallate protects intervertebral disc cells from oxidative stress  
Wuertz-Kozak K., Krupkova O., Handa J., Klasek J., Ospelt C., Ferguson S.J. (CH & JP)
- 17.40 **O237** Genetics is the main determinant of disc space height one and two levels cranial to the adjacent segment  
Omair A., Mannion A.F., Holden M., Leivseth G., Fairbank J., Hägg G., Fitzell P., Brox J.L. (NO, CH, UK & SE)
- 17.45 **Group discussion**

**AOSPINE AOSpine**

- 18.00 **O238** Concomitant back pain as a predictor of outcome after single level lumbar micro-de compressive surgery – A study of 995 patients  
Sethi G., Choudhry M.N., Fischer B., Divecha H.M., Leach J., Amali F., Verma R., Yasin N., Mohammad S., Siddique I. (UK)
- 18.05 **O239** Do spinal tumors affect to management of spinal degenerative stenosis?  
Plashnikov D.A., Smekalenkov O.A., Mihalov D.A., Zaborovskii N.S. (RU)
- 18.10 **O240** Lumbar paravertebral muscle fat content versus other spinal degenerative change in asymptomatic populations according to age and yearly decline  
Crawford R.J., Volken T., Valentin S., Elliott J.M., Mellon M. (CH, AU, AT & UK)
- 18.15 **Group discussion**



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**The International Society for the Advancement of Spine Surgery**

**Session 1**  
**Chairs: Anand N. (US) & Kumar N. (SG)**

- 08.10 **O241** Impact of race and insurance status on surgical approach for cervical spondylotic myelopathy in the United States: A population-based analysis  
McClelland III S., Marasciulo B.J., Passius P.G., Protospatitis T.S., Frempong-Boadi A.K., Erico T.J. (US)
- 08.16 **O242** The incidence of Proximal Junctional Kyphosis (PJK) in patients undergoing circumferential minimally invasive surgery (cMIS) for Adult Spinal Deformity (ASD) - A 7 year experience  
Anand N., Cohen J., Cohen R., Khandehroo B., Baron E., Kahwaty S. (US)
- 08.21 **O243** Comparison of complications, clinical and radiographic outcomes between non-obese and obese patients with adult spinal deformity undergoing minimally invasive surgery  
Park P., Wang M., Nguyen S., Mundis G., La Marca F., Uribe J., Anand N., Okonkwo D., Kanter A., Fessler R., Eastlach R., Chou R., Deviren V., Nunley P., Shaffrey C., Mummaneni P. (US)
- 08.27 **O244** Intra operative force and distraction measurement in growing rod for early onset scoliosis and the factors affecting them  
Kandwal P., Vijayaraghavan G., Goswami A., Bidre U., Jayaswal A. (IN)
- 08.33 **Discussion**
- 08.53 **O245** Cervical disc replacement vs. ACDF in the injured worker population  
Kube R.A., Morrow D.M. (US)
- 08.59 **O246** How to prevent proximal junctional kyphosis following combined short anterior and posterior fusion to sacrum without osteotomy in degenerative lumbar kyphosis?  
Shin D.S.J., Lee J.H., Chang D.G., Kim K.T., Lee S.H., Kang K.C., Jeong H.Y. (KR)
- 09.05 **Discussion**
- 09.31 **O247** Stand-alone LLF procedure: In which patient it can be used without cage subsidence?  
Pimenta L., Amaral R., Marchi L., Forti F., Oliveira L., Coutinho E., Jensen R. (BR & US)
- 09.37 **O248** Efficacy of demineralized bone sponges and concentrated bone marrow in posterolateral lumbar fusion  
Yoon B.V., Schroeder J., Abjornson C., Girardi F.P., Sama A.A. (IL & US)
- 09.43 **Discussion**
- 10.00 **Break**
- 10.30 **O249** Analysis of postoperative thoracolumbar spine infections in a prospective randomized controlled trial using the centers for disease control surgical site infection criteria  
McClelland III S., Takemoto R.C., Lonner B.S., Tate A.M., Park J.J., Ricart-Hofaz P.A., Bendo J.A., Goldstein J.A., Spivak J.M., Erico T.J. (US)
- 10.36 **O250** Comparison of radiographic measures of interbody fusion between PEEK and nanostructured porous titanium coated PEEK cages in a sheep model  
Freeman B.J.C., Jones C.F., Colloca C.J., Callary S., Hall D.J., Mulaibrahimovic A., Kuliwaba J.S., Szpalski M., Gunzburg R. (BE & AU)



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- 10.41 **O251** Identification of risk factors associated with occurrence of neurophysiological alarms during intraoperative monitoring in spinal deformity corrective surgeries  
Kandwal P., Vijayaraghavan G., Jaryal A., Goswami A., Jayaswal A. (IN)
- 10.47 **O252** Biomechanics of expandable lumbar interbody fusion cage deployed through transforaminal approach  
Voronov L., Conti Mica M., Carandang G., Havey R.M., Wojewnik B., Patwardhan A.G. (US)
- 10.53 **Discussion**
- 11.03 **O253** Anterior approaches for treating failed posterolateral fusion or dynamic stabilization - A case series  
Pimenta L., Amaral R., Marchi L., Forti F., Oliveira L., Coutinho E., Jensen R. (BR & US)
- 11.09 **O254** What factors will affect the patients' clinical outcome after decompression surgery for lumbar spinal stenosis?  
Hu X., Lieberman I.H. (US)
- 11.15 **O255** Magnetically controlled growing rods for the management of early-onset scoliosis: Results and complications at 3-year follow-up  
La Rosa G., Oggiano L., Ruzzini L. (IT)
- 11.21 **O256** Cost and clinical outcome analysis of adolescent idiopathic scoliosis surgeries - Experience from a non-profit community hospital  
Lieberman I.H., Hu X., Brice S. (US)
- 11.26 **Discussion**
- 11.46 **O257** Effects of intraoperative anesthetic medications on postoperative urinary retention after single level lumbar fusion  
Singh K., Mayo B.C., Masse D.H., Louie P.K., Bohl D.D., Iantomo S., Ahn J., Tabaraee E. (US)
- 11.52 **O258** The accuracy of prognostic scoring systems in predicting survival of lung cancer patients with spinal metastases  
Kumar N., Tan J., Tan K., Zaw A.S., Kumar N. (SG)
- 11.58 **O259** Revision versus primary adult spinal deformity surgery: Comparison of radiographic and clinical outcomes  
Lieberman I.H., Hu X. (US)
- 12.04 **O260** Postoperative narcotic following a single-level minimally invasive transforaminal lumbar interbody fusion: A comparison by body mass index  
Singh K., Masse D.H., Mayo B.C., Long W.W., Modi K.D., Bohl D.D. (US)
- 12.10 **Discussion**
- 12.30 **Lunch break + Industry workshops**



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**SMISS Society for Minimally Invasive Spine Surgery**

**Session 1: MISS - Free papers: Part 1**  
Chair: Kwon B. (US) & Lim H.H. (MY)

- 14.00 **Welcome**  
Kwon B. (US) & Lim H.H. (MY)
- 14.04 **Does greater body mass index increase the risk for revision procedures following a single-level minimally invasive lumbar discectomy?**  
Singh K., Bohl D.D., Ahn J., Massei D.H., Mayo B.C., Long W., Modi K.D., Baques B.A. (US)
- 14.08 **Spine surgeon selection criteria: Factors influencing patient choice**  
Singh K., Manning B.T., Ahn J., Bohl D.D., Louie F.K., Massei D.H., Mayo B.C. (US)
- 14.12 **Correlation of determinantal factors for indirect neural decompression after extreme lateral interbody fusion**  
Navarro-Ramirez R., Moriguchi Y., Alimi M., Corredor J.A., Gotfryd A., Berlin C., Hartl R. (US)
- 14.16 **Lumbar spinal canal through extreme lateral interbody fusion (XLIF) procedure is gradually increasing over time: Effect of indirect decompression**  
Otsuka S., Fukuoka M., Mizutani J., Suzuki N., Matsumoto Y., Kondo A., Otsuka T. (JP)
- 14.20 **Discussion**
- 14.30 **Five year clinical outcome comparing 2 level open TLIF versus MIS TLIF: A matched pair analysis**  
Lai M.C., Siddiqui M.A., Lim Y.G., Seng C.S., Yeo W., Chen J.L.T., Fong P.L., Yue W.M., Guo C.M., Tan S.B. (SG)
- 14.34 **A new method to assess indirect decompression after extreme lateral interbody fusion using a new generation of intraoperative computed-tomography scanner (Volumetric Study)**  
Navarro-Ramirez R., Moriguchi Y., Berlin C., Hainland T., Lian X., Hartl R. (US)
- 14.38 **Lateral access anterior lumbar interbody fusion is safe even in the cases with prior abdominal surgery**  
Okudaira T., Baba H., Konishi H., Yamaguchi T., Yokota K., Yamada S., Hirata H. (JP)
- 14.42 **How to strategically predict lumbar lordosis correction with oblique lateral interbody fusion (OLIF) surgery for degenerative lumbar kyphoscoliosis**  
Kotani Y., Gonchar I., Fujita R., Hamasaki M., Beng Tan B., Fukaya H., Masuko T. (JP)
- 14.46 **Discussion**
- 14.56 **Robotic-guided sacro-pelvic fixation using S2 Alar-Iliac screws: Feasibility and accuracy**  
Lieberman I., Hu X. (US)
- 15.00 **Advantages of navigation in minimal invasive TLIF**  
Godino-Martinez O., Lopez-Obanio L., Plans-Ahicart G., Gabarrós-Canals A. (ES)



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- 15.04 **A prospective study of intraoperative radiation exposure to surgeons in minimally invasive transforaminal lumbar interbody fusion - Does the patient's body mass index impact on surgeon's radiation dose?**  
Funao H., Momoshima S., Isogai N., Shiono Y., Fujita N., Hikata T., Iwanami A., Watanabe K., Koyanagi T., Nakamura M., Matsumoto M., Ishii K. (JP)
- 15.08 **Can MCID be achieved in elderly patients undergoing MIS deformity surgery?**  
Anand N., Park P., Okonkwo D., Ming Fu K., Nguyen S., Wang M., Uribe J., Mundis G., Deviren V., Fessler R., Shaffrey C., Chou D., Mummaneni P. (US)
- 15.12 **Discussion**
- 15.22 **Autogenous stem cell injection into the intervertebral disc to treat low back pain - Is it effective and safe? Can we treat more than one degenerated level? A prospective controlled study**  
Vaz de Lima M., Pettine K., Tschy F. (BR)
- 15.26 **Autogenous Bone Marrow Concentrate (BMC) Injection into the intervertebral disc to treat discogenic low back pain - A safe and effective method - Does the concentration (cells/ml) of stem cells in the BMC matter?**  
Vaz de Lima M., Pettine K., Tschy F. (BR)
- 15.30 **Anatomic considerations of extraradicular lumbar interbody fusion: A cadaveric study**  
Kumar A., Qureshi S., Merrill R. (US)
- 15.34 **Trans Articular Surface Screw (TASS) for minimum invasive PLIF**  
Terai H., Javid A., Suzuki A., Toyoda H., Tamai K., Hayashi K., Takahashi S., Shurab Rahmani M., Nakamura H. (JP)
- 15.38 **Discussion**
- 15.48 **Concluding comments**
- 16.00 **Break**
- Session 2: MISS - Free papers: Part 2**  
Chair: Taylor W. (US) & Wu J.C. (TW)
- 16.30 **Welcome**  
Taylor W. (US) & Wu J.C. (TW)
- 16.34 **Clinical and radiographic parameters associated with best vs. worst clinical outcomes in minimally invasive deformity surgery**  
Vogel T., Than K., Park P., Ming Fu K., Nguyen S., Wang M., Shaffrey C., Bess S., Akbarnia B., Deviren V., Uribe J., Okonkwo D., Mundis G., Mummaneni P.V. (US)
- 16.38 **Acute and hyper-acute corpectomy for traumatic burst fractures using a mini-open lateral approach**  
Smith W., Christian G. (US)
- 16.42 **Accuracy of fluoroscopically-assisted percutaneous pedicle screws placed in patients in the lateral decubitus position**  
Kwon B., Khalil A. (US)



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- 16.46 **Prevention of neurological complications using a neural monitoring system with a Anger electrode in extreme lateral interbody fusion**  
Narita W., Takatori R., Arai Y., Nagae M., Hayashida T., Kitahara S., Tonomura H., Harada T., Osawa T., Hase H., Ogura T., Kubo T. (JP)
- 16.50 **Discussion**
- 17.00 **A prospective, multi-center comparison of clinical outcomes between TLIF and XLIF for the treatment of degenerative spondylolisthesis at L4-5 at two-year follow up**  
Smith W., Phillips F., Khajavi K., Kanter A., Peterson M. (US)
- 17.04 **Clinical results of combined multiple OLIF and posterior instrumentation for adult spinal deformities: Emphasis on hybrid posterior MIS technique for improvement of sagittal plane correction**  
Kotani Y., Gonchar I., Hamasaki M., Fujita R., Fukaya A., Masuko T. (JP)
- 17.08 **Clinical and radiological results following lateral (LIF) versus transforaminal lumbar interbody fusion (MI-TLIF)**  
Lee R., Sedra F., Wilson L., Afsharipad A., Dala-Ali B. (UK)
- 17.12 **The impact of minimally invasive spinal deformity surgery on ICU and hospital stay**  
Nunley P., Chou D., Wang M., Ming Fu K., Nguyen S., Mundis G., Shaffrey C., Okonkwo D., Kanter A., Deviren V., Uribe J., Anand N., Park P., Mummaneni P.V. (US)
- 17.16 **Discussion**
- 17.26 **Two-year clinical outcomes of multilevel extreme lateral lumbar interbody fusion (XLIF®) versus minimally invasive surgery - Transforaminal lumbar interbody fusion (MIS-TLIF) for degenerative scoliosis/spondylolisthesis: A matched comparison study**  
Jiang L., Ng Y.H., Yue W.M., Guo C.M., Tan S.B., Siddiqui M.A. (SG)
- 17.30 **MIS-TLIF reduces an incidence of adjacent segment disease in the patient with degenerative spondylolisthesis - Comparative study with conventional TLIF**  
Ishii K., Hikata T., Shiono Y., Funao H., Kaneko Y., Ishihara S., Isogai N., Fujita N., Nakamura M., Matsumoto M., Iwanami A., Watanabe K. (JP)
- 17.34 **Incomplete pars interarticularis fractures treated by percutaneous screw fixation**  
Wilson L., Philippa T., Altaf F., Sedra F., Lee R. (UK)
- 17.38 **Manufacturing and implantation of an individualized 3D printed titanium cage for cervical fusion**  
Spetzger U., Frasca M., Eisen G. (US & DE)
- 17.42 **Discussion**
- 17.52 **Concluding comments**
- 18.00 **Adjourn**



## Thursday, May 19

# ScientiAc Program

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus	Room 5 Jasmine
	APSS	ISSLS	ICSG	NASS	SMISS
10.00	Break				
	APSS & SMISS	ISSLS	ICSG	NASS	
12.30	Break + Industry workshops				
	APSS	SOLAS	ISASS & SMISS	AOSPINE	SMISS & ISASS
16.00	Break				
	APSS	SOLAS	ISASS & SMISS	AOSPINE	SMISS & ISASS



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Asia Pacific Spine Society

Session 1: Presidential lecture  
Chair: Shanmugam K.S. (MY)

- 08.00 Citation of Professor Kuniyoshi Abumi  
Shanmugam K.S. (MY)
- 08.10 Presidential lecture: In my 40 years' practice of spine surgery: What have I learnt?  
Abumi K. (JP)
- 08.35 Q&A
- Session 2: Cervical spine  
Chair: Liu G. (SG) & Chaddha R. (IN)
- 08.45 Why do Asian have less symptomatic adjacent level cervical disease?  
Chung J.Y. (KR)
- 09.00 A decade old argument for the best approach for multilevel cervical myelopathy: Is there a verdict?  
Shimizu K. (JP)
- 09.15 Is there a solution to C5 palsy?  
Pokharel R. (NP)
- 09.30 Is whiplash treatable?  
Osti O.L. (AU)
- 09.45 Q&A
- 10.00 Break

Society for Minimally Invasive Spine Surgery  
Asia Pacific Spine Society

APSS / SMISS Joint session  
Session 3: Joint meeting APSS + SMISS  
Chairs: Pennings F. (US) & Liu G. (SG)  
Panel: Mummaneni P. (US) & Wang M. (US)

- 10.30 Welcome  
Pennings F. (US) & Liu G. (SG)
- 10.35 APSS Presentations  
11.41 Nucleoplasty: Indication techniques and results - Kumar N. (SG)
- 11.00 11.42 Tips and tricks for MED decompression technique - Yoshida M. (JP)
- 11.25 11.43 Tips and tricks for thoracoscopic surgery technique - Wong H.K. (SG)
- SMISS Presentations
- 11.50 11.44 Robotics in spine surgery: Update - Wang M. (US)
- 12.10 11.45 Navigation in spine surgery: Update - Mummaneni P. (US)
- 12.30 Lunch break + Industry workshops



Asia Pacific Spine Society

Free papers: Cervical  
Chairs: Shimizu K. (JP) & Yue W.M. (SG)

- 14.00 A MRI study of the dorsal cervical cord migration behaviour in hybrid open-door laminoplasty  
Lee B.H., Gabriel Liu K.P., Poh E., Wang H.K. (SG)
- 14.04 Feasibility and trajectory study of anterior transarticular crossing screw placement for atlantoaxial joint instability: A cadaveric study and description of a novel technique  
Ji W., Chen J., Zhu Q. (CN)
- 14.08 Recommendation of outpatient clinic for numbness (Shibire-clinic in Japanese)  
Neji M. (JP)
- 14.12 Revision surgeries following artificial disc replacement of cervical spine  
Park J.B., Chang H., Yeom J.S., Suk K.S., Lee D.H., Lee J.C. (KR)
- 14.16 Artificial disc replacement versus fusion for multi-level cervical spondylotic radiculopathy  
Ramoss M.R., Laput A.P.V., Ver M.R. (PH)
- 14.20 Q&A
- Free papers: Cervical  
Chairs: Yoshida M. (JP) & Yamasaki R. (JP)
- 14.30 O294 Is there an increase in intraoperative bleeding during emergency hybrid open-door laminoplasty for post-traumatic cervical cord injured patient?  
Lee B.H., Gabriel Liu K.P., Wong H.K. (SG)
- 14.34 O295 In continuous type ossification of posterior longitudinal ligament, which one is treatment of choice - Laminectomy or laminoplasty?  
Yoo S., Ryu S., Choi H., Ryu D.S., Cho Y. (KR)
- 14.38 O296 Clinical results and complications of surgical treatment for thoracic myelopathy caused by ossification of the posterior longitudinal ligament: A multicenter retrospective study  
Hayashida M., Harimaya K., Maeda T., Ohta H., Shirasawa K., Tsuchiya K., Terada K., Kaji K., Anzono T., Saito T., Fujiwara M., Iwamoto Y. (JP)
- 14.42 O297 A clavus plate fixation for reconstruction of ventral defect of the craniovertebral junction: A novel fixation device for craniovertebral instability  
Ji W., Chen J., Zhu Q. (CN)
- 14.46 O298 Clinical features and direct medical cost for patients with acute spinal cord injury  
Kato M., Endo Y., Hashimoto T., Tashima H., Udagawa K., Horiuchi K., Fujita Y., Takahashi M. (JP)
- 14.50 Q&A



Asia Pacific Spine Society

Session 4: Operative video sessions: Surgical techniques in cervical spine  
Chair: Rajasekaran S. (IN)

- 15.00 11.46 Cervical pedicle screw insertion and management of VA injury  
Abumi K. (JP)
- 15.15 11.47 Posterior cervical decompression technique  
Yoshida M. (JP)
- 15.30 11.48 Anterior cervical decompression technique  
Shimizu K. (JP)
- 15.45 Q&A
- 16.00 Break
- Session 5: Adult spinal deformity  
Chairs: Akbarnia B. (US) & Wong Y.W. (HK)
- 16.30 11.49 Should we stop at T10 as UIV?  
Ignacio J.M.F. (PH)
- 16.45 11.50 Must we perform L5 S1 Fusion in all adult spinal deformity cases?  
Wong Y.W. (HK)
- 17.00 11.51 Biologics in deformity  
Berven S. (US)
- 17.15 11.52 MIS adult spinal deformity surgery: Is it better?  
Anand N. (US)
- 17.30 Q&A
- Case discussion  
Case discussants: Ignacio J.M.F. (PH) & Wong Y.W. (HK) & Anand N. (US)
- 17.45 Case 1: The adequacy of distal fixation in adult scoliosis surgery  
Wong Y.W. (HK)
- 18.00 Case 2: Neglected adult idiopathic scoliosis  
Case 3: Severe kyphosis after surgical correction for achondroplasia  
Ha K.Y. (KR)
- 18.15 Case 4: Application of ACR in sagittal deformity correction  
Akbarnia B. (US)



The International Society for the Study of the Lumbar Spine

Session 10: Complications  
Chairs: Tomkins Lane C. (CA) & Mossaad M. (EG)

- 07.30 Complications and repeat operation associated with greater surgical invasiveness in lumbar spondylolisthesis: Findings of the High Value Healthcare Collaborative  
Martin B., McGuire K., Gladders B., Lurie J., Farokhi F., Weinstein J. (US)
- 07.37 Incidental dura lesions and the effect on outcome after decompression for lumbar spinal stenosis: Results of a prospective multi-center study  
Sepe C., Quante M., Engler N., Pirchner S., Heider F., Kothe R. (DE)
- 07.44 The impact and value of uni- and multimodal intraoperative monitoring (MIOM) on neurological complications during spine surgery: A prospective study of 2728 patients  
Dvorak J., Sutter M., Eggspuhler A., Jeszensky D., Kleinstueck F., Fekete T., Haschtmann D., Porchet F. (CH)
- 07.51 Discussion
- 08.00 Validation of the Mirza Invasiveness Index in patients undergoing surgery for lumbar spinal disorders registered in Eurospine's Spine Tango Registry  
Mannion A., Kleinstueck F.S., Jeszensky D., Porchet F., Pigott T., Greiner-Perth R., Berlemann U., Aghajany E. (CH)
- 08.07 O303 Risk factor analysis of surgical site infections after posterior instrumentation fusion surgery for spinal trauma: Prospective multicenter study  
Ogihara S., Yamazaki T., Maruyama T., Chikuda H., Inanami H., Miyoshi K., Oshima Y., Azuma S., Yamada T., Murakami M., Kawamura N., Yamakawa K., Morii J., Saita K. (JP)
- 08.14 O304 The pullout strength of pedicle screws following re-direction after lateral wall breach or end-plate breach  
Goda Y., Higashino K., Takata Y., Sakai T., Saito K. (JP)
- 08.21 Discussion
- 08.30 General poster session (eSpine area)
- Invited lecture II  
Chair: Wong H.K. (SG)
- 09.30 11.53 Volcano prognosis: When and how big will be the next eruption?  
Costa Rodriguez F. (SG)
- 10.00 Break
- Session 11: Outcomes  
Chairs: Gibson A. (UK) & Hasegawa K. (JP)
- 10.30 O305 Do lumbar decompression and fusion patients recall their preoperative status? Recall bias in patient-reported outcomes  
Nassr A., Aleem I., Duncan J., Ahmed A., Eck J., Rhee J., Currier B. (US)
- 10.37 O306 Concordance between patients' and surgeons' expectations of lumbar spine surgery  
Girardi F., Mancuso C., Duculan R., Cammisia F., Sama A., Hughes A., Lebl D. (US)



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## The International Society for the Study of the Lumbar Spine

- 10.44 InAfluence of previous surgery on patient-rated outcome after surgery for degenerative disorders of the lumbar spine  
Zehnder P., Aghayev E., Fekete TF., Haschtmann D., Pigott T., Mannion A. (CH)
- 10.51 Discussion
- 11.00 Preoperative psychological factors affect surgical satisfaction in elderly patients with lumbar spinal stenosis  
Kawakami M., Ishimoto Y., Nagata K., Kitagawa T., Minetama M., Nakagawa M., Fukui D. (JP)
- 11.07 What health-related outcome measure best predicts future healthcare costs after spine surgery for degenerative spinal disorders?  
Mannion A., O'Riordan D., von Büren M. (CH)
- 11.14 Assessing the utility of a clinical prediction score regarding 30-day morbidity and mortality following metastatic spinal surgery: The New England Spinal Metastasis Score (NESMS)  
Bono C.M., Schoenfeld A.J., Leonard D.A., Harris M.B. (US)
- 11.21 Discussion
- Session 12: Pain  
Chairs: Barz T. (DE) & Kawakami M. (JP)
- 11.30 O311 Proinflammatory cytokine upregulates the expression of glial cell line-derived neurotrophic factor by human intervertebral disc cells  
Yamada J., Akeda K., Masuda K., Yamada K., Cheng K., Takegami N., Nakase K., Sudo A. (JP)
- 11.37 O312 Changes of pain-related behavior and  $\mu$ -opioid receptor expression in a rat lumbar disc herniation model  
Kaneuchi Y., Sekiguchi M., Kobayashi Y., Kameda T., Konno S. (JP)
- 11.44 O313 Effectiveness and cost-effectiveness of radiofrequency denervation for chronic low back pain originating from the facet joints  
Van Tulder M., Maase, Juch J., Ostelo R., Groeneweg G., Kallewaard J.W., Koes B., Verhagen A., van Dongen H., Huijgen F. (NL)
- 11.51 Discussion
- 12.00 Second business meeting (members only)
- 12.30 Lunch break + Industry workshops



## Room 3



## International Consortium for Scoliosis Genetics

### ICSG Business meeting

- 07.45 Minutes
- 07.55 Round table discussion: Ethical considerations across continents
- 08.35 Invited lecture: Biobank for early onset scoliosis  
Garcia M. (AU)
- 08.45 Building collaborative biobanks
- 09.25 Update on phenotyping consensus  
Phenotyping subcommittee
- 09.40 Update on genome-wide meta-analysis  
Genetics subcommittee
- 09.55 Proposed ICSG meeting 2017  
Wise C. (US)
- 10.10 Other business
- 10.20 Break
- 10.50 I160 Invited lecture: Scoliosis animal models - Strategies and challenges  
Chan D., Cheah K. (CN)
- 11.10 O314 Compound inheritance of null mutations and the hypomorphic risk haplotype in TBX6 also causes congenital scoliosis in Japanese  
Takeda K., Watanabe K., Ogura Y., Kawakami N., Qudo H., Minami S., Kotani T., Miyake N., Fujita N., Nakamura M., Matsumoto M., Ikegawa S. (JP)
- 11.25 O315 Roentgenographic evaluation of the spine in patients with osteogenesis imperfecta  
Vaz de Lima M. (BR)
- 11.40 O316 Limited consensus regarding choice of phenotypes in idiopathic scoliosis - Results from an international research consortium including basic and clinical researchers  
Dahl B., Cheung K.M., Wise C., Bow C. (DK, CN & US)
- 11.55 I161 Invited lecture: DeÅning scoliosis phenotypes - Lessons from consensus survey  
Dahl B. (DK)
- 12.05 I162 Invited lecture: 3D Phenotyping  
Cheung J. (HK)
- 12.15 Discussion
- 12.30 Lunch break + Industry workshops



## Society of Lateral Access Surgery

- 14.00 Welcome to the SOLAS meeting at SpineWeek 2016  
Program chairs
- Session 1: Hot topics in lateral access surgery  
Chairs: Berjano P. (IT), Smith W. (US) & Pimenta L. (BR)
- 14.10 Overview of lateral lumbar interbody fusion  
Pimenta L. (BR)
- 14.20 Strategies for successful implementation of lateral lumbar surgery  
Smith W. (US)
- 14.30 The value of lateral approach in degenerative lumbar conditions  
Taylor W. (US)
- 14.40 Lateral surgery for degenerative scoliosis  
Berjano P. (IT)
- 14.50 Anterior alternatives to PSO  
Akbaria B. (US)
- 15.05 Panel discussion with audience questions
- Session 2: Case-based discussion - 3 Cases per topic discussed by expert panel with audience participation  
The educational goal of this session is to provide interactive case-based discussion exposing the participants to strategies that can benefit their practice. For those who are new to lateral surgery looking for a better understanding of indications to surgeons with lateral surgery experience looking for pearls to augment their practice, this engaging session will have learning opportunities for all participants.
- 15.10 Case-Based Session # 1: Utility of lateral surgery in revision degenerative lumbar cases  
Chair: Berjano P. (IT)
- Presentation of cases & discussion  
Menezes C. (BR), Kanemura T. (JA), Quante M. (DE)
- 15.55 Break
- 16.25 Case-Based Session # 2: Safe & effective lateral surgery at L4-L5  
Chair: Smith W. (US)
- Presentation of cases & discussion  
Taylor W. (US), Changming G. (S), Quante M. (DE), Cleaver N. (AU)
- 17.20 Case-Based Session # 3: Lateral surgery for deformity and alignment correction  
Chair: Berjano P. (IT)
- Presentation of cases & discussion  
Deviren V. (US), Diwan A. (AU), Akbaria B. (US)
- 18.10 SOLAS meeting adjourns  
Program chairs



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## Room 3



## The International Society for the Advancement of Spine Surgery Society for Minimally Invasive Spine Surgery

Case Discussion: L4-5 Grade 1 degenerative spondylolisthesis with stenosis  
Back (50%) and leg pain (50%)  
Chairs: Anand N. (US) & Kumar N. (SG)

- 14.00 Introduction
- 14.06 Lumbar decompression  
Kumar N. (SG)
- 14.35 Endoscopic decompression  
Yue J. (US)
- 15.04 Decompression with CoAex  
Yue J. (US)
- 15.30 MIS TLIF  
Anand N. (US)
- 16.00 Break
- 16.30 MIS LLIF with PSF  
Wang M. (US)
- 17.00 ALIF with PSF  
Foley K. (US)
- 17.30 PSF only  
Kumar N. (SG)
- 18.00 ADR  
Pimenta L. (BR)



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## NASS North American Spine Society

- 07.30 **Welcome**
- Paper presentations: Spinal tumor and traumatic injuries**  
Chairs: Bono C.M. (US) & Kawaguchi Y. (JP)
- 07.35 **Effectiveness of pre-operative selective arterial embolization to reduce intra-operative blood loss in patients with primary tumors of the mobile spine**  
Xu N., Wei F., Li Z., Lu X., Jiang L., Liu Z. (CN)
- 07.41 **Quality of life after different surgical procedures for spinal metastases – A prospective cohort study**  
de Ruiter G.C.W., Nogaerde C., Wolfs J.F.C., Arts M.P. (NL)
- 07.47 **Pre-operative magnetic resonance and intra-operative computed tomography fusion for real-time neuronavigation in intramedullary lesion surgery**  
Costa F. (IT)
- 07.53 **Revision surgery for spinal metastatic disease – Indications and outcomes**  
Choudhury M.Z., Bal N.S., Chan S.L., Stirling A.J., Grainger M.F. (UK)
- 07.59 **Are cervical collars required for immobilisation in the emergency trauma setting?**  
Gee C., Davies D., Kamani S., Bayed S., Cassell J. (UK)
- 08.05 **O322 Early decompression and stabilization following cervical spinal cord injury: Examining the process of care from accident scene to surgery**  
Freeman B.J.C., Battistuzzo C.R., Armstrong A., Clark J., Dunlop S.A., Batchelor P.E. (AU)
- 08.11 **O323 Assessment of whole spine MRI for multilevel non-contiguous spinal fractures: Incidence, patterns & missed injuries**  
Kanna R., Gaikar C., Maheswaran A., Shetty A.P., Rajasekaran S. (IN)
- 08.15 **Discussion**
- Paper presentations: Predictive factors after surgery**  
Chairs: Wetzel F.T. (US) & Thng P. (SG)
- 08.30 **O324 Effect of a comprehensive pre-surgical education program on the anxiety levels of patients with spinal disorders: A prospective study**  
Hu X., Block A.R., Brice S., Bedeman S.S., Lieberman I.H. (US)
- 08.36 **O325 The effect of obesity and being overweight on disability and pain after lumbar fusion: An analysis of 805 patients**  
Neva M.H., Sommachii Y., Vihtonen K., Kyrölä K., Iizuka H., Takagishi K., Hakkinen A. (FI & JP)
- 08.42 **O326 Comparison of intrathecal diamorphine with conventional methods of analgesia following lumbar spine surgery**  
Lee R.S., Krishnan R., Kennedy J., Sedra F. (UK)



Room 4

## NASS North American Spine Society

- 08.48 **Quality of life and disability – Can they be improved by active postoperative rehabilitation after spinal fusion surgery? A randomised controlled trial with 12-month follow-up**  
Neva M.H., Iives O., Dekker J., Pekkanen L., Marttinen I., Vihtonen K., Pitulainen K., Järvenpää S., Hakkinen A. (FI & NL)
- 08.54 **Discussion**
- 09.30 **Break**
- Paper presentations: Lumbar disc herniations and stenosis**  
Chairs: Dohring E.J. (US) & Rajasekaran S. (IN)
- 10.00 **Prognostic models of the outcome of surgery for disc herniation**  
Mannion A.F., Staub L.P. (CH)
- 10.06 **A comparison of quantitative and qualitative gradings of lumbar spinal stenosis based on MRI**  
Mannion A.F., Pacifico D., O'Riordan D., Schizas C. (CH)
- 10.12 **A prospective, multi-center comparison of outcomes for lumbar fusion in the treatment of degenerative spondylolisthesis and degenerative disc disease at two-year follow up**  
Smith W., Phillips F.M., Khajavi K., Kanter A., Peterson M. (US)
- 10.18 **O331 Changes in dural sac caliber with standing MRI improve correlation with symptoms of lumbar spinal stenosis**  
Lau Y.Y.O., Lee K.L., Chan L.Y., Kwok K.O., Griffiths J.F., Law S.W. (CN)
- 10.24 **O332 Does pre-operative magnetic resonance imaging of the lumbar multi-disc predict clinical outcomes following lumbar spinal decompression for symptomatic spinal stenosis?**  
Zotti M.G.T., Vilas-Boas F., Clifton T., Piche M., Yoon W.W., Freeman B.J.C. (AU)
- 10.30 **O333 Decreased CSF area in spinal canal is highly correlated with risk of neurogenic intermittent claudication but not SF-36 or pain**  
Peng H.Y., Lin P.C., Tsai W.L., Wu C.C., J Lin J.H., Chiang Y.H. (TW)
- 10.36 **Discussion**



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Room 4

## NASS North American Spine Society

- Endoscopically-assisted spine surgery: Current state and future directions**  
Chair: Dohring E.J. (US)
- 11.00 **Introduction**  
Dohring E.J. (US)
- 11.10 **O163 Transforaminal endoscopic discectomy**  
Wang C.C. (MY)
- 11.25 **O164 Endoscopic rhizotomy**  
Yue J. (US)
- 11.40 **O165 Percutaneous endoscopic cervical discectomy**  
Lee S.H. (KR)
- 11.50 **O166 Endoscopic spine surgery: What is the future?**  
Yeung A.T. (US)
- 12.10 **Discussion, questions**
- 12.30 **Lunch break + Industry workshops**



Room 4

## AOSpine AOSpine

- Session 1: Deformity**  
Chair: Liu G. (SG)
- 14.00 **Key opening lecture**  
Liu G. (SG)
- 14.30 **The benefit of operative management of post-tumor spinal deformity**  
Ptashnikov D., Zaborovskii N., Mikhaylov D., Smekalenkov O., Masevnin S., Lapaeva O. (RU)
- 14.34 **Cervical alignment after surgical correction of Scheuermann's Kyphosis**  
Hammett T.C., Romana A.B.P., Nasto L., Mehdian H. (UK)
- 14.38 **Age-adjusted alignment goals have the potential to reduce PJK**  
Lafage R., Schwab F., Glassman S., Bess S., Diebo B., Sheer J., Hart R., Line B., Burton D., Kim H.J., Klineberg E., Protosaltis T., Ames C., Lafage V. (US)
- 14.42 **Estimated X-ray exposure and additional cancer risk during surgical treatment of scoliosis in the growing spine**  
Loughenbury P.R., Gentles S., Murphy E., Tomlinson J., Dunsmuir R.A., Gummerson N.W., Rao A.S., Rowbotham E., Millner P.A., Khan A.L. (UK)
- 14.46 **O338 Defining normative quality metrics in complex high-risk deformity cases: Results from the Scol-Risk 1 study**  
Berven S.H., Saigal R., Lafage V., Kelly M., Kopjar B., Smith J., Dahl B., Cheung K.M., Cameron L.Y., Schwab F.J., Espinoza K., Shaffrey C.I., Fehlings M.G., Lenke L.G., Ames C.P. (US DK CN & CH)
- 14.50 **Group discussion**
- 15.00 **O339 De-novo degenerative lumbar scoliosis: A systematic review of prognostic factors for curve progression**  
Faraj S., Holewijn R., van Hooff M., de Kleuver M., Haanstra T. (NL)
- 15.04 **O340 Clinical and radiographic risk factor for knee-spine syndrome in 535 elderly volunteers: Retrospective TOEI study**  
Kobayashi S., Togawa D., Hasegawa T., Yamato Y., Oe S., Banno T., Mihara Y., Matsuyama Y. (JP)
- 15.08 **O341 Identifying thoracic compensation and predicting reciprocal thoracic kyphosis and PJK**  
Lafage R., Protosaltis T., Diebo B., Smith J., Sciubba D., Passias P., Klineberg E., Burton D., Ames C., Shaffrey C., Bess S., Hart R., Schwab F., Lafage V. (US)
- 15.12 **O342 Appropriate treatment for adults with spinal deformity: An international consensus**  
Berven S.H., Kamper S.J., Gernscheid N.M., Dahl B., Shaffrey C., Lenke L.G., Lewis S.J., Cheung K.M., Alanay A., Ito M., Polly D.W., de Kleuver M. (US AU CH DK CA TR JP & NL)
- 15.16 **O343 The development of a core outcome set for adolescent deformity surgery for the Nordic spine registries: An AOSpine deformity knowledge forum project**  
Faraj S., van Hooff M., Haanstra T., Holewijn R., Gernscheid N., de Kleuver M. (NL & CH)
- 15.20 **Group discussion**



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**AOSPINE AOSpine**

- 15.30 Adults with idiopathic scoliosis have similar physical activity level as controls  
Diabakerli E., Grauers A., Danielsson A., Gerdhem P. (SE)
- 15.35 Three dimensional morphometry of lumbar spine to design pedicle screw: First Indonesian population based study  
Sakti Y.M., Dewo P., Suwardi T., Lanodiyu Z., Magetari R. (ID)
- 15.40 Operative strategy of thoracolumbar kyphosis secondary to old osteoporotic vertebral compression fracture  
Jiang Y., Chen Z.Q., Guo Z.Q., Zeng Y., Liu Z.J., Liu X.G. (CN)
- 15.45 Modified four-rod instrumentation technique to support long posterior fixations at high risk of failure  
Morass G.L., Shafafy R., Quraishi N., Grevitt M., Boszczyk B.M., Shafafy M. (UK)
- 15.50 Group discussion
- 16.00 **Session 2: Degenerative Lumbar**  
Chair: Thng P. (SG)
- 16.30 1168 Key opening lecture  
Thng P. (SG)
- 17.00 O348 Unlocking TPA's clinical and sagittal significance by analyzing its relation to pelvic tilt  
Lafage R., Liabaud B., Oren J., Vira S., Harris B., Spiegel M., Diebo B., Tanzi E., Protosaltis T., Emco T., Schwab F., Lafage V. (US)
- 17.04 O349 Histological analysis of bone regeneration with different doses of rhBMP-2 in an ovine lumbar interbody fusion model  
Hohaus C., Segrist K., Seeger J., Meisel H.J. (DE)
- 17.08 O350 Lumbar paravertebral muscle fatty infiltration: Spatial distribution and association with disc degeneration in an Asian population  
Crawford R.J., Ni Mhuiris A., Cheung J., Bow C., Pang H., Elliott J.M., Karpinen J., Melloh M., Luk K., Cheung K., Samartzis D. (CH, AU, HK, US & FI)
- 17.12 O351 Calcified giant thoracic disc herniations in adults: A series of 10 patients with at least 2 years of follow up  
Xu N., Wei F., Liu X., Jiang L., Liu Z. (CN)
- 17.16 Group discussion
- 17.30 O352 Day case discectomy - Retrospective analysis of 70 case series  
Tomlinson J., Loughenbury P., Corns R., Derham C., Pal D., Rudol G., Thomson S., Khan A., Timothy J., Rao A., Borse V. (UK)

**AOSPINE AOSpine**

- 17.34 Synovial cysts of lumbar spine: State of the art - Outcome analysis on a series of two hundred ninety-four consecutive microsurgically resected cysts with long follow-up  
Ciarpaglini R., Ebeling U., Steinsepe K.F. (CH)
- 17.38 Long time follow up after posterior lumbar interbody fusion with bone morphogenetic protein-2  
Hohaus C., Meisel H.J. (DE)
- 17.42 Cement augmentation to reduce spinal interbody implant subsidence  
Borse V.H., Uddle A.M., Skrzypiec D.M., Timothy J., Jacob J., Persson C., Engqvist H., Kapur N., Hall R.M. (UK & SE)
- 17.46 Group discussion
- 18.00 Success criteria for core outcome measures in surgery for isthmic spondylolisthesis  
Rossvoll I., Seiten Ø., Nygaard Ø.P., Solberg T. (NO)
- 18.04 The role of lumbar facet and nerve root block in low back pain and sciatic pain  
Main-Sanabna E.A., Silver J.R. (PY)
- 18.08 Early results of a minimally invasive fusion technique with mediolateral pedicle screws  
Dipen N. (UK)
- 18.12 O359 Early unplanned readmissions in spine surgery: The current incidence and preventive aspects in Indian scenario  
Kanna R., Rajoli S.R., Shetty A.P., Rajasekaran S. (IN)
- 18.16 O360 Treatment of symptomatic spinal stenosis with the transforaminal endoscopic approach  
Yeung A. (US)
- 18.20 Group discussion



Room 5



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**SMISS Society for Minimally Invasive Spine Surgery**

- Session 1: MISS - Trauma and tumor**  
Chairs: Härtl R. (US) & Wong C.C. (MY)  
Panel: Pimenta L. (BR), Nakanishi K. (JP), Khoo L. (US), Kwan M.K. (MY), Nene A. (IN), Yue W.M. (SG) & Tanaka M. (JP)
- 08.00 Welcome  
Härtl R. (US) & Wong C.C. (MY)
- 08.05 1169 Contemporary surgical management of metastatic spine disease  
Tanaka M. (JP)
- 08.17 1170 Thoracolumbar trauma classifications for the practicing spine surgeon  
Nene A. (IN)
- 08.29 Q&A
- 08.35 Case: Single thoracic metastatic lesion - Kwan M.K. (MY)
- 08.39 En bloc resection - Nene A. (IN)
- 08.43 Posterior open - Tanaka M. (JP)
- 08.47 MIS - Khoo L. (US)
- 08.51 How case was treated - Kwan M.K. (MY)
- 08.55 Discussion
- 09.00 Case: Traumatic TL burst fracture - Nakanishi K. (JP)
- 09.04 MIS Anterior-posterior - Pimenta L. (BR)
- 09.08 Percutaneous posterior instrumentation without fusion - Yue W.M. (SG)
- 09.12 Short versus long segment fixation - Nene A. (IN)
- 09.16 How case was treated - Nakanishi K. (JP)
- 09.20 Discussion
- 09.30 Case: A traumatic TL burst fracture in patient with osteoporosis - Khoo L. (US)
- 09.34 Open posterior laminectomy with instrumentation - Nene A. (IN)
- 09.38 Short segment vs long segment - Kwan M.K. (MY)
- 09.42 Cement augmentation - Nakanishi K. (JP)
- 09.46 How case was treated - Khoo L. (US)
- 09.50 Discussion
- 10.00 Break

**The International Society for the Advancement of Spine Surgery Society for Minimally Invasive Spine Surgery**

- SMISS / ISASS Joint session**  
**Session 3: MISS - Spinal deformity**  
Chairs: Wong H.K. (SG) & Mummaneni P. (US)  
Panel: Ishii K. (JP), Pimenta L. (BR), Li Wen Wong E. (MY), Wang M. (US), Kwon B. (US) & Härtl R. (US)
- 14.00 Welcome  
Wong H.K. (SG) & Mummaneni P. (US)
- 14.05 Overview of cervical deformity: intrinsic or compensatory?  
Ishii K. (JP)
- 14.15 Discussion
- 14.20 Case: Idiopathic scoliosis with postural kyphosis - Mummaneni P. (US)
- 14.24 ACR / Lateral MIS - Wang M. (US)
- 14.28 Open Posterior only - Härtl R. (US)
- 14.32 Open anterior-posterior - Li Wen Wong E. (MY)
- 14.36 How case was treated - Mummaneni P. (US)
- 14.40 Discussion
- 14.45 1172 Overview of radiographic TL sagittal balance parameters  
Pimenta L. (BR)
- 14.55 Discussion
- 15.00 Case: Mild idiopathic mid lumbar scoliosis - Wong H.K. (SG)
- 15.04 Open - Wang M. (US)
- 15.08 MIS - Kwon B. (US)
- 15.12 Hybrid - Ishii K. (JP)
- 15.16 How case was treated - Wong H.K. (SG)
- 15.20 Discussion
- 15.30 Case: Thoracic PJK - Mummaneni P. (US)
- 15.34 Open - Ishii K. (JP)
- 15.38 MIS - Härtl R. (US)
- 15.42 Hybrid - Kwon B. (US)
- 15.46 How case was treated - Mummaneni P. (US)
- 15.50 Discussion
- 16.00 Break



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Session 4 | MISS - Free papers | Part 3  
Chair: Wang M. (US)

- 16.30 Welcome
- 16.34 **O361** Early outcomes in the use of minimally invasive lateral cages in primary adult degenerative scoliosis correction surgery - Minimum 6 month to 2 year follow-up  
Lee R. (UK)
- 16.38 Minimally invasive lateral interbody fusion with segmental lateral Axation for treatment of scoliotic deformity with significant spinopelvic malalignment  
Smith W., Bergmann L. (US)
- 16.42 **O362** Surgical outcome of corrective fusion with lateral lumbar interbody fusion for adult spinal deformity with severe imbalance  
Endo H., Mura kami H., Tokunaga K., Tsukimura T., Sato R., Saigo S., Yamabe D., Numata N., Doita M. (JP)
- 16.46 Discussion
- 16.53 **O363** Can MIS-TLIF be performed with conventional instrumentation? Prospective randomized clinico-radiological study of para-median Inter-transverse MIS-TLIF vs classical TLIF  
Bhani M., Naresh-Babu J., Anil-Babu P. (IN)
- 16.57 **O365** Minimally invasive transforaminal lumbar interbody fusion [MI-TLIF] - An attractive option for select failed backs  
Bangalore Kantharajanna S., Kulkarni A.G., Dhruv A., Annu A. (SG & IN)
- 17.01 **O366** The effectiveness of transforaminal endoscopic facet cyst resection  
Gibson J.N.A., Oelofse L., Ipreburg M. (UK, ZA & NL)
- 17.05 Discussion
- 17.12 **O367** Posterior percutaneous screw-rod instrumentation is a safe and effective alternative approach to a thoracolumbosacral orthosis rigid bracing for single level pyogenic spondylodiscitis  
Colangelo D., Formica V.M., Autore G., Pambianco V., Tamburelli F.C., Nasto L.A., Pola E. (IT)
- 17.16 **O368** A new groove-entry technique for inserting thoracic percutaneous pedicle screws  
Ishii K., Shiono Y., Funao H., Kaneko Y., Isogai N., Nagura T., Seki H., Fujita N., Hikata T., Iwanami A., Watanabe K., Nakamura M., Matsumoto M. (JP)
- 17.20 **O369** Anatomical consideration of iliac crest on percutaneous endoscopic discectomy using transforaminal approach  
Tezuka F., Sakai T., Abe M., Yamashita K., Takata Y., Higashino K., Saiyo K. (JP)
- 17.24 Discussion



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- 17.31 Reducing pedicle drilling radiation by using dynamic surgical guidance with a Jamshidi Needle while maintaining screw placement accuracy  
Williams J., Khoo L., Gaughan J., Betz R. (US)
- 17.35 **O364** Does microendoscopic technique reduce mortality and major complications in patients undergoing lumbar discectomy? A propensity score-matched analysis using a nationwide administrative database  
Ohya J., Oshima Y., Chikuda H., Ouchi T., Tanaka S., Yasunaga H. (JP)
- 17.39 **O365** Percutaneous lumbar intradiscal injection of autologous bone marrow concentrated cells significantly reduces discogenic pain through 24 months  
Vaz de Lima M. (BR)
- 17.43 Discussion
- 17.52 Concluding comments
- 18.00 Adjourn



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Friday, May 20  
Scientific Program

	Room 1 Heliconia	Room 2 Heliconia	Room 3 Hibiscus	Room 4 Hibiscus
10.00	APSS	ISSLS	AOSPINE	NASS
	Break			
12.30	APSS	ISSLS	AOSPINE	NASS
	Break + Industry workshops			
16.00	APSS	ISSLS	ISASS	
	Break			
	APSS		ISASS	

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### Asia Pacific Spine Society

Session 1: Early onset of scoliosis: EOS Spine  
Chairs: Jayaswal A. (IN) & Rajasekaran S. (IN)

- 08:00 1172 Luque instrumentation for fusionless surgery?  
Wong Y.W. (HK)
- 08:15 1174 When to use Vertical Expandable Prosthetic Titanium Rib (VEPTR)?  
Wong Y.W. (MY)
- 08:30 1175 Growing rods: What works, what doesn't?  
Akbaria B. (US)
- 08:45 Q&A
- Case discussion  
Case discussants: Shanmugam K.S. (MY), Wong Y.W. (HK) & Akbaria B. (US)
- 09:00 Case 1: Selective thoracic fusion and its complication  
Rajasekaran S. (IN)
- 09:20 Case 2: EOS with intraspinal anomaly  
Jayaswal A. (IN)
- 09:40 Case 3: What happens next after you have put in the growing rods?  
Liu G. (SG)
- 10:00 Break
- Session 2: Adolescent Idiopathic Scoliosis: AIS spine  
Chairs: Luk K.D.K. (HK) & Chan C.Y.W. (MY)
- 10:30 1176 Can you avoid neck and shoulder imbalance in Lenke 1 and 2 scoliosis correction?  
Kwan M.K. (MY)
- 10:45 1177 Lenke IC: Selective vs non selective fusion?  
Rajasekaran S. (IN)
- 11:00 1178 Direct Vertebral Rotation (DVR): Does it work?  
Wong C.C. (MY)
- 11:15 Q&A
- Case discussion  
Case discussants: Kwan M.K. (MY), Rajasekaran S. (IN) & Wong C.C. (MY)
- 11:30 Case 1: Selection of fusion level in Lenke 5 curves  
Chan C.Y.W. (MY)
- 11:50 Case 2: Selection thoracic fusion  
Luk K.D.K. (HK)
- 12:10 Case 3: Severe scoliosis - A safe management strategy  
Lim L.L. (SG)
- 12:30 Lunch break + Industry workshops



### Asia Pacific Spine Society

Session 3: Operative video sessions: Surgical techniques in thoracolumbar spine  
Chairs: Wong H.K. (SG), Luk K.D.K. (HK) & Rajasekaran S. (IN)

- 14:00 1179 AIS: Scoliosis reduction techniques  
Chan C.Y.W. (MY)
- 14:15 1180 Video-assisted thoracoscopic instrumentation surgery for AIS: VATI  
Wong H.K. (SG)
- 14:30 1181 Pedicle Subtraction Osteotomy (PSO) techniques  
Jayaswal A. (IN)
- 14:45 Q&A
- 15:00 1182 Posterior Vertebral Column Resection (PVCR)  
Wong C.C. (MY)
- 15:15 1183 MIDUF: Cortical bone trajectory screw  
Shanmugam K.S. (MY)
- 15:30 1184 Lateral lumbar interbody fusion: XLIF  
Akbaria B. (US)
- 15:45 Q&A
- 16:00 Break
- Free papers: Spinal deformity  
Chairs Aydogan M. (TR) & Thanh V.V. (VN)
- 16:30 O373 Sequential assessment of spinal cord location in adolescent idiopathic scoliosis  
Grant C.A., Newell N., Izatt M.T., Keenan B.E., Little J.P., Askin G.N., Labrom R.D., Adam C.J., Pearcy M.J. (AU)
- 16:34 O374 Characterization and predictive value of "segmental curve flexibility" in adolescent idiopathic scoliosis patients  
Cheung J.P.Y., Yao G., Shigematsu H., Cheung K.M.C., Luk K.D.K., Samartzis D. (CN)
- 16:38 O375 Predictability of peak growth spurt and growth cessation using the distal radius and ulna classification  
Cheung J.P.Y., Cheung P.W.H., Samartzis D., Cheung K.M.C., Luk K.D.K. (HK)
- 16:42 O376 Are magnetically controlled growing rods useful as an internal splint in idiopathic scoliosis?  
Yadav S., Cheung J.P.Y., Samartzis D., Cora B., Kenny K.Y.H., Cheung K.M.C. (CN)
- 16:46 O377 Effect of an imbalanced fusion block with residual shift on distal adding-on segments after adolescent idiopathic scoliosis surgical correction  
Shigematsu H., Luk K.D.K., Cheung J.P.Y., Bruzzone M., Mak K.C. (JP, HK & AR)
- 16:50 Q&A



### Asia Pacific Spine Society

Free papers: Spinal deformity  
Ignacio J.M.F. (PH) & Tobing D. (ID)

- 17:00 1185 Patient and radiographer assessment of the slump sitting Aexion compared to the conventional forward bending Aexion  
Choong D., Lau E., Lau L.L., Liu G., Wong H.K., Hey D. (SG)
- 17:04 O378 Posterior thoraco-pelvic corrective fusion for severe spinal deformity in patients with Parkinson's disease  
Yamato Y., Hasegawa T., Kobayashi S., Togawa D., Yasuda T., Oe S., Matsuyama Y. (JP)
- 17:08 O379 A prospective monocentric randomized pilot study to compare the safety and effectiveness of two vertebral compression fracture reduction techniques: 1 Year results  
Noriega D.C., Ardura F., Hernandez Ramajo R. (ES)
- 17:12 O381 3D mapping to assess anatomical restoration in vertebral compression fractures  
Noriega D.C., Maestretti G., Dufort P., Kruger A., Ardura F. (ES, CH, CA & DE)
- 17:16 O382 Two-level prophylactic balloon kyphoplasty decreases the risk of proximal junctional kyphosis in adult spinal deformity surgery  
Kaneko Y., Farhan SA., Nozaki T., Lu Y., Yoshioka H., Ishii K., Bedeman S.S. (US, JP)
- 17:20 Q&A
- Session 4: Closing  
Chair: Abumi K. (JP)
- 17:30 Presentation of future APSS activities and meetings  
Kwan M.K. (MY)
- 17:35 1185 What is the future of spine surgery in the next 10 years?  
Luk K.D.K. (HK)
- 18:00 Q&A
- Prize giving ceremony  
Liu G. (SG)
- 18:10 Prize giving ceremony: Best Papers (Oral and Poster)  
Jayaswal A. (IN), Shanmugam K.S. (MY) & Abumi K. (JP)
- 18:20 Closing remarks  
Abumi K. (JP)



### The International Society for the Study of the Lumbar Spine

- 07:45 Session 13: Special poster session 2 (eSpine area)
- Session 14: The ISSLS Prize Papers
- 09:00 Introduction and Award Ceremony  
Chair: Andersson G. (US)
- 09:10 ISSLS Prize - Clinical  
Consensus on the clinical diagnosis of lumbar spinal stenosis: Results of an International Delphi Study  
Tomkins-Lane C., Melloh M., Lurie J., Smuck M., Battie M., Freeman B., Samartzis D., Hu R., Barz T., Suber K., Schneider M., Haig A., Schizas C., Cheung J., Mannion A., Staub L., Comer C., Macedo L., Ahn S.H., Takahashi K., Sandella D. (CA, CH, US, AU, HK, DE, UK, KR, JP)
- 09:20 Discussion
- 09:30 ISSLS Prize - Biomechanics  
Vibration really does disrupt the disc - A microanatomical investigation  
Scholium M., Wade K., Robertson P., Thambyah A., Broom N. (NZ)
- 09:40 Discussion
- Session 15: Fellowship Award Ceremony  
Chair: Yoon T. (US)
- 09:50 Introduction of fellowships - Mossad M. (EG)  
Recipient - Abdelrazek Hassane M.A. (EG)  
Presentation of Spine Young Investigators Award - Boden S. (US)
- 10:00 Break
- 10:30 Report of special interest group chairs  
Chair: Yoon T. (US)
- Session 16: Sagittal alignment  
Chairs: Bono C. (US) & Sairyo K. (JP)
- 11:00 O385 Paravertebral muscle degeneration is the most significant factor associated with sagittal imbalance: The Wakayama spine study  
Hashizume H., Yoshimura N., Yamada H., Oka H., Teraguchi M., Iwashita H., Asai Y., Sasaki T., Muraki S., Matsuda K., Tsutsui S., Minamide A., Nakagawa Y., Iwasaki H., Yoshida M. (JP)
- 11:07 O386 Impact of fatigue on maintenance of upright posture: Dynamic assessment of sagittal spinal deformity parameter after 10 minutes of walking  
Bae J., Theologis A.A., Jang J.-S., Lee S.-H., Deviren V. (KR & US)
- 11:14 O387 The difference of total spinal sagittal alignment between up right and stepped position  
Endo K., Suzuki H., Nishimura H., Yonfuji M., Murata K., Tanaka H., Yamamoto K. (JP)
- 11:21 Discussion



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## The International Society for the Study of the Lumbar Spine

- 11.30 **O388** Spino-pelvic mismatch is the most significant indicator on low back symptom measured by ODI score  
Hasegawa K., Okamoto M., Hatsushikano S., Shimoda H., Ono M. (JP)
- 11.37 **O389** Effects of pre-existing adjacent-level pathologies and spinopelvic alignment on the prevalence of adjacent segment disease after single-level lumbar fusion  
Shimamura Y., Kanayama M., Oha F., Kuroki K., Hiseida Y., Tashiro K., Suzuki Y., Hashimoto T., Kaneko K. (JP)
- 11.44 **O391** Does sarcopenia impact on sagittal malalignment or not?  
Ohyama S., Hoshino M., Toyoda H., Takahashi S., Terai H., Suzuki A., Hayashi K., Tamai K., Nakamura H. (JP)
- 11.51 **Discussion**  
**Session 17: Disc degeneration**  
**Chairs: Yoon T. (US) & Kolaru N. (JP)**
- 12.00 **O392** Intervertebral disc repair with autologous nucleus pulposus cell transplantation: A two-year clinical study  
Ruan D.K., Wang C.F., He Q., Zhang C., Hou L.S., Li C., Bai X.D., Ji W., Weng T.Y. (CN)
- 12.07 **O392** Disc regeneration using MSC transplanted via the endplate route  
Vadala G., Russo F., Musumeci M., De Strobel F., Bernardini M., Denaro L., D'Avella D., Giordano R., Denaro V. (IT)
- 12.14 **O393** Functional self-assembled peptide nano-fibers for BMSCs encapsulation in nucleus pulposus regeneration  
Wu Y., Ruan D., Jia Z. (CN)
- 12.21 **Discussion**
- 12.30 **Lunch break + Industry workshops**
- 14.00 **Symposium II**
- 1186 **Diagnosis and non-surgical treatment of SI joint pain**  
Smuck M. (US)
- 1187 **SI Joint Fusion - Clinical update**  
GarAn SR (US)
- Session 18: Imaging**  
**Chairs: Smuck M. (US) & Ishii K. (JP)**
- 14.40 **O394** Axial loading during MRI combined with T2 mapping provide new insights into disc degeneration and biomechanics in LBP patients  
Hebelka H., Lagerstrand K., Brisby H., Nilsson M. (SE)
- 14.47 **O395** The influence of sub-diagnosis on radiographic and clinical outcomes after lumbar fusion for degenerative disc disorders: A 15-year meta-analysis  
Bhalla A., Schoenfeld A., George J., Bono C. (US)
- 14.54 **O396** Can Propionibacterium acne really cause Modic changes? Evidence from a rabbit model  
Zhao F., Shan Z., Li S., Zhang X., Yu T. (CN)



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- 15.01 **Discussion**
- 15.10 **O397** Psychometric alterations and brain images in chronic low back pain  
Yabuki S., Fukui S., Kikuchi S., Konno S. (JP)
- 15.17 **O399** Observation of bone volume change in osteoporotic vertebral body after vertebral fracture by CT color mapping technique  
Hamasaki T., Sadaoka D. (JP)
- 15.24 **O399** The diagnosis of double-crush lesion in the L5 lumbar nerve using diffusion tensor imaging  
Kanamoto H., Eguchi Y., Ohtori S., Suzuki M., Okawa Y., Yamanaka H., Tamai H., Kobayashi T., Ohta S., Yamauchi K., Suzuki M., Aoki Y., Watanabe A., Takahashi K. (JP)
- 15.31 **Discussion**  
**Session 19: Spinal stenosis**  
**Chairs: Jacobs W. (NL) & Takahashi K. (JP)**
- 15.40 **O400** The change of dural sac cross-sectional area (DCSA) with symptomatic lumbar spinal stenosis: 10-year community follow-up  
Igan T., Otani K., Sekiguchi M., Seki S., Tominaga R., Kobayashi Y., Kameda T., Kaneuchi Y., Sato R., Konno S. (JP)
- 15.47 **O401** Prognosis and prognostic factors after successfully treated by non-surgical procedures in patients with lumbar spinal canal stenosis  
Tsubosaka M., Kaneyama S., Yano T., Sumi M., Kasahara K., Kanemura A., Takabatake M., Koh A., Hirata H., Takeoka Y. (JP)
- 15.54 **O402** Determinants of patient satisfaction after surgery for central spinal stenosis without concomitant spondylolisthesis - A register study of 5100 patients  
Strömqvist B., Sigmundsson F. G., Jönsson B. (SE)
- 16.01 **Discussion**
- 16.10 **Announcement - Best Paper and Poster Awards**  
**Chair: Roberts S. (UK)**  
**Closing remarks: Luk K. (HK)**

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## AOSPINE AOSpine

- Session 1: Degenerative cervical**  
**Chair: Vielle L. (BR)**
- 08.00 **O403** Key opening lecture: Cervical Sagittal Alignment  
Vielle L. (BR)
- 08.30 **O403** Cervical - Foot print anthropometry in Indian population: Implications on design of artificial disc replacement devices  
Kulkarni A., Patil V., BK S., Saraf A. (IN)
- 08.35 **O403** More than 20 years of follow-up after en bloc cervical laminoplasty  
Kawaguchi Y., Nakano M., Yasuda T., Seki S., Suzuki K., Makino H., Kimura T. (JP)
- 08.40 **O403** Incidence and functional outcomes of reoperation after anterior cervical spine surgery: Results from AOSpine North America multicenter study on 8,887 patients  
Nagoshi N., Fehlings M.G., Nakashima H., Tetreault L., Riew D. (CA, JP & US)
- 08.45 **Group discussion**
- 09.00 **O404** Impact of cranio-cervical balance on surgical outcomes of laminoplasty  
Tamai K., Suzuki A., Terai H., Toyoda H., Hoshino M., Hayashi K., Oyama S., Takahashi S., Nakamura H. (JP)
- 09.05 **O407** Results of anterior surgery for spondylotic cervical myelopathy-role of the posterior longitudinal ligament in outcome  
Chatterjee S., Dutta D. (IN)
- 09.10 **O408** Sequence of segmental contributions in the lower cervical spine during active extension and flexion: Healthy controls vs. cervical degenerative disc disease patients  
Boselle T.F.M., van Santbrink H., de Be RA., van Mameren H. (NL)
- 09.15 **Group discussion**
- 09.30 **O409** 3-Year radiological evolution in a cohort of 384 patients treated with cervical arthroplasty  
Dufour Th., Bernard P., Beaurain J., Huppert J., Hovorka I., Vila T., Steib J.P., Vital J.M. (FR)
- 09.34 **O410** Are spacer fixations necessary for every opened lamina in expansive open-door laminoplasty? Matched case-control study  
Terakawa M., Tsujio T., Tamai K., Hoshino M., Seki M., Nakamura H. (JP)
- 09.38 **O411** Adjacent level cervical disc degeneration: Incidence and cause - Prospective study for 10 years  
Chatterjee S. (IN)
- 09.42 **O412** Accuracy of retrospective evaluation of pre-operative neurological function following decompressive surgery among patients with cervical spondylotic myelopathy (CSM)  
Xu N., Wang S., Yu M., Liu Z., Liu X., Jiang L., Wei F. (CN)
- 09.46 **Group discussion**
- 10.00 **Break**



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## AOSPINE AOSpine

- Session 2: Spinal trauma**  
**Chair: Rajasekaran S. (IN) & Berjano P. (IT)**
- 10.30 **O413** Key opening lecture: Knowledge gaps in thoraco-lumbar fracture management  
Rajasekaran S. (IN)
- 11.00 **O413** Computed tomography parameters for atlanto-occipital dislocation in adult patients: The occipital condyle-C1 interval  
Chang S., Martinez-del-Campo E., Kalb S., Soriano-Baron H., Tümer J.D., Neal M.T., Uschold T., Theodore N. (US)
- 11.04 **O413** Radiographical risk factors of vertebral artery injury in cervical spine dislocation - Multi-institutional study using CT angiography  
Nagata K., Chikuda H., Inokuchi I., Ishii K., Kobayashi A., Kanai H., Miyoshi K. (JP)
- 11.08 **O413** Cervical spinal cord injury assessment based on the Diffusion Tensor Imaging  
Czyz M., Szewczyk P., Yoon W., Jamundowicz W., Boszczyk B.M. (UK & PL)
- 11.12 **O416** Rib-sparing minimally invasive vertebrectomy is a safe and effective treatment for single-level metastatic spinal disease - A case series of 15 patients  
Loughenbury P.R., Wilson J., Rice E., Knights M., Timothy J. (UK)
- 11.16 **O417** Thoracolumbar fractures: Comparison between percutaneous and traditional fixation  
Nunes A.M., Caetano A.C., Sousa J.M., Almeida R.M., Consciência J.G. (PT)
- 11.20 **Group discussion**
- 11.30 **O418** Overnight reporting of spinal trauma - Are registrar reports sufficient to guide management?  
Loughenbury P., Ferrier J., Tachibana A., Rowbotham E. (UK)
- 11.34 **O419** Early outcome of surgical decompression for cervical spinal cord injury without bony injuries in the elderly  
Inoue T., Suzuki S., Endo T., Uenohara H., Tominaga T. (JP)
- 11.38 **O420** Corpectomy and expandable cage implantation for A2 subaxial cervical spine injury: Analysis of outcomes with minimum 3 years follow-up  
Byvaltsev V.A., Kalinin A.A., Budayev A.A., Egorov A.A. (RU)
- 11.42 **O421** Clinical outcomes of the posterior spinal shortening for delayed paralysis after osteoporotic vertebral fracture  
Chikawa T., Toki S., Kashima M., Yoshioka S., Nakagawa T., Nakamura M., Nakano S. (JP)
- 11.46 **Group discussion**
- 12.00 **O422** A cross-sectional survey of the understanding of cauda equina syndrome  
Taha R., Thompson A., Kamani S., Elsayed S. (UK)
- 12.04 **O423** The CT-based fractal analysis of trabecular bone structure may help in detecting decreased quality of bone prior to urgent spinal procedures (novel technique)



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- 12.08 **O428** Czyz M., Radwan H., Evazov K., Boszczyk B.M. (US & UK)  
Is the thoracolumbar injury classification and severity score (TIIOS) applicable to UK practice?  
Loughenbury P.R., Tomlinson J., Mann C., Lamb J., Dunsmuir R.A., Millner P.A., Rao A.S., Khan A.L., Gummerson N.W. (UK)
- 12.12 **O425** The value of CT and MRI in the classification and assessment of stability in patients with thoracolumbar spinal injuries  
Rajasekaran S., Vaccaro A.R., Kanna R.M., Schroeder G.D., Oner F.C., Valle L., Hapman J., Dvorak M., Fehlings M., Shetty A.P., Schnake K., Maheshwaran A., Kandziora F. (IN, US, NL, CA, DE & BR)
- 12.16 **O424** CT-based navigation system for C1-C2 posterior fixation surgery: Evaluation of 19 consecutive patients  
Borsa S., D'Orto S., Bertani G., Rampini P., Pluden M. (IT)
- 12.20 **Group discussion**
- 12.30 **Lunch break + industry workshops**



**The International Society for the Advancement of Spine Surgery**

Session 2

Chairs: Anand N. (US) & Kumar N. (SG)

- 14.10 **O427** Analysis of actual segmental lordosis obtained with lordotic and hyperlordotic lateral cages - Is degenerative scoliosis a risk factor for adult thoracolumbar spinal fractures? A 7000 multi-racial asian patients review  
Analysis of 218 levels  
Anand N., Khandehroo B., Cohen J., Cohen R., Baron E., Kahwaty S. (US)
- 14.16 **O428** How is the spine different in standing and in sitting? Important considerations in spinal deformity correction  
Hey D., Teo A.Q.A., Ng N.L.W., Chong D., Ruiz J., Lau L.L., Lu K.P.G., Wong H.K. (SG)
- 14.22 **O429** A morphology and prevalence study of degenerative lumbar scoliosis in over 7000 multi-racial asian adults  
Ng R., Liu G., Tan J.H., Ee G., Chan Y.H., Low S.L., Wong H.K. (SG)
- 14.28 **O430** Is degenerative scoliosis a risk factor for adult thoracolumbar spinal fractures? A 7000 multi-racial asian patients review  
Tan J.H., Ng R., Liu G., Win M.T.M., Wong H.K. (SG)
- 14.34 **Discussion**
- 14.54 **O431** Minimally invasive lateral interbody fusion with segmental lateral fixation for adult degenerative scoliosis: Mid-term clinical and radiographic results  
Smith W.D., Bergmann L. (US)
- 15.00 **O432** Clinical and radiographic results of indirect decompression and posterior cervical fusion for single level cervical radiculopathy using an expandable implant with 2-year follow-up  
Semionow K., Janusz P., Phillips F., McCormack B. (US & PL)
- 15.06 **O433** Multi-level fusion versus hybrid surgery in three-level cervical disc disease: Retrospective matched analysis of clinical and radiologic results in minimum 2-year follow-up  
Hur J.W., Ryu K.S., Kim J.S., Seong J.H. (KR)
- 15.12 **Discussion**
- 16.00 **Break**
- 16.30 **O434** A MRI characterization of the dorsal cervical cord migration behaviour in hybrid open-door laminoplasty  
Liu Ka Po G., Lee B.H., Poh E., Wong H.K. (SG & UK)
- 16.36 **O435** Impact of age on patient outcomes after cervical disc arthroplasty or anterior cervical discectomy and fusion: Comparison at 5-year follow-up  
Hisey M., Ziegler J., Guyer R., Ohnmeiss D. (US)
- 16.42 **O436** Comparison of one- and two-level treatment with cervical disc arthroplasty or anterior cervical discectomy and fusion  
Hisey M., Bae H., Ohnmeiss D. (US)
- 16.48 **O437** Comparison of 1 & 2 level versus 3 & 4 level cervical disc arthroplasty: An outcome analysis - Results from a single centre  
Reddy G., Friesem S., Khan S., Rajesh M., Berg A., Bhatia C., Aneiba K. (UK)
- 16.54 **Discussion**



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- 17.14 **O438** Rib cage measurement reproducibility using biplanar stereographic 3D reconstructions in severe adolescent idiopathic scoliosis  
Pietton R., Bouloussa H., Vergari C., Stali W., Viale R. (FR)
- 17.20 **O439** A comparative study of axial pain in cervical myelopathy patients treated with laminoplasty and healthy volunteers  
Kawakami M., Ishimoto Y., Nagata K., Kitagawa T., Matsuoka T. (JP)
- 17.26 **O440** Analysis of the 10 best and 10 worst functional outcomes of circumferential minimally invasive surgical (CMIS) correction of adult spinal deformity (ASD)  
Anand N., Millard J., Cohen R., Cohen J., Khandehroo B., Baron E., Kahwaty S. (US)
- 17.32 **O441** The convex manipulation: An alternative technique in surgical treatment of adolescent idiopathic scoliosis  
Oggiano L., La Rosa G. (IT)
- 17.38 **Discussion**
- 17.58 **O442** Does poor post-op sagittal vertical alignment directly correlate with poor functional outcomes in patients with circumferential minimally invasive correction of adult spinal deformity?  
Anand N., Khandehroo B., Cohen J., Cohen R., Baron E., Kahwaty S. (US)
- 18.04 **O443** MIS TLIF improves functional ability in injured workers as compared to open TLIF  
Kube R., Morrow D. (US)
- 18.10 **Discussion**
- 18.20 **Adjourn**



**North American Spine Society**

- 07.30 **Welcome**
- Paper presentations: Innovative surgical techniques**  
Chair: Bono C.M. (US)
- 07.35 **O444** Debridement and indwelling irrigation with diluted gentamicin solution for postoperative spinal infection  
Su Q.J., Wei Y., Hai Y. (CN)
- 07.41 **O445** Anterior hyperlordotic cages: Early experience and radiographic results  
Kadam A., Saville P.A., Smith H.E., Arlet V. (US)
- 07.47 **O446** Comparing radiation exposure using conventional fluoroscopy versus intra-operative cone-beam computed tomography (O-arm) to perform minimally invasive transforaminal lumbar interbody fusion, a single surgeon series  
Lee R.S., Sedra F., Kumano Y., Edwards J. (UK)
- 07.53 **O447** Efficiency and learning curves in image guided spinal surgery: A human factors analysis  
Drazin D., Catchpole K., Pashman R., Johnson J.P., Kim T.T. (US)
- 07.59 **O448** To evaluate the results of a single staged simultaneous decompression surgery for tandem spinal stenosis - A review of 149 patients  
Patel P.M., Bhojraj S.Y., Nagad P., Kashikar A.K., Kumar N., Akbary K., Prasad G., Hrushikesh M. (IN)
- 08.05 **O449** Porous silicon nitride spacers versus PEEK cages with autograft - 24 Month outcomes data from the CASCADE noninferiority trial  
Arts M.P., Wolfs J., Corbin T.P. (NL & US)
- 08.11 **Discussion**
- Paper presentations: Surgical complications**  
Chair: Wetzel F.T. (US)
- 08.30 **O450** Previous surgery significantly increases the risk of both surgical and general complications during surgery for degenerative disorders of the lumbar spine  
Mannion A.F., Zehnder P., Porchet F., Jeszenszky D., Kleinstück F.S., Pigott T., Aghayev E. (CH & UK)
- 08.36 **O451** Factors associated with the retro-odontoid soft tissue enlargement after middle and lower cervical spine surgery in non-rheumatoid arthritis patients  
Dohzono S., Toyoda H., Takahashi S., Suzuki A., Terai H., Nakamura H. (JP)
- 08.42 **O452** A comparative analysis of risk assessment tools in spine surgery  
Veeravagu A., Swinney C., Li A., Alamin T., Cheng I., Desai A., Hu S., Park J., Ratliff J. (US)
- 08.48 **O453** Recovery patterns of delayed postoperative foot drop after lumbar fusion surgery - Its association with reduction, type of pathology and type of surgery  
Basu S., Kondety S.K.C., Biswas A., Ahmed R., Suri T., Kesharwani S. (IN)



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- 08.54 **O443** **Rheumatoid arthritis is a risk factor for adjacent segment disease after PLIF irrespective of disease activity**  
Fujwara H., Makino T., Yonenobu K., Honda H., Matsuo Y., Kaifu T. (JP)
- 09.00 **O455** **Perioperative prevalence and risk factors for deep vein thrombosis in elective spine surgery**  
Nakamoto H., Murakami M., Shiono H., Yamamoto S. (JP)
- 09.06 **Discussion**
- 09.30 **Break**
- Paper presentations: Spinal deformity**  
**Chairs: Dohring E.J. (US) & Yeung A.T. (US)**
- 10.00 **O456** **Prevalence and factors affecting cervical deformity in adolescent idiopathic scoliosis patients**  
Hu X., Lieberman I.H. (US)
- 10.06 **O457** **Biplanar stereography predicts pulmonary function tests in adolescent idiopathic scoliosis**  
Pietton R., Bouloussa H., Vergari C., Haen T.X., Skalli W., Vialle R. (FR)
- 10.12 **O458** **Sagittal spinal and pelvic parameters in patients with Scheuermann's disease: A preliminary study**  
Lieberman I.H., Farhan SA., Echler M., Hu X., Belanger TA., Pendi A., Bedeman S.S. (US)
- 10.18 **O459** **An uniquely shaped rod improves curve correction in surgical treatment of adolescent idiopathic scoliosis**  
Gehrchen M., Oht-Nissen S., Hallager D.W., Dahl B. (DK)
- 10.24 **O460** **Accuracy of pre-operative surgical planning software in predicting postoperative alignment in patients undergoing minimally invasive multilevel anterior column reconstruction for positive sagittal balance deformity**  
Lee R.S. (UK)
- 10.30 **O461** **Intra- and perioperative complications with the OLIFF approach in 812 patients**  
Korge A., Mehren C., Sauer D., Sepe C., Mayer H.M. (DE & AT)
- 10.36 **O462** **3D-Navigation reduces radiation exposure and operative time in lumbopelvic Axations**  
Hoffmann M.F., Schildhauer T.A. (DE)
- 10.42 **Discussion**

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- Controversies in spine surgery**  
**Chair: Bono C.M. (US)**
- 11.00 **Introduction**  
Bono C.M. (US)
- 11.10 **O463** **Geriatric odontoid fractures: Operative or nonoperative treatment?**  
Bono C.M. (US)
- 11.25 **O464** **Recurrent lumbar disc herniations: Revision discectomy alone or with fusion?**  
Luk K.D. (HK)
- 11.40 **O465** **Spinal epidural abscess: Is it always an operative indication?**  
Rajasekaran S. (IN)
- 11.55 **O466** **Interspinous process devices: Are these implants just looking for indications?**  
Dohring E.J. (US)
- 12.10 **Discussion, Questions**
- 12.30 **Lunch break + Industry workshops**

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Special emphasis poster session I (Wednesday, May 18, 07:30 - 08:45)

### A. Low back pain

Chairs: Leionen V. (FI) & Vadala G. (IT)

- SP5 Effectiveness and cost-effectiveness of radiofrequency denervation for chronic low back pain originating from the sacroiliac joints  
Juch J.N.S., Maas E.T., Groeneweg J.G., Ostelo R.W.J.G., Kallewaard J.W., Koes B., Verhagen A.P., van Dongen J.M., van Tulder M.W., Huygen F.J.P.M. (NL)
- SP6 Does breast size predict back pain?  
Lees D., Bowey A., Serrano-Pedraza I., Sanderson P.L. (UK & ES)
- SP7 Simulation of multifactorial causes of low back pain  
Cholewicki J., Pathak P.K., Reeves N.P., Popovich J.M., Jr. (US)
- SP8 Novel classification and risk factors of high intensity zones of the lumbar spine: The Wakayama spine study  
Teraguchi M., Samartzis D., Hashizume H., Yamada H., Muraki S., Oka H., Cheung J., Yoshimura N., Cheung K., Yoshida M. (JP & HK)
- SP9 Prevalence and genetic associations of modic endplate changes in the lumbar spine  
Kanna R.M., Rajasekaran S., Senthil N., Raveendran M., Ranjani V.R., Cheung K.M.C., Chan D., Shetty A.P. (IN & CN)
- SP10 Psychological stress results in mechanical allodynia, but not in low back pain in the rat  
Fukui D., Kawakami M., Matsumoto T., Naiki M. (JP)

### B. Spinal alignment & tumours

Chairs: Hall D. (AU) & Kobayashi S. (JP)

- SP7 DeAining the role of lower limbs in compensating for sagittal malalignment  
Lafage R., Liabaud B., Diebo B., Oren J., Gammal J., Vira S., Spiegel M., Tanzi E., Protopsaltis T., Erico T., Schwab F. (US)
- SP8 Peak scoliosis brace can reduce pain in adults with painful scoliosis: Results from a prospective cohort study  
Zaina F., Poggio M., Donzelli M., Lusini M., Minnella S., Negri S. (IT)
- SP9 Progressive pattern of vertebral deformity throughout four years in a population-based cohort study of vertebral fracture  
Nakase K., Akeda K., Yamada J., Sudo A. (JP)
- SP10 Less invasiveness in minimally invasive spine stabilization (mist) for metastatic spinal tumor  
Hikata T., Isogai N., Shiono Y., Funao H., Okada E., Fujita N., Iwanami A., Watanabe K., Nakamura M., Matsumoto M., Ishii K. (JP)
- SP11 Efficacy of zoledronate against metastatic spinal tumors: Evaluation of bone strength using finite element analysis  
Matsumaru S., Takaishi H., Fujita N., Kobayashi Y., Takahashi Y., Shinozaki Y., Ogawa J., Anazawa U. (JP)
- SP12 Evaluation of the safety of using intraoperative salvaged blood in metastatic spine tumour surgery: Using microwell technique  
Kumar N., Zaw A.S., Khoo B.L., Kumar A., Thiery J.P. (SG)



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### C. Cell biology

Chairs: Vleggeert Lankamp C. (NL) & Sakai D. (JP)

- SP11 Intervertebral disc cells secrete BMP antagonists that alter osteogenesis of human mesenchymal stromal cells  
Tekari A., Frauchiger D.A., Chan S.C.W., Benneker L.M., Sebald H.J., Gantenbein B. (CH)
- SP12 Synergistic effect of nerve growth factor and insulin-like growth factor-1 on anti-apoptosis and extracellular matrix synthesis of rat intervertebral disc cells  
Park J.B., Chang D.G. (KR)
- SP13 Genetic attenuation of ATM signaling mitigates age-associated spine degeneration in mouse model of accelerated aging  
Han Y.C., Hartman R.A., Dong Q., Niedemhofer L.J., Sowa G.A., Vo N.V., Kang J.D. (US)
- SP14 RADA16-I conjugated with BMP-7 short peptide can retard degeneration of intervertebral disc  
Wu Y.H., Jia Z.W., Wang C.F., Tao H., Ruan D.K. (CN)
- SP15 A novel inducible system to regulate expression of the therapeutic transgene TIMP1 for treating intervertebral disc degeneration  
Han Y.C., Hartman R.A., Dong Q., Wang B., Vo N.V., Sowa G.A., Kang J.D. (US)
- SP18 Expression of the RANK/RANKL/OPG system in the human intervertebral disc  
Akeda K., Takegami N., Yamada J., Nakase K., Sudo A. (JP)

### D. Imaging & SCI

Chairs: Wong D. (US) & Park J.B. (KR)

- SP19 Enhanced disc/bone marrow cross-talk in Modic changes  
Dudli S., Hu S., Burch S., Berven S., Deviren V., Lotz J. (US)
- SP20 Evaluation of water retention in lumbar intervertebral disks before and after exercise stress with T2 mapping  
Chokan K., Murakami H., Endo H., Yamabe D., Tsukimura I., Doita M. (JP)
- SP21 Relationship between Modic changes, anterior vertebral osteophytes and spinal instability in the lumbar spine  
Tsukamoto M., Morimoto T., Yoshihara T., Snochata M., Mawatari M. (JP)
- SP22 Anatomical characteristics of lumbo-sacral nerve root and furcal nerve with 3.0-Tesla MR neurography  
Kobayashi H., Tanji H., Kato K., Watanabe K., Nikaide T., Otani K., Yabuki S., Kikuchi S.I., Konno S.I. (JP)
- SP23 Analysis of motion preservation following tdr at the lumbosacral junction: A prospective long-term clinical and radiographic investigation  
Würtinger C., D'Agostino Annes R., Hitzl W., Korge A., Mehren C., Mayer M.H., Sepe C.J. (DE & AU)
- SP24 Induction of endogenous neuronal stem cells proliferation by extracorporeal shock waves after spinal cord injury  
Ha K.Y., Kim J.W., Cho Y.K., Shin D.C., Kim S.I., Kim Y.H. (KR)



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## Special ePosters

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### E. Spinal stenosis

Chairs: Guyer R. (US) & Nordin M. (FR)

- SP25 Lifestyle related disease increases thickness of spinal epidural fat in the patients with lumbar spinal stenosis  
Ishihara S., Fujita N., Hikata T., Iwanami A., Watanabe K., Ishikawa M., Fukui Y., Nakamura M., Matsumoto M., Ishii K. (JP)
- SP26 Thickness of spinal epidural fat influences surgical outcomes in the patients with lumbar spinal stenosis  
Ishihara S., Fujita N., Hikata T., Iwanami A., Watanabe K., Ishikawa M., Fukui Y., Nakamura M., Matsumoto M., Ishii K. (JP)
- SP27 Early effects of medicare's bundle payment for care improvement program for lumbar fusion on episode costs, volume and safety  
Martin B.I., Testeson A.N.A., Lurie J.D., Farrokhi F., McGuire K.J., Mirza S.K. (US)
- SP28 Objective measurement of free-living physical activity (performance) in lumbar spinal stenosis: Are physical activity guidelines being met?  
Smuck M., Tomkins-Lane C., Norden J., Sinha A., Hu R. (US & CA)
- SP29 Use of the L5 spinal nerve angle on oblique coronal double echo steady state magnetic resonance imaging and the range of L5/S motion for foraminal stenosis diagnosis  
Murata Y., Wada K., Tamaki R., Numaguchi D., Kato Y. (JP)
- SP30 Natural history study of ossification of the yellow ligament: Five-year longitudinal MRI follow-up  
Cheung J.P.Y., Tang C.Y.K., Samartzis D., Cheung K.M.C. (HK)

Special emphasis poster session II (Friday, May 20, 07:45 - 09:00)

### F. Disc herniation & Bone

Chairs: Wilke H.J. (DE) & Patwardhan A. (US)

- SP31 Mechanism of developing sciatica experienced in lumbar disc herniation: Change in intradiscal oxygen saturation by intraoperative SLR test  
Kobayashi S., Yonezawa T., Hashishin Y., Matsuoka H. (JP)
- SP32 Gender differences in the surgical treatment of lumbar disc herniation in elderly  
Strömqvist B., Strömqvist F., Jönsson B., Karlsson M. (SE)
- SP33 Nucleotomy alters internal strain distribution of the human lumbar intervertebral disc  
Vresilovic E.J., Claeson A.A., Showalter B.L., Wright A.C., Gee J.C., Malhotra N.R., Elliott D.M. (US)
- SP34 Quantifying intervertebral disc inter-lamellar and inter-bundle mechanics  
Vergari C., Mansfield J., Meakin J.R., Winlove C.P. (UK)
- SP35 Tubular discectomy vs conventional microdiscectomy for the treatment of lumbar disk herniation - Long-term results of randomized controlled trial  
Overveest G.M., Peul W.C., Brand R., Koes B.W., Bartels R.H.M.A., Tan W.F., Arts M.P. (NL)
- SP36 Bone healing activation effect of freeze-dried platelet-rich plasma preserved for 8 weeks  
Shiga Y., Kubota G., Orita S., Yamauchi K., Inage K., Sato J., Fujimoto K., Abe K., Kanamata H., Inoue M., Kinoshita H., Takahashi K., Ohtori S. (JP)



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### G. Spinal stenosis II

Chairs: Weiner B. (US) & Zhuojing L. (CN)

- SP37 Discrimination between lumbar intraspinal stenosis and foraminal stenosis using diffusion tensor imaging parameters  
Kanamoto H., Eguchi Y., Ohtori S., Suzuki M., Oikawa Y., Yamanaka H., Tamai H., Kobayashi T., Orita S., Yamauchi K., Suzuki M., Aoki Y., Watanabe A., Takahashi K. (JP)
- SP38 One year results of a prospective randomized controlled trial comparing minimally invasive interspinous process device (IPD) with standalone decompressive surgery: Neurogenic Intermittent Claudication Evaluation (NICE) study  
Le Huec J.C., Meyer B. (FR & DE)
- SP39 Morphology and clinical importance of epidural membrane and peridiscal fibrous tissue in lumbar spinal stenosis  
Miyachi A., Sumida T., Kaneko M., Manabe H., Nakasaki K. (JP)
- SP40 The branches of the lumbar artery running vertically on the intervertebral disc of the lower lumbar spine: An anatomical study  
Nojri H., Miyagawa K., Banno S., Koike M., Sawa M., Iwase Y., Sakamoto I., Kaneko K. (JP)
- SP41 Novel use of accelerometry data to develop phenotypes of free-living physical activity (performance) and differentiate between lumbar spinal stenosis, knee osteoarthritis, and matched healthy populations  
Tomkins-Lane C., Norden J., Sinha A., Hu R., Smuck M. (US & CA)
- SP42 Comprehensive non-surgical treatments decrease the need for spine surgery in patients with degenerative spondylolisthesis  
Demir-Deviren S., Cil H., Ozcan-Eks EE., Tay B., Burch S., Berven S. (US)

### H. Fusion

Chairs: Lund T. (FI) & Hasegawa T. (JP)

- SP43 Decompression with or without concomitant fusion for patients suffering from stenosis in combination with degenerative spondylolisthesis  
Dijkeman M.L., Overveest G.M., Vleggeert-Lankamp C.L.A. (NL)
- SP44 The impact of fat back on patients with persistent low back pain after spinal fusion (short seg. vs long seg.)  
Murata K., Endo K., Suzuki H., Nishimura H., Matsuoka Y., Tanaka H., Shishido T., Yamamoto K. (JP)
- SP45 CT graft bone densitometry as a predictor of fusion status in posterior lumbar interbody fusion and its clinical significance  
Sawakami K., Ito T., Takahashi I., Ishikawa S. (JP)
- SP46 Anatomical analysis of the lumbar segmental artery in the oblique lateral interbody fusion approach  
Orita S., Shiga Y., Inage K., Sato J., Fujimoto K., Kanamoto H., Abe K., Yamauchi K., Takahashi K., Ohtori S. (JP)
- SP47 Effect of spinopelvic alignment on adjacent segment disease after multi-level lumbar fusion: Risk factor analysis  
Hisada Y., Kanayama M., Oha F., Shimamura Y., Kuroki K., Tashiro K., Hashimoto T., Iwasaki N. (JP)
- SP48 Degenerative Spondylolisthesis (DS) - An opportunity to implement value based spine care  
Kulkarni A., Dutta S. (IN)



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### I. Disc degeneration

Chairs: Samartzis D. (HK) & Park M.S. (KR)

- SP Lumbar disc degeneration was not related to bone mineral density in Chinese populations: Facet joint degeneration confounds the association  
Pan J.J., Tong X., Wang Y. (CN)
- SP Technical differences in microsurgical, endoscopic and endoscopically-assisted lumbar discectomies result in different complications but do not affect long-term QoL  
Belykh E.G., Morgan B.G., Theodore N., Preul M.C., Byvaltsev V.A. (RU & US)
- SP How reliable are the reported genetic associations in disc degeneration? The influence of phenotypes, age, population size and inclusion sequence in 809 patients  
Rajasekaran S., Kanna R.M., Senthil N., Raveendran M., Ranjani V.R., Cheung K.M.C., Chan D., Shetty A.P. (IN & CN)
- SP The preventive effect of dynamic stabilization against adjacent segment degeneration after posterior interbody fusion  
Tachibana N., Kawamura N., Masuyama S., Hirao Y., Maruyama H., Izuka M., Shimizu T., Yamato Y., Kunogi J. (JP)
- SP Do degenerated human lumbar spine segments exhibit biphasic viscoelastic properties?  
Costi J.J., Amin D., Lawless I.M., Sommerfeld D., Stanley R.M., Ding B. (AU & DE)
- SP54 The anti-angiogenic capacity of rabbit notochordal cells in the proliferation of human endothelial cells under hypoxia  
Kwon W.K., Moon H.J., Park Y.K., Kim J.H. (KR)

### J. Outcome measurements & complications

Chairs: Zaina F. (IT) & Chiba K. (JP)

- SP55 What do patients consider to be an acceptable level of symptoms to live with after surgery for adult spinal deformity?  
Mannion A.F., Wunderlin S., Obeid I., Pellisé F., Bago J., Acaroglu E., Alanay A., Pérez-Gueso F.S., Kleinstück F.S., European Spine Study Group (ESSG) (CH, FR, ES & TR)
- SP56 Stiffness after pan-lumbar arthrodesis for adult spinal deformity does not significantly impact patient functional status or satisfaction  
Hart R.A., Hratzka J., Kane M.S., Lafage V., Klineberg E., Ames C.P., Line B.G., Schwab F., Scheer J.K., Bess S., Hamilton D.K., Shaffrey C.I., Mundis G., Smith J.S., Burton D.C., Sciubba D.M., Devenyi V., Boachie-Adjei V., The International Spine Study Group (US)
- SP57 The Dartmouth/consumer reports treatment outcomes calculator for surgical and nonsurgical treatment of disc herniation, spinal stenosis and degenerative spondylolisthesis  
Tosteson T.D., Lurie J.D., Mycek K., Peters D., Schwarz S., Zhao W., Spratt K., Scherer E.A., Pearson L., Weinstein J. (US)
- SP58 Fulfillment of expectations two years after lumbar spine surgery  
Mancuso C.A., Cammisia F.P., Sama A.A., Hughes A.P., Lebl D.R., Duculan R., Girardi F.P. (US)
- SP59 Analysis of hospital length of stay following lumbar anterior/posterior combined fusion: Is there a disadvantage associated with shorter stay?  
Guyer R.D., Putney E., Ohnmeiss D.D., Ziegler J.E., Blumenthal S.L. (US)
- SP60 The occurrence of adjacent segment pathology and of adjacent disc degeneration in one-level lumbar fusion after 5 years follow-up: in comparison with the decompression surgery group  
Jeon C.H., Chung N.S., Lee H.D. (KR)



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### ISSLS General posters (On display on the poster boards)

- P Factors affecting anterior trunk bending during level walking in patients with lumbar spinal stenosis  
Igawa T., Katsuhira J., Sakurai A., Hosaka A., Fukui Y. (JP)
- P The use of TLIF procedure in management of degenerative spine deformities - A retrospective clinical study to evaluate the efficiency of this technique  
Mossaad M. (EG)
- P Quantitative computed tomography protocols affect QCT/FEA predicted stiffness  
Giambini H., Dragomir-Daescu D., Nassr A., Yaszemski M.J., Zhao C. (US)
- P Correlating common human postures with their associated lumbar alignment - A better understanding of the lumbar spine  
Lau E., Hey D., Choong D., Lau L.L., Liu G., Wong H.K. (SG)
- P Risk assessment of lumbar segmental artery injury during lateral transpos approach in the patients with lumbar scoliosis  
Takata Y., Sakai T., Tezuka F., Yamashita K., Abe M., Higashino K., Sairyo K. (JP)
- P Vertebral column resection in management of severe spinal deformities - Outcome and complications  
Mohammed K.M., Mossaad M.M., B-Nighey A.A., B-soufy M.A. (EG)
- P7 The pathological mechanism of L3 degenerative spondylolisthesis  
Fukushima M., Oshima Y., Oka H., Matsubayashi Y., Tamiguchi Y., Chikuda H., Tanaka S. (JP)
- P8 Trade-off between restoring stability and endplate stresses in the lumbar spine using different volume grades of a nucleus arthroplasty system: A finite element study  
Chamoli U., Tsafnat N., Diwan A.D. (AU)
- P9 Biomechanical evaluation of a bilateral spondylolytic defect at L5 and its progression into two clinically observed spondylolisthesis patterns: A finite element study  
Chamoli U., Tsafnat N., Diwan A.D. (AU)
- P10 Spinal movement improved after decompression surgery in patients with lumbar spinal stenosis on three-dimensional gait analysis  
Kawahara W., Tanaka N., Nakanishi K., Fujita N., Asaeda M., Nakamura H., Kono Y., Okamoto T., Watanabe H., Deie M. (JP)
- P11 The effect of a selective acid-sensing ion channels (ASICs) inhibitor on pain-related behavior by nucleus pulposus applied on the nerve root in rats  
Kobayashi Y., Sekiguchi M., Konno S.I. (JP)
- P12 Computer-assisted pre-operative planning of deformity correction surgeries: Numerical modeling to go beyond the consolidated image-based approaches  
Galbusera F., Bassani T., La Barbera L., Ottardi C., Schlager B., Brayda-Bruno M., Wilke H.-J. (IT & DE)
- P13 Significant effects on T2 relaxation times of axial loading during MRI in lumbar discs - A feasibility study on patients with low back pain  
Lagerstrand K., Nilsson M., Brisby H., Hebelka H. (SE)



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## Posters



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- P Impact of lumbar degenerative spondylolisthesis on lumbo-pelvic alignment in sit-to-stand motion  
Suzuki H., Endo K., Nishimura H., Matsuoka Y., Tanaka H., Yamamoto K. (JP)
- P An association between expression of neurotrophic factors and pain-related behavior induced by nucleus pulposus applied on the nerve root in rats  
Seiki S., Sekiguchi M., Konno S.I. (JP)
- P Postoperative changes of the gait in patients with lumbar spinal canal stenosis  
Goto T., Sakai T., Takata Y., Higashino K., Katoh S., Sairyo K. (JP)
- P Osteoporosis would be a factor that can promote the progress of disc degeneration  
Li S., Shan Z., Yu T., Zhang X., Mamuti M., Zhao F. (CN)
- P The relationship between gait and spinal sagittal parameters in patients with low back pain  
Murata K., Endo K., Suzuki H., Nagai T., Nishimura H., Matsuoka Y., Tanaka H., Yamamoto K. (JP)
- P Magnetic resonance imaging of the annulus fibrosus shows changes in tissue diffusion and anisotropy following mechanical loading: A pilot study in ovine tissue  
Tourel M., Kirkwood M., Momot K., Pearcy M., Little J.P. (AU)
- P20 Lumbar interbody fusion with the application of rhMP-2 are bone resorption and overzealous bone growth dose- and/or concentration-dependent?  
Results of a large animal study  
Heil G., Gerlach K., Vergroesen P., Hohaas C., Meise H.J. (DE, CH & NL)
- P21 Does an interbody fusion cage with nanoscale porous titanium coating increase spinal segmental stiffness? An in vivo biomechanical analysis in an ovine model  
Gunzburg R., Colloca C.J., McAviney J., Hegazy M., Jones C.F., Hall D.J., Szpalski M., Freeman B.J.C. (BE, AU & US)
- P22 Why does cement leakage easily occur in Basivertebral Foramen (BF) during vertebral augmentation procedures? A viewpoint from trabecular orientation and injury  
Li S., Wang C., Yu T., Zhang X., Shan Z., Zhao F. (CN)
- P23 An in vitro biomechanical comparison of anterior thoracolumbar reconstruction with sliding and rigid rod constructs: Kinematics and load-sharing  
Zhou R.Z., Huang Z.P., Liu X., Tong J., Ji W., Liu S.T., Chen J.T., Zhu Q.A. (CN)
- P24 Influence of dynamic factors in L5/S1 foraminal stenosis - Evaluation by 3D finite element analysis  
Shinozaki Y., Takaishi H., Fujita N., Matsumaru S., Kobayashi Y., Takahashi Y., Ogawa J. (JP)
- P25 Real time evaluation of spinal mechanics using MRI  
Parish A.J., Gowland P., McNally D.S. (UK)
- P26 Effect of loosening and retightening on pedicle screw closure mechanism strength: A biomechanical study  
Nuckley D.J., Mehdob A., Ferry C., Gandhi A. (US)
- P27 Characterization of the standing posture in adult spinal deformity patients  
Yagi M., Kaneko S., Yato Y., Machida M., Asazuma T. (JP)
- P28 Effect of posture on injury of the thoracolumbar junction under axial loading  
Christou A.K., Spurner E., Grigoriadis G., Masouros S.D. (UK)



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- P Intervertebral disc and facet joint contributions to the six degree of freedom mechanical properties of degenerated human spine segments  
Lawless I.M., Amin D., Sommerfeld D., Stanley R.M., Ding B., Costi J.J. (AU)
- P Rapid and distortion-free diffusion tensor imaging for evaluation of lumbar nerve roots using direct coronal single-shot turbo spin-echo diffusion sequence  
Sakai T., Aoki Y., Yoneyama M., Yanagawa N. (JP)
- P Assessment of magnetic field interactions and radiofrequency heating on metallic spinal implants at 7 Tesla  
Tsukimura I., Murakami H., Numata N., Endo H., Yamabe D., Saigo T., Chokan K., Doita M. (JP)
- P Adaptation of the global sagittal balance of the spine and the segmental orientation of each vertebra from the standing to the sitting position - A C2 to S1 study with the EOS system  
Rousseau M.A., Tahari, Brusson A., Lazennec J.Y. (FR)
- P Swelling pressure in the nucleus pulposus: Do we really understand it?  
Emanuel K.S., Veen A.J., Vergroesen P., Laan K., Kingma I., Smit T.H. (NL)
- P Biomechanical evaluation of vertebral column replacement for osteoporotic vertebral collapse - Importance of anterior load support by the lateral wall of the vertebra  
Takaishi H., Fujita N., Matsumaru S., Kobayashi Y., Takahashi Y., Shinozaki Y., Ogawa J. (JP)
- P35 Basic science research topic trends in spine-related publications  
Sng D.C., Dudley S. (US)
- P36 Comparative biomechanical study of anterior column support by unilateral PLIF, bilateral PLIF and IIF in degenerative lumbar scoliosis  
Fujita N., Takaishi H., Matsumaru S., Kobayashi Y., Takahashi Y., Shinozaki Y., Ogawa J. (JP)
- P37 Reducing rod breakage and nonunion in pedicle subtraction osteotomy: The importance of rod number and configuration in 264 patients with 2-year follow-up  
Gupta M., Henry J., Lafage V., Schwab F., Ames C., Klineberg E., Smith J., Devire V., Shaffrey C., Hart R., Hostin R., Mundis G., Kim H.J., Burton D.C., International Spine Study Group (US)
- P38 Do different dichotomization strategies of responders and non-responders and different corresponding biomechanical responses following spinal manipulative therapy?  
Wong A.Y.L., Parent E.C., Dhillon S., Pasad N., Samartzis D., Kawchuk G.N. (CH & CA)
- P39 The angiogenic capacity of human dura mater: A potential factor promoting peri-dural adhesion and fibrosis  
Moon H.J., Kwon W.K., Kim J.H., Park Y.K. (KR)
- P40 Mechanical burden on adjacent levels varies with construct length following lumbar fusion - An in vitro study  
Patwardhan A., Sullivan R., Voronov L., Havey R., Carandang G., Muriuk M., Khayatzaeh S., Sears W. (US & AU)
- P41 Reliability of a pelvic asymmetry measurement using MRI-based 3-dimensional models  
Gamada K., Katayama K., Kumagai H., Ogura H., Hoshi K. (JP)
- P42 Effects of the pelvic and thoracic realignment device on pelvic asymmetry in patients with low back pain  
Gamada K., Katayama K., Kumagai H., Takeda K., Ogura H., Hoshi K. (JP)



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- P498 **SHOX2 is required to maintain the function of nucleus pulposus cell: A protective factor for intervertebral disc degeneration?**  
Zheng Z. (CN)
- P499 **Injectable microcryogels reinforced alginate encapsulation of mesenchymal stromal cells for leak-proof delivery and alleviation of canine disc degeneration**  
Chen C., Zeng Y., Ruan D., Du Y. (CN)
- P500 **Increased apoptosis, expression of matrix degrading enzymes and inflammatory cytokines of annulus fibrosus cells in genetically engineered diabetic rats**  
Park J.B., Chang D.G. (KR)
- P501 **Diffusion of lumbar disc end-plate by using DCE-MRI after intervertebral disc allograft transplantation in beagle model**  
Ruan D.K., Li H., Wu Y.H., Hou L.S., Jia Z.W., Chen C., He Q., Ji W. (CN)
- P502 **Effect of donor age and culture passage on mesenchymal stem cells derived from nucleus pulposus: An in vitro study on rats**  
Zhao Y.C., Jia Z.W., Wu Y.H., Liu L.G., Wang D.L., Ruan D.K. (CN)
- P503 **Macrophages in the degenerated intervertebral disc produce inflammatory cytokines, but not growth factors, in a mouse model of disc injury**  
Miyagi M., Uchida K., Fujimaki H., Inoue G., Nakazawa T., Imura T., Saito W., Takahira N., Takaso M. (JP)
- P49 **Biological characteristics of nucleus pulposus mesenchymal stem cells in human degenerative intervertebral disc with different Pfirrmann grade**  
Li X., Bai X., Wu Y., Liu L., Wang D., Ruan D. (CN)
- P50 **Influence of pro-inflammatory stimulation by IL-1 $\beta$  on chondrogenic differentiation of human mesenchymal stem cells (MSCs) versus adipose-derived stem cells (ASCs)**  
Neidlinger-Wilke C., Nagl I., Teixeira G.Q., Ketsas D., Wilke H.-J., Ignatius A. (DE, PT & GR)
- P51 **Intervertebral disc nucleus pulposus has intensive involvement of autophagy compared to other musculoskeletal tissues and its degeneration is linked with decreased autophagy**  
Yunbe T., Hirata H., Ito M., Kakiuchi Y., Kakutani K., Maeno K., Takada T., Miyazaki S., Terashima Y., Kurosaka M., Nishida K. (JP)
- P52 **Biological behavior of purified human nucleus pulposus mesenchymal stem cells: A comparison of healthy and degenerative nucleus pulposus source**  
Wang D.L., Tang Y., Jia Z.W., Yang P.S., He Q., Ruan D.K. (CN)
- P53 **Hepatocyte growth factor/c-Met signal promotes proliferation, suppresses apoptosis, and improves matrix metabolism in rabbit nucleus pulposus cells in vitro**  
Ishibashi H., Tomomura H., Ikeda T., Sakata M., Takatori R., Mikami Y., Nagae M., Kubo T. (JP)
- P54 **Effect of a selective inhibitor of c-Fos/activator protein-1 on intervertebral disc degeneration**  
Makino H., Seki S., Yahara Y., Kawaguchi Y., Motomura H., Nogami M., Watanabe K., Shiozawa S., Kimura T. (JP)
- P55 **Cartilage-derived morphogenetic protein-2 signal via SMAD and Mitogen-Activated Protein (MAP) kinase pathways during extra cellular matrix production in human disc cells**  
Wei1 A., Shen B., Staff S., Williams L., Sebald W., Diwan A. (AU & DE)
- P56 **The intrinsic and extrinsic apoptotic pathways are both activated in human degenerated intervertebral discs**  
Barreto Henriksson H., Jönsson E., Tschernitz S., Brisby H. (SE)



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- P497 **How can we define a facet tropism with facet orientation? A comparative analysis of 200 Asian young adult populations without disc degeneration**  
Jeon C.H., Chung N.S., Lee H.D. (KR)
- P498 **Propionibacterium acnes can induce modic changes**  
Dudli S., Miller S., Demir-Deviren S., Lotz J.C. (US)
- P499 **FH1-Mint3 axis does not control HIF transcriptional activity in nucleus pulposus cells**  
Hiroe Y., Chiba K., Nakamura M., Matsumoto M., Ribud M.V. (JP & US)
- P500 **Low-density lipoprotein receptor-related protein-1 maintains the structure and myelination of Schwann cell in the peripheral nervous system**  
Orita S., Yamauchi K., Inage K., Fujimoto K., Sato J., Shiga Y., Kanamoto H., Abe K., Inoue M., Kinoshita H., Takahashi K., Ohtori S., Campana M.W. (JP & US)
- P501 **ER stress inhibitor suppresses intervertebral disc degeneration**  
Fuji T., Fujita N., Suzuki S., Watanabe R., Watanabe K., Ishii K., Tsuji T., Miyamoto T., Horuchi K., Matsumoto M., Nakamura M. (JP)
- P502 **What's in a name: A systematic review of use of the term 'degenerative disc disease'**  
Baltie M.C., Weiner B. (US)
- P63 **Inhibition of ERK pathway restores the discogenic phenotype of inbred intervertebral disc cells**  
Tekari A., Marazza A., Benneker L.M., Gantenbein B. (CH)
- P64 **Establishment of a bovine nucleus pulposus tissue culture model with early physiological degeneration model**  
Hlavna M., Krupkova O., Ito K., Ferguson S.J., Wuertz-Kozak K. (CH & NL)
- P65 **The fate of Tie2+ nucleus pulposus progenitor cells injected into a papain degenerated organ culture model with and without hydrogel**  
Frauchiger D.A., Tekari A., Benneker L.M., Sakai D., Gantenbein B. (CH & JP)
- P66 **Physical limitations to tissue engineering of intervertebral disc cells using growth factors - Effect of bone morphogenetic protein (bnp)-2 and 7 on glycosaminoglycan production and cell metabolism**  
Kobayashi S., Takeno K., Miyazaki T., Hayakawa K., Meir A. (JP & UK)
- P67 **Implications for cell survival and regeneration in the intervertebral disc: Factors affecting nutrient transport**  
Giers M.B., Munter B., Ide G., Eyster K., Newcomb A., Byvalts V., Kelly B., Crawford N.R., Preul M., Theodore N. (US & RU)
- P68 **The alterations of adiponectin receptor expression with disc degeneration in rat intervertebral disc cells**  
Terashima Y., Kakutani K., Takada T., Yurube T., Hirata H., Maeno K., Miyazaki S., Ito M., Kakiuchi Y., Kurosaka M., Nishida K. (JP)
- P69 **Mesenchymal stem cell treatment of intervertebral disc lesion prevents fatty infiltration and atrophy of the multi-axial muscle, but not cytokine and muscle fiber changes**  
James G., Blomster L., Hall L., Schmid A.B., Shu C.C., Little C.B., Melrose J., Hodges P.W. (AU & UK)
- P70 **Small interference RNA (siRNA) targeting for fas inhibits apoptosis of rat notochordal cells**  
Park J.B., Park E.Y. (KR)



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- P71 **Interplay of micro-topographies and growth factors in mesenchymal stem cell based annulus tissue engineering**  
Chuah Y.J., Wee S.N., Lim H.T.D., Khang M.N.K., Tan J.R., Tee C.A., Hee H.T., Kang Y.J. (SG & CN)
- P72 **Microfabrication strategy to develop the annular microstructure of an intervertebral disc composite**  
Seong L.C., Lim C.S., Chuah Y.J., Wu Y., Tay L.M., Hee H.T., Kang Y.J. (SG & CN)
- P73 **Characterization of cells in different regions of intervertebral disc through microfluidic cell sorting**  
Wee S.N., Tee C.A., Chuah Y.J., Yin L., Teo T.G., Hee H.T., Han J., Kang Y. (SG, US & CN)
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- P192 Development and validation of the iDI - A short self-rating disability instrument for low-back disorders.  
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- P193 Surgical treatment of low lumbar osteoporotic vertebral collapse  
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- P Effect of boomerang-shaped cage versus box-shaped cage on the local alignment after posterior lumbar interbody fusion with bilateral facetectomy  
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- P Radiation exposure to the surgeon and patient during a fluoroscopic procedure: How high is the exposure dose? A cadaveric study  
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- P Modic change type III may be a risk factor for low back pain in patients with lumbar spinal stenosis  
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- P Wrong site surgery in spine  
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- P Prediction of treatment outcomes for patients with chronic low back pain: The development of a clinical decision guideline for spine surgeons  
Van Hooff M.L., Van Dongen J.M., Groot D., Spruit M., Coupé V.M.H., Osteo R.W.J.G., De Kleuver M. (NL)
- P199 Impacts of percutaneous posterior fixation surgery on the performance status, activities of daily living, and quality of life in patients with spinal metastasis  
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- P200 MRI-based scoring of multi-Modus inadequately characterizes muscle tissue quantity and quality in patients with chronic lumbar spine disease  
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- P202 Stand-alone minimally invasive anterior lumbar interbody fusion for the treatment of adjacent segment disease: A case series  
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- P203 The shortcomings of the thoracolumbar injury classification and severity scale and the load-sharing classification in the evaluation of thoracolumbar burst fractures  
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- P204 Bilateral decompression via unilateral approach for lumbar spinal stenosis have advantage? Follow-up study  
Hatakeyama K., Aihara T., Urushibara M. (JP)
- P205 Patients with an elevated SVA and a low PT [ack of pelvic compensation for a high SVA] indicates a greater risk of deterioration of thoracic kyphosis following pedicle subtraction osteotomy for rigid degenerative lumbar kyphosis  
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- P206 Comparative analysis of three different surgical strategies for adult spinal deformity  
Bae J.S., Theologis A.A., Strom R., Tay B., Burch S., Berven S., Mummaneni P., Chou D., Ames C.P., Deviren V. (KR & US)



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- P211** Reliability of evaluation for lumbar interbody fusion by multi planer reconstruction CT  
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- P212** Radiographical results of a prospective, multicenter, observational study of total lumbar disc replacement, 24 months follow up  
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- P213** Effect of BMI and age on minimally invasive fusion (MILIF): One year follow up  
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- P214** Discrepancies between planned post-operative alignment and age-adjusted ideals: What are the implications of planning to over- or under-correct?  
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- P215** Importance of preoperative planning for adult spinal deformity correction  
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- P216** Sagittal plane correction using lateral transposas approach: Effect of cage angulation and surgical technique on segmental lordosis  
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- P217** Long term pain recurrence rates following lumbar discectomy or epidural injection  
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- P218** Outcomes in adult deformity surgery: What happens to those patients who are lost to follow up  
Beckerman D.A., Sharf T., Ntshaykolo J.J., Burch S., Berven S., Racine L. (US)
- P219** Appropriate surgical procedures in older patients with spinal deformity: A comparison of surgical approaches  
Hohenstein N.A., Verma K., Burch S., Deviren V., Berven S.H., Beckerman D.A. (US)
- P220** Is there an optimal upper thoracic upper-instrumented vertebral endpoint in adult spinal deformity surgery?  
Theologis A.A., Bae J., Burch S., Tay B., Chou D., Mummaneni P., Berven S., Ames C.P., Deviren V. (US & KR)
- P221** Does sagittal alignment indicate response after lumbar surgery augmented with DIAM interspinous implant?  
Crawford R.J., Malone Q.J., Price R.I. (CH, AU)
- P222** Complications of cortical screw fixation in the lumbar spine - A 3-year learning curve  
Thillainadesan T., Edis D. (AU)
- P223** Comparison of postoperative outcomes for degenerative disc disease patients in comparison with posterior vs. anteroposterior interbody fusion surgery  
Orita S., Inage K., Sato J., Fujimoto K., Shiga Y., Kanamoto H., Abe K., Inoue M., Kinoshita H., Yamauchi K., Takahashi K., Ohtori S. (JP)



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- P215** Pre-vertebroplasty transpedicular "vertebrography" assessment in delayed-union/pseudarthrosis associated with osteoporotic vertebral fracture  
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- P216** Does stopping of teriparatide treatment change the volume of bone fusion mass after lumbar posterolateral fusion in women with postmenopausal osteoporosis?  
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- P217** Characteristics of patients with lumbar spinal stenosis who had maintained disc height  
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- P218** Comparative analysis of sagittal balance and pelvic parameters between low-grade lumbar spondylolisthesis (isthmic and degenerative) and spinal stenosis  
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- P219** The effect of Capacitively Coupled (CC) electrical stimulation on human intervertebral disc cells and the relationship between CC and BMP  
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- P2** Thoracic trauma spine - About 24 cases  
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- P1** Finite element analysis of anterior release and pedicular screwing fixation for cervical kyphotic myelopathy associated with athetoid cerebral palsy  
Kono H., Takaiishi H., Miyamoto A., Tachibana A., Watanabe Y., Nakamichi K., Kataoka T. (JP)
- P2** Treatment of cervical degenerative disc diseases with single-level disc prosthesis: 3 Years outcomes - Multicenter study  
Byvaltsev V.A., Kalinin A.A., Shepelev V.V., Bardanova L.A., Sorokovikov V.A. (RU)
- P3** Factors affecting cage subsidence of single-level anterior cervical discectomy and fusion  
Fukao S., Kidooka M., Isozumi T., U H., Kayatani H. (JP)

### Degenerative lumbar

- P4** Osteoporotic vertebral collapse of the type A3.1.3 incomplete inferior burst fracture can cause the radiculopathy associated with dynamic foraminal stenosis  
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- P5** Non-surgical spinal decompression in a multi-disciplinary neurosurgical clinic  
Telman K., Keshishyan T., Betts M. (US)
- P6** Finite element analysis of posterior lumbar interbody fusion using a cortical bone trajectory screw construct: Anterior column support stability and spondylolisthesis reduction  
Takaiishi H., Fujita N., Matsumaru S., Kobayashi Y., Takahashi Y., Shinozaki Y., Ogawa J. (JP)
- P7** Adjacent segment degeneration after lumbar spinal fusion compared with motion preservation procedures: A meta-analysis  
Pan A., Hai Y., Yang J., Zhou L., Chen X., Guo H. (CN)
- P8** ILIF™ (Interlaminar Lumbar Instrumented Fusion): Clinical, radiological and safety results of a mini case-series (30 cases)  
Carrafs G., Sessa G., Sca G. (IT)
- P9** Risk factors for lumbar degenerative spondylolisthesis in Japanese patients with osteoarthritis of the hip: A radiographic study  
Sasagawa T., Nakamura T. (JP)
- P10** Evaluation of the temporal changes of the bone grafts on the X-ray and reconstruction CT images after single level L5-S1 TLIF  
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- P11** Do modic changes progress with aging?  
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- P13** A novel technique for the diagnosis of spinal implant infection  
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- P** **Focal Ponte osteotomy for more effective periapical segmental vertebral derotation in adolescent idiopathic scoliosis**  
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- P** **Comparison of clinical and radiologic outcome of adolescent idiopathic scoliosis treated by hybrid thoracic hook lumbar screw versus universal clamp system**  
Ghayem Hassankhani E (IR)
- PIA** **Focal and dynamic cervical alignment pathology correlates with myelopathy severity in cervical deformity patients**  
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- Spinal trauma**
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- P** **Qualitative grading on magnetic resonance imaging as a tool for decision making in lumbar spinal stenosis**  
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- PI** **Comparative study of anterior and posterior approach for unstable thoracolumbar burst fractures (20 cases each)**  
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- PIII** **Changes in segmental range of motion after laminoplasty and clinical results based on a 2-year follow-up**  
Shigematsu H, Iwata E, Okuda A, Monimoto Y, Masuda K, Kura T, Tanaka Y. (JP)
- PIV** **Cervical spinal canal stenosis first presenting after spinal cord injury due to minor trauma: An insight into the value of preventive decompression**  
Shigematsu H, Mak KC, Bruzzone M, Luk K.D.K., Cheung J.P.Y. (JP, CN & AR)
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Guizzardi G. (IT)
- P7** **New computed radiography processing condition for whole spine X-ray**  
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Sasagawa T, Kamiya N, Kunogi J. (JP)
- P9** **The impact of curative surgical resection of spinal metastases from thyroid carcinoma**  
Kato S, Murakami H, Demura S, Yoshioka K, Yokogawa N, Fujii M, Igarashi T, Yonezawa N, Takahashi N, Tsuchiya H. (JP)
- P10** **Anterior decompression via a posterolateral approach for ossification of posterior longitudinal ligament in the thoracic spine**  
Kato S, Murakami H, Demura S, Yoshioka K, Yokogawa N, Fujii M, Igarashi T, Yonezawa N, Takahashi N, Tsuchiya H. (JP)
- P11** **Appropriate size and angulation for axis screw placement**  
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- P12** **Lamina closure after cervical open-door laminoplasty**  
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- P13** **Matched comparative study between ACDF and laminoplasty for 2-3 levels cervical myelopathy, neurological outcome and late kyphosis**  
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- P14** **Prevalence of high-intensity zone in lumbar discs by age and correlation between high-intensity zone and other degenerative findings on MR images**  
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- P15** **The characteristics of regional bone quality in the cervical vertebrae considering BMD**  
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- P** **Long-term benefits of percutaneous anatomical restoration of vertebral compression fractures linked to malignancy**  
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- PIV** **Analysis of the relationship between surgical outcomes after double-door laminoplasty for cervical spondylotic myelopathy and dynamic factors**  
Miyazaki M., Notani N., Ishihara T, Yoshiwa T, Tsumura H. (JP)
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- P23** **Sequentially quantifying progressive anterior overgrowth in the vertebrae of adolescent idiopathic scoliosis patients**  
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- P24** **Accuracy and pitfalls of pre-operative simulation of pedicle subtraction osteotomy using a computer software**  
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- P25** **Application of pedicle subtraction osteotomy with excision of proximal adjacent intervertebral disc (Schwab grade IV osteotomy) to correction of post-traumatic kyphosis**  
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- P27** **The influence of histological subtype in predicting survival of lung cancer patients with spinal metastases**  
Kumar N., Tan K., Tan J., Zaw A.S., Kumar N. (SG)
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Kumar N., Zaw A.S., Malhotra R, Kumar N. (SG)
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- P30** **Surgical Site Infection surveillance in spinal surgery**  
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- PII** **Cervical myelopathy without exaggerated patellar tendon reflex depends on peripheral neuropathy?**  
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- PIII** **Investigation of ossification in the posterior longitudinal ligament using micro-focus X-ray CT scanning and histological examination**  
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- PIV** **Long term outcome of surgical treatment for cervical ossification of the posterior longitudinal ligament**  
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- PIV** **Spinal cord drift after non instrumented posterior cervical laminectomy**  
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- PIV** **The outcome of pedicle screw instrumentation removal for ongoing low back pain following posterolateral lumbar fusion**  
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- P44** **The alignment risk factor of proximal junctional kyphosis in corrective long fusion from T10 to sacral region for lumbar degenerative kyphosis**  
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- P462** CT-C2 Potts Disease: A unique picture of spine tuberculosis  
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- P464** Elderly patients have poorer outcome after single level open Transforaminal Lumbar Interbody Fusion (TLIF) at 5 years  
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- P461** Outcome evaluation of a zero-profile cage plate for single and multiple level anterior cervical discectomy and fusion (2 years maximum follow-up)  
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- P52** Surgical management of spinal extradural arachnoid cysts - A case series  
Vemula V.R.C., Bodapati C.P. (IN)
- P53** Spinal fractures in patients with diffuse idiopathic skeletal hyperostosis - CT-based analysis by fracture level  
Okada E., Shimizu K., Kato M., Fukuda K., Kaneko S., Ogawa J., Watanabe K., Matsumoto M., Ishii K. (JP)
- P54** Rotatory range of motion of atlanto-occipital joint increases after spontaneous osseous fusion following remodeling therapy for chronic atlantoaxial rotatory Axiation  
Kitamura K., Iwanami A., Hikata T., Fujita N., Watanabe K., Matsumoto M., Ishi K. (JP)
- P55** Neurological recovery in two patients with cauda equina syndrome secondary to L5 lumbar spine giant cell tumour after treatment with Denosumab without surgery  
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- P56** Assessment of intraoperative blood loss at different surgical stages during posterior spinal fusion surgery in the treatment of adolescent idiopathic scoliosis  
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- P59** Correlation study between clinical special tests for myelopathy and MRI findings in patients seen for cervical dysfunction  
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- P61** The UTE MRI Disc Sign (UDS): A novel imaging biomarker associated with spine degeneration, pain and disability  
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- P62** Incidence of DJK after selective thoracic fusion with low implant density in AIS  
Kwan K., Wong J., Cheung J.P.Y., Wong Y.W., Cheung K.M.C. (HK)
- P63** Challenging giant spinal nerve sheath tumours - Multidisciplinary approach  
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- P3** Bilateral endoscopic decompression of degenerative lumbar spinal stenosis involving a unilateral approach by Arthrospine system  
Kaushal M., Kaushal M. (IN)
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- P9** Does fusion method influence functional outcome? Does outcome vary between different methods of fusion with respect to indication of fusion?  
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- P10** Analysis of complications of surgical treatment of degenerative stenosis  
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- P11** Management of Anderson's lesion in ankylosing spondylitis by posterior-only approach - Short term and mid term results: A case series of 18 patients  
Shaik I., Bhojraj S., Naggad P., Kashikar A., Patel P. (IN)
- P12** Modification of Oswestry disability index for Indian rural patients, part I - Development of a modified disability index questionnaire  
Janardhana A.P., Kumar S., Shodhan A., Kotian M.S. (IN)
- P13** Effect of cervical kyphotic deformity type on the motion characteristics and dynamic spinal cord compression  
Phadke K., Moolya S., Nanda A., Chhabra H.S. (IN)
- P14** Clinico-radiological criteria for fusion in prolapsed intervertebral disc in lumbar spine: A single centre retrospective analysis  
Akbari K., Bhojraj S., Naggad P., Patel P., Kashikar A., Mehata H., Kumar N. (IN)
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