## Program at a Glance

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<th>MONDAY MAY 29</th>
<th>TUESDAY MAY 30</th>
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<th>THURSDAY JUNE 1</th>
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<td>Membership Committee Meeting</td>
<td>Welcome by Local Hosts &amp; Program Chair</td>
<td>Special Poster Session I</td>
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Dear Friends and Colleagues,

It is our esteemed honor to welcome you to the 44th Annual Meeting of the International Society for the Study of the Lumbar Spine (ISSLS) in Athens, Greece on May 29th to June 2nd, 2017.

Situated in Southern Europe and known as the “cradle” of Western civilization, Athens is located at the crossroads of three continents and has been a hub of many cultures. Throughout its near 6,000 years of history, Athens has played a seminal role in introducing the world to theatre, mythology, philosophy, science, medicine, and democracy. Equally important, the foundations of the spine discipline are deeply rooted in the annals of this country.

Athens is also a modern metropolitan center of incomparable charm and great interest. It is considered one of Europe’s safest capitals, known to have user-friendly transportation networks, an award-winning airport and port terminus, numerous world-class museums and archeological sites, hundreds of restaurants to satisfy every taste, endless markets and shopping opportunities, nightlife to cater to every desire, and a landscape fusing the breathtaking blue water of the sea with its mountainous terrain. In addition, Athens is the gateway to over 2,000 charming and unique Greek islands that consist of mesmerizing beaches and resorts, historical sites, and opportunities for rest and relaxation on the Mediterranean. Among this setting, our meeting will take place at the Hilton Hotel located in the center of the city and in a short distance from the Acropolis. It is also an excellent base to explore a lively city, numerous archaeological sites and many attractive locations.

The scientific program provides an excellent opportunity for prominent as well as younger researchers and clinicians to present their recent scientific findings. During the week, we will also offer two unique symposia, one focusing on translational and commercialization of research and the other on the pros and cons of minimally invasive lumbar spine surgery. We will have three eminent invited guest speakers that are sure to motivate and inspire. Furthermore, for the first time, ISSLS has partnered with AOSpine to offer a superb course helmed by an international faculty and leaders in the field addressing “Sagittal balance and its implications in spine surgery” to be held on Friday afternoon, June 2nd. Nestled among the scientific events, we will also provide a social program that will be exceptional and unforgettable, providing you an unparalleled opportunity to meet new friends and exchange ideas. For further convenience, the entire program will also be provided via our customized APP, which is available in both the Apple and Android online stores for easy download.

We look forward to welcoming you in person at the 44th Annual Meeting of ISSLS in Athens!

Sincerely,

Dimitris Kletsas and Dino Samartzis

Local Hosts

Dr. Theodoros B. Grivas
Dr. Dimitris Kletsas
Dr. Thomas Patsiaouras
Dr. Odysseas Paxinos
Dr. Dino Samartzis
Dr. George Sapkas
Dr. Constantin Schizas

Organizing Committee
Dear Friends and Colleagues,

On behalf of the ISSLS executives, I would like to welcome you all to our 44th Annual Meeting at this historic city of Athens. This is the second year the scientific committee has adopted a new system for reviewing the abstracts, making the selection process more transparent and efficient. Credit must also go to the many volunteer reviewers. I hope you will enjoy the high-quality of the scientific presentations and participate actively in the discussions.

What you cannot afford to miss in the program are the Invited Lectures. We all know Greece has contributed tremendously to world science and history. It is with great honor that our local hosts Drs Dino Samartzis and Dimitris Kletsas have invited for us three top academicians to speak on Greek archeology, mathematics and medical ethics. I guarantee you these lectures will be the highlight of this meeting.

At the Award ceremony on June 1st, the ISSLS will be honoring one of our respected senior members with the life achievement award. Please join us then.

This year is the first time we will jointly conduct a half day post-meeting symposium with another society, AOSpine, when many local Greek surgeons who will also be joining. We hope this will provide an additional platform for interaction between our basic scientists and clinician members bringing our research work from the bench to the bedside. Please make sure you stay behind for this final part of OUR meeting.

See you in Athens.

Keith DK Luk

President ISSLS 2016-17
WiFi

Name of WiFi: HHonors network
Log-in: ISSLS2017

Kindly note the following procedure for login with your access code:

• First, you need to turn on your Wi-Fi and connect to HHonors network.
• Then, you open your web browser and you should see the StayConnected welcome page; if not, type www.hilton.com.

The steps you need to take on this page are:
1. Tick the box next to “I agree with general Terms and Conditions”
2. Enter the code that was issued for you (ISSLS2017)
3. Press “Connect” to acquire internet access.

APP – ISSLS 2017

All abstracts and information can be found this year in the ISSLS 2017 APP.

APP download instructions:

Option 1: Keyword search on iOS APP Store (ISSLS2017) OR Google Play Store (ISSLS2017)

Option 2: Scan the QR code (attached) using a QR scanner APP on your smartphones and you will be directed to the APP download link.

Option 3: APP URL is https://crowd.cc/s/zCAA. When you type this URL on your smartphone web browser, you will be automatically directed to the APP download link.

All abstracts and information can be found in the ISSLS 2017 APP.
Monday – May 29, 2017

07:00-08:00  Program Committee Meeting
(for program committee members only)
Room: Executive Lounge

08:00-09:00  Membership Committee Meeting
(for membership committee members only)
Room: Executive Lounge

09:00-12:00 FOCUS GROUP SESSION #1

08:00-12:00  Degenerative Spinal Phenotypes Focus Group – Creating a common language to advance knowledge
Contact persons: Michele Battie and Dino Samartzis
COMBINED WITH
International Taskforce on Diagnosis and Management of Lumbar Spinal Stenosis
Contact persons: Christy Lane and Markus Melloh
Room: Erato B

09:30-11:30  Strategy Group Meeting
Room: Erato A

12:00 - 15:00  Executive Committee Meeting (for ExCom members only)
Room: Erato A

13:00-16:00 FOCUS GROUP SESSION #2

13:00-16:00  Current Stem Cell Research in the Intervertebral Disc
Benjamin Gantenbein and Daisuke Sakai
Room: Erato B

16:30 - 17:30  Women's ISSLS
Gwendolyn Sowa and Grace O'Connell
Room: Erato B

18:00 - 20:00  Welcome Reception
Room: Terpsichore D
Tuesday – May 30, 2017

07:45-07:50 Welcome - Dino Samartzis and Dimitris Kletsas
07:50-08:00 Program Chairman - Yoshiharu Kawaguchi

SESSION #1 DISC HERNIATION AND DEGENERATION
Moderators: Keith DK Luk and ST Yoon

08:00-08:05 1 A realistic disc herniation model employing complex motion and a micro-level damage analysis
Kelly Wade, Meredith Schollum, Ashvin Thambyah, Peter Robertson, Neil Broom; Germany

08:07-08:12 2 Could disc wall structural abnormalities be responsible for herniation?
Kelly Wade, Nikolaus Berger-Roscher, Marija Josipovic, Volker Rasche, Fabio Galbusera, Hans-Joachim Wilke; Germany

08:14-08:19 3 The effect of an anti-nerve growth factor (NGF) treatment by nerve root infiltration for lumbar disc herniation
Shinobu Seki, Miho Sekiguchi, Shin-ichi Konno; Japan

08:21-08:30 Discussion

08:30-08:35 4 Development of lumbar disc degeneration in cadherin 2 mouse mutant
Changli Zhang, Foonlian Lim, Wai-Kit Tam, Tiffany Au, Kathryn Cheah, Kenneth Cheung, Victor Leung; Hong Kong

08:37-08:42 5 Hyperosmolar overloading induces notochordal cell differentiation with osmosensitive aquaporin3 upregulation and altered N-cadherin and connexin-43 expression
Paolo E Palacio-Mancheno, Thomas W Evashwick-Rogler, Damien M Laudier, Devina Purmessur, James C Iatridis, USA

08:44-08:49 6 Temsirolimus is a candidate of the optimal mTOR inhibitor for protecting human intervertebral disc nucleus pulposus cells
Yuji Kakiuchi, Takashi Yurube, yoshiki Takeoka, Masaaki Ito, Kenichiro Kakutani, Koichiro Maeno, Toru Tokada, Yoshiki Terashima, Ryosuke Kuroda, Kotaro Nishida, Japan

08:51-09:00 Discussion

SESSION #2 DISC DEGENERATION
Moderators: Kazuhiro Chiba and Anne Mannion

09:00-09:05 7 Lumbar spine paraspinal muscle and intervertebral disc height changes in astronauts after long-duration spaceflight on the international space station
Douglas G Chang, Robert M Healey, JoJo V Sayson, Brandon R Macias, Dezba G Coughlin, Jeannie F Bailey, Scott E Parazynski, Jeffrey C Lotz, Alan R Hargens; United States

09:07-09:12 8 Heterogeneous change in annulus fibrosus height after nucleotomy correlates with annulus strains orthogonal to the compressive loading axis
Amy Claeson, Showalter L Brent, Vresilovic J Edward, Malhotra R Neil, Elliott M Dawn; United States
Temporal evolution of early degenerative changes in stressed lumbar intervertebral discs

Aseem Sharma, Kiran Sargar, Amber Salter; United States

Discussion

Anabolic response of the intervertebral disc to exercise in humans

Daniel Belavy, Matthew Quittner, Nicola Ridgers, David Connell, Adnan Sheikh, Guy Trudel, Timo Rantalainen; Australia

Potential involvement of unfolded protein response in the pathogenesis of intervertebral disc degeneration

Takeshi Fujii, Nobuyuki Fujita, Satoshi Suzuki, Kota Watanabe, Ken Ishii, Takashi Tsuji, Keisuke Horiuchi, Morio Matsumoto, Masaya Nakamura; Japan

Involvement of autophagy in intervertebral disc degeneration and its possible contribution to the maintenance of notochordal cell homeostasis

Takashi Yurube, Hiroaki Hirata, Masaaki Ito, Yoshikl Terashima, Yuji Kakiuchi, Yoshiki Takeoka, Shingo Miyazaki, Kenichiro Kakutani, Koichiro Maeno, Toru Takada, Ryosuke Kuroda, Kotaro Nishida; Japan

Stem cell seeded injectable hydrogels for intervertebral disc regeneration in a preclinical animal model


Combined biomaterials approach to repair the intervertebral disc

Daniela A Frauchiger, Silvan Heeb, Lorin M Benneker, Michael Wöljté, Benjamin Gantenbein; Switzerland

Generation intervertebral disc-like cells from peripheral blood cells

Tie Liu, Yueying Li, Yong Hai; China

Transformation of the nucleus pulposus into connective tissue - a method for biologic fusion of a spinal segment?

Kjell Olmarker, Anders Lehmann, Sweden

Cell carrier and disc degenerative state influence intervertebral disc response to stem cell treatment

Marianna Peroglio, Luzia Simone Douma, Tansinee Stephanie Caprez, Milena Janki, Lorin Michael Benneker, Mauro Alini, Sibylle Grad; Switzerland

Human bone mesenchymal stem cells protect or activate nucleus pulposus cells by co-culture under hypoxia environment

Dike Ruan, Wei Ji, deli wang, Xiao-Chuan Li; China

SESSION #3 DISC REGENERATION
Moderators: James Iatridis and Kotaro Nishida

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Discussion
INVITED LECTURE #1
Moderator: Dimitris Kletsas

11:30-12:00 Antikythera Mechanism: the oldest computer
Speaker - Professor Xenophon Moussas
National Kapodistrian University of Athens, Greece

12:00-13:30 LUNCH

SESSION #4 Magnetic Resonance Imaging
Moderators: Scott Blumenthal and Peter Robertson

13:30-13:35 19 Coexisting cervical and lumbar disc degeneration and associated MRI phenotypes: a large-scale population-based study
Cora HY Bow, Jaro Karppinen, Keith DK Luk, Kenneth MC Cheung, Dino Samartzis; Hong Kong

13:37-13:42 20 Lack of significant diurnal T2-value changes in lumbar discs with axial loading during MRI (aMRI)
Leif Toren, Kerstin Lagerstrand, Helena Brisby, Hanna Hebelka; Sweden

13:44-13:49 21 Lumbar high-intensity zones on MRI: imaging biomarkers for severe, prolonged low back pain and sciatica in a population-based cohort
Masatoshi Teraguchi, Jason Pui Yin Cheung, Jaro Karppinen, Hiroshi Hashizume, Keith Dip Kei Luk, Kenneth MC Cheung, Dino Samartzis; Japan

13:51-13:56 22 Significance of the degenerative changes on lumbar plain magnetic resonance imaging in the diagnosis of low back pain in the general population The Wakayama Spine Study
Hiroshi Hashizume, Hiroshi Yamada, Hiroyuki Oka, Masatoshi Teraguchi, Hiroki Iwashashi, Takahide Sasaki, Kazunori Shinto, Shigeyuki Muraki, Ko Matsudaira, Akihito Minamide, Yukihiro Nakagawa, Noriko Yoshimura, Munehito Yoshida; Japan

13:58-14:03 23 Classification criteria for neurogenic claudication caused by lumbar spinal stenosis
Stephane Genevay, Delphine Courvoisier, Kika Konstantinou, Francisco M Kovacs, Marc Marty, James Rainville, Michael Norberg, Jean-François Kaux, Thomas D Cha, Jeffrey N Katz, Steven J Atlas; Switzerland

14:05-14:20 Discussion
SESSION #5 LOW BACK PAIN
Moderators: Michele Batté and Jaro Karppinen

14:20-14:25 24 Risk factors for pediatric spinal pain
Julia Szita, Aron Lazary, Annamaria Somhegyi, Peter Pal Varga; Hungary

14:27-14:32 25 Global consensus of low back pain outcome indicators for older adults
Arnold Wong, Dino Samartzis, Luciana Macedo, Paulo Ferreira, Manuela Ferreira; Hong Kong

14:34-14:39 26 The prevalence of low back pain and its associated factors in patients with rheumatoid arthritis
Kazuto Miura, Osamu Morita, Toru Hirano, Kei Watanabe, Naoto Endo; Japan

14:41-14:50 Discussion

14:50-14:55 27 Initial promis scores predict success of therapeutic spinal injections
Paul T Rubery, Jeff Houck, Molly Baumhauer, Clifford Everett, Rajeev Patel, David Speach, John Orsini, Judith Baumhauer; United States

14:57-15:02 28 Bioactive dietary polyphenol preparation for preventing painful behavior associated with lumbar disc degeneration: an in-vivo rat model
Alon Lai, Thomas W Evashwick-Rogler, Jonathan Salandra, Lap Ho, Sam K Cho, Andrew C Hecht, Beth A Winkelstein, Giulio M Pasionetti, James C Iatridis; United States

15:04-15:09 29 Matrix Metalloproteinase-12 activity in a neuropathic pain rodent model: impact on neuroinflammation response
Wing Moon Raymond Lam, Syeda Fabeha Husain, Tao Hu, Nagata Keiji, Sanjay Khanna, Kishore Bhakoo, Yulin Lam, Roger Chun Man Ho, Hee Kit Wong; Singapore

15:11-15:20 Discussion

15:20-15:50 COFFEE

SESSION #6 BASIC SCIENCE
Moderators: Jeffrey Lotz and Nam Vo

15:50-15:55 30 Disc height and tissue morphology restoration by cryopreserved human discogenic cell transplantation in a canine model
Jordy Schol, Daisuke Sakai, Hiraishi Syunsuke, Nukaga Tadashi, Masahiko Watanabe; Japan

15:57-16:02 31 Molecular mechanisms of rhBMP-2 induced inflammation: a rabbit spinal fusion chamber study
Tao Hu, Mathanapriya Naidu, Wing Moon Raymond Lam, Zheng Yang, Xiafei Ren, Felly Ng, Ramruttun Amit Kumarsing, Kim Cheng Tan, Kai Thong, Mariner Kwok, Stuart Boden Goodman, Cho Hong, James Goh, Hee Kit Wong; Singapore

16:04-16:09 32 Inhibition of autophagy through ATG5 knock down induces apoptosis and senescence in human intervertebral disc cells
Masaaki Ito, Takashi Yurube, Kenichiro Kakutani, Koichiro Maeno, Toru Takada, Yoshiki Terashima, Yuji Kakiuchi, Yoshiki Takeoka, Ryosuke Kuroda, Kotaro Nishida; Japan
Human senescent disc cells exhibit metabolic shift and imbalanced matrix homeostasis
*Prashanti Patil, Gwendolyn Sowa, Nam Vo; United States*

**SYMPOSIUM: TRANSLATION AND COMMERCIALIZATION**
*Moderator: Jeffrey Lotz*

16:30-16:45 Conflict of Interest: Lessons from a Personal Odyssey
*Rowland G. Hazard; United States*

16:45-17:00 Partnering with industry: Is this right for you?
*Jeffery Lotz; United States*

17:00-17:15 Regenerative medicinal products for low back pain: global regulatory affairs and industrialization
*Daisuke Sakai; Japan*

17:15-17:30 Discussion

**FIRST BUSINESS MEETING**

17:30-18:10 For Members Only
Wednesday – May 31, 2017

SPECIAL POSTER SESSION #1

07:45-08:45
1A Disc Biology – Thalia 1
1B Lumbar Disc Herniation – Terpsichore C
1C Low Back Pain – Erato A
1D Spinal Stenosis – Erato B
1E Fusion Surgery – Erato C

SESSION #7 COHORT STUDY
Moderators: Margareta Nordin and Shoji Yabuki

09:00-09:05 34  Shared decision making in orthopaedic spine care leads to better health outcomes: a prospective cohort study
Steven J. Atlas, Yuchiao Chang, Thomas D. Cha, Joseph H. Schwab, David S. Binder, Mahima Mangla, Leigh H. Simmons, Karen Sepucha; United States

09:07-09:12 35  Incidence and risk factors for early postoperative mortality and complications following adult spinal deformity surgery data from the national surgical quality improvement program from 2011 to 2013
Ho-Joong Kim, Jin S. Yeom, Bong-Soon Chang, Choon-Ki Lee, Lawrence G. Lenke; South Korea

09:14-09:19 36  A novel use of the spine tango registry to evaluate selection bias in patient recruitment into clinical studies: an analysis of patients participating in the lumbar spinal stenosis outcome study (LSOS).
Hans-Jürgen Becker, Selina Nauer, François Porchet, Frank S Kleinstück, Daniel Haschtmann, Tamas Fekete, Johann Steuer, Anne F Mannion; Switzerland

09:21-09:30 Discussion

09:30-09:35 37  The relation between diffuse idiopathic skeletal hyperostosis (DISH) and low back pain: a population-based cohort study
Ryohei Kagotani, Munehito Yoshida, Shigeyuki Muraki, Hiroyuki Oka, Hiroshi Hashizume, Hiroshi Yamada, Niriko Yoshimura; Japan

09:37-09:42 38  A prognostic model of the outcome of surgery for disc herniation
Emin Aghayev, Lukas P Staub, Frank Kleinstueck, Daniel Haschtmann, Tamas Fekete, Francois Porchet, Anne F Mannion; Switzerland

09:44-09:49 39  Vertebral endplate defect as initiating factor for intervertebral disc degeneration in the general population
Marinika Rade, Juhani H Määttä, Maxim B Freydin, Olavi Ariaksinen, Jaro Karppinen, Frances MK Williams; Finland

09:51-10:00 Discussion

10:00-10:30 COFFEE
SESSION #8 TREATMENT FOR LBP
Moderators: Jeremy Fairbank and Serena Hu

10:30-10:35  40  A prospective, randomized study of patient controlled epidural analgesia vs. patient controlled intravenous analgesia for postoperative pain control after lumbar fusions.
   Todd Alamin, Alex Arzeno, Alicia Zagel, Maagnes Ith, Ivan Cheng, Serena Hu; United States

10:37-10:42  41  Associations of neuropeptide Y genotype and circulating levels with response to epidural steroid injection in patients with axial low back pain
   Wan Huang, Stephen Schaaf, Subashan Perera, Yvette Conley, Sara Ernst, Megan Cortazzo, Nam Vo, James Kang, Gwendolyn Sowa; United States

   Toshinaga Tsuji, Naohiro Itoh, Mitsuhiro Ishida, Toshimitsu Ochiai, Shinichi Konno; Japan

10:51-11:00  Discussion

PRESIDENTIAL ADDRESS - KEITH LUK

11:00-11:40  Presidential Address - Keith Luk
   Introduction – Tim Yoon

HARRY FARFAN PRESIDENTIAL LECTURE

11:40-12:20  Introduction - Keith DK Luk
   Columns
   Speaker - Professor Manolis Korres
   National Technical University of Athens
   Director, Acropolis Restoration Project

AFTERNOON OUTING
Thursday – June 1, 2017

SESSION #9 BIOMECHANICS
Moderators: Tom Oxland and Hans-Joachim Wilke

07:30-07:35 43  What spaceflight teaches us about lumbar spine biomechanics
Jeannie F Bailey, Stephanie L Miller, Kristine T Khieu, Conor O’Neill, Robert Healey, Dezba Coughlin, Jojo V Sayson, Douglas G Chang, Alan R Hargens, Jeffrey C Lotz; United States

07:37-07:42 44  Does the activation of deep and superficial lumbar multifidus differ during walking at different speeds and inclinations between younger and older adults?
Rebecca J Crawford, Leonardo Gizzi, Áine Ni Mhuiris, Angela V Dieterich, Deborah Falla; Switzerland

07:44-07:49 45  Paraspinal muscle passive stiffness remodels in direct response to spine stiffness: a study using the ent1 deficient mouse
Kelsey Gsell, Derek Zwambag, Dale Fournier, Cheryle Seguin, Stephen Brown; Canada

07:51-08:00 Discussion

08:00-08:05 46  Lumbosacral orientation in reference to gravity line shifts posteriorly with aging
Kazuhiro Hasegawa, Masashi Okamoto, Shun Hatsushikano, Haruka Shimoda, Kei Watanabe, Masayuki Ohashi; Japan

08:07-08:12 47  Visualization and pathological characteristics of cartilage and subchondral bone change in lumbar facet joint in OVX mouse model using propagation-based phase-contrast computed tomography
Hongbin Lu, Jianzhong Hu, Yong Cao; China

08:14-08:19 48  Changes in combined hydrostatic and osmotic pressure alter metabolic turnover in nucleus pulposus cells in vitro
Shuichi Mizuno, Kaori Kashiwa, James D Kang; United States

08:21-08:30 Discussion

SESSION # 10 ENDPLATE
Moderators: Ashish Diwan and S Rajasekaran

08:30-08:35 49  Vertebral endplate defect as initiating factor for Modic change in the general population
Juhani H Määttä, Marinko Rade, Maxim B Freidin, Olavi Airaksinen, Jaro Karpinen, Frances MK Williams; Finland and UK

08:37-08:42 50  P. acnes may be a key factor of Modic changes, a clinical and in vitro study
Fengdong Zhao, Shengyun Li, Xuyang Zhang, Zhi Shan, Junhui Liu, Tianming Yu; China

08:44-08:49 51  Propionibacterium acnes incubation in the discs can result in time-dependent Modic changes: a long term rabbit model
Zhi Shan, Xuyang Zhang, Shengyun Li, Tianming Yu, Junhui Liu, Fengdong Zhao; China

08:51-09:00 Discussion
Thursday June 1

09:00-09:05 52 Multi-dimensional assessment of vertebral endplate breaks on MRI: implications in spine degeneration and pain/disability
_Uruj Zehra, Jason Pui Yin Cheung, Cora Bow, Dino Samartzis, Hong Kong_

09:07-09:12 53 Who played the important role in the degeneration of rats disc, the nucleus pulposus mesenchymal stem cells age-related changes?
_Deli Wang, China_

09:14-09:19 54 Resistin promotes CCL4 expression through toll-1 like receptor-4 and activation of the P38-MAPK and NF-kb signaling pathways: implications for intervertebral disc degeneration
_Jianru Wang, Hui Liu, Zemin Li, Zhaomin Zheng; China_

09:21-09:30 Discussion

09:30-10:00 COFFEE

FELLOWSHIP AWARD CEREMONY
_Moderator: Tim Yoon_

10:00-10:05 Announcement of the ISSLS Clinical Travelling Fellowship
_Introduction: Wilco Peul_
Presentation of Spine Young Investigator Award – _Kevin Spratt_
Reduced spinal cord movement with the straight leg raise test in patients with lumbar intervertebral disc herniation
_Marinko Rade et al, Finland_

10:05-10:20 Wiltse Lifetime Achievement Award Ceremony
_Introduction: Jeremy Fairbank_

ISSLS PRIZE AWARD CEREMONY
_Moderator - Björn Rydevik_

10:20-10:30 Introduction and Award Ceremony

10:30-10:40 55 ISSLS Prize - Basic science
Intervertebral disc/bone marrow cross-talk with modic changes
_Stefan Dudli, David Sing, Serena S Hu, Sigurd H Berven, Shane Burch, Vedat Deviren, Ivan Cheng, Bobby KB Tay, Todd Alamin, Ma Agnes Martinez Ith, Eric M Pietras, Jeffrey C Lotz; Switzerland_

10:40-10:50 Discussion

10:50-11:00 56 ISSLS Prize - Bioengineering science
Automation of reading of radiological features from magnetic resonance images (MRI’s) of the lumbar spine without human intervention is comparable with an expert radiologist
_Jeremy Fairbank, Amir Jamaludin, Meelis Lootus, Timor Kadir, Andrew Zisserman, Jill Urban, Michele Battié, Iain McCall, Genodisc Consortium; United Kingdom_

11:00-11:10 Discussion
Thursday June 1

11:10-11:20  57  **ISSLS Prize - Clinical science**
Is infection the possible initiator of disc disease? An insight from proteomic analysis
Rajasekaran Shanmuganathan, Chitraa Tangavel, Siddharth N Aiyer, Sharon Miracle Nayagam, M Raveendran, Naveen Luke Demonte, Pramela Subbaiah, Rishi Kanna, Ajoy Prasad Shetty, K Dharmalingam; India

11:20-11:30  Discussion

**INVITED LECTURE #2**
Moderator: Dino Samartzis

11:30-12:00  Hippocratic Ethics: is the Hippocratic Oath relevant to contemporary medicine?
Professor Helen Askitopoulou
University of Crete, Greece

12:00-13:30  **LUNCH**

**SESSION #11 SURGERY FOR DEGENERATIVE DISC DISEASE**
Moderators: Robert Gunzburg and Shinichi Konno

13:30-13:35  58  Surgical outcomes of posterior lumbar intebody fusion in patients over 80 years of age.
Masayuki Furuya, Yukitaka Nagamoto, Hiroyuki Aono; Japan

13:37-13:42  59  Time to remove our rose-tinted glasses: a candid appraisal of the relative success of surgery in over 4'500 patients with degenerative disorders of the lumbar spine, hip or knee
Anne F Mannion, Franco Impellizzeri, Michael Leunig, Dezsö Jeszenszky, Daniel Haschtmann, Stefan Preiss, Tamas F Fekete; Switzerland

13:44-13:49  60  Adjacent segment degeneration after lumbar total disc replacement: 5-year results of a multicenter, prospective, randomized study with independent radiographic assessment
Scott L. Blumenthal, Richard D. Guyer, Donna D. Ohnmeiss, Jack E. Zigler; United States

13:51-14:00  Discussion

**SESSION # 12 SURGICAL COMPLICATIONS**
Moderators: James Kang and Teija Lund

14:00-14:05  61  Previous surgery significantly increases the risk of both surgical and general complications during surgery for degenerative disorders of the lumbar spine
Anne F Mannion, Pascal Zehnder, Francois Pochet, Dezsö Jeszenszky, Frank S Kleinstück, Tim Pigott, Emin Aghayev; Switzerland

14:07-14:12  62  Risk factors for poor patient-reported QOL outcomes after PLIF: an analysis of two-year follow-up
Takahiro Makino, Takashi Kaito, Hiroyasu Fujiiwara, Yohei Matsuo, Hirotsugu Honda, Yusuke Sakai, Shota Takenaka, Hideki Yoshikawa, Kazuo Yonenobu; Japan
14:14-14:19  63  Local application of vancomycin powder decreases the amount of bacteria in the operative field and leads to less incidence of surgical site infection

*Hirohito Takeuchi, Itaru Oda, Shigeki Oshima, Masaru Suzuki, Masanori Fujiya; Japan*

14:21-14:30  Discussion

14:30-14:35  64  Revision surgery of symptomatic pseudarthrosis after lumbar fusion: a viable treatment option?

*Markus Loibl, Siegmund Lang, Frank Kleinstück, Tamas Fekete, Dezső Jeszenszky, Anne F Mannion, Daniel Haschtmann; Switzerland*

14:37-14:42  65  The change of pain catastrophizing in patients with spine surgery

*Ho-Joong Kim, Joon-Hee Park; South Korea*

14:44-14:49  66  Planned two stage corrective spinal surgery for adult spinal deformity does not increase the risk of complication compared to one stage surgery

*Tomohiro Hasegawa, Daiske Togawa, Yu Yamato, Sho Kobayashi, Go Yoshida, Shin Oe, Tomohiro Banno, Yuki Mihara, Yukihiro Matsuyama; Japan*

14:51-15:00  Discussion

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**GENERAL POSTER SESSION**

15:00-16:00  Refreshments will be served

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**SESSION #13 SPINAL STENOSIS & Spondylolisthesis**

*Moderators: Koichi Sairyo and David Wong*

16:00-16:05  67  A comparison of non-surgical treatment methods for patients with lumbar spinal stenosis

*Michael J Schneider, Carlo Ammendolia, Donald Murphy, Ronald Glick, Sara Piva, Elizabeth Hile, Dana Tudorascu, Sally Morton; United States*

16:07-16:12  68  Deterioration in qol caused by lumbar spinal stenosis: a study of disease specific characteristics (lumbar spinal stenosis diagnosis support tool: disto-project)

*Hiroshi Kobayashi, Miho Sekiguchi, Koji Yonemoto, Tatsuyuki Kakuma, Kinshi Kato, Kazuyuki Watanabe, Takuya Nikaido, Koji Otani, Shoji Yabuki, Shin-ichi Kikuchi, Shin-ichi Konno; Japan*

16:14-16:19  69  Is reduction better than arthrodesis in situ in surgical management of low-grade spondylolisthesis? -a system review and meta analysis

*Xuedong Bai, Jiahai Chen, Dike Ruan, Deli Wang; China*

16:21-16:26  70  When and how often spondylolisthesis occurs in patients with or without spondylolysis

*Yasuchika VA Aoki, Go GK Kubota, Hiroyuki HF Fukuchi, Takayuki TS Sakai, Atsuya AW Watanabe, Takayuki TN Nakajima, Makoto MT Takazawa, Shiro SS Sugiura, Seiji SO Ohtori, Kazuhisa KT Takahashi, Noriyuki NY Yanagawa; Japan*

16:28-16:40  Discussion
CURRENT APPROACHES TO DISCECTOMY: ENDOSCOPIC AND OPEN
Moderator: Yoshiharu Kawaguchi

16:40-17:00 The King James IV Professorship Lecture
Transforaminal lumbar endoscopic discectomy and decompression: Review of techniques and supporting evidence
Alastair Gibson

17:00-17:20 Counterpoint: When are “open” spine techniques for the lumbar spine preferred?
Helena Brisby

17:20-17:30 Discussion

SECOND BUSINESS MEETING
17:35-18:00 For Members Only

DINNER BANQUET
19:00-23:00 Dinner Banquet
Friday – June 2, 2017

SPECIAL POSTER SESSION #2
07:45-08:45
2F Paravertebral Muscle, Musculoskeletal Model – Thalia 1
2G MIS, Complication, Miscellaneous – Terpsichore C
2H Operative Outcome – Erato A
2I Spinal Stenosis, Tumor – Erato B
2J Spinal Alignment – Erato C

REPORT FROM FOCUS GROUPS
Moderator: Tim Yoon
09:00-09:30
• Degenerative Spinal Phenotypes Focus Group – Creating a common language to advance knowledge: Michele Batté and Dino Samartzis
• International Taskforce on Diagnosis and Management of Lumbar Spinal Stenosis: Christy Lane and Markus Melloh
• Current Stem Cell Research in the Intervertebral Disc: Benjamin Gantenbein and Daisuke Sakai

SESSION #14 TUMOR, OSTEOPOROSIS
Moderators: Chris Colloca and Daisuke Togawa
09:30-09:35 71 Total en bloc spondylectomy for primary tumors of the lumbar spine
Takaki Shimizu, Hideki Murakami, Satoru Demura, Satoshi Kato, Katsuhito Yoshioka, Noritaka Yonezawa, Naoki Takahashi, Hiroyuki Tsuchiya; Japan
09:37-09:42 72 Preoperative embolization in patients with metastatic spinal cord compression: mandatory or optional?
Jae Hwan Cho, Chang Ju Hwang, Dong-Ho Lee, Choon Sung Lee, Youn-Suk Joo; South Korea
09:44-09:49 73 Patterns of failure of fixation in metastatic spinal disease
Naresh Kumar, Dhiraj Sonawane, Aditya Prakash Singla, Barry Wee Lung Tan, Aye Sandar Zaw, Dennis Hey, Gabriel Liu, Singapore
09:51-10:00 Discussion
10:00-10:20 COFFEE

SESSION #15 SPINAL ALIGNMENT
Moderators: Drew Bednar and Yong Hai
10:20-10:25 74 Lumbar incidence, tilt and slope - applications and comparison of values in standing versus sitting
Hwee Weng Dennis Hey, Shashidhar B Kantharajanna, Alex QA Teo, Kimberly-Anne Tan, Ka-Po Gabriel Liu, Hee-Kit Wong; Singapore
10:27-10:32  75  Comparative analysis of over-correction, ideal-correction, and under-correction of lumbar lordosis for adult spinal deformity: analysis of 458 consecutive patients at a tertiary spinal deformity center

Junseok Bae, Alexander A Theologis, Bobby Tay, Shane Burch, Sigurd Berven, Praveen Mummaneni, Dean Chou, Christopher Ames, Vedat Deviren; South Korea

10:34-10:39  76  The adult deformity surgery complexity index (ADSCI): a valid tool to quantify the complexity of posterior adult spinal deformity surgery and predict postoperative complications

Ferran Pellisé, Alba Vila-Casademunt, Susana Núñez-Pereira, Montse Domingo-Sòbat, Joan Bagó, Xavier Vidal, Ahmet Alanay, Emre Acaroglu, Frank Kleinstück, Ibrahim Obeid, Francisco Javier Perez-Grueso, Virginie Lafage, Shay Bess, Christopher Ames, Anne F Mannion, European Spine Study Group (ESSG); Spain

10:41-10:50  Discussion

10:50-10:55  77  Global alignment and proportion (GAP) score: development and validation of a new method of analyzing spinopelvic alignment to predict mechanical complications after adult spinal deformity surgery

Caglar Yilgor, Nuray Sogunmez, Louis Boissiere, Yasemin Yavuz, Ibrahim Obeid, Frank Kleinstuck, Francisco J. Sanchez Perez-Grueso, Emre Acaroglu, Ferran Pellise, Anne F Mannion, Ahmet Alanay, European Spine Study Group ESSG; Turkey

10:57-11:02  78  Lumbar spine alignment in 6 common postures - A ROM analysis with implications for deformity correction

Hwee Weng Dennis Hey, Eugene Tze-Chun Lau, Kimberly-Anne Tan, Joel Louis Lim, Denise Choong, Leok-Lim Lau, Ka-Po Gabriel Liu, Hee-Kit Wong; Singapore

11:04-11:09  79  Targeted therapy of low back pain in elderly de novo degenerative lumbar scoliosis

Kiyotaka Yamada, Yoshinori Fujimoto, Toshio Nakamae, Takeshi Hiramatsu, Takashi Hashimoto, Osami Suzuki, Yuji Tsuchikawa; Japan

11:11-11:20  Discussion

SESSION #16 MINIMUM INVASIVE SURGERY

Moderators: Constantin Schizas and Hans Jörg Meisel

11:20-11:25  80  Comparison of the clinical outcomes of minimally invasive decompression with those of minimally invasive decompression and fusion in patients with degenerative spondylolisthesis with instability -MEL versus CBT-PLIF with a minimum follow-up of 2 years

Kazunori Hayashi, Hiromitsu Toyoda, Hidetomi Terai, Masatoshi Hoshino, Akinobu Suzuki, Shinji Takahashi, Koji Tamai, Shoichiro Ohyama, Yusuke Horii, Hiroaki Nakamura; Japan

11:27-11:32  81  Interspinous dynamic stabilization adjacent to fusion versus double-segment fusion for degenerative lumbar diseases: minimum three years follow-up

Yong Hai, Xiaolong Chen; China
11:34-11:39  82  A comparative study between open and percutaneous posterior fixation surgeries for effects of the performance status, activities of daily living, and quality of life in patients with spinal metastasis  
*Takashi Yurube, Kenichiro Kakutani, Koichiro Maeno, Toru Takada, Yoshiki Terashima, Masaaki Ito, Yuji Kakiuchi, Yoshiki Takeoka, Shingo Miyazaki, Yoshitada Sakai, Ryosuke Kuroda, Kotaro Nishida; Japan*

11:41-11:50  Discussion

**ANNOUNCEMENT - BEST PAPER AND POSTER AWARDS**

11:50-12:00

**CLOSING REMARKS – TEIJA LUND**

12:00-12:10
Friday – June 2, 2017
ISSLS - AOSPINE SYMPOSIUM – SAGITTAL BALANCE AND ITS IMPLICATIONS IN SPINE SURGERY
* A Separate Registration Is Required to attend the Symposium *

13:30-13:35 Welcome address
   **Dino Samartzis**

13:35-13:55 Historical overview and concepts of sagittal alignment/balance and clinical applications
   **Virginie Lafage**

**SAGITTAL BALANCE IMPLICATIONS FOR TREATMENT OF SPINAL DEFORMITIES**
**Moderators: Thomas Patsiaouras and Theodoros B. Grivas**

13:55-14:15 Adolescent idiopathic scoliosis
   **Keith Luk**

14:15-14:35 Adult spinal deformity
   **Vedat Deviren**

14:35-14:55 High-grade spondylolisthesis
   **Panagiotis Korovessis**

14:55-15:15 Pedicle subtraction osteotomy: are the complications worth the results?
   **Rune Hedlund**

15:15-15:30 Discussion

15:30-15:40 COFFEE

**SAGITTAL BALANCE IMPLICATIONS FOR TREATMENT OF DEGENERATIVE CONDITIONS**
**Moderators: Odysseas Paxinos and Yoshiharu Kawaguchi**

15:40-16:00 Degenerative disc disease: are we creating a deformity or fixing a deformity?
   **Serena Hu**

16:00-16:20 Degenerative spondylolisthesis
   **Panagiotis Korovessis**

16:20-16:40 State of the art on total disc replacement and its role in sagittal balance reconstruction
   **Christoph Siepe**

16:40-16:55 Discussion

**CHALLENGES AND FUTURE DIRECTIONS IN SAGITTAL BALANCE AND SPINE SURGERY**
**Moderators: Keith Luk and Serena Hu**

16:55-17:15 Proximal junctional kyphosis
   **Robert Hart**

17:15-17:35 Age-specific parameters and considerations in management
   **Virginie Lafage**
17:35-17:55  Cervical alignment  
*Virginie Lafage*

17:55-18:15  Spine / hip and knee relationships: when everything goes wrong  
*Marc-Antoine Rousseau*

18:15-18:30  Discussion

18:30  Concluding remarks  
*Serena Hu*
Special Poster Session #1

**SP #1A DISC BIOLOGY**  
Wednesday, May 31, 2017 at 07:45-08:45  
*Moderators: Dimitris Kletsas and Jill Urban*

**SP01**  
Is dynamic surface electromyography topography an indication of low back pain?  
*Naifu Jiang, Keith Dip-Kei Luk, Yong Hu, Hong Kong*

**SP02**  
Use of the limiting dilution method for the isolation of nucleus pulposus mesenchymal stem cells (NPMSCS) and the effects of plating density on biological characteristics and plasticity  
*Linghan Lin, Yachao Zhao, Zhiwei Jia, Yaohong Wu, Deli Wang, Dike Ruan, China*

**SP03**  
Real-time monitoring of glucose consumption of intervertebral disc cells in 3d culture  
*Daniela A Frauchiger, Rahel D May, Andreas K Koch, Lorin M Benneker, Benjamin Gantenbein, Switzerland*

**SP04**  
Human mesenchymal stem cells pre-treated with IL-1β and stimulated with BMP-3 growth factor enhance chondrogenesis in vitro  
*Daphne DH Hingert, Helena HBH Barreto Henriksson, Helena HB Brisby, Sweden*

**SP05**  
Effect of geometry on human lumbar intervertebral disc six degree of freedom mechanics  
*John DeLucca, Dhara Amin, Edward Vresilovic, John Costi, Dawn Elliott; United States*

**SP06**  
Even mild degeneration of the lumbar spine is associated with a loss of the hydrostatic behavior of the intervertebral disc  
*David Volkheimer, Fabio Gabusera, Christian Liebsch, Hans-Joachim Wilke; Germany*

**SP#1B LUMBAR DISC HERNIATION**  
Wednesday, May 31, 2017 at 07:45-08:45  
*Moderators: Joo Han Kim and Miho Sekiguchi*

**SP07**  
Does an annular puncture influence the herniation pathway? an in vitro mechanical and structural investigation  
*Vonne M van Heeswijk, Ashvin Thambyah, Peter A Robertson, Neil D Broom; New Zealand*

**SP08**  
Diabetes’ negative impact on radiculopathy induced by application of nucleus pulposus onto DRG in spontaneous diabetic rats  
*Takuya Kameda, Miho Sekiguchi, Yoichi Kaneuchi, Shinichi Konno; Japan*

**SP09**  
Reduced neural movement with the straight leg raise test in patients with lumbar intervertebral disc herniation  
*Marinko Rade, Janne Pesonen, Mervi Könönen, Jarkko Marttila, Michael Shacklock, Ritva Vanninen, Markku Kankaanpää, Olavi Ariaksinen; Finland*

**SP10**  
Defect size and lumbar reherniation: identifying the high-risk patient  
*Nikolaus Koegl, Mark Arts, Frederic Martens, Javier Fandino, P. Douglas Klassen; United States*

**SP11**  
The effect of repeated bending and axial rotation motions on internal disc strains and risk of herniation in degenerated human cadaver lumbar discs  
*John J Costi, Karsta Heinze, Pawel P Skuza, Brian JC Freeman; Australia*

**SP12**  
Q-space imaging is a novel technique to evaluate intervertebral disc degeneration  
*Daisuke Nakashima, Nobuyuki Fujita, Junichi Hata, Takeo Nagura, Kanehiro Fujiyoshi, Hideyuki Okano, Masahiro Jinzaki, Morio Matsumoto, Masaya Nakamura; Japan*
**SP #1C LOW BACK PAIN**  
Wednesday, May 31, 2017 at 07:45-08:45  
Moderators: Hiroshi Hashizume and Gianluca Vadala

SP13  
Risk factors related to the severity of pain intensity in non-specific low-back pain patients of southern China  
*Zhaomin Zheng, Hua Wang, Jianru Wang, Hui Liu, Zemin Li; China*

SP14  
Productivity impairment among workers in Japan with chronic low back pain  
*Hiroki Sato, Ko Matsudaira, Toshinaga Tsuji, Jeffrey Vietri; United States*

SP15  
Intervertebral disc heterogeneity with mri histograms - potential markers in patients with low back pain?  
*Hanna Hebelka, Christian Waldenberg, Helena Brisby, Kerstin Lagerstrand, Sweden*

SP16  
A pilot study comparing an online back pain triage algorithm with clinical assessment  
*Gruffydd O Perks, Scott D Middleton, Sarah J MacInnes, Kirsten Lord, J.N. Alastair Gibson; United Kingdom*

SP17  
Lumbosacral Orthoses for preventing the onset of low back pain among healthy hospital nurses: a randomized controlled trial  
*Hongbin Lu, Jianzhong Hu, Yong Cao, Jing Qu; China*

SP18  
Identification of a NMR biomarker for Propionibacterium acnes infected intervertebral discs  
*Sergey Magnitsky, Stefan Dudli, Xinyan Tang, Joycelyn Diaz, Steve Miller, Jim Peacock, Jeffrey Lotz; United States*

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**SP #1D SPINAL STENOSIS**  
Wednesday, May 31, 2017 at 07:45-08:45  
Moderators: Helena Brisby and Orso Osti

SP19  
Analysis of factors influencing ligamentum flavum thickness in lumbar spine - a radiological study of 1070 levels in 214 patients  
*Ganesen Sudhir, Sakkrishna Gadde, Karthik Kailash; India*

SP20  
Hyperlipidemia is associated with idiopathic spinal epidural lipomatosis  
*Shinichi Ishihara, Nobuyuki Fujita, Mitsuru Yagi, Kota Watanabe, Takehiro Michikawa, Yuji Nishiwaki, Yasuyuki Fukui, Keisuke Horiuchi, Masaya Nakamura, Morio Matsumoto, Ken Ishii; Japan*

SP21  
10 year follow-up of lumbar spinal stenosis in the community. Part 1: time course of lumbar spinal stenosis symptom.  
*Koji Otani, Shinichi Kikuchi, Takahiro Igar, Miho Sekiguchi, Takuya Nkaido, Kazuyuki Watanabe, Kinshi Kato, Hiroshi Kobayashi, Shoji Yabuki, Shinichi Konno; Japan*

SP22  
10 year follow-up of lumbar spinal stenosis in the community. Part 2: relationship between lumbar spinal stenosis symptom and dural tube compression on mri  
*Koji Otani, Shinichi Kikuchi, Takahiro Igar, Miho Sekiguchi, Takuya Nkaido, Kazuyuki Watanabe, Kinshi Kato, Hiroshi Kobayashi, Shinichi Konno; Japan*

SP23  
Effectiveness and limitations of decompression without fusion for lumbar spinal stenosis with degenerative spondylolisthesis: can a higher slipping rate affect surgical outcomes?  
*Akira Miyauuchi, Tadayoshi Sumida, Hideki Manabe, Nobukazu Okimoto, Toru Yoshioka, Yoshifumi Fuse, Shin-ichi Saka; Japan*
SP24  Relationships between preoperative psychological factors and patient-reported outcomes in patients with lumbar spinal stenosis
Tomoko Kitagawa, Mamoru Kawakami, Yuyu Ishimoto, Masatoshi Teraguchi, Masakazu Minetama, Masahumi Nakagawa, Daisuke Fukui; Japan

SP #1E FUSION SURGERY
Wednesday, May 31, 2017 at 07:45-08:45
Moderators: Moon Park and Odysseas Paxinos

SP25  Histological analysis of bone regeneration with different doses of rhBMP-2 in an ovine lumbar interbody fusion model
Hans Jörg Meisel, Katharina KS Siegrist, Johannes JS Seeger, Christian CH Hohaus; Germany

SP26  Early reduction of ligamentum flavum after posterior fusion without neural decompression for unstable degenerative lumbar spondylolisthesis
Hiromi Ataka, Tomoiihiro Miyashita, Kei Kato, Hiromitsu Takaoka, Takaaki Tanno; Japan

SP27  BMP-2 carrier and interbody spinal fusion outcome: rabbit spinal fusion chamber study on BMP antagonist
Tao Hu, Mathanapriya Naidu, Zheng Yang, Wing Moon Raymond Lam, Xiafei Ren, Felly Ng, Ramruttun Amit Kumarsing, Ming Wang, Kim Cheng Tan, Kai Thong, Mariner Kwok, Stuart B. Goodman, Cho Hong, James Goh, Hee Kit Wong; Singapore

SP28  Balancing bone resorption and overzealous bone growth in lumbar interbody fusion with RhBMP-2 in the sheep model- A question of dose and/or concentration?
Hans Jörg HJM Meisel, Gerlinde GH Heil, Christian CH Hohaus; Germany

SP29  Creating lordosis in transforaminal and posterior lumbar interbody fusion (TLIF/PLIF) “ The impact of surgical technique” a controlled cadaveric study
Peter Robertson, Will D Armstrong, Daniel L Woods, Jeremy J Rawlinson; New Zealand

SP30  Factors affecting the bony union of the defects in the pars interarticularis of L5 unilateral spondylolysis
Hayato Ishitani, Takato Aihara, Naoki Ishigaki, Jun Kurokawa; Japan
**SPECIAL POSTER SESSION #2**

**SP #2F PARAVERTEBRAL MUSCLE, MUSCULOSKELETAL MODEL**  
Friday, June 2, 2017 at 07:45-08:45  
*Moderators: Itaru Oda and Gwendolyn Sowa*

**SP31**  
Manually defining regions of interest when quantifying paravertebral muscles fatty infiltration from axial magnetic resonance imaging: a proposed method for the lumbar spine with anatomical cross-reference  
*Rebecca J Crawford, Jon Cornwall, Rebecca Abbott, James M Elliott; Switzerland*

**SP32**  
Lumbar paravertebral muscle fatty infiltration: relationship of distribution patterns to demographics, disability and pain  
*Rebecca J Crawford, Thomas Volken, Áine Ni Mhuiris, Cora Bow, James M Elliott, Markus Melloh, Dino Samartzis; Switzerland*

**SP33**  
Do sitting postures really affect spinal biomechanics of asymptomatic individuals?  
*Arnold YL Wong, Alan KH Lam, Alex WM Chau, Keith CK Kwan, HT Cheung, PM Chan; Hong Kong*

**SP34**  
Axial loading during MRI induces significant effects on vertebral endplate T2-values - A feasibility study on patients with low back pain  
*Hanna Hebelka, Andreia Miron, Helena Brisby, Kerstin Lagerstrand; Sweden*

**SP35**  
Ascorbic acid attenuates multifidus muscles injury and atrophy after posterior lumbar spine surgery by suppressing inflammation and oxidative stress in a rat model  
*Zhi-Jun Hu, Pan Tang, Zi-Ang Xie, Xu Jia-Qi, Gu Jia-Ming, Lin Xian-Feng, Huang Kang-Mao, Wang Ji-Ying, Fan Shun-Wu; China*

**SP36**  
Correlation of preoperative lumbar paraspinal extensor muscle conditions with severity of degenerative flat back and its improvement after corrective fusion surgery  
*Jung Hwan Lee, Sang-Ho Lee; South Korea*

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**SP #2G MIS, COMPLICATION, MISCELLANEOUS**  
Friday, June 2, 2017 at 07:45-08:45  
*Moderators: Alastair Gibson and Akihito Minamide*

**SP37**  
Minimally invasive decompression surgery for lumbar spinal stenosis with degenerative scoliosis: predictive factors of radiographic and clinical outcomes  
*Akihito Minamide, Munehito Yoshida, Hiroki Iwashashi, Andrew K Simpson, Hiroshi Yamada, Hiroshi Hashizume, Yukihiro Nakagawa, Hiroshi Iwasaki, Shunji Tsutsui, Ryohei Kagotani; Japan*

**SP38**  
The Impact of Hypertension on the Occurrence of Postoperative Spinal Epidural Hematoma Following after Single Level Microscopic Posterior Lumbar Decompression Surgery  
*Yasushi YF Fujiiwara, Bunichiro Bi Izumi, Takahiro TH Harada, Takayuki TS Shima, Hideki HM Manabe; Japan*

**SP39**  
Assessment of the anybody full body musculoskeletal model in computing spine loads at lumbar level: comparison with in vivo values obtained during exercise tasks  
*Tito Bassani, Elena Stucovitz, Zhihui Qian, Matteo Briguglio, Fabio Galbusera; Italy*

**SP40**  
How effective is MIS-TLIF in the surgical treatment of lumbar degenerative diseases?: a comparative study with open PLIF procedure  
*Masumi Iwabuchi, Jun Komatsu, Hironari Fukuda, Mutsumi Shimazaki, Osamu Shirada; Japan*
SP41  Comparison of Microendoscopic Discectomy with Transformimal Percutaneous Endoscopic Discectomy in Lumbar Disc Herniation: Results of a Randomized Controlled Trial
Zhi-Jun Hu, Xiang-Qian Fang, Gang Liu, Wen-Bin Xu; China

SP42  Variation in procedural utilization for lumbar spine disorders in fee-for-service vs salaried healthcare systems in the United States
Andrew Schoenfeld, Christopher Bono; United States

SP #2H OPERATIVE OUTCOME
Friday, June 2, 2017 at 07:45-08:45
Moderators: Hiroyuki Aono and Ulrich Berlemann

SP43  The effect of 1- or 2-level posterior lumbar interbody fusion on global sagittal balance
Jae Hwan Cho, Chang Ju Hwang, Dong-Ho Lee, Choon Sung Lee; South Korea

SP44  Surgical outcomes of pedicle screw with cortical bone trajectory compared with conventional trajectory for patients with lumbar spinal stenosis: a 1-year follow-up study
Yuyu Ishimoto, Mamoru Kawakami, Masatoshi Teraguchi, Shin-ichi Nakao, Keiji Nagata, Tomoko Kitagawa, Nami Moriguchi; Japan

SP45  Two year follow-up after percutaneous interspinous process device for lumbar spinal stenosis in a prospective case-registry of patients with severe co-morbidities
Adad Baranto, Hanna Hebelka Bominger, Christian Hagelberg, Per Wessberg, Klas Halldin, Helena Brisby; Sweden

SP46  Patient reported outcomes following spinal surgery for degenerative disc disease, disc herniation, spondylolisthesis and spinal stenosis
Greg McIntosh, Hamilton Hall, Raja Rampersaud, Charles Fisher, Neil Manson, Ken Thomas; Canada

SP47  Comparative study of 1-year clinical outcomes using robot-assisted pedicle screw fixation and freehand technique in posterior lumbar interbody fusion: a prospective, randomized controlled trial
Ho-Joong Kim, Jin S. Yeom, Bong-Soon Chang, Choon-Ki Lee; South Korea

SP48  What is the appropriate timing of patient-rated follow-up after surgery for degenerative disorders of the lumbar spine?
Tamas Fekete, Daniel Haschtmann, Hans-Jürgen Becker, Frank Kleinstück, Dezső Jeszenszky, Peter Banczerowski, Anne F Mannion; Switzerland

SP #2I SPINAL STENOSIS, TUMOR INFECTION
Friday, June 2, 2017 at 07:45-08:45
Moderators: Vedat Deviren and Jon Lurie

SP49  NELL-1 combined with bone marrow aspirate concentrate in a polyelectrolyte complex based construct enhances posterolateral spinal fusion in rabbits
Ling Liu, Wing Moon Raymond Lam, Ming Wang, Mathanapriya Naidu, Felly Ng, Xia Fei Ren, Kang Ting, Chia Soo, James Cho Hong Goh, Hee Kit Wong; Singapore

SP50  Preoperative knowledge test feedback intervention (KTFI) increases patients’ knowledge level - a randomized controlled trial in 100 spinal stenosis patients
Jukka Kesänen, Teija Lund, Helena Leino-Kilpi, Liisa Montin, Pauli Puukka, Kirsi Valkeapää; Finland
SP51 Boot camp programs for lumbar spinal stenosis: a randomized controlled trial comparing outcomes following a comprehensive versus self-directed non-surgical approach
Carlo Ammendolia, Pierre Côté, Y. Raja Rampersaud, Danielle Southerst, Brian Budgell, Claire Bombardier, Gillian Hawker; Canada

SP52 Effectiveness of decompression surgery for lumbar spinal stenosis in patients aged 80 years and older
Kazuyuki Watanabe, Koji Otani, Takuya Nikaido, Kinshi Kato, Hiroshi Kobayashi, Shoji Yabuki, Shin-ichi Kikuchi, Shin-ichi Konno; Japan

SP53 Clinical efficacy of minimally invasive direct lateral interbody fusion for adult spinal deformity
Young-Hoon Kim, Jae-Won Lee, Kee-Yong Ha, Sang-Il Kim; South Korea

SP54 Lower extremities motor function of the L2 nerve root transection cases in total spondylectomy
Naoki Takahashi, Hideki Murakami, Satoru Demura, Satoshi Kato, Katsuhito Yoshioka, Noriaki Yokogawa, Takashi Ota, Noritaka Yonezawa, Takaki Shimizu, Hiroyuki Tsuchiya; Japan

SP #2J SPINAL ALIGNMENT
Friday, June 2, 2017 at 07:45-08:45
Moderators: Jason Cheung and Mamoru Kawakami

SP55 The effect of parity on age-related degenerative changes in sagittal balance
Jeannie F Bailey, Frances MK Williams, Patrick F Curran, Jeffrey C Lotz, Patricia A Kramer; United States

SP56 Importance of tailoring surgical strategies to preoperative pelvic incidence (PI) in adult spinal deformity: a comparative analysis of 138 patients with high PI and low PI
Alexander Theologis, Junseok Bae, Corinna Zygourakis, Shane Burch, Dean Chou, Sigurd Berven, Praveen Mummaneni, Bobby Tay, Christopher Ames, Vedat Deviren; United States

SP57 An analysis of radiographic parameters comparison between lumbar spine latericumbent and full-length lateral standing radiographs
Ke Gong, Xueyu Hu, Zhiwei Yang, Zhe Wang, Zhuojing Luo; China

SP58 Spino-pelvic sagittal imbalance as a risk factor for adjacent segment disease after single-segment PLIF
Tomiya TM Matsumoto, Shinya SO Okuda, Takafumi TM Maeno, Tomoya TY Yamashita, Tsuyoshi TS Sugiura, Motoki MI Iwasaki; Japan

SP59 The incidence of pleural fluid and its associated risk factors following posterior corrective spinal fusion in patients with adolescent idiopathic scoliosis
Kazunori Hayashi, Hidetomi Terai, Hiromitsu Toyoda, Akinobu Suzuki, Masatoshi Hoshino, Shinji Takahashi, Koji Tamai, Shoichiro Ohyama, Hiroaki Nakamura; Japan

SP60 Pharmachometrics for changing behaviors induced by lumbar facetectomy and repeated cold stress in rats
Daisuke Fukui, Mamoru Kawakami; Japan
GENERAL POSTER SESSION

Thursday, June 1, 2017 at 15:00-16:00, drinks and snacks will be served

GP001  Gait analysis of lumbar spinal stenosis using a wireless inertial measurement unit
        Kengo Fujii, Naotaka Mamizuka, Yasuaki Ohtaki, Tetsuya Abe, Masashi Yamazaki; Japan

GP002  Lumbar spine shape as a biomarker of lumbar disc degeneration: a preliminary analysis
        Janet A Deane, Anastasia V Pavlova, Adrian K P Lim, Richard M Aspden, Alison H McGregor; United Kingdom

GP003  Superior cortical screw in lumbar spine: - a biomechanical and micro-structure based study - in osteoporotic human vertebrae
        Tianming Yu, Xuyang Zhang, Junhui Liu, Shengyun Li, Zhi Shan, Shunwu Fan, Fengdong Zhao; China

GP004  The mechanism of thoracolumbar burst fracture may be related to the basivertebral foramen
        Xuyang Zhang, Tianming Yu, Shengyun Li, Fengdong Zhao; China

GP005  The changes of sagittal spino-pelvic morphology in long-time loading Chinese persons compared with the non-loading
        Xuyang Zhang, Tianming Yu, Bao Huang, Maiwulanjiang Mamuti, Fengdong Zhao, Shunwu Fan; China

GP006  An increased change in the posterior pelvic inclination from the supine to standing position in elderly osteoarthritis of the hip is associated with the sagittal spino-pelvic alignment
        Tadatsugu Morimoto, Masatsugu Tsukamoto, Tomohito Yoshihara, Kasumasa Maeda; Japan

GP007  Kinematic and kinetic indices for lumbar spine stability in subjects with recurrent low back pain
        Paul Sung, Pamela Danial; United States

GP008  In vitro experiment analyzing the influence of the rib cage on human thoracic spine stability by stepwise reduction of the single structures
        Christian Liebsch, Nicolas Graf, Konrad Appelt, Hans-Joachim Wilke; Germany

GP009  The effect of compressive loading on the delamination strength of the annulus fibrosus
        Joshua Clayton, Diane Gregory; Canada

GP010  The effect of short duration low back vibration on pain developed during prolonged standing
        Diane Gregory, Analysa Cardenas, Renée Lurie, Stephanie Cimino, Stephen Brown; Canada

GP011  Resonance frequency analysis of pedicle screw stability: a cadaveric study with micro-CT
        Daisuke Nakashima, Takeo Nagura, Ken Ishii, Hiromasa Kawana, Masahiro Jinzaki, Morio Matsumoto, Masaya Nakamura; Japan

GP012  Postural influence on lumbosacral sagittal alignment - what is the “ideal” fusion alignment?
        Avinash G. Patwardhan, Saeed Khayatzadeh, Antonio Faundez, Robert M. Havey, Leonard I. Voronov, Alexander J. Ghanayem, Jean-Charles Le Huec; United States

GP013  Targeting the low back improves return to play in athletes with functional hamstring disorders
        Georgios Kakavas, Christopher J Colloca, Mostafa A Hegazy, Nikos Maliaropoulos; Greece

GP014  Tidemark avulsions are a highly prevalent form of endplate damage
        Jennifer Bailey, Britta Berg-Johansen, Ellen C Liebenberg, Aaron J Fields, Jeffrey C Lotz; United States

GP015  Machine learning for the analysis of medical images of the spine
        Fabio Galbusera, Tito Bossani, Maike Seyfried, Margarita Darminow, Meinrad Beer, Annette Kienle, Frank Niemeyer, Hans-Joachim Wilke; Italy
GP016  Biomechanical loads on the lumbar spine during simulated wheelchair pushing
Eric B. Weston, Safdar Khan, William S. Marras; United States

GP017  Biomechanical push-pull limits that protect the lumbar spine
William S. Marras, Eric B. Weston, Jonathon Dufour, Gregory G. Knapik, Safdar Khan, Ehud Mendel; United States

GP018  Thickness of the ligamentum flavum is associated with the total content of advanced glycation end products (AGEs) in lumbar spinal stenosis patients
Hirotaka Makino, Yoshiharu Kawaguchi, Mitsuru Saito, Shoji Seki, Taketoshi Yasuda, Kayo Suzuki, Yasuhiro Yahara, Kenta Watanabe, Yoshikuni Kida, Keishi Marumo, Tomoatsu Kimura; Japan

GP019  Measuring participation in chronic back pain patients - the 5-item pain disability index
Ashley B McKillop, Carroll L.J, Dick B.D., Batté M.C.; Canada

GP020  Altered intervertebral disc mechanics in vivo after 60D bed-rest
Daniel L Belavy, Ulf Gast, Darius Gerlach, Albert Gollhöfer, Markus Gruber, Timo Rantalainen, Jörn Rittweger, Jochen Zange, Dieter Felsenberg, Gabrielle Armbrecht; Australia

GP021  Postoperative change in sagittal spinopelvic alignment and low back pain after total hip arthroplasty
Kazuya Kishima, Keishi Maruo, Toshiya Tachibana, Fumihiro Arizumi, Kazuki Kusuyama, Shinichi Yoshiya; Japan

GP022  Radiographic factors and diagnostic indicator of the onset of lumbosacral foraminal stenosis
Yoshiro Shinozaki, Yoshiji Ogura, Yoshiomi Kobayashi, Yohei Takahashi, Jun Ogawa; Japan

GP023  The correlation between sagittal spinopelvic alignment and degree of lumbar degenerative spondylolisthesis.
Kazuyoshi Nakamichi, Nobuhiro Tanaka, Naosuke Kamei, Shinji Kotaka, Mitsuo Ochi, Nobuo Adachi; Japan

GP024  Validation of new technique for assessing the muscle activity of the psoas major using diffusion-weighted magnetic resonance imaging
Yu Okubo, Koji Kaneoka, Atsushi Imai, Kiyotaka Hasebe, Naoto Matsunaga, Paul Hodges; Japan

GP025  Biomechanical advantages of robot-assisted pedicle screw fixation in posterior lumbar interbody fusion compared to free-hand technique in a prospective randomized controlled trial - perspective for patient-specific finite element analysis
Ho-Joong Kim, Jin S. Yeom, Bong-Soon Chang, Choon-Ki Lee; South Korea

GP026  Co-activation of trunk muscles during hip extension movements
Kiyotaka Hasebe, Yu Okubo, Hiroshi Akuzawa, Atsushi Imai, Koji Kaneoka; Japan

GP027  Diastasis recti and trunk muscle function in women at one-year postpartum
Nicole F Hills, Ryan B Graham, Linda McLean; Canada

GP028  Spinal tissue loading created by different methods of spinal manipulative therapy (SMT) application
Martha Funabashi, François Nougarou, Martin Descarreaux, Narasimha Prasad, Gregory Kawchuk; Canada

GP029  Effect of lumbar disc fusion on adjacent segment disc deformation: an in-vivo patient analysis pre and post fusion surgery
Thomas D Cha, Kamran Z Khan, Yan Yu, Jing sheng, Tsung-Yuan Tsai, Kirkham B Wood, Guoan Li; United States

GP030  The role of L5-S1 intervertebral disc shape in the progression of a bilateral spondylolytic defect at L5 to spondylolisthesis: a biomechanical investigation using finite element analysis
Vivek Ramakrishna, Uphar Chamoli, Naomi Tafsinat, Ashish D Diwan; Australia
GP031  A computed tomography analysis of S2 alar-iliac and iliac screws: comparison using Hounsfield unit value along screw pathway
Masatsugu Tsukamoto, Yuichiro Abe, Masaki Terakawa, Yasushi Yanagibashi, Takahiko Hyakumachi, Shigenobu Satoh; Japan

GP032  Nucleus implant geometry significantly influences bending stiffness of the human lumbar motion segment: a finite element modelling study
Uphar Chamoli, Johannes Goldmann, Naomi Tsafnat, Ashish D Diwan; Australia

GP033  Cortical bone vs traditional trajectory pedicle screws: a combined compression and flexion biomechanical analysis
Chase Bennett, Tyler Johnston, Anthony Behn, Todd Alamin; United States

GP034  Differential patient responses to spinal manipulative therapy and their relation to spinal degeneration and post-treatment changes in disc diffusion
Arnold YL Wong, Eric C Parent, Sukhvinder S Dhillon, Narasimha Prasad, Dino Samartzis, Gregory N Kawchuk; Hong Kong

GP035  Can a lumbar interspinous stabilisation device provide adequate support to allow spinal fusion: a biomechanical test
Niall J A Craig, Werner Schmoelz, Ana Spicher; United Kingdom

GP036  Anatomical study of psoas major muscle on sagittal MRI
Masayoshi Iwamae, Teruo Kita, Kazushi Takayama, Hideki Sakana, Hiroaki Nakamura, Yoshihiko Yamano; Japan

GP037  Interspinous process implants causes wear of the spinous processes in patients treated for spinal stenosis - an experimental biomechanical study with comparison to clinical cases
Adad Baranto, Christian Hagelberg, Jonas Hvannberg, Lars Ekström, Klas Halldin, Helena Brisby, Sweden

GP038  Lumbar lordosis of spinal stenosis patients during intraoperative prone positioning
Seung-Hwan Lee, Su-Keon Lee, South Korea

GP039  Kinematic analysis of spino-pelvic-rhythm using a dynamic flat panel detector
Katsuhito Yoshioka, Hideki Murakami, Satoru Demura, Satoshi Kato, Noritaka Yonezawa, Naoki Takashashi, Takaki Shimizu, Hirokichi Tsuchiya; Japan

GP040  Paravertebral muscle volume in patients with lumbar degenerative scoliosis
Takashi Tamura, Yoshi Kawaguchi, Hiroto Makino, Taketoshi Yasuda, Shoji Seki, Kayo Suzuki, Yasuhiro Yahara, Kenta Watanabe, Tomoatsu Kimura; Japan

GP041  NFkB Decoy Oligodeoxyynucleotide Injected into normal rabbit intervertebral discs remains in the discs at least 4 weeks and restored puncture-induced degenerated rabbit intervertebral discs with long term analysis
Kenji Kato, Shingo Miyazaki, Mary E Lenz, Takahiro Nakazawa, Toshinori Yamamoto, Robert L Sah, Koichi Masuda; United States

GP042  Disc degeneration through axial loading on the lumbar spine: a rabbit model
Xuedong Bai, Dike Ruan, Deli Wang; China

GP043  Biological characteristics and potential of nucleus pulposus derived stem cells in human degenerative intervertebral disc with different Pfirrmann grade
Xiao-Chuan Li, Xuedong Bai, Yahong Wu, Ziming Guo, Wei Ji, Deli Wang, Dike Ruan; China
GP044  MR evaluation of the characteristics of the intervertebral disc in subjects after a single traumatic event: cervical spine.
Charlotte Van Langenhove, Thiebault Saveyn, Lennart Jans, Jan K Van Meirhaeghe, Koen Verstraete; Belgium

GP045  Scale up and in vivo evaluation of a disc-like angle ply structure (DAPS) for total disc replacement in a preclinical large animal model
Sarah E Guillbrand, Beth G Ashinsky, Dong Hwa Kim, John T Martin, Thomas P Schaer, Dawn M Elliott, Lachian J Smith, Robert L Mauck, Harvey E Smith; United States

GP046  Investigation of influence by different hydrogel features and growth hormone on the direction of human mesenchymal stem cells into the chondrogenic lineage
Axelia AH Hansson, Anna AW Wenger, Helena HBH Barreto Henriksson, Susan SL Li, Bengt BJ Johansson, Helena HB Brisby, Sweden

GP047  Role of semaphorin 3A in intervertebral disc degeneration
Yuichiro Y Mima, Nobuyuki N Fujita, Satoshi S Suzuki, Takeshi T Fujii, Kota K Watanabe, Ken K Ishii, Takashi T Tsuji, Takeshi T Miyamoto, Mario M Matsumoto, Masaya M Nakamura; Japan

GP048  Stimulation of mitogen-activated protein kinases by cyclic tensile stress in human annulus fibrosus cells induces the expression of pro-inflammatory genes
Harris Pratsinis, Adamantia Papadopoulou, Cornelia Neidlinger-Wilke, Marco Brayda-Bruno, Hans-Joachim Wilke, Dimitris Kletsas; Greece

GP049  A possible role of the terminal complement complex TCC in intervertebral disc degeneration
Cornelia Neidlinger-Wilke, Helga Joos, Taryn Saggese, Helena Brisby, Helena Barreto Henriksson, Michael Ruf, Thomas Barth, Uwe M Mauer, Anita Ignatius, Rolf Brenner; Germany

GP050  Identification of intracellular sources of reactive oxygen species in intervertebral discs under inflammatory condition
Yingchao Han, Gwendolyn Sowa, James Kang, Nam Vo; United States

GP051  The effect of capacitively coupled electrical stimulation on human intervertebral disc cells from discs of different degrees of degeneration
Zili Wang, Steven Presciutti, William Hutton, Tim Yoon; United States

GP052  Sound the ‘alarmin:’ disc degneration and toll-like receptors in mice and men
Emerson Krock, Magali Millecamps, Jean A Ouellet, Laura S Stone, Lisbet Haglund; Canada

GP053  The effect of the intervertebral disc environment on the specific phenotype of senescent nucleus pulposus cells
Anastasios Kouroumalis, Eleni Mavrogonatou, Harris Pratsinis, Olga D Savvidou, Panayiotis J Papagelopoulos, Dimitris Kletsas; Greece

GP054  Proteomic profile of herniated intervertebral lumbar disc
Rajasekaran Shanmuganathan, Chitraa tangavel, Siddharth Aiyer, Shraon Nayagam, Raveendran Muthurajan, Naveen Luke, Dharmalingam K; India

GP055  Comparative protein profiling of degenerative intervertebral disc and disc herniations using proteomics
Rajasekaran Shanmuganathan, Chitraa tangavel, Siddharth Aiyer, Shraon Nayagam, Raveendran Muthurajan, Naveen Luke, Dharmalingam K; India

GP056  Follistatin-like protein 1 has an anti-inflammatory effect on the notochordal nucleus pulposus cell line, U-CH1-N
Ryuichi Watanabe, Nobuyuki Fujita, Kota Watanabe, Ken Ishii, Takashi Tsuji, Keisuke Horiuchi, Takeshi Minamoto, Masaya Nakamura, Morio Matsumoto; Japan
GP057 Biological characteristics and potential of nucleus pulposus derived stem cells in human degenerative intervertebral disc with different Pfirrmann grade
Xiao-Chuan Li, Xuedong Bai, Yao-Hong Wu, Zi-Ming Guo, Jia-Hai Chen, Deli Wang, Dike Ruan; China

GP058 Stimulation of primary human osteoblasts and human stromal cells with the BMP antagonists gremlin and noggin
Rahel D May, Adel Tekari, Daniela A Frauchiger, Lorin M Benneker, Sandro Kohl, Benjamin Gantenbein; Switzerland

GP059 Three-dimensional characterization of the morphology changes in the intervertebral disc and endplate and their cross talk during aging: a propagation phase contrast synchrotron CT study
Hongbin Lu, Jianzhong Hu, Yong Cao; China

GP060 Ultrastructural analysis of annulus fibrosus elastic fibers using a rapid matrix digestion technique
Javad Tavakoli, John J Costi; Australia

GP061 Different types of senescence lead to a similar transcriptional regulation of catabolic and inflammatory genes in human intervertebral disc cells
Sotirios-Spyridon Vamvakas, Eleni Mavrogonatou, Dimitris Kletsas; Greece

GP062 Controlled release of celecoxib from polyesteramide microparticles in a canine pre-clinical intervertebral disc degeneration model
Anna Tellegen, Martijn Beukers, Imke Jansen, Guy CM Grinwis, Nina Woike, George Mihov, Björn P Meiij, Laura B Creemers, Marianna A Tryfonidou; Netherlands

GP063 The role of TGFβ/CCL3/4 in reversing IVDD and relieving pain
Zhaomin Zheng, Jian Zhang, Jianru Wang; China

GP064 Enhanced myofibroblast activity in human and rat disc degeneration
Yan Peng, Fengjuan Lv, Kenneth Cheung, Victor Leung; Hong Kong

GP065 Small molecule antagonist of C-C Chemokine Receptor 1 can reduce disc inflammation in the rabbit model
Po-Hsin Chou, Peng Shi, Cheng-Li Lin, Yibao Zhao, Li Zhang, Ana Chee, Howard S An; USA

GP066 High-resolution mri enables non-invasive size determination of hernia-like nodules formed after experimental disc puncture in the rat
Daniel Jonsson, Mikael Montelius, Kjell Olmarker, Sweden

GP067 Effect of disc dimensions on diffusion of solutes in healthy human intervertebral discs
Naresh-Babu J, Arun-Kumar Viswanadha, Aruna Priyadarshini, Neelima G; India

GP068 Effect of exogenous nitric oxide on proteoglycan metabolism of disc cells in vitro
Shigeru Kobayashi, Takahiro Asai, Adam Meir, Jill Urban, Japan

GP069 To study the efficacy of treatment algorithm in the management of postoperative discitis
Mandar D Borde, Shekhar Y Bhojraj, Premik B Nagad, Priyank Patel, Akshay Gadiya, Tanay Prabhoo; India

GP070 Half an hour’s effect of the jackknife stretch on the flexibility of the leg and trunk: a comparative study
Naoki Ishigaki, Takato Aihara; Japan

GP071 Postural change effects on T1 pelvic angle and other spino-pelvic alignment in adult spinal deformity are less than those in nondeformity: criterion-related validation study
Kazunori Hayashi, Hidetomi Terai, Shinji Takahashi, Masatoshi Hoshino, Hiromitsu Toyoda, Akinobu Suzuki, Koji Tamai, Shoichiro Ohyama, Yusuke Hori, Hiroaki Nakamura; Japan
General Poster Session

GP072 Relationship between fear of movement and health related quality of life in patients with chronic pain
Petteri P Koho, Hannu H Kautiainen, Heikki H Hurri; Finland

GP073 New global classification of radiological imaging for lesions of the lumbar spine. Development and feasibility
Josef J. Assheuer, Federico F. Balagué, Walter W Kaufmann, Ronald R Reisner, Farhad F Forutan; Germany

GP074 Predictive risk factors for stenosis in the thoracic and lumbar spines of patients with cervical myelopathy
Moon Soo Park, Ho Guen Chang, Tae-Hwan Kim, Jae Keun Oh, K. Daniel Riew; South Korea

GP075 Sagittal alignment based on end vertebrae according to different age groups
Moon Soo Park, Seong-Hwan Moon, Ho Guen Chang, Tae-Hwan Kim, Jae Keun Oh, Jae-Hyuk Shin; South Korea

GP076 Cervical spondylolisthesis combined with lumbar spondylolisthesis
Moon Soo Park, Seong-Hwan Moon, Ho Guen Chang, Tae-Hwan Kim, Jae Keun Oh, K. Daniel Riew; South Korea

GP077 Two-year follow-up of physical therapy versus surgical therapy for patients with lumbar spinal stenosis
Masakazu Minetama, Mamoru Kawakami, Yuzu Ishimoto, Keiji Nagata, Masatoshi Teraguchi, Tomoko Kitagawa, Tadashi Sumiya, Takahiro Miyake, Yoshio Yamamoto, Masafumi Nakagawa, Nana Sakon, Toshiko Matsuoka; Japan

GP078 Gender difference of dynamic postural steadiness during one leg standing in older adults with recurrent low back pain
Paul Sung, Pamela Danial; United States

GP079 Characteristics of patients with lumbar facet syndrome showing efficacy of lumbar flexion exercise
Kazuji Aoki, Toru Uehara, Shota Yamada, Atsushi Inada, Nobuharu Suzuki; Japan

GP080 Prospective study of characteristics of low back pain in adolescent patients with early-stage spondylolisthesis evaluated by questionnaire
Shiro Sugiura, Yasuchika Aoki, Oyama Takato, Takeshi Toyooka, Tetsuo Shiga, Tohru Ishizaki, Yasumi Kiguchi, Tetsuya Otsuki, Ayako Kote, Yasutaka Omori, Akito Takata, Yasushi Suwazono, Kazuhsita Takahashi, Seiji Ohtori, Satoru Nishikawa; Japan

GP081 Safety and efficacy of aggressive exercise therapy for patients with early-stage spondylolysis
Shiro Sugiura, Yasuchika Aoki, Oyama Takato, Takeshi Toyooka, Tetsuo Shiga, Tohru Ishizaki Ishizaki, Yasumi Kiguchi, Tetsuya Otsuki, Ayako Kote, Yasutaka Omori, Akito Takata Takata, Kazuhsita Takahashi, Seiji Ohtori, Satoru Nishikawa; Japan

GP082 Secular changes of lumbar canal dimensions in western switzerland: an MRI study
Constantin Schizas, Jean-Aybert Collinot, Patrick Omouni, Jean-Baptise Ledoux, Fabio Becce; Switzerland

GP083 Magnetic resonance imaging of anterior thoracolumbar vertebral endplate lesions in young gymnasts
Makoto Urushibara, Takato Aihara, Kenji Hatakeyama, Junarou Ohuchi; Japan

GP084 Lumbar degenerative kyphosis with conservative treatment: do clinical symptoms and radiological parameters progress?
Whoan Jeang Kim, Kun Young Park, Shann Haw Chang, Kyung Hoon Park, Jae Won Lee; South Korea

GP085 Prevalence and related clinical factors of thoracic ossification of the ligamentum flavum - A CT-based cross-sectional study
Sang-II Kim, Kee-Yong Ha, Young-Hoon Kim; South Korea
GP086 Recent trends in gender- and age-specific rates of vertebral fractures: a computed tomography-based study
Go Kubota, Yasuchika Aoki, Hiroyuki Fukuchi, Atsuya Watanabe, Takayuki Nakazima, Makoto Takazawa, Noriyuki Yanagawa, Kazuhisa Takahashi, Seiji Ohtori; Japan

GP087 Evaluation of prognostic factors and a modification to the modified Tokuhashi Score in patients with spinal metastases from breast cancer
Jonathan Tan, Kimberly Anne Tan, Lay Wai Khin, Aye Sandar Zaw, Dennis Hey, Naresh Kumar; Singapore

GP088 Functional assessment of lumbar nerve roots using direct coronal single-shot turbo spin-echo diffusion tensor imaging - Application to patients with bilateral spinal canal stenosis showing unilateral neurological symptom
Tokayuki Sakai, Yasuchika Aoki, Masami Yoneyama, Noriyuki Yanagawa; Japan

GP089 Detecting stress at the sacrum with bone single-photon emission computed tomography/computed tomography after instrumented lumbar fusion
Sang-Il Kim, Young-Hoon Kim, Kee-Yong Ha; South Korea

GP090 The influence of histologic subtype in predicting survival of lung cancer patients with spinal metastases
Kimberly Anne Tan, Jonathan Tan, Lay Wai Khin, Aye Sandar Zaw, Dennis Hey, Naresh Kumar; Singapore

GP091 Relation between residual low back pain and local/global spinal alignment in osteoporotic vertebral compression fracture
Akira Iwata, Masahiro Kanayama, Fumihiro Oha, Yukitoshi Shimamura, Tomoyuki Hashimoto, Norimasa Iwasaki; Japan

GP092 Factors influencing adherence to non-surgical treatment for individuals with lumbar spinal stenosis: a qualitative study
Allyn M Bove, Andrew D Lynch, Carlo Ammendolia, Michael J Schneider; United States

GP093 A validation study of 3D MRI sequences for the qualitative and quantitative assessment of lumbar spinal stenosis
Constantin Schizas, Gianluca Fetz, Yerly Jerome, Omoumi Patrick, Laudato Aniello, Jean-Baptiste Ledoux, Fabio Becce; Switzerland

GP094 Extra foraminal selective nerve root block - a novel technique for management of lumbar radiculopathy
Naresh-Babu J, Arun-Kumar Viswanadha, Aruna Priyadarsini, Neelima G, India

GP095 Trans-lateral recess versus paramedian interlaminar epidural injection for lumbar degenerative disc disease
Min-Seok Kang, Suk-Ha Lee, Tae-Hoon Kim; South Korea

GP096 Prevalence and characteristics of sacroiliac joint pain in high school baseball players
Kinshi Kato, Kenichi Otoshi, Shoji Yabuki, Koji Otani, Takuya Nikaido, Kazuyuki Watanabe, Hiroshi Kobayashi, Ryoji Tominaga, Takahiro Kaga, Takahiro Igari, Yoichi Kaneuchi, Ryohsei Sato, Ryosuke Mashiko, Shin-ichi Kikuchi, Shin-ichi Konno; Japan

GP097 Psychological stress response in relation to musculoskeletal pain in high school baseball players
Kinshi Kato, Kenichi Otoshi, Shoji Yabuki, Koji Otani, Takuya Nikaido, Kazuyuki Watanabe, Hiroshi Kobayashi, Ryoji Tominaga, Takahiro Kaga, Takahiro Igari, Yoichi Kaneuchi, Ryohsei Sato, Ryosuke Mashiko, Shin-ichi Kikuchi, Shin-ichi Konno; Japan
GP098 Characterizing the course of low back pain after osteoporotic vertebral fracture: a hierarchical cluster analysis of the prospective cohort study
Hiromitsu Toyoda, Shinji Takahashi, Masatoshi Hoshino, Kazushi Takayama, Ryuichi Sasaoka, Tadao Tsujio, Hiroyuki Yasuda, Fumiaki Kanematsu, Hiroshi Kono, Hiroaki Nakamura; Japan

GP099 Effect of exercise using an innovative device for the abdominal trunk muscles in patients with chronic low back pain
Satoshi Kato, Hideki Murakami, Satoru Demura, Katsuhito Yoshioka, Naoki Takahashi, Noritaka Yonezawa, Takaki Shimizu, Hiroyuki Tsuchiya; Japan

GP100 Metabolic syndrome affects accumulation of lumbar epidural fat
Shinichi Ishihara, Nobuyuki Fujita, Kouichirou Azuma, Osahiko Tsuji, Naruhiro Nagoshi, Mitsuru Yagi, Kota Watanabe, Takashi Tsuji, Ken Ishii, Masaya Nakamura, Morio Matsumoto; Japan

GP101 Who contributed the most to the spine surgery literature? Publication rates of the abstracts presented at the annual meetings of the North American Spine Society between 2009 and 2012
Murat S Eksi, Emel E Ozcan-Eksi; Turkey

GP102 Evaluation of lumbar paraspinal muscle atrophy in patients with sarcopenia
Nobuyuki Fujito, Koichiro Azuma, Shinichi Ishihara, Osahiko Tsuji, Naruhiro Nagoshi, Mitsuru Yagi, Kota Watanabe, Takashi Tsuji, Masaya Nakamura, Morio Matsumoto, Ken Ishii; Japan

GP103 Pre-treatment goal clarity: validity and association with rehabilitation outcomes for people disabled by chronic low back pain
Kelly R Esposito, Kevin F Spratt, Elizabeth S Ossen, Rowland G Hazard; United States

GP104 Core muscle weakness is the key risk factor of functional disability in patients with degenerative lumbar disease
Jae-Ho Yang, Su Bong Chae, Sang-Youn Lim, Kil-Hyeong Lee, Seung-Hwan Lee, Ho Kang, Jee-Hye Kim, Young-Mi Kang, Yong-Kwan Jeon, Seong-Hwan Moon, Hwan-Mo Lee; South Korea

GP105 Participation of orthopedists in hematopoietic malignancies
Yu Toda, Tadatsugu Morimoto, Tomohito Yoshihara, Kazumasa Maeda, Motoki Sonohata, Masaaki Mawatari; Japan

GP106 Clinical efficacy of percutaneous endoscopic lumbar annuloplasty and nucleoplasty for treatment of patients with discogenic low back pain
Jung Hwan Lee, Sang-Ho Lee; South Korea

GP107 Satisfaction scores and patient reported outcomes following spinal surgery and non-operative care
Greg McIntosh, Hamilton Hall, Tom Carter, Charles Fisher, Ken Thomas, Raja Rampersaud, Neil Manson; Canada

GP108 Diagnostic capability of “Spine paindetect” to screen for neuropathic pain caused by spinal disorders
Takuya Nikaido, Masahiko Sumitani, Miho Sekiguchi, Mika Kawaguchi, Shoji Yabuki, Shinichi Konno; Japan

GP109 Interplay among pain intensity, sleep disturbance and emotion in patients with non-specific low back pain
Zhoomin Zheng, hua wang, Jianru Wang, Hui Liu, Zemin Li; China

GP110 The traction spur is associated with intervertebral vacuum phenomenon and modic change
Kazuki Muranaka, tadatsugu morimoto, Masatsugu Tsukamoto, Tomohito Yoshihara, Kazumasa Maeda, Motoki Sonohata, Masaaki Mawatari; Japan

GP111 Predictive factors for low back pain development in healthcare students: a systematic review
Arnold YL Wong, Kelvin CK Lam, Jean-Maxime Coran; Hong Kong
GP112 The prevalence of spinopelvic misalignment in individuals with refractory low back pain and association with MRI findings
*Sibel Demir, Hemra Cil, Zachary McCormick, Sigurd Berven; United States*

GP113 Efficacy of ankle brachial index in determining peripheral arterial occlusive disease in patients with lumbar spinal stenosis
*Si Young Park, Seung Woo Suh, Jae Young Hong, Hyun Min Lee; South Korea*

GP114 Quality of life of patients with osteoporotic vertebral compression fractures
*Si Young Park, Ys Soo Park, Hyoung Yeon Seo, Jae Chul Lee, Ki Chan An, Byung Joon Shin, Tae Wook Kang, Ho Jin Jung; South Korea*

GP115 Structural vertebral endplate nomenclature and etiology: a study by the ISSLS Spinal Phenotype Focus Group
*Uruj Zehra, Cora Bow, Jeff Lotz, Frances MK Williams, Rajasekaran S Shanmuganathan, Jaro Karpinnen, Keith DK Luk, Michele Battè, Dino Samartzis; Hong Kong*

GP116 A study on the difference of clinical results between unilateral and bilateral lumbar spondyloysis in adolescent patients
*Kenji Hatakeyama, Takato Aihara, Makoto Urushibara, Atsushi Kojima; Japan*

GP117 How does the sexual function change after lumbar spinal fusion?
*Yukitoshi Shimamura, Masahiro Kanayama, Michiko Horio, Ai Yamaguchi, Atsunori Yuasa, Fumihiro Oha, Tsutomu Endo, Takamasa Watanabe, Hiroyuki Hara, Tomoyuki Hashimoto, Kazuo Kaneko; Japan*

GP118 Investigation on physical activity participation, attitude and preference of female patients 50 years and older with degenerative lumbar spinal disease
*Jae-Ho Yang, Su Bong Chae, Sang-Youn Lim, Kil-Hyeong Lee, Young-Mi Kang, Jee-Hye Kim, Yong-Kwan Jeon, Seong-Hwan Moon, Hwan-Mo Lee; South Korea*

GP119 Intradiscal application of a PCLA-PEG-PCLA hydrogel loaded with Celecoxib for the treatment of back pain: a translational approach
*Anna R Tellegen, Nicole Willems, Martijn Beukers, Guy CM Grinwis, Saskia GM Plomp, Mike De Leeuw, Maarten Van Dijk, Laura B Creemers, Marianna A Tryfonidou, Björn P Meij; Netherlands*

GP120 Is culture-negative spinal infection really one of the suppurative diseases?  
*Yusuke Miyashima, Teruo Kita, Kazushi Takayama, Masayoshi Iwamai, Akiti Yabu, Hideki Sakana, Yoshiaki Yamano, Hiroaki Nakamura; Japan*

GP121 The cost impact of a precise mechanical diagnosis for low back pain: a comparison with usual community care
*Ronald Donelson, Kevin Spratt, Richard Gray, Mark Miller, Steve McClellan, Boscoby Miranda, Michael Morgan, Eric Gatmaitan; United States*

GP122 Progression of lumbar paraspinal muscle atrophy following bilateral botulinum toxin injections in a rabbit model
*John M. Popovich, Jr., Joshua D. Hubert, Emma L. Klosterman, Anne Tonson, Ronald A. Meyer, Steven P. Arnoczky; United States*

GP123 The profile of low back pain patients who attend the emergency department and their reasons for doing so
*Gregory N Kawchuk, Kyria Slomp, Mallory McNiven, Michael E Kawchuk; Canada*

GP124 Human cartilaginous endplate discontinuities: flash MRI for potential clinical diagnostics
*Kyle D Meadows, Amy A Claeson, John F DeLuca, John M Pelquin, Edward J Vresilovic, Dawn M Elliott; United States*
GP125  The natural history of idiopathic scoliosis during growth: a meta-analysis  
Francesca Di Felice, Fabio Zaina, Sabrina Donzelli, Stefano Negrini; Italy

GP126  Peak scoliosis brace can reduce pain in adults with painful scoliosis: six months results from a prospective cohort pilot study  
Fabio Zaina, Martina Poggio, Sabrina Donzelli, Francesca Di Felice, Stefano Negrini; Italy

GP127  Scoliosis-specific exercises reduce bracing rate in adolescents with idiopathic scoliosis. End growth results of an everyday clinics prospective cohort controlled study  
Stefano Negrini, Sabrina Donzelli, Alessandra Negrini, Silvana Parzini, Michele Romano, Fabio Zaina; Italy

GP128  Vertebral endplate abnormalities are highly associated with thoracic disc herniations in symptomatic patients  
Dino Samartzis, Miguel Agoncillo, Jason PY Cheung, Cora HY Bow, Alex Gefter, Daniel Rosenthal, Keith DK Luk; Hong Kong

GP129  The prevalence of spinopelvic misalignment in individuals with degenerative disc disease and refractory low back pain  
Hemra Cil, Zachary McCormick, Sigurd Berven, Sibel Demir; United States

GP130  Inhibition of cyclooxygenase-2 pathway modulates collagen synthesis of cytokine-stimulated fibroblasts from ligamentum flavum  
Young-Mi Kang, Jee-Hye Kim, Jae-Ho Yang, Sang-You Lim, Kil-Hyeong Lee, Kang Ho, Hwan-Mo Lee, Seong-Hwan Moon; South Korea

GP131  Anatomical flow pattern of contrast in lumbar epidural space: a human study with a trans-lateral recess approach under fluoroscopy  
Min-Seok Kang, Suk-Ha Lee, Tae-Hoon Kim; South Korea

GP132  Expression of protein kinase c (pkc) isoforms in the intervertebral disc cells  
Young-Mi Kang, Jee-Hye Kim, Jae-Ho Yang, Sang-You Lim, Kil-Hyeong Lee, Kang Ho, Hwan-Mo Lee, Seong-Hwan Moon, South Korea

GP133  A survey of the attitude about osteoporosis among patients with osteoporotic vertebral fracture  
Norihiko Sumiyoshi, Takahiro Kubo, Toshiaki Maruyama, Toshiaki Tashima, Yoshitaka Hagiyama, Japan

GP134  Difference between rheumatoid arthritis patients with degenerative lumbar scoliosis and non-rheumatoid arthritis patients with degenerative lumbar scoliosis in segmental and non-wedging segment - matched cohort study  
Hiroyuki Yasuda, Akinobu Suzuki, Kentaro Yamada, Shinji Takahashi, Sho Dohzono, Hidetomi Terai, Masatoshi Hoshino, Hiromitsu Toyoda, Hiroaki Nakamura, Japan

GP135  Publication rates of abstracts presented at a scientific spine meeting: a retrospective analysis of four consecutive meetings between 2009 and 2012  
Ece E Ozcan-Eksi, Murat S Eksi, Turkey

GP136  Can preoperative administration of prochlorperazine maleate prevent postoperative nausea and vomiting after spinal surgery?  
Yushi Hoshino, Yoshifumi Kudo, Toshiyuki Shirahata, Tomoaki Toyone, Katunori Inagaki, Atushi Sato, Kazunari Tomita; Japan

GP137  Acute vertebral low compression fractures: an early surgical treatment by kyphoplasty allows quick full recovery  
Mayalen Lamerain, Jules Descamps, Perrine Jubert, Clémence Heyberger, Djamel Attouche, Marc-Antoine Rousseau, France

GP138  Over 3-year follow up study concerning the return-to-play after posterior lumbar interbody fusion for highly competitive (national or professional level) athletes  
Takato Aihara, Makoto Urushibara; Japan
Magnetic resonance imaging and computed tomography (CT) vs CT alone in the evaluation of cervical spine injury: a propensity matched analysis  
Andrew J Schoenfeld, Christopher M Bono, Mitchel B Harris, James D Kang; United States

Description and results of a comprehensive care protocol for overnight-stay lumbar spine surgery in adults  
Drew A Bednar; Canada

Comparison of clinical results and fusion rates in PLIF between plate system and rod system  
Takafumi Maeno, Shinya Okuda, Tomoya Yamashita, Tomiya Matsumoto, Tsuyoshi Sugiura, Motoki Iwasaki, Japan

Precepts obtained from our patients who underwent spine surgery during recent 15 years suggested prevention and control of hematoma following  
Katsuhiko Sato, Takumi Sekine, Japan

Spinal canal diameter in cauda equina syndrome patients is smaller than in the average herniated disc patient: an MRI study  
Nina S. Korse, Carmen L.A. Vleggeert-Lankamp; Netherlands

Effective repair of dural tear using bioabsorbable sheet with fibrin glue  
Akira Iwata, Masahiko Takahata, Katsuhisa Yamada, Terufumi Kokabu, Hideki Sudo, Ken Kadoya, Nokimasa Iwasaki; Japan

Assessment of pelvic obliquity in neuromuscular scoliosis using the Eos-chair® protocol  
Raphael Vialle, Jihane Rouissi, Robin Arvieu, Claudio Vergari, Manon Bachy, France

Ten-year follow-up of patients enrolled in the fda-regulated trial for single-level lumbar total disc replacement: One site’s experience  
Scott L. Blumenthal, Donna D. Ohnmeiss, Jack E. Zigler, USA

The outcome of pedicle screw instrumentation removal for ongoing low back pain following posterolateral lumbar fusion  
Mario Zotti, Orso Osti, Wai Weng Yoon, Thomas Fisher, Chris Tsimiklis, Benjamin McDonald, Oscar Brumby-Rendell; Australia

Administration of teriparatide after balloon kyphoplasty to treat osteoporotic vertebral fractures prevents subsequent vertebral fractures  
Atsushi Kojima, Makoto Urushibara, Kenji Hatakeyama; Japan

The long-term clinical efficacy of single segment lumbar 4-5 fusion and its effect on the lumbar-pelvic sagittal alignment parameter  
Ke Gong, Zhe Wang, Xueyu Hu, Zhuojing Luo; China

Treatment of chronic low back pain via ablation of the basivertebral nerve: results of the SMART trial  
Alfred Rhyne, Jeffrey Fischgrund, Rick Sasso, Hyun Bae, Christopher Yeung, Eric Truumees, Philip Yuan, Peter Vajkoczy, Michael DePalma, Bernard Meyer; United States

Slip reduction improves global sagittal balance and spinopelvic harmony in lumbar degenerative spondylolisthesis surgery  
Takahiro Tsutsumimoto, Mutsuki Yui, Ryo Munakata, Terue Hatakenaka, Hiroshi Ohta, Hiromichi Kosaku, Hiromichi Misawa; Japan

A retrospective analysis of sagittal alignment after vertebroplasty with posterior instrumentation for osteoporotic vertebral fractures presenting neurological deficits  
Itaru Oda, Hirohito Takeuchi, Shigeki Oshima, Masaru Suzuki, Katsuhisa Yamada, Masanori Fujiya; Japan
GP153  Vertebral artery loops in surgical perspective  
*Murat S Eksi, Zafer O Toktas, Baran Yilmaz, Mustafa K Demir, Ece E Ozcan-Eksi, Ahmed B Bayoumi, Akin Akakin, Deniz Konya; Turkey*

GP154  Temporary pedicle screw fixation for thoracolumbar burst fractures - comparative study with or without vertebroplasty -  
*Hiroyuki Aono, Keisuke Ishii, Hidekazu Tobimatsu, Yukitaka Nagamoto, Shota Takenaka, Masayuki Furuya, Chiaki Horii, Motoki Iwasaki; Japan*

GP155  The effect of correcting the initial OLIF in a two stage corrective fusion using OLIF method for adult spinal deformity.  
*Shugo SK Kuraishi, Jun JK Takahashi, Masayuki MS Shimizu, Ikegami Shota, Futatsugi FT Toshimasa, Uehara um Masashi, Hiroki HO Oba, Koseki KM Michihiko, Kato KH Hiroyuki; Japan*

GP156  Postoperative compensatory action of lower extremities in patient with adult spinal deformity (ASD): implication for the postoperative sagittal alignment  
*Myung-Hoon Shin; South Korea*

GP157  The value of bone SPECT/CT in diagnosis of pathology causing low back pain  
*Naoki Takahashi, Satoshi Kato, Hideki Murakami, Satoru Demura, Katsuhiro Yoshioka, Noritaka Yonezawa, Takaki Shimizu, Hidenori Matsubara, Hiroyuki Tsuchiya; Japan*

GP158  Percutaneous vertebroplasty for osteoporotic vertebral fracture associated with delayed neurologic deficit in thoracolumbar spine  
*Toshio Nakamae, Yoshinori Fujimoto, Kiyotaka Yamada, Takeshi Hiramatsu, Takashi Hashimoto, Osami Suzuki, Yuji Tsuchikawa; Japan*

GP159  Risk factors predicting cement loosening after percutaneous vertebroplasty for osteoporotic vertebral fracture with intravertebral cleft: a retrospective analysis  
*Toshio Nakamae, Yoshinori Fujimoto, Kiyotaka Yamada, Takeshi Hiramatsu, Takashi Hashimoto, Osami Suzuki, Yuji Tsuchikawa; Japan*

GP160  Clinical and radiographic analysis of unilateral versus bilateral instrumented one-level lateral lumbar interbody fusion  
*Masayoshi Fukushima, Tomohide Segawa, Yasushi Oshima, Yohei Yuzawa, Seizo Yamamoto, Hirohiko Inanami; Japan*

GP161  Evaluation of the Minimum Clinically Important Differences of the Zurich Claudication Questionnaire after Microendoscopic Laminectomy in Patients with Lumbar Canal Stenosis  
*Masayoshi Fukushima, Hiroyuki Oka, Yasushi Oshima, Yohei Yuzawa, Seizo Yamamoto, Hirohiko Inanami; Japan*

GP162  The correlation between spinal alignments with clinical outcome after lumbar decompression/fusion surgery in patients with lumbar spinal canal stenosis  
*Yoichiro Takata, Fumitake Tezuka, Kazuta Yamashita, Toshinori Sakai, Kosaku Higashino, Akihiro Nagamachi, Koichi Sairyo*

GP163  Targeting spine surgical care to patient need for optimized outcome with the solution-focused spine patient outcomes questionnaire - A solution-focused survey looking into patient outcome expectations in adult reconstructive surgical spine care  
*Drew Bednar, Constantina Nanos-Bednar; Canada*

GP164  The incidence and the risk factors of injury to the lateral femoral cutaneous nerve after posterior spine surgery  
*Hidekazu Tobimatsu, Hiroyuki Aono, Yukitaka Nagamoto, Masayuki Furuya, Masayuki Kuroda, Kenta Ariga, Toshiyuki Ohkouchi; Japan*
A prospective comparative study of clinical outcomes for lumbar spine surgery in elderly patients older than 80 years old evaluated with JOABPEQ and patient satisfaction

Hiroyuki Yasuda, Shumpei Hama, Sadahiko Konishi, Hiroaki Nakamura; Japan

Radiologic features and clinical outcomes of juxtafacet cyst associated with degenerative lumbar disease

Whoan Jeang Kim, Kun Young Park, Shann Haw Chang, Kyung Hoon Park, Jae Won Lee; South Korea

Decompression only or decompression with concomitant fusion in degenerative spondylolisthesis: a short- and long-term outcome

Dike Ruan, Qing He, Chao Zhang, Lisheng Hou, Chao Li, Xuedong Bai; China

Cause and rate of revision surgery for adult spinal deformity patients: a single center study

Daisuke Tagawa, Tomohiko Hasegawa, Yu Yamato, Sho Kobayashi, Go Yoshida, Tatsuya Yasuda, Shin Oe, Tomohiro Banno, Yuki Mihara, Yukihiro Matsuyama; Japan

Are pedicle screw perforation rates influenced by the distance from the reference frame in multi-level registration using CT-based navigation system in the setting of scoliosis?

Masashi Uehara, Jun Takahashi, Shota Ikegami, Shugo Kuraishi, Masayuki Shimizu, Toshimasa Futatsugi, Hiroki Oba, Hiroyuki Kato; Japan

Metastatic spine tumour surgery: does perioperative blood transfusion influence postoperative complications?

Naresh Kumar, Aye Zaw, Dhiraj Sonawane, Karthikeyan Maharajan, Hwee Weng Dennis Hey, Aravind Kumar; Singapore

Perioperative blood transfusion: does it influence survival and cancer progression in metastatic spine tumor surgery?

Aye Sandar Zaw, Karthikeyan Maharajan, Dhiraj Sonawane, Gabriel Liu, Hee Kit Wong, Naresh Kumar; Singapore

“Annulonucleoplasty-discfx” a radio frequency treatment modality for treatment of axial low back pain - 2 years outcome

Naresh Kumar, Nishant Kumar, Aye Sandar Zaw, Jonathan Tan, Hwee Weng Dennis Hey, Aravind Kumar; Singapore

Surgical Aggressiveness Index (SAI) for Metastatic Spinal Disease (MSD)

Naresh Kumar, Barry Wee Lung Tan, Lay Wai Khin, Aye Sandar Zaw, Dhiraj Sonawane, Aravind Kumar; Singapore

Effect of preoperative hemoglobin A1c on surgical site infection after posterior lumbar spinal instrumentation surgery in diabetes patients

Hiroyuki Hara, Masahiro Kanayama, Fumihiro Oha, Yukitoshi Shimamura, Tsutomu Endo, Takamasa Watanabe, Tomoyuki Hashimoto, Kazuo Kaneko; Japan

Validity and reliability of a lower extremity lateral Scanogram as alternative method of EOS™ imaging system in the assessment of global sagittal balance

Chang-Hoon Jeon, Nam-Su Chung, Han-Dong Lee, Jung-Hyun Seo, Hee-Sung Kim, Ji-Sung Kim; South Korea

Sacral fractures following instrumented lumbar fusion

Sang-Il Kim, Young-Hoon Kim, Kee-Yong Ha; South Korea

Clinical efficacy of short level bony fusion with long segment instrumentation for unstable thoracolumbar burst fracture ; A comparative study between implant removal and retention

Chang-Hoon Jeon, Nam-Su Chung, Han-Dong Lee, Jung-Hyun Seo, Ji-Sung Kim, Hee-Sung Kim; South Korea
GP178  Is the intradiscal vacuum phenomenon at the adjacent segment of fusion clinically important for the adjacent segment pathology? A comparative study with disc degeneration using minimum 5-yr follow-up MRI
Chang-Hoon Jeon, Nam-Su Chung, Han-Dong Lee, Jung-Hyun Seo, Hee-Sung Kim, Ji-Sung Kim; South Korea

GP179  Does the preoperative diagnosis of degenerative lumbar disease determine the characteristics of clinical adjacent segment pathology?
Chang-Hoon Jeon, Nam-Su Chung, Han-Dong Lee, Jung-Hyun Seo, Ji-Sung Kim, Hee-Sung Kim; South Korea

GP180  Risk factors for skipped adjacent segment pathology after short instrumented lumbar fusion - does pre-existing disc degeneration matter in accelerating adjacent segment pathology?
Sang-II Kim, Young-Hoon Kim, Hyung-Youl Park, Kee-Yong Ha; South Korea

GP181  Learning curve for residents placing pedicle screws with O-arm navigation
Takashi Hozumi, Toshiaki Kotani, Tsutomu Akazawa, Tuyoshi Sakuma, Keita Nakayama, Shunji Kishida, Yu Sasaki, Keisuke Ueno, Sho Hiramatsu, Shohei Minami; Japan

GP182  The prospective cohort study for the predicting factor of symptomatic spinal metastasis
Kenichiro Kakutani, Yoshitada Sakai, Koichiro Maeno, Takashi Yurube, Toru Takada, Yoshi Terashima, Masaki Ito, Yuji Kakiuchi, Yoshiki Takeoka, Toshihiro Akisue, Tetsuhiro Iguchi, Ryosuke Kuroda, Kotaro Nishida; Japan

GP183  Comparison of complications of spinal surgery in elderly patients performed at a teaching hospital and an affiliated hospital
Fumihiro Arizumi, Keishi Maruo, Toshiya Tachibana, Kazuki Kusuyama, Kazuya Kishima, Shinnichi Yoshiya; Japan

GP184  Quality measures in spine surgery
Chase Bennett, Grace Xiong, Serena Hu, Kirkham Wood, Robin Kamal; United States

GP185  Improvement of sagittal balance after minimally invasive lateral lumbar interbody fusion favorably affects the risk of fall related functional mobility tests and quality of life in patients with lumbar spinal stenosis
Byung Ho Lee, Hak-Sun Kim, Kyung-Soo Suk, Hwan-Mo Lee, Seong-Hwan Moon, Jae-Ho Yang; South Korea

GP186  Selective thoracic fusion treated by rod derotation and direct vertebral rotation in the treatment of thoracic adolescent idiopathic scoliosis
Dong-Gune Chang, Jae Hyuk Yang, Seung-Woo Suh, Jin-Hyok Kim, Seung-Joo Lee, Se-Il Suk, Kee-Yong Ha; South Korea

GP187  Factors affecting segmental lordosis of lumbar spine after XLIF
Yoshitaka Suzuki, Koji Sato, Yoshihiro Ando, Junichi Ukai, Masahiro Yoshida, Shigeharu Iwano, Hiroaki Iwase, Keisuke Tomita, Masatoshi Haruta, Ryota Futatsugi, Itaru Kawashima, Yoichi Sato; Japan

GP188  Determination of distal fusion level in major thoracolumbar and lumbar adolescent idiopathic scoliosis treated by rod derotation and direct vertebral rotation
Dong-Gune Chang, Jae Hyuk Yang, Jun-Seok Lee, Jin-Hyok Kim, Se-Il Suk, Seung-Woo Suh, Kee-Yong Ha; South Korea

GP189  Distal adding-on and risk factors in severe and rigid scoliosis
Yong Hai; China
GP190  The reoperation of coflex interspinous dynamic stabilization in the treatment of degenerative disease of the lumbar spine
  Yong Hai; China

GP191  Analysis on characteristics of spinal surgical emergency excluding trauma cases
  Hiroaki Iwase, Yoshitaka Suzuki, Koji Sato, Toshihiro Ando, Junichi Ukai, Masahiro Yoshida, Shigeharu Iwano, Keisuke Tomita, Masatoshi Haruta, Ryota Futatsugi, Itaru Kawashima, Yoichi Sato; Japan

GP192  Risk factors for rod fracture after posterior correction surgery in adult spinal deformity: multivariable logistic regression analysis
  Hironari Fukuda, Tatsuya Endo, Jun-ichi Omata, Jun Komatsu, Masumi Iwabuchi, Osamu Shirado; Japan

GP193  Clinical outcome of the corrective posterior long fusion surgery for patients with multiple vertebral-body fractures in very severe osteoporosis: a minimum two-year followup study
  Kotaro Nishida, Toru Takada, Takashi Yurube, Koichiro Maeno, Yoshiuki Terashima, Masaaki Itoh, Yuji Kakiuchi, Yoshiki Takeoka, Tetsuhiro Iguchi, Ryosuke Kuroda; Japan

GP194  An attempt of intraoperative povidone-iodine irrigation in spinal surgeries for the prevention of surgical site infection
  Yuki Onishi, Kazuhiro Masuda, Tatsuro karita, Taiji Kondo; Japan

GP195  Relationship between spinopelvic alignment and HRQOL score after osteoporotic thoracolumbar vertebral fractures
  Keishi Maruo, Toshiya Tachibana, Fumihiro Arizumi, kazuya kishima, Shinichi Yoshiya; Japan

GP196  Radiographic indices for lumbar developmental spinal stenosis
  Jason Pui Yin Cheung, Karen Ka Man Ng, Prudence Wing Hang Cheung, Dino Samartzis, Kenneth MC Cheung; Hong Kong

GP197  Relation between achievement of kyphosis correction and clinical outcomes in elderly spinal deformity
  Masahiro Kanayama, Tomoyuki Hashimoto, Fumihiro Oha, Yukitoshi Shimamura, Tsutomu Endo, Takamasa Watanabe, Hiroyuki Hara; Japan

GP198  Creating a developmental spinal stenosis rat model and utility of somatosensory evoked potential for testing
  Jason Pui Yin Cheung, Prudence Wing Hang Cheung, Yong Hu; Hong Kong

GP199  What has occurred in posterior dynamic stabilization system more than 10 years after the surgery? a biomechanical and histological study with the retrieved implants
  Osamu Shirado, Masumi Iwabuchi, Jun Komatsu, Hironari Fukuda, Mutsumi Shimazaki, Japan

GP200  Cost analysis of single level lumbar fusions
  Daniel Beckerman, Melissa Esparza, Sigurd Berven, Sun Ik Lee, Shane Burch, Vedat Deviren, Bobby Tay; United States

GP201  Do peek materials can be a risk factor of nonunion? ; Frequency of occurrence survey of vertebral endplate cyst and subsidence of the cage at the time of 1 year after PLIF.
  Masaki Terakawa, Yuichiro Abe, Masatsugu Tsukamoto, Yasushi Yanagibashi, Takahiko Hyakumachi, Shigenobu Satoh; Japan

GP202  ER stress aggravates the hypertrophy of the ligamentum flavum
  Masatoshi Morimoto, Fumitake Tezuka, Fumio Hayashi, FumioKazuta Yamashita, Ryosuke Sato, Yoichiro Takata, Toshinori Sakai, Kosaku Higashino, Akihiro Nagamachi, Masato Miyake, Seiichi Oyadomari, Koichi Sairyo; Japan
GP203  Risk factors of radiological adjacent disc degeneration with lumbar interbody fusion for degenerative spondylolisthesis  
Takahashi Tsuji, Naoyuki Shizu, Daiki Ikeda, Yusuke Oka, Hurumoto Yamada; Japan

GP204  Comparative study of the efficacy of transdermal buprenorphine patches and prolonged-release tramadol tablets for postoperative pain control after spinal fusion surgery: a prospective, randomized controlled non-inferiority trial  
Ho-joong Kim, Jin S. Yeom, Bong-soon Chang, Choon-Ki Lee; South Korea

GP205  Surgical treatments for 32 pyogenic spondylodiscitis patients: delayed surgery, revision surgery and 24 months follow-up  
Chongyan Wang, Mohd Mashfiqul Arafin Siddiqui; Singapore

GP206  The influence of the intervertebral disc height and intervertebral disc height index in the single segmental lumbar fusion on the spine-pelvic parameters and clinical outcomes  
Ke Gong, Zuoqing Luo, Xueyu Hu, Zhe Wang, Peipei Huang; China

GP207  Clinical outcome of 69 symptomatic thoracic disc herniations treated surgically through minimally invasive lateral transthoracic trans/retropleural approach: a 10-year Experience  
Ismail Oltulu, Grigoriy Arutyunyan, Hemra Cil, Vedat Deviren; United States

GP208  PLIF/TLIF for neurological disturbance with lumbar vertebral fracture - problem with the use of implant for the fracture vertebra  
Takamasa Watanabe, Masahiro Kanayama, Tsutomu Endo, Fumihiro Oha, Yukitoshi Shimamura, Hiroyuki Hara, Tomoyuki Hashimoto, Norimasa Iwasaki; Japan

GP209  Surgical decompression for foraminal and extraforaminal lumbar disc herniation using the far-lateral approach: patient-rated outcome depends on the involved segment  
Daniel Haschtmann, Anne F Mannion, Markus Loibl, Francois Porchet, Frank Kleinstück, Dezso Jeszenszky, Tamas Fekete; Switzerland

GP210  Surgery for refractory coccygodynia: operative versus non-operative treatment  
Kirkham Wood, Todd Alamin, Greger Lonne, Tyler Herzog, Kevin Ju, Lisa Beyer, Christine Park; United States

GP211  Complications around cortical bone trajectory screw system associated with PLIF operation  
Tetsuo Dr. Ohwada; Japan

GP212  Anterior lumbar interbody fusion for degenerative lumbar spondylosis  
Kirkham Wood, Todd Alamin, Thomas Cha, Vijay Yanamadala; United States

GP213  Potential of porous hydroxyapatite/collagen (HAp/Col) composite as a graft material for PLIF/TLIF  
Tsutomu Endo, Masashi Kanayama, Fumihiro Oha, Yukitoshi Shimamura, Takamasa Watanabe, Hiroyuki Hara, Tomoyuki Hashimoto, Norimasa Iwasaki; Japan

GP214  Morphometric analysis of the retroperitoneal vessels with respect to lateral access surgery in adult scoliosis  
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GP215  Surgical treatment of superior and/or middle cluneal nerve entrapment  
Tomoyuki Konno, Yoichi Aota, Takuya Kawai, Tomoyuki Saito; Japan

GP216  Surgical management of thoracic disc herniation: anterior vs posterior approach  
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GP217  Lifelong antibiotic suppression for infected instrumented spines - Fact or myth?  
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GP218 Evaluation of the revision spine surgeries performed by endoscopic procedures
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GP219 Surgical outcomes of full-endoscopic lumbar foraminotomy for degenerative lumbar scoliosis
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GP220 Factor analysis of the SRS-22 questionnaire in patients with adult spinal deformity
Achim Elfering, Anne F Mannion, Joan Bago, Ferran Pellise, Alba Vila-Casademunt, Sarah Wunderlin, Montse Domingo-Sàbat, Ibrahim Obeid, Emre Acaroglu, Ahmet Alanay, Francisco S Pérez-Grueso, Frank S Kleinstück, ESSG Group; Switzerland

GP221 Discectomy with and without bone-anchored annular closure for high-risk disc herniation patients: complete early readmission and delayed discharge analysis from a multicenter, prospective, randomized study
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GP222 Clinical Outcomes of the Posterior Spinal Shortening for Delayed Paralysis after Osteoporotic Vertebral Fracture
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GP223 Combining titanium screws with stainless steel rods for adult spinal deformity does not result in increased implant related complications
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GP224 Clinical outcome of two-level lumbar total disc replacement: an analysis of 141 patients with minimum 24-month follow-up
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GP225 Can MIS-TLIF be performed with standard implants and instrumentation? - Paraspinal approach revisited.
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GP226 Does smoking impact on outcomes for post-operative back pain patients completing rehabilitation?
Greg McIntosh, Chris Gregg, Hamilton Hall, Tom Carter, Chris Hoffman; Canada

GP227 Accuracy of models for predicting patient centered outcomes after surgical and non-operative treatment for low back pain conditions
Tor Tosteson, Zhao W, Scherer EA, Lurie J, Mycek K, Peter D, Pearson L, Spratt K, Weinstein JN; United States

GP228 Pathomechanisms of sciatica induced by straight leg raising (SLR) test in lumbar disc herniation . Changes of intraradicular oxygen saturation and electrophysiological values
Shigeru Kobayashi, Yuichi Hashishin, Hisanori Matsuoka, Katsuhiko Hayakawa, Adam Meir, Japan
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