<table>
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<tr>
<th>Time</th>
<th>Monday, May 29</th>
<th>Tuesday, May 30</th>
<th>Wednesday, May 31</th>
<th>Thursday, June 1</th>
<th>Friday, June 2</th>
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<tr>
<td>07:00-08:00</td>
<td>Program Committee Meeting</td>
<td>07:00-07:45 Breakfast</td>
<td>07:00-07:45 Breakfast</td>
<td>07:00-07:30 Breakfast</td>
<td>07:00-07:45 Breakfast</td>
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<tr>
<td>08:00-09:00</td>
<td>Membership Committee Meeting</td>
<td>07:45 Welcome by Local Hosts &amp; Program Chair</td>
<td>07:45-08:45 Special Poster Session I</td>
<td>07:30-09:30 Scientific</td>
<td>07:45-08:45 Special Poster Session II</td>
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<tr>
<td>08:00-12:00</td>
<td>Focus Groups</td>
<td>08:00-10:00 Scientific</td>
<td>09:00-10:00 Scientific</td>
<td>09:00-10:00 COFFEE</td>
<td>09:00-09:30</td>
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<tr>
<td>9:30-11:30</td>
<td>Strategy Group Meeting</td>
<td>10:00-10:30 COFFEE</td>
<td>10:00-11:00 Scientific</td>
<td>10:30-11:00 COFFEE</td>
<td>09:30-10:00 Scientific</td>
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<tr>
<td>12:00-15:00</td>
<td>ExCom Meeting</td>
<td>10:30-11:30 Scientific</td>
<td>11:00-11:40 Presidential Address</td>
<td>11:00-11:40 Invited Lecture (Prof. Askitopoulou)</td>
<td>10:20-11:30 Scientific</td>
</tr>
<tr>
<td>13:00-16:00</td>
<td>Focus Group</td>
<td>11:30-12:00 Invited Lecture (Prof. Moussas)</td>
<td>11:40-12:20 Harry Farfan Presidential Lecture (Prof. Korres)</td>
<td>11:30-12:00 Invited Lecture (Prof. Askitopoulou)</td>
<td>10:20-11:50 Scientific</td>
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<td>15:00-onward</td>
<td>Registration Opens</td>
<td>12:00-13:30 LUNCH</td>
<td>13:00 Afternoon Outing</td>
<td>12:00-13:30 LUNCH</td>
<td>11:50-12:10 Announcement – Best paper and poster awards/</td>
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<td>18:00-20:00</td>
<td>Welcome Reception</td>
<td>15:20-15:50 COFFEE</td>
<td>15:20-15:50 COFFEE</td>
<td>15:00-16:00 General Poster Session</td>
<td>15:00-16:00 General Poster Session</td>
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<td>15:50-16:30 Scientific</td>
<td>16:00-17:30 Scientific</td>
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<td>16:30-17:30 Symposium #1</td>
<td>17:35 Second Business Meeting</td>
<td>17:35 Second Business Meeting</td>
<td>17:35 Second Business Meeting</td>
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<td>17:30-18:10 First Business Meeting</td>
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<td>19:00 Dinner Banquet</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:**

**Option1:** 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](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 Battié 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 Takada, 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
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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>09:14-09:19</td>
<td>9</td>
<td>Temporal evolution of early degenerative changes in stressed lumbar intervertebral discs</td>
<td>Aseem Sharma, Kiran Sargar, Amber Salter; United States</td>
<td>United States</td>
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<tr>
<td>09:21-09:30</td>
<td></td>
<td>Discussion</td>
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<td>09:30-09:35</td>
<td>10</td>
<td>Anabolic response of the intervertebral disc to exercise in humans</td>
<td>Daniel Belavy, Matthew Quittner, Nicola Ridgers, David Connell, Adnan Sheikh, Guy Trudel, Timo Rantalainen; Australia</td>
<td>Australia</td>
</tr>
<tr>
<td>09:37-09:42</td>
<td>11</td>
<td>Potential involvement of unfolded protein response in the pathogenesis of intervertebral disc degeneration</td>
<td>Takeshi Fujii, Nobuyuki Fujita, Satoshi Suzuki, Kota Watanabe, Ken Ishii, Takashi Tsuji, Keisuke Horiuchi, Morio Matsumoto, Masaya Nakamura; Japan</td>
<td>Japan</td>
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<tr>
<td>09:44-09:49</td>
<td>12</td>
<td>Involvement of autophagy in intervertebral disc degeneration and its possible contribution to the maintenance of notochordal cell homeostasis</td>
<td>Takeshi Yurube, Hiroaki Hirata, Masaaki Ito, Yoshiki Terashima, Yuji Kakuuchi, Yoshiki Takeoka, Shingo Miyazaki, Kenichiro Kakutani, Koichiro Maeno, Toru Takada, Ryosuke Kuroda, Kotaro Nishida; Japan</td>
<td>Japan</td>
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<td>09:51-10:00</td>
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<td>Discussion</td>
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<td>10:00-10:30</td>
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<td>COFFEE</td>
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**SESSION #3 DISC REGENERATION**

*Moderators: James Iatridis and Kotaro Nishida*

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<tr>
<td>10:37-10:42</td>
<td>14</td>
<td>Combined biomaterials approach to repair the intervertebral disc</td>
<td>Daniela A Frauchiger, Silvan Heeb, Lorin M Benneker, Michael Wölkte, Benjamin Gantenbein; Switzerland</td>
<td>Switzerland</td>
</tr>
<tr>
<td>10:44-10:49</td>
<td>15</td>
<td>Generation intervertebral disc-like cells from peripheral blood cells</td>
<td>Tie Liu, Yueying Li, Yong Hai; China</td>
<td>China</td>
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<td>10:51-11:00</td>
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<td>Discussion</td>
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<td>11:00-11:05</td>
<td>16</td>
<td>Transformation of the nucleus pulposus into connective tissue - a method for biologic fusion of a spinal segment?</td>
<td>Kjell Olmarker, Anders Lehmann, Sweden</td>
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<tr>
<td>11:07-11:12</td>
<td>17</td>
<td>Cell carrier and disc degenerative state influence intervertebral disc response to stem cell treatment</td>
<td>Marianna Peroglio, Luzia Simone Douma, Tansinee Stephanie Caprez, Milena Janki, Lorin Michael Benneker, Mauro Alini, Sibylle Grad; Switzerland</td>
<td>Switzerland</td>
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<tr>
<td>11:14-11:19</td>
<td>18</td>
<td>Human bone mesenchymal stem cells protect or activate nucleus pulposus cells by co-culture under hypoxia environment</td>
<td>Dike Ruan, Wei Ji, deli wang, Xiao-Chuan Li; China</td>
<td>China</td>
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<tr>
<td>11:21-11:30</td>
<td></td>
<td>Discussion</td>
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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

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 Pasinetti, 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 Watanebe; 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*
16:11-16:16  33  Human senescent disc cells exhibit metabolic shift and imbalanced matrix homeostasis  
*Prashanti Patil, Gwendolyn Sowa, Nam Vo; United States*

16:18-16:30  Discussion

**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 F 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
Marinko 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 Karrpinnen,
   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
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 Batié, Iain McCall, Genodisc Consortium; United Kingdom_

11:00-11:10  Discussion
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 interbody 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 Porchet, 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 Fujiwara, 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, Yuukihiro Matsuyama; Japan

14:51-15:00 Discussion

GENERAL POSTER SESSION
15:00-16:00 Refreshments will be served

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
Yosuchika YA 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 Battié 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
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Authors/Location</th>
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<tbody>
<tr>
<td>10:27-10:32</td>
<td>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</td>
<td>Junseok Bae, Alexander A Theologis, Bobby Tay, Shane Burch, Sigurd Berven, Praveen Mummaneni, Dean Chou, Christopher Ames, Vedat Deviren; South Korea</td>
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<tr>
<td>10:34-10:39</td>
<td>The adult deformity surgery complexity index (ADSCI): a valid tool to quantify the complexity of posterior adult spinal deformity surgery and predict postoperative complications</td>
<td>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</td>
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<td>10:41-10:50</td>
<td>Discussion</td>
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<td>10:50-10:55</td>
<td>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</td>
<td>Caglar Yilgor, Nuray Sogunmez, Louis Boissiere, Yasemin Yavuz, Ibrahim Obeid, Frank Kleinstueck, Francisco J. Sanchez Perez-Grueso, Emre Acaroglu, Ferran Pellise, Anne F Mannion, Ahmet Alanay, European Spine Study Group ESSG; Turkey</td>
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<td>10:57-11:02</td>
<td>Lumbar spine alignment in 6 common postures - A ROM analysis with implications for deformity correction</td>
<td>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</td>
</tr>
<tr>
<td>11:04-11:09</td>
<td>Targeted therapy of low back pain in elderly de novo degenerative lumbar scoliosis</td>
<td>Kiyotaka Yamada, Yoshinori Fujimoto, Toshio Nakamae, Takeshi Hiramatsu, Takashi Hashimoto, Osami Suzuki, Yuji Tsuchikawa; Japan</td>
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<td>11:11-11:20</td>
<td>Discussion</td>
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**SESSION #16 MINIMUM INVASIVE SURGERY**

*Moderators: Constantin Schizas and Hans Jörg Meisel*

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<th>Authors/Location</th>
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<tr>
<td>11:20-11:25</td>
<td>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</td>
<td>Kazunori Hayashi, Hiromitsu Toyoda, Hidetomi Terai, Masatoshi Hoshino, Akinobu Suzuki, Shinji Takahashi, Koji Tamai, Shoichiro Ohyama, Yusuke Horii, Hiroaki Nakamura; Japan</td>
</tr>
<tr>
<td>11:27-11:32</td>
<td>Interspinous dynamic stabilization adjacent to fusion versus double-segment fusion for degenerative lumbar diseases: minimum three years follow-up</td>
<td>Yong Hai, Xiaolong Chen; China</td>
</tr>
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18
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

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 Galbusera, 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
Marinka 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 Vadalá

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*

**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, Saikrishna 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 Nikaido, 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 Nikaido, 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 Miyavuchi, 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, Tomoihiro 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 Yi, 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 paraspinous extensor muscle conditions with severity of degenerative flat back and its improvement after corrective fusion surgery  
*Jung Hwan Lee, Sang-Ho Lee; South Korea*

**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  
*Akihtio Minamide, Munehito Yoshida, Hiroki Iwahashi, Andrew K Simpson, Hiroshi Yamada, Hiroshi Hashizume, Yukihiro Nakagawa, Hiroshi Iwasaki, Shunji Tsutsui, Ryoei 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 Fujiwara, Bunichiro Bl 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 Shirado; 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-series 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 INFECTIO
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 verses a 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, Song-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 osteoarthritics of the hip is associated with the sagittal spino-pelvic alignment
  Tadatsugu Morimoto, Masatsugu Tsukamoto, Tomohito Yoshihara, Kasunama Maeda; Japan

GP007  Kinematic and kinetic indices for lumbar spine stability in subjects with recurrent low back pain
  Paul Sung, Pamela Daniel; 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, Analyssa 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 Malliaropoulos; 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 Bassani, Maikel 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, Yasuhito 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., Battie M.C.; Canada

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

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

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

GP023  The correlation between sagittal spinopelvic alignment and degree of lumbar degenerative spondylolisthesis.  
Kazuyoshi Nakano, 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 Tsafnat, 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 Sakakura, Hiroaki Nakamura, Yoshiki 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 Takahashi, Takaki Shimizu, Hiroyuki Tsuchiya, Japan

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

GP041  NFkB Decoy Oligodeoxynucleotide 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 Guilbrand, 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, Gweldolyn 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
General Poster Session

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 Meij, 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 Priyadarzini, 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 Bhorej, 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
| 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, Yuyu 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 Daniel; 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 Sugiuira, Yasuchika Aoki, Oyama Takato, Takeshi Toyooka, Tetsuo Shiga, Tohru Ishizaki, Yasumi Kiguchi, Tetsuya Otsuki, Ayako Kote, Yasutaka Omori, Akito Takata, Yasushi Suwazono, Kazuhsa Takahashi, Seiji Ohtori, Satoru Nishikawa; Japan* |
| GP081 | Safety and efficacy of aggressive exercise therapy for patients with early-stage spondylolysis  
*Shiro Sugiuira, Yasuchika Aoki, Oyama Takato, Takeshi Toyooka, Tetsuo Shiga, Tohru Ishizaki Ishizaki, Yasumi Kiguchi, Tetsuya Otsuki, Ayako Kote, Yasutaka Omori, Akito Takata Takata, Kazuhsa 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 Omoumi, Jean-Baptiste Ledoux, Fabio Becce; Switzerland* |
| GP083 | Magnetic resonance imaging of anterior thoracolumbar vertebral endplate lesions in young gymnasts  
*Makoto Urushibara, Takato Aiha, Kenji Hatakeyama, Juntao 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* |
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, Kazuhsa Takahashi, Seiji Ohtori; Japan

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

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
Takayuki Sakai, Yasuchika Aoki, Masami Yoneyama, Noriyuki Yanagawa; Japan

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

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

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

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

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

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

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

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

Psychological stress response in relation to musculoskeletal pain in high school baseball players
Kinshi Kato, Kenichi Otoshi, Shoji Yabuki, Koji Otani, Takuya Nikaaido, Kazuyuki Watanabe, Hiroshi Kobayashi, Ryoji Tominaga, Takahiro Kaga, Takahiro Igari, Yoichi Kaneuchi, Ryoho 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, Kouichiro Azuma, Osahiko Tsuji, Naruhito 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 paraspinous muscle atrophy in patients with sarcopenia
*Nobuyuki Fujita, Koichiro Azuma, Shinichi Ishihara, Osahiko Tsuji, Naruhito 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; S 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*

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