<table>
<thead>
<tr>
<th>MONDAY JUNE 3</th>
<th>TUESDAY JUNE 4</th>
<th>WEDNESDAY JUNE 5</th>
<th>THURSDAY JUNE 6</th>
<th>FRIDAY JUNE 7</th>
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</thead>
<tbody>
<tr>
<td>07:00 - 08:00 Program Committee Meeting</td>
<td>07:00-07:45 Breakfast</td>
<td>07:00-07:45 Breakfast</td>
<td>06:45-07:30 Breakfast</td>
<td>07:00-07:45 Breakfast</td>
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<tr>
<td>08:00 - 09:00 Membership Committee Meeting</td>
<td>07:45-08:00 Welcome by local hosts and program chair</td>
<td>07:45-08:45 Special poster session 1A-1E</td>
<td>07:30 - 09:30 Scientific</td>
<td>07:45-08:45 Special Poster Session 2F-2J</td>
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<tr>
<td>09:00 - 12:00 Focus Group #1</td>
<td>08:00-09:00 Scientific</td>
<td>09:00-10:00 Scientific</td>
<td>09:30-10:00 Fellowships and Awards</td>
<td>09:00-09:10 Report from Focus Groups</td>
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<tr>
<td>9:30 - 11:30 Strategy Group Meeting</td>
<td>10:00-10:30 COFFEE</td>
<td>10:00-10:30 COFFEE</td>
<td>10:00-10:20 COFFEE</td>
<td>09:10-09:40 Scientific</td>
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<tr>
<td>12:00-15:00 ExCom Meeting</td>
<td>10:30-11:30 Scientific</td>
<td>10:30-11:00 Scientific</td>
<td>10:20-11:30 The ISSLS Prize</td>
<td>09:40-10:10 COFFEE</td>
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<tr>
<td>13:00-16:00 Focus Group #2</td>
<td>11:00-11:40 Presidential address</td>
<td>11:30-12:20 Invited lecture Prof. Osamu Honmou</td>
<td>11:30-12:20 Dinner Banquet</td>
<td>10:10-12:10 Scientific</td>
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<td>16:30- Registration opens</td>
<td>11:40-12:20 Harry Farfan Presidential Lecture Dr Eric Grant</td>
<td>12:30 Closing remarks</td>
<td>12:20-13:30 LUNCH</td>
<td>12:10-12:20 Closing remarks</td>
</tr>
<tr>
<td>17:00-18:00 Women’s ISSLS Banquet</td>
<td>12:30 Afternoon outing</td>
<td>13:30-14:30 Scientific</td>
<td>14:30-15:30 General poster session</td>
<td>Meeting adjourned</td>
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<tr>
<td>18:00-20:00 Welcome Reception</td>
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<td>15:30-16:30 Scientific</td>
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Program at a Glance
Dear Members and Guests,

It is our great honour to welcome you on behalf of the Local Organizing Committee to the 46th Annual Meeting of the International Society for the Study of the Lumbar Spine (ISSLS) in Kyoto, Japan. ISSLS’ Annual Meeting was first held in Japan in 1989. Thirty years on, we are excited to once again host the Meeting, this time in Kyoto.

With over 1,200 years of history, Kyoto boasts wonderful historic scenery along with traditional architecture and beautiful nature. At the same time, Kyoto is a city of learning and creation with cutting edge universities, research institutions and companies. This harmony of preserving tradition while continually innovating is a uniquely attractive feature of Kyoto. Kyoto has 17 UNESCO World Heritage Sites and over 2,000 temples and shrines. The history of harmony that has been built in Kyoto over the centuries has created a culture of hospitality that can be experienced not only at our meeting facilities and accommodation but also throughout the city.

Our half-day outing for everyone will take us to Kinkaku-ji Temple (Golden Pavilion), Ryoan-ji Temple, and Nijo-jo Castle, all three of which are World Heritage Sites. Kinkaku-ji Temple is richly adorned in gold leaf and reflects beautifully in the water and it is best seen reflected in the adjoining "mirror pond". In contrast to Kinkaku-ji Temple, Ryoan-ji Temple is simple and renowned for its mysterious rock garden. Try to find fifteen rocks in the garden at Ryoan-ji Temple from any single vantage point. At Nijo-jo Castle, walk down the “Nightingale Hallway” and notice the birds singing, a feature uniquely designed to detect intruders walking the halls. At the end of the tour, take in the graceful ambience of a traditional Japanese house while enjoying a dinner of Italian cuisine at Sodoh Higashiyama Kyoto. We also offer two accompanying persons’ tours, which will include the most popular places and a full course lunch. For the Banquet, we promise a fantastic display of Japanese culture, an experience not to be missed. Be sure to arrive on time for both the Opening Ceremony and the Banquet.

The meeting venue, Kyoto Hotel Okura, is located downtown and is convenient to access anywhere in Kyoto city. For the scientific program, there has been a record number of abstracts submitted this year and the program committee members chose oral and poster presentations according to peer review. In addition, they have arranged a wonderful program with special lectures and a symposium for the latest and greatest topics. We hope this meeting will be memorable for you all.

We are looking forward to meeting you at the 46th Annual Meeting of ISSLS in Kyoto.

Sincerely,
Shin-ichi Konno & Miho Sekiguchi
(Local hosts)

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**WI-FI AND SOCIAL MEDIA**

**Wi-Fi and Log-in:** To be advised at venue

**Twitter:** https://twitter.com/ISSLS_Society

**Instagram:** @ISSLS_2019 (ISSLS Kyoto 2019)

**Hashtag for conference:** #issls2019
MESSAGE FROM THE PRESIDENT

Dear friends and colleagues,

On behalf of the ISSLS Executive Committee, welcome to Kyoto! Our 46th Annual Meeting is being hosted in Japan for the second time, with the previous meeting also held in Kyoto, 30 years ago! The former capital of Japan, Kyoto is of great historical and cultural importance, with a dazzling array of things to do and see, including 17 UNESCO World Heritage Sites!

Our local hosts, Drs. Miho Sekiguchi and Shinichi Konno, and the local organizing committee have worked diligently to plan our time in Kyoto. The Program Committee, under the leadership of Dr Scott Blumenthal, has assembled a high-quality and interesting program of scientific presentations, debates, and symposia. For the first time, we will have a podium session highlighting the highest-scoring abstracts submitted to this meeting. As always, we look forward to active and vigorous discussions!

The Award Ceremony on June 6th will honor one of our most respected senior members with the Wiltse Lifetime Achievement Award. The prestigious ISSLS Prizes will be presented at a special session on the same day. We have two invited lectures. Dr. Eric Grant from the Radiation Effects Research Foundation will deliver the Harry Farfan Presidential Lecture on June 5th and Professor Osamu Honmou from Sapporo Medical University will be our guest for a lecture on cell transplantation on June 6th.

The traditional ISSLS outing will allow us to explore some of the classic sites of Kyoto, including the Ryoan-ji Temple, the Kinkaku-ji Temple, and the Nijo-jo Castle. We will conclude at Sodoh Higashiyama for something to eat and refreshments. The Accompanying Person’s program covers other great sites in and around Kyoto.

At the conclusion of the ISSLS program, a half-day symposium will be held, titled the Mechanism of Low Back Pain - Recent Advancement. I encourage you all to stay for what promises to be an informative session on a most relevant topic.

I look forward to seeing you all in Kyoto.

Tom Oxland
President ISSLS 2018-2019
UPCOMING MEETINGS

2020 Annual meeting combined with Spineweek, Melbourne, Australia

April 27 - May 1, 2020
Local hosts: Robert Gunzburg
Deadline for abstracts: October 15, 2019 (please note early deadline)

2021 Annual meeting in Milan, Italy

May 31- June 4, 2021
Local hosts: Stefano Boriani and Fabio Zaina
Deadline for abstracts: November 15, 2020

2022 Annual meeting in North America

To be decided on at the Second Business meeting in Kyoto, Japan. One site proposal has been received:
- Boston - local hosts James Kang and Andrew Schoenfeld
FELLOWSHIPS AND AWARDS

YOUNG INVESTIGATOR TRAVEL AWARD
Sponsored by Eisai Co.
Prize Ceremony for Recipients
Fellowship Award Ceremony
Thursday June 6 at 09:30

CLINICAL TRAVELLING FELLOWSHIP
Sponsored by Seoul Chuk Hospital
Announcement of this year’s recipient
Report from last year’s recipient: Xialong Chen, China
Fellowship Award Ceremony
Thursday June 6 at 09:30

ISSLS RESEARCH GRANT
Sponsored by Taisho Pharmaceutical Co.
Announcement of this year’s recipient
Report from last year’s winner: Hugo Massé-Alarie
Fellowship Award Ceremony
Thursday June 6 at 09:30

WILTSE LIFETIME ACHIEVEMENT AWARD CEREMONY
An annual award for exceptional achievement in the spinal field.
Announcement of this year’s winner
Winner from 2017: Robert Fraser
Fellowship Award Ceremony
Thursday June 6 at 09:30

THE ISSLS PRIZE FOR LUMBAR SPINE RESEARCH
Sponsored by European Spine Journal
Announcement of this year’s recipients
The prize-winning papers will be presented on Thursday, June 6 at 10:20

BEST PAPER AND POSTER AWARD
A special best paper award session with selected papers will be presented and judged by
the Program Committee on Tuesday June 4 at 13:30
SOCIAL PROGRAM
(Included in registration fee for all fully registered delegates/accompanying persons. Additional tickets may be purchased at the registration desk, pending availability)

WELCOME RECEPTION - Monday June 3 - 18:00 – 20:00
Kyoto Hotel Okura, 4F, Gyouin Hall
Dress Code: Smart Casual

Please be sure to arrive on time as there will be an exclusive performance by world-renowned opera singer Michië Nakamaru on stage.

AFTERNOON OUTING – Wednesday June 5 from 12:30

Ryoan-ji Temple
Japan’s most famous “hiraniwa” (flat garden void of hills or ponds), reveals the stunning simplicity and harmony of the Principles of Zen meditation. Ryoan-ji Temple is famous for its mysterious rock garden, the most celebrated in Japan, which defies attempts at explanation. Enclosed by an earthen wall, fifteen carefully placed rocks seem to drift in a sea of raked white gravel. A viewing platform right above the garden gives visitors an unimpeded view, although from whatever angle you view the garden, you can never see all fifteen stones.

After pondering the garden’s “sermon in stone”, you can stretch your legs with a tour of the extensive grounds of Ryoan-ji Temple, which includes larger gardens with trees and moss and the Kyoyo-chi pond, which is particularly striking in autumn.

Kinkaku-ji Temple
The image of the temple richly adorned in gold leaf reflects beautifully in the water of Kyokochi, the mirror pond. It is perhaps the most widely-recognized image of Kyoto.

Seen reflected in the adjoining “mirror pond” with its small islands of rock and pine, Kinkaku-ji Temple, “The Golden Pavilion” is a breathtaking must-see.

The building’s first purpose was to serve the retiring Shogun Ashikaga Yoshimitsu (1358-1409) as a residence. The gold-leaf-adorned building was converted into a Zen temple shortly after his death. In an event that was later fictionalized by the renowned author Yukio Mishima, a 21-year-old monk burned Kinkaku-ji Temple down in 1950. The temple was rebuilt in 1955 and continues to function as a storehouse of sacred relics.

Nijo-jo Castle
The gorgeous style of this castle was intended as a demonstration of Shogun Tokugawa Ieyasu’s (1542-1616) prestige.

Nijo-jo Castle was the residence of the Tokugawa Shoguns in Kyoto, who ruled Japan for over 260 years from 1603 to 1868. It remains an eloquent testimony to their power. The wide moat, massive stone walls, and heavy yet elaborate gates are still impressive and were the only fortifications the inhabitants felt necessary, so firm was their grip on power.

The grounds are large and contain several lovely gardens as well as groves of plum and cherry trees. The palace building itself is imposing, yet upon closer examination, is rich in decorative detail.

The Sodoh Higashiyama, Kyoto
An Italian restaurant at the foot of the Tower of Yasaka, the symbol of Kyoto. You will enjoy the ambience of this graceful Japanese house, with its 46,800ft² (4,300m²) of gardens that reflect the colours of the four seasons.

GALA DINNER - Thursday June 6 at 19:00
Kyoto Hotel Okura 3F Suiun
Dress Code: Smart Casual

At the start of the Banquet, Geiko will arrive and there will be a traditional performance on stage. Please arrive at 18:50 to be seated before the performance.

During the performance, please remain seated and do not move around the banquet hall. After the performance, she will come to each table to serve drinks and there will be a photo opportunity with her. The Banquet will be an extraordinary event and experience of traditional Japanese culture. Please enjoy the dinner with a selection of wine.
ACCOMPANYING PERSONS PROGRAM

Tuesday June 4 - Bus departs at 09:00 (7-8 hours)
Japanese Lunch at Suiran
*Wear comfortable clothing and walking shoes as this tours will be on foot.

Arashiyama & Sagano Bamboo Grove

Arashiyama is one of the most popular sightseeing districts in Kyoto. It is a great escape from the city. You will enjoy walking through the beautiful Sagano Bamboo Forest pathway, where there are plenty of opportunities to take photos.

Tenryu-ji Temple

Tenryu-ji temple, registered as a UNESCO World Heritage site, was ranked first among the city’s five great Zen temples. The main attraction of Tenryu-ji Temple is the Zen garden, which was created by the famous garden designer Muso Soseki in the 14th century. After sightseeing and lunch, you can experience Kyoto cultures and traditional arts through crafting at Kyoto Handcraft Center. Your hand-made items will be the best souvenirs.

Folding Fan Painting

Enjoy the experience of making Japanese handicraft!
You will paint on an unfolded fan as you like.
When it is dry, it will be fastened at the end with a catch.

Thursday June 6 - Bus departs at 09:00 (6 hours)
French Lunch at Funatsuru
*Wear comfortable clothing and walking shoes as there will be 1½ hours of walking

Fushimi Inari Shrine

Fushimi Inari Shrine is a Shinto shrine, which was voted Kyoto’s top tourist destination by foreign visitors. Inari is the Shinto God of Rice. Thousands of red torii (shrine gates) straddle a network of trails behind its main buildings. At the entrance stands the Romon Gate, donated in 1589. Behind that is the shrine’s main hall (honden). Individuals and companies have been donating torii for around 400 years. These symbolize prosperity and profitability. You will find the names of the donors inscribed on the back of each gate.

Tofukuji Temple

Tofukuji is a large Zen temple, founded in 1236 by the Fujiwara clan. There are unique gardens surrounding the building on all sides, with particularly beautiful views from the Tsutenkyo Bridge. The 22m tall Sanmon Gate is the oldest Zen gate of its kind, dating back to 1425.

Sanjusangendo

After lunch, we will visit Sanjusangendo, which was originally built in 1164. The original temple building was lost to fire, but reconstructed in 1266. Measuring 120m, the temple hall is Japan’s longest wooden structure. The building houses 1,001 wooden statues of Kannon (the thousand-armed Goddess of Mercy).
DR ERIC GRANT

Health effects of ionizing radiation exposure - what we’ve learned from the atomic bomb survivors

Eric Grant is the Associate Chief of Research at the Radiation Effects Research Foundation (RERF) in Hiroshima and Nagasaki, Japan. Dr Grant received his BSEE from the University of Michigan and his PhD in Epidemiology from the University of Washington. Eric worked as a computer programmer and a biomedical engineer prior to working for RERF.

RERF’s mission is to study the long-term health effects due to exposure to ionizing radiation from the atomic bombings. Dr Grant’s recent publication focused on the radiation risks of solid cancer incidence among the Life Span Study of atomic bomb survivors. Dr Grant has also authored manuscripts on indirect effects of radiation exposure, specifically hormonal changes among women after whole-body exposure, and on the lack of evidence of trans-generational mortality effects of radiation exposure among the children of the atomic bomb survivors.

Dr Grant has recently been put in charge of developing RERF’s “Research Resource Center”, an institutional repository designed to safeguard RERF’s varied resources (data, paper, physical artifacts, etc.) as well as integrate research data with biosample inventories. This integrated resource center along with updated policies for data sharing should facilitate RERF’s own research as well as improve opportunities for collaborative research in the future.

INVITED SPEAKER

PROFESSOR OSAMU HONMOU

Cell therapy for spinal cord injury

Dr. Osamu Honmou, M.D., Ph.D. is the chairman and Professor in the Department of Neural Regenerative Medicine at Sapporo Medical University School of Medicine in Japan. He received his M.D. from Sapporo Medical University in 1989 and obtained his Ph.D. in Medicine from the same institution in 1999. After completing his neurosurgical residency at Sapporo Medical University Hospital, he moved to New York University Medical Center in the U.S. in 1991, where he first studied basic neuroscience. He then moved to Yale University in 1992 and began working on projects in the field of neural regeneration. He has served as a Lecturer in Neurology at Yale University School of Medicine since 1995.

He returned to Sapporo Medical University in 1995 as an Assistant Professor in the Department of Neurosurgery and launched a neuroscience and regeneration research laboratory. He conducted a pilot clinical study on autologous mesenchymal stem cells derived from bone marrow for stroke patients in 2006-2007. He became a Professor in the Department of Neural Repair and Therapeutics in 2008 and was appointed as the chairman of and Professor in the Department of Neural Regenerative Medicine at Sapporo Medical University in 2011. He is a board-certified neurosurgeon in Japan and also holds a Visiting Assistant Professorship in the Department of Neurology at Yale University School of Medicine.

Currently, he is leading a team that is conducting a phase III, double-blinded, placebo-controlled, randomized clinical trial in patients with stroke that started in 2013. He also launched a clinical trial of intravenous administration of autologous mesenchymal stem cells in patients with spinal cord injury at Sapporo Medical University in 2013. His professional specialties are central nervous system diseases and his main research objectives are to pursue a better understanding of these diseases at a fundamental level and to develop regenerative therapies with innovative approaches.
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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Chairpersons/Details</th>
<th>Location</th>
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<tbody>
<tr>
<td>07:00 – 08:00</td>
<td><strong>Program Committee Meeting</strong> <em>(Program Committee only)</em></td>
<td>Chair: Scott Blumenthal</td>
<td>Edinburgh (3F)</td>
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<td>Location: Edinburgh (3F)</td>
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<tr>
<td>08:00 – 09:00</td>
<td><strong>Membership Committee Meeting</strong> <em>(Membership Committee only)</em></td>
<td>Chair: Daisuke Sakai</td>
<td>Edinburgh (3F)</td>
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<td>Location: Edinburgh (3F)</td>
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<tr>
<td>09:00 – 12:00</td>
<td><strong>Focus Group #1 - Degenerative Spinal Phenotypes - Creating a common language to advance knowledge</strong></td>
<td>Chairpersons: Michele Battié, Dino Samartzis, Josef Assheuer &amp; Bradley Weiner</td>
<td>Kobu (3F)</td>
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<td>Location: Kobu (3F)</td>
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<td>09:30 – 11:30</td>
<td><strong>Strategy Group</strong></td>
<td>Chair: Keith DK Luk</td>
<td>Edinburgh (3F)</td>
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<td>Location: Edinburgh (3F)</td>
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<td>12:00 – 15:00</td>
<td><strong>Executive Committee Meeting</strong></td>
<td>Chair: Tom Oxland</td>
<td>Edinburgh (3F)</td>
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<td>Location: Edinburgh (3F)</td>
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<td>13:00 – 16:00</td>
<td><strong>Focus Group #2 – International Taskforce on Diagnosis and Management of Lumbar Spinal Stenosis</strong></td>
<td>Chairpersons: Christy Tomkins-Lane, Markus Melloh &amp; Arnold Wong</td>
<td>Kobu (3F)</td>
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<td>Location: Kobu (3F)</td>
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<td>17:00 – 18:00</td>
<td><strong>Women's ISSLS</strong></td>
<td>Chair: Jeannie Bailey</td>
<td>Kobu (3F)</td>
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<td>Location: Kobu (3F)</td>
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<td>18:00 – 20:00</td>
<td><strong>Opening Ceremony &amp; Welcome Reception</strong></td>
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<td>Gyoun (Central and South (4F))</td>
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<td>07:00-07:45</td>
<td>Breakfast</td>
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<td>Location: Banquet Lobby in front of Gyoun (4F)</td>
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<td>07:45-07:50</td>
<td>WELCOME</td>
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<td>Local Hosts: Shin-ichi Konno &amp; Miho Sekiguchi</td>
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<td>Program Chair: Scott Blumenthal</td>
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<td>Location: Gyoun (Central and South) (4F)</td>
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<td>08:00-09:00</td>
<td>SESSION #1 STENOSIS</td>
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<td>Chairs: Tom Oxland &amp; Kazuhiro Chiba</td>
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<td>08:00-08:05</td>
<td>1 Multi-level decompression/fusions are as effective as single level lumbar spinal stenosis operations.</td>
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<td>08:07-08:12</td>
<td>2 Does the Concomitant Presence of Lumbar Scoliosis or Spondylolisthesis Affect Clinical Outcomes Following Decompression Surgery in Patients with Spinal Stenosis?</td>
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<td>08:14-08:19</td>
<td>3 Early Surgery vs Prolonged Conservative Treatment for Sciatica-10-year results of a Randomized Controlled Trial.</td>
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<td></td>
<td>Gjisbert M Overdevest, W.C. Peul, W.A. Moojen, B. Koes, R.H. Bartels, The Netherlands</td>
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<td>08:21-08:26</td>
<td>4 Mood disorders predict poor outcome of lumber disc surgery - results from a clinical trial.</td>
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<td>Gjisbert M Overdevest, N.A. van der Gaag, W.M. Moojen, W. Peul, M.P. Arts, The Netherlands</td>
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<td>08:28-08:33</td>
<td>5 The indirect decompression effect of oblique lateral interbody fusion in the treatment of degenerative lumbar stenosis.</td>
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<td>Zhi-Jun Hu, X. Fang, F. Zhao, J. Zhang, X. Zhao, S. Fan, China</td>
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<td>08:35-08:40</td>
<td>6 Efficacy of decompression surgery on walking ability and health-related quality of life in lumbar spinal stenosis patients with glutaeus medius muscle weakness.</td>
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<td>Satoshi Suzuki, N. Fujiita, A. Miyamoto, O. Tsuji, N. Nagoshi, E. Okada, M. Yagi, T. Tsuji, H. Kono, M. Nakamura, M. Matsumoto, K. Watanabe, Japan</td>
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<td>08:42-09:00</td>
<td>Discussion</td>
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<td>09:00 – 10:00</td>
<td>SESSION #2 DISC DEGENERATION</td>
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<td>Chairs: Ashish Diwan &amp; Sumihisa Orita</td>
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<td>09:00-09:05</td>
<td>7 Nucleus pulposus-derived stem cells encapsulated in BMP7-based functionalized self-assembling peptide for alleviation of intervertebral disc degeneration in a rabbit model.</td>
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<td></td>
<td>Dike Ruan, J. Ying, L. Su, S. Pei, T. Wen, China</td>
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<td>09:07-09:12</td>
<td>8 Expression of TRPV4 in human IVDs and its relevance in stretch-induced inflammation.</td>
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<td>Karin Wuertz-Kozak, E. Cambria, A. Sadowska, L. Halgund, P. Jaszcuzek, F. Passini, W. Hitzl, J. Snedeker, O.N. Hausmann, Switzerland</td>
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<td>09:14-09:19</td>
<td>9 Pathological effects of cortisol on intervertebral disc cells and mesenchymal stem cells from low back pain patients.</td>
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<td>Daphne Hingert, J. Nilsson, H. Barreto Henriksson, A. Baranto, H. Brisby, Sweden</td>
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<td>09:21-09:26</td>
<td>10 Genetic lineage tracing of intervertebral disc cells in a neonatal regeneration model.</td>
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<td>James C Iatridis, O. Torre, V. Mroz, A.R. Martinez Benitez, A.H. Huang, USA</td>
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<td>09:28-09:33</td>
<td>11 A new rabbit model of intervertebral disc degeneration induced by intradiscal injection of monosodium iodoacetate.</td>
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<td>Tekao Sudo, H.H. Cherif, D.D. Bisson, S.S. Kocabas, Japan</td>
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<td>09:35-09:40</td>
<td>12 Identification of two natural compounds as new senolytics in intervertebral disc degeneration and back pain.</td>
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<td>Lisbet L.H. Haglund, N.A. van der Gaag, W.M. Moojen, W. Peul, M.P. Arts, Canada</td>
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<tr>
<td>09:42-10:00</td>
<td>Discussion</td>
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<td>10:00-10:30</td>
<td>Coffee</td>
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<td></td>
<td>Location: Banquet Lobby in front of Gyoun (4F)</td>
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<tr>
<td>Time</td>
<td>Session and Details</td>
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</tbody>
</table>
| 10:30-11:30  | **SESSION #3 REHABILITATION**  
Chair: Jeremy Fairbank & Margareta Nordin                                                                                                                                 |
| 10:30-10:35  | 13 Identification through movement analysis of chronic low back pain pathological spinal movements patterns and their sensibility to change during exercise treatment.  
*Stefano Negri*, B. Piovanelli, C. Amici, S. Donzelli, F. Zaina, Italy |
| 10:37-10:42  | 14 Male gender and initial job demand predicts successful re-integration and return to work: results from 20-years of Experience with a Multidisciplinary Programme for Rehabilitation of Chronic Low Back Pain.  
*Jason Pui Yin Cheung*, G. Leung, P. Cheung, G. Lau, S. Lau, K. Luk, Y. Wong, K. Cheung, P. Koljonen, Hong Kong |
| 10:44-10:49  | 15 Exercise for the intervertebral disc: a 6-month RCT.  
| 10:51-10:56  | 16 Can Preoperative Rehabilitation Improve the Surgical Outcome in the Patients with Adult Spinal Deformity? A retrospective cohort study.  
*Tatsuya Endo*, T. Ito, M. Iwabuchi, O. Shirado, Japan |
| 10:58-11:03  | 17 What factors differ between individuals with either good or poor outcome following microdiscectomy for lumbar disc herniation: an investigation of inflammatory and muscle regeneration markers in the lumbar multifidus muscle.  
*Xiaolong Chen*, P. Hodges, G. James, J. Umali, U. Chamoli, K. Sheldrick, J. TU, W. Li, A. Diwan, Australia |
| 11:05-11:10  | 18 The tasks effect in low back pain movement patterns.  
*Enrica Papi*, A.M. Bull, A.H. McGregor, United Kingdom |
| 11:10-11:30  | **Discussion**                                                                                                                                 |
| 11:30-12:15  | **DEBATE - Prehabilitation and post-operative rehabilitation: What do we really know?**  
*A debate built on the ISSLS memberships’ knowledge*  
Chairs: Helena Brisby, Kristin Archer & Marin Lundberg |
| 12:15-13:30  | **Lunch**  
Location: Suiun (3F)                                                                                                                                 |
| 13:30-15:00  | **SESSION #4 BEST PAPER AWARD SESSION**  
Chairs: Scott Blumenthal, Dino Samartzis & Seiji Ohtori                                                                                                                                 |
| 13:30-13:35  | 19 In vitro biomechanical testing of an innovative antero-posterior fixation for A3 lumbar fracture.  
*Marc-Antoine Rousseau*, L. Simon, S. Persohn, A. Nerot, W. Skalli, France |
*Wing Moon Raymond Lam*, L. Liu, M. Wang, R. Kumarsing, M. Naidu, K. Ting, C. Goh, H. Wong, Singapore |
*Sam Yeol Chang*, H. Kim, C. Lee, B. Chang, South Korea |
*John P Kleimeyer*, J.C. Koltsov, S.S. Hu, USA |
| 13:58-14:03  | 23 A Study on Sports Activities of Non-union Adolescent Lumbar Spondylolysis Patients  
*Kenji Hatakeyama*, M. Urushibara, A. Kojima, J. Ouchi, S. Ohtori, Japan |
| 14:12-14:17  | 25 Is the terminal complement complex a possible target for therapeutic intervention in intervertebral disc degeneration?  
*Graciosa Q Teixeira*, S. Munir, M.B. Freidin, J.H. Määttä, G. Livshits, F.M. Williams, Germany |
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>14:19-14:24</td>
<td>Endplate damage is heritable, is independently associated with low back pain and may trigger intervertebral disc degeneration: a longitudinal study from TwinsUK. Marinko Rade, S. Munir, M.B. Freidin, J.H. Määttä, G. Livshits, F.M. Williams, United Kingdom</td>
</tr>
<tr>
<td>14:31-15:00</td>
<td>Discussion</td>
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<tr>
<td>15:00-15:30</td>
<td>Coffee</td>
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<tr>
<td>15:30-16:30</td>
<td>SESSION #5 AGING SPINE Chairs: Anne F. Mannion &amp; Hirotaka Haro</td>
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<tr>
<td>16:10-16:30</td>
<td>Discussion</td>
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**SYMPOSIUM - AGING SPINE: TOWARD A COMPREHENSIVE UNDERSTANDING OF LOW BACK PAIN IN THE ELDERLY**

*Chair: Hans-Joachim Wilke & Hiroaki Nakamura*

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>16:30-17:10</td>
<td>The Patho-mechanism of Pain due to Aging Intervertebral Disc and Muscle Masayuki Miyagi, M.D., Ph.D, Department of Orthopaedic Surgery, Kitasato University, School of Medicine</td>
</tr>
<tr>
<td></td>
<td>From Bench to Bedside: The Osteoporosis-Related Pain. Miyako Suzuki, M.D., Ph.D, Department of Orthopaedic Surgery, Graduate School of Medicine, Chiba University</td>
</tr>
<tr>
<td></td>
<td>Aging Spine and Low Back Pain: Analysis of Cohort Studies Shinji Takahashi, M.D., Ph.D, Department of Orthopaedic Surgery, Osaka City University Graduate School of Medicine</td>
</tr>
<tr>
<td>17:10-18:10</td>
<td>First Business Meeting (For members only) Chair: Tom Oxland</td>
</tr>
</tbody>
</table>
### WEDNESDAY JUNE 5

- **07:00-07:45** Breakfast  
  Location: Banquet Lobby in front of Gyoun (4F)

- **07:45-08:45** SPECIAL POSTER SESSION #1A: BIOLOGY  
  Chairs: Helena Brisby & Gen Inoue  
  Location: Small Banquet Hall – Kame (5F)  
  SPECIAL POSTER SESSION #1B: BIOMECHANICS  
  Chairs: Fabio Galbusera & Osamu Shirado  
  Location: Small Banquet Hall – Tsuru (5F)  
  SPECIAL POSTER SESSION #1C: REHABILITATION  
  Chairs: Jiri Dvorak & Hiroshi Hashizume  
  Location: Small Banquet Hall – Ume (5F)  
  SPECIAL POSTER SESSION #1D: DEFORMITY  
  Chairs: Jason Pui Yin Cheung & Daisuke Togawa  
  Location: Small Banquet Hall – Take (5F)  
  SPECIAL POSTER SESSION #1E: SURGERY OUTCOMES  
  Chairs: Christopher Bono & Kazuhiro Hasegawa  
  Location: Small Banquet Hall – Matsu (5F)

- **09:00-10:00** SESSION #6 POPULATION STUDIES  
  Chairs: Björn Strömqvist & Masatoshi Teraguchi  
  09:00-09:05  
  34 Factors related to low back pain among elderly population in suburban area Japan - The Shiraniwa Study.  
  Shoichiro Ohyama, M. Hoshino, S. Takahashi, Y. Hori, T. Tsuji, H. Nakamura, Japan  
  09:07-09:12  
  35 Pelvic compensation accompanying spinal malalignment and back pain-related factors - The Wakayama Spine Study.  
  09:14-09:19  
  36 Association of vertebral bone marrow edema with low back pain in degenerative lumbar scoliosis in the elderly.  
  09:21-09:26  
  37 Lifestyle and lifetime occupational exposures may not play a role in the pathogenesis of Modic Changes on the lumbar spine MRIs.  
  Jialong Wu, J. Huang, M.C. Battié, Y. Wang, China  
  09:28-09:33  
  38 Results of conservative protocol in management of 403 patients of Lumbar Disc Herniation: Are we operating more than we should?  
  Harvinder Chhabra, A. Pedaballe, M. Gupta, India  
  09:35-09:40  
  39 Range of motion and local sagittal alignment of lumbar spine in 627 healthy volunteers - Age-related changes and gender difference.  
  Yasutsugu Yukawa, T. Matsumoto, A. Minamide, H. Hashizume, H. Yamada, F. Kato, Japan  
  09:40-10:00  
  Discussion

- **10:00-10:30** Coffee  
  Location: Banquet Lobby in front of Gyoun (4F)

- **10:30-11:00** SESSION #7 SURGICAL OUTCOMES  
  Chairs: Serena Hu & Yoshiharu Kawaguchi  
  10:30-10:35  
  40 Differences in Surgical Practices Between Salaried and Fee-for-Service Surgeons for Degenerative Lumbar Conditions in a Universal Health Payer System  
  Charles G Fisher, D. Banaszek, H. Hall, G. McIntosh, T. Inglis, R. Charest-Morin, N. Manson, Y.R. Rampersaud, K. Thomas, N. Dea, Canada  
  10:37-10:42  
  41 Can Minimally Invasive Spinal Fusion Surgery Provide the Better Surgical Outcome than Conventional One in the Treatment of Degenerative Lumber Spinal Diseases? A minimum of one-year follow-up study  
  Masumi Iwabuchi, H. Fukuda, R. Tominaga, Y. Hanyu, O. Shirado, Japan  
  10:44-10:49  
  42 Application study of ERAS in perioperative period of fusion surgery of patients with degenerative lumbar diseases  
  Zhe Wang X. Hu, Z. Yang, Z. Luo, China  
  10:49-11:00  
  Discussion
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<th>Time</th>
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<tbody>
<tr>
<td>11:00-11:40</td>
<td><strong>PRESIDENTIAL ADDRESS – TOM OXLAND</strong></td>
<td>“ISSLS – Who are we?”</td>
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<td></td>
<td><strong>Introduction by Kazuhiro Chiba</strong></td>
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<tr>
<td>11:40-12:20</td>
<td><strong>HARRY FARFAN PRESIDENTIAL LECTURE – DR ERIC GRANT</strong></td>
<td>Radiation Effects Research Foundation of Hiroshima and Nagasaki</td>
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<td>“Health effects of ionizing radiation exposure – what we’ve learned from the atomic bomb survivors”</td>
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<td><strong>Introduction: Tom Oxlund</strong></td>
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**AFTERNOON OUTING**

- Meeting place: 4F Auditorium
- First bus departs at 12:30
- A boxed lunch will be provided

*(See Page 5 for full details)*
**THURSDAY JUNE 6**

**06:45 – 07:30**  
*Breakfast*  
Location: Banquet Lobby in front of Gyoun

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**07.30:30-08:30**  
**SESSION #8 SURGERY FUSION**  
*Chairs: Yong Hai & Tim Yoon*

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Authors/Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:30-07:35</td>
<td>Effects of restoration of sagittal balance on adjacent segment degeneration in instrumented lumbar fusions</td>
<td>Sang-Il Kim, Y. Kim, K. Ha, H. Min, H. Park, South Korea</td>
</tr>
<tr>
<td>07:37-07:42</td>
<td>Open versus Minimally Invasive Transforaminal Lumbar Interbody Fusion in Obese Patients. A systematic Review and Meta-analysis</td>
<td>Steven McAnany, A. Alhammoud, O. Alatahamsheh, Y. Othman, A. Vaishnav, C. Gang, S. Qureshi, USA</td>
</tr>
<tr>
<td>07:44-07:49</td>
<td>Risk factors for readmission and complications in obese and severely obese patients undergoing elective posterior lumbar spine fusion</td>
<td>Shane Burch, D. Jain, J. Shaw, V. Deviren, A.L. Zhang, S. Berven, USA</td>
</tr>
<tr>
<td>07:58-08:03</td>
<td>Impact of Previous Lumbar Spine Surgery on Outcome of Lumbar Total Disc Replacement: Analysis of Prospective 5-year Follow-up Study Data</td>
<td>Scott L Blumenfeld, D.D. Ohnmeiss, J.E. Zigler, R.D. Guyer, USA</td>
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**08:30-08:35**  
**SESSION #9 DISC DEGENERATION**  
*Chairs: Zorica Buser & Keita Ito*

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<tr>
<th>Time</th>
<th>Session</th>
<th>Authors/Institutions</th>
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</thead>
<tbody>
<tr>
<td>08:30-08:35</td>
<td>Nucleus replacement gets a new chance with annulus sealing</td>
<td>Laura Zengerle, A. Köhler, C. Hackenbrock, H. Wilke, Germany</td>
</tr>
<tr>
<td>08:37-08:42</td>
<td>Low-intensity Pulsed Ultrasound Far-field Exposure Increases Matrix Synthesis in Annulus Fibrosus Cells</td>
<td>Devante A Horne, P. Jones, M. Adams, C. Diederich, J.C. Lotz, USA</td>
</tr>
<tr>
<td>08:44-08:49</td>
<td>Osteomacs: may be a key factor in the development of Modic changes</td>
<td>Fengdong Zhao, J. Wang, China</td>
</tr>
<tr>
<td>08:58-09:03</td>
<td>Viable allograft as a supplemental therapeutic for disc regeneration</td>
<td>Douglas Beall, G. Wilson, R. Bishop, W. Tally, T. Temple, T. Ganey, USA</td>
</tr>
<tr>
<td>09:05-09:10</td>
<td>Safety of intradiscal condoliasse in the treatment of lumbar disc herniation</td>
<td>Kazuhiro Chiba Y. Matsuyama, T. Seo, Japan</td>
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**09:30-10:00**  
**FELLOWSHIP AWARD SESSION**  
*Chairs: Kazuhiro Chiba & Christopher Bono*  
*See Page 4 for full details*

**10:00-10:20**  
*Coffee*
THURSDAY JUNE 6 (Continued)

THE ISSLS PRIZE FOR LUMBAR SPINE RESEARCH

10:20-10:30  ISSLS PRIZE INTRODUCTION
10:30-11:30  ISSLS PRIZE AWARD CEREMONY
Chair: Björn Rydevik

10:30-10:40  55 Clinical importance of trunk muscle mass for low back pain, spinal balance, and quality of life: A multicenter cross-sectional study

10:40-10:50  Discussion

10:50-11:00  56 Physical activity attenuates fibrotic alterations to the multifidus muscle associated with intervertebral disc degeneration
Paul Hodges, G. James, D. Klyne, M. Millecamps, L. Stone, Australia

11:00-11:10  Discussion

11.10-11:20  57 Biomechanical changes in dynamic sagittal balance and lower limb compensatory strategies following realignment surgery in adult spinal deformity patients.
Jeannie Bailey, R.P. Matthew, S. Seko, P. Curran, L. Chu, S.H. Berven, V. Deviren, S. Burch, J. Lotz, USA

11:20-11:30  Discussion

11.30-12:20  INVITED LECTURE – PROFESSOR OSAMU HONMO
Molecular Medicine and Neural Repair and Therapeutics, Sapporo Medical University School of Medicine, Japan
“Cell Therapy for Spinal Cord Injury”
Chair: Shin-ichi Konno

12:20-13:30  Lunch
Location: Suiun (3F)

13.30-14:30  SESSION #10 BASIC SCIENCE, IMAGING
Chairs: Asseem Sharma & Daisuke Sakai

13:30-13:35  58 Ultrasound measurement of the skin as a potential marker of bone quality: A prospective pilot study of patients undergoing lumbar spinal fusion

Wing Moon Raymond Lam, L. Liu, M. Wang, J. Li, C. Goh, H. Wong, Singapore

13:44-13:49  60 The impact of obesity, diabetes, and epidural steroid injections on regional Bone Mineral Density (BMD) measured by Quantitative Computed Tomography (QCT) in the lumbosacral spine
Ichiro Okano, C. Jones, S.N. Salzmann, C. Ortiz Miller, T. Shirahata, C. Rentenberger, J. Shue, J.A. Carrino, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes, USA

Hanna Hebelka, K. Lagerstrand, H. Brisby, P. Owen, D. Belavy, Sweden

13:58-14:03  62 Feasibility of lumbar disc lamellar measurement with in-vivo ultrasonography
Claudio Vergani, T. Langlais, P. despairries, P. Rohan, R. Pietton, J. Dubousset, J. Meakin, C. Winlove, R. Vialle, W. Skalli, France

14:05-14:10  63 Symptomatic implant/construct failure after metastatic spine tumour surgery
Naresh Kumar, R.S. Patel, D. Sonawane, J. Song, A.P. Singla, H. Milavec, N. Ravikumar, J. Ruiz, H. Hey, H. Wong

14:10-14:30  Discussion
### 14.30-15:30 GENERAL POSTER SESSION

*Location: Gyoun (North) (4F)*

*Drinks and Coffee will be served during this session*

### 15.30-16:30 SESSION #11 STENOSIS

*Chairs: Robert Gunzburg & Kotaro Nishida*

<table>
<thead>
<tr>
<th>Time</th>
<th>Poster Number</th>
<th>Presentation Title</th>
<th>Authors</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:44-15:49</td>
<td>66</td>
<td>Facet Joint Capsular Laxity in Degenerative Lumbar Spondylolisthesis Associated with the Increased Expression of Fractalkine CX3CL1/CX3CR1 Chemokine</td>
<td>In-Soo Oh, S. Kim, K. Ha, K. Rhyu</td>
<td>South Korea</td>
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<tr>
<td>15:51-15:56</td>
<td>67</td>
<td>Association of hypertrophy of the ligamentum flavum with an increase in myofibroblasts in the dorsal layer of the ligament in lumbar spinal canal stenosis</td>
<td>Fumio Hayashi, K. Higashino, M. Morimoto, Y. Goda, N. Sato, Y. Morimoto, T. Sakai, Y. Takata, F. Tezuka, K. Sairyo</td>
<td>Japan</td>
</tr>
<tr>
<td>16:05-16:10</td>
<td>69</td>
<td>The influence of developmental spinal stenosis on reoperation risk at the adjacent segment after decompression surgery for lumbar spinal stenosis</td>
<td>Jason Pui Yin Cheung, P. Cheung, Hong Kong</td>
<td>Hong Kong</td>
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### 16:10-16:30 Discussion

### 16:30-17:30 DEBATE

*Blended learning vs conventional education for spine specialists and research*

*Chairs: Tom Oxland, Dino Samartzis, Ashish Diwan*

### 17:30-18:30 Second Business Meeting *(for members only)*

### 19:00-21:00 Banquet

*Location: Suiun (3F)*
07:00-07:45 | Breakfast  
Location: Banquet Lobby in front of Gyoun (4F)

07:45-08:45 | SPECIAL POSTER SESSION #2F: BIOLOGY  
Chairs: James Iatridis & Nam Vo  
Location: Small Banquet Hall – Kame (5F)  
SPECIAL POSTER SESSION #2G: BIOMECHANICS, BIOLOGY  
Chairs: Cornelia Neidlinger-Wilke & Miho Sekiguchi  
Location: Small Banquet Hall – Tsuru (5F)  
SPECIAL POSTER SESSION #2H: NON-SURGERY  
Chairs: Ken Ishii & Fabio Zaina  
Location: Small Banquet Hall – Ume (5F)  
SPECIAL POSTER SESSION #2I: SURGERY TECHNIQUES  
Chairs: Nareesh Kumar & Kazuyuki Watanabe  
Location: Small Banquet Hall – Take (5F)  
SPECIAL POSTER SESSION #2J: INFECTION/OSTEOPOROSIS  
Chairs: Koji Akeda & Koji Otani  
Location: Small Banquet Hall – Matsu (5F)

09:00-09:10 | Report from Focus Groups  
Chair: Kazuhiro Chiba

09:10-09:40 | Session #12 INFECTION  
Chairs: Teija Lund & Masahiro Kanayama

09:10-09:15 | Hypoalbuminemia and Elevated CRP as Predictors for Superficial, Deep, and Urinary Tract Infections  
Zorica Buser, B. Yoshida, A. Nguyen, B. Formanek, M. Alam, J. Wang, USA

09:17-09:22 | Clinical Features and Treatments of Pyogenic Spondylodiscitis with Severe Paralysis  
Teppei Hayashi, M. Kato, Japan

09:24-09:29 | Avoiding infection and screw loosening due to biofilm at bone-screw interface: Periop measures  

09:29-09:40 | Discussion

10:10-11:10 | Session #13 BASIC SCIENCE, BIOMECHANICS  
Chairs: Alejandro Espinoza & Hans-Joachim Wilke

10:10-10:15 | Immuno-stimulatory capacity of decorin in the intervertebral disc and the mechanical consequence of resultant inflammation  
Diane Gregory, M. Guerreiro, D. Zwambag, S. DeWitte-Orr, Canada

10:17-10:22 | 810nm low level laser therapy regulating polarization of M1/M2 macrophages and its mechanism  
Zhe Wang, J. Zhang, J. Sun, Q. Zheng, X. Hu, China

10:24-10:29 | Mechanical characterization of lumbar annulus fibrosus in adolescent idiopathic scoliosis before and after surgical intervention  
Claudio Vergari, L. Chanteux, R. Pietton, T. Langlais, R. Skalli, France

10:31-10:36 | Cortical trajectory pedicle screws versus traditional trajectory: differences in fatigue loading conditions  
Steven T Swinford, T.R. Johnston, A.W. Behn, T.F. Alamin, USA

10:38-10:43 | Dysregulated bone marrow stromal cells in Modic type 1 changes  
Stefan Dudli, D. Hänni, A. Jüngel, M. Betz, J. Spirig, F. Brunner, M. Farshad, O. Distler, Switzerland

10:45-10:50 | High Fat Diet and Leptin Receptor Deficiency have Sex-Dependent Effects on Spinal Structures in a Type 2 Diabetes Mouse Model  
Svenja Illien-Junger, D.M. Natelson, D. Krishnamoorthy, J. Iatridis, USA

10:50-11:10 | Discussion
### Session #14 SURGERY

**Chair:** Haruki Funao & David Wong

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
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<tbody>
<tr>
<td>11:17-11:22</td>
<td>80 Prognostic factors for drop foot due to lumbar degenerative diseases: The impact of surgical timing on postoperative recovery. Soichiro Masuda, Y. Kanba, J. Kawai, N. Ikeda, Japan</td>
</tr>
<tr>
<td>11:24-11:29</td>
<td>81 Predictive factors related with recovery of bowel and bladder function and ambulatory capacity in surgically treated traumatic conus medullaris syndrome with thoracolumbar fracture Chang-Hoon Jeon, N. Chung, H. Lee, S. Moon South Korea</td>
</tr>
<tr>
<td>11:31-11:36</td>
<td>82 No long-time benefit from fusion in decompressive surgery for lumbar spinal stenosis. 5 year-clinical results and 2-year MRI follow-up from the Swedish Spinal Stenosis Study, a multicenter RCT of 233 patients. Thomas Karlsson, P. Försth, M. Skorpil, K. Pazarlis, P. Öhagen, K. Michaelsson, B. Sanden, Sweden</td>
</tr>
<tr>
<td>11:45-11:50</td>
<td>84 Association between the definition of unfavorable surgical outcomes and their risk factors after spine surgery for lumbar spinal stenosis Ho-Joong Kim, D. Shin, J. Yeom, C. Lee, B. Chang, South Korea)</td>
</tr>
<tr>
<td>11:50-12:00</td>
<td>Discussion</td>
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**Closing Remarks – Mamoru Kawakami**

*Chair: Kazuhiro Chiba*
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<th>Time</th>
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<tbody>
<tr>
<td>14:00-14:05</td>
<td>Opening Remarks</td>
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<tr>
<td>14:05-14:40</td>
<td>LECTURE 1 - Moderator: Dr. Anne Mannion</td>
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<tr>
<td></td>
<td>Title: Clinical and imaging phenotyping: what we know, what we don't know, and future directions</td>
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<td>Speaker: Dr. Dino Samartzis</td>
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<td></td>
<td>Department of Orthopaedic Surgery, Institute for Spine Research &amp; Innovation (ISRII) RUSH University Medical Center</td>
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<tr>
<td>14:40-15:15</td>
<td>LECTURE 2 - Moderator Dr. Helena Brisby</td>
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<tr>
<td></td>
<td>Title: Spinal Column Pain and its Various Dimensions</td>
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<td>Speaker: Dr. Ashish Diwan</td>
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<td>St George &amp; Sutherland, Clinical School, Faculty of Medicine, The University of New South Wales</td>
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<tr>
<td>15:15-15:50</td>
<td>LECTURE 3 - Moderator: Dr. Serena Hu</td>
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<tr>
<td></td>
<td>Title: Motor Deficits from Degenerative Lumbar Compression: What's the Prognosis?</td>
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<tr>
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<td>Speaker: Dr. Christopher Bono</td>
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<tr>
<td></td>
<td>Department of Orthopaedic Surgery, Massachusetts General Hospital, Harvard Medical School, Harvard Medical School</td>
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<tr>
<td>15:50-16:25</td>
<td>LECTURE 4 - Moderator: Dr. Shin-ichi Konno</td>
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<td>Title: New patient reported outcome measures with greater precision over a wider range of scores</td>
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<td>Speaker: Dr. Shunichi Fukuhara</td>
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<td>Former Dean, Kyoto University School of Public Health</td>
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<td>16:25</td>
<td>Closing remarks</td>
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### SPECIAL POSTERS SESSION #1A: BIOLOGY

**Chairs:** Helena Brisby & Gen Inoue  
**Location:** Small Banquet Hall – Kame (5F)

| SP1 | Daphne Hingert | Signaling peptides from human mesenchymal stem cells including connective tissue growth factor enhance chondrogenesis in disc cells. |
| SP4 | Mauro Alini, S. Wangler, M. Peroglio, U. Menzel, L. Benneker, L. Haglund, D. Sakai, S. Grad | MSC homing into intervertebral discs enhances the Tie2 positive progenitor cell population, prevents cell death and induces a proliferative response. |

### SPECIAL POSTERS SESSION #1B: BIOMECHANICS

**Chairs:** Fabio Galbusera & Osamu Shirado  
**Location:** Small Banquet Hall – Tsuru (5F)

| SP7 | Helena Brisby, M. Khalil, K. Lagerstrand, H. Hebelka | Diurnal variation of vertebral T2-time investigated with T2 mapping. |
| SP9 | Alejandro A Espinoza, F. Mukhtar, G.B. Andersson, H.S. An, N. Inoue | Is the Lumbar Spinous Process a Reliable Sagittal Plane Reference Landmark? |
| SP10 | Harvinder Chhabra, M. Gupta, A. Pedaballe | Is the anatomy of failure in lumbar disc herniation clinically relevant?: a prospective study. |

### SPECIAL POSTERS SESSION #1C: REHABILITATION

**Chairs:** Jiri Dvorak & Hiroshi Hashizume  
**Location:** Small Banquet Hall – Ume (5F)

SP16 **Michele Battie** Y. Xiao, M. Fortin, J. Ahn, H. Rivaz, T. Peters
Statistical morphometric analysis of lumbar paraspinous muscles in patients with lumbar pathology

Analysis of skeletal muscle mass in women over 40 with degenerative lumbar scoliosis.

SP18 **Daniel Chepurin** U. Chamoli, K. Sheldrick, S. Lapkin, D. Scott, J. Kuan, A.D. Diwan
Bony stress in the lumbar spine is associated with disc degeneration and pain in the lower back. A retrospective case-control MRI study of patients under 25-years of age.

**SPECIAL POSTER SESSION #1D: DEFORMITY**
Chairs: Jason Pui Yin Cheung & Daisuke Togawa
Location: Small Banquet Hall – Take (5F)

SP19 **Whoan Jeang Kim** S. Hwang, S. Kim, C. Ma, J. Lee, D. Song, K. Park, W. Choy
Prevention of adjacent segmental disease after fusion in degenerative spinal disorder: correlation between segmental lumbar lordosis ratio and PI-LL mismatch for a minimum 5-year follow-up

What factors affect low back pain of patients with Adolescent Idiopathic Scoliosis average 35 years after surgery?

Spinal alignments of non-fused lumbar curve affect the disc degenerations after selective thoracic fusion in the patients with adolescent idiopathic scoliosis with a minimum 5-year follow-up

SP22 **Daisuke Togawa** S. Oe, T. Hasegawa, Y. Yamato, G. Yoshiida, T. Banno, H. Arima, Y. Mihara, H. Ushirozako, Y. Matsuyama
What Made Differences between Best and Worst Clinical Results for Adult Spinal Deformity Patients: 2-Year Follow-Up

SP23 **Daisuke Togawa** S. Oe, T. Hasegawa, Y. Yamato, G. Yoshiida, T. Banno, H. Arima, Y. Mihara, H. Ushirozako, Y. Yamada, Y. Matsuyama
Multimodal Analyses Were Required to Understand the Complaints of Adult Spinal Deformity Patients

Impact of correction surgery on activities of daily living related to Oriental life-style in adult spinal deformity patients. Survey with original ADL questionnaire.

**SPECIAL POSTER SESSION #1E: SURGERY OUTCOMES**
Chairs: Christopher Bono & Kazuhiro Hasegawa
Location: Small Banquet Hall – Matsu (5F)

Performance-Based Tests as Predictors of Patient-Reported Outcomes at 1-Year Following Lumbar Spine Surgery

SP26 **Max Jakobsson** H. Brisby, A. Gutke, M. Lundberg, R. Smeets
Physical capacity tasks assessing functional status in patients scheduled for lumbar fusion surgery were not associated with depression, pain catastrophizing, and fear of movement

SP27 **Tetsuro Ohba** S. Ebata, H. Oba, K. Koyama, H. Haro
Predictors of poor Global Alignment and Proportion score after surgery for adult spinal deformity

SP28 **Steven M Presciutti** T. Doan, M. Teklemariam, S. Sangadala, S.D. Boden, H. Drissi
The Spatial and Temporal Expression of Sclerostin and Canonical Wnt Signaling Factors in the Maturing Posterolateral Spine Fusion

SP29 **Ji-Won Kwon** J. Lee, J. Yang, K. Suk, H. Kim, S. Moon, H. Lee, B. Lee
Intraoperative real-time stress analysis using EEG and heart rate over 800 surgeries; multicenter prospective study among 12 orthopedic surgeons

SP30 **Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder
Patient outcomes following short-segment lumbar fusion are not affected by PI-LL mismatch
SPECIAL POSTER SESSION #2
Friday June 7 – 07:45 – 08:45

SPECIAL POSTER SESSION #2F: BIOLOGY
Chairs: James Iatridis & Nam Vo
Location: Small Banquet Hall – Kame (5F)

SP31 Jianru Wang F. Chen, Z. Zheng
Paraoxonase 1 (PON1) was negatively associated with intervertebral disc degeneration (IVDD).

SP32 Bao Huang X. Zhang, J. Liu, J. Chen
Notochord-like cell clusters may retard the progression of disc degeneration and mechanical pain following annular puncture injury.

Sex differences in the interaction between biomechanical tissue properties of rat intervertebral discs and mechanical pain following annular puncture injury.

Cellularity and Matrix Homeostasis during Intervertebral Disc Degeneration is Regulated via Phlpp1.

SP35 Jinwei Ying D. Ruan, S. Pei, L. Su, T. Wen, C. Xu
Injectable RADA16-I hydrogel conjugated with a bioactive short peptide from BMP-7 attenuates intervertebral disc degeneration in canine.

SP36 Nikolaos Papadimitriou H. Hebelka, A. Baranto, K. Lagerstrand, H. Brisy
Longitudinal MRI controls of intervertebral discs up to 24 months after transplantation of autologous mesenchymal stromal cells in 10 patients.

SPECIAL POSTER SESSION #2G: BIOMECHANICS, BIOLOGY
Chairs: Cornelia Neidlinger-Wilke & Miho Sekiguchi
Location: Small Banquet Hall – Tsuru (5F)

SP37 John J Costi D.B. Amin, J. Tavakoli, B.J. Freeman
Understanding the Impact of Repetitive Lifting Towards Lumbar Disc Herniation: A Clinically Relevant Biomechanical Cadaveric Study.

SP38 Laura Zengerle C. Fleege, T. Theodor Di Pauli von Treuheim, D. Vogele, M. Rauschmann, H. Wilke
Subsidence risk of vertebral body replacements using a new biomechanical in vitro test method.

SP39 Hugo Massé-Alarie S.E. Salomoni, P.W. Hodges
Complex reorganization of the nociceptive withdrawal reflexes of the trunk in people with chronic low back pain.

Inter-Level and Intra-pedicle Bone Mineral Density Distribution in the Lumbar Spine Pedicle Cortex.

A novel small compound prevented intervertebral disc degeneration via PI3K/AKT pathway.

SP42 Nam Vo D. Wang, R. Hartman, C. Han, M. Jurczak, J. Kang, J. Lee, G. Sowa
Lactate as a carbon biofuel for annulus fibrosus cells.

SPECIAL POSTER SESSION #2H: NON-SURGERY
Chairs: Ken Ishii & Fabio Zaina
Location: Small Banquet Hall – Ume (5F)

SP43 Chang-Hoon Jeon S. Kim, N. Chung, H. Lee
Clinical differences of each item of Oswestry Disability Index between the patients with lumbar spinal stenosis and lumbar disc herniation.

Therapeutic advantages of frequent physical therapy sessions for patients with lumbar spinal stenosis.

Advanced Glycosylation End Products (AGEs) in Hypertrophied Ligamentum Flavum Flavum of Diabetes Mellitus and Non Diabetes Mellitus.
Risk factors for occurrence of lumbar lesion in patients with rheumatoid arthritis

Comparison of Analgesic Effects between Chimera Decoy Oligodeoxynucleotide and Corticosteroid in the Rat Thrombin-induced Facet Joint Pain Model

Effects of exogenously administered basic fibroblast growth factor and Heme oxygenase-1 in a rat sciatic nerve injury model

**SPECIAL POSTER SESSION #2I: SURGERY TECHNIQUES**  
**Chairs:** Naresh Kumar & Kazuyuki Watanabe  
**Location:** Small Banquet Hall – Take (5F)

SP49  **Charles Ledonio** R. Frisch, T. Shirk, J. Riggleman, I.Y. Luna, D. Brooks, G. Joshua  
Comparative Effectiveness of Expandable versus Static Lateral Lumbar Interbody Fusion Devices: Two Year Clinical and Radiographic Outcomes

SP50  **Srikant N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder  
Fusion technique does not affect short-term patient-reported outcomes for lumbar degenerative disease

SP51  **Steven McAnany** A. Vaishnav, J. Wright-Chisem, M. Steinhaus, T. Albert, S. Iyer, C. Gang, S. Qureshi  
Effect of Cage Type on Immediate Post-operative Radiographic Outcomes in Single-level Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF)

SP52  **Shingo Miyazaki** K. Kakutani, Y. Sakai, T. Takada, T. Yurube, Z. Zhang, Y. Kakiuchi, Y. Kanda, R. Tsujimoto, K. Kuroda, K. Nishida  
The factor lowering the cost-utility of surgical treatment for patients with metastatic spinal tumor

Correlation of automated lumbar MRI grading with microdecompression surgical level

SP54  **Fredrik Strömqvist** N. Haren, B. Strömqvist, F. Sigmundsson, B. Rosengren, M. Karlsson  
Back pain improves after lumbar disc herniation surgery

**SPECIAL POSTER SESSION #2J: INFECTION/OSTEOPOROSIS**  
**Chairs:** Koji Akeda & Koji Otani  
**Location:** Small Banquet Hall – Matsu (5F)

SP55  **Katsuhisa Yamada** M. Takahata, K. Nagahama, A. Iwata, T. Endo, T. Onishi, H. Sudo, M. Ito, N. Iwasaki  
Epidemiology and Risk factors of Multidrug-Resistant Pyogenic Spondylitis in Thoraco-Lumbar spine

SP56  **Ping-Yeh Chiu** K. Kao, M. Hsieh, T. Tsai  
Is the sandwich vertebra at a higher risk of further fracture? -A retrospective analysis of 1,347 patients undergoing cement augmentation for osteoporotic vertebral compression fracture in a single medical center in Taiwan

Iodine-supported spinal instruments reduce surgical site infection in total en bloc spondylectomy for spinal tumors.

SP58  **Charles Fisher** O. Ayling  
The effect of peri-operative adverse events on long-term patient reported outcomes after lumbar spine surgery

SP59  **Ichiro Okano** C. Jones, S. Salzmann, C. Ortiz Miller, C. Rentenberger, J. Shue, J.A. Carrino, A.A. Sama, F.P. Cammis, F.P. Girardi, A.P. Hughes  
The Regional Effect of Lumbar Fusion Surgery on Volumetric Bone Mineral Density measured by Quantitative Computed Tomography in Adjacent Vertebrae: A Longitudinal Cohort Study

SP60  **Charles Fisher** O. Ayling, T. Alton  
National Adverse Event Profile After Lumbar Spine Surgery for Lumbar Degenerative Disease and comparison of complication rate between hospitals: A COSRN Registry Study
| GP1 | Dorthe Schoeler Ziegler | L. Carreon, M. Andersen, R. Jensen | The association between pre-operative MRI findings and surgical revision within three years after surgery for lumbar disc herniation |
| GP2 | Wing Moon Raymond Lam | Z. Liu, J. Liu, H. Wong | Systemic Diclofenac Reduces Post-Operative rhBMP-2 Induced Neuroinflammation at Lumbar Nerve Root in a Rodent Model |
| GP3 | Zhe Wang | X. Hu, Z. Luo, P. Huang, Z. Tu, F. Xie | The influence of the intervertebral disc height and intervertebral disc height index in the single segmental lumbar fusion on the radiographicadjacent segment degeneration (rASD) |
| GP7 | Takahito Fujimori | M. Miwa, M. Iwasaki, T. Oda | Cost-effectiveness of lumbar surgery in the Japanese universal health insurance system |
| GP8 | Takahito Fujimori | H. Sakaura, T. Sugiyama, D. Ikegami, K. Tateishi, Y. Mukai, N. Hosono, T. Fuji | Clinical outcomes and union rate of 2-level PLIF ~Comparison between the lumbar segments and the lumbosacral segments |
| GP10 | Nikolaos Papadimitriou | H. Hebelka, A. Baranto, H. Barreto Henriksson, A. Lindahl, H. Brisby | Autologous mesenchymal stromal cells labeled with iron used for transplantation to intervertebral discs in patients with chronic low back pain. |
| GP11 | Shane Burch | D. Jain, W. Durand, A.H. Daniels, S.H. Berven | Machine learning for predictive modeling of 90-day readmission, major medical complication, and discharge to a facility in patients undergoing surgery for adult spinal deformity: logistic regression vs. random forest |
| GP12 | Xuan Lu | Z. Zhu, J. Wu, J. Huang, L. Yu, Z. Wen, Y. Wang | Vertebral augmentation with bone cement cannot stop creep deformation of the fractured vertebra but may accelerate adjacent disc degeneration |
| GP13 | Kristin R Archer | E.R. Oleisky, J.S. Pennings, J. Hills, A. Sivaganesan, I. Khan, R. Call, C. Devin | Comparing different chronic preoperative opioid use definitions on outcomes after spine surgery |
| GP14 | Kazuyuki Watanabe | K. Otani, T. Nikaido, K. Kato, H. Kobayashi, S. Yabuki, S. Kikuchi, S. Konno | Pre-operative evaluation by the Brief Scale for Psychiatric problems in Orthopaedic Patients (BS-POP) relates to poor surgical outcomes of lumbar decompression surgery |
| GP16 | Dike Ruan | W. Li | Acellular nerve allograft seeded with SDNF and autogenic ADSCs for nerve root repairment in a beagle model |

Extensive spinal fusion surgery to correct severe deformities in patients with Parkinson’s disease or Parkinson’s syndrome: clinical outcomes over a five-year follow up

Steven McAnany L. Ricci, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi

Geographic Differences is Intraoperative Neuromonitoring during Minimally Invasive Lateral Spine Surgery

Naresh Kumar (Orthopaedic Surgery, National University Health System, Singapore)


Asymptomatic construct failure after metastatic spine tumour surgery: a new entity or a continuum with symptomatic failure?

Xu Sun C. Dui, L. Xu, S. Li, B. Qian, Z. Zhu, Y. Yu, B. Wang, Y. Qiu

Are double-level TLIFs preferable to single-level TLIF for contiguous double-level spondylolytic spondylolisthesis?

Naresh Kumar V. G, N. Ravikumar, Y. Ding, Y. Lin, R.S. Patel, N. Naresh, H. Hey, L. Lau, G. Liu

Intra-operative neuromonitoring (IONM): is there a role in metastatic spine tumour surgery?

Timothy Ganey B. Fox, D. Goss, T. Temple

Viable cellular allograft for spine fusion - clinical success comparing two surgical techniques


Factors influencing extended hospital stay in patients undergoing metastatic spine tumour surgery and its impact on survival


Association of global sagittal alignment with the adjacent segment disease after posterior lumbar interbody fusion in spondylolytic spondylolisthesis


Carbon-fiber-reinforced PEEK fixation system in the treatment of spine tumours

Giovanni Barbanti Brodano M. Girolami, S. Bandiera, S. Terzi, R. Ghermandi, G. Evangelisti, G. Tedesco, V. Pipola

Update on custom made 3D printed titanium implants for anterior column reconstruction following en bloc resection for spinal tumours

Kazunari Fushimi C. Iwai, S. Nozawa, H. Akiyama

Cortical bone trajectory screws for lumbar interbody fusion: Influence on proximal adjacent segment degeneration.

Steven McAnany A. Samuel, F. Lovecchio, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi

Acute Readmission and Reoperation after Lumbar Decompression Surgery: An Analysis of 81,365 patients

Steven McAnany A. Samuel, F. Lovecchio, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi

Benefits of Medical Optimization before Thoracolumbar Three-Column Osteotomies: An Analysis of 618 Patients

Steven McAnany A. Vaishnav, D. Patel, B. Haws, B. Khechen, K. Singh, C. Gang, S. Qureshi

Correlation between ODI and PROMIS in Minimally Invasive Lumbar Microdiscectomy

Chang-Hoon Jeon N. Chung, H. Lee, S. Moon

Neurological recovery in surgically treated traumatic conus medullaris syndrome combined with thoracolumbar fracture

Steven McAnany A. Vaishnav, D. Patel, B. Haws, B. Khechen, K. Singh, C. Gang, S. Qureshi

Correlation between ODI and PROMIS in Minimally Invasive Lumbar Decompression Surgery

Zorica Buser B. Harwin, B. Formanek, J. Wang

Reinfarction rates in patients undergoing lumbar spine procedures


Hidden blood loss in extreme lateral interbody fusion for adult spinal deformity


The titanium coated PEEK cage maintains better graft bone contact with the endplate than PEEK cage at six months after PLIF surgery: a multicenter, prospective, randomized study
GP36  **Mari Lundberg** H. Brisby, A. Gutke , O. Hägg , M. Jakobsson, H. Lotzke, R. Smeets
A Person-Centered Prehabilitation Program Based on Cognitive-Behavioral Physical Therapy for Patients Scheduled for Lumbar Fusion Surgery – A One Year Follow-Up of A Randomized Controlled Trial

GP37  **Steven McAnany** A. Vaishnav, P. Saville, S. Kirnaz, R. Navarro-Ramirez, R. Hartl, C. Gang, S. Qureshi
Immediate Restoration of Lordosis in Single-level Minimally Invasive Transforaminal Lumbar Interbody fusion (MI-TLIF): A comparison of Expandable and Static Interbody Cages

GP38  **Steven McAnany** A. Vaishnav, J. Albert, S. Iyer, C. Gang, S. Qureshi
Is the Surgical Invasiveness Index valid in Minimally Invasive Spine Surgery?

Analysis of the factors associated with having an indication for surgery in lumbar spinal stenosis

GP40  **Steven McAnany** D. Bu, S. Overley, T. Albert, A. Vaishnav, S. Iyer, C. Gang, S. Qureshi
Assessing the true cost of minimally invasive TLIF in patients with workers' compensation using TDABC

GP41  **François Porchet** V. Pittet, F. Steiger, M. Aepli, J. Vader, F. Mariaux, D. O’Riordan, A. Mannion
Is the outcome of surgery for lumbar degenerative spondylolisthesis related to the appropriateness of surgery?

GP42  **Anne F Mannion** G. Waisbord, T. Fekete, F. Kleinstück, D. Jeszenszky, D. Haschtmann
Surgical Training in Spine Surgery: Safety and Patient-rated Outcome

GP43  **Dorthe Schoeler Ziegler** R. Jensen, L. Storm, L. Carreon, M. Andersen
The association between early post-operative leg pain intensity and disability at one-year and two-years follow-up after first time lumbar discectomy

GP44  **Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder
Preoperative Depression Identified by the SF-12 Mental Component Score Affects Outcomes Following Lumbar Fusion

GP45  **Caroline Yoon** J. Kleimeyer, E. Yoon, T. Yoon
Cost Prediction Modeling of Single Level Lumbar Decompression and Fusion by Machine Learning

GP46  **Kazuyuki Watanabe** K. Otani, T. Nikaido, K. Kato, H. Kobayashi, S. Yabuki, S. Kikuchi, S. Konno
Five-year results of lumbar spinal stenosis with degenerative spondylolisthesis treated with decompression alone

GP47  **Iina Tuomainen** T. Aalto, J. Pesonen, M. Rade, M. Pakarinen, H. Kröger, O. Airaksinen
Who will do better; predicting better surgical outcomes in lumbar spinal stenosis – a prospective 10-year follow-up study

GP48  **Toshiyuki Shirahata** I. Okano, S.N. Salzmann, O.C. Sax, J. Shue, A.A. Sama, A.P. Hughes, F.P. Cammis, T. Toyone, K. Inagaki, F.P. Girardi
The Association between Surgical Level and Postoperative Thigh Symptoms among Patients Undergoing Standalone Lateral Lumbar Interbody Fusion (LLIF)

GP49  **Anne F Mannion** S. Nauer, H. Becker, F. Porchet, G. Pichierri, J. Burgstaller, J. Steurer
How reliable are measures of treatment success after surgery for central spinal canal stenosis?

Improvement effect of microendoscopic decompression surgery on low back pain of lumbar spinal stenosis and risk factors of poor outcome

GP51  **Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder
Lumbar Pedicle Morphology and Vertebral Dimensions in Isthmic and Degenerative Spondylolisthesis – A Comparative Study

GP52  **Juichi Tonosu** D. Kurosawa, T. Nishi, K. Ito , D. Morimoto , Y. Musha, H. Ozawa, E. Murakami
The association between sacroiliac joint-related pain following lumbar spine surgery and spinopelvic parameters: A prospective multicenter study

Low back pain after lumbar discectomy for disc herniation: what can you tell your patient?
GP54  **Eijiro Okada** M. Yagi, S. Suzuki, N. Fujita, N. Nagoshi, O. Tsuji, M. Nakamura, M. Matsumoto, K. Watanabe

Factors associated with bony fusion after lateral interbody fusion for adult spinal deformity

GP55  **Huan Wang** Z. Lei

The Value of Selective Diagnostic Nerve Root Block in the Treatment of Multilevel Degenerated Lumbar Spinal Stenosis


Five-year postoperative good outcomes after facet fusion using a percutaneous pedicle screw system for degenerative lumbar spondylolisthesis

GP57  **Sam Yeol Chang** H. Kim, C. Lee, B. Chang

Impact of preoperative diagnosis on clinical outcomes of oblique lateral interbody fusion for lumbar degenerative disease in a single-institution prospective cohort.


Predictors of surgical outcomes in adult spinal deformity

GP59  **Katsuhiho Sato** T. Sekine

Types of nerve root anomalies with the high risk for nerve root injury during surgery can be identified with MR Neurography

GP60  **Steven McAnany** A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi

Is PROMIS Physical Function more relevant for lumbar spinal disorders than for cervical spinal disorders?

GP61  **Chang-Hoon Jeon** S. Kim, N. Chung, H. Lee

Changes of ODI item score pattern and spinopelvic parameters after implant removal of posterior instrumented fusion for the unstable thoracolumbar fracture

GP62  **Yiqing Tao**

Facet Angle And Its Importance On Joint Violation In Percutaneous Pedicle Screw Fixation In Lumbar Vertebrae: A Retrospective Study

GP63  **Ho-Joong Kim** J. Yeom, D. Shin, B. Chang, C. Lee

The improvement of sleep quality after surgery in patients with lumbar spinal stenosis

GP64  **Hidetomi Terai** M. Hoshino, H. Toyoda, A. Suzuki, S. Takahashi, K. Tamai, S. Ohyama, Y. Hori, H. Nakamura

Anterior reconstruction surgery for osteoporotic vertebral fractures.

GP65  **Shuta Ushio** T. Hirai, T. Yoshii, A. Okawa

Preoperative risk factor of adjacent segment degeneration after two-levels floating posterior fusion at L2-L4 or L3-L5 levels


How does the preoperative HR-QOL affect the postoperative satisfaction of patients with degenerative lumbar spondylolisthesis who underwent surgery?

GP67  **Steven McAnany** S. Virk, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi

Does pre-operative muscle health impact pre-operative health related quality of life scores for patients with lumbar pathology?


Prospective multicenter surveillance and risk factor analysis of deep surgical site infection after posterior instrumented fusion surgery of the thoracolumbar spine for degenerative diseases

GP69  **Norio Numata** H. Murakami, H. Endo, D. Yamabe, S. Yoshida, T. Kikuchi, T. Usui, M. Doita

Evaluation of the Surgical Stress in the Lumbar Interbody Fusion Using E-PASS Scoring System

GP70  **Dike Ruan** H. Li, L. Shi, C. Zhang, L. Hou, C. Li

46 cases of spinal surgical site infection (SSI) in 4922 patients and the risk factors analysis

GP71  **Masahiko Seki** Y. Hori, A. Yabu, M. Terakawa, H. Nakamura

Microsurgical bilateral decompression via a unilateral approach using tubular retractor can improve lumbar spinal canal stenosis patients with scoliotic disc wedging if they have not foraminal stenosis

GP72  **Kiyoshi Yagi** N. Suzuki, K. Kato, A. Kondo, J. Mizutani

Anatomical importance of the anterior part of segmental artery and vein to prevent vascular injury by anterior retractor at Lateral Lumbar Interbody Fusion (LLIF) or Anterior Column Realignment (ACR) technic

GP73  **Sang-Il Kim** K. Ha, Y. Kim, H. Park

Surgical Outcomes For Late Neurological Deficits After Long Lumbar Instrumented Fusion For Degenerative Lumbar Diseases
A Retrospective Review of Transforaminal Lumbar Interbody Fusion Patients Treated with Expandable and Static Spacers

Minimally Invasive Sacroiliac Joint Fusion Using a Novel Hydroxyapatite-Coated Screw: Two-Year Clinical and Radiographic Outcomes

Incidence and characteristics of postoperative vertebral fractures after fusion surgery in elderly patients

Large PI is a risk factor for the progression of scoliosis in patients with lumbar spinal canal stenosis and degenerative lumbar scoliosis.

Effect of HRQOL and radiographic parameters on minimum posterior decompression in patients with lumbar spinal canal stenosis with spinal sagittal imbalance

Changes in Pelvic Incidence after long spinal fusions for adult deformity

Frailty status as a predictor of discharge disposition following posterior decompression surgery in the patient with lumbar spinal stenosis: a multi-center study using prospectively collected data

Recurrent lumbar disc herniation following percutaneous transforaminal endoscopic discectomy preferentially occured when Modic changes are present

Bone Mineral Density Screening in Patients Who Are Lumbar Total Disc Replacement Candidates

Correlation analysis of sagittal alignment and skeletal muscle mass in patients with spinal degenerative disease - Comparative study between cervical spine group and lumbar spine group

Comparison of Reoperation Rates after Fusion Surgeries for Spondylosis between Cervical And Lumbar Regions: National Population-Based Administrative Database Study

Patient satisfaction with surgery for single-level degenerative lumbar spondylolisthesis: a prospective multicenter study

The Effect of Pre-Operative Epidural Steroid Use on Volumetric Bone Mineral Density in Patients Undergoing Lumbar Fusion Surgery Measured by Quantitative Computed Tomography

Cost-Effectiveness for Posterior Lumbar Fusion in Patients Aged 80 Years or Older

Progressive Pedicle Screw Accuracy in Clinical Utilization of Navigated-Robot-Assisted Spine Surgery

Perioperative Risk Factors for Early Revisions in Stand-alone Lateral Lumbar Interbody Fusion

Analysis of risk factors for proximal kyphosis after adult degenerative scoliosis
Does the actual lordosis gain following use of interbody grafts in fusion operations match the expected gain based on the lordosis of graft itself?

Increased PT/SS may play an important role in the pathogenesis of lumbar spondylolisthesis with degenerative lumbar scoliosis

Spinal cord stimulation therapy has the effect of reducing overdose drugs for chronic severe pain patients

Difference in the Amount of Analgesics Used after Spinal Posterior Fusion Surgery: Comparison between Regular and On-demand Prescription

Pre-operative muscle health impacts the time it takes to reach minimally clinically important differences in health related quality of life scores for one level lumbar fusions

What makes the early outcome of spinal metastasis surgery unsatisfactory? A retrospective study

Insufficient augmentation of bone cement causes recompression of the augmented vertebra after balloon kyphoplasty

Spike vs. Keel: Does Endplate Design of Lumbar Artificial Discs Affect Radiographic Outcomes?

Are there any cultural and social differences

Chronic compartment syndrome engaging the erector spina muscles in the lumbar spine can develop into an acute compartment syndrome
The strategy for osteoporotic vertebral fracture based on its fracture types

Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF) vs Minimally Invasive Lateral Lumbar Interbody Fusion (MI-LLIF): A comparison of immediate post-operative outcomes for the assessment of decompression

Anatomical study of the lumbar segmental artery and vein to prevent vascular complications during lateral lumbar interbody fusion

Hand grip strength can be a useful surrogate marker for postoperative changes in spinopelvic alignment in patients with lumbar spinal stenosis

Penetrating endplate screw for spinal fractures with diffuse idiopathic skeletal hyperostosis (DISH)

Stabilizing the Unstable Osteoporotic Vertebral Fracture is Critical to Preventing the not only the pain but also Further Progression of Spinal Canal Stenosis due to Fractured Vertebrae

Depression and Anxiety Influence Patient Reported Outcomes after Lumbar Fusion

An anatomical analysis of the lumbar segmental artery in the oblique lateral corridor in lumbar spine: Existence of “L5 segmental artery

Factors Leading to Postoperative Pain in Adolescent Idiopathic Scoliosis Patients Including Sagittal Alignment and Lumbar Disc Degeneration

Does the duration to the surgery affect the reduction of fractured vertebra in posterior short-segment fixation for thoracolumbar burst fractures?

The long and short of it: outcome assessment using the SRS-instrument in patients with adult spinal deformity

Impact of Age on Outcomes Following Degenerative Scoliosis Surgery

Clinical impact of sarcopenia for the outcome of minimally invasive lumbar decompression surgery

Correlation between ODI, PROMIS and SF-12 in Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF)

Aneurysmal bone cyst of the spine: treatment by concentrated bone marrow injection

Comparison of Perioperative Complications between Anterior Fusion and Posterior Fusion for Thoracolumbar Vertebral Fractures in Elderly Patients: Propensity Score Matching Analysis using Diagnosis Procedure Combination Database

Risk factors of pulmonary embolism after lumbar spine surgery

Predictors of clinical outcome following surgery for lumbar spinal stenosis: a study of postoperative pain and disability trajectories
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Serum oxidative stress reflects the severity of neurological damage in patients with lumbar canal stenosis: a pilot cross-sectional human study

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A novel therapeutic strategy for 3′ untranslated region of neuropathic pain target genes

GP182 **Ichiro Okano** S. Salzmann, C. Ortiz Miller, C. Rentenberger, J. Shue, J.A. Carrino, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes
The Impact of Degenerative Disc Disease on Regional Volumetric Bone Mineral Density (vBMD) measured by Multicenter Computed Tomography

Risk factors and progression rate of sacroiliac joint degeneration in asymptomatic subjects

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A prevention project for low back disorders in Japanese elite swimmers: 10 years follow-up of lumbar intervertebral disc degeneration

Poor flexibility is negative predictive factors of bone union in adolescent athletes with spondyloysis

The Effects of Abdominal Draw-in Maneuver on Electromyographic Activities in Response to a Sudden Release from Loading in Subjects with Non-specific Chronic Low Back Pain

Automatic segmentation of paravertebral muscle image of lumbar vertebrae MRI by artificial intelligence in young men of northern China

Comparison of the physical activity of the upper limbs and trunk in patients with low back pain evaluated using a wearable tracker: a validation study

Relationship between the Vitamin D Concentration and Bone Turnover Marker Levels in Patients Undergoing Spinal Surgery

Prevalence and risk factors for low back pain in male college athletes

Paresthesia in the soles of the feet correlates with myelopathy in spinal disease

Significance of vitamin D in low back pain in the elderly

Lumbar spine facet joint osteoarthritis in professional athletes

Angiogenesis in a moderately degenerated ligament is one of the causes of ligamentum flavum hematoma

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Does the level of occurrence of vertebral body fractures and disc degeneration affect spinal alignment and low back pain? – The Wakayama Spine Study

Paravertebral Muscles Show Cross Activation in Double but also in Single AIS curves, with a Correspondent Oxygen Consumption: An Electromyographic and Near Infrared Spectroscopic Study

The effect of Runx2 mixed with cell penetrating peptide on differentiation of mesenchymal stem cells into osteoblasts.

The Associations between Bone Material Properties Measured by Fourier Transform Infrared Spectroscopy (FTIR), Bone Microstructure, and Bone Mineral Density among Caucasian Patients Undergoing Lumbar Spinal Fusion
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Correlation between osteoporotic vertebral fracture and abdominal trunk muscle strength in the elderly women

Relationship between spinopelvic parameters and chronic neck, back and multiregional pain

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Association between low back pain prevalence and work engagement in Japanese hospital workers

Chronic coccydinia treated conservatively with a 3-year follow up. A series of 120 patients

Multidisciplinary pain management program for the patients with chronic low back pain in Japan

Can the conventional MRI substitute for the 3D-MRI to diagnose lumbar foraminal stenosis?

Hypertrophy of the Ligament Flavum in Degenerative Lumbar Stenosis Associated with Fibrosis Induced by Macrophage

Relationship among spinal alignment, bone mineral density, and muscle mass in elderly osteoporosis patients

Severe lumbar intervertebral disc degeneration is associated with Modic changes and fatty infiltration in the paraspinal muscles at all lumbar levels, except L1-L2: A cross-sectional analysis of 50 symptomatic females and age-matched 50 symptomatic males

Poor posture causes shoulder girdle muscles hypoactivity and lower back muscles hyperactivity during using a smartphone

The importance of mechanical forces affecting for the union of osteoporotic vertebral fracture

An investigation of infective endocarditis as a complication of vertebral osteomyelitis

Analysis of lumbar trunk muscles in healthy volunteers using surface electromyography during postoperative exercise programs for lumbar spine surgery

Low back pain among 906 nurses :Is the prevalence higher in orthopedics wards?

The Early Bird Catches The Worm: Do paraspinal muscle fatty infiltration and intervertebral disc degeneration start earlier than expected?

The evaluation of computed tomography Hounsfield units before and after treatment of spinal metastatic tumor of lung cancer

Japanese version of Bad Sobernheim Stress Questionnaire-Brace for Adolescent Idiopathic Scoliosis patients

Is spinal deformity related to the aerobic capacity of patients with adolescent idiopathic scoliosis? A systematic review.

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An accepting attitude and lack of negative cognition leads to less pain and disability related to chronic low back pain 

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Relationship among osteoporosis, sarcopenia, locomotive syndrome, and spinal kyphosis in elderly living in a local mountain area

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Assessment of lumbar changes over 8 years in hemodialysis patients

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Lumbar spinal stenosis, knee osteoarthritis and loss of lumbar lordosis have an impact on quality of life: findings from the Katsuragi Low Back Pain Study

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Examining the sport-specific impact on intervertebral disc degeneration: a cross-sectional analysis of 308 athletes

Lumbar facet effusion and paraspinal edema in the patients with lumbar spondylodiscitis

Development and enlargement of ossification of the ligamentum flavum in the thoraco-lumbar spine in Asian professional baseball players: comparison with age- and sex-matched control subjects

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Changes in sagittal alignment in upslope or downslope: An insight into dynamic spinal stenosis symptomatology

Short time clinical outcome of Chondriase injection therapy for lumbar disc herniation

Effects of bracing on head and pelvis sagittal alignment in adolescent idiopathic scoliosis

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Impact of Total Hip Arthroplasty for Low Back Pain and Radiological Spinopelvic Sagittal Parameters in Patients with Hip Diseases

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The association between narrow cross-sectional area of lumbar dural sac and lower limb numbness in a Japanese population

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Intramuscular oxygenation of lumbar multifidus in different trunk positions in sitting

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Relationship between hip muscle flexibility and low back pain during lumbar flexion and extension

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Does magnitude of dorsal tube compression induce fall?  –A prospective one-year follow-up in the community

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Comparative analysis of sarcopenia and back muscle degeneration in back pain and new risk index of back muscle degeneration
Therapeutic effects of gefitinib-encapsulated thermosensitive injectable hydrogel in intervertebral disc degeneration


The effect of total hip arthroplasty on the low back pain and lumbar spine function in hip patients with or without scoliosis in lumbar spine.

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Caudal Epidural Block for Lumbar Spine Disease

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Pelvic incidence: computed tomography study evaluating correlation with sagittal sacropelvic parameters


Characteristics of neuropathic pain due to lumbar spine disorders: Relationship with recognition of pain, psychiatric problems, and HR-QoL

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A new classification of micro-damaged cartilaginous endplates in the degenerative discs

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Function of MMP12 In Myofibroblastic Differentiation of NP Cells And Disc Degeneration

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A Resource Efficient Novel MRI Post Processing Technique for the Assessment of Intervertebral Disc Degeneration - Correlation with Histological Grading in a Rabbit Disc Regeneration Model.

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Pathological and MR Imaging Evaluation of Articular Cartilage Degeneration in the Human Zygaphophysial Joint


Involvement of ATG5-dependent autophagy in the maintenance of rat intervertebral disc homeostasis in vitro and in vivo

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The potential role of stromal cell-derived factor 1α in promoting recruitment and chondrogenic differentiation of nucleus pulposus-derived stem cell via SDF-1/CXCR4 axis for intervertebral disc regeneration


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Promoting nucleus pulposus progenitors-like differentiation from mesenchymal stem cells via MAP kinase coupled chondrogenic induction

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Scaffold-Free Tissue Engineering with Aligned Bone Marrow Stromal Cells Sheets to Recapitulate the Microstructural and Biochemical Composition of Annulus Fibrosus

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Repetitive Changes in Hydrostatic Pressure at High Osmotic Pressure Have a Potential to Reproduce Homeostasis in Human Nucleus Pulposus


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Crocin exhibits anti-inflammatory effects by suppressing the activation of JNK in IL-1β treated human annulus fibrosum cells.

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Crocin exhibits anti-inflammatory effects by suppressing the activation of JNK in IL-1β treated human annulus fibrosus cells.

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Crocin exhibits anti-inflammatory effects by suppressing the activation of JNK in IL-1β treated human annulus fibrosus cells.

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Shox2 inhibits inflammatory response in nucleus pulposus cells and intervertebral disc degeneration associated pain behavior in vivo

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A link of disc degeneration to increased myofibroblast and fibrocyte-like activity

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Sarcopenia affecting low back pain in patients with lumbar spinal stenosis
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The Relationship between Degree of Scoliosis and Body Composition In Adolescent Idiopathic Scoliosis

The pelvic incidence value is inversely correlated with the true acetabular anteversion angle value

Estimation of a Density-Elastic Modulus Equation for Improved Vertebral Fracture Risk Prediction

Biomechanical stability of pedicle versus cortical screws in the lumbar spine

Length of Fusion is a Significant Risk Factor In Development of Adjacent Disc Disease in a normal and osteoporotic Lumbar Spine : A Finite Element Study

Associations between accumulated Advanced Glycation End-products, revealed by skin autofluorescence, and chronic low back pain

Thoracic kyphosis and pelvic anteversion increases during walking in patients with adult spinal deformity: analyses of dynamic alignment change with three-dimensional gait motion analysis system

The classification of lumbopelvic sagittal alignment based on the difference between standing and sitting position

Gait features for discriminating between mobility-limiting musculoskeletal disorders: lumbar spinal stenosis and knee osteoarthritis

A pilot study of forward bending, lateral flexion and axial rotation of the spine in healthy subjects

Three-dimensional assessment of the lumbar spine motion in vivo using the EOS stereography system : intra- and inter- observer reproducibility study

Biomechanical comparison of degenerative spondylolisthesis models between L4-L5 and L5-S1 segments

Sestrins inhibits stress-induced intervertebral disc degradation by enhancing autophagy

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