



ISSLS 2018

45TH ANNUAL MEETING

Banff, Canada • May 14–18, 2018

The International Society for the
Study of the Lumbar Spine



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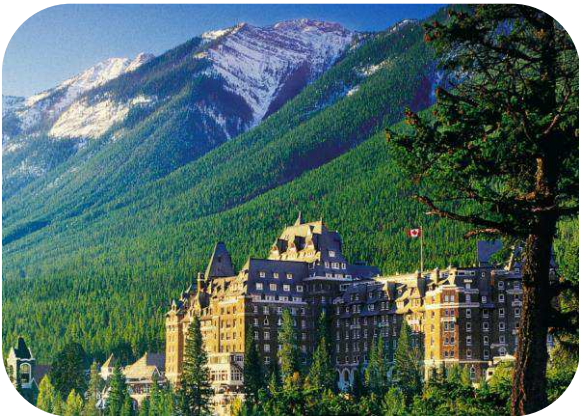
ISSLS 2019

Kyoto JAPAN



Please join us for the 46th ISSLS Annual Meeting June 3-7, 2019 • Kyoto, Japan

WELCOME TO BANFF



Dear Members and Guests,

It is our great honor to welcome you on behalf of the Local Organizing Committee to this 45th Annual Meeting of the International Society for the Study of the Lumbar Spine (ISSLS) in Banff, Canada.

After the very first annual meeting of ISSLS in 1974 in Montreal, it fills us with pride that this year marks the 5th time that our country is hosting this prestigious meeting with delegates traveling from all over the globe.

Banff is one of the most precious and protected places in this world. Visitors can experience the landscape of breathtaking Canadian Rocky Mountains, glacier-fed lakes and, with some luck, wildlife at its best. Our Half-Day Excursion will bring us to Lake Louise. Its mesmerizing emerald water comes from the melt-water of nearby glaciers. When back at the Fairmont Banff Springs hotel, the luscious spa facilities and heated outdoor pool will permit you to rest well. For the Banquet we will spend an unforgettable evening at Brewster's Mountain Lodge, with everyone entrenched in a Canadian style rodeo theme, spoiled with a hearty traditional Canadian barbeque.

The Fairmont Banff Springs hotel is an UNESCO World Heritage site and stands as a landmark in the picturesque alpine town of Banff. The hotel is sometimes called the "Castle of the Rockies". You will understand why the very second when entering its premises! It will lend itself well to a spectacular coulisse for the very reputed Scientific Meeting with its respected International Faculty. For a contribution outside our comfort zone of spinal sciences, we have invited three inspiring guest speakers that will speak on topics including happiness, arctic exploration and overcoming obstacles. We have also added two exciting symposia this year focusing on digital health and precision medicine for spine providers. Last but not least, we welcome the Spine Section of the Orthopaedic Research Society (ORS), who will join us this year with a co-hosted superb workshop on Monday afternoon entitled "Novel Therapeutics for Spinal Disorders and Low Back Pain: from Bench to the Bedside".

We look forward to welcoming you at the 45th Annual Meeting of ISSLS in Banff!

Sincerely,

Christy Tomkins-Lane
Thomas Steffen
(local co-hosts)

WI-FI AND SOCIAL MEDIA

Name of Wi-Fi: Fairmont_Meeting

Log-in: ISSLS2018

Twitter: https://twitter.com/ISSLS_Society

Instagram: @ISSLS_2018 (ISSLS Banff 2018)

Hashtag for conference: #issls2018

MESSAGE FROM THE PRESIDENT



Dear friends and colleagues,

On behalf of the ISSLS Executive Committee it gives me great pleasure to welcome you all to our 45th Annual Meeting at the historic town of Banff high in the Canadian Rockies. Our local hosts Drs Christy Tomkins-Lane and Thomas Steffen together with the local organizing committee have worked hard to ensure an unforgettable experience in Banff. I would also like to express our thanks to the Program Committee under the leadership of Dr Serena Hu and the many volunteer abstract reviewers for a comprehensive program based on scientific presentations and symposia.

Once again, we will have the opportunity to learn from high-quality research and active discussions.

The award ceremony on May 17th will honor one of our respected senior members with the Wiltse Lifetime Achievement Award. The prestigious ISSLS Prizes will be presented at a special session on the same day.

Invited Lectures have always been the highlights of our Annual Meeting, and this year makes no exception. We are honored to have three excellent invited speakers who will share with us their expertise on empowering Inuit girls and young women, on the power of happiness, and on overcoming obstacles to reach our full potential. The variety of topics promises exciting presentations that nobody should miss.

The traditional ISSLS outing will give us an opportunity to explore the Banff National Park, a UNESCO World Heritage Site since 1985, which has been described as one of the world's most awe-inspiring mountain destinations. We will end the tour with an evening in true Canadian style at Wild Bills Legendary Saloon in downtown Banff.

On the afternoon prior to the ISSLS Annual Meeting, a workshop organized by the Spine Section of the Orthopaedic Research Society will focus on "Novel Therapeutics for Spinal Disorders and Low Back Pain: from Bench to the Bedside". Please join us for this exciting symposium.

Looking forward to seeing you all in Banff.

Teija Lund

President ISSLS 2017-2018

FELLOWSHIPS AND AWARDS

Young Investigator Travel Award sponsored by Eisai Co.

Prize ceremony for the recipients will be during the Fellowship Award Ceremony, Thursday May 17, at 09:30

Clinical Traveling Fellowship sponsored by Seoul Chuk Hospital

The winner will be announced during the Fellowship Award Ceremony, Thursday May 17, at 09:30

ISSLS Research Grant sponsored by Taisho Pharmaceutical Co.

The winner will be announced during the Fellowship Award Ceremony, Thursday May 17, at 09:30

ISSLS Wiltse Lifetime Achievement Award

A yearly award for exceptional achievement in the spinal field. This award will be announced at Fellowship Award Ceremony, Thursday May 17, at 09:30

The ISSLS Prize for Lumbar Spine Research sponsored by European Spine Journal

The ISSLS Prize winning papers will be presented on Thursday, May 17, at 10:20

Best Paper and Poster Award sponsored by Ono Pharmaceutical Co.

The two best paper and poster presentations will be announced during Closing Remarks on Friday May 18, at 12:00

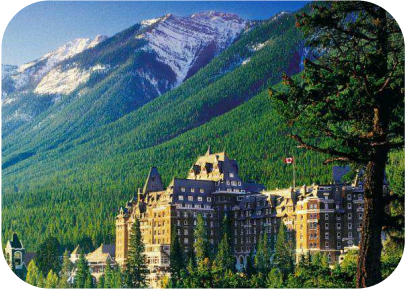
UPCOMING MEETINGS

- 2019, June 3 - 7, Kyoto, Japan
- 2020, April 27 - May 1, Melbourne Australia
- 2021, Milan, Italy (dates not decided yet)

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



The **Welcome Reception** will be held at the Fairmont Banff Springs Hotel.

Time: Monday May 14, at 18:00

- Passed Canapés & Drinks
- Live music for all to enjoy!

Dress code: Formal

AFTERNOON OUTING – LAKE LOUISE TOUR



Enjoy a half day tour and travel the scenic route to **Lake Louise** – the most famous glacial lake in the Canadian Rockies

Time: Wednesday May 16, buses depart at 13:00

Lunch: A boxed lunch will be served

Wear casual, comfortable shoes, possibly warm jacket/coat



At the end of the tour guests will be dropped off at **Wild Bills Legendary Saloon** in downtown Banff to enjoy an assortment of food stations, drinks and a ride on Ebenezer the mechanical bull! Bring your boots and cowboy hat for a fun ride. Yeehaw!

There will be buses from Wild Bills to the Fairmont, the first shuttle will depart at 19:15 and the last will depart at 22:00.

GALA DINNER AT MOUNT VIEW BARBECUE



Time: Thursday May 17, First bus departs at 18:30

Dress code: Smart casual

The Gala Dinner will be at Mount View Barbecue, a venue that offers a truly unique, Western Canadian experience! This event at Mount View Barbecue will be an unforgettable evening, and a highlight of your visit to the mountains!

- Buffet Dinner & Drinks
- Whiskey Tasting Bar
- Live band with Line Dancing
- Photo Opportunities with Royal Canadian Mounties

ACCOMPANYING PERSONS PROGRAM

(Included in registration fee for all fully registered accompanying persons. Additional tickets may be purchased at the registration desk, pending availability)

COLUMBIA ICEFIELD & GLACIER SKYWALK



Day: Tuesday May 15, Bus departs at 08:00 (9-10 hours)

Lunch: Buffet Lunch at the Icefield Chalet

Be sure to bring warm clothes, gloves, toques, warm jacket and durable footwear.

Spend the day exploring one of the most scenic highways in the world. The Icefield Parkway offers an ever-changing view of waterfalls, turquoise lakes, alpine meadows, snow-capped peaks and glaciers. Getting to the Columbia Icefield is a remarkable attraction in itself!



The Columbia Icefield is the largest sub-polar body of ice in North America and is one of the reasons why the United Nations declared Canada's four Rocky Mountain Parks a World Heritage Site. It covers an area of nearly 325 square kilometers, sometimes reaching a depth of 300-360 meters (1150 feet) deep. The Ice Explorer Glacier Tour takes you onto the surface of the Athabasca Glacier in a unique, specially designed Ice Explorer. This Ice Age adventure is a once in a lifetime experience! *Caution is advised – the ice surface may be wet and slippery.*

WORLD HERITAGE SITE



Day: Thursday May 17, Bus departs at 08:00 (5 hours)

Lunch: Light Lunch at Toque Canada

Be sure to bring warm clothes, gloves, toques, warm jacket and durable footwear.

The tour begins with a trip to Cave and Basin National Historic Site. This historic site preserves the stories of the hot springs that have drawn visitors to Banff since three railroad workers stumbled across them in 1883. The classic bath houses, sulphuric mineral springs, and interactive displays will transport you back in time to relive the origin of Banff and Lake Louise and Canada's National Park system.



Guests will be treated to a stop at Bankhead, the abandoned mining town, a relic of Banff's industrial past!

INVITED SPEAKERS

(more information about the speakers can be found in the ISSLS meeting app)

JENNIFER MOSS - TUESDAY MAY 15, 11:30 – 12:15



Title of Lecture: How to Energize Healthcare Professionals for Better Patient Care

In a provocative and illuminating new talk, bestselling author and researcher, Jennifer Moss, shares ground-breaking and novel research on issues facing healthcare professionals today. Jennifer will discuss the serious impact of empathy fatigue, burnout, depletion and anxiety on health professionals and how that influences patient care. Jennifer's talk includes real-world case studies from her first-hand experience working with administrators and front-line staff in hospitals, and government agencies.

Twitter: @jenleighmoss

LinkedIn: <https://www.linkedin.com/in/jenleighmoss/>

SUSAN EASTON - WEDNESDAY MAY 16, 11:40 – 12:20



Harry Farfan Presidential Lecture

Title of Lecture: Empowering the Next Generation of Inuit Woman Leaders in Canada's Arctic

The Sedna Epic Expedition is comprised of an international team of women ocean explorers, scientists, journalists, movie-makers, photographers, artists, educators, and medical and scuba diving professionals.

Twitter: @SusanREaton_Geo

LinkedIn: <https://www.linkedin.com/in/susan-r-eaton-13037a7/>

Website: <http://www.susanreaton.com/>

MARTIN PARNELL - THURSDAY MAY 17, 11:30 – 12:15



Title of Lecture: Ordinary to Extraordinary - One Step at a Time

Martin shares his message of having a "Finish the Race Attitude – Setting goals and overcoming obstacles to unlock your potential". Martin's first book "MARATHON QUEST" was published by Rocky Mountain Books and CBC Radio listed him as one of Alberta's top five authors, for 2014.

His second book, "RUNNING TO THE EDGE", was released in November 2016.

Face book: @MarathonQuest250

Twitter: @MartinJParnell

LinkedIn: <https://www.linkedin.com/in/martinparnell/>

Website: www.martinparnell.com

SPECIAL WORKSHOP MAY 14

Organized by: The Spine Section of the Orthopaedic Research Society

Day and Time: Monday May 14, 14:00-17:00

Separate registration: fee \$50

Organizers: Lisbet Haglund, Ph.D. – McGill University, Canada & Lachlan Smith, Ph.D. – University of Pennsylvania, USA

Novel Therapeutics for Spinal Disorders and Low Back Pain: from Bench to the Bedside

14:00-14:05 Welcome and introduction

Session 1: Novel Therapeutic Approaches and Preclinical Translation

Moderators: Lisbet Haglund, Ph.D. McGill University, Can & James Kang, M.D. – Harvard University, USA

14:05-14:25 Treating discogenic pain with intravertebral electrothermal nerve ablation
Jeffrey Lotz, Ph.D. – University of California San Francisco, USA

14:25-14:45 Annulus fibrosus repair using adhesive biomaterials
James Iatridis, Ph.D. – Icahn School of Medicine at Mt Sinai, USA

14:45-15:05 Preclinical optimization of an injectable hydrogel and stem cell therapy for moderate severity disc degeneration
Lachlan Smith, Ph.D. – University of Pennsylvania, USA

15:05-15:25 *Panel Discussion*

15:25-15:40 **COFFEE**

Session 2: Clinical Translation

Moderators: Cornelia Neidlinger-Wilke, Ph.D. – University of Ulm, Germany & Ashish Diwan, M.D. University of New South Wales, Australia

15:40-16:00 Diagnosis and pain management of Modic changes
Jaro Karppinen, M.D. Ph.D. – University of Oulu, Finland

16:00-16:20 Intradiscal stem cell injection to treat patients with discogenic low back pain: overview and preliminary results from the RESPINE clinical trial
Gianluca Vadala, M.D. – Campus Bio-Medico University of Rome, Italy

16:20-16:40 Designing and executing a first-in-human clinical trial to evaluate IDCT, a cell therapy to treat lumbar degenerative disc disease
Lara Silverman, Ph.D. – Discgenics Inc, USA

16:40-17:00 *Panel Discussion*

MONDAY MAY 14

- 07:00–08:00 **Program Committee Meeting** *(for program committee only)*
Chair: Serena Hu
Location: Oak Room
- 08:00-09:00 **Membership Committee Meeting** *(for membership committee only)*
Chair: Kazuhiro Chiba
Location: Oak Room
- 09:00-12:00 **Focus Group #1: Degenerative Spinal Phenotypes Focus Group**
Chairpersons: Michele C. Battié, Dino Samartzis, Josef Assheuer, Bradley Weiner
Location: Ivor Petrak
- 09:30-11:30 **Strategy Group Meeting**
Chairperson: James D Kang
Location: Oak Room
- 12:00-15:00 **Executive Committee Meeting**
Chairperson: Teija Lund
Location: Oak Room
- 13:00-16:00 **Focus Group #2: International Taskforce on Diagnosis and Management of Lumbar Spinal Stenosis**
Chairpersons: Christy Tomkins-Lane and Markus Melloh
Location: Ivor Petrak
- 14:00-17:00 **ORS Spine Section/ISSLS Workshop - Novel Therapeutics for Spinal Disorders and Low Back Pain: from Bench to the Bedside**
Chairpersons: Lisbet Haglund and Lachlan Smith
Location: Cascade Ballroom
- 15:00 **Registration opens**
- 17:00-18:00 **Women's ISSLS**
Chairpersons: Gwendolyn Sowa and Grace O'Connell
Location: Ivor Petrak
- 18:00–20:00 **Welcome Reception**
Location: Alberta/New Brunswick/Riverview

TUESDAY MAY 15

OPENING CEREMONY

07:45 - 07:50 **WELCOME** - *Thomas Steffen & Christy Tomkins Lane*

07:50 - 08:00 **PROGRAM CHAIRMAN** - *Serena Hu*

SESSION #1 DISC DEGENERATION/HERNIATION

Chairs: Teija Lund & Kazuhiro Chiba

- 08:00-08:05 1 Normalization of spinal cord displacement during the straight leg raise with resolution of sciatica in patients with lumbar intervertebral disc herniation: a 1.5 year follow-up study
*J Pesonsn, **M. Rade**, M. Könönen, J. Marttila, M. Shacklock, R. Vanninen, M. Kankaanpää, O. Airaksinen, Finland*
- 08:07-08:12 2 Neonatal mouse intervertebral discs restore function following herniation injury
O.M. Torre, *R. Das, R.E. Berenblum, A.H. Huang, J.C. Iatridis, USA*
- 08:14-08:19 3 Does inflammatory stimulation and mechanical loading weaken the annulus fibrosus? Preliminary investigations in a bovine AF-organ-culture approach
*T. Saggese, L. Moll, K. Wade, A. Weigl, G.P. Teixeira, A. Ignatius, H. Wilke, **C. Neidlinger-Wilke**, Germany*
- 08:21-08:26 4 Macrophage-derived inflammatory cytokines promote upregulation of pain-related molecules in degenerated human intervertebral discs
M. Miyagi, *K. Uchida, S. Takano, M. Nakawaki, J. Aikawa, H. Sekiguchi, G. Inoue, T. Nakazawa, T. Imura, W. Saito, E. Shirasawa, M. Takaso, Japan*
- 08:28-08:33 5 Age-related molecular changes in the intervertebral disc of natural aging rabbits
*Z. Wang, W. Hutton, **S. Presciutti**, T. Yoon, USA*
- 08:35-08:40 6 Wnt5a suppresses inflammation-driven intervertebral disc degeneration via a TNF- α - Wnt5a negative-feedback loop
H. Liu, *Z. Li, J. Wang, X. Li, Z. Zheng, China*
- 08:42-09:00 *Discussion*

SESSION #2 DISC DEGENERATION/HERNIATION

Chairs: Gianluca Vadalà & Nam Vo

- 09:00-09:05 7 Spine-on-a-chip; Human annulus fibrosus degeneration model for simulating the severity of IVD
*M. Hwang, **J.H. Kim**, H. Moon, H. Choi, South Korea*
- 09:07-09:12 8 Ingrowth of nerves and blood vessels into degenerated intervertebral discs requires free surfaces
*P. Lama, C. Le Maitre, I. Harding, P. Dolan, **M. Adams**, UK*

TUESDAY MAY 15 (continued)

- 09:14-09:19 9 Traceability of mesenchymal stromal cells after transplantation into degenerated discs in patients with low back pain
HBH Barreto Henriksson, N.N. Papadimitriou, D.D. Hingert, H.H. Brisby, Sweden
- 09:21-09:26 10 Dietary advanced glycation end products cause murine intervertebral disc stiffening
D. Krishnamoorthy, R. Hoy, O.M. Torre, D. Natelson, J.C. Iatridis, **S. Illien-Junger**, USA
- 09:28-09:33 11 Comparison of inflammaging in cervical and lumbar degenerated intervertebral discs: analysis of proinflammatory cytokine and TRP channel expression
A. Sadowska, E. Touli, W. Hitzl, H. Greutert, S. Ferguson, K. Wuertz-Kozak, O. Hausmann, Switzerland, Austria, Germany
- 09:35-09:40 12 Human Wharton's jelly cells activate degenerative nucleus pulposus cells in vitro
Z. Han, Y. Zhang, D. Ruan, China

09:42-10:00 Discussion

10:00-10:30 COFFEE

SESSION #3 DISC REGENERATION

Chairs: Ashish Diwan & Si Young Park

- 10:30-10:35 13 Ex vivo biomechanical evaluation of a combined annulus fibrosus and nucleus pulposus hydrogel repair in a large animal model of severe intervertebral disc herniation injury
W.W. Hom, H.A. Lin, N. Korda, J.S. Desai, P. Nasser, A.C. Hecht, S.B. Nicoll, **J.C. Iatridis**, USA
- 10:37-10:42 14 Regenerative potential of the intervertebral disc by using the Low Adhesive Scaffold Collagen (LASC_{ol})
Y. Takeoka, T. Yurube, S. Kunii, K. Morimoto, N. Fukase, T. Takemori, Y. Kakiuchi, M. Ito, Y. Kanda, K. Kakutani, T. Takada, R. Kuroda, K. Nishida, Japan
- 10:44-10:49 15 Effective disc height restoration following hydrogel injection is dependent on degeneration severity
S.E. Gullbrand, T.P. Schaer, J.R. Bendigo, G.R. Dodge, E.J. Vresilovic, D.M. Elliott, R.L. Mauck, N.R. Malhotra, **L.J. Smith**, USA
- 10:51-10:56 16 Blunting age-associated intervertebral disc degeneration in old mice by exposure to young circulatory factors
Patil, P, Wang, D, Dong, Q, Ngo, K, Li, V, Lei, C, Colangelo D² Niedernhofer, L, Robbins P.D., Wyss-Coray, T, Lee, J, Sowa, G **Vo N.**, USA
- 10:58-11:03 17 Autologous nucleus pulposus cell-seeded hydrogel implantation to isolated human intervertebral discs promotes tissue repair during physiological culture.
D. Rosenzweig, R. Fairag, D. Eglin, A. Mathieu, M. Weber, J. Ouellet, T. Steffen, **L. Haglund**, Canada

TUESDAY MAY 15 (continued)

11:05-11:10 18 Therapeutic effects of cell therapy with neonatal human dermal fibroblasts and rabbit dermal fibroblasts on disc degeneration and inflammation
*P. Shi, W. Liu, P. Chou, H.S. An, **A. Chee**, USA*

11:12-11:30 *Discussion*

INVITED LECTURE #1 - JENNIFER MOSS

Chair: Christy Tomkins-Lane

11:30-12:15 How to Energize Healthcare Professionals for Better Patient Care

12:15-13:30 **LUNCH**

SESSION #4 MRI PHENOTYPES

Chair: Dawn Elliott & Gwendolyn Sowa

13:30-13:35 19 Lumbar vertebral endplate defects on magnetic resonance images: prevalence, distribution patterns, and associations with back pain in a population-based sample of Chinese
***L. Chen**, M.C. Battié, G. Yang, Y. Yuan, Z. Chen, Y. Wang, China*

13:37-13:42 20 MRI reveals significant differences in vertebral and endplate t2-values between low back pain patients and controls
*H. Hebelka, H. Brisby, **K. M. Lagerstrand**, Sweden*

13:44-13:49 21 Quantitative imaging of bone marrow composition reveals significant alterations in marrow fat content in patients with modic changes
***A.J. Fields**, A. Ballatori, M. Han, J.F. Bailey, A. Rochette, D. Jain, Z. McCormick, C. O'Neill, S. Deviren, R. Krug, J.C. Lotz, USA*

13:51-13:56 22 Upright open MRI for imaging lumbar spinal musculature in varying postures
***N. Shaikh**, H. Zhang, J. Street, D. Wilson, T. Oxland, Canada*

13:58-14:03 23 Does lumbar disc degeneration predict facet joint changes or vice versa? A 5 year prospective MRI study
***D. Samartzis**, J. Yu, C. Bow, K. Luk, J. Cheung, USA, Hong Kong*

14:05-14:20 *Discussion*

SESSION #5 LOW BACK PAIN

Chair: Mamoru Kawakami & Dilip Sengupta

14:20-14:25 24 The effects of compression and traction on lumbar MRI findings in relation to chronic low back pain
***V. Abdollah**, E. Parent, A. Su, K. Wachowicz, M. Battie, Canada*

TUESDAY MAY 15 (continued)

- 14:27-14:32 25 Serum biomarkers for Modic changes among chronic low back pain patients
J. Karppinen, K. Koivisto, J. Ketola, M. Haapea, M. Paananen, K. Herzig, M. Alini, J. Lotz, S. Dudli, D. Samartzis, J. Risteli, M. Majuri, H. Alenius, E. Kyllönen, J. Järvinen, J. Niinimäki, S. Grad, Finland, Switzerland, USA, Sweden
- 14:34-14:39 26 Lumbar spine morphometrics predict back pain
T.K. Videman, L.E. Gibbons, USA
- 14:41-14:46 27 Associations of low back pain and long-term sciatica with autonomic nervous system regulation
P. Oura, A. Hautala, J. Auvinen, A. Kiviniemi, M. Tulppo, H. Huikuri, T. Seppänen, **J. Karppinen**, Finland
- 14:48-14:53 28 Local associations between intervertebral disc biochemistry, muscle health, physical activity, and clinical disability
C. Iriondo, V. Pedroia, J. Talbott, W. Dillon, S. Majumdar, USA
- 14:55-15:00 29 Genome-wide meta-analysis of 158,000 individuals of European ancestry identifies two loci associated with chronic back pain
P. Suri, M. Palmer, Y. Tsepilov, M. Freidin, L. Karssen, G. Jarvik, C. Boer, M. Yau, T. Bartz, T. Neogi, C. Hayward, B. Smith, A. Campbell, L. Arbeeve, J. Jordan, M. Nethander, M. Karlsson, C. Ohlsson, D. Mellstrom, D. Evans, N. Lane, C. Nielson, E. Orwoll, L. Marshall, M. Hochberg, R. Jackson, B. Mitchell, J. Van Meurs, A. Skelin, O. Polasek, G. Lauc, N. Smith, Y. Aulchenko, **F.M. Williams**, UK
- 15:02-15:20 Discussion
- 15:20-15:50 COFFEE

SESSION #6 BASIC SCIENCE

Chairs: Koichi Sairyo & Jill Urban

- 15:50-15:55 30 Honokiol prevents oxidation and inflammation through the activation of TXNIP/NLRP3 inflammasome signaling pathway in intervertebral disc
Z.J. Hu, P. Tang, S. Fa, China
- 15:57-16:02 31 Autophagy plays protective roles against human disc cellular apoptosis, senescence, and extracellular matrix degradation
M. Ito, T. Yurube, K. Kakutani, T. Takada, Y. Kakiuchi, Y. Takeoka, Y. Kanda, R. Kuroda, K. Nishida, Japan
- 16:04-16:09 32 Melatonin antagonizes intervertebral disc degeneration by promoting mitophagy through the NF- κ B signaling pathway
J. Wang, H. Liu, Z. Li, China
- 16:11-16:16 33 Anti-nerve growth factor therapy attenuates osteoporosis-related cutaneous and deep musculoskeletal pain following ovariectomy in mice
M Suzuki, M. Millechamps, S. Ohtori, C. Mori, L.S. Stone, Canada
- 16:18-16:30 Discussion

TUESDAY MAY 15 (continued)

SYMPOSIUM #1 - DIGITAL HEALTH FOR SPINE PROVIDERS

Chairs: Matthew Smuck and Markus Melloh

16:30-17:30 How Digital Health Technologies are Changing Clinical Practice - *Matthew Smuck, MD*
 In-Clinic Diagnostic Motion Analysis - *Jeffrey Lotz, PhD*
 Intervention with Wearables - *Christy Tomkins-Lane, PhD*
 Intervention with Mobile Apps - *Patricia Zheng, MD*
 Discussion, Question and Answer

FIRST BUSINESS MEETING *(For members only)*

17:30 *Chair: Teija Lund*

WEDNESDAY MAY 16

07:45-08:45 SPECIAL POSTER SESSION #1

- 1A Disc Biology (1-6) - Ivor Petrak Room
- 1B Disc Degeneration/Herniation (7-12) - Oval Room
- 1C Spinal Deformity (13-18) – Frontenac
- 1D Spinal Stenosis (19-24) – Champlain
- 1E Lumbar Spine Surgery (25-30) - Conservatory

SESSION #7 RANDOMIZED AND COHORT STUDIES

Chairs: Brook Martin & Shoji Yabuki

- 09:00-09:05 34 The spinal stenosis pedometer and nutrition lifestyle intervention (SSPANLI): results of a randomized trial
C. Tomkins-Lane, R. Hu, Y. Andreas, L. Lafave, Canada
- 09:07-09:12 35 Smoking is associated with increased development of musculoskeletal burden: a longitudinal cohort study from the midlife development in the U.S. (MIDUS) study
P. Tamer, J. Du, K. Goon, U. Ahn, N. Ahn, USA
- 09:14-09:19 36 Type II Diabetes is associated with development of musculoskeletal pathology: a cohort study from the Midlife Development in the U.S. (MIDUS) database
H.K. Koech, J.Y. Du, H. Archibald, P. Tamer, G. O'Connor, N. Ahn, USA
- 09:21-09:26 37 Post-operative single-shot epidural fentanyl and bupivacaine for postoperative analgesia after lumbar decompression: a prospective, double-blind randomized study
M.F.B. Alican, R. Ver, M.D. Ramos, Philippines
- 09:28-09:33 38 Association of degenerative lumbar scoliosis with the susceptibility genes for adolescent idiopathic scoliosis and disc degeneration
K. Takeda, I. Kou, N. Hosogane, M. Yagi, S. Kaneko, H. Kono, M. Ishikawa, Y. Takahashi, T. Ikegami, K. Nojiri, E. Okada, H. Funao, K. Okuyama, T. Tsuji, N. Fujita, N. Nagoshi, O. Tsuji, Y. Ogura, K. Ishii, M. Nakamura, M. Matsumoto, K. Watanabe, S. Ikegawa, Japan
- 09:35-09:40 39 A prospective randomized controlled trial of posterolateral lumbar fusion in combination with Platelet-Rich Plasma (PRP)
G. Kubota, H. Kamoda, Y. Aoki, K. Yamauchi, S. Orita, Y. Sakuma, Y. Oikawa, K. Inage, T. Sainoh, J. Sato, M. Ito, M. Yamashita, K. Takahashi, S. Ohtori, Japan
- 09:42-10:00 *Discussion*
- 10:00-10:30 **COFFEE**

WEDNESDAY MAY 16 (continued)

SESSION #8 LOW BACK PAIN

Chairs: Miho Sekiguchi & Fabio Zaina

- 10:30-10:35 40 Sagittal imbalance of the spine-pelvis-lower extremity axis is associated with back-related disability in inhabitant volunteers
M. Teraguchi, M. Kawakami, Y. Ishimoto, K. Nagata, R. Kagotani, M. Nakagawa, M. Minetama, H. Yamada, Japan
- 10:37-10:42 41 Variability in self-reported pain score on the same-day in different lumbar degenerative disorders
D. Sengupta, P. Huang, USA
- 10:44-10:49 42 Integrating multidisciplinary knowledge of low back pain through collaborative modeling
J. Cholewicki, P. Aminpour, J.M. Popovich, Jr., P.W. Hodges, S. Gray, USA
- 10:51-11:00 *Discussion*

PRESIDENTIAL ADDRESS – TEIJA LUND

11:00-11:40 *Introduction - Kazuhiro Chiba*

HARRY FARFAN PRESIDENTIAL LECTURE - SUSAN EATON

11:40-12:20 *Introduction: Teija Lund*

AFTERNOON OUTING – LAKE LOUISE TOUR

13:00 Buses depart

THURSDAY MAY 17

SESSION #9 BIOMECHANICS

Chairs: Grace O'Connell & Hans-Joachim Wilke

- 07:30-07:35 43 In vivo measurement of 3d disc strain and degenerative variation using MRI
*J.M. Peloquin, K.D. Meadows, E.J. Vresilovic, **D.M. Elliott**, USA*
- 07:37-07:42 44 Evaluation of the effects of loading and disc degeneration on lumbar intervertebral discs and motion segments
***V. Abdollah**, E. Parent, A. Su, K. Wachowicz, M. Battié, Canada*
- 07:44-07:49 45 The biomechanics of the inter-lamellar matrix and the lamella during lumbar disc herniation: which is the weakest link?
*J. Tavakoli, D. Amin, B.J. Freeman, **J.J. Costi**, Australia*
- 07:51-07:56 46 Axial loading during MRI provides new insights into IVD biomechanics in low back pain patients
***H. Hebelka**, L. Torén, H. Brisby, K.M. Lagerstrand, Sweden*
- 07:58-08:03 47 Altered multifidus muscle quality following long-duration spaceflight affects lumbar lordosis and compression on the intervertebral disc
***J.F. Bailey**, K.T. Khieu, R. Healey, C. O'Neill, D. Coughlin, J. Sayson, D.G. Chang, A.R. Hargens, J.C. Lotz, USA*
- 08:05-08:10 48 Analysis of internal disc strains during simulation of repetitive lifting motions
***D. Amin**, C. Moawad, J.J. Costi, Australia*
- 08:12-08:30 *Discussion*

SESSION #10 ENDPLATE

Chairs: John Costi & Dino Samartzis

- 08:30-08:35 49 Can nerves and blood vessels grow through the cartilage endplate in degenerated discs?
***U. Zehra**, I. Harding, M.A. Adams, P. Dolan, UK*
- 08:37-08:42 50 Characterisation of bone marrow pathologies across the spectrum of modic changes in the human lumbar spine
*J.S. Kuliwaba, A. Mulaibrahimovic, **B. Freeman**, K. Kantar, P. Brown, O.L. Osti, Australia*
- 08:44-08:49 51 Cartilage endplate damage strongly associates with chronic low back pain, independent of modic changes
***A.J. Fields**, A. Ballatori, M. Han, P.E. Larson, J.F. Bailey, A. Rochette, D. Jain, Z. McCormick, C. O'Neill, S. Deviren, R. Krug, J.C. Lotz, USA*
- 08:51-08:56 52 Impacts of vertebra and endplate fractures on the adjacent disc and vertebral trabeculae: a retrospective MR follow-up study
***X. Lu**, Z. Zhu, J. Pan, Z. Feng, X. Lv, Y. Wang, China*

THURSDAY MAY 17 (continued)

- 08:58-09:03 53 New evidence for structural integration across the cartilage-vertebral endplate junction
N.H. Sapiee, A. Thambyah, P. Robertson, N. Broom, New Zealand
- 09:05-09:10 54 Spinopelvic alignment and the development of vertebral endplate abnormalities: the "missing link"
U. Zehra, J. Cheung, C. Bow, P. Cheung, D. Samartzis, Hong Kong
- 09:12-09:30 Discussion

FELLOWSHIP AWARD CEREMONY

Chair: Kazuhiro Chiba and Shinichi Konno

- 09:30-09:50 **Young Investigator Travel Award - Shinichi Konno**
Prize Ceremony for the recipients
Clinical Traveling Fellowship - Shinichi Konno
Report from last year - *Gianluca Vadala*
Announcement of this year's recipient
ISSLS Research Grant - Kazuhiro Chiba
Announcement of this year's recipient
Wiltse Lifetime Achievement Award
Introduction: Nominator - The winner gives a short speech

09:50-10:20 **COFFEE**

ISSLS PRIZE AWARD CEREMONY AND PRESENTATIONS

- 10:20-10:30 Introduction – *Robert Gunzburg*
- 10:30-10:40 55 Growth differentiation factor-6 attenuated pro-inflammatory molecular changes in the rabbit annular-puncture model and degenerated disc-induced pain generation in the rat xenograft radiculopathy model
S. Miyazaki, A.D. Diwan, K. Kato, K. Cheng, W.C. Bae, Y. Sun, J. Yamada, C. Muehleman, M.E. Lenz, N. Inoue, R.L. Sah, M. Kawakami, K. Masuda, USA, Japan
- 10:40-10:50 Discussion
- 10:50-11:00 56 Dynamic imaging of degenerative spondylolisthesis reveals mid-range dynamic lumbar instability not evident on static clinical radiographs
M.E. Dombrowski, B. Ryneerson, C. LeVasseur, Z. Adgate, W.F. Donaldson, J.Y. Lee, A. Aiyangar, W.J. Anderst, USA, Switzerland
- 11:00-11:10 Discussion
- 11:10-11:20 57 Longitudinal analysis of inflammatory, psychological and sleep-related factors following an acute low back pain episode: the good, the bad and the ugly
D. Klyne, M. Barbe, W. Van den Hoorn, P.W. Hodges, Australia
- 11:20-11:30 Discussion

THURSDAY MAY 17 (continued)

INVITED LECTURE #2 – MARTIN PARNELL

Chair: Thomas Steffen

11:30-12:15 Ordinary to Extraordinary - One Step at a Time

12:15-13:30 **LUNCH**

SESSION #11 SURGERY FOR DDD

Chairs: Kotaro Nishida & Jan Van Meirhaeghe

13:30-13:35 58 Opioids delay healing of spinal fusion: a rabbit posterolateral lumbar fusion model
N. Jain, K.Y. Himed, J.M. Toth, K.C. Briley, F.M. Phillips, S.N. Khan, USA

13:37-13:42 59 Pre-operative chronic opioid therapy: a risk factor for complications, readmission, continued opioid use and increased costs after one and two level posterior lumbar fusion
N. Jain, F.M. Phillips, T. Weaver, S.N. Khan, USA

13:44-13:49 60 Predicting likelihood of surgery prior to first visit in patients with back and lower extremity symptoms: a simple mathematical model based on over 8000 patients
L.M. Boden, S.A. Boden, A. Premkumar, M.B. Gottschalk, S.D. Boden, USA

13:51-14:00 Discussion

SESSION #12 SURGICAL COMPLICATIONS

Chairs: Daisuke Sakai & David Wong

14:00-14:05 61 Outcome after degenerative spine surgery - Do we need longer follow-up than 1 year?
C. Parai, O. Hägg, B. Lind, H. Brisby, Sweden

14:07-14:12 62 The influence of preoperative opioid use on hospital length of stay and patient reported outcomes following elective spine surgery.
Y. R. Rampersaud, J. Murray, M. Canizares, J.D. Powers, A.V. Perruccio, Canada

14:14-14:19 63 Lumbar surgery within two weeks of epidural steroid injection is associated with increased 90-day complications
J. Koltsov, M. Smuck, T. Alamin, K. Wood, I. Cheng, S.S. Hu, USA

14:21-14:26 64 Effect of HbA1c and Perioperative Blood Glucose Control on the Occurrence of Postoperative Infection in Lumbar Instrumentation Surgery
H.H.Hara, M.M. Kanayama, F.F. Oha, Y.Y. Shimamura, T.T. Watanabe, R.R. Hyakkan, T.T. Hashimoto, K.K. Kaneko, Japan

14:28-14:33 65 A multicenter prospective investigation of thoracolumbar/lumbar perioperative complications in patients aged 80 years or older
T. Watanabe, M. Kanayama, M. Takahata, I. Oda, K. Suda, Y. Abe, J. Okumura, Y. Hojo, T. Kajino, N. Iwasaki, Japan

THURSDAY MAY 17 (continued)

14:35-14:40 66 Retrospective multicenter study of perioperative complications in 1,015 patients who underwent oblique lateral interbody fusion surgery
S. Orita, Y. Kotani, H. Murakami, T. Harada, K. Nakano, K. Sasaki, M. Yoshida, Y. Arai, T. Iida, S. Kaneko, T. Saito, T. Okudaira, K. Abe, R. Hynes, S. Fujibayashi, S. Ohtori, Japan

14:42-15:00 Discussion

GENERAL POSTER SESSION

15:00-16:00 Coffee and refreshments will be served

SESSION #13 SPINAL STENOSIS & SPONDYLOLYSIS

Chairs: Atsushi Fujiwara & Douglas Gross

16:00-16:05 67 Lumbar epidural steroid injections for herniation and stenosis: incidence and risk factors of subsequent surgery
J.C.B. Koltsov, M.W. Smuck, A. Zagel, T. Alamin, K. Wood, I. Cheng, S.S. Hu, USA

16:07-16:12 68 Supervised physical therapy versus unsupervised exercise for patients with lumbar spinal stenosis: a randomized controlled trial
M. Minetama, M. Kawakami, M. Teraguchi, R. Kagotani, T. Kitagawa, T. Miyake, Y. Yamamoto, M. Nakagawa, N. Sakon, N. Mori, S. Matsuo, T. Nakatani, T. Sumiya, Japan

16:14-16:19 69 Associations among natural history, conservative treatment and health-related quality of life among patients with symptomatic lumbar spinal stenosis: Locomotive Syndrome and Health Outcomes in Aizu Cohort Study (LOHAS)
K.Kato, K. Otani, M. Sekiguchi, S. Yabuki, T. Nikaido, K. Watanabe, H. Kobayashi, R. Tominaga, S. Kikuchi, S. Konno, Japan

16:21-16:26 70 A study on the difference of bone union between unilateral and bilateral lumbar spondylolysis in adolescent patients
K. Hatakayama, M. Urushibara, A. Kojima, Japan

16:28-16:40 Discussion

SYMPOSIUM #2 - ADVANCES TOWARD PRECISION MEDICINE IN SPINE CARE

Chairs: Matthew Smuck and Christy Tomkins-Lane

16:40-17:40 Molecular Biomarkers - Gwen Sowa
Genetic Biomarkers - Michelle Crites Battié
Digital Biomarkers - Matthew Smuck
Imaging Biomarkers - Dino Samartzis
Discussion, Question and Answer - all speakers

17:40-18:00 **SECOND BUSINESS MEETING** (For members only)

19:00 **BANQUET**

FRIDAY MAY 18

SPECIAL POSTER SESSION #2

07:45-08:45 2F Muscle, Disc, Lbp (31-36) - Ivor Petrak Room
2G Mis, Complication, Miscellaneous (37-42) - Oval Room
2H Operative Outcomes (43-48) – Frontenac
2I Spinal Stenosis, Tumor Infection (49-54) – Champlain
2J Spinal Alignment (55-30) - Conservatory

REPORT FROM FOCUS GROUP

09:00-09:30 Chair: Kazuhiro Chiba

SESSION #14 TUMOR, OSTEOPOROSIS

Chairs: Jeremy Fairbank & Shinichi Konno

- 09:30-09:35 71 Risk factors and score for recollapse of the augmented vertebrae after percutaneous vertebroplasty in osteoporotic vertebral compression fractures
J. Wang, W. Yu, China
- 09:37-09:42 72 Is it feasible to manage osteoporotic vertebral fracture with pharmacologic therapy?: a comparative study with subcutaneously injected weekly teriparatide, daily teriparatide and denosumab
M. Iwabuchi, J. Komatsu, H. Fukuda, K. Kusano, O. Shirado, Japan
- 09:44-09:49 73 Prognostic factors and survival after surgical resection of spinal metastases from renal cell carcinomas with a minimum 3-year follow-up
S. Kato, H. Murakami, S. Demura, N. Yokogawa, T. Shimizu, N. Oku, R. Kitagawa, H. Tsuchiya, Japan
- 09:51-10:00 Discussion
- 10:00-10:20 COFFEE

SESSION #15 SPINAL ALIGNMENT

Chairs: Samuel Bederman & Kazuyuki Watanabe

- 10:20-10:25 74 Spinopelvic alignment predicts disc stiffness, herniation, and Modic changes: evidence of an evolutionary etiology for clinically-relevant spinal phenotypes
U. Zehra, J. Cheung, C. Bow, R.J. Crawford, K. Luk, W. Lu, D. Samartzis, Hong Kong, Australia
- 10:27-10:32 75 Dynamic sagittal balance associates with patient-reported disability in adult spinal deformity population
J.F. Bailey, P.F. Curran, D. Beckerman, J.C. Lotz, S. Burch, USA
- 10:34-10:39 76 Impact of paraspinal muscle degeneration on fatigue of spinopelvic compensatory mechanism in sagittal plane adult spinal deformity: quantitative assessment of MRI and sagittal parameters after 10 minutes walking
J Bae, S. Lee, V. Deviren, South Korea, USA

FRIDAY MAY 18 (continued)

- 10:41-10:46 77 The relationship of spino-pelvic parameters between static radiograph and motion analysis in adult spinal deformity patients with positive sagittal imbalance
H-J. Kim, S. Kim, J. Park, South Korea
- 10:48-10:53 78 The sex and age distribution of indices for muscle evaluation and their association with spinal sagittal alignment: The Wakayama Spine Study
H. Hashizume, H. Yamada, H. Oka, S. Tsutsui, Y. Yukawa, A. Minamide, Y. Nakagawa, H. Iwasaki, M. Takami, T. Sasaki, H. Iwahashi, K. Matsudaira, N. Yoshimura, M. Yoshida, Japan
- 10:55-11:00 79 Spinal alignment and additional surgery after short fusion for degenerative lumbar scoliosis
Y. Shimamura, M. Kanayama, F. Oha, T. Watanabe, H. Hara, R. Hyakkan, T. Hashimoto, K. Kaneko, Japan

SESSION #16 SPINAL ALIGNMENT

Chairs: Drew Bednar & Jon Lurie

- 11:20-11:25 80 Clinical outcomes of minimally invasive spinal decompression surgery for lumbar spinal stenosis with I grade degenerative spondylolisthesis: A 4-year Follow-up Study
A. Minamide, M. Yoshida, Y. Nakagawa, H. Hashizume, Y. Yukawa, H. Iwasaki, S. Tsutsui, M. Takami, H. Yamada, Japan
- 11:27-11:32 81 Distribution and determinants of 90-day payments for multi-level posterior lumbar fusion: a medicare analysis
N. Jain, F.M. Phillips, S.N. Khan, USA
- 11:34-11:39 82 Recovery rate of sensory symptoms following decompression of nerve root in cervical vs lumbar radiculopathy – a prospective, self-reported, computerized pain drawing study
D. Sengupta, USA
- 11:41-11:46 83 Patients' expectations for spine surgery: what are they, are we meeting them and does it correlate to one year postoperative satisfaction
M. Canizares, A. Glennie, K. Thomas, S. Christie, E. Wai, C. Fisher, A.V. Perruccio,
Y.R. Rampersaud, Canada
- 11:48-12:00 Discussion

ANNOUNCEMENT - BEST PAPER AND POSTER AWARDS

12:00-12:10 Chairman: Kazuhiro Chiba

CLOSING REMARKS - TOM OXLAND

12:10-12:20

SPECIAL POSTER SESSION #1

WEDNESDAY MAY 16, 07:45-08:45

SP #1A DISC BIOLOGY - Ivor Petrak Room

Chairs: Koji Akeda & James Iatridis

- SP01 **Amir Jamaludin** T. Kadir, A. Zisserman, J. Urban, J. Fairbank, F.M. Williams
Adapting a deep learning model to a different grading system in a new dataset
- SP02 **Daisuke Fukui** M. Kawakami, M. Naiki, T. Okada, K. Sawada, H. Yamada
A possible mechanism underlying pain-related behavior induced by lumbar facetectomy and repeated cold stress in rats — DNA microarray analysis
- SP03 **Jianru Wang** Z. Zheng, F. Chen
Melatonin breakdown the vicious circle of IL-1 β induced intervertebral disc degeneration by NLRP3 inflammasome inhibition
- SP04 **Yuji Kakiuchi** T. Yurube, Y. Takeoka, M. Ito, Y. Kanda, K. Kakutani, T. Takada, R. Kuroda, K. Nishida
Temsirolimus is a candidate of the optimal mTOR inhibitor to protect human disc cells depending on Akt and autophagy induction
- SP05 **Sibylle Grad** Z. Li, F. Heizmann, Y. Liu, J. Geries, D.C. Kubosch, N. Suedkamp, M. Alini, G.M. Lang
Validation of anti-inflammatory and regenerative drug therapy in a bioreactor-guided intervertebral disc organ culture model
- SP06 **Svenja Illien-Junger** G.K. Zhou, M. Smith, E.W. Bradley, J.J. Westendorf, D.M. Laudier, J.C. Iatridis
Role of PHLPP1 in cell proliferation and apoptosis in intervertebral disc and vertebrae

SP#1B DISC DEGENERATION/HERNIATION - Oval Room

Chairs: Howard An & Keith DK Luk

- SP07 **Hans-Joachim Wilke** K. Wade, M. Josipovic, N. Berger-Roscher, V. Rasche
How does transition zone structure influence the herniation process?
- SP08 **Yasuchika Aoki** H. Fukuchi, G. Kubota, T. Sakai, S. Ohtori, K. Takahashi, N. Yanagawa
Incidence of intervertebral vacuum phenomenon in the general population and in patients with lumbar spondylolysis.
- SP09 **Kazuhiro Chiba** Y. Matsuyama
Follow-up study of condoliase treatment in patients with lumbar disc herniation
- SP10 **Vishal Deshmukh** C. Barroga, S. KC, L. Dellamary, J. Stewart, H. Hu, J. Hood, Y. Yazici
A small molecule inhibitor of the Wnt pathway (SM04690) as a potential treatment for degenerative disc disease

- SP11 **Kerstin Lagerstrand** C. Waldenberg, H. Hebelka, H. Brisby
Detailed T2-mapping analysis reveal differences in IVD characteristics between low back patients and controls
- SP12 **Mengge Sun** W. Lu, S. Peng
MicroRNA-19b with special expression profile in osteoporotic patients regulates osteogenic differentiation

SP#1C SPINAL DEFORMITY – Frontenac Room

Chairs: Masayuki Miyagi & Tim S Yoon

- SP13 **Sang-Il Kim** Y. Kim, J. Ahn, H. Park, H. Min, K. Ha
Clinical and radiographic features of subtypes of proximal junctional failures following correction surgery for degenerative adult spinal deformity
- SP14 **Greg McIntosh** M. Staudt, R. Charest-Morin, C. Fisher, Y. Rampersaud, A. Glennie, K. Thomas, E. Abraham, N. Manson, S. Christie, N. Dea, J. Urquhart, H. Hall, C. Bailey
Relationship between spinopelvic parameters and baseline pain, function, or health related quality of life in degenerative lumbar spondylolisthesis.
- SP15 **Haddas Ram** L.H. Isador
Surgical realignment in adult deformity patients increased balance within the cone of economy
- SP16 **Greg McIntosh** A. Stratton, E. Wai, D. Roffey, S. Kingwell, P. Phan, H. Hall
Narcotic use trends in elective thoracolumbar spinal surgery patients
- SP17 **Hyung-Youl Park** K. Ha, y. Kim, D. Chang, S. Kim, H. Min, A. Mohammed
Risk factors and clinical outcomes of proximal junctional kyphosis following iliac screw fixation for degenerative adult spinal deformity
- SP18 **Arnold YL Wong** D. Samartzis, P.W. Cheung, J.P. Cheung
The prevalence and risk factors of back pain in patients with adolescent idiopathic scoliosis - a large-scale cross-sectional study

SP#1D SPINAL STENOSIS – Champlain Room

Chairs: William Donaldson & Hiroshi Hashizume

- SP19 **Tomotaka Umimura** Y. Eguchi, M. Suzuki, S. Orita, K. Inage, K. Abe, M. Inoue, H. Kinoshita, M. Norimoto, T. Huruya, K. Takahashi, S. Otori
Influence of skeletal muscle mass and spinal alignment on surgical outcomes for lumbar spinal stenosis
- SP20 **Shinichi Ishihara** N. Fujita, O. Tsuji, N. Nagoshi, E. Okada, M. Yagi, T. Tsuji, K. Ishii, M. Nakamura, M. Matsumoto, K. Watanabe
Epidural fat accumulation affects the surgical outcome in patients with lumbar spinal stenosis
- SP21 **Andree-Anne Marchand** J. O'Shaughnessy, C. Châtillon, V. Cantin, M. Descarreaux
The feasibility and efficacy of an active prehabilitation program on the postoperative recovery of patients following surgery for spinal stenosis
- SP22 **Kyoung Tae Kim** I. Han, W. Bang, J. Sung, D. Cho, B.K. Kwon, J. Yang
Relationships between Vitamin D and paraspinal muscle: human data and experimental rat model analysis

SP23 **Yuyu Ishimoto** C. Cooper, K. Walker-Bone, G. Ntani, H. Yamada, H. Hashizume, K. Nagata, S. Muraki, S. Tanaka, N. Yoshimura, M. Yoshida
Heavy manual work is associated with an increased risk of severe lumbar spinal stenosis on MRI scans

SP24 **Hiroshi Hashizume** T. Maeda, N. Yoshimura, Y. Ishimoto, H. Oka, T. Fujiki, K. Nagata, M. Takami, S. Tsutsui, H. Iwasaki, Y. Nakagawa, A. Minamide, Y. Yukawa, M. Yoshida, H. Yamada
Diabetes mellitus and lower ABI are associated with symptomatic lumbar spinal stenosis: The Wakayama Spine Study

SP#1E LUMBAR SPINE SURGERY – Conservatory Room

Chairs: Kazuhiro Hasegawa & Dietrich Schlenzka

SP25 **Steven M Presciutti** S. Sangadala, T. Doan, G. Beck, H. Drissi, S. Boden
Novel small molecule inhibitors of sclerostin with the potential to enhance spinal fusions

SP26 **Scott L. Blumenthal** D.D. Ohnmeiss, R.D. Guyer, J.E. Zigler
Analysis of lumbar total disc replacement removals and revisions: a 17-year experience

SP27 **Eric Ledet** J.M. Peterson, C. Chlebek, A.M. Clough, A.K. Wells, K.E. Batzinger, K. Kradinova, J.C. Glennon, D.J. DiRisio
Stiffness matters: PART II - the effects of plate stiffness on load-sharing and the progression of fusion in vivo

SP28 **Kristin R. Archer** S.T. Wegener, C.J. Devin, S.W. Vanston, M.J. McGirt, D.M. Spengler, O.S. Aaronson, J.S. Cheng, K.J. Smith
Cost-effectiveness of psychologically informed physical therapy in patients after lumbar spine surgery

SP29 **Norihiko Takegami** K. Akeda, K. Takegami, T. Kondo, T. Fujiwara, T. Imanishi, A. Sudo
Incidence and characteristics of clinical L5/S1 adjacent segment disease following L5 floating lumbar fusion

SP30 **A. Simone Maybin** K.R. Archer, S. Chotai, J. Pennings, C.J. Devin
The impact of postoperative physical therapy on patient-reported outcomes in patients undergoing spine surgery

SPECIAL POSTER SESSION #2

FRIDAY MAY 18, 07:45-08:45

SP #2F MUSCLE, DISC, LBP - Ivor Petrak Room

Chairs: John Costi & Todd Alamin

- SP31 **Jacques JA Abboud** M.M. Descarreaux, J.J. Blouin
Organization of the motor units in the longissimus
- SP32 **Douglas G Chang** R.M. Healey, J.F. Bailey, J.V. Sayson, K. Khieu, S. Parazynski, J.C. Lotz, A.R. Hargens
Regional patterns of lumbar paraspinal muscle degeneration in astronauts after long-duration spaceflight on the international space station
- SP33 **Dawn Elliott** J. DeLucca, J. Peloquin, E. Vresilovic
Incorporation of residual stresses from swelling and fiber tension in a disc finite element model
- SP34 **Y. Raja Rampersaud**
Ontario inter-professional spine assessment and education clinics (ISAEC): patient, provider and system impact of an integrated model of care for the management of low back pain (LBP)
- SP35 **Martha Funabashi** K.A. Pohlman, S. Mior, H. Thiel, M.D. Hill, D. Cassidy, M. Westaway, J. Yager, E. Hurwitz, G. Kawchuk, M. O'Beirne, S. Vohra
Preliminary findings from an active surveillance reporting system for spinal manipulative therapy regulated providers and low back pain patients
- SP36 **Hans-Joachim Wilke** B. Schlager, F. Niemeyer, F. Galbusera, D. Volkheimer, R. Jonas
Which material properties and which morphology parameters are most important for numerical models of the lumbar spine?

SP#2G MIS, COMPLICATION, MISCELLANEOUS - Oval Room

Chairs: Donna Ohnmeiss & Edward Vresilovic

- SP37 **Kyoung Tae Kim** J. Sung, D. Cho, M. Park, B.K. Kwon, J. Yang
Risk factors for cage migration and cage retropulsion following transforaminal lumbar interbody fusion: does osteoporosis carry higher risk?
- SP38 **Sangwook Tim Yoon** A. Jain, S.L. Hobson, E.J. Yoon, S.D. Boden, J.G. Heller, J.M. Rhee
Older age is independently associated with increased hospital charges and resource utilization in degenerative lumbar surgery: an analysis of 2,010 cases at a single institution
- SP39 **Shinji ST Tanishima** A.A. Tanida, T.T. Mihara, S.S. Ogawa, C.C. Takeda, H.H. Nagashima
The evaluation of brain activity in patients with chronic low back pain using a non-contact brain activity detection sensor
- SP40 **Tim S Yoon** A. Jain, S.L. Hobson, E.J. Yoon, S.D. Boden, J.G. Heller, J.M. Rhee
Obesity is associated with increased OR time, hospital stay, and postoperative wound complications in lumbar fusion surgery: analysis of 1,196 cases at a single institution
- SP41 **Kentaro Yamada** H. Hashizume, N. Yoshimura, R. Kagotani, Y. Ishimoto, S. Muraki, S. Satoh, H. Nakamura, M. Yoshida
Is diffuse idiopathic skeletal hyperostosis associated for lumbar spinal stenosis

- SP42 **Hiroyuki Aono** K. Ishii, S. Takenaka, Y. Nagamoto, H. Tobimatsu, M. Furuya, T. Yamashita, M. Iwasaki
Risk factors for kyphotic recurrence after temporary short-segment fixation for thoracolumbar burst fractures

SP#2H OPERATIVE OUTCOMES – Frontenac Room

Chairs: Scott Boden & Dike Ruan

- SP43 **Haddas Ram** L. Isador
The utility of gait analysis in patients with symptomatic adult degenerative scoliosis
- SP44 **Tomotaka Umimura** Y. Eguchi, M. Suzuki, S. Orita, K. Inage, K. Fujimoto, H. Kanamoto, K. Abe, M. Inoue, H. Kinoshita, M. Norimoto, T. Huruya, K. Takahashi, S. Otori
Associations between sarcopenia and degenerative lumbar scoliosis in Japanese older women
- SP45 **Nikhil Jain** F.M. Phillips, S.N. Khan, E. Yu
Early healthcare utilization after primary lumbar decompression/discectomy predicts revision surgery at two years
- SP46 **Kotaro Nishida** T. Takada, K. Kakutani, T. Yurube, M. Ito, Y. Kakiuchi, Y. Takeoka, Y. Kanda, T. Iguchi, R. Kuroda
Features and problems of corrective long spinal fusion for adult spinal deformity with multiple vertebral fractures due to severe osteoporosis
- SP47 **Tsutomu Akazawa** H. Niki, T. Kotani, T. Sakuma, S. Orita, K. Inage, K. Fujimoto, Y. Shiga, Y. Torii, T. Umehara, M. Iinuma, S. Kuroya, K. Takahashi, S. Ohtori
Modic changes and disc degeneration 27 to 45 years after spinal fusion for adolescent idiopathic scoliosis
- SP48 **Haddas Ram** L. Isador
The correlation of biomechanical parameters measured by balance analysis with the functional parameters measured by self-reported questionnaires in patients with adult degenerative scoliosis

SP#2I SPINAL STENOSIS, TUMOR INFECTION – Champlain Room

Chairs: Robert Gunzburg & Masatoshi Teraguchi

- SP49 **Yong Hai** P. Yin, Q. Ji, Q. Su, Y. Wang, Z. Li, Y. Wu, S. Zhu
Percutaneous kyphoplasty for osteoporotic vertebral compression fractures via unilateral versus bilateral approach: a meta-analysis
- SP50 **Zhi-Jun Hu** Y. Chen, X. Zhang, B. Huang, J. Wang, Z. Zheng, J. Chen, F. Zhao
Low virulence bacteria in degenerative intervertebral discs: A cross-sectional study with comparisons between cervical and lumbar spine
- SP51 **Junseok Bae** J. Seo, S. Lee, S. Shin, S. Eun, H. Keum
Does *propionibacterium acnes* presence in intervertebral disc which is acquired in percutaneous endoscopic lumbar discectomy?
- SP52 **Hanna Lotzke** M. Jakobsson, H. Brisby, A. Gutke, O. Hägg, R. Smeets, M. Hagströmer, M. Lundberg
Low levels of physical activity among patients with degenerative disc disease who are to undergo spinal fusion surgery
- SP53 **Wouter A. Moojen** C.D. Schenck, C. Talhi, C.L. Vleggeert-Lankamp, M.P. Arts, W.C. Peul
The influence of an interspinous distraction device on the foraminal size in the follow-up after surgery

SP54 **Shinji Takahashi** *M. Hoshino, H. Terai, H. Toyoda, A. Suzuki, K. Tamai, T. Tadao, H. Yasuda, H. Kono, R. Sasaoka, S. Dohzono, K. Hayashi, S. Ohyama, Y. Hori, H. Nakamura*
Differences in clinical and radiological outcomes depending on timing of balloon kyphoplasty for osteoporotic vertebral fracture

SP#2J SPINAL ALIGNMENT – Conservatory Room

Chairs: Paul Licina & Koji Otani

SP55 **John P Kleimeyer** *N. Liu, K.B. Wood*
The association of radiculopathy with lateral lumbar listhesis?

SP56 **Gang-Un Kim** *H. Kim, N. Lee, J. Park*
Relationship between short-term and long-term outcomes following spine surgery for lumbar spinal stenosis

SP57 **Conor O'Neil** *S. Burch, M. Callahan*
Population level analysis of health-related quality of life in patients with spinal disorders

SP58 **Masahiro Kanayama** *T. Hashimoto, F. Oha, Y. Shimamura, T. Watanabe, H. Hara, R. Hyakkan, N. Iwasaki*
Does lumbar spinal surgery extend healthy life expectancy in the elderly?

SP59 **Daisuke Togawa** *T. Hasegawa, Y. Yamato, G. Yoshida, S. Oe, T. Banno, H. Arima, Y. Matsuyama*
Impacts of postoperative symptom improvement and disabilities on health related quality of life (HRQOL) and treatment satisfaction in the adult spinal deformity patients treated by corrective long fusion

SP60 **Greg McIntosh** *O. Ayling, C. Fisher, N. Dea, T. Ailon, H. Hall*
Clinical outcomes research in lumbar spine surgery: Are 2 year follow-ups necessary?

GENERAL POSTERS

THURSDAY MAY 17, 15:00-16:00

- GP1** **Douglas P. Gross** A. Suman, G.P. Bostick, D. Schopflocher, A.S. Russell, R. Ferrari, M.C. Battie, R. Hu, R. Buchbinder
Long-term evaluation of a Canadian back pain mass media campaign
- GP2** **Wouter Moojen** R. Goes, I. Muskens, T. Smith, R. Mekary, M. Broekman
Risk of aspirin continuation in spinal surgery: a systematic review and meta-analysis
- GP3** **Takahiro Makino** Y. Sakai, S. Takenaka, H. Yoshikawa, T. Kaito
Bioactivity of a titanium-coated peek cage in posterior lumbar interbody fusion assessed by CT Hounsfield unit
- GP4** **Masaru Tanaka** R. Momomura, A. Itoi, K. Kaneko
Clinical outcomes of thoracic and lumbar fractures in patients with diffuse idiopathic skeletal hyperostosis
- GP5** **Dike Ruan** S. Cheng, X. Li, I. Lin, J. Ying, T. Wen, D. Wang
The inflammatory cytokine TNF- α regulates the biological behavior of nucleus pulposus mesenchymal stem cells through the NF- κ B signaling pathway in a rat model in vitro
- GP6** **Tomohiro Miyashita** H. Ataka, K. Kato, H. Takaoka, S. Ohtori, T. Tanno
Five-year postoperative good clinical outcomes after facet fusion using a percutaneous pedicle screw system for degenerative lumbar spondylolisthesis
- GP7** **Tomohiro Miyashita** K. Kato, H. Ataka, H. Takaoka, S. Ohtori, T. Tanno
Good clinical outcomes and fusion rate after facet fusion with cortical bone trajectory screws for degenerative lumbar spondylolisthesis
- GP8** **Andrew Schoenfeld**
Outpatient spine clinic utilization reduces emergency department visits following spine surgery
- GP9** **Andrew Schoenfeld** C. Bono, J. Kang
Changes in the use of preference sensitive surgery within accountable care organizations: the case of lumbar fusion procedures
- GP10** **Joo Han Kim** W. Park
The reverse knot X-shape suture for annular repair during microscopic lumbar discectomy; technical note and clinical outcomes
- GP11** **Junseok Bae** J. Lee, S. Lee
Which clinical and radiological variables could predict clinical outcomes of percutaneous endoscopic lumbar discectomy for treatment of patients with lumbosacral disc herniation?
- GP12** **Dike Ruan** T. Wen, S. Cheng, J. Ying
The two important UPR pathway in Intervertebral Disk Degeneration: PERK and IRE1- α
- GP13** **Nathan Wanderman** W. Robinson, B. Carlson, M. Bydon, B. Currier, P. Huddleston, A. Nassr, B. Freedman
Tranexamic Acid in thoracic and lumbar fusions and perioperative blood loss
- GP14** **Jae Hwan Cho** C. Hwang, D. Lee, C. Lee
The effect of osteoporosis on clinical and radiological outcomes following one-level posterior lumbar fusion

- GP15** **Munehiro Sakata** *H. Tonomura, H. Ishibashi, R. Takatori, Y. Mikami, M. Nagae, K. Matsuda, Y. Tabata, M. Tanaka, T. Kubo*
Positive effect on bone regeneration by platelet-rich plasma combined with gelatin beta-tricalcium phosphate sponges: a study using a bone defect model of vertebral body in ovariectomized rats
- GP16** **Kentaro Yamada** *S. Satoh, Y. Abe, H. Nakamura*
Diffuse idiopathic skeletal hyperostosis extended to the lumbar segment is a risk factor of reoperation in patients treated surgically for lumbar stenosis
- GP17** **Maryse Fortin** *Y. Xiao, M.C. Battie, H. Rivaz*
Building unbiased population-averaged MRI atlases for image processing and assessment of lumbar paraspinal muscle morphometry
- GP18** **Barend Van Royen** *S. Faraj, T. Haanstra, M. De Kleuver*
Functional outcome of non-surgical and surgical management for de novo degenerative lumbar scoliosis: a mean follow-up of 10 years
- GP19** **Koji Ishikawa** *T. Toyone, T. Shirahata, Y. Kudo, A. Matsuoka, H. Maruyama, C. Hayakawa, T. Soji, M. Sekimizu, K. Tsuchiya, T. Eguro, Y. Oshita, T. Ozawa, Y. Nakao, S. Sano, T. Nagai, K. Kanzaki, K. Inagaki*
A novel method for the prediction of the pedicle screw stability: regional bone mineral density around the screw
- GP20** **Hiroshi Ataka** *T. Tanno, H. Takaoka, T. Miyashita, K. Kato, S. Ohtori*
Early reduction of ligamentum flavum 2 weeks after *in situ* posterior fusion without neural decompression for unstable degenerative lumbar spondylolisthesis
- GP21** **Masahiro Kashima** *T. Higuchi, M. Takeuchi, S. Yoshioka, M. Nakamura, S. Nakano, T. Chikawa, K. Sairyo*
Morphological analysis of the intervertebral foramen and the lumbar facet joint
- GP22** **Raghu Natarajan** *K. Hasegawa, K. Watanabe*
Posterior bone graft in lumbar fusion surgery reduces the stress in the screw-rod system ~ a finite element study
- GP23** **Naohiro Kawamura** *J. Kunogi, Y. Hirao*
Dynamic stabilization for prevention of proximal junctional failure in thoracolumbar long fusion
- GP24** **Joo-Hyun Ahn** *Y. Kim, K. Ha, S. Kim, H. Park, H. Min*
Clinical outcomes of pathologic vertebral fractures in patients with multiple myeloma: comparison of reconstruction surgery with adjuvant radiotherapy and radiotherapy alone
- GP25** **Masayoshi Fukushima** *H. Oka, Y. Oshima, T. Segawa, Y. Yuzawa, S. Yamamoto, H. Inanami*
Assessment of minimal clinically important differences after microendoscopic laminectomy in patients with lumbar canal stenosis
- GP26** **Hidekazu Tobimatsu** *M. Furuya, H. Aono*
SSI (Surgical Site Infection) after spinal surgery and nasal MRSA (Methicillin-Resistant Staphylococcus Aureus) colonization
- GP27** **Jon D Lurie** *H. Moulton, T. Tosteson, W. Zhao, L. Pearson, K. Mycek, E. Scherer, J.N. Weinstein, A. Pearson, M. Kelly, K. McGuire, A. Milam*
An outcomes calculator for informed decision making in spine surgery
- GP28** **Haddas Ram** *L. Isador*
The correlation of Scoliosis Research Society questionnaires with biomechanical parameters measured by with gait and balance analyses in patients with adult degenerative scoliosis
- GP29** **Hanna Hebelka** *C. Molinder, H. Brisby, A. Baranto*
Axial loading during MRI reveal insufficient effect of percutaneous interspinous implants on spinal canal area

- GP30** **Paul J Slosar** *J.B. Reynolds, S.L. Slosar, S. Martineck*
BMP vs. alternatives: Cost savings and clinical outcomes data in 137 ALIF patients with 2 yr. Follow-up
- GP31** **Takaaki Fujiki** *H. Hashizume, N. Yoshimura, Y. Ishimoto, H. Oka, T. Maeda, K. Nagata, H. Iwasaki, S. Tsutsui, M. Takami, H. Nakagawa, A. Minamide, Y. Yukawa, M. Yoshida, H. Yamada*
Impaired glucose metabolism is a significant associated factor for radiographic lumbar spinal stenosis
- GP32** **Kiyotaka Yamada** *Y. Fujimoto, T. Nakamae, T. Hiramatsu, T. Hashimoto, O. Suzuki, T. Maruyama, N. Kamei, N. Adachi*
Long-term outcome of targeted therapy for low back pain in elderly *de novo* degenerative lumbar scoliosis
- GP33** **John T Martin** *S.E. Gullbrand, A.J. Fields, D. Purmessur, A.D. Diwan, J.A. Hoyland, J.C. Iatridis*
Publication trends in spine research: comparison of the Orthopaedic Research Society Spine Section and the International Society for the Study of the Lumbar Spine
- GP34** **Ryota Hyakkan** *M. Kanayama, F. Oha, Y. Shimamura, T. Watanabe, H. Hara, T. Hashimoto, N. Iwasaki*
Relationship between cage design and retropulsion after posterior lumbar interbody fusion
- GP35** **Eric H Ledet** *G.P. Sanders, D.J. DiRisio, J.C. Glennon*
Load-sharing through elastic micro-motion accelerates bone formation and interbody fusion
- GP36** **Ryo Taiji** *H. Iwasaki, H. Hashizume, Y. Yukawa, A. Minamide, Y. Nakagawa, S. Tsutsui, M. Takami, K. Nagata, H. Yamada*
Microendoscopic foraminotomy for the lumbosacral junction: two year's outcome and risk factors for poor results
- GP37** **Hyung-Youl Park** *K. Ha, y. Kim, D. Chang, S. Kim, H. Min, A. Mohammed*
Two different type of stooping posture after iliac screw fixation for degenerative adult spinal deformity
- GP38** **Tomohiko Hasegawa** *Y. Yamato, D. Togawa, G. Yoshida, T. Banno, H. Arima, S. Oe, Y. Mihara, H. Ushirosako, Y. Matsuyama*
Spinal correction surgery enables long-term relief of gastroesophageal reflux disease symptoms in adult spinal deformity
- GP39** **Magali Millecamps** *D. Foster, S. Lee, A.P. Mathieu, L.S. Stone*
Behavioural, radiologic and morphologic long-term consequences of an acute single lumbar intervertebral disc injury in mice
- GP40** **Greg McIntosh** *I. Steenstra, C. Chen, S. Hogg-Johnson, B. Amick, H. Hall, T. Carter*
Low back pain prognostic factors for time receiving wage replacement benefits
- GP41** **Dilip Sengupta** *Health related quality of life improvement after spinal fusion for degenerative low back pain vs adult spine deformity*
- GP42** **Greg McIntosh** *O. Ayling, C. Fisher, N. Dea, T. Ailon, H. Hall*
Effect of peri-operative adverse events on long-term patient reported outcomes after lumbar spine surgery
- GP43** **Greg McIntosh** *F.E. Nares, A. Soroceanu, H. Hall, K.C. Thomas*
Lumbar surgery in octogenarians. Really?
- GP44** **Sho SD Dohzono** *H.H. Toyoda, Y.Y. Hori, S.S. Takahashi, A.A. Suzuki, M.M. Hoshino, H.H. Terai, H.H. Nakamura*
Spinopelvic sagittal alignment after minimally invasive decompression surgery without fusion in patients with lumbar degenerative spondylolisthesis

- GP45** **Tomoko Kitano** *M. Kawakami, M. Teraguchi, R. Kagotani, S. Nara*
Do preoperative psychological factors affect patient satisfaction with surgery for lumbar spinal stenosis?
- GP46** **Greg McIntosh** *K. Vu, D. Roffey, P. Phan, A. Stratton, E. Tsai, S. Kingwell, E. Wai, M. Johnson, H. Hall*
Beneficial effects of regular exercise prior to thoracolumbar spinal surgery
- GP47** **Masahiro Inuma** *T. Akazawa, Y. Torii, T. Umehara, S. Kuroya, H. Niki*
Accuracy of two major scoring systems for prediction of metastatic spine tumor prognosis: analysis of revised Tokuhashi and Katagiri scores
- GP48** **Hirohito Hirata** *T. Morimoto, T. Nonaka, T. Yoshihara, M. Sonohata, M. Mawatari*
Sagittal spinopelvic alignment in patients with hip osteoarthritis
- GP49** **Akira Yamagishi** *H. Sakaura, A. Onishi, T. Ohwada*
Postoperative loss of lumbar lordosis affects clinical outcomes in patients with pseudoarthrosis after PLIF using cortical bone trajectory screw fixation
- GP50** **Satoshi Ogihara** *T. Yamazaki, H. Inanami, K. Saita, Y. Takano, S. Azuma, N. Kawamura, K. Yamakawa, Y. Oshima, J. Morii, Y. Takeshita, Y. Kumano, S. Tanaka*
Prospective multicenter surveillance and risk factor analysis of surgical site infection after lumbar laminectomy and/or herniotomy in adults
- GP51** **Satoshi Ogihara** *K. Sato, T. Maru, Y. Monobe, Y. Kobayashi, K. Saita*
Risk factors for incidental durotomy during posterior spine surgery for degenerative diseases in adults: a prospective single-center observational study
- GP52** **Tomoya Terai** *N. Hibino, R. Sato, K. Kita, S. Hama, T. Henmi, K. Sairyō*
Discrepancy of clinical outcome and postoperative magnetic resonance imaging after percutaneous endoscopic lumbar discectomy
- GP53** **Hayato Futakawa** *Y. Kawaguchi, T. Yasuda, S. Seki, K. Suzuki, T. Kimura*
Actual state of surgical site infection after spine surgery in our department - what seen from the data in recent 16 years -
- GP54** **Philip K Louie** *A.G. Varthi, A.S. Narain, D.D. Bohl, F.M. Phillips*
Stand-alone lateral lumbar interbody fusion is an effective intervention for adjacent segment disease following previous lumbar fusion surgery
- GP55** **Tadashi Nukaga** *D. Sakai, H. Kato, A. Hiyama, M. Tanaka, M. Sato, G. Inoue, T. Nakazawa, T. Imura, M. Miyagi, W. Saito, E. Shirasawa, M. Takaso, M. Watanabe*
Does persistent back pain in patients with delayed vertebral collapse differ with methods of surgical treatment?
- GP56** **Daisuke Nakashima** *K. Mikami, T. Kitamura, N. Hasegawa, H. Okada, M. Nishikino, S. Kurahashi, Y. Shimada, T. Nagura, H. Kawana, N. Fujita, M. Matsumoto, M. Nakamura*
Establishment of a novel measurement technique for pedicle screw stability -LASER resonance frequency analysis-
- GP57** **Shigeyuki Kitanaka** *R. Takatori, Y. Arai, M. Nagae, H. Tonomura, A. Makinodan, Y. Mikami, N. Inoue, T. Ogura, T. Kubo*
Relationship between facet joint osteoarthritis and spinal segmental motion in degenerative spondylolisthesis
- GP58** **Kei Sato** *S. Ogihara, T. Yamazaki, H. Inanami, S. Azuma, N. Kawamura, K. Yamakawa, Y. Oshima, J. Morii, Y. Takeshita, S. Tanaka, K. Saita*
Risk factor analysis of surgical site infections after posterior instrumentation fusion surgery for spinal trauma, prospective multicenter study
- GP59** **John J Costi** *B.K. Kamitakahara, D.B. Amin*
Investigation of the combinations of loading and facet joint contributions to lumbar disc herniation

- GP60** **Greg McIntosh** *F. Jiang, M.H. Weber, H. Hall, Y. Rampersaud*
Prediction rule for determining discharge destination post posterior thoracolumbar spinal fusion procedures using the Canadian spine outcomes and research network
- GP61** **Toshihiro Nagai** *D. Sakai, Y. Yamamoto, M. Sato, M. Watanabe*
The effect of cage geometry on segmental lordosis in posterior lumbar interbody fusion: hyperlordotic box cages versus boomerang cages
- GP62** **Douglas P. Gross** *A. Suman, G.P. Bostick, F.G. Schaafsma, J.R. Anema*
Associations between determinants of socioeconomic status, beliefs about back pain, and exposure to a mass media back pain campaign
- GP63** **Donna D. Ohnmeiss** *R.D. Guyer*
Supine vs. upright weight bearing MRI in the evaluation of patients with lumbar spondylolisthesis
- GP64** **Kazuhiro Hasegawa** *M. Okamoto, S. Hatsushikano, G. Caseiro, K. Watanabe*
Lumbo-sacral alignment and deformity in patients with adult spine deformity deteriorate in standing compared with supine position
- GP65** **Hiromitsu Takaoka** *H. Ataka, T. Miyashita, K. Kato, T. Tanno*
Clinical results of facet fusion using a ligamentum flavum floating method for degenerative lumbar spondylolisthesis
- GP66** **Diane Gregory** *C. Snow, M. Harvey-Burgess, B. Laird, S. Brown*
Pressure-induced end-plate fracture in the porcine spine: is the annulus fibrosus susceptible to damage?
- GP67** **Keishi Maruo** *T. Tachibana, F. Arizumi, K. Kushuyama, k. kishima, S. Yoshiya*
The relationship between compensatory mechanisms of residual kyphotic deformity after osteoporotic vertebral fractures and health-related quality of life
- GP68** **Fumihiko Arizumi** *K. Maruo, T. Tachibana, K. Kusuyama, k. kishima, S. Yoshiya*
Efficacy of prevention program using delirium risk scoring system for postoperative delirium after spine surgery
- GP69** **Takao Sudo** *K. Akeda, T. Sano, N. Takegami, A. Sudo*
5-hydroxytryptamine (serotonin) in human intervertebral disc: preliminary in vitro study
- GP70** **Takashi Chikawa** *F. Tezuka, Y. Takata, T. Sakai, K. Sairyō*
Clinical outcomes and prognosis after spinal surgery for patients on hemodialysis
- GP71** **Su Hun Lee** *D. Son, J. Lee, G. Song*
Variation of C-reactive protein and white blood cell counts in spinal operation: primary fusion surgery versus revision fusion surgery
- GP72** **Kazuyuki Watanabe** *K. Otani, M. Sekiguchi, T. Nikaido, K. Kato, H. Kobayashi, R. Tominaga, S. Yabuki, S. Kikuchi, S. Konno*
Spinal deformity and depression symptoms -locomotive syndrome and health outcomes in aizu cohort study (LOHAS)
- GP73** **Zhi-Jun Hu** *Z. Shan, B. Huang, J. Wang, Z. Zheng, X. Zhang, J. Liu, F. Zhao*
Functional role of mechanosensitive ion channel Piezo1 in Modic changes, and the effect of *Propionibacterium acne*
- GP74** **Howard S An** *E.P. Moyer, K. Segami, J. He, A.A. Espinoza Orías, N. Inoue*
Validation of clinical CT against μ CT to measure lumbar facet joint width
- GP75** **Ki-Hyun Kwon** *S. Kim, K. Ha, H. Park, J. Ahn, H. Min, y. Kim*
Simple predictor of postoperative neurologic status in patients with metastatic spinal cord compression - Cord compression ratio on MRI

- GP76** **Hideyuki Kinoshita** S. Orita, K. Inage, K. Abe, M. Inoue, M. Norimoto, T. Umimura, Y. Eguchi, K. Fujimoto, Y. Shiga, Y. Aoki, T. Furuya, M. Suzuki, T. Akazawa, K. Takahashi, S. Ohtori
Skeletal muscle cell oxidative stress as a possible therapeutic target for denervation-induced sarcopenia
- GP77** **Chang-Hoon Jeon** N. Chung, H. Lee, K. Kim
The characteristics of endplate fractures in the thoracolumbar fracture with fixation
- GP78** **John M. Popovich, Jr.** P. Aminpour, J. Cholewicki, P.W. Hodges, S.A. Gray
Psychological factors are central to understanding chronic low back pain
- GP79** **Sho Kobayashi** K. Khanna, T. Grace, M.A. Aksekili, Y. Matsuyama, V. Deviren
Comparison of intraoperative fluoroscopic and postoperative radiographic measurement of lumbar lordosis in flatback syndrome
- GP80** **Lachlan J Smith** M. Piazza, S.H. Peck, S.E. Gullbrand, J.R. Bendigo, T. Arginteanu, Y. Zhang, H.E. Smith, N.R. Malhotra
Quantitative MRI correlates with histological grade in a percutaneous needle injury mouse model of disc degeneration
- GP81** **Zorica Buser** K. Tamai, R. Chamnan, K. Chantarasirirat, B. Formanek, P. Paholpak, J.C. Wang
The effect of nicotine on human bone marrow stem cell proliferation and differentiation
- GP82** **Ashish Diwan** V. Ramakrishna, U. Chamoli, L. Viglione, N. Tsafnat
Mild (and not severe) disc degeneration is implicated in the progression of L5 spondylolysis to spondylolisthesis
- GP83** **Yuki Onishi** N. Kawamura, S. Masuyama, Y. Hirao, T. Sato, T. Teshima, N. Otomo, Z. Kunogi
Fulcrum backward bending as a basis for surgical planning in adult spinal deformity
- GP84** **Ho-Joong Kim** B. Chang, Y. Heo, J. Park, J. Yeom
The prevalence and impact of frailty in patients with symptomatic lumbar spinal stenosis
- GP85** **Masaru Kanda** N. Sato, T. Kitamura, I. Konishi
Back endurance test -application for elderly population with spinal deformity-
- GP86** **Takuya Nikaido** S. Kikuchi, K. Otani, T. Igari, M. Sekiguchi, K. Watanabe, K. Kato, H. Kobayashi, R. Tominaga, S. Yabuki, S. Konno
Intermittent claudication due to low back pain in the community: the Minami Aizu Study
- GP87** **Yutaro Kanda** K. Kakutani, Y. Morita, T. Yurube, M. Ito, Y. Kakiuchi, Y. Takeoka, T. Kurakawa, Y. Terashima, T. Takada, R. Kuroka, K. Nishida
The fate of notochordal cell in intervertebral disc degeneration induced by dynamic compressive load through integrin alpha5/beta1 mechanotransduction.
- GP88** **Stephan N Salzmann** T. Shirahata, C. Ortiz Miller, B.B. Carlson, J.A. Carrino, J. Yang, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes
Regional bone mineral density differences measured by QCT: is the clinically used L1/L2 average representative of the entire lumbosacral spine?
- GP89** **Stephan N Salzmann** B.B. Carlson, T. Shirahata, C. Ortiz Miller, J.A. Carrino, J. Yang, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes
Prevalence of low bone mineral density measured by quantitative computed tomography (QCT) in 296 consecutive lumbar fusion patients *abs# GP089*
- GP90** **Stephan N Salzmann** B.B. Carlson, T. Shirahata, C. Ortiz Miller, J.A. Carrino, J. Yang, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes
Does lumbar spine pathology affect bone mineral density measurement by quantitative computed tomography (QCT)?
- GP91** **Michael J Schneider** S.R. Piva, A. Bove, A. McCarthy, L. Person Mecca
Pre-operative education and rehabilitation prior to surgery for lumbar spinal stenosis: patient and physical therapist perspectives

- GP92** **Ho-Joong Kim** *J. Park, J. Park*
Prevalence of frailty in patients with osteoporotic vertebral compression fracture and its association with fracture severity
- GP93** **Michele C Battié** *A. McKillop, L.J. Carroll, B.D. Dick*
What motivates engagement in work and other valued social roles despite persistent back pain?
- GP94** **Brook I Martin** *J. Shaw, B. Lawrence, R. Spiker, R. McEntarfer, N. Spina*
Validation of a coding algorithm based on version 10 of the international classification of disease for classifying spinal surgery patient diagnosis
- GP95** **Drew A Bednar**
Transosseous intradiscal screw fixation in lumbar reconstruction; clinical experience with an alternative in osteoporosis fixation
- GP96** **Yasuchika Aoki** *G. Kubota, H. Fukuchi, A. Watanabe, T. Nakajima, M. Takazawa, N. Yanagawa, H. Takahashi, S. Sugiura, K. Takahashi, S. Ohtori*
Comparing the incidence of lumbar spondylolysis between a general population and patients with lumbar degenerative disease who underwent lumbar spine surgery
- GP97** **Hironobu Sakaura** *A. Ohnishi, A. Yamagishi, T. Ohwada*
A comparative study of early fusion status after PLIF with cortical bone trajectory screw fixation between carbon peek cages and titanium-coated peek cages
- GP98** **Akira Iwata** *M. Kanayama, F. Oha, Y. Shimamura, T. Hashimoto, M. Takahata, N. Iwasaki*
Is bone non-union, vertebral deformity, or spino-pelvic malalignment the best therapeutic target for amelioration of low back pain after osteoporotic vertebral fracture?
- GP99** **Qingjun Su** *W. Yuan, P. Yin, Y. Hai*
Debridement and indwelling irrigation with diluted gentamicin solution for postoperative spinal infection
- GP100** **Derek P Zwambag** *M.B. Hurtig, H. Vernon, S.H. Brown*
Disruption of erector spinae aponeurosis and facet injury do not alter the passive mechanics of spine muscles after four weeks of recovery in a rat
- GP101** **Junichi Ohya** *T. Oichi, Y. Oshima, N. Kawamura, J. Kunogi, H. Chikuda, S. Tanaka*
Intraoperative navigation decreases the risk of reoperation for implant-related complication following spinal fusion surgery
- GP102** **Stephan N Salzmann** *C. Ortiz Miller, J.A. Carrino, J. Yang, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes*
A novel quantitative computed tomography bone mineral density assessment of the sacrum does not predict sacral fractures following instrumented spinal fusion
- GP103** **Masahiro Inoue** *S. Orita, K. Inage, Y. Shiga, k. Fujimoto, K. Abe, H. Kanamoto, H. Kinoshita, M. Norimoto, T. Umimura, S. Ohtori*
Evaluation of physical activity before and after lumbar surgery using wearable activity trackers
- GP104** **Akihiko Hiyama** *D. Sakai, H. Katoh, M. Tanaka, M. Sato, M. Watanabe*
The prevalence of diffuse idiopathic skeletal hyperostosis (DISH) of the whole spinal computed tomography for the 1189 subjects
- GP105** **Tomohiko Sano** *K. Akeda, N. Takegami, J. Yamada, K. Nakase, T. Sudo, A. Sudo*
Inhibitory effect of anti-human RANKL antibody on pro-inflammatory responses by human intervertebral disc cells
- GP106** **Takashi Yurube** *M. Ito, T. Takeoka, N. Watanabe, K. Kakutani, T. Takada, Y. Kakiuchi, Y. Takeoka, Y. Kanda, R. Kuroda, K. Nishida*
Protective effects of "locomotion training" exercise against the sagittal malalignment of the spine-pelvis-lower extremity axis in patients with the locomotive syndrome

- GP107** **Nikhil Jain**, J.L. Brock, F.M. Phillips, S.N. Khan
30-day emergency department visits after primary lumbar fusion: incidence, reasons, risk factors, and costs
- GP108** **Shinichi Ishihara** N. Fujita, K. Azuma, O. Tsuji, N. Nagoshi, M. Yagi, K. Watanabe, T. Tsuji, K. Ishii, M. Nakamura, M. Matsumoto
Association between epidural fat accumulation and metabolic conditions
- GP109** **Nikhil Jain** N. Adapa, Y. Gussous, R. Chandawarkar, S.N. Khan, E. Yu
Prophylactic muscle flap reconstruction in complex degenerative spine surgery
- GP110** **Masatoshi Hoshino** S. Takahashi, H. Yasuda, H. Terai, K. Hayashi, T. Tsujio, H. Kono, A. Suzuki, K. Tamai, S. Ohyama, H. Toyoda, R. Sasaoka, S. Dohzono, F. Kanematsu, Y. Hori, H. Nakamura
Efficacy of balloon kyphoplasty for fresh osteoporotic vertebral fractures with poor prognostic factors - a propensity-score-matched analysis using data from the multicenter prospective study
- GP111** **Dong-Eun Shin** Y. Lee
Cranio-caudal biostructural asymmetries of vertebral bodies - why vertebral fractures usually involve the superior end plate?
- GP112** **Howard S An** B.A. Aliaga Crespo, A.A. Espinoza Orías, G.B. Andersson, N. Inoue
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- GP235** **Yuji Yokozeki** *T. Koyama, S. Inoue, M. Miyagi, S. Tajima, K. Murata, A. Kawakubo, Y. Uekusa, F. Hisako, D. Ishi, S. Ohshima, K. Inage, K. Uchida, G. Inoue, M. Takaso*
The characteristics of low back pain, muscle mass and bone quality in glucocorticoid-induced osteoporosis patients
- GP236** **Kazushi Takayama** *T. Kita, R. Sasaki, H. Taniwaki, H. Sakanaka, Y. Yamano, H. Nakamura*
High prevalence of osteoporotic vertebral fracture in patients with proximal femoral fracture
- GP237** **Yasuhiro Shiga** *T. Kotani, S. Orita, E. Hanaoka, F. Hasue, T. Fujiyoshi, T. Miyashita, T. Ishikawa, T. Furuya, S. Ohtori*
Spinal cord stimulation therapy improves pain and walking ability, but the improvement in psychological disability according to JOABPEQ score is poor
- GP238** **Yuichiro Mima** *N. Isogai, M. Yagi, S. Nishimura, M. Nishida, N. Fujita, E. Okada, N. Nagoshi, O. Tsuji, M. Nakamura, M. Matsumoto, K. Watanabe*
Risk predictors of perioperative complications for the palliative surgical treatment of spinal metastasis
- GP239** **Yue Wang** *L. Chen, X. Hu, M.C. Battié, X. Lin*
Modic changes in the lumbar spine are common aging related degenerative findings that parallel with disc degeneration
- GP240** **Toshio Nakamae** *K. Yamada, T. Hiramatsu, T. Hashimoto, O. Suzuki, T. Maruyama, N. Adachi, Y. Fujimoto*
Percutaneous endoscopic discectomy for lumbar disc herniation in athletes
- GP241** **Koji Akeda** *E.S. Abarado, K. Cheng, N. Inoue, K. Masuda, A. Sudo*
Morphological changes of the lumbar spine following extreme lateral interbody fusion: three-dimensional computerized tomography evaluation
- GP242** **Fabio Zaina** *S. Donzelli, F. Di Felice, A. Caronni, S. Minnella, S. Negrini*
Pain and function in adult patients with scoliosis attending a rehabilitation center
- GP243** **Hiroaki Matsumori** *H. Shigematsu*
The change of radiographic spinal alignment after using high angle cage in posterior lumbar interbody fusion surgery
- GP244** **Morgan B Giers** *L.A. Bardonova, E. Belykh, V.A. Byvaltsev, M.C. Preul*
Intervertebral disc cells' metabolic and synthetic activity under the influence of macrophage cocultivation in 3D cell culture
- GP245** **Tomoyuki Ozawa** *T. Toyone, M. Yamagata, S. Ohtori*
Efforts toward achieving relief from refractory low back pain using Duloxetine — Experience on the use of Duloxetine —
- GP246** **Hiroaki Manabe** *T. Sakai, M. Morimoto, F. Tezuka, K. Yamashita, Y. Takata, T. Chikawa, K. Sairyo*
Radiological outcomes of lumbar interbody fusion using titanium-coated peek cage
- GP247** **Tsuyoshi Deguchi** *H. Hashizume, M. Nakajima, M. Teraguchi, T. Akune, S. Tanaka, N. Yoshimura, M. Nojima, Y. Yukawa, A. Minamide, Y. Nakagawa, H. Iwasaki, S. Tsutsui, M. Takami, M. Yoshida, H. Yamada, S. Ikegawa*
A population-based cohort study identifies an association of *THBS2* with intervertebral disc degeneration

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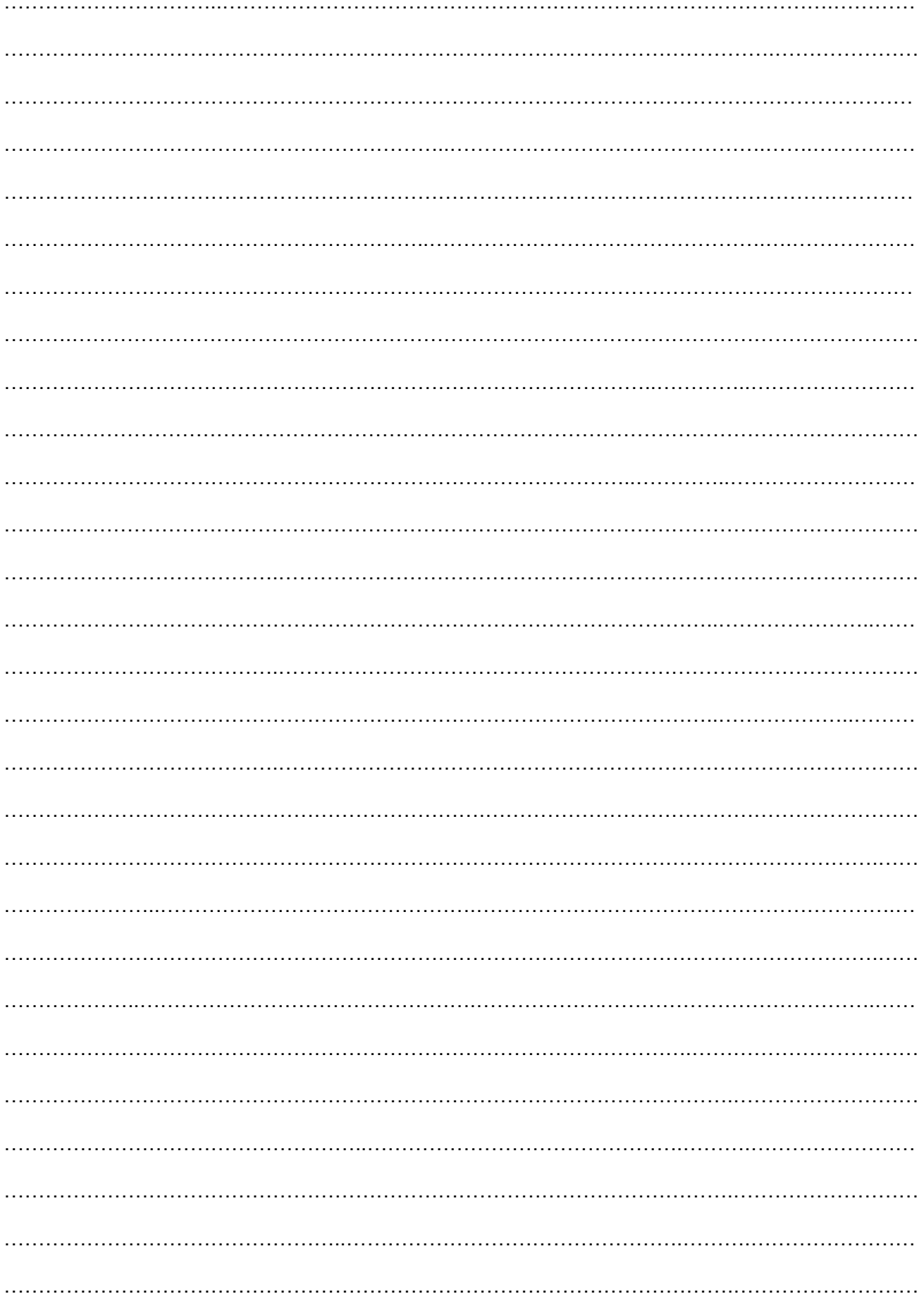
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NOTES

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Program at a Glance

Monday May 14

07:00 – 08:00
Program
Committee
Meeting

08:00 – 09:00
Membership
Committee
Meeting

09:00 – 12:00
Focus Group #1

9:30 – 11:30
Strategy Group
Meeting

12:00 – 15:00
ExCom Meeting

13:00 – 16:00
Focus Group #2

14:00 – 17:00
ORS Spine
Section/ISSLS
Workshop

15:00
Registration
opens

16:30 – 17:30
Women's ISSLS

18:00 – 20:00
**WELCOME
RECEPTION**

Tuesday May 15

07:00 – 07:45
BREAKFAST

07:45 – 08:00
Welcome by
local hosts and
program chair

08:00 – 10:00
Scientific

10:00 – 10:30
COFFEE

10:30 – 11:30
Scientific

11:30 – 12:00
Invited lecture
Jennifer Moss

12:00 – 13:30
LUNCH

13:30 – 15:20
Scientific

15:20 – 15:50
COFFEE

15:50 – 16:30
Scientific

16:30 – 17:30
Symposium #1

17:30 – 18:10
First business
meeting

Wednesday May 16

07:00 – 07:45
BREAKFAST

07:45 – 08:45
Special poster
session 1

09:00 – 10:00
Scientific

10:00 – 10:30
COFFEE

10:30 – 11:00
Scientific

11:00 – 11:40
Presidential
address

11:40 – 12:20
Harry Farfan
Presidential
Lecture
Susan Eaton

13:00
Afternoon
outing

Thursday May 17

07:00 – 07:30
BREAKFAST

07:30 – 09:30
Scientific

09:30 – 09:50
Fellowships and
Awards

09:50 – 10:20
COFFEE

10:20 – 11:30
The ISSLS Prize

11:30 – 12:15
Invited lecture
Martin Parnell

12:15 – 13:30
LUNCH

13:30 – 15:00
Scientific

15:00 – 16:00
General poster
session

16:00 – 16:40
Scientific

16:40 – 17:40
Symposium #2

17:40
Second Business
Meeting

19:00
**DINNER
BANQUET**

Friday May 18

07:00 – 07:45
BREAKFAST

07:45 – 08:45
Special Poster
Session II

09:00 – 09:30
Report of Focus
Groups

09:30 – 10:00
Scientific

10:00 – 10:20
COFFEE

10:20 – 12:00
Scientific

12:00 – 12:20
Announcement:
Best paper and
poster awards
Closing remarks
Meeting
adjourned



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