MONDAY JUNE 3

07:00-08:00   Program Committee Meeting
08:00-09:00   Membership Committee Meeting
09:00-12:00   Focus Group #1 - Degenerative Spinal Phenotypes - Creating a common language to advance knowledge
                Josef Assheuer, Michele Battié, Dino Samartzis & Bradley Weiner
09:30-11:30   Strategy Group Meeting
12:00-15:00   Executive Committee Meeting
13:00-16:00   Focus Group #2 - International Taskforce on Diagnosis and Management of Lumbar Spinal Stenosis
                Markus Melloh and Christy Tomkins-Lane
17:00-18:00   Women's ISSLS
18:00-20:00   Opening Ceremony & Welcome Reception
TUESDAY JUNE 4

07:45-07:50 Welcome – Shinichi Konno and Miho Sekiguchi

07:50-08:00 Program chairman report - Scott Blumenthal

SESSION #1 - STENOSIS

Chairs: Tom Oxland and Kazuhiro Chiba

08:00-08:05 Multi-level decompression/fusions are as effective as single level lumbar spinal stenosis operations id# 2390


08:07-08:12 Does the concomitant presence of lumbar scoliosis or spondylolisthesis affect clinical outcomes following decompression surgery in patients with spinal stenosis? id# 2403


08:14-08:19 Early surgery vs prolonged conservative treatment for sciatica - 10-year results of a randomized controlled trial id# 2245

Gijsbert M Overdevest W.C. Peul, W.A. Moojen, B. Koes, R.H. Bartels, The Netherlands

08:21-08:30 Discussion

08:30-08:35 Mood disorders predict poor outcome of lumber disc surgery - results from a clinical trial id# 2429

Gijsbert M Overdevest N.A. van der Gaag, W.M. Moojen, W. Peul, M.P. Arts, The Netherlands

08:37-08:42 The indirect decompression effect of oblique lateral interbody fusion in the treatment of degenerative lumbar stenosis id# 2057

Zhi-Jun Hu X. Fang, F. Zhao, J. Zhang, X. Zhao, S. Fan, China

08:44-08:49 Efficacy of decompression surgery on walking ability and health-related quality of life in lumbar spinal stenosis patients with gluteus medius muscle weakness id# 2145

Satoshi Suzuki N. Fujita, A. Miyamoto, O. Tsuji, N. Nagoshi, E. Okada, M. Yagi, T. Tsuji, H. Kono, M. Nakamura, M. Matsumoto, K. Watanabe, Japan

08:51-09:00 Discussion
SESSION #2 - DISC DEGENERATION

Chairs:

09:00-09:05  
Nucleus pulposus-derived stem cells encapsulated in BMP7-based functionalized self-assembling peptide for alleviation of intervertebral disc degeneration in a rabbit model  
*id# 1759*  
**Dike Ruan** J. Ying, L. Su, S. Pei, T. Wen, China

09:07-09:12  
Expression of TRPV4 in human IVDs and its relevance in stretch-induced inflammation  
*id# 2317*  
**Karin Wuertz-Kozak** E. Cambria, A. Sadowska, L. Halgund, P. Jaszuczuk, F. Passini, W. Hitzl, J. Snedeker, O.N. Hausmann, Switzerland

09:14-09:19  
Pathological effects of cortisol on intervertebral disc cells and mesenchymal stem cells from low back pain patients.  
*id# 1600*  
**Daphne Hingert**, J. Nilsson, H. Barreto Henriksson, A. Baranto, H. Brisby, Sweden

09:21-09:30  
Discussion

09:30-09:35  
Genetic lineage tracing of intervertebral disc cells in a neonatal regeneration model  
*id# 2397*  
**James C Iatridis** O. Torre, V. Mroz, A.R. Martinez Benitez, A.H. Huang, US

09:37-09:42  
A new rabbit model of intervertebral disc degeneration induced by intradiscal injection of monosodium iodoacetate  
*id# 1814*  
**Takao Sudo** K. Akeda, T. Iwasaki, N. Takegami, J. Yamada, K. Masuda, N. Inoue, A. Sudo, Japan

09:44-09:49  
Identification of two natural compounds as new senolytics in intervertebral disc degeneration and back pain.  
*id# 1667*  
**Lisbet LH Haglund** H.H. Cherif, D.D. Bisson, S.S. Kocabas, Canada

09:51-10:00  
Discussion

10:00-10:30  
COFFEE

SESSION #3 - REHABILITATION

Chairs:

10:30-10:35  
Identification through movement analysis of chronic low back pain pathological spinal movements patterns and their sensibility to change during exercise treatment  
*id# 2304*  
**Stefano Negrini** B. Piovanelli, C. Amici, S. Donzelli, F. Zaina, Italy
Male gender and initial job demand predict successful re-integration and return to work: results from 20-years of experience with a multidisciplinary programme for rehabilitation of chronic low back pain  id# 1678

Jason Pui Yin Cheung G. Leung, P. Cheung, G. Lau, S. Lau, K. Luk, Y. Wong, K. Cheung, P. Koljonen, Hong Kong

Exercise for the intervertebral disc: a 6-month RCT  id# 2223

Daniel L Belavy C. Miller, A. Hahne, S. Tagliaferri, K. Simson, D. Connell, G. Trudel, T. Rantalainen, J. Ford, Australia

Discussion

Can preoperative rehabilitation improve the surgical outcome in the patients with adult spinal deformity?; A retrospective cohort study  id# 2384

Tatsuya Endo T. Ito, M. Iwabuchi, O. Shirado, Japan

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  id# 2444

Xiaolong Chen P. Hodges, G. James, J. Umali, U. Chamoli, K. Sheldrick, J. TU, W. Li, A. Diwan, Australia

The tasks effect in low back pain movement patterns  id# 1812

Enrica Papi A.M. Bull, A.H. McGregor, UK

Discussion

DEBATE - Prehabilitation and postoperative rehabilitation – what do we really know? – A debate built on the ISSLS memberships’ knowledge

Chairs: Helena Brisby and Kristin Archer

Kristin Archer
Mari Lundberg

LUNCH

SESSION #4 - BEST PAPER AWARD SESSION

Chairs:

In vitro biomechanical testing of an innovative antero-posterior fixation for A3 lumbar fracture  id# 1659

Marc-Antoine Rousseau L. Simon, S. Persohn, A. Nerot, W. Skalli, France
13:37-13:42 Enhanced spinal fusion by combination of NELL-1 and ultra-low dose of BMP-2 in a rat model id# 2297

**Ling Liu** W. Lam, M. Wang, R. Kumarsing, M. Naidu, K. Ting, CHJ. Goh, H. Wong, Singapore

13:44-13:49 Remaining systemic treatment options: a valuable predictor of survival and functional outcomes after surgical treatment for spinal metastasis.id# 1731

**Sam Yeol Chang** H. Kim, C. Lee, B. Chang, South Korea

13:51-14:00 Discussion

14:00-14:05 Cervical epidural steroid injections: incidence and determinants of subsequent surgery id#

**John P Kleimeyer** J.C. Kolts, S.S. Hu, US

14:07-14:12 A study on sports activities of non-union adolescent lumbar spondyloysis patients id# 2196

**Kenji Hatakeyama** M. Urushibara, A. Kojima, J. Ouchi, S. Ohtori, Japan

14:14-14:19 Quantitative evaluation of motor function of the lower extremity using the foot tapping test: Part 2. Five-year follow-up. id# 2208

**Hiroshi Kobayashi** K. Otani, T. Nikaido, K. Watanabe, K. Kato, S. Yabuki, S. Konno, Japan

14:21-14:30 Discussion

14:30-14:35 Is the terminal complement complex a possible target for therapeutic intervention in intervertebral disc degeneration? id# 2233


14:37-14:42 Endplate damage is heritable, is independently associated with low back pain and may trigger intervertebral disc degeneration: a longitudinal study from TwinsUK id# 2438

**Marinho Rade** S. Munir, M.B. Freidin, J.H. Määttä, G. Livshits, F.M. Williams, UK

14:44-14:49 Causes of low back pain in different populations –The Wakayama Spine Study id# 2104


14:51-15:00 Discussion
15:00-15:30 **COFFEE**

**SESSION #5 - AGING SPINE**

**Chairs:**

15:30-15:35 Cost-effectiveness of balloon kyphoplasty for patients with acute osteoporotic vertebral fractures in a super-aging society. *id# 178*


15:37-15:42 Teriparatide neoadjuvant therapy targeting the osteoporotic spine: influence of administration period from the perspective of bone histomorphometry *id# 2101*


15:44-15:49 Do osteoporosis and spinal degenerative disorders affect low back pain and related disorders? The Wakayama Spine Study *id# 2339*


15:51-16:00 **Discussion**

16:00-16:05 Local mechanical environment plays a role in spinal bone mineral density measured by quantitative computed tomography: A study on lumbar lordosis *id# 1742*


16:07-16:12 An effect comparison of denosumab and serm on spinal instrumentation in patients with osteoporosis *id# 2155*


16:14-16:19 Clinical and radiological impact of adjacent vertebral fracture after balloon kyphoplasty: Development of a scoring system for predicting adjacent vertebral fracture occurrence *id# 1769*

16:21-16:30 Discussion

SYMPOSIUM - Aging spine: toward a comprehensive understanding of low back pain in the elderly

Chairs: Hans-Joachim Wilke and Hiroaki Nakamura

16:30-16:40 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.

16:40-16:50 From Bench to Bedside: The Osteoporosis-Related Pain.

Miyako Suzuki, M.D., Ph.D, Department of Orthopaedic Surgery, Graduate School of Medicine, Chiba University

16:50-17:00 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

17:00-17:10 Discussion

FIRST BUSINESS MEETING

17:10-18:10 Chair: Tom Oxland (for members only)
WEDNESDAY JUNE 5

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

1A – BIOLOGY
1B – BIOMECHANICS
1C - REHABILITATION
1D - DEFORMITY
1E - SURGERY OUTCOMES

SESSION #6 - POPULATION STUDIES

Chairs:

Factors related to low back pain among elderly population in suburban area Japan -The Shiraniwa Study  id# 1760

Shoichiro Ohyama M. Hoshino, S. Takahashi, Y. Hori, T. Tsujio, H. Nakamura, Japan

09:07-09:12 Pelvic compensation accompanying spinal malalignment and back pain-related factors -The Wakayama Spine Study id# 2110


09:14-09:19 Association of vertebral bone marrow edema with low back pain in degenerative lumbar scoliosis in the elderly id# 1676

Toshio Nakamae Y. Fujimoto, K. Yamada, K. Nakanishi, N. Kamei, Y. Tsuchikawa, T. Morisako, T. Harada, N. Adachi, Japan

09:30-09:35 Lifestyle and lifetime occupational exposures may not play a role in the pathogenesis of Modic Changes on the lumbar spine MRIs id# 1902

Jialong Wu J. Huang, M.C. Battié, Y. Wang, China

09:37-09:42 Results of conservative protocol in management of 403 patients of Lumbar Disc Herniation: Are we operating more than we should? id# 2349

Harvinder Chhabra A. Pedaballe, M. Gupta, India

09:44-09:49 Range of motion and local sagittal alignment of lumbar spine in 627 healthy volunteers - Age-related changes and gender difference - id# 1710
SESSION #7 - SURGICAL OUTCOMES

Chairs:

10:30-10:35  Differences in surgical practices between salaried and fee-for-service surgeons for degenerative lumbar conditions in a universal health payer system  id# 2394  
**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  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  id# 2332  
**Masumi Iwabuchi** H. Fukuda, R. Tominaga, Y. Hanyu, O. Shirado, Japan

10:44-10:49  Application study of ERAS in perioperative period of fusion surgery of patients with degenerative lumbar diseases  id# 1569  
**Xueyu Hu** Z. Yang, Z. Luo, China

10:51-11:00  Discussion

PRESIDENTIAL ADDRESS

Introduction – Kazuhiro Chiba

11:00-11:40  Title:  
Tom Oxland, The University of British Columbia, Vancouver BC Canada

HARRY FARFAN PRESIDENTIAL LECTURE

Introduction: Tom Oxland

11:40-12:20  Title:  
Dr. Eric Grant, Radiation Effects Research Foundation of Hiroshima and Nagasaki

13:00-  AFTERNOON OUTING
THURSDAY JUNE 6

SESSION #8 - SURGERY FUSION

Chairs:

07:30-07:35 Effects of restoration of sagittal balance on adjacent segment degeneration in instrumented lumbar fusions id# 2021
Young-Hoon Kim K. Ha, S. Kim, H. Min, H. Park, South Korea

07:37-07:42 Open versus minimally invasive transforaminal lumbar interbody fusion in obese patients. A systematic review and meta-analysis id# 2406
Ayani Vaishnav A. Alhammoud, O. Aldahamsheh, Y. Othman, C. Gang, S. Qureshi, Qatar

07:44-07:49 Risk factors for readmission and complications in obese and severely obese patients undergoing elective posterior lumbar spine fusion id# 1875
Deeptee Jain J. Shaw, V. Deviren, A.L. Zhang, S. Berven, USA

07:51-08:00 Discussion

08:00-08:05 One-third of postoperative scoliosis patients pursue a career path in a healthcare-related field. id# 2328

08:07-08:12 Impact of previous lumbar spine surgery on outcome of lumbar total disc replacement: Analysis of prospective 5-year follow-up study data id# 2089
Scott L Blumenthal D.D. Ohnmeiss, J.E. Zigler, R.D. Guyer, USA

08:14-08:19 Adjacent segment degeneration versus disease after lumbar spine fusion for degenerative pathology: A Meta-analysis of the Literature id# 1745
Chao Zhang D. Ruan, China

08:21-08:30 Discussion

SESSION #9 - DISC DEGENERATION

Chairs:

08:30-08:35 Nucleus replacement gets a new chance with annulus sealing id# 1664
Laura Zengerle A. Köhler, C. Hackenbrock, H. Wilke, Germany

08:37-08:42 Low-intensity pulsed ultrasound far-field exposure increases matrix synthesis in annulus fibrosus cells id# 2399
Devante A Horne, P. Jones, M. Adams, C. Diederich, J.C. Lotz, USA

08:44-08:49 Osteomacs: may be a key factor in the development of Modic changes id# 2048

Fengdong Zhao, J. Wang, China

08:51-09:00 Discussion

09:00-09:05 Autophagy plays protective roles against human disc cellular apoptosis and senescence, but not affect extracellular matrix degradation id# 1965


09:07-09:12 Viable allograft as a supplemental therapeutic for disc regeneration id# 1985

Douglas Beall, G. Wilson, R. Bishop, W. Tally, T. Temple, T. Ganey, USA

09:14-09:19 Safety of intradiscal condoliase in the treatment of lumbar disc herniation id# 2098

Kazuhiro Chiba, Y. Matsuyama, T. Seo, Japan

09:21-09:30 Discussion

FELLOWSHIP AWARD CEREMONY

Chairs: Kazuhiro Chiba and Christopher Bono

09:30-10:00 Young Investigator Travel Award - Prize Ceremony for the recipients

Clinical Traveling Fellowship - announcement for this year’s recipient and report from last year’s recipient

ISSLS Research Grant - announcement of this year’s winner and report from last year’s winner

Young investigators Award SPINE - announcement of winner

Best Paper and poster Award – announcement of winners

Wiltse Lifetime Achievement Award Ceremony – announcement of winner

10:00-10:30 COFFEE

ISSLS PRIZE INTRODUCTION AND AWARD CEREMONY

10:30-10:40 Chairman: Björn Rydevik - introduction

10:40-10:50 Clinical importance of trunk muscle mass for low back pain, spinal balance, and quality of life: A multicenter cross-sectional study id# 1837

10:50-11:00 Discussion

11:00-11:10 Physical activity attenuates fibrotic alterations to the multifidus muscle associated with intervertebral disc degeneration id# 2428

Greg James P. Hodges, D. Klyne, M. Millecamps, L. Stone, Australia

11:10-11:20 Discussion

11:20-11:30 Biomechanical changes in dynamic sagittal balance and lower limb compensatory strategies following realignment surgery in adult spinal deformity patients id# 2482


11:30-11:40 Discussion

INVITED LECTURE

Chairman:

11:40-12:20 Cell therapy for spinal cord injury

Prof. Osamu Honmou: Molecular Medicine, and Neural Repair and Therapeutics, Sapporo Medical University School of Medicine

12:20-13:30 LUNCH

SESSION #10 - BASIC SCIENCE, IMAGING

Chairs:

13:30-13:35 Ultrasound measurement of the skin as a potential marker of bone quality: A prospective pilot study of patients undergoing lumbar spinal fusion id# 1674


13:37-13:42 Enhance long-term stability of alginate-based polyelectrolyte complex BMP-2 carrier by freeze-drying in spinal fusion id# 2457

Ling Liu W. Lam, M. Wang, J. Li, C. Goh, H. Wong, Singapore

13:44-13:49 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 id# 1833

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

13:51-14:00 Discussion

14:00-14:05 The importance of lumbar level stratification for quantitative MR studies of lumbar intervertebral discs: a cross-sectional analysis of 101 healthy adults id# 1750

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

14:07-14:12 Feasibility of lumbar disc lamellar measurement with in-vivo ultrasonography id# 1602

Claudio Vergari T. Langlais, P. desprairies, P. Rohan, R. Pietton, J. Dubousset, J. Meakin, C. Winlove, r. vialle, W. Skalli, France

14:14-14:19 Symptomatic implant/construct failure after metastatic spine tumour surgery id# 2148

Naresh Kumar R.S. Patel, D. Sonawane, J. Song, A.P. Singla, H. Milavec, N. Ravikumar, J. Ruiz, H. Hey, H. Wong, Singapore

14:21-14:30 Discussion

GENERAL POSTER SESSION

14:30-15:30 Coffee and Refreshments will be served

SESSION #11 - STENOSIS

Chairs:

15:30-15:35 Intraspinal diffusion tensor imaging parameters in quantitative assessment of patients with lumbar spinal canal stenosis id# 1562


15:37-15:42 Lumbar spinal stenosis (LSS) is frequent comorbidity in familial idiopathic normal pressure hydrocephalus (iNPH) id# 2215

Ville Leinonen J.A. Räsänen, J. Huovinen, Finland

15:44-15:49 How does lumbosacral multi-level spondylolytic spondylolisthesis differ from mono-level spondylolytic spondylolisthesis in spino-pelvic sagittal alignment? id# 2281
Facet joint capsular laxity in degenerative lumbar spondylolisthesis associated with the increased expression of fractalkine CX3CL1/CX3CR1 chemokine id# 2080

Association of hypertrophy of the ligamentum flavum with an increase in myofibroblasts in the dorsal layer of the ligament in lumbar spinal canal stenosis id# 2237

Automation of MRI gradings to aid longitudinal studies of lumbar spinal stenosis in the Wakayama Spine Study id# 1966

DEBATE - Blended learning vs conventional education for spine specialists and research

Chairs: Tom Oxland

SECOND BUSINESS MEETING

Chair: Tom Oxland
FRIDAY JUNE 7

07:45-08:45  SPECIAL POSTER SESSION #2

2F - BIOLOGY
2G - BIOMECHANICS, BIOLOGY
2H - NON-SURGERY
2I - SURGERY TECHNIQUES
2J - INFECTION/OSTEOPOROSIS

REPORT FROM FOCUS GROUPS

09:00-09:10  Chairman: Kazuhiro Chiba

SESSION # 12 - INFECTION

Chairs:

09:10-09:15  Hypoalbuminemia and elevated CRP as predictors for superficial, deep, and urinary tract infections id# 2290

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 id# 2068

Teppei Hayashi M. Kato, Japan

09:24-09:29  Avoiding infection and screw loosening due to biofilm at bone-screw interface: periop measures id# 1977

Aakash Agarwal B. Lin, C. Schultz, V. Goel, D. McGowan, A. Agarwal, H. Elgafy, C. Karas, J. Wang, S. Garfin, N. Anand, USA

09:31-09:40  Discussion

09:40-10:10  COFFEE

SESSION #13 - BASIC SCIENCE, BIOMECHANICS

Chairs:

10:10-10:15  Immuno-stimulatory capacity of decorin in the intervertebral disc and the mechanical consequence of resultant inflammation id# 2234

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 id# 1557

**Xueyu Hu** J. Zhang, J. Sun, Q. Zheng, Z. Wang, China

10:24-10:29 Mechanical characterization of lumbar annulus fibrosus in adolescent idiopathic scoliosis before and after surgical intervention id# 1588

**Claudio Vergari** L. Chanteux, R. Pietton, T. Langlais, R. Vialle, W. Skalli, France

10:31-10:40 Discussion

10:40-10:45 Cortical trajectory pedicle screws versus traditional trajectory: differences in fatigue loading conditions id# 2299

**Steven T Swinford** T.R. Johnston, A.W. Behn, T.F. Alamin, USA

10:47-10:52 Dysregulated bone marrow stromal cells in Modic type 1 changes id# 2322

**Stefan Dudli** D. Hänni, A. Jüngel, M. Betz, J. Spirig, F. Brunner, M. Farshad, O. Distler, Switzerland

10:54-10:59 High fat diet and leptin receptor deficiency have sex-dependent effects on spinal structures in a type 2 diabetes mouse model id# 1998

**Svenja Illien-Junger** D.M. Natelson, D. Krishnamoorthy, J. Iatridis, USA

11:01-11:10 Discussion

**SESSION # 14 - SURGERY**

*Chairs:*

11:10-11:15 Effect of spinal surgery on prognosis in patients with symptomatic spinal metastasis: a prospective cohort study id# 2078


11:17-11:22 Prognostic factors for drop foot due to lumbar degenerative diseases: the impact of surgical timing on postoperative recovery. id# 1820

**Soichiro Masuda** Y. Kanba, J. Kawai, N. Ikeda, Japan

11:24-11:29 Predictive factors related with recovery of bowel and bladder function and ambulatory capacity in surgically treated traumatic conus medullaris syndrome with thoracolumbar fracture id# 2260
Chang-Hoon Jeon  N. Chung, H. Lee, S. Moon, South Korea

11:31-11:40  Discussion

11:40-11:45  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. id# 1847

Thomas Karlsson  P. Försth, M. Skorpil, K. Pazarlis, P. Öhagen, K. Michaelsson, B. Sanden, Sweden

11:47-11:52  A comparison of functional and quality of life improvement in six different types of lumbar surgery in a Pan Canadian database. id# 2159

Mina Aziz  A. Kelly, M. Weber, G. McIntosh, P. Jarzem, Canada

11:54-11:59  Association between the definition of unfavorable surgical outcomes and their risk factors after spine surgery for lumbar spinal stenosis id# 2072

Ho-Joong Kim  D. Shin, J. Yeom, C. Lee, B. Chang, South Korea

12:01-12:10  Discussion

CLOSING REMARKS - MAMORU KAWAKAMI

12:10-12:20
SPECIAL POSTER SESSION #1
07:45-08:45 WEDNESDAY JUNE 5

1A - BIOLOGY
LOCATION:

Chairs:

Signaling peptides from human mesenchymal stem cells including connective tissue growth factor enhance chondrogenesis in disc cells. id# 1941

**Daphne Hingert** P. Nawilajaroen, J. Aldridge, A. Baranto, H. Brisby, Sweden

Nutrient supply and nucleus pulposus cell function: effects of the transport properties of the cartilage endplate and potential implications for intradiscal biologic therapy id# 2087

**Aaron J Fields** J. Wong, S.L. Sampson, H. Bell-Briones, A. Ouyang, J.C. Lotz, USA

The role of integrin α5β1 in the alteration of notochordal cell induced by dynamic loading id# 1974


MSC homing into intervertebral discs enhances the Tie2 positive progenitor cell population, prevents cell death and induces a proliferative response id# 2336

**Sebastian Wangler** M. Peroglio, U. Menzel, L. Benneker, L. Haglund, D. Sakai, M. Alini, S. Grad, Switzerland

Potential involvement of oxidative stress/inflammatory cytokines cascade in ligamentum flavum hypertrophy id# 2049

**Satoshi Suzuki** E. Okada, O. Tsuji, N. Nagoshi, M. Yagi, T. Tsuji, T. Miyamoto, K. Watanabe, M. Matsumoto, M. Nakamura, N. Fujita, Japan

Genome-wide DNA methylation analysis identifies a differentially methylated profile associated with human intervertebral disc degeneration id# 2269


1B – BIOMECHANICS
LOCATION:

Chairs:

Diurnal variation of vertebral T2-time investigated with T2 mapping id# 2206

**Hanna Hebelka** M. Khalil, K. Lagerstrand, H. Brisby, Sweden

Disc degeneration – more than an aging process id# 2180
**Amir Jamaludin** T. Kadir, A. Zisserman, C. Pereira, F. Williams, J. Urban, J. Fairbank, UK

Is the lumbar spinous process a reliable sagittal plane reference landmark? *id# 2088*

**Alejandro A Espinoza** F. Mukhtar, G.B. Andersson, H.S. An, N. Inoue, USA

Is the anatomy of failure in lumbar disc herniation clinically relevant?: a prospective study *id# 2309*

**Harvinder Chhabra** M. Gupta, A. Pedaballe, India

Lumbar spine slenderness in adolescent idiopathic scoliosis *id# 1563*

**Claudio Vergari** M. Karam, R. Pietton, R. Vialle, I. Ghanem, W. Skalli, A. Assi, France

Does body mass index affect spinal alignment and low back pain in patients with primary osteoporosis? *id# 2268*


**SP #1C – REHABILITATION**

**LOCATION:**

**Chairs:**

A network meta-analysis of effectiveness of specific modes of exercise for chronic low back pain *id# 2219*

**Daniel L Belavy** P.J. Owen, C. Miller, N. Mundell, S.J. Verswijveren, S. Tagliaferri, H. Brisby, S. Bowe, Australia

Optimising conservative management of chronic low back pain: a randomised trial of general strength and conditioning versus motor control manual therapy. *id# 2258*


Voluntary physical activity reinforces the efficacy of acute non-steroidal anti-inflammatory drug treatment for osteoporosis-related pain in a mouse model of ovariectomy-induced osteoporosis *id# 2226*

**Miyako Suzuki** M. Millecamps, S. Ohtori, L.S. Stone, Japan

Statistical morphometric analysis of lumbar paraspinal muscles in patients with lumbar pathology *id# 2231*

**Yiming Xiao** M. Fortin, J. Ahn, H. Rivaz, M. Battié, T. Peters, Canada

Analysis of skeletal muscle mass in women over 40 with degenerative lumbar scoliosis *id# 1841*

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. id# 1687

Daniel Chepurin U. Chamoli, K. Sheldrick, S. Lapkin, D. Scott, J. Kuan, A.D. Diwan, Australia

SP #1D - DEFORMITY

LOCATION:

Chairs:

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 id# 2293

Whoan Jeang Kim C. Ma, J. Lee, D. Song, K. Park, W. Choy, South Korea

What factors affect low back pain of patients with Adolescent Idiopathic Scoliosis average 35 years after surgery? id# 2217

Takehide Katogi T. Akazawa, T. Kotani, Y. Iijima, K. Nakayama, T. Sakuma, S. Minami, Japan

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 id# 1652


What made differences between best and worst clinical results for adult spinal deformity patients: 2-year follow-up id# 2212

Daisuke Togawa S. Oe, T. Hasegawa, Y. Yamato, G. Yoshida, T. Banno, H. Arima, Y. Mihara, H. Ushirozako, Y. Matsuyama, Japan

Multimodal analyses were required to understand the complaints of adult spinal deformity patients id# 2323

Daisuke Togawa S. Oe, T. Hasegawa, Y. Yamato, G. Yoshida, T. Banno, H. Arima, Y. Mihara, H. Ushirozako, T. Yamada, Y. Matsuyama, Japan

Impact of correction surgery on activities of daily living related to Oriental lifestyle in adult spinal deformity patients. Survey with original ADL questionnaire. id# 2094

Performance-based tests as predictors of patient-reported outcomes at 1-year following lumbar spine surgery id# 1848


Physical capacity tasks assessing functional status in patients scheduled for lumbar fusion surgery were not associated with depression, pain catastrophizing, and fear of movement id# 2382

Max Jakobsson H. Brisby, A. Gutke, M. Lundberg, R. Smeets, Sweden

Predictors of poor global alignment and proportion score after surgery for adult spinal deformity id# 1696

Tetsuro Ohba S. Ebata, H. Oba, K. Koyama, H. Haro, Japan

The influence of developmental spinal stenosis on reoperation risk at the adjacent segment after decompression surgery for lumbar spinal stenosis id# 1681

Jason Pui Yin Cheung P. Cheung, Hong Kong

The spatial and temporal expression of sclerostin and canonical wnt signaling factors in the maturing posterolateral spine fusion id# 1912

Steven M Presciutti T. Doan, M. Teklemariam, S. Sangadala, S.D. Boden, H. Drissi, USA

Intraoperative real-time stress analysis using EEG and heart rate over 800 surgeries; multi-center prospective study among 12 orthopedic surgeons id# 2116

Ji-Won Kwon J. Lee, J. Yang, K. Suk, H. Kim, S. Moon, H. Lee, B. Lee, South Korea
**SPECIAL POSTER SESSION #2**

**07:45-08:45 FRIDAY JUNE 7**

**#2F - BIOLOGY**

*Chairs:*

Paraoxonase 1 (PON1) was negatively associated with intervertebral disc degeneration (IVDD). *id# 1962*

**Jianru Wang** F. Chen, Z. Zheng, China

Notochord-like cell clusters may retard the progression of disc degeneration *id# 2063*

**Bao Huang** X. Zhang, J. Liu, J. Chen, China

Sestrins inhibits stress-induced intervertebral disc degradation by enhancing autophagy *id# 1584*

**Ji Tu** W. Li, Australia

Sex differences in the interaction between biomechanical tissue properties of rat intervertebral discs and mechanical pain following annular puncture injury *id# 1849*

**Grace E Mosley** P. Nasser, A. Lai, D. Charen, T.W. Evashwick-Rogler, J.C. Iatridis, USA

Cellularity and matrix homeostasis during intervertebral disc degeneration is regulated via phlpp1 *id# 1996*


Injectable RADA16-I hydrogel conjugated with a bioactive short peptide from BMP-7 attenuates intervertebral disc degeneration in canine *id# 2114*

**Jinwei Ying** D. Ruan, S. Pei, L. Su, T. Wen, C. Xu, China

**#2G - BIOMECHANICS, BIOLOGY**

*Chairs:*

Understanding the impact of repetitive lifting towards lumbar disc herniation: A clinically relevant biomechanical cadaveric study *id# 2106*

**Dhara B Amin** J. Tavakoli, B.J. Freeman, J.J. Costi, Australia

Subsidence risk of vertebral body replacements using a new biomechanical in vitro test method *id# 1665*

**Laura Zengerle** C. Fleeger, T. Theodor Di Pauli von Treuheim, D. Vogele, M. Rauschmann, H. Wilke, Germany
Complex reorganization of the nociceptive withdrawal reflexes of the trunk in people with chronic low back pain id# 1775

**Hugo Massé-Alarie** S.E. Salomoni, P.W. Hodges, Canada

Inter-Level and intra-pedicle bone mineral density distribution in the lumbar spine pedicle cortex id# 2391

**Alejandro Espinoza** T. Irie, T. Irie, K. Segami, H. An, N. Iwasaki, G.B. Andersson, N. Inoue, USA

A novel small compound prevented intervertebral disc degeneration via PI3K/AKT pathway. id# 2040


Lactate as a carbon biofuel for annulus fibrosus cells id# 2415

**Nam Vo** D. Wang, R. Hartman, C. Han, M. Jurczak, J. Kang, J. Lee, G. Sowa, USA

**#2H - NON SURGERY**

**Chairs:**

Clinical differences of each item of Oswestry Disability Index between the patients with lumbar spinal stenosis and lumbar disc herniation id# 2263

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

Therapeutic advantages of frequent physical therapy sessions for patients with lumbar spinal stenosis id# 1641

**Masakazu Minetama** M. Kawakami, M. Teraguchi, R. Kagotani, Y. Mera, T. Sumiya, T. Kitano, M. Nakagawa, Y. Yamamoto, S. Matsuo, Y. Koike, N. Sakon, T. Nakatani, Y. Nakagawa, Japan

Advanced glycolysation end products (ages) in hypertrophied ligamentum flavum of diabetes mellitus and non diabetes mellitus id# 2107


Risk factors for occurrence of lumbar lesion in patients with rheumatoid arthritis id# 1961

**Kentaro Yamada** A. Suzuki, S. Takahashi, K. Tamai, H. Toyoda, M. Hoshino, H. Terai, H. Nakamura, Japan

Comparison of analgesic effects between chimera decoy oligodeoxynucleotide and corticosteroid in the rat thrombin-induced facet joint pain modelid# 2310


Effects of exogenously administered basic fibroblast growth factor and Heme oxygenase-1 in a rat sciatic nerve injury model id# 2344
#21 - SURGERY TECHNIQUES

**Chairs:**

Comparative effectiveness of expandable versus static lateral lumbar interbody fusion devices: two year clinical and radiographic outcomes id# 1772

**Richard Frisch** T. Shirk, J. Riggleman, I.Y. Luna, D. Brooks, G. Joshua, C. Ledonio, USA

Virtual / mixed reality simulation for the spine surgery -now and in the future- id# 1858

**Wataru Narita** R. Takatori, M. Nagae, H. Tonomura, Y. Arai, T. Ogura, T. Kubo, Japan

Fusion technique does not affect short-term patient-reported outcomes for lumbar degenerative disease id# 2420

**Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder, USA

Effect of cage type on immediate post-operative radiographic outcomes in single-level minimally invasive transfaniminal lumbar interbody fusion (MI-TLIF) id# 2271

**Steven McAnany** A. Vaishnav, J. Wright-Chisem, M. Steinhaus, T. Albert, S. Iyer, C. Gang, S. Qureshi, USA

The factor lowering the cost-utility of surgical treatment for patients with metastatic spinal tumor id# 2050

**Shingo Miyazaki** K. Kakutani, Y. Sakai, T. Takada, T. Yurube, Z. Zhang, Y. Kakiuchi, Y. Kanda, R. Tsujimoto, R. Kuroda, K. Nishida, Japan

Correlation of automated lumbar MRI grading with microdecompression surgical level id# 2347

**Brandon L. Roller** Z.O. Knio, T.J. O’Gara, J. Tan, L. Lenchik, R.D. Boutin, T. Kadir, A. Jamaludin USA

## 2J - INFECTION/OSTEOPOROSIS

**Chairs:**

Exploration of the recurrence of spinal tuberculosis: A clinical analysis of 38 cases id# 1580

**Liang Yan** B. He, D. Hao, China

Epidemiology and risk factors of multidrug-resistant pyogenic spondylitis in thoraco-lumbar spine id# 1940

**Katsuhisa Yamada** M. Takahata, K. Nagahama, A. Iwata, T. Endo, T. Onishi, H. Sudo, M. Ito, N. Iwasaki, Japan
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 id# 1691

**Ping-Yeh Chiu** K. Kao, M. Hsieh, T. Tsai, Taiwan

Iodine-supported spinal instruments reduce surgical site infection in total en bloc spondylectomy for spinal tumors. id# 2446


The effect of peri-operative adverse events on long-term patient reported outcomes after lumbar spine surgery id# 2407

**Charles Fisher** O. Ayling, Canada

The regional effect of lumbar fusion surgery on volumetric bone mineral density measured by quantitative computed tomography in adjacent vertebrae: a longitudinal cohort study id# 1704

**Ichiro Okano** C. Jones, S. Salzmann, C. Ortiz Miller, C. Rentenberger, J. Shue, J.A. Carrino, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes, USA
The association between pre-operative MRI findings and surgical revision within three years after surgery for lumbar disc herniation id# 1554

**Dorthe Schoeler Ziegler** L. Carreon, M. Andersen, R. Jensen, Singapore

Systemic Diclofenac Reduces Post-Operative rhBMP-2 Induced Neuroinflammation at Lumbar Nerve Root in a Rodent Model id# 1559

**Zi Qiang, Glen Liau** J. Liu, W. Lam, H. Wong, China

The influence of the intervertebral disc height and intervertebral disc height index in the single segmental lumbar fusion on the radiographic adjacent segment degeneration (rASD) id# 1572

**Xueyu Hu** Z. Luo, P. Huang, Z. Tu, F. Xie, China

Risk factors for vertebral, hip, and femoral fractures among patients with Parkinson disease: A 5-year follow-up in Korea id# 1575

**Sungbae Park** Seoul

Structural bone graft versus morselized bone graft in instrumented lumbar facet joint fusion: a prospective, randomized, self-controlled, and blinded study id# 1581

**Liang Yan** B. He, D. Hao, China

Tubular Discectomy vs Conventional Microdiscectomy for the treatment of lumbar disk herniation – Long-term results of a Randomized Controlled Trial id# 1595

**Mark Arts** G. Overdevest, R. Bartels, W. Peul, The Netherlands

Psychological factors affect physical activity in patients with lumbar spinal stenosis id# 1642

**Masakazu Minetama** M. Kawakami, M. Teraguchi, R. Kagotani, Y. Mera, T. Sumiya, T. Kitano, M. Nakagawa, Y. Yamamoto, S. Matsuo, Y. Koike, N. Sakon, T. Nakatani, Y. Nakagawa, Japan

Serum oxidative stress reflects the severity of neurological damage in patients with lumbar canal stenosis: a pilot cross-sectional human study id# 1648


Clinical characteristics and risk factors for subsequent vertebral body fractures in patients with lumbar degenerative disease treated with transforaminal lumbar interbody fusion. id# 1653


A novel therapeutic strategy for 3’ untranslated region of neuropathic pain target genes id# 1697
**Takashi TH Hirai** T.T. Yoshii, T. Yokoyama, A. Okawa, Japan

The Impact of Degenerative Disc Disease on Regional Volumetric Bone Mineral Density (vBMD) measured by Quantitative Computed Tomography id# 1703

**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, USA

Remaining of endplate is a risk factor of delayed osseous union after posterior lumbar interbody fusion: a multicenter, prospective, randomized study id# 1723

**Hiroki Ushirozako** T. Hasegawa, S. Ebata, T. Ohba, K. Mukaiyama, H. Oba, J. Takahashi, H. Haro, Y. Matsuyama, Japan

Does L4/5 Pose Additional Neurologic Risk in Lateral Lumbar Interbody Fusion? id# 1726

**Stephan N Salzmann** T. Shirahata, O.C. Sax, J. Yang, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes, USA

Cost-effectiveness of lumbar surgery in the Japanese universal health insurance system id# 1794

**Takahito Fujimori** T. Miwa, M. Iwasaki, T. Oda, Japan

Clinical outcomes and union rate of 2-level PLIF ~Comparison between the lumbar segments and the lumbosacral segments~ id# 1796

**Takahito Fujimori**

H. Sakaura, T. Sugiura, D. Ikegami, K. Tateishi, Y. Mukai, N. Hosono, T. Fuji, Japan

Psychologically Informed Physical Therapy for Patients Following Lumbar Spine Surgery: A Randomized Clinical Trial id# 1809

**Kristin R Archer**


Initial single-institution experience with a novel robotic-guided system for thoracolumbar pedicle screw and pelvic screw placement with 643 screws id# 1850

**Deeptee Jain**

J. Manning, E. Lord, T. Protopsaltis, A. Buckland, J. Bendo, C. Fischer, J. Goldstein, USA

Autologous mesenchymal stromal cells labeled with iron used for transplantation to intervertebral discs in patients with chronic low back pain. id# 1864

**Nikolaos Papadimitriou**

H. Hebelka, A. Baranto, H. Barreto Henriksson, A. Lindahl, H. Brisby, Sweden

A validated preoperative score for predicting 30-day readmission after 1-2 level elective posterior lumbar fusion. id# 1873

**Deeptee Jain**

P. Singh, M. Kardile, S. Berven, USA
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 id# 1874

**Deeptee Jain** W. Durand, A.H. Daniels, S.H. Berven, USA

Risk factors and progression rate of sacroiliac joint degeneration in asymptomatic subjects id# 1931


Improvement of the sagittal alignment and balance of the spine through a “locomotion training” rehabilitation program in patients with locomotive syndrome id# 1960

**Takashi Yurube** T. Takeoka, N. Watanabe, H. Inaoka, K. Kakutani, T. Takada, Y. Kakuuchi, Y. Takeoka, Y. Kanda, R. Tsujimoto, S. Miyazaki, Z. Zhang, R. Kuroda, K. Nishida, Japan

Low-Grade Isthmic L5-Spondylolisthesis in Patients with Adolescent Idiopathic Scoliosis (AIS): Any Additional Problem? id# 1971

**Dietrich Schlenzka** M. Ylikoski, M. Poussa, T. Yrjönen, L. Ristolainen, Helsinki

Investigation of the 3D vascular network in vertebral end plates using micro-computed tomography id# 1979

**Sheen Gurrib** R. Cameron, S. Bes, UK

Comparing different chronic preoperative opioid use definitions on outcomes after spine surgery id# 1987

**Kristin R Archer** E.R. Oleisky, J.S. Pennings, J. Hills, A. Sivaganesan, I. Khan, R. Call, C. Devin, USA

A deep learning based fully automated program to segment and quantify paraspinal muscles on axial lumbar spine MR images id# 2018

**Haotian Shen** J. Huang, Q. Zheng, Y. Liu, Y. Wang, China

Whole Exome Sequencing to Identify Genetic Variants Associated with Sagittal Imbalance of Spine: A prospective, multicenter, observational cohort study id# 2022

**Byeongwoo Kim** P. Ahn, D. Lee, D. Shin, S. Yi, Y. Ha, D. Yoon, K. Kim, South Korea

Vertebral augmentation with bone cement cannot stop creep deformation of the fractured vertebra but may accelerate adjacent disc degeneration id# 2024

**Xuan Lu** Z. Zhu, J. Wu, J. Huang, L. Yu, Z. Wen, Y. Wang, China

Spine Explorer: a deep learning based fully automated program for efficient and reliable quantifications of the vertebrae and discs on lumbar spine MR images id# 2035

**Jiawei Huang** H. Shen, J. Wu, Y. Liu, Y. Wang, China
Pre-operative evaluation by the Brief Scale for Psychiatric problems in Orthopaedic Patients (BS-POP) relates to poor surgical outcomes of lumbar decompression surgery id# 2042

**Kazuyuki Watanabe** K. Otani, T. Nikaido, K. Kato, H. Kobayashi, S. Yabuki, S. Kikuchi, S. Konno, Japan

A new anatomical consideration on foraminal decompression for lumbar foraminal stenosis id# 2064


Acellular nerve allograft seeded with SDNF and autogenic ADSCs for nerve root repairment in a beagle model id# 2070

**Wei Li** D. Ruan, China

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 id# 2074

**Yu Yamato** T. Hasegawa, D. Togawa, G. Yoshida, T. Banno, S. Oe, H. Arima, Y. Mihara, H. Ushirozako, T. Yamada, Y. Matsuyama, Japan

Geographic Differences is Intraoperative Neuromonitoring during Minimally Invasive Lateral Spine Surgery id# 2076

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

The effect of the “One Stretch” exercise on the improvement of low back pain in Japanese nurses: a large-scale, randomized, controlled trial id# 2115

**Hiroyuki Oka** K. Matsudaira, T. Fujii, Japan

Are double-level TLIFs preferable to single-level TLIF for contiguous double-level spondyloloytic spondylolisthesis? id# 2138

**Sun Xu** D. Changzhi, X. Liang, L. Song, Q. Bangping, Z. Zhezhang, Y. Yang, W. Bin, Q. Yong, China

Asymptomatic construct failure after metastatic spine tumour surgery: a new entity or a continuum with symptomatic failure? id# 2140

**Naresh Kumar** R.S. Patel, B.W. Tan, A.P. Singla, L. Khin, N. Ravikumar, H. Milavec, A. Kumar, H. Hey, L. Lau, J. Thambiah, G. Liu, Singapore

Intra-operative neuromonitoring (IONM): is there a role in metastatic spine tumour surgery? id# 2144

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

Factors influencing extended hospital stay in patients undergoing metastatic spine tumour surgery and its impact on survival id# 2147

Viable cellular allograft for spine fusion - clinical success comparing two surgical techniques id# 2153

**Bryan Fox** D. Goss, T. Temple, T. Ganey, USA

Association of global sagittal alignment with the adjacent segment disease after posterior lumbar interbody fusion in spondylolytic spondylolisthesis id# 2165

**Kazuki Takeda** E. Okada, N. Fujita, S. Suzuki, O. Tsuji, N. Nagoshi, M. Yagi, H. Kono, M. Nakamura, M. Matsumoto, K. Watanabe, Japan

Carbon-fiber-reinforced PEEK fixation system in the treatment of spine tumours id# 2169

**Giovanni Barbanti Brodano** G. Tedesco, M. Girolami, V. Pipola, S. Bandiera, S. Terzi, R. Ghermandi, G. Evangelisti, T. Greggi, A. Gasbarrini, Italy

Opioid Consumption Patterns after Lumbar Decompression or Microdiscectomy id# 2171


Update on custom made 3D printed titanium implants for anterior column reconstruction following en bloc resection for spinal tumours id# 2176

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

Longitudinal MRI controls of intervertebral discs up to 24 months after transplantation of autologous mesenchymal stromal cells in 10 patients id# 2181

**Nikolaos Papadimitriou** H. Hebelka, A. Baranto, K. Lagerstrand, H. Brisby, Sweden

Cortical bone trajectory screws for lumbar interbody fusion: Influence on proximal adjacent segment degeneration. id# 2188

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

Assessment of sarcopenia in patients with sagittal imbalance and symptomatic lumbar spinal stenosis id# 2203

**Ho-Joong Kim** B. Chang, J. Yeom, C. Lee, South Korea

Does dural sac cross-sectional area predict the presence of subjective lumbar spinal stenosis symptoms after 10-year follow-up? id# 2214

**Koji Otani** S. Kikuchi, T. Nikaido, S. Konno, Japan

Lumbar plain radiograph is not reliable to identify lumbosacral transitional vertebra types according to Castellvi Classification principle id# 2225

**Lisheng Hou** X. Bai, H. Li, W. Li, T. Wen, Q. He, D. Ruan, China

Acute Readmission and Reoperation after Lumbar Decompression Surgery: An Analysis of 81,365 patients id# 2248
Steven McAnany A. Samuel, F. Lovecchio, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi, USA

Benefits of Medical Optimization before Thoracolumbar Three-Column Osteotomies: An Analysis of 618 Patients id# 2249

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

Back pain improves after lumbar disc herniation surgery id# 2255

Niyaz Hareni F. Strömqvist, B. Strömqvist, F. Sigmundsson, B. Rosengren, M. Karlsson, Sweden

Correlation between ODI and PROMIS in Minimally Invasive Lumbar Microdiscectomy id# 2256

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

Neurological recovery in surgically treated traumatic conus medullaris syndrome combined with thoracolumbar fracture id# 2257

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

Correlation between ODI and PROMIS in Minimally Invasive Lumbar Decompression Surgery id# 2266

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

Single Position Versus Lateral-then-Prone Positioning for Lateral Interbody Fusion and Pedicle Screw Fixation id# 2275

Chason Ziino J. Konopka, R. Ajiboye, J. Koltsov, I. Cheng, USA

Topical use of tranexamic acid in reducing blood loss during lumbar spinal surgery: a retrospective case control study and low costs strategy id# 2280

Abhinandan Mallepally R. Mahajan, H. Chhabra, India

Reinfarction rates in patients undergoing lumbar spine procedures id# 2294

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

Cross-sectional and one-year follow-up study for the relationship between lumbar spinal stenosis and low back pain in the community id# 2296

Koji Otani S. Kikuchi, T. Nikaido, S. Yabuki, S. Konno, Japan

Hidden blood loss in extreme lateral interbody fusion for adult spinal deformity id# 2311

Yuichiro Mima M. Yagi, N. Fujita, E. Okada, S. Suzuki, O. Tsuji, N. Nagoshi, M. Nakamura, M. Matsumoto, K. Watanabe, Japan

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 id# 2325

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 id# 2343

Mari Lundberg H. Brisby, A. Gutke , O. Hägg , M. Jakobsson, H. Lotzke, R. Smeets , Sweden

Immediate Restoration of Lordosis in Single-level Minimally Invasive Transforaminal Lumbar Interbody fusion (MI-TLIF): A comparison of Expandable and Static Interbody Cages id# 2348

Steven McAnany A. Vaishnav, P. Saville, S. Kirnaz, R. Navarro-Ramirez, R. Hartl, C. Gang, S. Qureshi, USA

Is the Surgical Invasiveness Index valid in Minimally Invasive Spine Surgery? id# 2361

Steven McAnany A. Vaishnav, J. Mok, T. Albert, S. Iyer, C. Gang, S. Qureshi, USA

Analysis of the factors associated with having an indication for surgery in lumbar spinal stenosis id# 2392


How does pre-operative narcotic use impact post-operative health-related quality of life scores for patients undergoing lumbar microdiscectomy? id# 2395

Sohrab Virk M. Sandhu, H. Sandhu, USA

Surgical Training in Spine Surgery: Safety and Patient-rated Outcome id# 2400

Daniel Haschtmann G. Waisbrod, A.F. Mannion, T. Fekete, F. Kleinstück, D. Jeszenszky, Switzerland

National Adverse Event Profile After Lumbar Spine Surgery for Lumbar Degenerative Disease and comparison of complication rate between hospitals: A COSRN Registry Study id# 2408

Charles Fisher O. Ayling, T. Allon, Canada

Opioid Free Anesthesia optimizes Enhanced Recovery After Minimally Invasive Spine Surgery by decreasing total perioperative opioid consumption: A retrospective matched cohort study id# 2409

Steven McAnany E. Soffin, D. Wetmore, E. Sheha, A. Vaishnav, T. Albert, S. Iyer, C. Gang, S. Qureshi, USA

Assessing the true cost of minimally invasive TLIF in patients with workers' compensation using TDABC id# 2410

Steven McAnany D. Bu, S. Overley, T. Albert, A. Vaishnav, S. Iyer, C. Gang, S. Qureshi, USA
Is the outcome of surgery for lumbar degenerative spondylolisthesis related to the appropriateness of surgery? id# 2411

**Francois Porchet** V. Pittet, F. Steiger, M. Aepli, J. Vader, F. Mariaux, D. O’Riordan, A. Mannion, Switzerland

The association between early post-operative leg pain intensity and disability at one-year and two-years follow-up after first time lumbar discectomy id# 2418

**Dorthe Schoeler Ziegler** R. Jensen, L. Storm, L. Carreon, M. Andersen, Denmark

Patient outcomes following short-segment lumbar fusion are not affected by PI-LL mismatch id# 2425

**Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder, USA

Trends in In-hospital Repeat Spine Surgery Following Elective and Non-elective Lumbar Fusion. id# 2430

**Brook I Martin** S.K. Mirza, I.D. Engler, R. Spiker, D. Brodke, USA

Preoperative Depression Identified by the SF-12 Mental Component Score Affects Outcomes Following Lumbar Fusion id# 2433

**Srikanth N Divi** D.K. Goyal, M.S. Galetta, C.K. Kepler, A.R. Vaccaro, G.D. Schroeder, USA

Cost Prediction Modeling of Single Level Lumbar Decompression and Fusion by Machine Learning id# 2456

**Caroline Yoon** J. Kleimeyer, E. Yoon, T. Yoon, USA

Bone formation during restoration of rounding vertebral deformity in pediatric spondylolisthesis id# 2471

**Hiroaki Manabe** K. Yamashita, K. Higashino, M. Morimoto, Y. Ishihama, F. Tezuka, Y. Takata, T. Sakai, K. Sairyo, Japan

Five-year results of lumbar spinal stenosis with degenerative spondylolisthesis treated with decompression alone id# 2474

**Kazuyuki Watanabe** K. Otani, T. Nikaido, K. Kato, H. Kobayashi, S. Yabuki, S. Kikuchi, S. Konno, Japan

“SI Joint At Risk” after Lumbosacral fixations – Identification of risk factors and role of prophylactic management for SI joint dysfunction. id# 2478

**Naresh Babu**, India

The effect of GDF6 in reducing intervertebral disc degeneration and inflammation-related pain in a rat model id# 2306

**Haowen Cui** A. Diwan, H. Pan, Z. Lv, J. Long, Z. Zheng, China

Development of a guide for the conservative treatment for acute OVF according to a prospective, randomized, multi-center study by the comparison of rigid and soft-brace treatments id# 1919
**Tsuyoshi Kato** H. Inose, T. Yoshii, A. Okawa, Japan

Who will do better; predicting better surgical outcomes in lumbar spinal stenosis – a prospective 10-year follow-up study id# 2135

**Iina Tuomainen** T. Aalto, J. Pesonen, M. Rade, M. Pakarinen, H. Kröger, O. Airaksinen, Finland

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. id# 2272

**Eiki Shirasawa** G. Inoue, M. Miyagi, W. Saito, T. Imura, T. Nkazawa, S. Shoji, M. Takao, Japan

The Association between Surgical Level and Postoperative Thigh Symptoms among Patients Undergoing Standalone Lateral Lumbar Interbody Fusion (LLIF) id# 1719

**Toshiyuki Shirahata** I. Okano, S.N. Salzmann, O.C. Sax, J. Shue, S.A. Andrew, A.P. Hughes, C.P. Frank, T. Toyone, K. Inagaki, F.P. Girardi, Japan

A prevention project for low back disorders in Japanese elite swimmers: 10 years follow-up of lumbar intervertebral disc degeneration id# 2014

**Hangai Mika** O. Toru, Y. Masashi, K. Koji, Japan

Association between core stability and low back pain in high-school baseball players id# 2277

**Kinshi Kato** K. Otoshi, S. Yabuki, K. Otani, T. Nikaido, K. Watanabe, H. Kobayashi, S. Kikuchi, S. Konno, Japan

Poor flexibility is negative predictive factors of bone union in adolescent athletes with spondylolysis id# 1792

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**Colleen Rentenberger** I. Okano, S.N. Salzmann, F. Winter, N. Plais, M.D. Burkhard, J. Shue, A.A. Sama, F.P. Cammisa, F.P. Girardi, A.P. Hughes, USA

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**Izumi Nobe** T. Tanno, H. Ataka, Japan

Large PI is a risk factor for the progression of scoliosis in patients with lumbar spinal canal stenosis and degenerative lumbar scoliosis. id# 2013

**Yuji Matsuoka** T. Kusakabe, A. Maekawa, T. Aihara, K. Yamamoto, Japan
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