Department of Surgery

University of Toronto

Innovation
Collaboration
Leadership
Networking
Excellence

Bench To Bedside To Community

SPINEFEST
2015

SESSION I
9:15am – 10:45am
Clinical Outcome in Spine Surgery
Dr Raj Rampersaud
Dr Carlo Ammendolia
Dr Henry Ahn
Dr Michael Fehlings

Coffee Break

&

Poster Presentations & Judging

10:45am – 12:15pm

SESSION II
12:15pm – 1:15pm
Issues on Education
Dr Peter Ferguson
Dr Stephen Lewis
Dr Albert Yee

Lunch & Poster viewing

1:15pm – 2:00pm

SESSION III
2:00pm – 4:00pm
Research Presentations
SpineFEST Abstract Presentations
Awards Presentations
Closing Remarks

INTRODUCTION
7:00am – 8:00am
Welcome Reception – Breakfast
Introductory Comments
Prof Albert Yee & Prof Michael Fehlings
Co-Directors, U of T Spine Program
Greetings from the University of Toronto
Prof James Rutka
Prof Peter Ferguson
Welcome Remarks
Dr Charles Tator & Dr Hamilton Hall

New Faculty Presentation
Dr Meaghan O’Reilly

Monday, June 8, 2015
7:00 AM - 4:00 PM
THE TATOR-HALL VISITING PROFESSOR LECTURE
8:00am - 9:15am
Keynote Address
Prof Wilco Peul
Leiden, Netherlands

“Societal impact & added value of spine surgery”

THE TATUH HALL VISITING PROFESSOR LECTURE
Keynote Address
Prof Wilco Peul

MaRS PROROFESSIONAL DEVELOPMENT PROGRAM
Lower Concourse
101 College St. Toronto

Keynote Speaker
U of T Spine Program

The Program
(established in 2009)

is integrated across multiple clinical and research programs at the Affiliated teaching hospitals:

University Health Network,
Sunnybrook Health Sciences Centre,
Hospital for Sick Children,
St. Michael’s Hospital,
and
Mount Sinai Hospital

St. Michael’s Hospital
Henry Ahn MD PhD
Howard Ginsberg MD PhD FRCSC

Mount Sinai Hospital
Carlo Ammendolia DC PhD CCRF
Rita Kandel MD FRCPC

Sunnybrook Health Sciences Centre
Leo da Costa MD
Joel Finkelstein MD MSc FRCS(C)
Mahmood Fazl MD FRCSC
Michael H. Ford MD FRCSC
Barry W. Malcolm MD FRCSC MBA
Meaghan O’Reilly PhD
Farhad Pirouzmand MD MSc FRCSC
Arjun Sahgal BSc MD FRCPC
Cari Whyne PhD
Albert Yee MD MSc FRCSC

Hospital for Sick Children
James Drake BSE MB BCH MSc FRCSC
James G. Wright MD MPH FRCSC
Reinhard Zeller MD FRCSC

UHN-Toronto Western Hospital
W Mark Erwin PhD DC
Michael G. Fehlings MD PhD FRCSC FAC SFCAHS FRSC
Stephen Lewis MD
Eric Massicotte, MD MSc FRCSC
Y Raja Rampersaud MD FRCSC
Sukhvinder Kalsi-Ryan PT PhD
Mohammed F. Shamji MD PhD FRCSC
Anoushka Singh RN PhD
Alexander Velumian PhD

UHN-Toronto Rehabilitation Institute
Karl Zabjek BSc MSc PhD

UHN-Techna
Margarete Akens Dr med vet PhD

University of Toronto
Cindi M Morshead BSc PhD
Molly S Shoichet PhD FRSC
Remarks from the Co-Directors  
Dr Michael Fehlings & Dr Albert Yee

Colleagues,

It has been a productive year in the University Department of Surgery Spine Program. We continue to develop and implement activities arising from our program’s external review and strategic plan. Our program coordinator Ms. Nadia Jaber has done an excellent job in organizing our activities and this year we welcome a refreshed layout for our SpineFEST program brochure. The themes of integration and collaboration continue to resonate and we are pleased to provide the group with an update of our efforts relating to clinical care, research, teaching and education.

Our program continues to develop and lead new innovations in spine surgery clinical fellowship education. Dr. Yee has co-led with Dr. Scott Paquette (UBC) a national-based fellowship initiative through the Canadian Spine Society that has observed the development of a competence based fellowship education curriculum of cognitive and procedural training objectives. Dr. Fehlings in his capacity as the Chairman of AOSpine North America has facilitated linkages with AOSNA to build on our Canadian experience with a future planned study to explore North American perspectives in fellowship education. Locally, we have been developing a surgical case log for our city-wide clinical fellows. Our fellows Drs. Tony Bateman and Jeremie Larouche has been working with Ms. Jaber and the University Department to develop a custom case-log spine e-module as a resource for clinical fellows starting the 2015/16 academic year. The provision of a validated case log for job recruitment has been an essential requirement for employment in the United Kingdom for some time now and we are starting to observe a similar trend evolving in North America. Providing an enhanced infrastructure to support our clinical fellows is anticipated to help in their transition towards independent practice.

This year, we have also held important discussions regarding models of
Remarks from the Co-Directors
Dr Michael Fehlings & Dr Albert Yee

Program Timeline - 2015

Jan 20
City-Wide Spine Fellow Journal Club & Research Update Meeting

Feb 23
Hospital-Based Visiting Professorship (MSH hosting) & UofT/GTA Spine Rounds Prof Jackson Mwale (Montreal)

Mar 9
FRCS Mini Prep Course on Spine Disorder

May 9 to 13
The CSRS Traveling Fellowship

Jun 5 to 7
Annual UofT Spine Program Residents Course

Jun 8
SpineFEST Prof Wilco Peul (Leiden-Netherlands)

Aug 11
Annual Spine Fellowship Surgical Skills Course & Research Update Meeting

Oct 5
Hospital-Based Visiting Professorship (SMH hosting) & UofT/GTA Spine Rounds Prof Yu Liang (Shanghai-China)

Nov 13
Tator-Turnbull Lectureship Prof Jan Schwab (Ohio-USA)

Nov 20
Hospital-Based Visiting Professorship (SickKids hosting) & UofT/GTA Spine Rounds (Nov 19) Prof Stefan Parent (Ste Justine-Montreal)

fellowship training and opportunities for greater city-wide collaboration in training. We have discussed opportunities of a selective or observership during the course of the fellowship year, with some fellows expressing interest and partaking in the observership experience this year. This is one area that requires ongoing collaborative discussion as well as input by our trainees so as to best meet training objectives. We also thank our fellows who have taking important leadership roles in organizing and leading our city-wide journal clubs.

Drs. Eric Massicotte and Steve Lewis continue to chair key surgical skills courses for our residents and fellows, respectively. Our case-log program will be helpful to us in gauging clinical exposure to procedural objectives of our national curriculum and to help inform areas for focusing training, for example with exposure during surgical skills courses, that will complement clinical exposure. This year, Dr. Michael Fehlings organized a new and well received combined orthopaedic and neurosurgical evening for final year residents preparing for their upcoming Royal College of Physicians and Surgeons of Canada examinations. Based on positive feedback, we plan to include this new event in our annual academic calendar of events.

In research, evolving university and city-wide hospital initiatives in Research Ethics Board approval are gradually facilitating ongoing planned and future opportunities in multi-centre trials. Current efforts are underway to facilitate a city-wide U of T Spine Program data-sharing agreement to facilitate high impact clinical translational research. We continue to hold regular research update meetings and appreciate Drs. Carlo Ammendolia and Karl Zabjek’s efforts in organizing these meetings. Our academic excellence in spinal cord injury, biomechanics, and cell biology expertise in the spine is recognized internationally and we are honored for being selected to host the newly established Cervical Spine Research Society travelling fellows in May as well as hosting the CSRS Annual meeting in Toronto in December of 2016. We have also been successful in attracting the Canadian Spinal Cord Injury meeting for 2017 and the International Neurotrauma Symposium for 2018. A formal bid to attract the 2019 Global Spine Congress will be submitted later this year.
From an advocacy perspective, the U of T Spine Program, led by Drs. Michael Fehlings and Raj Rampersaud have been actively involved with provincial initiatives to enhance access to care and service delivery for patients with acute and chronic spine conditions.

As a program, we seek out new opportunities and collaborations. This year we welcome Dr. Meaghan O’Reilly as a new program member! Meaghan has recently been recruited to the Physical Sciences Platform at Sunnybrook Research Institute and has expertise in image guided ultrasound therapeutics. She is interested in adapting strategies to study focused ultrasound treatment for both neurological and orthopaedic applications in the spine. As a program, we are proud of our diverse backgrounds in spine academia and value the contributions or members bring to our program activities. The program has been a great conduit for the exchange of knowledge and ideas and has helped establish new research collaborations and professional relationships.

This year, we welcome Professor Wilco Peul from the Netherlands. He is recognized for his work in evaluating outcomes following spine surgery and his keynote presentation on the value of spine surgery and its societal impact resonates as an important and timely topic. We look forward to his presentation and the discussions that are likely to follow.

In closing, thank you for all your support over the years. We are privileged to benefit from the diverse and specialized expertise of our program members. We look forward to continuing to shape the landscape of spine academia at the University together, into the future.

Sincerely yours,

Albert and Michael
7:00 – 7:30 Welcome Reception – Breakfast

 Introductory Comments
 University of Toronto Department of Surgery Spine Program
 Dr Albert Yee & Dr Michael Fehlings
 Program Co-Directors

7:30 – 7:45 Greetings from the University of Toronto
 Dr James Rutka
 RS McLaughlin Professor & Chair Department of Surgery &
 Dr Peter Ferguson
 Albert and Temmy Latner & Chair Division of Orthopaedics

7:45 – 8:00 Welcome Remarks
 Dr Charles Tator & Dr Hamilton Hall

THE TATOR-HALL VISITING PROFESSOR LECTURE
 Moderator: Dr Michael Fehlings

8:00 – 8:15 Introduction of Visiting Lecturer
 Dr Michael Fehlings
 Visiting Professor Wilco Peul

8:15 – 9:00 Keynote Address
 Professor Wilco Peul
 Societal impact & added value of spine surgery

9:00 – 9:15 Discussion - Dr Michael Fehlings

New Faculty Presentation

9:15 – 9:30 Dr Meaghan O’Reilly - Dr Cari Whyne introducing
 Focused ultrasound therapy: Targeting the spine
SESSION I Clinical Outcome in Spine Surgery

Moderator: Dr Henry Ahn

9:30 – 9:45 Dr Raj Rampersaud
Long-term outcomes of surgical treatment for lumbar spinal stenosis

9:45 – 10:00 Dr Henry Ahn
The RCT - All That Glitters Is Not Gold

10:00 – 10:15 Dr Carlo Ammendolia
Clinical outcomes in lumbar spinal stenosis research: Challenges and opportunities

10:15 – 10:30 Dr Michael Fehlings
Outcomes of surgical treatment for cervical spondylotic myelopathy: Results of two international, multicentre AO Spine studies

10:30 – 10:45 Discussion

10:45 – 11:00 Coffee Break

11:00 – 12:15 Poster Presentations & Judging

SESSION II Issues on Education

Moderator: Dr Eric Massicotte

12:15 – 12:30 Dr Peter Ferguson
A Recipe for radical curricular change in postgraduate surgical training

12:30 – 12:45 Dr Stephen Lewis
Training spine fellows: U of T experience

12:45 – 13:00 Dr Albert Yee
Defining the spine surgeon in 2015

13:00 – 13:15 Discussion

13:15 – 14:00 Lunch & Poster Viewing
Invited Presentations

14:00 – 14:15
Jeremie Larouche
Development of a competency-based spine surgery fellowship education curriculum in Canada

14:15 – 14:30
Spyridon Karadimas
Locomotor Central Pattern Generator (CPG) and spinal cord injury; unlock the “black box”

Abstract Presentations

14:30 – 14:40
Pathologic vertebral fracture severity: Semi automated quantitative CT based assessment
Michael Hardisty

14:40 – 14:50
Closure of the intervertebral disc annulus fibrosus using a novel suture application device – in vivo porcine and ex-vivo biomechanical evaluation
Antony Bateman

14:50 – 15:00
The minimal clinically important difference of the modified Japanese orthopaedic association scale in patients with degenerative Cervical Myelopathy
Lindsay Tetreault

15:00 – 15:10
Neural stem cells promote multimodal recovery in a severe bilateral model of cervical spinal cord injury through myelination and not direct synaptic connectivity
Jared Wilcox

15:10 – 15:20
Next-generation MRI of the human spinal cord: methods of a longitudinal translational study to develop quantitative imaging biomarkers in cervical spondylotic myelopathy (CSM)
Allan Martin
Invited Presentations

15:20 – 15:30
Enhancing nucleus pulposus tissue formation in-vitro: A novel approach
Rahul Gawri

15:30 – 15:45 Discussion

15:45 – 16:00 Award Presentations and Closing Remarks
Dr Michael Fehlings & Dr Albert Yee

SpineFEST 2015

SESSION III Research Presentations...Continued

Visitng Professors

- 2014 Professor Kenneth Cheung- University of Hong Kong
- 2013 Professor Alexander Richard Vaccaro, Thomas Jefferson University - PA
- 2012 Professor Jean Dubousset, The University of Paris
- 2011 Professor Jens Chapman, University of Washington
- 2010 Professor Edward C. Benzel, Cleveland Clinic
- 2009 Professor Jeffrey C. Wang, University of California-Los Angeles
Spinal surgery has evolved from simple decompression (1934) to sophisticated reconstructive techniques today. Technical developments with positive impact have, however, also created societal drawbacks. Surgery for degenerative spine disorders has suffered top-level criticism in JAMA, NEJM and the lay press. In particular varying surgery rates for herniated discs and increased use of implants in surgeries for spinal stenosis has paved the way for politicians to lower reimbursement and to question indications. This leads to the dilemma between creating advanced techniques to enhance sagittal balance in deformity and adding value to patients with oncologic instability on the one hand versus the societal impact of surgery for degenerative spine disease on the other hand.

- Should we care about QALY’s?
- If we care, what should we do as academic spine-surgeons?

My view will be presented as both an epidemiologist with “Cochrane’s glasses” and the international “Choosing Wisely Campaign” in the back of my head and the innovative spinal soul in my ‘academic’ heart!

“Societal impact & added value of spine surgery”
Dr Charles Tator is a Professor in the Department of Surgery, at the University of Toronto, and a neurosurgeon at the Toronto Western Hospital. He is the former Chair of Neurosurgery at the University of Toronto. He started the first Acute Spinal Cord Injury Unit in Canada in 1974, and has reported on the epidemiology, prevention and treatment of spinal cord injury. He has undertaken seminal translational and clinical research in spinal cord injury. In 1992, he founded ThinkFirst, Canada, a national brain and spinal cord injury foundation whose mission is to reduce the incidence of catastrophic injuries in Canada. In 2008, the University of Toronto Press published his book “Catastrophic Injuries in Sports and Recreation, Causes and Prevention—a Canadian Study.” He has held two research chairs at the University of Toronto, the Dan Family Chair in Neurosurgery and the Campeau Family-Charles Tator Chair in Brain and Spinal Cord Research. In 2000, he received the Order of Canada, and in 2009 he was inducted into the Canadian Medical Hall of Fame.

Dr Hamilton Hall is a Professor in the Department of Surgery at the University of Toronto and on the active orthopaedic staff at the Sunnybrook Health Sciences Centre. In 1974 Dr Hall founded the Canadian Back Institute (CBI Health Group), now the largest rehabilitation company in Canada. Dr Hall continues to serve as its Medical Director. He is co-founder of the Canadian Spine Society and is presently the Society’s Executive Director. Dr Hamiltion Hall is a member of the North American Spine Society, the Canadian Orthopaedic Association and the International Society for the Study of the Lumbar Spine. He has served on the editorial boards of Spine, The Spine Journal and The BackLetter. Honours include the Laurie Chute Award for the best undergraduate clinical lecturer at the University of Toronto and the Henry Farfan Award from the North American Spine Society for outstanding contributions to the field of spine care. Dr Hall's concept of a syndrome approach to mechanical back pain is an essential component of the provincial initiatives to educate primary care providers in British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia. His system is the basis of undergraduate teaching about back pain in the Faculties of Medicine at the University of Toronto and McMaster University. In addition to over 125 published articles and book chapters and over 1000 invited presentations, many as Visiting Professor at universities in North America, Europe and Asia, Dr Hamilton Hall is the author of the best-selling Back Doctor series of books for the lay public.
Dr Meaghan O’Reilly is a new Scientist in the Physical Sciences Platform and Holland Musculoskeletal Research Program at Sunnybrook Research Institute (SRI). Prior to becoming an independent investigator, Dr O’Reilly was a Research Associate at SRI developing tools to transcranially detect, localize and control cavitation events to mediate focused ultrasound brain therapy. With expertise in delivering ultrasound non-invasively through bony structures, she is interested in adapting existing techniques to investigate focused ultrasound therapy for both neurological and orthopaedic applications in the spine. Dr O’Reilly holds a PhD in Applied Physics from the University of Eastern Finland (’12) and also holds degrees from Queen’s University (BSc Mechanical Engineering ’07) and the University of Oxford (MSc Biomedical Engineering ’08).

Dr Jeremie Larouche is a graduate of the charter class of the Northern Ontario Medical School. He was then a member of the inaugural cohort Competency Based Curriculum at the University of Toronto, after which he completed a one year Orthopaedic Trauma Fellowship at the University of British Columbia. After the completion of his current spine fellowship, he will be joining the University of California in San Francisco as a surgeon-educator, with a practice based on spine and orthopaedic trauma. His research interests are focused on medical education and patient-reported outcomes. He will be joined by his long-suffering wife, Allison, their two children Félix and Chloé, and their dog Joey.
Spyridon Karadimas obtained his MD at the University of Athens, School of Medicine in Greece. Subsequently, he began his research in Greece in the department of Neurosurgery, where he developed a novel rabbit model of cervical spondylotic myelopathy (CSM), the most common cause of spinal cord injury (SCI). Currently, he is a PhD candidate at the University of Toronto, Institute of Medical Science under the supervision of Dr. Michael Fehlings. In the Fehlings' lab, Spyros has developed rodent models of CSM and used them to discover a previously unrecognized biological injury associated with surgical decompression of cervical spinal cord and to develop novel treatment strategies. His main interest is the probing of changes in the locomotor circuits after SCI. Since beginning his graduate studies, Spyros has been the recipient of a number of awards, fellowships and scholarships from national and international societies.

Michael Hardisty is a Research Engineer in the Orthopaedic Biomechanics Laboratory at Sunnybrook Research Institute, working on creating and translating medical image analysis tools for clinical applications; specifically he is focused on quantifying diseased and healthy spines to aid in clinical decision making and semi-automated design of custom craniofacial implants. He has extensive experience in biomechanics, modelling as well as in creating innovative visualization and image analysis methods applied to solve orthopaedic problems. Michael has a Bachelor of Engineering Science and Master of Biomedical Engineering from the University of Toronto, as well as a PhD in Biomedical Engineering from the University of California-Davis.
Antony Bateman is a fellowship trained orthopaedic spinal surgeon who graduated from Imperial College School of Medicine in 2004. He has always been interested in a career in spinal surgery and completed a BSc in spinal biomechanics during undergraduate training at Imperial. He completed basic surgical and higher trauma and orthopaedic training programmes in the South East of England gaining the award of CCT in Trauma and Orthopaedic surgery in 2014. He has been awarded an MSc in Trauma and Orthopaedic surgery through the University of Brighton with a dissertation reviewing the role of interspinous devices in the treatment of spinal stenosis. Tony completed a spinal fellowship at Frimley Park Hospital (UK) focusing on degenerative disease of the lumbar and cervical spine. Most recently he has been in the privileged position of participating in the University of Toronto’s spine program at Sunnybrook Health Sciences Centre and St Michael’s Hospital.

Lindsay Tetreault is a graduate student at the University of Toronto’s Institute of Medical Sciences. Her research is focused on developing a clinical prediction model to determine postoperative functional status and risk of complications in patients undergoing surgery for the treatment of cervical spondylotic myelopathy (CSM). She is also currently working on establishing guidelines for the management of CSM with a group of North American spine surgeons, neurologists and rehab specialists. Lindsay’s interests outside of research include rowing, coaching, road biking and playing games with friends and family. She hopes to pursue a career in medicine and work with high performance athletes.
Jared Wilcox Currently in his seventh year in the MD/PhD Combined Degree program at the University of Toronto, Jared is completing his doctoral training in the Fehlings Laboratory. In the lab, Jared has pioneered and characterized a novel microsurgical model of cervical spinal cord injury with Dr. Satkunendrarajah to assess hand function and evaluate potential therapies. Jared uses cutting edge axonal and synaptic tracing techniques and genetically labeled cells to determine the efficacy of transplantation of adult and pluripotent stem cells into the cervical injured cord. Following the completion of this doctoral thesis, Jared hopes to maintain productivity in the lab during graduate medical training in a surgical specialty. Jared is active throughout University of Toronto in leadership capacities for mentorship and Clinician Scientist Training, including: CIHR Strategy for Patient-Oriented Research--Training and Career Development (Committee Member), Clinician Investigator Trainee Association of Canada (Past President), and MD/PhD Mentorship Symposia (Founder).

Allan Martin is currently a PGY4 Neurosurgery Resident, enrolled in the Institute of Medical Science PhD Program at University of Toronto under the supervision of Dr. Michael Fehlings. His research is focused on translation of next-generation spinal cord MRI techniques and their application to specific clinical populations such as spinal cord injury and cervical spondylotic myelopathy. The MRI methods he is studying include diffusion tensor imaging, magnetization transfer, T2*-weighted imaging, MR spectroscopy, perfusion imaging, and functional MRI. These techniques are particularly interesting in that they are amenable to quantitative analysis using software that can extract data from specific white matter tracts. This work combines Allan’s clinical interests in Spine Neurosurgery with his previous background in Engineering Science and 10-year career as a software programmer. His free time is spent running, coaching soccer, doing home renovations, and relaxing with his wife and 3 children: Zia (7), Scarlett (5), and Leo (3).
Rahul Gawri received his MD from Calcutta University, India and thereon came to McGill University, Montreal, Quebec, and joined the department of Experimental Surgery to pursue his PhD under the supervision of Drs Mwale, Antoniou and Haglund. He was recently awarded his second doctorate for his work on intervertebral discs and discovery of a novel bioactive peptide for disc regeneration. Rahul has numerous peer reviewed publications and a provisional patent from his Ph.D. work. He is currently pursuing his post-doctoral fellowship under the supervision of Dr Rita Kandel studying the effects of inorganic polyphosphates on intervertebral disc metabolism and regeneration. He is currently funded by The Arthritis Society and Toronto Musculoskeletal Center. Recently, he also received a NSERC post-doctoral fellowship award.
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<th>Poster Presentations</th>
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<tr>
<td>Iwabu Aleksanderek</td>
<td>Imaging biomarkers of the spinal cord in cervical spondylotic myelopathy quantified using MR spectroscopy</td>
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<td>Anick Nater</td>
<td>Prognostic factors for survival in surgical series of symptomatic metastatic epidural spinal cord compression: A prospective North American multicentre study in 145 patients</td>
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<td>Anna Badner</td>
<td>The Vasoprotective effect of early intravenous mesenchymal stromal cell delivery after traumatic spinal cord injury</td>
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<td>Mikhail Burke</td>
<td>Osteolytic tumour involvement modifies characteristics of Collagen-I within the vertebral bone matrix impacting mechanical behaviour</td>
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<td>Hiroaki Nakashima</td>
<td>Quality of Life and Functional Outcomes after Surgical Decompression in Patients with Cervical Ossification of the Posterior Longitudinal Ligament: Results from the Prospective, Multicenter AOSpine International Study on 479 Patients</td>
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<td>Does the older age affect surgical outcomes in patients with degenerative cervical myelopathy?: Results from the prospective, multicenter AOSpine international study on 479 patients</td>
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<td>K. Satkunendarajah</td>
<td>Rewiring of spinal respiratory neural network via cervical glutamatergic interneurons preserves respiratory function in cervical spondylotic myelopathy (CSM)</td>
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<td>So Kato</td>
<td>Postoperative improvement of apical vertebral rotation in adolescent idiopathic scoliosis: 3-dimensional reconstruction analysis by EOS imaging</td>
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<td>Impact of various weights in the intra-operative skull-skeletal traction on correction of adolescent idiopathic scoliosis</td>
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<td>Factors affecting length of stay following three column spinal osteotomies in pediatric patients</td>
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<td>Salvage surgery of chance fracture as a complication after pedicle screw fixation for scoliosis</td>
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<td>Mark Kotter</td>
<td>Axonal plasticity underpins functional recovery following decompression in a rat model of cervical spondylotic myelopathy</td>
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<td>Generation of oligodendrocyte precursors by direct cellular reprogramming</td>
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Effect of clinically relevant cell survival factors for spinal cord injury in models of in vitro oxidative stress on adult spinal cord-derived neural stem/progenitor cells

Mohamad Khazaei

Investigating the effect of GDNF expression on survival and differentiation of hiPSC derived NPCs for repair and regeneration of the injured spinal cord

Jonathan Lu

Effect of Insulin-Transferrin-Selenium on the Bioengineering of Multilamellated Annulus Fibrosus Tissues Using Oriented Nanofibrous Polyurethane Membranes

Chandan Mohanty

Does correction of cervical spine alignment lead to better neurological outcome? A single centre study

Narihito Nagoshi

Do racial differences affect surgical outcomes and quality of life for degenerative cervical myelopathy? Results from the prospective, multicenter AO Spine international study on 479 patients

Aria Nouri

The epidemiology, genetics, and pathogenesis of degenerative cervical myelopathy

Nardin Samuel

Intramedullary spinal cord tumors: review of the spinal program surgical registry at Toronto Western Hospital

Sukhvinder Kalsi-Ryan

Establishing disease severity of cervical spondylotic myelopathy (nontraumatic SCI) through novel sensitive gait assessments

Upper limb disability in cervical spondylotic myelopathy: Implications of quantitative measurement for clinical decision-making

Neurological recovery of the upper limb after traumatic cervical spinal cord injury (SCI): Novel findings to inform benchmarks for clinical trials

Antigona Ulndreaj

IgM immunoglobulin persistence after experimental cervical spinal cord injury

Pia Vidal

Neuroinflammatory changes in an experimental model of cervical spondylotic myelopathy: implications for neurobehavioural recovery

Simon Harris

The importance of employment status as an outcome measure in the development of an effective model of care for low back pain