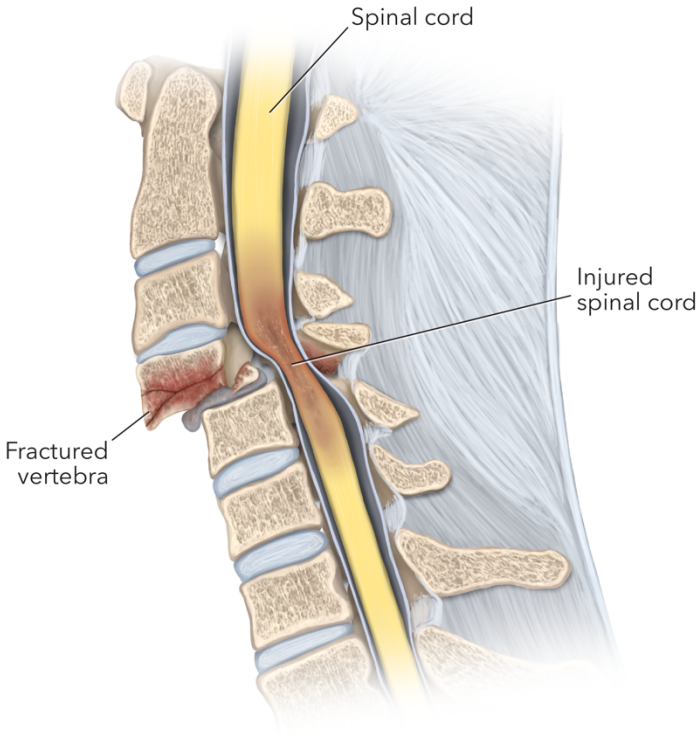
**UNIVERSITY OF TORONTO SPINE PROGRAM**

# Course in the Management of Traumatic Spinal Cord Injury




Hybrid Course

Virtual lectures & in-person hands-on session and Discussion dinner

**In-person attendance on January 19, 2026**

**Hands-on-session at TWH**

**Case discussion at Cibo Restaurant**

**Table of Contents**

## Course Calendar

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| **January 5, 2026** | Fellows receive brochure with links to lectures recordings.<br>**Instructions regarding the course and pre-requisites (PG 7)** |
| **By January 17, 2026** | Fellows complete pre-requisites (In-Step, and view recorded lectures) and prepare for questions and cases presented at each lecture. |
| **January 19, 2026**<br>**4 – 6pm** | **Fellows attend in-Person Workshop at Toronto Western Hospital. Take McLaughlin Elevator to 11th floor. Room: Spinal Cord Injury Clinical Research Unit (MC-435-458) located between the McLaughlin Elevators.** |
| **January 19, 2026**<br>**6:30 pm** | **Fellows attend in-person course discussion Dinner at Cibo , 133 Yorkville Ave, Toronto, ON M5R** |

## Cohort

*Course Coordinator:*

Sukhvinder Kalsi-Ryan, BScPT MSc PhD

Toronto Rehabilitation Institute – KITE Research Institute UHN
Department of Physical Therapy, Temerty Faculty of Medicine, University of Toronto

*Faculty:*

Sukhvinder Kalsi-Ryan, BScPT MSc PhD

Toronto Rehabilitation Institute – KITE Research Institute UHN
Department of Physical Therapy, Temerty Faculty of Medicine, University of Toronto

Michael Fehlings, MD PhD FRCSC

Toronto Western Hospital - UHN

Jeten Badhiwala, MD PhD FRCSC

Sunnybrook Health Sciences Centre

Julio Furlan, MD LLB MBA PhD MSc (Clinepi) FRCPC

Toronto Rehabilitation Institute – Lyndhurst Centre - UHN

Jefferson R. Wilson, MD PhD FRCSC

St. Michael's Hospital, Unity Health

Mohammad Khazei, PhD

Division of Anatomy, Temerty Faculty of Medicine, University of Toronto, Krembil Brain Institute, UHN

*Spine Program Co-Director:*

Michael Fehlings, MD PhD FRCSC

Co-Director, University of Toronto Spine Program

*Spine Program Co-Director:*

Albert Yee, MD MSc FRCSC
Co-Director, University of Toronto Spine Program

Manager, Education Programs:

Nadia Jaber, MISt CLA ALA
Program Manager, University of Toronto Spine Program

## Syllabus

**Objectives:** This hybrid virtual (on-demand) and in person course is designed to provide visiting fellows with a body of knowledge related to traumatic SCI, management, regenerative medicine related to SCI, clinical trials, trauma room management and classification of disease severity. The course covers information related to disease, pathology, epidemiology, fracture classification and severity of injury classification.

**Structure:** This hybrid course has three components, two of which are self-learning. All potential trainees will have 2 weeks to complete the virtual components. Once completed all trainees will attend a 2 hour in person session at Toronto Western Hospital, followed by a dinner discussion of case studies. The case studies to be discussed will be presented at the end of each virtual on-demand lecture. Those case studies will be presented at dinner and discussed with all attendees.

A. Prerequisites:

A.1: Video–on Demand Lectures to be attended by fellows prior to the date of the course. Lecturers will end their lectures with questions and cases for discussion. These cases will be discussed at the dinner meeting on the day of the course following the in-person workshop.

A.2: Complete online InSTeP training prior to attending the in-person training. E-mail certificate in advance to secure spot for in-person course. (InSTeP instructions below). **Note without providing InSTeP in advance, fellows cannot attend the in person portion.**

B. On the day of the course

***B.1***: 4pm to 6pm - Dr Kalsi-Ryan will run an in-person ISNCSCI training which will consist of a didactic lecture and practical case based learning.

***B.2***: 6:30 pm to 9:00 pm - Case-based dinner discussion, to discuss lectures, and cases or questions presented in the recorded videos.

### Instructions Regarding Prerequisites

InSTep Certification

The International Standards of Neurological Classification of SCI is an assessment and classification system used to define the extent of SCI. This assessment is used globally and provides the field with a common language to describe SCI. There is an e-learning module that clinicians can complete to provide them with an understanding of administration and classification. However, this is usually followed by an in-person training. For the purpose of this course, it is required by the trainees to complete the InSTeP and provide the certificate of completion prior to the course:

**Steps to follow:**

1. The InSTep e-module will provide each trainee with CME credits
2. Each of you will receive a link to the course, use this to register as a resident/fellow.
3. Please reach out to Nadia Jaber for reimbursement for fees
4. Complete the learning module
5. Provide the completed certificate to Sukhvinder Kalsi-Ryan at least 1 day prior to in- person course on January 18, 2025.

On-Demand Lectures

- Review lectures 1 to 5. Lectures link will be provided to trainees in advance. See lectures below.
- Retain the case studies or questions at end of presentations to discuss at the dinner meeting.

## Lecture Videos

**[Link to Introductory Remarks]** (5 min), Drs. Michael Fehlings and Albert Yee

**[Link to Instructions] (3 min), Dr. Sukhvinder Kalsi-Ryan**

- Brief Overview of the course and instructions for completion.
- Trainee preparation for the January 19th in person part of the course.

**[Link to Lecture # 1]** (50 min)
Repair and Regeneration of the injured spinal Cord. Dr. Michael Fehlings

- Provides an update of current clinical treatment of spinal cord injury and the related emerging therapeutics

**[Link to Lecture # 2]** (15 min)
Trauma Room Care and Management of Spine Injuries. Dr. Jetan Badhiwalia

- Provides a practical roadmap for managing the spinal cord injury and spine disorder, and logical practical evidence based-approach.

**[Link to Lecture # 3]** (15 min)
AO Fracture Classification. Dr. Jefferson R. Wilson

- What is a good fracture classification and what should be included
- What are some of the most commonly used classifications
- What are emerging classifications looking like

**[Link to Lecture # 4]** (15 min)
Neurophysiological Assessment. Dr. Julio Furlan

- Review the limitations of clinical assessment and need for Neurophysiological Assessment
- Review the different methods of Neurophysiological Assessment
- Discuss the importance of objective and quantitative assessment of sensory, motor and autonomic function

**[Link to Lecture # 5]** (30 min)
International Standards of Neurological Classification for Spinal Cord Injury (ISNCSCI).
Dr. Sukhvinder Kalsi-Ryan

- Key elements of how to administer the ISNCSCI
- Key uses for the ISNCSCI
- Refining the skillset for administering the ISNCSCI

**[Link to Lecture #6]** (20 min)
Current Practices in Regenerative Medicine and Stem Cell Treatments for Spinal Cord Injury.
Dr. Mohammad Khazei

- Why Stem Cells Matter in SCI (What Problem They Solve)
- The Two Cell Types Surgeons Must Know (NSCs vs. MSCs)
- Surgical Delivery: What Actually Matters

## Biographies

**Course Coordinator and Faculty**

**Dr. Sukhvinder Kalsi-Ryan** is a Clinician Scientist in the field of upper limb assessment and recovery and spine pathology at KITE Research Institute and is also Assistant Professor at the University of Toronto, Department of Physical Therapy (Associate Faculty in RSI and IMS). Her research is oriented to establishing methods to quantify neurological change after injury and studying neuro-restorative methods to enhance and optimize function for those with neurological impairment. She is the PI of her own lab called the Upper Extremity NeuroRestorative and Innovations Lab. Her research focuses on developing neurorestorative rehab interventions and moving them into implementation. She also leads the Centre of Excellence for NeuroRestoration and NeuroModulation, which is intended to provide more options for consumers looking to access new interventions. Dr. Kalsi-Ryan provides academic teaching within the Neurosurgical Resident training and Physical Therapy programs at the University of Toronto. She is the founder of her own company, which manufactures the GRASSP (Neural Outcomes Consulting Inc.); she acts as a consultant for neurological trials worldwide. Her interests include: outcome measurement, upper limb recovery, traumatic and non- traumatic SCI, quantification of neurological disorders.

**Faculty, and Co-Director U of T Spine Program**

**Dr. Michael Fehlings is** the Vice Chair Research for the Department of Surgery at the University of Toronto and a Neurosurgeon at Toronto Western Hospital, University Health Network. Dr. Fehlings is a Professor of Neurosurgery at the University of Toronto, holds the Robert Campeau Family Foundation / Dr. C.H. Tator Chair in Brain and Spinal Cord Research at UHN, is a Senior Scientist at the Krembil Brain Institute and is Editor-in-Chief of Spinal Cord. In the fall of 2008, Dr. Fehlings was appointed the inaugural Director of the University of Toronto Neuroscience Program (which he held until June 2012) and is currently Co-Director of the University

of Toronto Spine Program. Dr. Fehlings combines an active clinical practice in complex spinal surgery with a translationally oriented research program focused on discovering novel treatments to improve functional outcomes following spinal cord injury (SCI). He has published over 1,150 peer-reviewed articles (h-index 129; cited over 49,000 times) chiefly in the area of central nervous system injury and complex spinal surgery. His seminal 1991 paper, cited over 2,000 times, outlined the severe and lasting consequences of SCI due to a cascade of secondary injury mechanisms following the initial trauma. His research on secondary injury mechanisms ultimately led to the commencement of the multicenter, international Surgical Timing in Acute Spinal Cord Injury Study (STASCIS), aimed at establishing the need for early surgical decompression to prevent the negative effects of the secondary injury cascade. His work examining the use of regenerative approaches including neural stem cells to repair the injured nervous system led to numerous international awards and has helped lead the field toward clinical translation in this area. Dr. Fehlings has published in prominent journals such as Nature, Nature Neuroscience, Lancet Neurology, and Science Translational Medicine and received numerous prestigious, international awards.

**Faculty**

**Dr. Mohammad Khazaei** is an Assistant Professor in the Division of Anatomy at the Temerty Faculty of Medicine, University of Toronto, and a neuroscientist specializing in regenerative strategies for spinal cord and brain injury. His research focuses on understanding how human neural stem and progenitor cells respond to injury, how new neurons and glial cells can be generated, and how these cells may be used to rebuild damaged spinal pathways.

Dr. Khazaei's work has contributed to defining fundamental mechanisms of neural repair, including neuronal polarity, axon outgrowth, and intrinsic growth programs relevant to recovery after spinal cord injury. He has developed multiple human neural progenitor populations with spinal and cortical identities and has investigated their ability to survive, remyelinate, extend axons, and integrate into injured CNS tissue. His research program aims to translate these discoveries into next-generation cell-based therapies for traumatic spinal cord injury and related neurological disorders.

Dr. Khazaei has collaborated extensively with clinician-scientists within the Toronto spinal cord injury community, including the Krembil Brain Institute and UHN, and has published on stem-cell–based repair, mechanisms of regeneration, and neural progenitor fate regulation. His interests include: neural stem cell biology, regenerative neuroanatomy, axon regeneration, remyelination, and the development of clinically meaningful cell-based therapies for SCI.

**Faculty:**

**Dr. Jetan Badhiwala** is a staff spinal neurosurgeon at Sunnybrook Health Sciences Centre and Assistant Professor within the Division of Neurosurgery, Department of Surgery at the University of Toronto. He completed medical school at McMaster University, neurosurgical residency at the University of Toronto, and a Fellowship in Complex Spine Surgery at the Cleveland Clinic. His clinical interests focus on spinal trauma and oncology. His academic program is focused on health outcomes research in traumatic and non-traumatic spinal cord injury. This includes harnessing big data to address clinical knowledge gaps and the application of artificial intelligence to healthcare data for 'personalized' or 'precision' medicine. He has published over 125 peer-reviewed papers, 50 conference abstracts, and 15 book chapters to date. Many of these have been published in high impact general medical journals, such as *The Lancet*, *JAMA*, *BMJ*, *The Lancet Neurology*, and *Annals of Internal Medicine*, as well as subspecialty journals, such as *Neurosurgery*, *Journal of Neurosurgery*, *Journal of Neurotrauma*, *The Spine Journal*, and *Spine*. Jetan has been the recipient of a number of honors and awards, including the CIHR Fellowship, the AANS/CNS Spine Section Research Grant, First Place Resident/Fellow Paper (CSRS), and the Stewart B. Dunsker Award (AANS/CNS).

**Faculty**:

**Dr. Jefferson Wilson** entered the neurosurgery program at University of Toronto after completing his MD at the University of Saskatchewan in 2007. During residency he earned a PhD through IMS and the Surgeon Scientist Program under the mentorship of Michael Fehlings and Abhaya Kulkarni with his research focused on the epidemiology and clinical epidemiology of traumatic spinal cord injury. Dr. Wilson's research has been funded by multiple grants from the Christopher and Dana Reeve Foundation, Cervical Spine Research Society and the Ontario Neurotrauma Foundation. Further, he has been the recipient of numerous prestigious awards including: the K.G. McKenzie Prize from the Canadian Federation of Neurological Sciences, the Synthes Spinal Cord Injury Award from the American Association of Neurological Surgeon and the Shafie S. Fazel Outstanding Resident Surgeon and Investigator Award from the U of T Department of Surgery. After obtaining his FRCSC in neurosurgery in 2015, Dr. Wilson undertook a combined neurosurgery orthopedic fellowship in complex spine surgery at Thomas Jefferson University in Philadelphia, PA under the mentorship of James Harrop and Alex Vaccaro. Dr. Wilson returns to Toronto as a Surgeon Scientist at St. Michael's Hospital with clinical focus on the full spectrum of spinal disorders. From a research perspective, he is primarily interested in topics related to the epidemiology and clinical epidemiology of spinal trauma and spinal cord injury. Currently he serves as the Deputy Editor of the Journal Clinical Spine Surgery.

**Faculty:**

**Dr. Julio Furlan** is a staff neurologist and a Clinician Investigator in the Division of Physical Medicine and Rehabilitation and the SCI Rehabilitation Program at the Lyndhurst Centre, Toronto Rehabilitation Institute, University Health Network, and an Associate Professor in the Department of Medicine, Division of Physical Medicine and Rehabilitation, University of Toronto. He is a trained head and neck surgeon from Brazil, who holds MBA degree in Health Administration, an MSc degree in Clinical Epidemiology, and a PhD degree in Neuroanatomy. In the past, Dr. Furlan has worked as an Associate Research Scientist in the Department of Genetics and Development, Toronto Western Research Institute, University Health Network from 2007 to 2012. Dr. Furlan has also been an Adjunct Scientist at Toronto Rehabilitation Institute, University Health Network from 2009 to 2016, inclusive. He completed five years of residency training in Adult Neurology at University of Toronto in June 2014. Most recently, he completed a two-year clinical fellowship in Neurorehabilitation and Neural Repair at Toronto Rehabilitation Institute and the University of Toronto in June 2016. Dr Furlan´s research has been focused on outcome measures (including clinical assessments, neuroimaging analysis, and neurophysiological assessments), neuromodulation therapies, predictors of outcome (including sex and age) after traumatic and non-traumatic spinal cord injury. In addition, he has interest and expertise in autonomic dysfunction after spinal cord injury and economic analyses. Dr. Furlan has had research funding support from Christopher and Dana Reeve Foundation, Wings for Life Spinal Cord Research Foundation, Rick Hansen Foundation, Cervical Spine Research Society, Praxis Spinal Cord Institute, CRANIA, J. P. Bickell Foundation, Craig H Neilsen Foundation, and Ontario Neurotrauma Foundation.

**Co- Director, U of T Spine Program:**

**Dr. Albert Yee** is the Holland Bone and Joint Program Chief and the Head of the Division of Orthopaedic Surgery at Sunnybrook Health Sciences Centre, where he holds the Marvin Tile Chair in Orthopaedic Surgery. Dr. Yee is an Orthopaedic Spine Surgeon at Sunnybrook Health Sciences Centre, an Associate Scientist (Physical Sciences Platform) at Sunnybrook Research Institute and a Consultant in Surgical Oncology, Bone Metastasis Clinic, Odette Cancer Centre. He is a Full Professor at the University of Toronto in the Institute of Medical Sciences with a cross appointment in the Institute of Biomaterials and Biomedical Engineering. He is the Vice Chair of Research in the Division of Orthopaedic Surgery and Co-Director of the University of Toronto's Department of Surgery Spine Program. Dr. Yee is the Past President of the Canadian Orthopaedic Research Society, President of the Canadian Spine Society and Co-Chair of Bone & Joint Canada. He is the Canadian Lead for the Young Investigators Initiative (YII) of Bone & Joint Canada, and the US Bone & Joint Initiative, a grant mentorship and career development program. Dr. Yee has over 100 peer reviewed publications and has received academic honours including the American British Canadian (ABC) International Travelling Fellowship (American Orthopaedic Association / Canadian Orthopaedic Association, 2013), the Charles H. Tator Surgeon-Scientist Mentoring Award (2012), and the Canadian Orthopaedic Foundation J. Edouard Samson Award (2011). Dr. Yee's laboratory focuses on translational orthopaedic research utilizing pre-clinical surgical models to evaluate novel minimally invasive vertebral metastatic therapies (e.g. Photodynamic Therapy, Radiofrequency Ablation). His work has led to first in human clinical trials and FDA approval with commercialization of new minimally invasive spine technology. He has interest in understanding mechanisms of disease in cancer invasiveness to bone with an aim towards identifying potential new promising therapeutic targets.

**Manager of Education Programs:**

**Ms. Nadia Jaber** serves as the Program Manager at the University of Toronto Spine Program. She has extensive experience managing postgraduate surgical skills training programs, and is responsible for operations, communications, fundraising, and the planning and coordination of Program's educational initiatives. Nadia holds a Bachelor of Arts in English Literature from Philadelphia University (Amman) and a Master of Information Studies from the University of Toronto. She completed her professional training in Entrepreneurship and Leadership from Harvard Business School Online. Nadia has extensive expertise in educational program development, bringing a combination of academic rigor, organizational leadership, and strategic vision to advance the spine fellowship training experience.