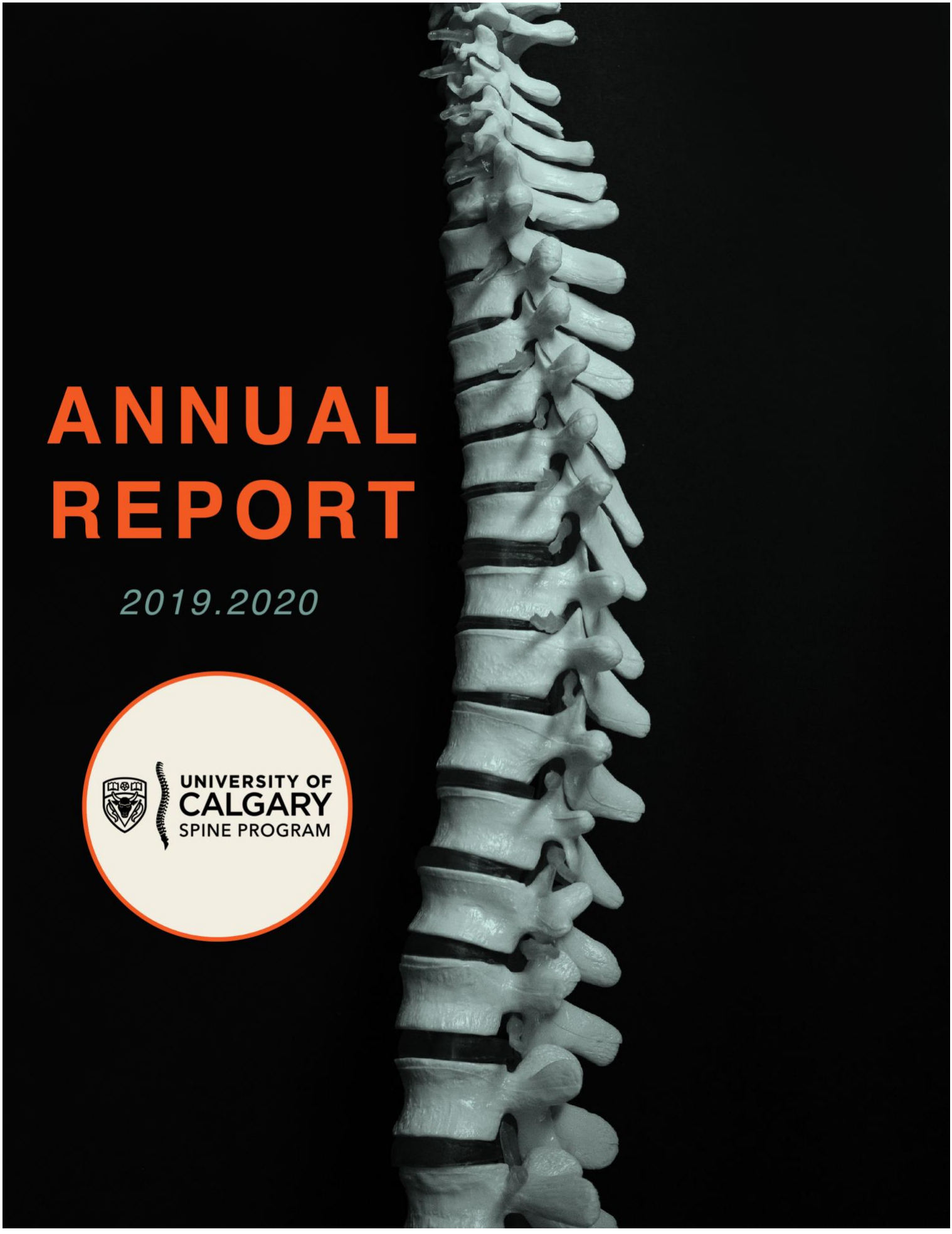
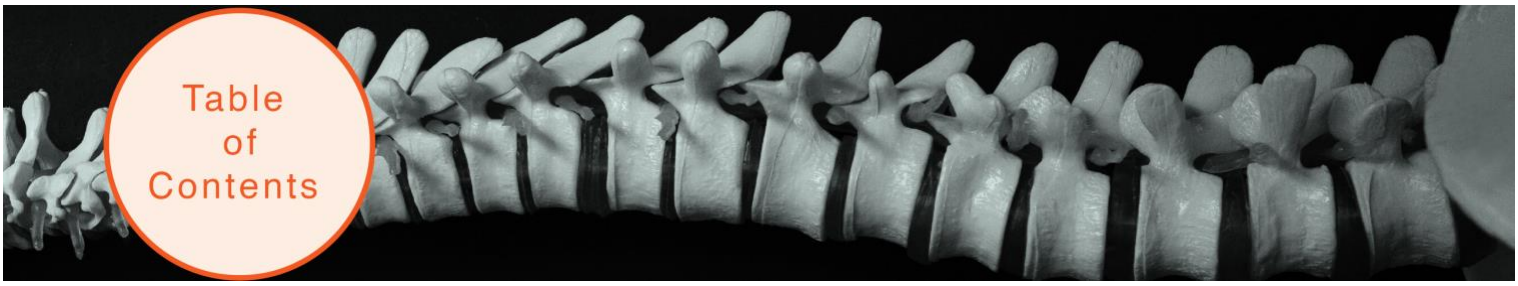
ANNUAL REPORT

2019.2020



UNIVERSITY OF CALGARY
SPINE PROGRAM



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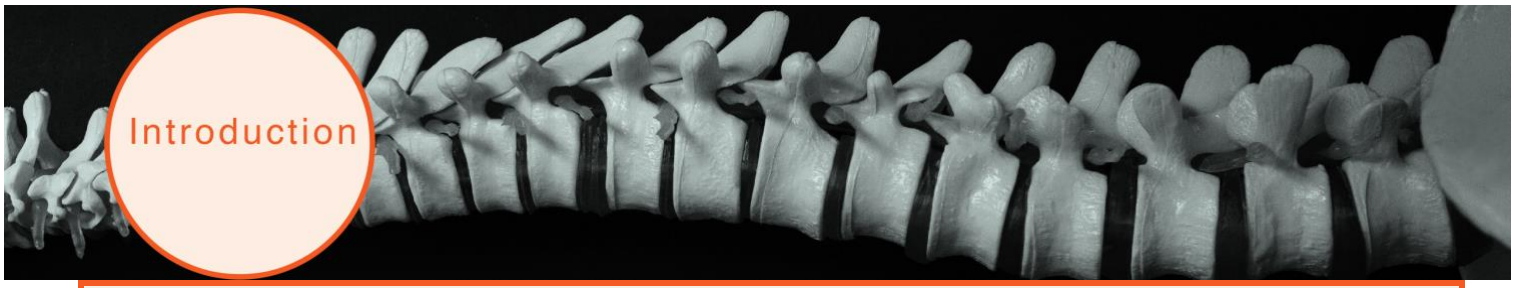


Introduction

The University of Calgary Spine Program is a multidisciplinary clinical and academic group focused on the care of individuals affected by conditions and diseases of the spine and spinal cord. Our mission is to provide the highest quality health care to individuals with spinal disorders through the pursuit of excellence in research, teaching and clinical care.

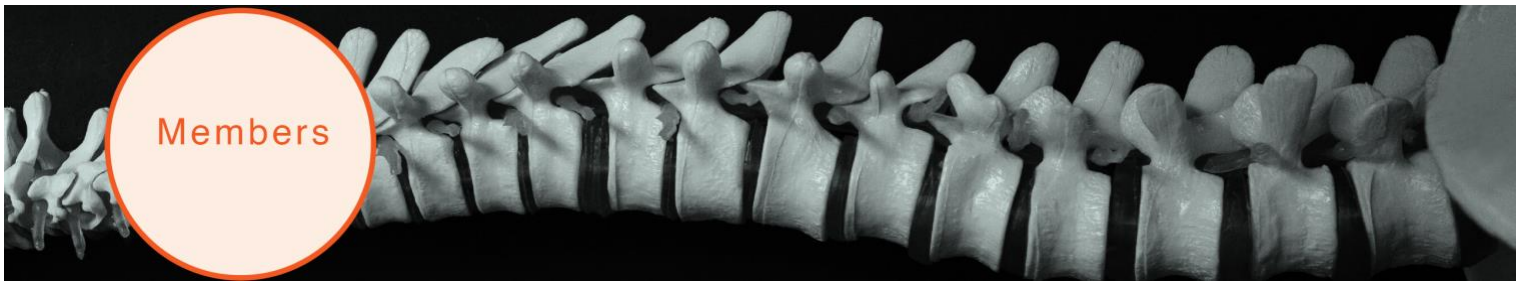
Dr. Bradley Jacobs, Program Chair

The program is centered at the Foothills Medical Centre and Alberta Children's Hospital within Alberta Health Services. Members of the Spine Program have appointments in the Division of Neurosurgery, Department of Clinical Neurosciences or the Section of Orthopedic Surgery, Department of Surgery. Many members have joint appointments in both Departments.

The Spine Program provides care for patients with spinal cord and column injury, infection, neoplasia and degenerative disease. Clinical care is closely linked to clinical education and research in a supportive academic setting. The program has representation from Neurological Surgery, Orthopedic Surgery, Nursing, and Orthotics. Active collaborations exist with physiatry and psychiatry.
Our program offers comprehensive Spinal Surgery Fellowship training under the leadership of Dr. Fred Nicholls. The Spinal Surgery Fellowship at the University of Calgary is a combined Orthopaedic and Neurosurgical clinical experience with the goal of training surgeons in the diagnosis and surgical management of diseases of the entire spine. Trainees gain experience in the surgical treatment of a wide array of conditions, ranging from common degenerative conditions to complex adult deformity and oncological surgical resections and reconstructions. Minimally invasive and anterior/anterolateral approaches are commonly employed in daily practice.

Dr. Ken Thomas leads our research program. There are currently numerous active research studies within the Spine Program that range from fundamental science experiments focused on intervertebral disc biology to advanced MR imaging and machine learning research to prospective randomized controlled clinical trials on acute spinal cord injury therapeutics. Basic science investigations are carried out via active collaborations with the McCaig Bone & Joint Research Institute and the Hotchkiss Brain Institute. Clinical research studies are active on many spinal surgery topics, with key activity focused on the Canadian Spine Outcomes & Research Network (CSORN) clinical registry.

The COVID-19 global pandemic presented an unprecedented and unique challenge to the Calgary Spine Program beginning in March 2020. Elective clinical activity was halted completely for a number of weeks and did not return to fully normal levels until mid-June. Clinical research activity was suspended during this time and did not resume until July 2020. All in-person teaching activities were also paused but after a brief suspension, these activities (Fellow Rounds, Weekly Case Rounds and Journal Club) pivoted to virtual Zoom events and continue to be run in this fashion. Despite this extraordinary public health crisis, the Calgary Spine Program has adapted our daily operations so that we can continue to provide exceptional clinical care, education and research activity during the COVID-19 pandemic.



- Surgical Staff
  - Dr. W. Bradley Jacobs, Program Chair
  - Dr. Jacques Bouchard
  - Dr. David Cadotte
  - Dr. Steven Casha
  - Dr. Roger Cho
  - Dr. Stephan du Plessis
  - Dr. Fábio Ferri-de-Barros
  - Dr. Richard Hu
  - Dr. Peter Lewkonia
  - Dr. Fred Nicholls, Fellowship Director
  - Dr. David Parsons
  - Dr. Paul Salo
  - Dr. Alex Soroceanu
  - Dr. Ganesh Swamy
  - Dr. Ken Thomas, Research Director

- Allied Health
  - Brooke Nowicki, Manager Clinical Neurosciences, AHS Liaison
  - Ken Moghadam, Certified Orthotist (CO) Cascade Orthotics
  - Rob Cameron, CO Cascade Orthotics
  - Drew Anholt, CO Cascade Orthotics
  - Jeff Wright, CO Cascade Orthotics

- Nursing Staff
  - Bruce Chatterton, OR nurse clinician
  - Erin Fischer, OR nurse clinician

- Nurse Practitioners
  - Patti Long, Neurosurgery
  - Carla Dean, Neurosurgery
  - Erin Villard, Neurosurgery
  - Ron Prince, Neurosurgery
  - Nicole Miller, Orthopedics

- Research Staff
  - Tara Whittaker, Research Nurse

- Ish Bains, Research Coordinator
- Saswati Tripathy, Research Coordinator
- Ariana Frederick, Research Coordinator
- Victoria Smith, Research Coordinator

Spine Fellows

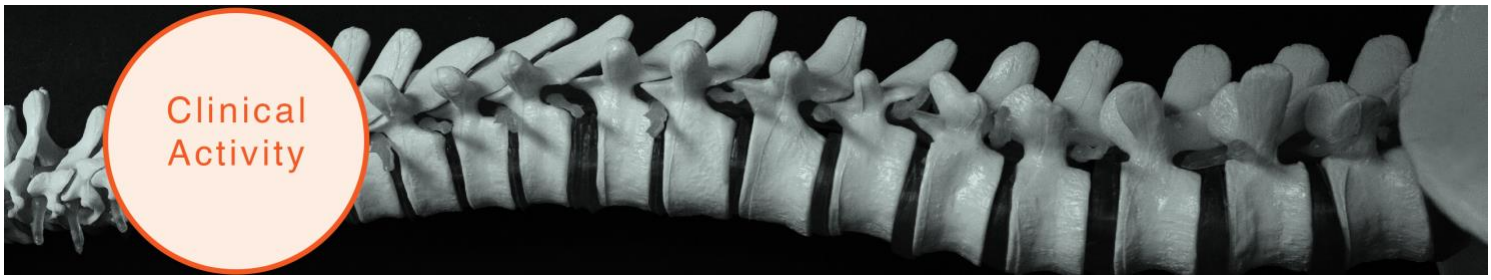
- Dr. Michael Bond
- Dr. Nathan Evaniew
- Dr. Faizal Kassam
- Dr. Stuart McGregor
- Dr. Marina Rosa Filezio (ACH)

Neurosurgery Residents 2019-2020

- Candice Poon (R5)
- Michael Yang (R5)
- Albert Isaacs (R5)
- Stevan Lang (R5)
- Rita Nguyen (R5)
- David Ben-Israel (R5)
- Magalie Cadieux (R5)
- Sandeep Muram (R4)
- Nicholas Sader (R4)
- Madeleine de Lotbiniere-Bassett (R3)
- Matthew Eagles (R3)
- Abdulrahman Albakr (R2)
- Benjamin Beland (R2)
- Jenna Mann (R1)
- Branavan Manoranjan (R1)
- Richard Yu (R1)

Orthopaedic Residents 2019-2020

- Jonathan Bourget-Murray (R5)
- Eva Gusnowski (R5)
- Kate Thomas (R5)
- Lee Fruson (R4)
- Joseph Kendal (R4)
- Madison Litowski (R4)
- Sarup Sridharan (R4)
- Michael James (R3)
- Taryn Ludwig (R3)
- Jennifer Purnell (R3)
- Murray Wong (Research)
- Daniel You (R3)
- Annalise Abbott (R2)
- Brent Benavides (R2)
- Jayd Lukenchuk (R2)
- Laura Morrison (R2)
- Erin Davison (R1)
- Christopher Flanagan (R1)
- Bryan Heard (R1)
- Christopher Hewison (R1)



Surgical Sites:

Foothills Medical Centre

The Foothills Medical Centre is a level 1 trauma center serving more than two million people from the City of Calgary and the surrounding regions of southern Alberta, southeastern British Columbia and southern Saskatchewan. Approximately 1800 spinal procedures are performed per year at Foothills Medical Centre. All adult spinal cord injuries are seen and managed in the acute and rehabilitation stages at the Foothills.

Alberta Children's Hospital

Alberta Children's Hospital provides tertiary and quaternary care dedicated to pediatric spine surgery patients and their families. On average, 35,000 children per year attend our multidisciplinary orthopaedic clinics and over 1,000 orthopaedic operative procedures are performed each year. A dedicated spine team successfully manages spinal problems of diverse etiologies in all paediatric age groups, including scoliosis, kyphosis, spondylolisthesis and thoracic insufficiency syndrome. In 2019/2020 the paediatric spine team performed 105 spine surgeries.

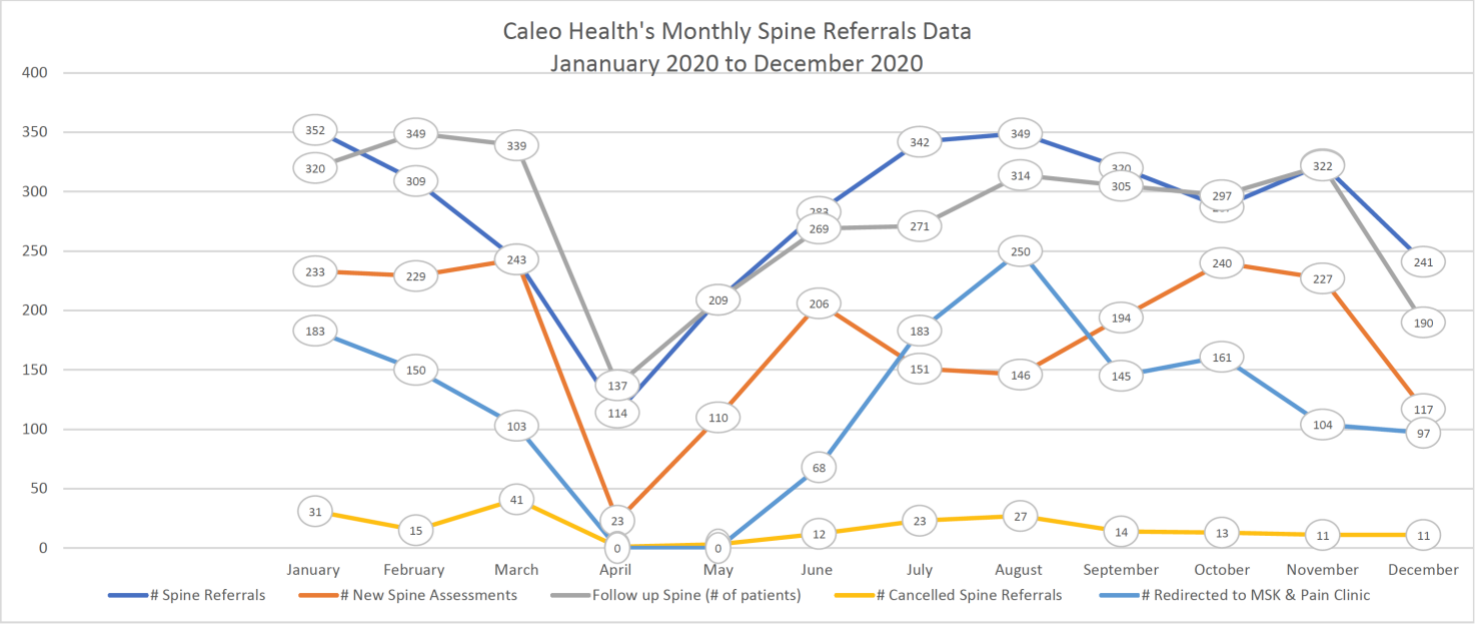
Canadian Surgery Solutions

Canadian Surgical Solutions is a non-hospital surgical facility equipped to perform a comprehensive range of orthopaedic surgical procedures, including total joint replacements and spinal procedures. Dr. Fred Nicholls, Dr. Roger Cho and Dr. Paul Salo perform spine cases for the Workers Compensation Board.

Consultation Services:

Caleo Health

- Ten spine surgeons participate in clinic activity at the Caleo Health outpatient facility including Dr. Hu, Dr. Bouchard, Dr. Cho, Dr. du Plessis, Dr. Thomas, Dr. Swamy, Dr. Lewkonia, Dr. Nicholls and Dr. Soroceanu and Dr. Cundal.
- Caleo received approximately 3500 referrals in 2020. The wait time for spine assessment was approximately 1-3 months on average (referenced from registration date to appointment date).
- On average, patients in 2020 were provided with a spine assessment appointment date within 5 -10 business days of completing the spine registration.
- On average, referring physicians/healthcare providers received a "Referral Received/Accepted Confirmation" letter within 1-2 weeks of sending.
- Approximately 45-50% of the patients assessed required further referral to a spine surgeon.
- In 2020, the wait time from spine assessment to surgical consult, was approximately 16-18 months.
- The pre-spine assessment education sessions were interrupted in 2020 due to COVID-19. Patients that were not able to register for a spine assessment, were provided access to the MSK & Pain clinic based on an e-consultation review of their current referral information.



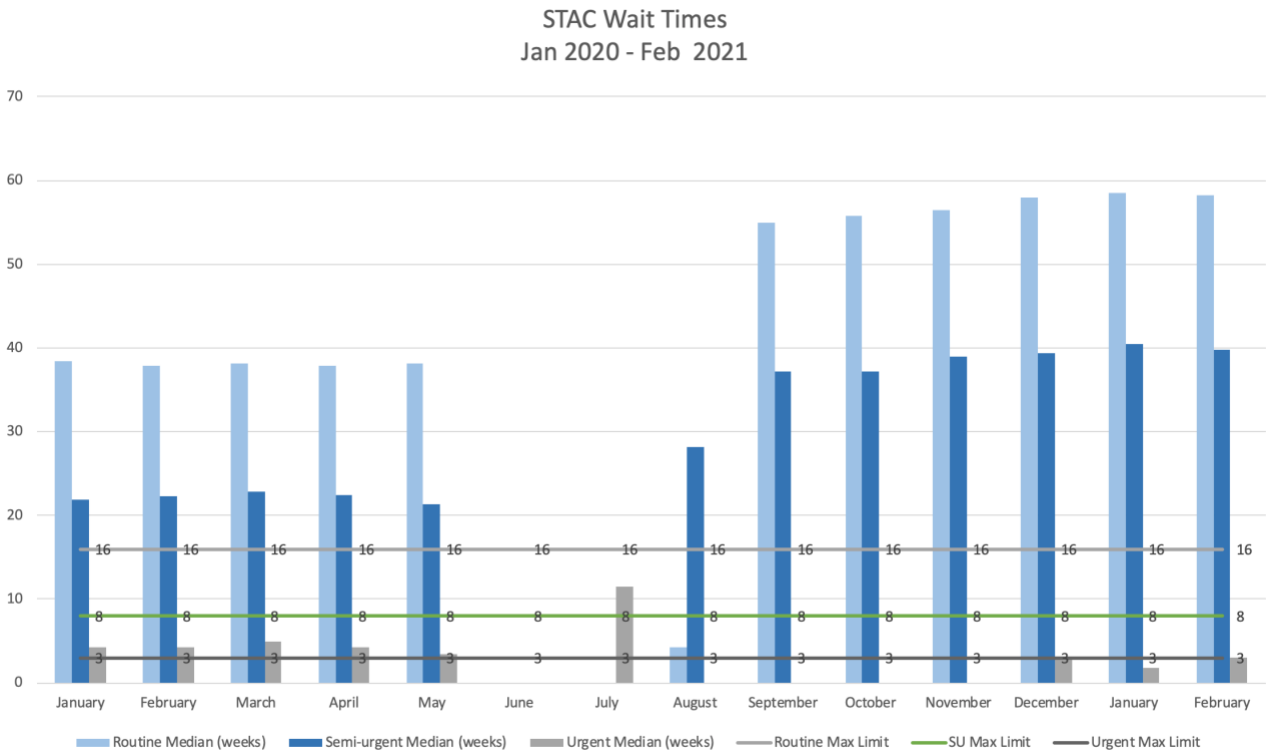
Dr. Mark Lewis
Clinical Director, Caleo Health

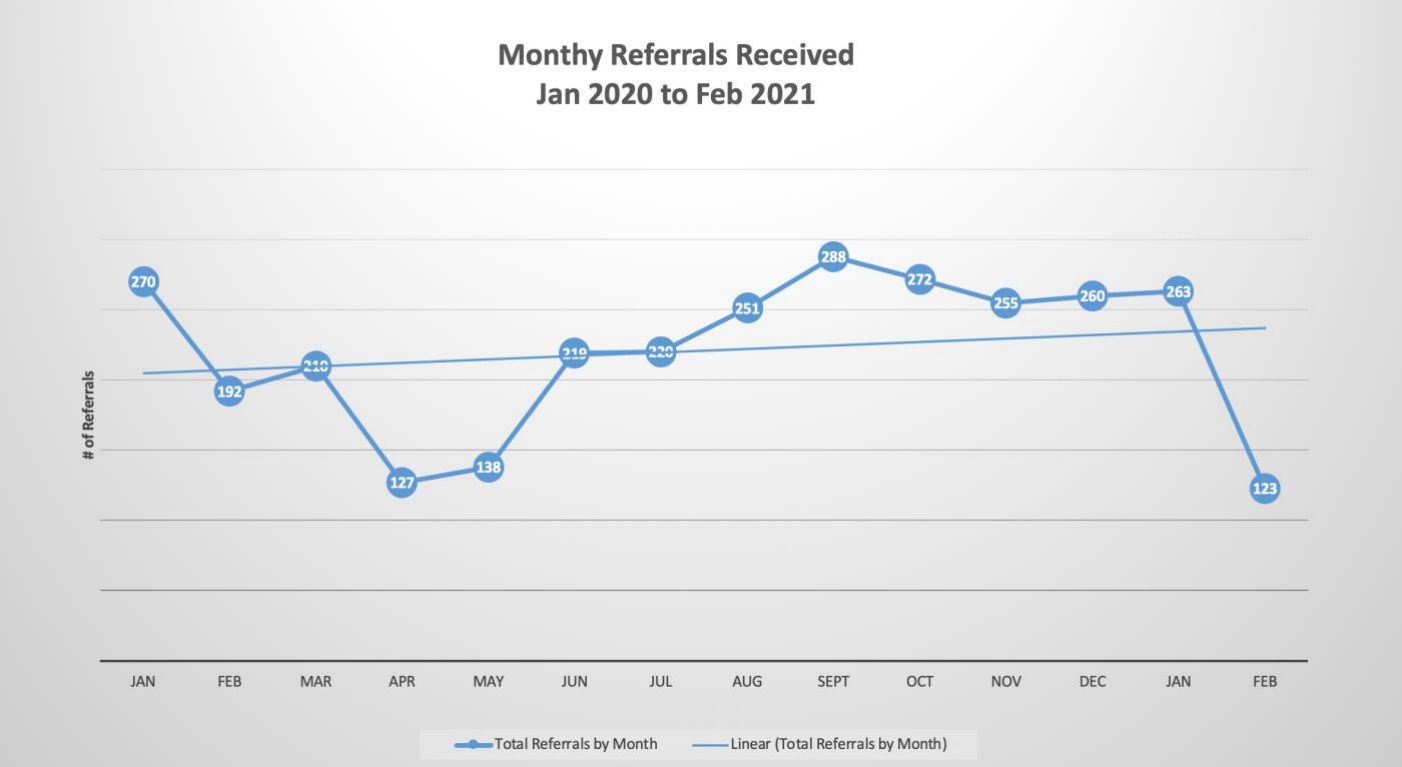
Spine Triage and Assessment Clinic (STAC)

The Spine Triage and Assessment Clinic (STAC) has now been operational for 16 years. Working out of the 12th floor at the Foothills Medical Center as a DCNS clinic, the primary function of STAC is to provide triage and assessment to residents of Southern Alberta; and to determine if patients are surgical candidates (probable and possible). Early identification of both surgical and non-surgical candidates facilitates the management of both surgical and non-surgical patients and leads to greater efficiency of care.

Educational initiatives about the indications for referral and diagnostic imaging requirements have been developed with community partners. General Practitioners, Physiotherapists and Chiropractors can attend onsite visits to STAC and educational sessions have been scheduled in the community. In addition, Residents in Physiatry are being exposed to STAC with future plans to involve Family medicine and Emergency medicine residents as well. Training and education in the management of patients with spine-related problems should decrease the number of unnecessary referrals, decrease wait times and improve overall satisfaction.

From January 1, 2020 to December 31, 2020 the clinic received a total of 2702 referrals from the community and other specialists. This is a 23% decrease from 2019; the decreased volume was due to many local doctors' offices being shut down due to COVID. From March 17, 2020 to July 6, 2020 the STAC clinic was open but unable to see patients. This shutdown greatly impacted our waitlist. Wait times for routine patients were increased from 12 to 18 months (a 6-month increase) as we worked on getting the semi-urgent patients through with a limited schedule once we reopened.





STAC has been managed successfully by the motivated administrative team and the clinical assistants: Randi, Katie, and Drs. Gaekwad, Shao and Kandil. As clinic time and space resources have not increased, the team has worked in collaboration with the medical leads to refine the acceptance criteria to ensure that patients seen in clinic are appropriate and that services rendered are effectively and efficiently distributed. The total number of new patients seen during this same time was 1197. The STAC team is grateful for our Physiatry partners from Kinesis and the ongoing support of the whole team committed to improving spine care in Alberta.

Dr. Stephan du Plessis

University of Calgary Outpatient Clinics

Several outpatient clinics take place at the University of Calgary including consultation and follow-up. It is also the site of basic science research, clinical research and many education activities provided by members of the spine program.

Urgent Consultations and Surgery

Patients presenting with neurologic deficits, fractures, dislocations and tumors are assessed and treated by a spine staff surgeon on call. Nine adult spine surgeons provide full-time on call services for the Foothills Hospital while similar coverage is provided at Alberta Children's Hospital. Physicians respond to enquiries for all Alberta Health Services hospitals including Calgary, Southern Alberta, Eastern British Columbia and Southwestern Saskatchewan. There has been excellent collaboration from all Neurosurgeons, Orthopaedic Surgeons and Emergency physicians in referring the appropriate patients in a timely fashion.

Overall Surgical Wait Times

The wait time that elective surgical patients experience from initial referral by their primary care physician through until the surgical date is a difficult metric to quantify. Considering patient wait lists for triage, surgical consultation as well as surgical waitlists the estimated patient wait time is up to 22 months.

Enhanced Recovery After Surgery (ERAS)

The spine program is developing an enhanced recovery after surgery program (ERAS) for lumbar decompression and fusion operations at Foothills Medical Centre. This multidisciplinary endeavor will bring together a set of evidence-based interventions designed to enhance surgical recovery and reduce postoperative complications in hospital. ERAS programs have been successfully implemented in other surgical disciplines both locally and around the world. Although ERAS programs have been set up for spine surgery, we believe this will be the first program of its kind in Canada and will highlight the strengths of the Calgary Spine Program.

Implementation of ERAS will be an iterative process and require multidisciplinary input from nursing, physicians, allied health members, program administrators, data analysts, and AHS leadership. As the program grows, we may be able to implement lessons learned from lumbar fusion patients to spine patients undergoing other types of spine surgery.

Dr. Peter Lewkonia
Brooke Nowicki
Erin Barrett
Dr. Michael Yang

Surgical Activity:

Alberta Health Services (all sites)

Surgeries by procedure code from 1-Jul-2019 to 30-Jun-2020 listed for the following surgeons: Bouchard, Cadotte, Casha, Cho, Cundal, du Plessis, Ferri-de-Barros, Gallagher, Jacobs, Lewkonia, Nicholls, Parsons, Phillips, Salo, Soroceanu, Swamy, Thomas.

Level	*Procedure Group*	*Case Count*	*Category Totals*
Cervical	Cerv Ant Decompression	3	
Cervical	Cerv Ant Arthroplasty	13	
Cervical	Cerv Ant Arthroplasty w/Fusion	1	
Cervical	Cerv Ant Fusion/ACDF	182	
Cervical	Cerv Postr Fusion/Inst	86	
Cervical	Cerv Postr Decompression	33	
Cervical	Cerv Postr Decompression MIS	24	
Cervical	Cerv Postr Fusion/Laminoplasty	15	
Cervical	Cervical 2 Stage	13	370
Thoraco-lumbar	Tho/Lum 2 Stage	71	
Thoraco-lumbar	Tho/Lum Ant Arthroplasty	12	
Thoraco-lumbar	Tho/Lum Ant Arthroplasty w/Fusion	8	
Thoraco-lumbar	Tho/Lum Ant Fusion	19	
Thoraco-lumbar	Tho/Lum Postr Decompression	401	
Thoraco-lumbar	Tho/Lum Postr Decompression MIS	301	
Thoraco-lumbar	Tho/Lum Postr Fusion MIS	76	
Thoraco-lumbar	Tho/Lum Postr Fusion/Inst	245	
Thoraco-lumbar	Tho/Lum 3 Stage	10	
Thoraco-lumbar	Tho/Lum Fusion DLIF short segment	4	
Thoraco-lumbar	Tho/Lum Fusion OLIF short segment	5	
Thoraco-lumbar	Tho/Lum Postr Fusion Combined Open/MIS	3	1155
Misc Spine *	Misc Spine	145	145
ACH	ACH Only Spine Codes	76	76
*Grand Total***		1746	1746

For the 1746 cases, the total cases minutes were 403087, whereas the skin-to-skin (surgical) time was 251596 minutes or 62% of total case time.

* Misc Spine includes spine tumor, neuro spine shunt, cranial halo application, spine cord tumor/excision lipoma, spine lum pos detether fatty filum terminale, spine lum pos pseudo meningo/cystocele repair, spine pos laminoplasty with rhyzotomy 1-2 levels & spine pos laminoplasty with rhyzotomy 3+ levels.

Canadian Surgery Solutions

Between 1-Jul-2019 and 30-Jun-2020, three of our spine surgeons, Dr. Cho, Dr. Nicholls and Dr. Salo completed a total of 37 lumbar cases at Canadian Surgery Solutions.

Inpatient Spine Care

Unit 101 – Foothills Medical Centre

The 2019-2020 year started out like many others, with Unit 101 managing the summer surge of patients with spinal cord injuries (SCI), and the elective spine patient population. In September, The Department of Clinical Neurosciences sponsored a half-day SCI symposium; this event was done in collaboration with all of the teams involved in the SCI patient journey at FMC-ICU, allied health, tertiary neurorehabilitation, and others. The goal for this symposium was to bring care providers together to learn and share their knowledge regarding SCI and the people involved. We had a great turnout of staff, physicians and people living with SCI; there was positive feedback generated with a focus on the ability to network and liaise with other staff that is not always possible when working.

The end of the year also gave us the opportunity to standardize a piece of acute care across the province. The standardized spinal assessment tool used by nurses on 101 and the supportive spine units, such as 54 and 41B, was adopted into Connect Care and implemented by Edmonton-ensuring that regardless of where a patient a spine patient is hospitalized, the bedside nursing assessment of their motor power and sensation is the same. This standardization in case was a great step forward in implementing best practice across care environments. In January of 2020, Unit 101 renewed its relationship with SCI Alberta by engaging in weekly visits from a patient liaison; this supported the integration of community within acute care by introducing people with SCI to resources and services available once they are discharged.

As was the experience of all programs in 2020, Unit 101 was affected by the onset of the COVID-19 pandemic and its arrival in Alberta on March 13th. Initially, as surgeries were postponed, the Unit 101 bed capacity hovered around 75% - almost unheard of for our spine program. But this slowing of surgical admissions was short-lived, and the spine service soon returned to normal rates once the province reopened in the summer of 2020.

The business of providing care to spine patients had changed, however. There were periods where visitors were limited, times when visitors were not permitted at all, and times when patients were not permitted to bring personal items such as clothing or hygiene products with them to the hospital. Visits with loved ones were held on Zoom with iPads provided by the Calgary Health Foundation, as were music therapy sessions. The resilience of the Unit 101 staff and their multidisciplinary colleagues was tested during this time. While staff continued to support the patient's added emotional, social, and communication needs, they navigated an unprecedented scarcity of supplies and personal protective equipment. The team became experts in the "new normal" infection prevention and control landscape. As always, the Unit 101 staff kept calm and carried on, and continued to provide excellent care, despite limitations imposed by the pandemic.

By April, the team had acclimated to the "new normal," and started to get back to the work of progressing the spine program forward. Work with the Neurosciences, Vision and Rehabilitation SCN began on standardization of care for persons with SCI in May, and Karolina Herold joined the 101/112 team as Unit Manager in June.

Julie Reader, Nursing Education Unit 101

Adult Spinal Deformity

The Calgary Spine Program can be considered one of the biggest centres in Canada specialising in the surgical treatment of adult spinal deformity. These surgeries are long and complex, and the patients themselves can be just as complex, with many comorbidities and longstanding chronic pain. Dr. Swamy, Dr. Soroceanu, Dr. Thomas, Dr. Jacobs, and Dr. Nicholls meet regularly as a group in order to learn from each other and progress their standard of care for these patients.

Over the recent years, these meetings have been streamlined to focus on 1) discussing as a group the clinical treatment plans of the current patients and 2) reviewing patients and their outcomes 1-2 years post-surgery which has driven a number of clinical initiatives.

The most notable change with the deformity group is its new interdisciplinary nature. Along with the regular spine surgeons, regular attendees to these meetings now also include Nicole Miller, (nurse practitioner), Ariana Frederick (research associate), and our two newest additions: Dr. Sean Stacey and Dr. Kyle Rogan from anesthesiology. Dr. Stacey and Dr. Rogan have collaborated with the group to ensure these complex spine patients get seen in a pre-admission clinic well before their surgery, in order to assess and optimize any medical conditions that may put patients at risk for anesthesia-related complications and to help them in their recovery process following the lengthy surgical procedures. They are also working with the spine group to set up a research initiative examining fluid resuscitation practices at FMC with spine surgical cases that go over several hours and have extensive blood loss. The group also continues to collaborate with Dr. Rob Tanguay and the majority of all deformity patients are referred through the TOPPS program (pain management and peri-operative opioid use). In the last year, the spine unit nurses can attest to the improvements they see from patients who have gone through the TOPPS program. These patients require less narcotics and have a more positive approach the post-op rehab process.

Another big initiative of the deformity group this year was developing a national prospective deformity module as part of the larger CSORN registry. We are hoping to see the CSORN deformity module begin patient enrolment at multiple Canadian centres in the fall of 2020.

Dr. Alex Soroceanu

UNIVERSITY OF CALGARY SPINE PROGRAM

Rehabilitation:

Calgary Spinal Cord Injury Program Data

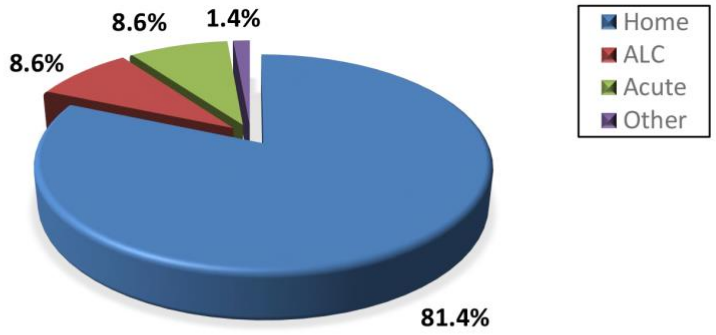
(July 2019 - June 2020)

BASIC DEMOGRAPHICS	Traumatic	Non-Traumatic	Total
Total # of patients discharged	28	42	70
	40%	60%	

ADDITIONAL DEMOGRAPHICS	Traumatic	Non-Traumatic	Total
Average age (years)	45.6	62	55.5
Males	86%	64%	73%
Females	14%	36%	27%

AVERAGE LENGTH OF STAY (LOS) *(in # of days)*		Traumatic	Non-Traumatic	Total
Acute LOS (Onset Days)		41.3	37.1	38.8
Tertiary Neuro Rehab Unit	Active LOS	54.7	45.9	49.4
	Total LOS	63	50.4	55.4
Total In-patient LOS		104.3	87.5	94.2

DISCHARGE DISPOSITION



Additional Notes re: Discharge Disposition

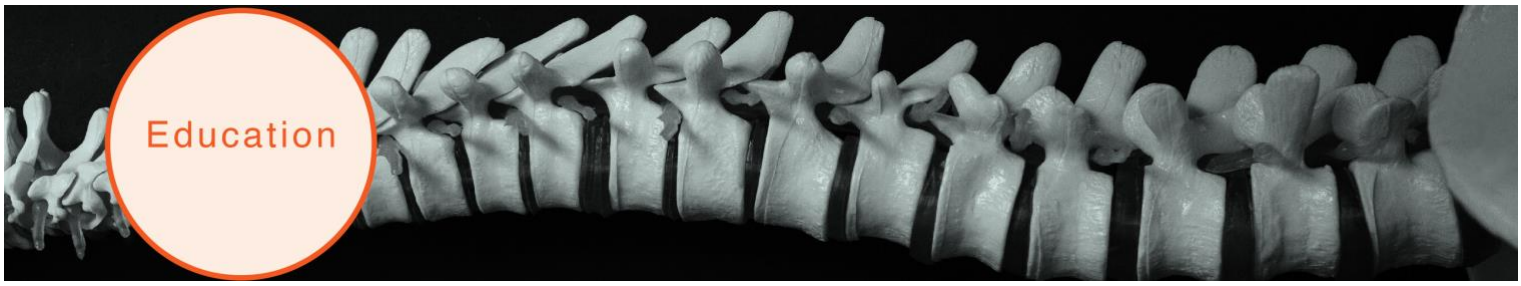
Home → Includes with and without additional health care services (i.e., home care)

ALC (Alternative Level of Care) → Includes long-term care, assisted living, personal care home, etc.

Acute → Includes acute medical units AND transitional units (urban or rural/home hospitals)

FUNCTION SCORES Functional Independence Measure ® FIM)	Traumatic	Non-Traumatic	Total
Average Admit FIM Score	82	85.5	84.1
Average Discharge FIM Score	102.5	106.4	104.8
Change in FIM Score	25.0%	24.4%	24.6%

Provided by Magda Mouneimne MScOT
Quality Lead, FMC Tertiary Neurorehabilitation Program



Undergraduate

Surgeons take part in both scheduled didactic lectures as well as problem-based small-group learning environments. The orthopedic and neurosurgeons play an active role in teaching medical students anatomy and physical examination techniques. Dr. Peter Lewkonia completed his term as course director for "Course 2" in June 2020. Course 2 is the integrated musculoskeletal unit of the undergraduate medical curriculum.

Postgraduate Resident

The orthopedic and neurosurgical consultants provide both formal and informal teaching to the postgraduate residents in orthopedics and neurosurgery. Formal teaching takes the form of lecture supervision and case discussion during the academic half days. Informal teaching takes place in the operating room and clinic setting. In May 2020, Dr. Peter Lewkonia became the Assistant Program Director for the orthopaedics residency program.

Each year the Calgary spine program offers a course to senior orthopedic and neurosurgical residents interested in pursuing a career in spine. This is under the direction of Dr. Brad Jacobs. This hands-on cadaver course provides an opportunity to review surgical techniques and implant systems. The course is offered to residents across the country.

Postgraduate MSc/PhD

Consultants within the spine program have supervised several graduate students at the University of Calgary. These graduate students have pursued training in both basic science and clinical research. We did not have any postgraduate students this academic year.

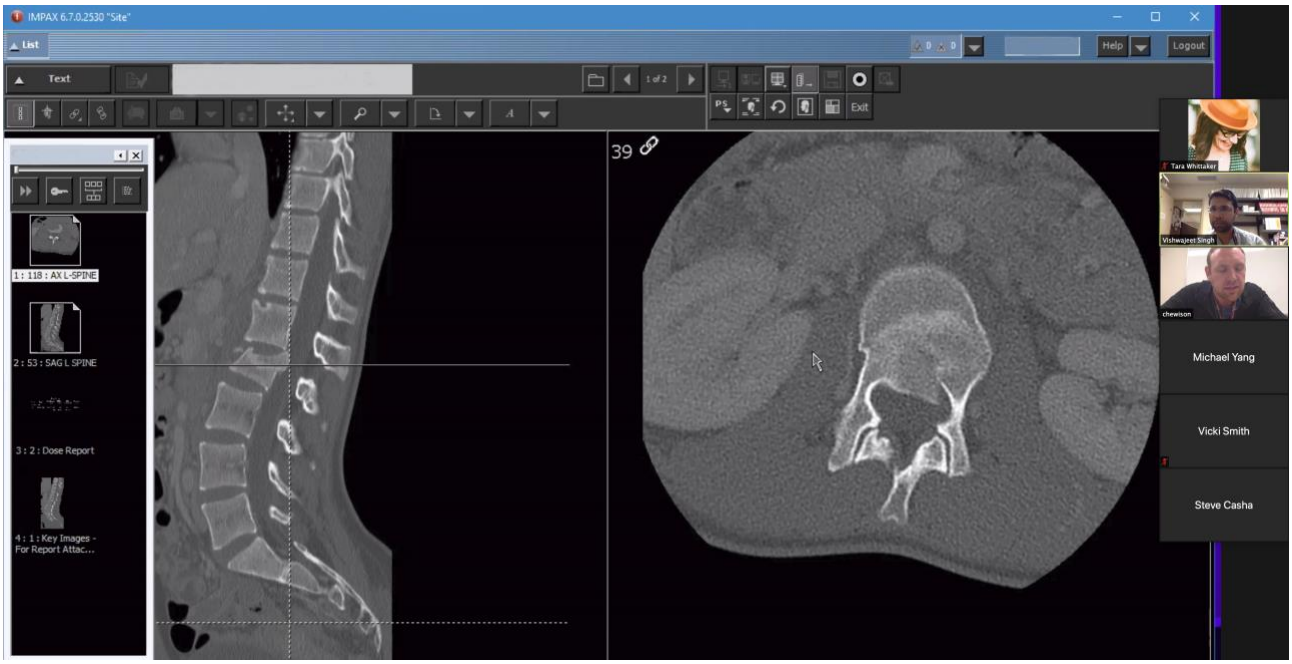
Postgraduate Continuing Medical Education

Annually, under the direction of Dr. Jacobs, Calgary hosts orthopaedic and neurosurgical residents from across Canada at our Spinal Techniques course. This course is limited to 14 residents with nearly as many surgeon instructors – making the student to teacher ratio very favorable. The course consists of short didactic sessions followed by cadaver labs. The course enjoys the support of our Calgary spine industry partners, as there is a strong emphasis on appropriate use of spinal implants. Once again, the course achieved excellent participant ratings.

Rounds

Weekly Spine Rounds are typically held Wednesdays from 7-8 AM in the ICU Classroom. During COVID, we successfully adapted to a Zoom format. Neurosurgery, Orthopaedic Surgery, Spine Fellows, Neurosurgery Residents, Orthopaedic Residents, Research Nurses and Industry Partners attend rounds. A variety of cases are presented by the Spine Fellows. The Neurosurgery and Orthopaedic Surgery residents are then asked for feedback under the guidance of the staff surgeons.

Spinal Surgery Fellow rounds take place each Tuesday in a didactic seminar series format.



UNIVERSITY OF CALGARY SPINE PROGRAM

Postgraduate Spine Fellowship Program

Spine Fellowship at the University of Calgary is a combined Orthopaedic and Neurosurgical clinical experience. The Goals of the fellowship are to train Orthopaedic and Neurosurgical surgeons in the diagnosis and management of diseases of the spine. The University of Calgary Spine Program is an AO-sponsored fellowship program. Our fellows participate in the annual AO Spine Fellows Forum and are exposed to other global leaders in spine surgery.

Dr. Fred Nicholls, Fellowship Director

The Spine Program is a multidisciplinary group dedicated to the management of individuals with spinal disease. The emphasis of this spine fellowship is upon the decision-making and the surgical techniques relevant to spine surgery. At the end of the fellowship, the trainee will have the experience and ability to independently perform surgical approaches, decompressions, deformity correction and instrumentation in areas of the spine from the occiput to sacrum.

- Decompression techniques both anterior and posterior will be acquired. Exposure to multiple different instrumentation systems will occur, including anterior and posterior stabilization of the cervical spine, thoracic spine and lumbar spine.
- Cervical and Lumbar disc arthroplasty.
- Open and less invasive procedures.
- Image guidance/computer-aided surgery.
- An intra-operative MRI surgical suite that is capable of performing cervical, thoracic and lumbar intra-operative imaging.

The Spine Fellowship year runs from July 1 to June 30 of the following year. Time is equally divided between the Orthopaedic and Neurosurgical service. Combined teaching conferences occur weekly with discussion and presentation of recent cases and complex management cases. Monthly presentation rounds occur with the full attendance of Orthopaedic and Neurosurgical house staff and Spine Program attending staff. Weekly outpatient clinics are performed with the attending staff and informal teaching occurs with junior house staff and residents.

Spine Service call occurs for each attending for one week in duration. During this time the house staff and Fellows assigned to the attending surgeon, form the spine team on call. The resident and fellow staff makes initial assessment and management decisions, with close supervision by the attending staff. All fellow call is at home call with no in-hospital responsibilities. During the course of the year, a clinical research project is required and must be completed prior to the conclusion of the training year. The fellow and the supervisor of the fellow's choice mutually agree upon this research project.

2019/2020 Spine Fellows

- Dr. Michael Bond
- Dr. Nathan Evaniew
- Dr. Faizal Kassam
- Dr. Stuart McGregor
- Dr. Marina Rosa Filezio (ACH)





Fellowship Testimonial

When I showed up to Calgary in July 2020, I was decent with a mallet but barely knew how to hold a Kerrison. I looked down, looked up again, and suddenly it was March 2021. I was doing anterior cervical discectomies with a resident assisting.

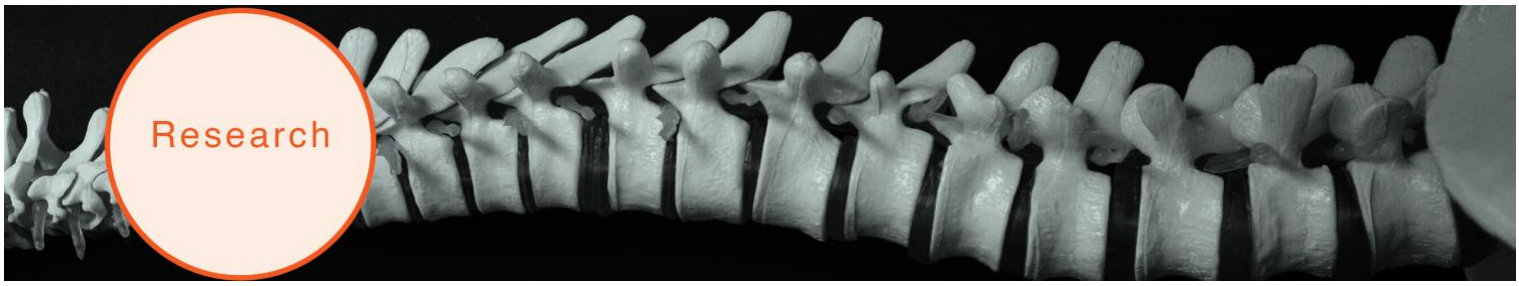
From the entertainment of Spine Rounds to the delicious offerings at monthly journal clubs, the year flew by. Through the hard work and patience of my mentors in Calgary, I became technically proficient in anterior, lateral and posterior-based procedures.

I will always be thankful to my co-Fellows, the Residents that I worked with, and the Attendings who provided me with unlimited opportunities to grow. I think of them every single day.

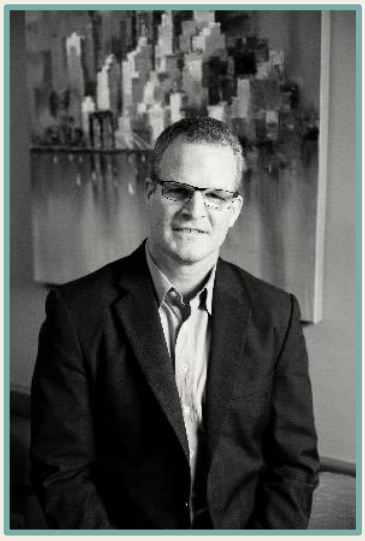
For anyone lucky enough to be admitted to this fellowship, my advice would be to take it before the opportunity is gone. You won't regret it.

I am currently an attending spine & trauma surgeon at Queen's University and will always be proud to say that I'm a Calgary-trained spine surgeon.

Dr. Faizal Kassam



The University of Calgary Spine Program had a very successful year on the research front. Our Faculty were principal investigators or collaborators on 10, separate externally-funded research grants (worth over $1.8 million). Faculty members authored 28 peer-reviewed publications and 4 book chapters. In addition, 25 research abstracts were presented at national or international meetings with authorship/co-authorship involvement from Calgary Spine Group faculty.



Dr. Ken Thomas, Research Director

This research productivity was a direct result of our involvement in a multitude of clinical research initiatives. These research endeavors ranged from retrospective reviews of local clinical data on a wide range of spinal surgery topics to multicenter data analysis of large prospective spinal surgery patient registries. The University of Calgary continues to be the largest enrolling site for the Canadian Spine Society's national Canadian Spine Outcomes and Research Network (CSORN) prospective spine surgery registry, which includes participation in two CSORN sub-studies related to cervical spondylotic myelopathy and the surgical treatment of degenerative spondylolisthesis. The CSORN database continues to mature and we anticipate initiation of the CSORN deformity module later this year.
In addition to our clinical research efforts, Spine Group members (e.g. Paul Salo, Ganesh Swamy, Steve Casha) are also involved in active collaborations with basic scientists in musculoskeletal and neuroscience translational research projects through the McCaig Bone & joint Institute and the Hotchkiss Brain Institute.

Finally, it is very important to note that many of the recent successes of the Calgary Spine Group research program are a direct result of our 4 excellent, efficient and highly organized research associates: Tara Whittaker, Ish Bains, Saswati Tripathy and Ariana Frederick.

CURRENT RESEARCH PROJECTS

Prospective RCTs enrolling	PI	Status
Minocycline (MASC)	Casha	Stop
Liberation from Mechanical Ventilation (RHSCIR)	Casha/Demetrios	Enrolling/data collection
Microbiome & SCI (RHSCIR)	Casha/J Steeves	Analysis

Prospective Randomized Clinical Trials in follow-up		
INSTRuCT-SCI Study	Casha	In follow-up
Degenerative Spondy RCT pilot (CSORN)	Casha/Thomas	In follow-up

Clinical Studies - Observational		
Cervical Myelopathy (CSM)	Cadotte	Enrolling/data collection
Degenerative Spondy Cohort Study (CSORN)	Fisher/Casha/Thomas	Enrolling/data collection
qMRI & cervical myelopathy (CSORN)	Cadotte	Enrolling/data collection
Acceptance & empowerment after SCI	Lewkonia	Enrolling/data collection
Analysis of the Implications of Lumbopelvic Alignment on the Alignment of the Cervical Spine	Nicholls	Enrolling/data collection
Can Systemic inflammatory profiles predict Natural history of lumbar disc herniations	Swamy/Salo	Enrolling/data collection
Is spine surgery associated with improvement in depressive symptoms?	Thomas/Cushnie	Edits
The impact of admission unit on peri-operative complications after elective spine surgery	Soroceanu	Analysis
Torus: Validation of Torus Software	Swamy	Awaiting arrival of Machine
Quantifying in-vivo cervical spine motion and influence of cervical total disc arthroplasty		Enrolling/data collection
Impact of kidney disease and non-union in lumbar fusion	Jacobs/Beland/Eagles	Enrolling/data collection
Quantifying chronic opioid use in adult spine deformity patients	Soroceanu	Manuscript prep
Fusion surgery for low back pain: CSORN review	Thomas/Swamy	Analysis

Prospective Data Collection		
ISSG – Deformity	Soroceanu	Enrolling/data collection
CSORN	Soroceanu	Enrolling/data collection

Fellows		
Evaluation of the Ability of Lateral Interbody Cages to Correct Adult Spinal Deformities	Singh, Swamy	Enrolling/data collection
Robotic Assessment of Cervical Myelopathy	Kassam/Cadotte/Dukelow	Ethics
Clinical predictors of the Minimal Clinically Important Difference after surgery for CSM	Evaniew/Jacobs	Under Review
Patient/surgeon expectation concordance and postop satisfaction	Bond/Thomas	Analysis
Does neuromonitoring predict permanent neuro deficits after LLIF	Zafereis/Sirois/Thomas	Manuscript prep
Ageism: is age an independent predictor of outcome after lumbar spine surgery	Bond/Aldebeyan/Nares/Thomas	Analysis
Midterm outcomes of m6l anterior lumbar disc replacement	Bouchard/Taryn (resident)	Analysis

Published Manuscripts

Peer-Reviewed Publications (Bold denotes Calgary Spine Program Faculty, * denotes Calgary Spine Fellow):

2020

1. *Aoude A, Litowski M, *Aldebeyan S, Fisher C, Hall H, Manson N, Bailey CS, Ahn H, Abraham E, Nataraj A, Paquet J, Stratton A, Christie S, **Cadotte D**, **Nicholls F**, **Soroceanu A**, Rampersaud YR, **Thomas KC**. A Comparison of Patient and Surgeon Expectations of Spine Surgical Outcomes. Global Spine J, Epub 2020 Mar10 doi: 10.1177/2192568220907603.

2. Ben-Israel D, **Jacobs WB**, **Casha S**, Lang S, Ryu WHA, de Lotbiniere-Bassett M, **Cadotte D**. The Impact of Machine Learning on Patient Care: A Systematic Review. Artificial Intelligence in Medicine. 2020 Mar;103:101785.

3. Canizares M, Gleenie RA, Perruccio A, Abraham E, Ahn H, Attabib N, Christie S, Johnson MG, Nataraj A, **Nicholls F**, Paquet J, Phan P, Rasoulinejad P, Manson N, Hall H, **Thomas K**, Fisher CG, Rampersaud R. Patients' expectations of spine surgery for degenerative conditions: Results from the Canadian Spine Outcomes and Research Network (CSORN). Spine J, 2020 Mar; 20(3):399-408.

4. Chan V, Nataraj A, Bailey C, Abraham E, **Soroceanu A**, Johnson M, Paquet J, Christie S, Stratton A, Hall H, Manson N, Rampersaud R, **Thomas K**, Fisher C. Comparison of Clinical Outcomes between Posterior Instrumented Fusion with and without Interbody Fusion for Isthmic Spondylolisthesis. Clin Spine Surg. 2020 May 15.

5. *Evaniew N, **Cadotte DW**, Bailey CS, Christie S, Dea N, Fisher CG, Paquet J, **Soroceanu A**, **Thomas KC**, Rampersaud YR, Manson N, Johnson M, Hall H, McIntosh G, **Jacobs WB**. Clinical Predictors of Achieving the Minimal Clinically Important Difference After Surgery for Cervical Spondylotic Myelopathy: An External Validation Study from the Canadian Spine Outcomes And Research Network. Journal of Neurosurgery: Spine, 2020 Apr 10;1-9.

6. *Evaniew N, Jalali Mazlouman S, Belley-Cote EP, **Jacobs WB**, Kwon B. Interventions to optimize Spinal Cord Perfusion in Patients with Acute Traumatic Spinal Cord Injury: A Systematic Review. Journal of Neurotrauma 2020 May 1;37(9):1127-1139.

7. Fisher CG, Vaccaro A, Patel A, Whang P, **Thomas K**, Chi J, Mulpuri K, Prasad SK. Evidence-Based Recommendations for Spine Surgery. Spine 2020 June 15: 45(12):851-859.

8. Passias PG, Horn SR, Soroceanu A, Oh C, Ailon T, Neuman BJ, Lafage V, Lafage R, Smith JS, Line B, Bortz CA, Segreto FA, Brown A, Alas H, Pierce KE, Eastlack RK, Sciubba DM, Protopsaltis TS, Klineberg EO, Burton DC, Hart RA, Schwab FJ, Bess S, Shaffrey CI, Ames CP, ISSG. Development of a Novel Cervical Deformity Surgical Invasiveness Index. Spine (Phila Pa 1976). 2020 Jan 15;45(2):116-123.

9. *Peiro-Garcia A, Bourget-Murray J, Suarez-Lorenzo I, Parsons D, Ferri-de-Barros F. Staged instrumentation with magnetically controlled growing rods in early-onset scoliosis: indications and preliminary outcomes. Spine Deform. 2020 Apr;8(2):317-325.

10. *Peiro-Garcia A, *Teles AR, Ojaghi R, Ferri-de-Barros F. Pedicle Screw Instrumentation in Scoliosis Surgery: On Site Simulation Data on Accuracy and Efficiency with Different Techniques. Spine (Phila Pa 1976). 2020 Jun 1;45(11):E670-E676.

11. Protopsaltis TS, Soroceanu A, Tishelman JC, Buckland AJ, Mundis GM Jr, Smith JS, Daniels A, Lenke LG, Kim HJ, Klineberg EO, Ames CP, Hart RA, Bess S, Shaffrey CI, Schwab FJ, Lafage V, ISSG. Should Sagittal Spinal Alignment Targets for Adult Spinal Deformity Correction Depend on Pelvic Incidence and Age? Spine (Phila Pa 1976) 2020 Feb 15;45(4):250-257.

12. Rowe E, Hassan E, Carlesso L, Astephen Wilson J, Gross DP, Fisher C, Hall H, Manson N, Thomas K, McIntosh G, Drew B, Rampersaud R, Macedo L. Predicting outcomes 1 year post lumbar spinal stenosis surgery: a protocol for a historical cohort study using data from the Canadian Spine Outcomes Research Network (CSORN). Can J Pain Feb 2020.

13. Sankar WN, Lavalva SM, Mcguire MF, Jo C, Laine JC, Kim HKW (Ferri-de-Barros F, Collaborator); International Perthes Study Group. Does Early Proximal Femoral Varus Osteotomy Shorten the Duration of Fragmentation in Perthes Disease? Lessons from a Prospective Multicenter Cohort. J Pediatr Orthop. May/Jun 2020;40(5):e322-e328

14. Segreto FA, Passias PG, Brown AE, Horn SR, Bortz CA, Pierce KE, Alas H, Lafage V, Lafage R, Smith JS, Line BG, Diebo BG, Kelly MP, Mundis GM, Protopsaltis TS, Soroceanu A, Kim HJ, Klineberg EO, Burton DC, Hart RA, Schwab FJ, Bess S, Shaffrey CI, Ames CP. The influence of Surgical Intervention and Sagittal Alignment on Frailty in Adult Cervical Deformity. Oper Neurosurg (Hagerstown). 2020 Jun 1;18(6):583-589.

15. Soroceanu A, Smith J, Lau D, Kelly M, Passias P, Protopsaltis T, Gum J, Lafage V, Kim HJ, Scheer J, Gupta M, Mundis G, Kineberg E, Burton D, Bess S, Ames C, ISSG. Establishing the Minimum Clinically Important Difference in Neck Disability Index and Modified Japanese Orthopaedic Association Scores for Adult Cervical Deformity, J Neurosurg Spine. 2020 May 29;1-5.

16. Stratton A, Wai E, Kingwell S, Phan P, Roffey D, El Koussy M, Christie S, Jarzem P, Rasoulinejad P, **Casha S**, Paquet J, Johnson M, Abraham E, Hall H, McIntosh G, **Thomas K**, Rampersaud R, Manson N, Fisher C. Opioid use trends in patients undergoing elective thoracic and lumbar spine surgery. Can J Surg 2020 May 28; 63(3):E306-E312.

2019

1. *Bond M, McIntosh G, Fisher C, **Jacobs WB**, Johnson M, Bailey CS, Christie S, Charest-Morin R, Paquet J, Nataraj A, Cadotte D, Wilson J, Manson N, Hall H, **Thomas K**, Rampersaud YR and Dea N. Treatment of Mild Cervical Spondylotic Myelopathy: Factors Associated with Decision for Surgical Intervention. Spine (Phila Pa 1976). 2019 Nov 15;44(22):1606-1612.

2. Bortz CA, Passias PG, Segreto F, Horn SR, Lafage V, Smith JS, Line B, Mundis GM, Kebaish KM, Kelly MP, Protopsaltis T, Sciubba DM, **Soroceanu A**, Klineberg EO, Burton DC, Hart RA, Schwab FJ, Bess S, Shaffrey CI, Ames CP. Indicators for Nonroutine Discharge Following Cervical Deformity-Corrective Surgery: Radiographic, Surgical, and Patient-Related Factors. Neurosurgery. 2019 Sep 1;85(3):E509-E519.

3. Bourget-Murray J, Brown GE, *Peiro-Garcia A, Earp MA, **Parsons DL**, **Ferri-de-Barros F**. Quality, Safety, and Value of Innovating Classic Operative Techniques in Scoliosis Surgery: Intraoperative Traction and Navigated Sequential Drilling. Spine Deform. 2019 Jul;7(4):588-595.

4. *Cushnie D, **Thomas K**, **Jacobs WB**, **Cho RKH**, **Soroceanu A**, Ahn H, Attabib N, Bailey CS, Fisher CG, Glennie RA, Hall H, Jarzem P, Johnson MG, Manson NA, Nataraj A, Paquet J, Rampersaud YR, Phan P, **Casha S**: Effect of Preoperative Symptom Duration on Outcome in Lumbar Spinal Stenosis: a CSORN Registry Study. Spine Journal. 2019 Sep;19(9):1470-1477.

5. Dhaliwal P, Yavin D, Whittaker T, Hawboldt GS, Jewett GA, **Casha S**, **du Plessis S**. Intrathecal morphine following lumbar fusion: a randomized, placebo-controlled trial. Neurosurgery, 2019 Aug 1;85(2):189-198.

6. Hebert JJ, Abraham E, Wedderkopp N, Bigney E, Richardson E, Darling M, Hall H, Fisher CG, Rampersaud YR, **Thomas KC**, **Jacobs B**, Johnson M, Paquet J, Attabib N, Jarzem P, Wai EK, Rasoulinejad P, Ahn H, Nataraj A, Stratton A and Manson N. Patient Undergoing Surgery for Lumbar Spinal Stenosis Experience Unique Courses of Pain and Disability: A Group-based Trajectory Analysis. PLoS One 2019 Nov 7;14(11):e0224200.

7. Jablonski CL, Leonard C, **Salo P**, Krawetz RJ. CCL2 but not CCR2 is required for spontaneous articular cartilage regeneration post-injury. J Orthop Res. 2019 Dec;37(12):2561-2574.

8. Passias PG, Horn SR, Raman T, Brown AE, Lafage V, Lafage R, Smith JS, Bortz CA, Segreto FA, Pierce KE, Alas H, Line BG, Diebo BG, Daniels AH, Kim HJ, **Soroceanu A**, Mundis GM, Protopsaltis TS, Klineberg EO, Burton DC, Hart RA, Schwab FJ, Bess S, Shaffrey CI, Ames CP, ISSG. The impact of osteotomy grade and location on regional and global alignment following cervical deformity surgery. J Craniovertebr Junction Spine. 2019 Jul-Sep;10(3):160-166.

9. *Peiro-Garcia A, Brown GE, Earp MA, **Parsons D**, **Ferri-de-Barros F**. Sagittal Balance in Adolescent Idiopathic Scoliosis Managed with Intraoperative Skull Femoral Traction. Clin Spine Surg. 2019 Dec;32(10):E474-E478

10. Sharifi B, McIntosh G, Fisher C, **Jacobs WB**, Johnson M, Bailey CS, Christie S, Charest-Morin R, Paquet J, Nataraj A, Cadotte D, Manson N, Hall H, **Thomas KC**, Rampersaud YR, Dea N: Consultation and Surgical Wait Times in Cervical Spondylotic Myelopathy. Canadian Journal of Neurological Sciences. 2019 Jul;46(4):430-435.

11. **Thomas K**, Faris P, McIntosh G, Manners S, Abraham E, Bailey CS, Paquet J, **Cadotte D**, **Jacobs WB**, Rampersaud YR, Manson NA, Hall H, Fisher CG. Decompression Alone vs Decompression Plus Fusion for Claudication Secondary to Lumbar Spinal Stenosis. Spine Journal. 2019 Oct;19(10):1633-1639

12. Yang MMH, Ryu WHA, **Casha S**, **du Plessis S**, **Jacobs WB** and Hurlbert RJ. Heterotopic Ossification and Radiographic Adjacent Segment Degeneration After Cervical Disc Arthroplasty. Journal of Neurosurgery: Spine. 2019 Aug 2;1-10. doi: 10.3171/2019.5.SPINE19257

Published Book Chapters

Published Book Chapters (Bold denotes Calgary Spine Program Faculty, * denotes Calgary Spine Fellow):

2020

1. Mothe AJ, **Casha S**, Kwon, BK. Neurochemical Biomarkers of Acute Spinal Cord Injury in Neural Repair and Regeneration after SCI and Spine Trauma Fehlings, Kwon, Vaccaro, and Oner editors Elsevier publisher, in press 2020

2. **Thomas KC**. Nonoperative and Operative Management of Paget's Disease. In The Spine. Alexander Vaccaro, Brian Su, Kazuhiro Chiba, Marcel Dvorak, H Michael Mayer, S. Rajasekaran,Luiz Vialle, Yan Wang, and Magdy Gamal Youssef (eds) pending publication by: Jaypee Brothers Medical Publishers (P) ltd.

2019

1. *Aldebeyan S, Ahn J, *Aoude A, Stacey S, **Nicholls F**: Multimodal Perioperative Blood Management for Spinal Surgery. Operative Techniques in Orthopaedics 2019 (Book Chapter)

2. **Lewkonia P**, Rawall S. Closed Management of Surgical Spine Injuries. In The Spine: Medical & Surgical Management. Alexander Vaccaro, Brian W Su, Yan Wang, Marcel F Dvorak, H Michael Mayer, Kazuhiro Chiba, Luiz Vialle, Magdy Gamal Youssef, S Rajasekaran, editors. JP Medical Publishers; 2019.

Presentations

Meeting Presentations (Bold denotes Calgary Spine Program Faculty, * denotes Calgary Spine Fellow):

2020

1. *Bond M (presenter), *Evaniew N, *Aldebeyan S, **Thomas K**, CSORN Investigator Group. Outcomes of Surgery in Older Adults with Lumbar Spinal Stenosis. Podium presentation at the Canadian Spine Society Annual Meeting, Whistler, BC, February 2020.

2. Chen T, Christie S, Yee A, Fisher C, Jarzem P, Roy JF, **Bouchard J**. A Canadian Spine Outcomes Research Network (CSORN) Matched-Cohort Study Comparing Lumbar Fusion and Disk Arthroplasty. Podium presentation at the Canadian Orthopedic Association Annual Meeting, Halifax Nova Scotia, June 2020.

3. Chen T, Christie S, Yee A, Fisher C, Jarzem P, Roy JF, **Bouchard J**. A Canadian Spine Outcomes Research Network (CSORN) Matched-Cohort Study Comparing Lumbar Fusion and Disk Arthroplasty. Podium presentation at the Canadian Spine Society Annual Meeting, Whistler, BC, February 2020.

4. Chen T, Yee A, **Bouchard J**, Christie S, Fisher C, Jarzem P, Roy JF. Two Year Results of Lumbar Disk Arthroplasty: A Canadian Spine Outcomes Research Network (CSORN) study. Poster presentation at the Canadian Orthopedic Association Annual Meeting, Halifax Nova Scotia, June 2020.

5. Chen T, Yee A, **Bouchard J**, Christie S, Fisher C, Jarzem P, Roy JF. Two Year Results of Lumbar Disk Arthroplasty: A Canadian Spine Outcomes Research Network (CSORN) study. Poster presentation at the Canadian Spine Society Annual Meeting, Whistler, BC, February 2020.

6. Chen T, Christie S, **Bouchard J**, Fisher C, Roy JF, Yee A, Jarzem P.
Predictive Socioeconomic Factors Following Lumbar Disk Arthroplasty: A Canadian Spine Outcomes Research Network (CSORN) Study. Poster presentation at the Canadian Orthopedic Association Annual Meeting, Halifax Nova Scotia, June 2020.

7. Chen T, Christie S, **Bouchard J**, Fisher C, Roy JF, Yee A, Jarzem P. Predictive Socioeconomic Factors Following Lumbar Disk Arthroplasty: A Canadian Spine Outcomes Research Network (CSORN) Study. Poster presentation at the Canadian Spine Society Annual Meeting, Whistler, BC, February 2020.

8. *Evaniew N, **Cadotte DW**, Dea N, Bailey CS, Christie SD, Fisher CG, Paquet J, **Soroceanu A**, **Thomas KC**, Rampersaud YR, Manson NA, Johnson M, Nataraj A, Hall H, McIntosh G, **Jacobs WB**. Clinical predictors of achieving Minimal Clinically Important Difference after surgery for Cervical Spondylotic Myelopathy: An external validation study from the Canadian Spine Outcomes and Research Network, Podium presentation at the 18th Annual AOSpine North America Fellows' Forum (online), May 14, 2020.

9. *Evaniew N, **Cadotte DW**, Dea N, Bailey CS, Christie SD, Fisher CG, Paquet J, **Soroceanu A**, **Thomas KC**, Rampersaud YR, Manson NA, Johnson M, Nataraj A, Hall H, McIntosh G, **Jacobs WB**. Clinical predictors of achieving Minimal Clinically Important Difference after surgery for Cervical Spondylotic Myelopathy: An external validation study from the Canadian Spine Outcomes and Research Network, Podium presentation at the Canadian Spine Society Annual Meeting, Whistler, BC. February 2020.

10. Evaniew N, Mazlouman S, Belley-Côté E, **Jacobs WB**, Kwon B. Interventions to optimize spinal cord perfusion in patients with acute traumatic spinal cord injuries: A systematic review. Canadian Spine Society Annual Meeting, Whistler, BC. February 2020.

11. Karim SM, **Jacobs WB**, Johnson M, Bailey C, Christie S, Paquet J, Nataraj A, **Cadotte D**, Wilson J, Manson N, Hall H, **Thomas K**, Rampersaud YR, McIntosh G, Dea N. Efficacy of Surgical Decompression in Patients with Cervical Spondylotic Myelopathy: Results of the Canadian Prospective Multi-Center Study. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

12. *Kassam F (presenter), *Evaniew N, **Nicholls F**, **Jacobs WB**, **Cadotte D**. Sagittal alignment in patients with cervical myelopathy and healthy controls. 18th Annual AOSpine North America Fellows' Forum (online). April 2020.

13. *Kassam F, Yach J. Significance of Extracanalicular Cement Extravasation in Thoracolumbar Kyphoplasty. Poster presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

14. *MacGregor S and **Jacobs WB**: Clinical Outcome of Posterior Cervical Foraminotomy vs. Anterior Cervical Discectomy and Fusion. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

15. *Padhye K, Peiro-Garcia A, Benavides B, **Parsons D**, **Ferri-de-Barros F**. Intraoperative skull femoral traction in adolescent idiopathic scoliosis: The correlation of traction with side bending radiographs. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

16. Sadiq I, Frederick A, *Kassam F, **Nicholls FA**, **Swamy G**, **Lewkonia P**, **Thomas KC**, **Jacobs WB**, Miller N, Tanguay R, **Soroceanu A**. Chronic Pre-operative Opioid use Associated with Higher Peri-operative Resource Utilization and Complications in Adult Spinal Deformity Patients. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

17. Tanguay R, Eckenswiller D, Yu A, Klassen K, **Lewkonia P**, **Thomas KC**, **Jacobs WB**, Miller N, **Swamy G**, Yang M, **Soroceanu A**. QI/QA of a Transitional Pain Program for Spine. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

18. Yang M, Riva-Cambrin J, Cunningham J, Jetté N, Sajobi TT, **Casha S**.
Development and validation of a prediction score for poor postoperative pain control following elective spine surgery oral presentation at Joint Section on Disorders of the Spine and Peripheral Nerves annual meeting (Spine Summit) Las Vegas 2020.

2019

1. Badhiwala JT, Wilson JR, **Jacobs WB**, Johnson MG, Bailey C, Christie SD, Charest-Morin R, Paquet J, Nataraj A, **Cadotte DW**, Manson N, Hall H, **Thomas KT**, Rampersaud YR, McIntosh G, Fisher C, Dea N: The Minimum Clinically Important Difference in Patient Reported Outcomes for Cervical Spondylotic Myelopathy: An Analysis from the Canadian Spine Outcomes and Research Network (CSORN). Poster presentation at the Congress of Neurological Surgeons Annual Meeting, San Francisco, California, October 20 – 23, 2019.

2. Evaniew N, Charest-Morin R, **Jacobs WB**, Johnson M, Bailey C, Christie S, Paquet J, Nataraj A, **Cadotte D**, Wilson JR, Manson N, Hall H, **Thomas KC**, Rampersaud YR, McIntosh G, Fisher CG, Dea N (presenter): Importance of Sagittal Alignment in Cervical Spondylotic Myelopathy: An Observational Study from the Canadian Spine Outcomes and Research Network. North American Spine Society Annual Meeting, Chicago, IL, September 27, 2019.

3. Fehlings MG, Badhiwala JH, Ahn H, Farhadi, HF, Shaffrey CI, Nassr A, Mummaneni PV, Arnold PM, **Jacobs WB**, Brodke DS, Riew KD, Kelly MP, Harrop JS, Vaccaro AR, Wilson JD, Yoon ST, Fourney DR, Kim K, Santaguida C, Kopjar B: The Safety and Efficacy of Riluzole in Enhancing Clinical Outcomes in Patients Undergoing Surgery for Cervical Spondylotic Myelopathy: Results of the CSM-Protect Double-blinded, Multi-center Randomized Controlled Trial in 300 Patients. Oral presentation at the Congress of Neurological Surgeons Annual Meeting, San Francisco, California, October 20 – 23, 2019.

4. Gum J, Serra-Burriel M, Line B, Protopsaltis T, **Soroceanu A** (presenter), Hostin Jr R, Passias P, Kelly M, Burton D, Smith J, Shaffrey C, Lafage V, Klineberg E, Kim J, Harris, A, Kebaish K, Schwab F, Bess S, Ames C. Predicting ASD Surgeries at Exceed Medicare Allowable Payment Thresholds: A Comparison of Hospital Costs to What the Government Will Actually Pay. Podium presentation at the Scoliosis Research Society (SRS), Montreal, September 2019.

5. Harris A, Neuman B, **Soroceanu A** (presenter), Hostin Jr R, Protopsaltis T, Passias P, Gum G, Gupta M, Daniels A, Shaffrey C, Klineberg E, Schwab F, Bess S, Kebaish K, ISSG. Factors Associated with Chronic Opioid Use in Preoperative Opioid Nonusers Following Adult Spinal Deformity Surgery. Podium presentation at the Scoliosis Research Society (SRS), Montreal, September 2019.

6. **Soroceanu A** (presenter), ISSG. Are Posterior Osteotomies Warranted when Managing Mild Flexible Cervical Deformity? Podium presentation at the Scoliosis Research Society (SRS), Montreal, September 2019.

7. **Soroceanu A** (presenter), Gum J, Kebaish K, Gupta M, Line B, Protopsaltis T, Passias P, Klineberg E, Bess S, Burton D, Lafarge V, Schwab F, Hostin Jr R, ISSG. Postop opioid cessation in ASD patients using opioids preop is associated with improved outcomes and satisfaction. Oral poster presentation at the North American Spine Society (NASS), Chicago, September 2019.

Grants

Active Research Grants (Bold denotes Spine Program Faculty)

1. **Cadotte D**. The Institute for Data Valorization: A Scientific and Economic Data Science Hub (IVADO). Physics-informed deep learning architecture to generalize medical imaging tasks. Co-Investigator (PI: Julien Cohen-Adad, Montreal). 2020.
   Amount $225 000

2. **Cadotte D**. Canadian Institutes of Health Research (CIHR) Project Grant: Defining the Natural History and Predictors of Disease Progression in Mild Degenerative Cervical Myelopathy: A Longitudinal Multicenter Prospective Cohort Study. Co-Principal Investigator (Lead: J.Wilson, University of Toronto). 2019. Amount $700,000

3. **Casha S**. Rick Hansen Spinal Cord Injury Registry Project 3.0 revision. Praxis Institute. 2020-2021. Amount $50,000

4. **Casha S**. Rick Hansen Spinal Cord Injury Registry Project. Principal Investigator. 2017-2020. Amount $60-72,000/yr renewable

5. **Casha S**. Source: Wings for Life Foundation. INSTrUCT-SCI: INdependent observational STUdy of Cell Transplantation in SCI. Co-applicant with A. Curt (U of Zurich) and M. Fehlings (U of Toronto). 2017-2019. Amount: €15,000 (Calgary portion $22,000 CAD)

6. Krawetz R & **Salo P**. Alberta Spine Foundation, The Regenerative Potential of Epidural Fat Stem Cells: An in vivo Study to Determine How These Cells Respond to Injury. 10/2018-09/2019. Amount $20,000

7. Matos MA (PI), **Ferri-de-Barros F** (International consultant), et al.
Critical approach about the waiting line for Adolescent Idiopathic scoliosis surgery in the Brazilian Health System. Brazilian Ministry of Health, Brazilian Ministry of Science and Technology, Brazilian National Council of Research (CNPq), Brazilian Spine Society (SBC). Amount R$ 270,000 ($62,000 CAD)

8. Meves R (PI), Matos MA (National consultant) **Ferri-de-Barros F** (International consultant), et al.
National registry of scoliosis in children (Brazil). Medtronic. Brazilian Spine Society. Amount R$ 240,000 ($55,000 CAD)

9. **Nicholls F**. Analysis of the Implications of Lumbopelvic Alignment on the Alignment of the Cervical Spine:
    - Fraternal Order of Eagles Spine Grant $20,000.00
    - McCaig Catalyst Grant $30,000.00
    - Division of Orthopaedic Surgery $30,000.00
    - Total Funding: $80,000.00

10. **Nicholls F**. Normative Relationship of Spino-Pelvic Alignment to Femoral-Acetabular Orientation:
    - Alberta Spine Foundation Grant $20,000.00
    - COREF Grant $9,875.00
    - Total Funding: $29,875.00

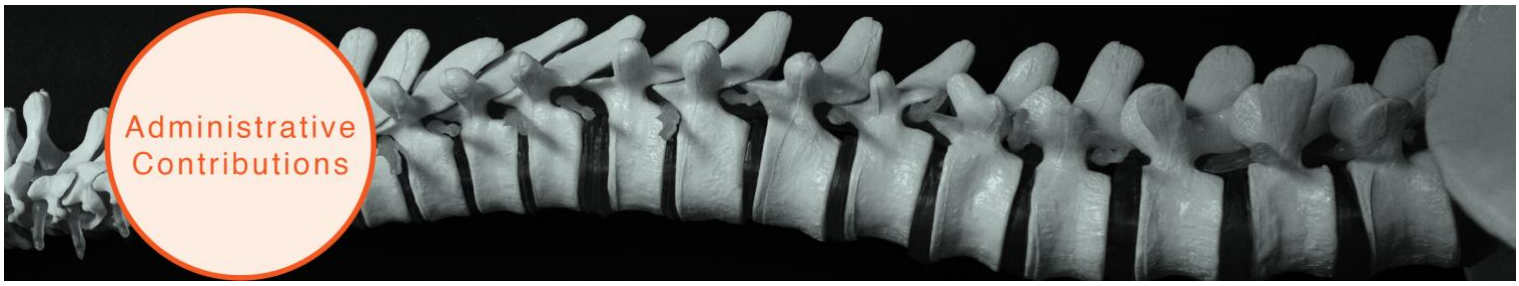
11. Noel, M (PI), Brindle M, Chorney J, Katz J, Lebel C, Moayedi M, Mychasiuk R, Rasic N, Sumpton J, Vinall J, Williamson T, **Ferri de Barros F**, **Parsons D**. Elucidating the Role of Memory in the Transition from Acute to Chronic Pediatric Pain. Canadian Institutes of Health Research Project Scheme Grant. 2020-2025. Amount $661,725

12. **Swamy G**, Duncan N, Matyas J, **Salo P**, Hart D. Are Sex-Differences in Degenerative Spondylolisthesis and Degenerative Scoliosis Explainable by Mechanical Differences in the Post-Menopausal Intervertebral Disc? Amount $70,000.
    - Alberta Spine Foundation & McCaig Institute Clinician-Scientist Grant ($20000)
    - Fraternal Order of Eagles Grant – to supervise B. Heard ($20000)
    - Faculty Seed Grant Div Orthopaedics ($20000)
    - McCaig Clinician-Scientist Grant ($1000)

13. **Swamy G**. Alberta Spine Foundation. Can automated imaging analysis of multi-modality spinal imaging be more reliable than human assessors in the CSORN degenerative spondylolisthesis investigation? Amount $40,000

14. **Swamy G**, **Salo P**. Alberta Spine Foundation & McCaig Institute Encore Grant 2018 (awarded to co-author P. Salo). Can Systemic Inflammatory Profiles predict natural history of lumbar disc herniations? Amount $60,000

15. **Thomas K**, Ben-Israel D, Spackman E. Alberta Spine Foundation: Annual Grant Competition 2019. Evaluating the optimal timing of surgery for symptomatic lumbar disc herniation: a cost-effectiveness analysis. Amount $20,000



Regional

Bouchard J. Faculty advisor University of Calgary, 2001 to present

Bouchard J. Medical student Appeals Committee, 2009 to present

Bouchard J. Postgraduate Medical Education Committee (2019 to present)

Bouchard J. Surgical Foundations Competence Committee (2018 to present)

Bouchard J. Orthopedic Surgery Competence Committee (2018 to present)

Bouchard J. Orthopedic Surgery Residency Training Committee (2018 to present)

Bouchard J. Surgical Foundations Faculty Advisor (2018 to present)

Cadotte D. Spinal Cord Injury Advisory Committee, Alberta Health Services, Foothills Medical Centre (September 2020 - ongoing)

Cadotte D. Brain and Mental Health Research Committee, Hotchkiss Brain Institute, University of Calgary, 2017 – present

Casha S. Head, Division of Neurosurgery, Department of Clinical Neurosciences, University of Calgary

Ferri-de-Barros F. Pediatric spine fellowship director, Alberta Children's Hospital, University of Calgary, 2011 to present

Jacobs WB. Associate Residency Program Director, Division of Neurosurgery, Department of Clinical Neuroscience, Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada, 2019 to 2020

Jacobs WB. Chairperson, University of Calgary Spine Program, Calgary, Alberta, Canada. 2019 to present

Jacobs WB. Neurosurgery Residency Competency by Design Director, Division of Neurosurgery, Department of Clinical Neuroscience, Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada. 2018 to 2020

Jacobs WB. Chair, Division of Neurosurgery Competence Committee, 2019 to present

Jacobs WB. Member, Division of Neurosurgery AMHSP Management Committee, 2017 to 2019

Jacobs WB. Member, Division of Neurosurgery Residency Program Committee, 2016 to present

Jacobs WB. Member, Surgical Undergraduate Medical Education Committee, Faculty of Medicine, University of Calgary, 2013 to 2020

Jacobs WB. Organizing Committee, Chair, University of Calgary Spinal & Peripheral Nerve Anatomy and Surgery Annual National Residents Course, 2009 to present

Lewkonia P. Co-Lead, Foothills Medical Centre Orthopaedics Quality Improvement, 2020 to present

Lewkonia P. RCPSC Orthopaedic Surgery examiner, 2019 to present

Lewkonia P. Orthopaedic Surgery Residency Assistant Program Director, 2020 to present

Lewkonia P. Lead, Foothills Medical Centre Orthopaedic Spine Program, 2018 to present

Lewkonia P. Course II Director, Undergraduate Medical Education, University of Calgary, 2015 to 2020

Nicholls F. Second Annual Calgary Spine Program Operating Room Nursing Course, Foothills Medical Centre, 2019-2020

Salo P. Site Chief, Section of Orthopaedics, Foothills Medical Centre, 2011 to present

Salo P. Acting Chair, McCaig Institute Research Committee, 2018 to present

Salo P. Faculty Research Director, Section of Orthopaedics, 2014 to present

Salo P. Co-Chair Research Portfolio, Section of Orthopaedics, Foothills Medical Centre

Salo P. Member, Operations Committee, Section of Orthopaedics, Foothills Medical Centre

Salo P. Member, Combined Orthopaedic/Neurosurgical Spine Program, Foothills Medical Centre

Salo P. Member, Research Committee, McCaig Institute for Bone and Joint Health, 1998 to present

Salo P. Member, Clinical Investigator Program Residency Training Committee, 2015 to present

Soroceanu A. Orthopaedic Research Portfolio Committee – Spine representative

Soroceanu A. Adult Spinal Deformity Committee, Foothills Medical Centre

Thomas K. Orthopaedic Residency Ombudsman, 2006- present

Thomas K. Chair of Spine Research, University of Calgary Spine Program, 2018 to present

Provincial

Jacobs WB. Provincial Neurosurgery Representative to Alberta Medical Association, 2017 – present

Lewkonia P. Alberta Health Evidence and Review, Alberta Health Panel (Back Pain), 2020 to present

Lewkonia P. Clinical Systems Design Clinical Lead, Connect Care (Orthopaedics), Alberta Health Services, 2018 present

Lewkonia P. Surgery Area Council, Connect Care, Alberta Health Services, 2018 present

Lewkonia P. Alberta Pain Strategy Spine Representative, Alberta Health Services, 2018 present

Thomas K. Low Back Pain Expert Advisory Group for Alberta Health, 2020-persent

Thomas K. Tri-lead of the Bone and Joint Health Strategic Clinical Network – MSK Transformation-Spine Health Work Group. 2019 to present

Thomas K. President, Alberta Spine Foundation. 2018 to 2020

National

Bouchard J. Royal College of Physicians and Surgeons of Canada: Program survey team

Bouchard J. Royal College of Physicians and Surgeons of Canada: Vice-chair, Orthopaedic Surgery Specialty Committee, June 2016 to present

Bouchard J. Royal College of Physicians and Surgeons of Canada: Surgical Foundations Advisory Committee collaborator

Cadotte D. National Technical Advisory Committee, Rick Hansen Institute (Praxis) and Canadian Spine Outcomes Research Network (2020 - ongoing)

Casha S. CIHR Collaborative Health Research Projects – NSERC Partnered peer review panel member. January 2014 to present

Casha S. Rick Hansen Institute Cure Program Advisory Committee member. October 2013 to 2019

Ferri-de-Barros F. Canadian Pediatric Spine Society, President, 2019 to 2021

Ferri-de-Barros F. Member of the subcommittee of the Canadian Pediatric Spine Study Group for the pediatric spine registry initiative, March 2014-present

Nicholls F. Program Committee – Canadian Spine Society Annual Meeting, 2020

Soroceanu A. Canadian Spine Society (CSS), Executive Committee – Member at large, 2020- present

Soroceanu A. Canadian Spine Outcomes and Research Network (CSORN), Lead – Data Quality Taskforce, 2018-present

Soroceanu A. Canadian Spine Society, Scientific Program Committee, 2016 to present

Thomas K. Canadian Spine Society Secretary/Treasurer Designate, 2020 – 2022

Thomas K. RCPSC Orthopaedic Surgery Speciality Committee, Member. 2019 to present

Thomas K. Data Quality and Cleaning Task Force, Canadian Spine Research Outcomes Network. 2018/19/20

Thomas K. Examiner, Royal College Physicians and Surgeons - Orthopaedic Surgery. 2018, 2019

Thomas K. Canadian Spine Research Outcomes Network(CSORN), Board Member, 2012 to present

Thomas K. Canadian Spine Society Executive Committee Board Member, Inter-professional Liaison, 2017-2020

International

Bouchard J. Research Committee, SAS (Society for the Advancement of Spine, Spine Arthroplasty Society), Member

Bouchard J. International Competency Based Medical Education study group, Member

Bouchard J. Continuing Medical Development Committee, North American Spine Society

Cadotte D. FIENS, the Federation for International Education in Neurological Surgery Communications committee, March 2013-present

Casha S. AANS and CNS joint guidelines committee member, 2011 – present

Ferri-de-Barros F. Member of the Heath Policy and Quality Committee for Scoliosis Research Society (SRS), 2017-present

Ferri-de-Barros F. Member of the Quality Safety and Value (QSVI) committee (Spine-subgroup), POSNA, March 2015-present

Jacobs WB. AOSpine North America Nominating Committee, Member, 2019

Jacobs WB. Scientific Program Committee, Member, 2020 Annual Meeting of the AANS/CNS Section of Disorders of the Spine and Peripheral Nerves

Jacobs WB. AOSpine International Diploma Curriculum Committee, Member, 2018 – present

Jacobs WB. Research & Awards Committee, AANS/CNS Section of Disorders of the Spine and Peripheral Nerves, Member, 2018 – present

Jacobs WB. AOSpine North America Curriculum Planning Committee, Member, 2017 – present

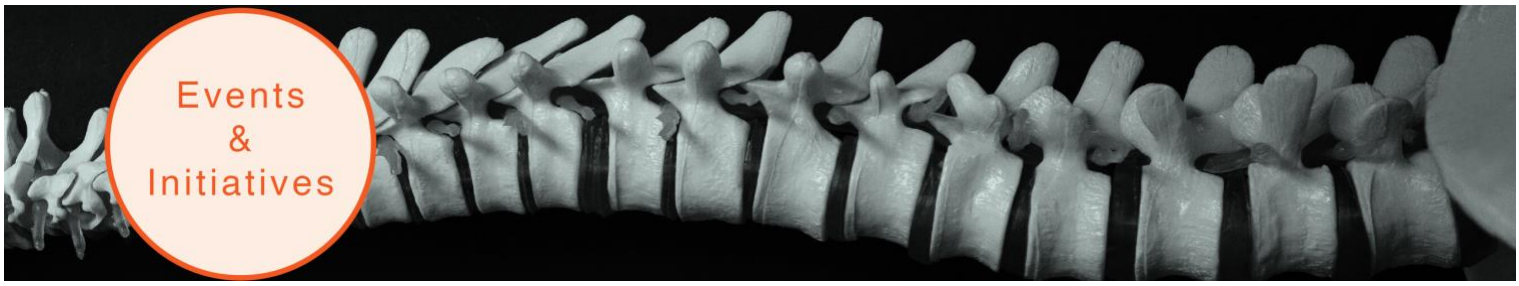
Jacobs WB. Member, Executive Committee, AANS/CNS Section of Disorders of the Spine and Peripheral Nerves, 2015 – present.

Lewkonia P. AO Spine North American Faculty, 2018 to present

Nicholls F. Global Spine Congress, Program Committee, 2019, 2020

Soroceanu, A. SRS/CSRS Cervical Deformity Task Force, 2020- present

Soroceanu, A. International Spine Study Group (ISSG) Complications Committee – member, Cervical Deformity Committee – member, Realignment Committee – member, 2013-present



Canadian Spine Society

In 2020, the Canadian Spine Society (CSS) meeting was held in Western Canada. Many members of our program, representing both neurosurgery and orthopedic surgery, attended the annual meeting at the Fairmont Chateau Whistler in British Columbia. In addition to consultant presentations, our Residents, Fellows and Students presented the following:

- *Bond M (presenter), *Evaniew N, *Aldebeyan S, **Thomas K**, CSORN Investigator Group. Outcomes of Surgery in Older Adults with Lumbar Spinal Stenosis. Podium presentation at the Canadian Spine Society Annual Meeting, Whistler, BC, February 2020.

- *Evaniew N, **Cadotte DW**, Dea N, Bailey CS, Christie SD, Fisher CG, Paquet J, **Soroceanu A**, **Thomas KC**, Rampersaud YR, Manson NA, Johnson M, Nataraj A, Hall H, McIntosh G, **Jacobs WB**. Clinical predictors of achieving Minimal Clinically Important Difference after surgery for Cervical Spondylotic Myelopathy: An external validation study from the Canadian Spine Outcomes and Research Network, Podium presentation at the Canadian Spine Society Annual Meeting, Whistler, BC. February 2020.

- *Evaniew N, Mazlouman S, Belley-Côté E, **Jacobs WB**, Kwon B. Interventions to optimize spinal cord perfusion in patients with acute traumatic spinal cord injuries: A systematic review. Canadian Spine Society Annual Meeting, Whistler, BC. February 2020.

- *Kassam F, Yach J. Significance of Extracanalicular Cement Extravasation in Thoracolumbar Kyphoplasty. Poster presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

- *MacGregor S and **Jacobs WB**: Clinical Outcome of Posterior Cervical Foraminotomy vs. Anterior Cervical Discectomy and Fusion. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

- *Padhye K, Peiro-Garcia A, Benavides B, **Parsons D**, **Ferri-de-Barros F**. Intraoperative skull femoral traction in adolescent idiopathic scoliosis: The correlation of traction with side bending radiographs. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

- Sadiq I (presenter), Frederick A, *Kassam F, **Nicholls FA**, **Swamy G**, **Lewkonia P**, **Thomas KC**, **Jacobs WB**, Miller N, Tanguay R, **Soroceanu A**. Chronic Pre-operative Opioid use Associated with Higher Peri-operative Resource Utilization and Complications in Adult Spinal Deformity Patients. Oral presentation at the 20th Annual Meeting of the Canadian Spine Society, Whistler, British Columbia, February 26 – 29, 2020.

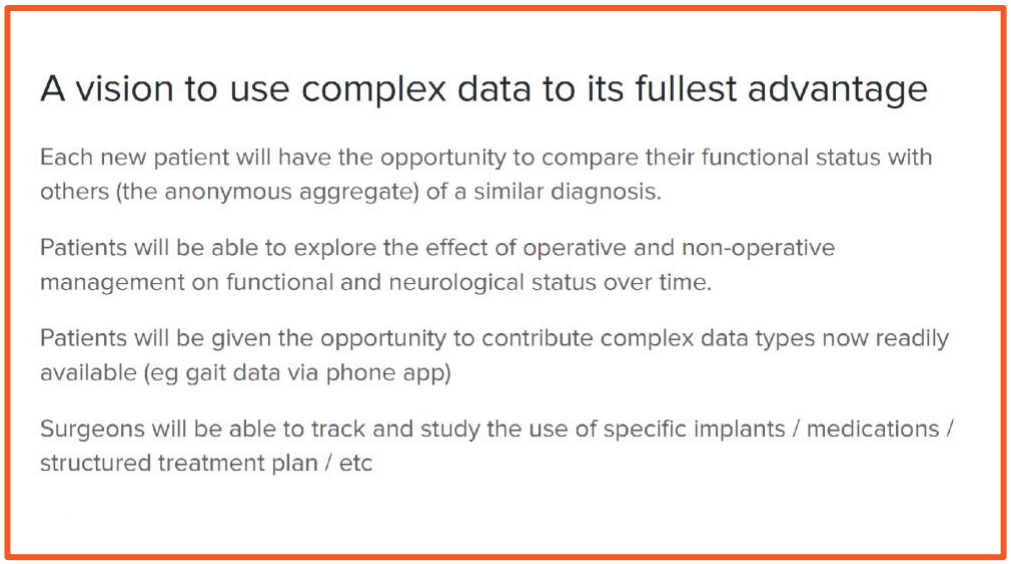

SHORT-TERM COMPLICATIONS IN
MAGNETICALLY
GROWING RODS TO

Canadian Spine Society Data Strategy – Dr. David Cadotte

presented at the Canadian Spine Society Annual Meeting, Whistler, BC

Goals:

- To collect, curate, analyze and present multi-parametric data important to the study of spinal disorders.
- To deliver a personalized report to each patient summarizing
    - their symptoms and quality of life at the time of triage
    - their specialised diagnosis (current studies include cervical myelopathy, acute sciatica, back pain and deformity)
- To educate medical specialists and the general public on spinal disorders in their community and options to improve their quality of life
- To deliver structured data reports to treating surgeons at the time they need it - at the point of triage, specialized diagnosis or longitudinal follow-up
- To build machine learning algorithms that answer patient-focused questions
- To build deep learning algorithms for advanced imaging analytics



Timelines:

Calgary

- 2020 Office of the Information and Privacy Commissioner of Alberta - approval
- 2020-2021 patient derived data collected for triage and cervical myelopathy
- 2021 delivery of personalized reports to patients
- 2021 v1 of ML algorithm to triage patients and cervical myelopathy predictions
- ? 2022-2023 deliver predictive algorithms to patients

National level

- Plan for at least 2-3 years preparation; Calgary model will mature / make all the mistakes!

Alberta Spine Foundation

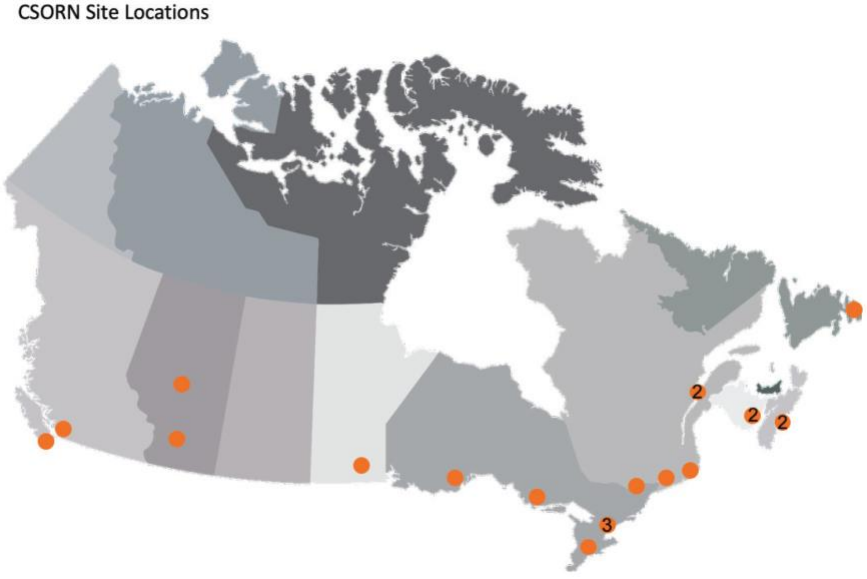
The Alberta Spine Foundation (ASF) is a non-profit organization that was established by the members of the University of Calgary Spine Program and the members of the University of Alberta Spine Program. The objective of the ASF is to advance the delivery of spine care in Alberta through innovative clinical care, focused education and academic collaboration.

The ASF is committed to appropriate high-quality spine care through the development of innovative patient care and referral modes.

- Through our fellowship positions, we offer newly qualified orthopedic surgeons and neurosurgeons, the opportunity to develop advanced management of complex spine disorders.
- The ASF is actively involved in research through its members. The ASF financially supports clinical and basic science research. The ASF supports research where multiple care providers collaborate.

Canadian Spine Outcomes Research Network (CSORN)

Under the guidance of Local PI, Dr. Alex Soroceanu, the program continues to contribute to the Canadian Spine Outcomes Research Network (CSORN), the national spine registry of the Canadian Spine Society. CSORN now contains more than 11,000 enrolments with 1237 added in 2020. The Network contains a variety of spine diagnoses and surgical procedures and reflects a predominantly stenotic cohort of patients. There were 209 enrollments added to the prospective studies in 2020. From baseline to 3-month follow up, pain ratings improved and overall patient satisfaction with spine surgery was high. There have been 7 studies published in peer-review medical journals this year. CSORN research initiatives including abstracts and presentations at scientific conferences were abundant once again in 2020.



Our site enrolled 441 patients into CSORN over the last year with 12 surgeons enrolling consecutive patients. Some are enrolling all eligible surgical patients and others for specific diagnoses only (i.e. CSM). Last year, 73% of our CSORN patients were enrolled from Caleo health, a multi-disciplinary clinic in the Northwest. 27% of our CSORN patients were enrolled from clinics at Foothills Medical Centre or University of Calgary.

We continue to focus on collecting high quality data, prioritizing form completion and ongoing patient follow-up with good results. Our completion rates are as follows:

- 6-18-week follow-up 95%
- 1-year follow-up 95%
- 2-year follow-up 92%

In addition to our participation in national CSORN sub-studies for cervical myelopathy and degenerative spondylolisthesis, several local prospective and retrospective studies are also underway/completed including:

- Natural History of Mild Degenerative Cervical Myelopathy: an observational study.
  Dr. David Cadotte

- Midterm outcomes of anterior lumbar disc replacement: a comparison between stand-alone disc replacement and hybrid anterior fusion and disc replacement.
  Dr. Jacques Bouchard

- Quantifying chronic opioid use in adult spine deformity patients
  Dr. Alex Soroceanu

Rick Hansen Spinal Cord Injury Registry

The University of Calgary combined spine program has been an active participant in the Rick Hansen Spinal Cord Injury Registry (RHSCIR) since 2014. Eight hundred and twenty-five new patients have been enrolled through this site, contributing data on acute care and rehabilitation metrics and outcomes. Our program is also an active participant in multi-site sub-study collaborations within the registry, recruiting patients specifically to these initiatives and collecting additional data for those research questions. Recent and on-going projects include Gastrointestinal and Urinary Tract Microbiome after Spinal Cord Injury, Acceptance and Empowerment after Spinal Cord Injury, Liberation from Mechanical Ventilation and implementation of registry collected key performance indicators in spinal cord injury care in Alberta. In addition, the Calgary program has undertaken new studies and innovations in this patient population including: the phase III Minocycline in Acute Spinal Cord Injury (MASC) clinical trial, and the creation of a cerebrospinal fluid and serum tissue bank for the study of biomarkers. Current new activities in this initiative include participation in a multicenter study examining the use of Nerve Transfers to Improve Upper Extremity Function and Quality of Life in Tetraplegic Patients and application of epidural stimulation to restore hemodynamic stability following spinal cord injury.

Innovations

dScoli / dSpondy study

Do women have it harder in life? Certainly, when it comes to spinal deformity, they do!

Scoliosis occurs in adolescents (Adolescent Idiopathic Scoliosis) and in adults (degenerative Scoliosis), and the etiology is unknown. While a mechanical hypothesis exists for both AIS and dScoli, the predominantly female prevalence (~90% for both) remains underexplored. In addition, approximately 70-75% of patients with degenerative Spondylolisthesis (dSpondy) are women. There are some suggestions of sex hormone involvement, but the basic molecular mechanisms are unknown. dScoli/dSpondy also occur around the time of menopause, which further raises sex hormone involvement.

The central tenet of our investigations is to understand why some females are predisposed to this problem. We feel that there should be a mechanical difference in the intervertebral disc (IVD). Our center is well-suited for such an investigation. With engineers and scientists of the McCaig Institute for Bone and Joint Health a walk away, surgeons can collaborate to answer questions.

Taylor is our first graduate student in this study, and he has undertaken a Masters' level project. He is tasked with collecting IVD from our anterior cases, evaluating the mechanical properties in the biomechanics lab, and then further examining structure-function relationships. We will be using histomorphology to grade the IVDs, and then query the tissues with immunohistochemistry (for estrogen receptors), histochemistry (for collagen breaks and elastin distribution) and gene expression analyses. We have also received some funding to evaluate for epigenetic changes and examine differential gene methylation in these tissues.

We hope that his project will set the stage for further, more hypothesis-driven investigations to understand why this sexual dimorphism exists. By the time Taylor finishes in 2023, we will have established possibly the largest IVD tissue bank for dScoli and dSpondy tissues. Hopefully with further collaborations with David Cadotte and his informatics team, this tissue bank will be a valuable resource for researchers.

Dr. Ganesh Swamy

Access of Care for Children & Youth with Scoliosis

Children with scoliosis have a delay in diagnosis and access to specialist care. This delay leads to missed opportunities for simple and inexpensive treatment. The missed opportunity is leading to much more complex spine problems, which cost millions of dollars to our health care system and which have caused preventable suffering to children and youth with spinal deformity.

This is a problem in Canada, and a much bigger problem in low- and middle-income countries. In Canada, one of the main concerns is the disconnect between primary care (e.g. family doctors or paediatricians), radiologists and specialists. Also concerning is the long waiting times for specialized treatment. In Calgary, we have made progress integrating primary care, radiologists and specialist care; however, there is certainly room for improvement with continuing education.

Assessment by a primary care physician is a critical step to confirm the diagnosis and to ensure that there are no other associated health problems. This includes:

Surveillance for kids 10-16 years old
Clinical diagnosis Adam's test Scoliometer >7 degrees
Neuro Exam
Standard 3" PA spine radiographs
Observation 10-20 degrees

Children who are still growing from their spines and who have scoliosis over 20 degrees, may benefit from brace treatment. The goal is to prevent aggravation of the spinal deformity. Full time bracing can prevent the need for surgery and this is a time-sensitive intervention

A similar program integrating primary and tertiary care is now being pilot tested with our spine partners in Brazil. The goal is to strengthen primary care surveillance and manage eligible children and youth with scoliosis through educational tools.

Refer to the following video for more information: www.ahs.ca/scoliosis

Dr. Fábio Ferri,
Alberta Children's Hospital

Transitional Outpatient Pain Program for Spine (TOPPS)

The Transitional Outpatient Pain Program for Spine Surgery (TOPPS) is an interdisciplinary outpatient transitional pain program based at Caleo Health in Calgary. Patient centered individual care is provided through a team based-model involving pain physicians, surgeons, addiction medicine specialists, psychiatrists, nurse practitioners, physiotherapists, and kinesiologists.

The TOPPS program was developed by Dr. Rob Tanguay (Psychiatry) in cooperation with the Adult Spinal Deformity surgery group at Foothills Medical Center in late 2017.

The Adult Spinal Deformity and Spine surgery group refer the pre-operative and post- operative patients directly to the TOPPS program with the goal of addressing psychological risk factors associated with poor surgical outcomes and recovery from spinal pain. Where possible the program is started prior to elective surgery and has two parts:

Part 1: Pre-operative phase

The pre-operative phase is 12 to 24 weeks in duration, and includes an educational session and 4 weeks of Acceptance and Commitment Therapy (ACT) with the following goals:

1. Opioid tapering (reduction or cessation)
2. Reduction of pain behaviors
3. Reduction of kinesiophobia
4. Treatment of Psychiatric Co-morbidities

Part 2: Post-operative phase

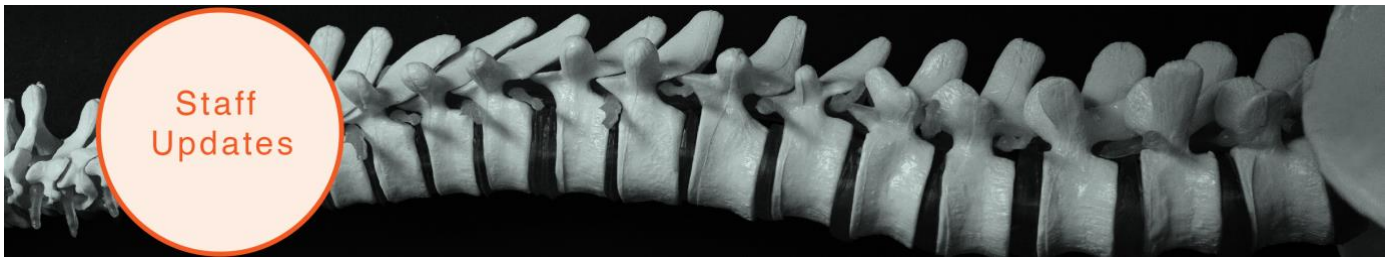
Patients are followed in the post-operative period by members of the TOPPS program to ensure their analgesic needs are met before transitioning to their primary care physician. The TOPPS program assumes all opioid prescriptions from the time of discharge from the hospital up to 24 weeks postoperatively for opioid discontinuation. Post-operative physiotherapy is also initiated. Psychiatric co-morbidities are assessed and treated. Pain is assessed and treated. Once the patient has been tapered off all opioids, or to the lowest effective dose, the patient is then transferred back to primary care with access to telephone consultation services for the primary care physician to ensure a smooth transition in care.

In 2020, the TOPPS program transitioned to provide group therapy and appointments remotely. The program is currently run by Dr. Denise Eckenswiller MD, PhD, CCFP, and Dr. Elias Soumbasis MD, CCFP, Dip Anesthesia. Dr. Rob Tanguay continues to act as the consulting Psychiatrist for the program.

Who can be referred to TOPPS?

- Any patient can be referred and will be triaged based on their baseline questionnaire, priority will be given to surgical patients.
- Refer early - a minimum of 3 months before surgery if possible.
- Post-op patients can be referred and will be triaged by the TOPPS team.

Dr. Denise Eckenswiller



Profile – Brooke Nowicki

Brooke Nowicki,
Manager Clinical Neurosciences
AHS Liaison

Tell us about your background with AHS

I started with AHS (formerly Calgary Health Region) in 2004 working on a few post-operative nursing units in Calgary. In 2005 I moved to the emergency department at the FMC and worked there on and off until 2016. During that time, I also worked as the nurse clinician for Pulmonary Central Triage at PLC, was an FMC Site manager, and worked as a senior consultant for AHS Process Improvement.

How were you first introduced to the spine program?

I was hired as the unit manager for 101 in November 2016, but my first introduction to the spine program-or spine patients-was in the fall of 2004 when unit 101 first opened. I was one of the first nurses who was hired to work there.

Tell us about your current role

My official title is manager for units 101, 112 (hyper acute neurosurgery) and the Calgary Spine program. I oversee the operations for both of these 2 units, which means I lead the nursing and support staff in taking care of the specific patient populations. My role for the Calgary Spine program is to be the liaison between operations and clinical work for anything spine related-from individual patient concerns, to quality improvement for all of spine patients.

What are the current initiatives you're working on?

Enhanced Recovery After Surgery (ERAS) for lumbar spine patients, developing data reports within Connect Care (both clinical and administrative), Alternative Level of Care (ALC) coding to ensure our spine LOS is an accurate reflection of current state, Team to Team Communication project-looking at how all of the team members pass information about the patient amongst themselves, where are our gaps, and what improvements can we make?

Farewell to Ariana Frederick

Ariana joined us in 2017 with the goal of expanding her work experiences within the clinical research realm. After joining the program, her primary focus became the collecting and analyzing outcomes for the adult spinal deformity group. She was an integral part of their multi-disciplinary approach to spinal deformity care.

Additionally, she worked closely with Dr. Fred Nicholls on the LACS study, with the goal of establishing normative values for alignment of the cervical spine in a healthy population.

We appreciated her eagerness to learn, her problem-solving capabilities and her calming demeanor.

Congratulations to Ariana and Jon on the addition of Tessa Rae to your family. We wish you all well as you travel to Oxford to begin your next adventure in the United Kingdom.

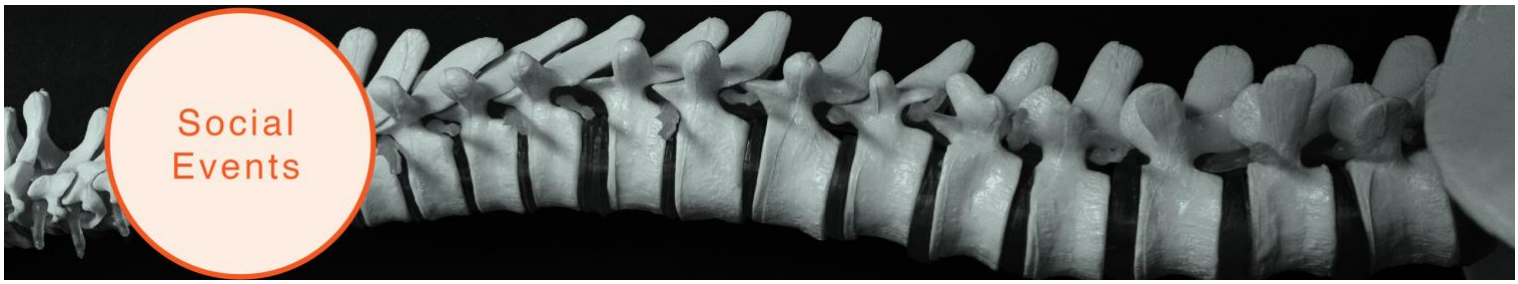
Ariana Frederick, Research Coordinator

New Staff

Vicki comes to us from both a clinical and a research background. She has a BSc, MSc, and a PhD in Psychology, all from the University of Calgary, with a specialization in Behavioural Neuroscience. Specifically, she studied Circadian Rhythms, investigating the neurobiology and neurochemistry involved in the adjustments in circadian timing inherent to Rotating Shift Work and Jetlag. She has also been a part-time lecturer at several universities around southern and central Alberta, including the University of Calgary and Mount Royal University (among others), teaching numerous undergraduate courses in Psychology as well as Behavioural Neuroscience.

She previously worked as a lab manager and researcher in the field of Circadian Rhythms at the University of Calgary, as well as in the position of Nutrition and Research Associate in a Large-Animal Nutrition practice. Subsequently, she worked for several years as a clinic manager at a Rural Family Medicine practice in Didsbury, Alberta. Vicki joined the Spine Program in July 2020 with the goal of combining her passion for research with her experience in the clinical side of medicine. Since joining the program, she has developed a specific interest in adult spinal deformity outcomes.

Victoria Smith, Research Coordinator



Holiday Party 2019

Our last group social event prior to the COVID-19 restrictions, took place December 7, 2019 at Elbow Room in Britannia. It gave us the opportunity to wish Dr. Stuart McGregor well as he began his career in Sudbury, Ontario.

We look forward to a time when we can celebrate together again.