

ANNUAL REPORT SPINE



UNIVERSITY OF
CALGARY
SPINE PROGRAM

2017-2018



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Dr. Ken Thomas Program Chairman

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 bedside clinical care.

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

The Spine Program provides care for patients with spinal 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.



Our program offers a comprehensive Spine Surgery Fellowship training under the leadership of Dr. Steve Casha. The spine Fellowship at the University of Calgary is a combined Orthopaedic and Neurosurgical clinical experience with the goal of training Orthopaedic and Neurosurgical surgeons in the diagnosis and management of diseases of the entire spine. Trainees gain a breadth of experience with anterior and posterior approaches to all regions of the spine for both less-invasive and open procedures.

Dr. Brad Jacobs leads our research program with current projects underway concerning topics ranging from spinal cord injury/regeneration to recent advancements in minimally invasive techniques. In addition, our program is participating in a Nation-wide spine surgery registry that allows Canadian centers to collect a common dataset and thus collaborate in pertinent national spine research and advocacy. We are proud of the University of Calgary Spine Program and grateful to those surgeons, allied health providers, administrators and industry partners who paved the way for what it is today.



- **Surgical Staff**

- Dr. Ken Thomas, Program Chairman
- Dr. Richard Hu
- Dr. Paul Salo
- Dr. Stephan du Plessis
- Dr. Jacques Bouchard
- Dr. Roger Cho
- Dr. Steven Casha
- Dr. Ganesh Swamy
- Dr. David Parsons
- Dr. W. Bradley Jacobs
- Dr. Fabio Ferri-de-Barros
- Dr. Peter Lewkonja
- Dr. Alex Soroceanu
- Dr. Fred Nicholls

- **Allied Health**

- 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
- Nicole Miller, Orthopedics

- **Research Staff**

- Tara Whittaker, Research Nurse
- Ish Bains, Research Coordinator
- Saswati Tripathy, Research Coordinator
- Ariana Frederick, Research Assistant

• Spine Fellows

- Dr. Patricia Sirois
- Dr. Felipe Nares
- Dr. Christos Zafeiris
- Dr. Duncan Cushnie
- Dr. Alisson Roberto Teles
- Dr. Alejandro Peiro Garcia (ACH)

• Neurosurgery Residents 2017-2018

- Ahmed Alaqeel (R6)
- Michael Avery (R6)
- Michael Opoku-Darko (R6)
- Andrew Ryu (R6)
- Albert Isaacs (R5)
- Stevan Lang (R5)
- Rita Nguyen (R5)
- Candice Poon (R5)
- Michael Yang (R5)
- Magalie Cadieux (R4)
- David Ben-Israel (R4)
- Sandeep Muram (R3)
- Nicholas Sader (R3)
- Madeleine de Lotbiniere-Bassett (R2)
- Matthew Eagles (R2)
- Abdulrahman Albakr (R1)
- Benjamin Beland (R1)

• Orthopaedic Residents 2017-2018

- David Cinats (R5)
- Denis Joly (R5)
- Pierre Zaharia (R5)
- Sahil Kooner (R4)
- Jeremy Kubik (R4)
- Cory Kwong (R4)
- Alexander Meldrum (R4)
- Spencer Montgomery (R4)
- Jonathan Bourget-Murray (R3)
- Eva Gusnowski (R3)
- Joseph Kendal (Research)
- Kate Thomas (R3)
- Lee Fruson (R2)
- Madison Litowski (R2)
- Sarup Sridharan (R2)
- Daniel You (R2)
- Michael James (R1)
- Taryn Ludwig (R1)
- Jennifer Purnell (R1)
- Murray Wong (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. Over two thousand 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. The spine team performs over 100 paediatric spine surgeries per year.

South Health Campus

South Health Campus (SHC) is a healthcare facility located in SE Calgary. Day surgery spine procedures are being performed there including lumbar decompressions and discectomies. Drs. Bouchard, Casha, Cundal and Thomas have completed surgical procedures at SHC. As the SHC has become busier, available OR time for spine procedures has diminished.

Canadian Surgical 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 and Dr. Paul Salo perform spine cases for the Workers Compensation Board.

Consultation Services:

Caleo Health – Dr. Mark Lewis

The spine triage process experienced **only** slight changes in 2018. Wait times to spine assessment increased from approximately 2-3 months to approximately 4-5 months

Wait times to surgical consult decreased for most of the surgeons, from approximately 18 months to approximately 8-10 months.



A pre-spine assessment education session was introduced in September 2017. This session offers information regarding the spine assessment process and addresses patient expectations. The sessions also provide pain management and opioid use education. The sessions are offered to all patients that have registered for a spine assessment. Approximately 20% of patients took advantage of the sessions in 2018. Other aspects of the spine assessment process have stayed relatively the same. Several members of the spine program see patients through the Caleo Health's outpatient facilities including: Dr. Hu, Dr. Bouchard, Dr. Cho, Dr. du Plessis, Dr. Thomas, Dr. Swamy, Dr. Lewkonja, Dr. Nicholls and Dr. Soroceanu.

Summary of spine assessment information:

- The Triage team consist of 4 Spine Triage Physicians & 4 Allied Health Professionals (3 Physiotherapists and 1 Chiropractor).
- Caleo received approximately 5000 referrals in 2018.
- 2238 patients registered online for a spine assessment. Another ~ 450 registered manually in 2018. ~2200 spine assessments were completed at Caleo Health in 2018. 4036 spine follow-ups were completed at Caleo Health in 2018 (medical appointments with the triage physicians).
- Caleo health has averaged 3000 to 3500 spine assessments per year for the past 10 years.
- Caleo Health has cancelled 2293 spine referrals in 2018 (approximately 1500-1800 spine referrals are processed then cancelled per year). The numbers relate directly to patients that have cancelled their appointment or did not register for the spine assessment. Some patients do return to register at a later date.
- Currently referring physicians/healthcare providers are notified within 1-2 weeks of the time the referral was received and accepted at Caleo Health (referral received confirmation).
- Currently patients are provided their spine assessment appointment date within 5-10-business days of completing registration.
- Currently the wait time from the completion of registration to the spine assessment appointment is 4-5 months.
- Currently referring physicians/healthcare providers are notified within 1-2 days of an appointment being scheduled for their patient (appointment confirmation).
- It is difficult to determine the wait time from referral to appointment because the rate at which people choose to register is variable.
- Approximately 45-50% of the patients assessed require further referral to a spine surgeon.
- Approximately 65% of the patients referred to the surgeon go on to require surgery (up from the 15-20% surgical yield prior to the triage process).
- Wait-times to surgical consult have decreased for some of the surgeons to approximately 6-8 months.

12th Floor Neurosurgery Clinic – Dr. Stephan du Plessis

The Spine Triage and Assessment Clinic (STAC) was implemented on the 12th floor of the Foothills Hospital to decrease wait times for neurosurgical spine consultations, which had reached unacceptably long levels. The primary function of the clinic is to provide triage and assessment to residents of Southern Alberta and to determine if patients are surgical candidates (probable and possible) or not. Early identification of both surgical and non-surgical candidates facilitates the management of both surgical and non-surgical patients and leads to efficient 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.

While progress has been made, the STAC has several challenges moving forward including clinic rooms, surgical presence and eventually more surgical time which have been identified as priorities. We are grateful for our Physiatry partners from Kinesis, our clinical assistants and administrative assistants for their committed efforts and ongoing support.

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 22 months.

Surgical Activity:

Alberta Health Services (all sites)

Overall by Procedure Code

Surgeries from 1-Jul-2017 to 30-Jun-2018

LEVEL	PROCEDURE GROUP	CASE COUNT	CATEGORY TOTALS
Cervical	Cerv Ant Arthroplasty	22	
Cervical	Cerv Ant Arthroplasty w/Fusion	8	
Cervical	Cerv Ant Fusion/ACDF	206	
Cervical	Cerv Ant Decompression	2	
Cervical	Cerv Postr Fusion/Inst	108	
Cervical	Cerv Postr Decompression	29	
Cervical	Cerv Postr Decompression MIS	17	
Cervical	Cerv Postr Fusion/Laminoplasty	6	
Cervical	Cervical 2 Stage	13	411
Thoraco-lumbar	Tho/Lum 2 Stage	76	
Thoraco-lumbar	Tho/Lum Ant Arthroplasty	5	
Thoraco-lumbar	Tho/Lum Ant Arthroplasty w/Fusion	7	
Thoraco-lumbar	Tho/Lum Ant Fusion	22	
Thoraco-lumbar	Tho/Lum Postr Decompression	466	
Thoraco-lumbar	Tho/Lum Postr Decompression MIS	377	
Thoraco-lumbar	Tho/Lum Postr Fusion MIS	102	
Thoraco-lumbar	Tho/Lum Postr Fusion/Inst	395	
Thoraco-lumbar	Tho/Lum 3 Stage	6	
Thoraco-lumbar	Tho/Lum Fusion DLIF short segment	13	
Thoraco-lumbar	Tho/Lum Fusion OLIF short segment	2	
Thoraco-lumbar	Tho/Lum Postr Fusion Combined Open/MIS	5	1476
Misc	Misc Spine Codes	77	
Misc	Spine All Tumour	24	
Misc	Neuro spine*	29	130
ACH	ACH Only Spine Codes	80	80
GRAND TOTAL		2097	2097

For the 2097 cases, the total cases minutes were 497762 whereas the skin-to-skin (surgical) time was 333365 minutes or 67% of total case time.

* Misc Neuro spine includes 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 rhizotomy 1-2 levels & spine pos laminoplasty with rhizotomy 3+ levels.

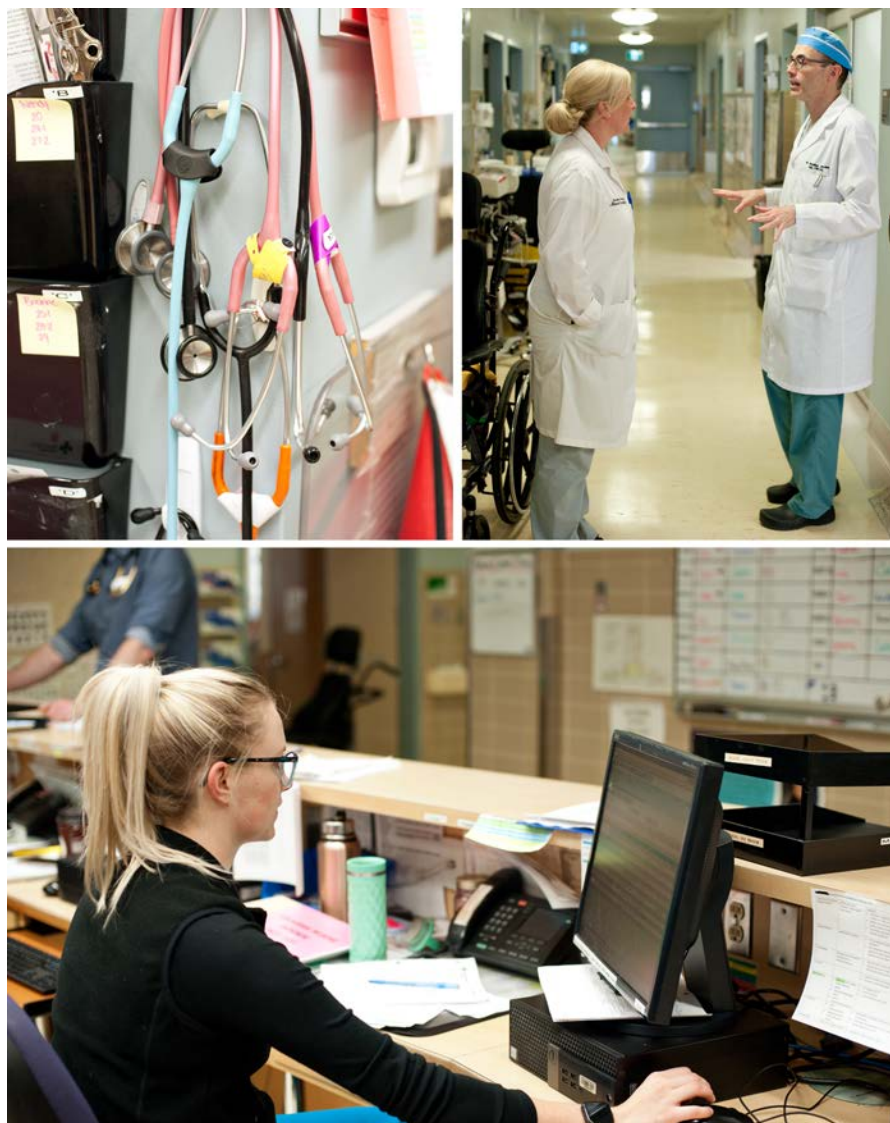
Canadian Surgical Services (CSS) Surgeries from 1-Jul-2017 to 30-Jun-2018

Dr. Nicholls and Dr. Salo completed a total of 44 lumbar cases at CSS during 2017/18.

Inpatient Spine Care:

Unit 101

Unit 101 celebrated many successes this year, and has thrived under the leadership of Unit Manager, Brooke Nowicki. The Unit 101 Quality Council worked on many quality improvement projects, some of which are still ongoing. The council benefited greatly from the support of Dr. Steve Casha, who has been an important and engaged member of the team for some time now. With the implementation of ADOD (anticipated date of discharge), we have seen our beds occasionally empty over the weekend, and our patients more prepared to go home.



12 new nurses joined our team, many of them transitioning from student nurses completing their final practicum on 101, to independent professionals. A number of staff members have moved on from Unit 101 to other opportunities. This included Nicole Sun, who has taken a position in PACU, Erika Tataryn, who has taken a position in the OR, and Kathleen Herbison, who took a position in the emergency department.

Trying new things in 2017/2018:

- Unit 101 nurses were one of the first in Canada to attempt gravity traction in the adult scoliosis population. This project required collaboration between Nurses, Physiotherapists, Occupational Therapists, Nurse Practitioners, Unit Managers, Orthotists and FMC welders to make it happen. An amazing team dedicated their efforts to give the two patients who participated the best possible chance of success.
- The inpatient Neuro department initiated an e-sim program, enabling nurses to experience Neuro emergencies in a controlled environment, and facilitating collaboration and teamwork.

Julie Reader
Nursing Education
Unit 101



Adult Spinal Deformity Rounds

Over the last decade, surgeons at FMC have seen an increasing number of patients with Adult Spinal Deformity (ASD). For those patients that have surgery, there are many perioperative concerns. Concerns arise from the magnitude of the surgery coupled with the comorbid state of these patients. In an effort to develop a more standardized approach to these complex problems, deformity rounds are held twice a month. Regular participants of these meetings are Dr. Swamy, Dr. Soroceanu, Dr. Thomas, Dr. Jacobs, and Dr. Nicholls, along with Nicole Miller (nurse practitioner) and Ariana Frederick (research coordinator). At the beginning of the month are clinical rounds, where deformity cases completed over the previous month are reviewed. Radiographs are evaluated for the success of deformity correction, and operative times, blood loss, need for transfusions and any complications are reviewed. The second half of clinical deformity rounds is spent presenting upcoming cases, where the surgeons discuss as a group any particular challenges they foresee with each case.

In the middle of the month are research rounds. At the beginning of this meeting 1-year and 2-year outcome data is regularly reviewed for any deformity patients enrolled in one of our registry studies (CSORN or ISSG). Reflecting on this data has pushed the group to seek improvement in a few areas of care, with the aims of meeting the needs of our deformity patients better. Some examples include:

- Dr. Rob Tanguay (psychiatry) has become involved in pain management and opioid use before and after surgery.
- Nicole Miller has started working with the perioperative blood conservation program to get all patient' iron levels optimized before surgery and between stages, to decrease the need for transfusions.
- Dr. Shean Stacey (anesthesiology) has become involved in streamlining anesthesiology practices during 2-stage cases.
- Regular operating room pauses have been implemented to improve communication between surgeons, nurses and anesthesiologists during difficult cases.

Improving pre-operative patient education has also been a major goal.



Rehabilitation:

Calgary Spinal Cord Injury Program Data

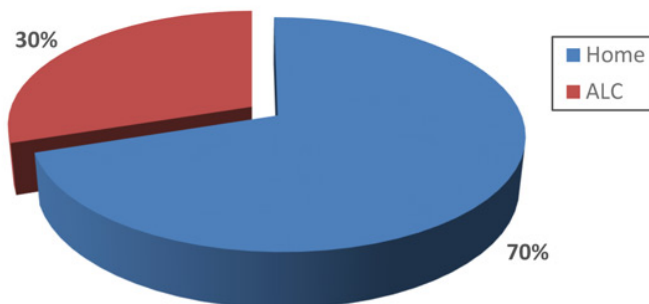
(July 2017 – June 2018)

BASIC DEMOGRAPHICS	Traumatic	Non-Traumatic	Total
Total # of patients discharged	33	37	70
	47%	53%	

ADDITIONAL DEMOGRAPHICS	Traumatic	Non-Traumatic	Total
Average age	47 years	57 years	52 years
Males	64%	54%	71%
Females	36%	46%	29%

MEDIAN LENGTH OF STAY (# of days)		Traumatic	Non-Traumatic	Total
Acute (onset days)		36 days	32 days	35 days
Tertiary neuro rehab unit	Active LOS	63 days	56 days	61 days
	Total LOS	69 days	57 days	62 days
Total in-patient stay		112 days	93 days	99 days

DISCHARGE DESTINATION



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.

FUNCTION SCORES	Traumatic	Non-Traumatic	Total Population
Functional Independence Measure® (FIM)			
Average Admit FIM Score	74.7	82.7	78.9
Average Discharge FIM Score	95.8	103.1	99.6
Change in FIM Score	27.8%	26.4%	27.0%



Rounds

Weekly Spine Rounds are held Wednesdays from 7-8 AM in the ICU Classroom. 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.

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 Lewkonja has been the course director for "Course 2", which is the integrated musculoskeletal unit of the undergraduate medical curriculum. He now supervises students as the clerkship lead for spine surgery at Foothills Medical Centre.

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.

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 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 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.

Fellows 2017-2018:

- Dr. Patricia Sirois
- Dr. Felipe Nares
- Dr. Christos Zafeiris
- Dr. Duncan Cushnie
- Dr. Alisson Roberto Teles
- Dr. Alejandro Peiro Garcia (ACH)

Fellowship Testimonial

Dr. Duncan Cushnie

I completed the combined orthopedic and neurosurgery spine fellowship in 2018. It was a great year for experiences both clinical and recreational. Calgary has a great spine team with a very broad range of practices ranging from minimally to maximally invasive. The volume is good and there was lots of opportunity for learning from so many cases and experts. Outside of the hospital, I enjoyed my time in Calgary and loved being so close to the mountains and snowboarding. I am certain the other fellows also enjoyed their time and we remain close to this day, despite the countries and oceans between us. Afterwards, I felt very comfortable diving into practice on my own and taking on whatever a busy trauma center has thrown my way so far.



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 16 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.





Research Synopsis

This past academic year was very successful for the Calgary Spine Group on the research front. Our Faculty were principal investigators or collaborators on 17 separate externally funded research grants (worth approximately \$2.6 million). Faculty members authored 54 peer-reviewed publications and 5 book chapters. In addition, 85 research abstracts were presented at national or international meetings with authorship/co-authorship involvement from Calgary Spine Group faculty.



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. As the CSORN database continues to mature, I anticipate a steady increase in research studies initiated by our faculty using CSORN data. The success of the CSORN database in Calgary is largely related to the hard work and vision of Dr. Ken Thomas. Ken should be commended for his highly successful stewardship of the CSORN database here in Calgary, as it now represents the centerpiece of research productivity within our program.

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.

Dr. Bradley Jacobs
Research Director
Foothills Medical Centre

Current Research Projects

Foothills Medical Centre

CURRENT RESEARCH PROJECTS	PI	STATUS
Prospective Randomized Clinical Trials enrolling		
Minocycline (MASC)	Casha	Enrolling
MAPS (Mean Arterial Pressure)	Jacobs	Enrolling
MAPS Trial in San Antonio (Sponsor Calgary)	Jacobs	Enrolling
STRIVE - S. Aureus Vaccine Study - Pfizer	Conly/Thom/Jac/Salo	Enrolling
Degenerative Spondy RCT Pilot	Casha/Thomas	Enrolling
Liberation From Mechanical Ventilation (RHSCIR-sub study)	Casha/Demetrios	Enrolling
Microbiome and SCI	Casha/J Steeves	Enrolling
INSTRuCT-SCI Study	Casha	Enrolling
Prospective Randomized Clinical Trials in follow-up		
P-15 Bone Putty in ACDF (CeraPedics)	du Plessis	
Clinical Studies - Observational		
Cervical Myelopathy (CSM)	Cadotte	Enrolling
Degenerative Spondy Cohort Study (CSORN)	Fisher/Casha/Thomas	Enrolling
Reoperations rates for pts with inflammatory arthropathy undergoing spinal	Lewkonja	Pending AHS agreement
Acceptance and empowerment after spinal cord injury	Lewkonja	Enrolling
Analysis of the Implications of Lumbopelvic Alignment on the Alignment of	Nicholls	Enrolling
Decompression vs decompression plus fusion for stenosis	Thomas	anaylsis/manuscript
Patient and Surgeon Expectations for various elective spine surgeries	Thomas/Soroceanu	data analysis
Prospective Data Collection		
Rick Hansen SCI database	Casha	Enrolling
ISSG - Deformity	Soroceanu	Enrolling
CSORN	Soroceanu	Enrolling
Projects submitted to ethics		
Dysphagia Study (EAT)	Lewkonja	Preparing for submission
Can Systemic inflammatory profiles predict Natural history of lumbar disc herra	Swamy/Salo	Pending Ethics submission
FELLOWS:		
Does neuromonitoring predict permanent neuro deficits after LLIF	Zafereis/Sirois/Thomas	data collection
Lumbar Surgery in Octogenarians	Nares/Thomas	manuscript prep
Pelvic Parameters	Zafereis	
Duration symptoms and outcome lumbar stenosis/herniation	Cushnie/Casha/Thomas	manuscript prep

Highlight Research Project

Alberta Children's Hospital

On-site surgical simulation for teaching pedicle screw instrumentation: a pilot study.

Peiro-Garcia A, Teles A, Parsons D, Ferri-de-Barros F.

Background

Spine instrumentation with pedicle screws (PS) is taught during different levels of surgical education. Most of the current teaching occurs in vivo. Sequential Navigated Power Drilling (SNPD) is an improvement of the classic technique for spine instrumentation with PS. Previous research documented a significant reduction in operating time and blood loss in scoliosis surgery in our institution since the systematic implementation of SNPD (Ferri-de-Barros et al, AAOS 2017; CSS 2018).



Surgical simulation is an effective tool for studying and teaching technical skills. We developed a simulation model for studying and teaching PS instrumentation. We would like to present our pilot data to the CPSS membership with the intent of fostering national collaboration in this research and educational endeavour.

Objective

To compare accuracy and efficiency of different PS instrumentation techniques.

Five spine fellows performed four experiments, each using a specific technique. Each experiment consisted of instrumenting a standard simulator with 10 PS (T3 to T7). A neurosurgeon, blinded to the PS technique, directly measured accuracy of PS instrumentation, and graded each PS according to a valid scale. We will compare the timed performances of all subjects using the T-test and the Z- test (alpha 1%) and we will use regression modeling to study the hypothetical effect of different techniques on accuracy and efficiency of PS instrumentation.

Results

Five fellows completed the experiments. There are differences in performance with different levels of training and with different techniques. This requires further analysis, which will be concluded for presentation at the CPSS meeting.

Conclusions

The experiments can be completed in approximately 30 minutes each. Invaluable learning has been reported. Ten residents will be recruited to perform the same experiments, which will be repeated with a pre-test, test and retention test model. With this data, we will describe the learning curves of different techniques. Plans are underway for the next phase to this project in 2018/2019.

Published Manuscripts

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

2018

1. Ailon T, Smith JS, Shaffrey CI, **Soroceanu A**, Lafage V, Schwab F, Burton D, Hart R, Kim HJ, Gum J, Hostin R, Kelly MP, Glassman S, Scheer JK, Bess S, Ames CP; ISSG. Patients with Adult Spinal Deformity with Previous Fusions Have an Equal Chance of Reaching Substantial Clinical Benefit Thresholds in Health-Related Quality of Life Measures but Do Not Reach the Same Absolute Level of Improvement. *World Neurosurg.* 2018 May 9. pii: S1878-8750(18)30924-0. PMID: 29705556.
2. Ailon T, Smith JS, Shaffrey C, Kim HJ, Mundis G, Gupta M, Klineberg E, Schwab F, Lafage V, Lafage R, Passias P, Protopsaltis T, Neuman B, Daniels A, Scheer J, **Soroceanu A**, Hart R, Hostin R, Burton D, Deviren V, Albert TJ, Riew KD, Bess S, Ames C, ISSG. Outcomes of Operative Treatment for Adult Cervical Deformity: A Prospective Multicenter Assessment with 1-Year Follow-up. *Neurosurgery.* 2018 Nov 1; 83(5):1031-1039.
3. Ailon T, Tee J, Manson N, Hall H, **Thomas KC**, Rampersaud YR, Yee A, Dea N, Glennie A, Bailey C, Christie S, Weber MH, Nataraj A, Paquet J, Johnson M, Norton J, Ahn H, McIntosh G, Fisher CG. Patient Reported Outcomes Following Surgery for Degenerative Spondylolisthesis: Comparison of a Universal and Multi-Tier Health Care System. *Spine J.* 2018 Oct 9. pii: S1529-9430(18)31162-8.
4. Badhiwala JH, Wilson JR, Kwon BK, **Casha S**, Fehlings MG. A Review of Clinical Trials in Spinal Cord Injury including Biomarkers. *J Neurotrauma* 2018; 35(16): 1906-1917.
5. Bertram K, Narendran N, Tailor P, Jablonski C, Leonard C, Irvine E, Hess R, Masson A, Abubacker S, Rinker K, Biernaskie J, Yates R, **Salo P**, Narendran A, Krawetz R. 17-DMAG regulates p21 expression to induce chondrogenesis in vitro and in vivo. In press, *Disease Models and Mechanisms*, 2018.
6. Bourget-Murray J, Peiro-Garcia A*, Brown G, Earp M, Parsons D, **Ferri-de-Barros F**. Quality, Safety, and Value of Innovation in Scoliosis Surgery: Intraoperative Skull Femoral Traction and Navigated Sequential Drilling. Accepted for publication *Spine Deformity (SRS Journal)*.
7. **Cadotte DW**, Akbar MA, Fehlings MG, Stroman PW and Cohen-Adad J. What has been learned from magnetic resonance imaging examination of the injured human spinal cord: A Canadian perspective. *J Neurotrauma.* 2018 Aug 15;35(16):1942-1957. doi: 10.1089/neu.2018.5903. PMID: 30074873.
8. **Casha S**, Rice T, Stirling DP, McGowan D, Silva C, Smekal M, Gnanapavan S, Zygum D, Giovannoni G, Hurlbert RJ, Yong VW. Cerebrospinal Fluid Biomarkers in Human Spinal Cord Injury from a Phase II minocycline trial. *J Neurotrauma* 2018; 35(16): 1918-1928.
9. Kucher K, Maier D, Abel R, Badke A, Baron H, Thietje R, **Casha S**, Rupp R, Weidner N, Meindl R, Gomez-Mancilla B, Johns D, Pfister C, Mir A, Schwab ME, Curt A. First-in-man intrathecal application of neurite growth promoting anti-Nogo-A antibodies in acute spinal cord injury. *Neurorehabilitation & Neural Repair* 2018; 32(6-7): 578-589
10. Levi AD, Okonkwo D, Park P, Jenkins A, Kurpad S, Parr A, Ganju A, Aarabi B, Kim D, **Casha S**, Fehlings M, Anderson KD, Gage A, Hsieh J, Huhn S, Curt A, Guzman. Emerging safety of intramedullary transplantation of human neural stem cells in chronic cervical and thoracic spinal cord injury *Neurosurgery.* 2018; 82(4): 562-575.
11. Martin AR, De Leener B, Cohen-Adad J, Kalsi-Ryan S, **Cadotte DW**, Wilson JR, Tetreault L, Nouri A, Crawley A, Mikulis DJ, Ginsberg H, Massicotte E and Fehlings MG. Monitoring for myelopathic progression with multiparametric quantitative MRI. *PLoS One.* 2018 Apr 17;13(4):e0195733. doi: 10.1371/journal.pone.0195733. eCollection 2018.

12. Martin AR, De Leener B, Cohen-Adad J, **Cadotte DW**, Nouri A, Wilson JR, Tetreault L, Crawley AP, Mikulis DJ, Ginsberg H and Fehlings MG. Can microstructural MRI detect subclinical tissue injury in subjects with asymptomatic cervical spinal cord compression? A prospective cohort study. *BMJ Open*. 2018 Apr 13;8(4):e019809. doi: 10.1136/bmjopen-2017-019809.
13. Morcos MW, Jiang F, McIntosh G, Johnson M, Christie S, Wai E, Ouellet J, Bailey C, Ahn H, Paquet J, Manson N, Fisher C, Rampersaud R, **Thomas K**, Hall H, Weber M. Predictive Factors for Discharge Destination Following Posterior Lumbar Spinal Fusion: A Canadian Spine Outcome and Research Network (CSORN) study. *Global Spine Journal* DOI: 10.1177/2192568218797090.
14. Passias PG, Horn SR, Oh C, Ramchandran S, Burton DC, Lafage V, Lafage R, Poorman GW, Steinmetz L, Segreto FA, Bortz CA, Smith JS, Ames C, Shaffrey CI, Kim HJ, **Soroceanu A**, Klineberg EO, ISSG. Evaluating cervical deformity corrective surgery outcomes at 1-year using current patient-derived and functional measures: are they adequate? *J Spine Surg*. 2018 Jun;4(2):295-303. PMID: 30069521.
15. Passias PG, Horn SR, Bortz CA, Ramachandran S, Burton DC, Protosaltis T, Lafage R, Lafage V, Diebo BG, Poorman GW, Segreto FA, Smith JS, Ames C, Shaffrey CI, Kim HJ, Neuman B, Daniels AH, **Soroceanu A**, Klineberg E, ISSG, The Relationship between Improvements in Myelopathy and Sagittal Realignment in Cervical Deformity Surgery Outcomes. *Spine (Phila Pa 1976)*. 2018 Feb 16. PMID: 29462071.
16. Protosaltis TS, Diebo BG, Lafage R, Henry JK, Smith JS, Scheer JK, Sciubba DM, Passias PG, Kim HJ, Hamilton DK, **Soroceanu A**, Klineberg EO, Ames CP, Shaffrey CI, Bess S, Hart RA, Schwab FJ, Lafage V, ISSG. Identifying Thoracic Compensation and Predicting Reciprocal Thoracic Kyphosis and Proximal Junctional Kyphosis in Adult Spinal Deformity Surgery. *Spine (Phila Pa 1976)*. 2018 Nov 1;43(21):1479-1486. PMID: 30096125.
17. Protosaltis T, Terran J, **Soroceanu A**, Bronsard N, Smith J, Klineberg E, Mundis G, Kim HJ, Hostin R, Hart R, Shaffrey C, Bess S, Ames C, Schwab, ISSG. T1 slope minus cervical lordosis (TS-CL), the cervical answer to PI-LL, defines cervical sagittal deformity in patients undergoing thoracolumbar osteotomy. *Int J Spine Surg*. 2018 Aug 15;12(3):362-370. PMID: 30276093.
18. Safaee MM, Deviren V, Dalle Ore C, Scheer JK, Lau D, Osario JA, **Nicholls F**, Ames CP. Ligament Augmentation Reduces Proximal Junctional Kyphosis and Proximal Junctional Failure in Adult Spinal Deformity. *Journal of Neurosurgery Spine*, 28(5): 512-519; May 2018.
19. Smuck M, Muaremi A, Zheng P, Norden J, Sinha A, **Hu R**, Tomkins-Lane C. PhD. Objective Measurement of Function Following Lumbar Spinal Stenosis Decompression Reveals Improved Functional Capacity with Stagnant Real-Life Physical Activity. *The Spine Journal*. 2018 Jan; 18(10):15-21.
20. St-Pierre GH*, Yang MH, Bourget-Murray J, **Thomas KC**, Hurlbert RJ, Matthes N. Performance Indicators in Spine Surgery. *Spine (Phila Pa 1976)*. 2018 Feb 15;43(4):275-280.
21. Stratton A*, Faris P, **Thomas KC**. The Prognostic Accuracy of Suggested Predictors of Failure of Medical Management in Patients With Nontuberculous Spinal Epidural Abscess. *Global Spine J*. 2018 May;8(3):279-285.
22. **Swamy G**, Lopatina E, **Thomas KC**, Marshall DA, Johal HS. The cost effectiveness of minimally invasive spine surgery in the treatment of adult degenerative scoliosis: a comparison of transposas and open techniques. *Spine J*. 2018 May 31. pii: S1529-9430(18)30266-3.
23. Teles AR*, Yavin D, Zafeiris C*, **Thomas KC**, **Lewkonja P**, **Nicholls F**, **Swamy G** and **Jacobs WB**: Spine Fractures After Removal of Instrumentation: Revisiting the Stress-shielding Effect of Instrumentation in Spine Fusion. *World Neurosurgery*. *World Neurosurg*. 2018 Aug;116:e1137-e1143.
24. Teles A*, Montgomery S, **Thomas KC**. Necrotizing Fasciitis involving the Spine: An unusual medical emergency for the spine surgeon; *World Neurosurg*. 2018 Oct 12. pii: S1878-8750(18)32324-6.

25. Tomkins-Lane C, Norden J, Sinha A, **Hu R**, Smuck M. Digital biomarkers of spine and musculoskeletal disease from accelerometers: defining phenotypes of free-living physical activity in knee osteoarthritis and lumbar spinal stenosis, *Spine J.* 2018 Jul 17. pii: S1529-9430(18)31011-8. Outstanding Paper: Basic Science.
26. Tong B, Jutzeler CR, Cragg JJ, Grassner L, Schwab J, **Casha S**, Kramer JLK. Serum albumin predicts long-term neurological motor outcomes after acute spinal cord injury. *Neurorehabilitation and Neural Repair* 2018; 32(1): 7-17.
27. Yavin D, Dhaliwal P, Whittaker T, Hawboldt GS, Jewett GA, **Casha S**, **Du Plessis S**. Intrathecal morphine following lumbar fusion: a randomized, placebo-controlled trial. *Neurosurgery* May 21, 2018 in press manuscript:
28. Zygourakis C, DiGiorgio AM, Crutcher C, Safaee M, **Nicholls FH**, Dalle Ore CL, Deviren V, Ames CP. The Safety and Efficacy of CT-Guided, Fluoroscopy-Free Vertebroplasty in Adult Spinal Deformity Surgery. (Accepted for Publication, May 2018, *World Neurosurgery*).

2017

1. Ahmed AS, Li J, Abdul AM, Ahmed M, Ostenson CG, **Salo PT**, Hewitt C, Hart DA, Ackermann PW. Compromised neurotrophic and angiogenic regenerative capability during tendon healing in a rat model of type-II diabetes. *PLoS One.* (2017) Jan 25; 12(1): e0170748. Doi: 10.1371/journal.pone.0170748. PMID: 28122008.
2. Arnold PM, Harrop JS, Merli G, Tetreault LG, Kwon BK, **Casha S**, Palmieri K, Wilson JR, Fehlings MG, Holmer HK, Norvell DC. Efficacy, Safety, and Timing of Anticoagulant Thromboprophylaxis for the Prevention of Venous Thromboembolism in Patients With Acute Spinal Cord Injury: A Systematic Review. *Global Spine J* 2017; 7 (3 Suppl):138S-150S.
3. Bono OJ, Poorman GW, Foster N, Jalai CM, Horn SR, Oren J, **Soroceanu A**, Ramachandran S, Purvis TE, Jain D, Vira S, Diebo BG, Line B, Sciubba DM, Protosaltis TS, Buckland AJ, Errico TJ, Lafage V, Bess S, Passias PG, Body mass index predicts risk of complications in lumbar spine surgery based on surgical invasiveness. *Spine J.* 2017 Nov 16. pii: S1529-9430(17)31168-3. PMID: 29155339
4. Caverzagie KJ, Nousiainen MT, Ferguson PC, ten Cate O, Ross S, Harris KA, Busari J, Bould D, **Bouchard J**, Iobst WF, Carraccio C, Frank JR, Overarching challenges to the implementation of competency-based medical education, *Medical Teacher* 2017, Vol 39, No 6, 588-593.
5. Deng J, Koutras C, Donnelier J, Alshehri M, **Casha S**, Braun AP, Robbins S, Braun JE. Neurons Export Extracellular Vesicles Enriched in Cysteine String Protein and Misfolded Protein Cargo *Nature Scientific Reports* 2017;7(1):956.
6. Martin AR, De Leener B, Cohen-Adad J, **Cadotte DW**, Kalsi-Ryan S, Lange SF, Tetreault L, Nouri A, Crawley A, Mikulis DJ, Ginsberg H and Fehlings MG. Clinically feasible microstructural MRI to quantify cervical spinal cord tissue injury Using DTI, MT, and T2*-Weighted Imaging: Assessment of Normative Data and Reliability. *AJNR Am J Neuroradiol.* 2017 Jun;38(6):1257-1265. doi: 10.3174/ajnr.A5163. Epub 2017 Apr 20. PMID: 28428213.
7. Martin AR, De Leener B, Cohen-Adad J, **Cadotte DW**, Kalsi-Ryan S, Lange SF, Tetreault L, Nouri A, Crawley A, Mikulis DJ, Ginsberg H and Fehlings MG. A novel MRI biomarker of spinal cord white matter injury: T2*-Weighted white matter to gray matter signal intensity ratio. *AJNR Am J Neuroradiol.* 2017 Jun;38(6):1266-1273. doi: 10.3174/ajnr.A5162. Epub 2017 Apr 20. PMID: 28428212.
8. Morcos MW, Jiang F, McIntosh G, Johnson M, Christie S, Wai E, Ouellet J, Bailey C, Ahn H, Paquet J, Manson N, Fisher C, Rampersaud R, **Thomas K**, Hall H, Weber M. Predictors of Blood Transfusion in Posterior Lumbar Spinal Fusion: A Canadian Spine Outcome and Research Network (CSORN) Study. *Spine (Phila Pa 1976).* 2017 Feb 9.

9. **Nicholls FH**, Bae J, Theologis AA, Eksi MS, Ames CP, Berven SH, Burch S, Tay BK, Deviren V. Factors associated with the development of and revision for proximal junctional kyphosis in 440 consecutive adult spinal deformity patients. *Spine* 2017 Nov 15;42(22):1693-1698.
10. Norden J, Smuck M, Sinha A, **Hu R**, Tomkins-Lane C, Objective measurement of free-living physical activity (performance) in lumbar spinal stenosis: are physical activity guidelines being met? *The Spine Journal* 2017 Jan;17(1):26-33.
11. Opoko-Darko M and **Jacobs WB**: Spondylodiscitis Caused by *Prevotella Intermedia*: A Case Report and Literature Review. *Interdisciplinary Neurosurgery: Advanced Techniques and Case Management*. 2017. 10:57-61.
12. Padhye K, Soroceanu A, Russell D, El-Hawary R. Thoracoscopic Anterior Instrumentation and Fusion as a Treatment for Adolescent Idiopathic Scoliosis: A Systematic Review of the Literature. *Spine Deform*. 2018 Jul - Aug;6(4):384-390. doi: 10.1016/j.jspd.2017.12.013. PMID: 29886908.
13. Passias PG, Horn SR, Jalai CM, Ramchandran S, Poorman GW, Kim HJ, Smith JS, Sciubba D, **Soroceanu A**, Ames CP, Hamilton DK, Eastlack R, Burton D, Gupta M, Bess S, Lafage V, Schwab F., Cervical Alignment Changes in Patients Developing Proximal Junctional Kyphosis Following Surgical Correction of Adult Spinal Deformity, *Neurosurgery*. 2017 Oct 12. [Epub ahead of print], PMID: 29040759.
14. Passias PG, Jalai CM, Lafage V, Lafage R, Protopsaltis T, Ramchandran S, Horn SR, Poorman GW, Gupta M, Hart RA, Deviren V, **Soroceanu A**, Smith JS, Schwab F, Shaffrey CI, Ames CP. *Neurosurgery*. Primary Drivers of Adult Cervical Deformity: Prevalence, Variations in Presentation, and Effect of Surgical Treatment Strategies on Early Postoperative Alignment. 2017 Aug 5. [Epub ahead of print] PMID: 28950349.
15. Protopsaltis TS, Lafage R, Vira S, Sciubba D, **Soroceanu A**, Hamilton K, Smith J, Passias PG, Mundis G, Hart R, Schwab F, Klineberg E, Shaffrey C, Lafage V, Ames C; ISSG, Novel Angular Measures of Cervical Deformity Account for Upper Cervical Compensation and Sagittal Alignment. *Clin Spine Surg*. 2017 Aug;30(7):E959-E967. PMID: 286508797.
16. Protopsaltis T, Bronsard N, **Soroceanu A**, Henry JK, Lafage R, Smith J, Klineberg E, Mundis G, Kim HJ, Hostin R, Hart R, Shaffrey C, Bess S, Ames C; International Spine Study Group. Cervical sagittal deformity develops after PJK in adult thoracolumbar deformity correction: radiographic analysis utilizing a novel global sagittal angular parameter, the CTPA. *Eur Spine J*. 2017 Apr;26(4):1111-1120. PMID: 27437690.
17. Rice T, Larsen JEA, Li H, Nuttall RK, Larsen PH, **Casha S**, Hurlbert RJ, Edwards DR, Yong VW. Neuroprotection by minocycline in murine traumatic spinal cord injury: analyses of matrix metalloproteinases *Neuroimmunology and Neuroinflammation* 2017; 4:243-53.
18. Ryu WHA, Mostafa AE, Dharampal N, Sharlin E, Kopp G, **Jacobs WB**, Hurlbert RJ, Chan S and Sutherland GR: Design-based Comparison of Spine Surgery Simulators: Optimizing Educational Features of Surgical Simulators. *World Neurosurgery*. 2017; 106:870-877.
19. Ryu WHA, Dharampal N, Mostafa AE, Sharlin E, Kopp G, **Jacobs WB**, Hurlbert RJ, Chan S and Sutherland GR: Systematic Review of Patient-Specific Surgical Simulation: Next Steps in Advancing Medical Education. *Journal of Surgical Education*. 2017; 74:1028-1038.
20. Stratton A*, Gustafson K, **Thomas K**, James MT. Incidence and risk factors for failed medical management of spinal epidural abscess: a systematic review and meta-analysis. *J Neurosurg Spine*. 2017 Jan;26(1):81-89.
21. Suman A, Bostick G, Schopflocher D, Russell AS, Ferrari R, Battié MC, **Hu R**, Buchbinder R, Gross D, Long-term evaluation of a Canadian back pain mass media campaign. *Eur Spine J*. 2017 Sep;26(9):2467-2474.
22. Vaccaro AR, Fisher CG, Patel AA, Prasad SK, Chi J, Kishore M, **Thomas KC**, Whang PG. Evidence-Based Recommendations for Spine Surgery. *Spine (Phila Pa 1976)*. 2017 Apr 1;42(7):E435-E442.

23. Wilcox JT, Satkunendrarajah K, Nasirzadeh Y, Laliberte AM, Lip A, **Cadotte DW**, Foltz WD and Fehlings MG. Generating level-dependent models of cervical and thoracic spinal cord injury: Exploring the interplay of neuroanatomy, physiology, and function. *Neurobiol Dis.* 2017 Sep;105:194-212. doi: 10.1016/j.nbd.2017.05.009. Epub 2017 May 31. PMID: 28578003
24. Wilson JR, Tetreault LA, Kwon BK, Arnold PM, Mroz TE, Shaffrey C, Harrop JS, Chapman JR, **Casha S**, Skelly AC, Holmer HK, Brodt ED, Fehlings MG. Timing of Decompression in Patients With Acute Spinal Cord Injury: A Systematic Review. *Global Spine J* 2017; 7 (3 Suppl):95S-115S.
25. Yavin D, **Casha S**, Wiebe S, Feasby TE, Clark C, Isaacs A, Holroyd-Leduc J, Hurlbert RJ, Quan H, Nataraj A, Sutherland GR, Jette N. Lumbar fusion for degenerative disease: A systematic review and meta-analysis *Neurosurgery.* 2017; 80(5):701-715.
26. You D, Garcia AP, **Ferri-de-Barros F**, **Parsons, D.** Hemolysis Following Intraoperative Cell Salvage Replacement in A Scoliosis Patient With Sick Cell Trait: A Case Report. *Spine,* 2017.

Published Book Chapters

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

2018

1. Fenton E*, **Casha S**, Hurlbert R. Intraoperative Monitoring in Routine, Deformity, and Complex Surgery in Spine Surgery: Avoidance and Management of Complications. Ball, Steinmetz, and Benzel editors, in press.
2. Hardy St Pierre G*, **Thomas KC.** Radiculopathy and myelopathy at segments adjacent to the site of a previous anterior cervical arthrodesis, in 50 Landmark Papers Every Spine Surgeon Should Know, Vaccaro AR, Wilson JR and Fisher CG (Eds.). New York: CRC Press. 2018.
3. **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.
4. Yang MMH and **Jacobs WB:** The Impact of Positive Sagittal Balance on Spinal Deformity, in 50 Landmark Papers Every Spine Surgeon Should Know, Vaccaro AR, Wilson JR and Fisher CG (Eds.). New York: CRC Press. 2018.

2017

1. **Jacobs WB** and Hurlbert RJ: Anterior Cervical Instrumentation, Chapter 11, pp. 78 – 82, in *Neurosurgery Operative Atlas: Spine and Peripheral Nerves*, 5th Edition, Wolfla C and Resnick D (Eds.). New York: Thieme, 2017.

Presentations

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



2018

1. Abdullah H, Catherine A, Urban D, Rivera L, **Ferri-de-Barros F**, Brindle M. Risk factors for surgical site infections following spinal instrumentation in children: a case-control study. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference Feb. 28-Mar. 3, 2018.
2. Bond M, Zhou H, **Jacobs WB**, Johnson M, Fisher, C, Bailey C, Christie S, Charest-Morin R, Nataraj A, Manson N, Hall H, **Thomas KC**, Rampersaud R, McIntosh G, Dea N. Treatment of Mild Cervical Myelopathy: what factors are associated with the decision for surgical intervention. Can J Surg 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
3. Bond M, Zhou H, Bailey C, Dea N, Charest-Morin R, Glennie A, Manson N, Hall H, **Thomas KC**, Rampersaud R, McIntosh G, Fisher C. Does back pain improve in surgically treated degenerative spondylolisthesis. Can J Surg 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
4. Bourget-Murray J, Peiro- Garcia A*, Brown G, Earp M, Parsons D, **Ferri-de-Barros F**. Quality, safety and value of innovation in scoliosis surgery: intraoperative skull-femoral traction and navigated sequential drilling. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference, Feb. 28-Mar. 3, 2018.
5. Canizares M, Andrew G, **Thomas KC**, Bailey C, Christie S, Wai E, Fisher C, Perruccio A, Rampersaud R. Patient expectations in spine surgery: a national Canadian perspective. Can J Surg 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
6. Canizares M, Glennie A, **Thomas KC**, Bailey C, Christie S, Wai E, Fisher C, Perruccio A, Rampersaud R. Patient Expectations Fulfillment and Satisfaction with Spine surgery. Can J Surg 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
7. **Casha S**. Minocycline in Acute Spinal Cord Injury Trial update at the annual meeting of the American Spinal Injury Association, Rochester MN 2018 (May).

8. Christie S, Ramperaud R, **Thomas KC**, Roffey D, Wai E, Vu K. Arthroplasty versus fusion surgery following anterior decompression: The Canadian Experience. *Can J Surg* Vol. 61 (4 Suppl 1), August 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
9. Cushnie D*, **Thomas KC**, **Casha S**. Effect of Duration of Symptoms on Outcome of Surgery in Lumbar stenosis and disc herniation. *Can J Surg* 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
10. Fehlings MG, Kopjar B, Ahn H, Farhadi F, Shaffrey C, Nassr A, Mummaneni P, Arnold P, **Jacobs WB**, Riew KD, Brodke D, Vaccaro A, Hillibrand A, Wilson J, Harrop J, Yoon ST, Kim K, Fourney D, Santaguida C: Role of the sodium/glutamate blocker riluzole in enhancing functional outcomes in patients undergoing surgery for degenerative cervical myelopathy: Results of the prospective, multicenter double blind controlled CSM-Protect randomized controlled trial. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. *Canadian Journal of Surgery* 61(4 Suppl 1): S77, 2018.
11. Fehlings MG, Kopjar B, Ahn H, Farhadi F, Shaffrey C, Nassr A, Mummaneni P, Arnold P, **Jacobs WB**, Riew KD, Brodke D, Vaccaro A, Hillibrand A, Wilson J, Harrop J, Yoon ST, Kim K, Fourney D, Santaguida C: Role of the sodium/glutamate blocker riluzole in enhancing functional outcomes in patients undergoing surgery for degenerative cervical myelopathy: Results of the prospective, multicenter double blind controlled CSM-Protect randomized controlled trial. Oral presentation at the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, March 14 – 17, 2018.
12. Fox S*, **Jacobs WB**, **du Plessis S**, Yavin D, Lee R: Impact of pelvic parameters on clinical outcome following short segment lumbar fusion. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. *Canadian Journal of Surgery* 61(4 Suppl 1): S46, 2018.
13. **Jacobs WB**. Invited Lecture, “Spinopelvic Balance and the Oblique/Lateral Advantage”, Medtronic Canada Oblique Lateral Interbody Fusion Practical Course, January 13, 2018, Calgary, Alberta, Canada.
14. **Jacobs WB**. Invited Discussant, “Genome-wide transposon mutagenesis screening identifies novel genetic drivers and oncogenic networks in spinal gliomas”, AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, March 14 – 17, 2018.
15. **Jacobs WB**. Invited Lecture, “Challenging Cases: Deformity and Tumor”, AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, March 14 – 17, 2018.
16. **Jacobs WB**. Invited Lecture, “Re-thinking the Geriatric Spinal Trauma Patient” and Symposium Faculty, “Update on the Management of Spine and Spinal Cord Injury” at the American Association of Neurological Surgeons Annual Meeting, April 29 – May 2, 2018, New Orleans, Louisiana.
17. **Jacobs WB**. Invited Lectures, “Introduction to Cervical Sagittal Parameters”, “Natural History of CSM and OPLL: When Should We Operate?” and “Thoracolumbar Trauma Case Discussion”, Evidenced Based Medicine Spinal Surgery Course, May 11 - 12, 2018, Toronto, Ontario, Canada

18. **Jacobs WB**. Invited Lecture, "Approach to Surgery for Unstable Spinal Metastases", and Course Faculty, Canadian Contemporary Spinal Techniques: Management of Spinal Tumours, May 25, 2018, Toronto, Ontario, Canada.
19. Nares F*, **Soroceanu A, Thomas K**. Lumbar Surgery in Octogenarians. Really? Can J Surg 61(4 suppl 1) 2018. Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
20. Peiro-Garcia A*, Teles AR*, **Parsons D, Ferri-de-Barros F**. On-site surgical simulation for teaching pedicle screw instrumentation: a pilot study. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference, Feb. 28–Mar. 3, 2018.
21. Peiro-Garcia A*, Brown G, Earp M, **Parsons D, Ferri-de-Barros F**. Sagittal balance and spinopelvic parameters in patients with adolescent idiopathic scoliosis managed with intraoperative skull–femoral traction. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference, Feb. 28–Mar. 3, 2018.
22. Peiro-Garcia A*, Bourget-Murray J, **Ferri-de-Barros F, Parsons D**. Short-term complications with vertical expandable prosthetic titanium rib and magnetically controlled growing rods to manage early onset scoliosis. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference, Feb. 28–Mar. 3, 2018.
23. Peiro-Garcia A*, Bourget-Murray J, **Parsons D, Ferri-de-Barros F**. Staged MAGEC rods insertion to manage early onset scoliosis. CJS Vol. 61 (4 Suppl 1) August/août 2018 Canadian Spine Society Abstracts, 18th Annual Scientific Conference, Feb. 28–Mar. 3, 2018.
24. Sharifi B, Fisher C, Charest-Morin R, **Jacobs WB**, Johnson M, Bailey C, Christie S, Nataraj A, Manson N, Hall H, **Thomas K**, Rampersaud R, McIntosh G, Dea N: Consultation and surgical wait time in patients with cervical spondylotic myelopathy: A prospective Canadian Spine Outcomes and Research Network (CSORN) study. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. Canadian Journal of Surgery 61(4 Suppl 1): S87, 2018.
25. **Soroceanu AM**. Can We Determine Clinically Relevant DJK in Cervical Deformity Surgery?- Podium, Nominated for Whitecloud Best Clinical Paper. International Meeting on Advanced Spine Techniques (IMAST), Los Angeles, July 2018
26. **Soroceanu AM**. Successful Clinical Outcomes Following Surgery for Severe Cervical Deformity are Dependent Upon Achieving Sufficient Cervical Sagittal Alignment – Podium. North American Spine Society (NASS), Los Angeles, September 2018
27. **Soroceanu AM**. Anterior Reconstruction Provides Better Outcomes When Correcting Mild Flexible Cervical Deformity – Podium, Best Papers Session. North American Spine Society (NASS), Los Angeles, September 2018
28. **Soroceanu AM**. Limited Morbidity and Possible Radiographic Benefit of C2 versus Subaxial Cervical Upper-Most Instrumented Vertebrae – Poster grand rounds. North American Spine Society (NASS), Los Angeles, September 2018

29. **Soroceanu AM.** Indicators for Non-Routine Discharge Following Cervical Deformity-Corrective Surgery: Radiographic, Surgical, and Patient-Related Predictors – Podium. North American Spine Society (NASS), Los Angeles, September 2018
30. **Soroceanu AM.** Surgical Outcomes in Rigid versus Flexible Cervical Deformities – Podium. North American Spine Society (NASS), Los Angeles, September 2018
31. **Soroceanu AM.** The Influence of Surgical Intervention and Sagittal Alignment on Frailty in Adult Cervical Deformity – Podium. North American Spine Society (NASS), Los Angeles, September 2018
32. **Soroceanu AM.** Can Postoperative cSVA, C2 Slope and T1 Slope be Predicted Accurately in Cervical Deformity Surgery? – Podium. North American Spine Society (NASS), Los Angeles, September 2018
33. **Soroceanu AM.** Can We Determine Clinically Relevant DJK in Cervical Deformity Surgery? – Podium. North American Spine Society (NASS), Los Angeles, September 2018
34. **Soroceanu AM.** Reciprocal Changes of Mild and Severe Cases of Proximal Junctional Kyphosis After Lumbopelvic Spinal Fusions – Podium. North American Spine Society (NASS), Los Angeles, September 2018
35. **Soroceanu AM.** Development of a Novel Cervical Deformity Surgical Invasiveness Index – Poster. North American Spine Society (NASS), Los Angeles, September 2018
36. **Soroceanu AM.** Limited Morbidity and Possible Radiographic Benefit of C2 versus Subaxial Cervical Upper-Most Instrumented Vertebrae – Poster. North American Spine Society (NASS), Los Angeles, September 2018
37. **Soroceanu AM.** Preliminary Review of an ISSG AO Multi-Domain Spinal Deformity Complication Classification System - Podium. Scoliosis Research Society (SRS), Bologna, October 2018
38. **Soroceanu AM.** Development of a Novel Cervical Deformity Surgical Invasiveness Index – Podium. Scoliosis Research Society (SRS), Bologna, October 2018
39. **Soroceanu AM.** Indicators for Non-Routine Discharge Following Cervical Deformity-Corrective Surgery: Radiographic, Surgical, and Patient-related Predictors - Podium. Scoliosis Research Society (SRS), Bologna, October 2018
40. **Swamy G, Salo P, Duncan N, Jirik F, Matyas J.** Normative aging of caudal IVD in C57BL6J Mice: Decoupling of structure and biomechanical function. Orthopaedic Research Society Meeting, Louisiana, New Orleans, March 10-13, 2018.
41. **Teles AR*, Jacobs WB, Nicholls FH, Lewkonja P, Cho R, Thomas KC, Swamy G:** Surgical feasibility and results of oblique lateral interbody fusion at L5-S1 level. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. Canadian Journal of Surgery 61(4 Suppl 1): S68, 2018.
42. **Teles AR*, Casha S, Jacobs WB, Thomas KC, McIntosh G, Charest-Morin R, Golan J, Santaguida C,**

Jarzem P, Ouellet JA, Weber MH: Predictive model for return to work after lumbar spine surgery in Canada. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. Canadian Journal of Surgery 61(4 Suppl 1): S69, 2018.

43. Teles AR*, **Jacobs WB, Nicholls FH, Lewkonian P, Cho R, Thomas KC, Swamy G**: Surgical feasibility and results of oblique lateral interbody fusion at L5-S1 level. Oral presentation at the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, March 14 – 17, 2018.
44. Yang MMH, Ryu WHA, **du Plessis S, Casha S, Jacobs WB**, Hurlbert RJ Radiographic outcome after cervical disc arthroplasty: Development of heterotopic ossification oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018.
45. Yang MMH, Almansoori KA*, **Lewkonian P, Jacobs WB**: Post-operative radiographic spinopelvic measurements gradually change following thoracolumbar fusions for adult spinal deformity. Oral presentation at the Canadian Spine Society Annual Meeting, Banff, Alberta, February 28 – March 3, 2018. Canadian Journal of Surgery 61(4 Suppl 1): S46, 2018.
46. Zygourakis CC, DiGiorgio AM, Crutcher C, Safaee M, Nicholls F, Dalle Ore CL, Deviren V, Ames CP: The Safety and Efficacy of CT-guided, Fluoroscopy-free Vertebroplasty in Adult Spinal Deformity Surgery. Congress of Neurological Surgeons 34th Annual Spine Summit 2018, Orlando, FL (Podium)
47. Zygourakis CC, DiGiorgio AM, Crutcher C, Safaee M, **Nicholls F**, Dalle Ore CL, Deviren V, Ames CP: The Safety and Efficacy of CT-guided, Fluoroscopy-free Vertebroplasty in Adult Spinal Deformity Surgery. Global Spine Congress 2018, Singapore (Podium)

2017

1. Bourget-Murray J, Hardy St Pierre G*, Gurr K, **Bouchard J**. Long term surgical relief of back pain: minimum 5 year follow up results at 2 Canadian Institutions, Calgary Orthopaedic resident Research Day, 1st prize, May 4, 2017.
2. **Cadotte DW**. Invited Address, Advanced imaging of the human spinal cord: Imaging science as a method for disease surveillance. University of Calgary, Hotchkiss Brain Institute Spinal Cord Injury Community-Research Engagement. December 12, 2017.
3. **Casha S**. Management of sacral fractures presented at AANS annual meeting breakfast seminar on Contemporary Management of Spine Fractures Los Angeles CA, 2017 (April).
4. **Ferri-de-Barros F**, Da Cunha R, **Parsons D**, Brown G. Quality Safety and Value of Innovation in Scoliosis Surgery: intraoperative skull femoral traction and navigated sequential drilling. Poster and podium presentation, AAOS, 2017.
5. Fox S*, Yavin D, Lee R, **Casha S, du Plessis S**, Dhaliwal P, **Jacobs WB**. Impact of pelvic parameters on clinical outcomes following short segment lumbar fusion. Department of Orthopedic Surgery Fellows' Research Day, University of Calgary Cumming School of Medicine (Calgary, AB) April 2017 (platform presentation).

6. **Jacobs WB.** Invited Lecture, "Geriatric Odontoid Fractures" and Symposium Faculty, "Update on the Management of Spine and Spinal Cord Injury" at the American Association of Neurological Surgeons Annual Meeting, April 22 – 25, 2017, Los Angeles, California.
7. **Jacobs WB.** Invited Lecture, "Acute Spinal Cord Injury Management and Translational Research", Grand Rounds, Department of Critical Care Medicine, University of Calgary, April 26, 2017.
8. **Jacobs WB.** Invited Lectures, "Diagnosis and Classification of Lumbar Deformity" and "Proximal Junctional Kyphosis: Diagnosis and Treatment", Evidenced Based Medicine Spinal Surgery Course, October 21, 2017, Montreal, Quebec, Canada.
9. McIntosh G, Fisher C, Hall H, Manson N, Rampersaud YR, **Thomas K.** Patient Reported Outcomes Following Spinal Surgery for Degenerative Disc Disease, Disc Herniation, Spondylolisthesis and Spinal Stenosis: A National Comparison. Canadian Spine Outcomes and Research Network, Saint John, Toronto, Calgary, Vancouver, Canada. CSS Meeting Montreal February 2017
10. McIntosh G, Fisher C, Hall H, Manson N, Rampersaud YR, **Thomas K.** Patient Reported Outcomes Following Spinal Surgery for Degenerative Disc Disease, Disc Herniation, Spondylolisthesis and Spinal Stenosis: A National Comparison. Canadian Spine Outcomes and Research Network, Saint John, Toronto, Calgary, Vancouver, Canada. International Society for Study of the Lumbar Spine (ISSLS), Athens Greece May 2017
11. McIntosh G, Fisher C, Hall H, Manson N, Rampersaud YR, **Thomas K,** Carter T. Satisfaction Scores and Patient Reported Outcomes Following Spinal Surgery and Non-Operative Care. International Society for Study of the Lumbar Spine (ISSLS), Athens Greece May 2017.
12. Murray JC, Manson N, McIntosh G, **Thomas K,** Hall H, Fisher C, Rampersaud YR. The Impact of Degenerative Spinal Disorders on the Quality of Life of Patient Undergoing Spine Surgery in Canada: A National Comparison to Normal Peers. CSS Meeting Montreal February 2017.
13. Ryu WHA, Mostafa AE, Dharampal N, Sharlin E, Kopp G, **Jacobs WB,** Hurlbert RJ, Chan S, Sutherland GR: Design-based Comparison of Spine Surgery Simulators: Optimizing Educational Features of Surgical Simulators. Oral presentation at the Canadian Spine Society Annual Meeting, Montreal, Quebec, February 22 – 25, 2017.
14. Ryu WHA, Dharampal N, Mostafa AE, Sharlin E, Kopp G, **Jacobs WB,** Hurlbert RJ, Chan S, Sutherland GR: Systematic review of patient-specific surgical simulation: Next step in advancing medical education. Oral presentation at the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Las Vegas, Nevada, March 8 – 11, 2017.
15. Ryu WHA, Dharampal N, Mostafa AE, Sharlin E, Kopp G, **Jacobs WB,** Hurlbert RJ, Chan S, Sutherland GR: ReflectiveSpineVR: Incorporating nonlinear interaction history into surgical simulation design. Poster presentation at the 2017 SimExpo, Toronto, Ontario, Canada, November 30, 2017

16. Safaee M, Deviren V, Scheer J, Lau D, Osorio J, **Nicholls F**, Ames C. Ligament Augmentation Reduces Proximal Junctional Kyphosis and Proximal Junctional Failure in Adult Spinal Deformity. Scoliosis Research Society International Meeting on Advanced Spine Techniques 2017, Cape Town (Podium)
17. **Soroceanu AM**. Adult Cervical Deformity : How does Revision Surgery Compare to Primary Surgery? Prospective Multicenter Study with 1-Year Follow-up – Podium. Canadian Spine Society, Montreal, February 2017
18. **Soroceanu AM**. Radiographic Assessment of Spinopelvic Parameters in Surgically Treated Patients with Symptomatic Low Grade Spondylolisthesis – Podium. Canadian Spine Society, Montreal, February 2017
19. **Soroceanu AM**. Establishing the Minimum Clinically Important Difference in NDI and mJOA for Adult Cervical Deformity – Podium. Scoliosis Research Society (SRS), Philadelphia, September 2017
20. **Soroceanu AM**. Is the “2/3 Lumbar Lordosis Comes from L4-S1” Rule Predictive of Outcome Among Patients with Sagittal Plane Spinal Deformities – Podium. Scoliosis Research Society (SRS), Philadelphia, September 2017
21. **Soroceanu AM**. Comprehensive Complication Classification for Adult Spinal Deformity: Impact on Patient Outcomes – epresentation. Scoliosis Research Society (SRS), Philadelphia, September 2017
22. **Soroceanu AM**. Analysis of Prospective Collection of 374 Osteotomies in 99 Patients with Adult Cervical Deformity – Podium. North American Spine Society (NASS), October 2017
23. **Soroceanu AM**. Establishing the Minimum Clinically Important Difference in NDI and mJOA for Adult Cervical Deformity – Podium. North American Spine Society (NASS), October 2017
24. **Soroceanu AM**. Comprehensive Complication Classification for Adult Spinal Deformity: Impact on Patient Outcomes – Podium. North American Spine Society (NASS), October 2017
25. **Soroceanu AM**. The Relationship Between Improvements in Myelopathy and Sagittal Realignment in Cervical Deformity Surgery – Podium. North American Spine Society (NASS), October 2017
26. **Soroceanu AM**. Radiographic Assessment of Spinopelvic Parameters in Surgically Treated Patients with Symptomatic Low Grade Spondylolisthesis – Poster Grand Rounds. North American Spine Society (NASS), October 2017
27. **Soroceanu AM**. Incidence and Outcomes of Neurological Complications in 176 Adult Spinal Deformity Patients Treated with Three-column Osteotomy – Poster. North American Spine Society (NASS), October 2017
28. **Soroceanu AM**. Comprehensive Complication Classification for Adult Spinal Deformity: Impact on Length of Stay – Poster. North American Spine Society (NASS), October 2017

29. **Soroceanu AM.** Should Targets for Adult Spinal Deformity Correction Depend on Pelvic Incidence? – Poster. North American Spine Society (NASS), October 2017
30. **Soroceanu AM.** Evaluating Cervical Deformity Corrective Surgery Outcomes at One-year Using Current Patient Derived and Functional Measures; Are they Adequate? – Poster. North American Spine Society (NASS), October 2017
31. **Soroceanu AM.** Impact of Obesity on Radiographic Alignment and Short-term Complications after Surgical Treatment of Adult Cervical Deformity – Poster. North American Spine Society (NASS), October 2017
32. Tee J, Rampersaud R, Manson N, Hall H, **Thomas K**, McIntosh G, Fisher C. The Effect of Surgical Wait Time on Patients with Degenerative Lumbar Spondylolisthesis: a Canadian Spine Outcomes and Research Network (CSORN) Study. CSS Meeting Montreal February 2017.
33. **Thomas K**, Manners S*, Faris P and CSORN. Regional variation in the treatment of lumbar stenosis. CSS Meeting Montreal February 2017.
34. Tomkins-Lane C, Hepler C, Sinha A, Norden J, **Bouchard J.** Changes in Objectively Measured Performance, Function and Pain Following Total disc Replacement for Degenerative Disc Disease”, 32nd Annual North American Spine Society Meeting, Orlando, October 2017.
35. Yang M, Hardy St Pierre G*, Gurr K, **Bouchard J.** Long term surgical relief of back pain- minimum 5 years follow-up outcomes of lumbar TDR, Canadian Spine Society Annual meeting, Montreal, February 24, 2017.
36. Yang M, Dulku B, **Casha S.** Radiological predictors of kyphosis after thoracolumbar burst fractures managed using thoracolumbarsacral orthosis and long-term follow-up of outcomes. Oral presentation at AANS/CNS Joint section spine and peripheral nerve Spine Summit, Las Vegas, Nevada, March 2017.
37. Yavin D, **Casha S**, Wiebe S, Feasby T, Holroyd-Leduc J, Hurlbert RJ, Quan H, Nataraj A, Sutherland GR, Bartleson Jr JD, Christie S, Davenport WJ, Findlay T, Fleetwood IG, Furlan A, Gallagher C, Mukhida K, Ouellet JA, O’Toole J, Reitman CA, Shamji MF, Williamson O, Dhaliwal P, **du Plessis S**, Jette N Lumbar Spine Fusion: A RAND/UCLA Appropriateness Study. Oral presentation at AANS/CNS Joint section spine and peripheral nerve Spine Summit, Las Vegas, Nevada, March 2017.
38. Yavin D, Dhaliwal P, Whittaker T, Hawboldt GS, Jewett GA, **Casha S**, **du Plessis S.** Intrathecal morphine following lumbar fusion: a randomized, placebo-controlled trial. The Annual Meeting of the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves (Las Vegas, NV) March 2017 (platform presentation).

Grants

Active Research Grants (Bold denotes Spine Program Faculty):

1. **Bouchard J.** COREF spine grant: An examination of community performance before and after total disc replacement surgery for degenerative disc disease: The use of computerized activity monitors. Amount \$20,000
2. **Cadotte D.** 2018 Chief Medical Officer Quality Improvement grant: Keeping the Patient in Focus: Timely Access and Valuable Interaction: A Quality Improvement Initiative. Amount \$35,000
3. **Casha S.** 2017-2019 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). Amount: €15,000 (Calgary portion)
4. **Casha S.** Alberta Spine Foundation 2015-2017. Title: Appropriateness of Surgical Fusion of the Lumbar Spine. Role: Co-applicant with N. Jette (U of Calgary). Amount: \$20,000
5. **Casha S.** Rick Hansen Institute 2012-2018. MASC - Minocycline in Acute SCI. Role: Co-applicant with RJ Hurlbert (U of Calgary). Amount: \$1,300,000
6. **Ferri-de-Barros F** (PI), Parsons D, Stratton A, et al. Alberta Children's Hospital Foundation Child Health Grant Program, Alberta Health Services/Cumming School of Medicine – University of Calgary June 2015-2017 Surgical Simulation for Scoliosis Surgery Training. CAD\$ 244,310
7. **Jacobs WB.** Alberta Spine Foundation Research Grant 2016-2017. Title: Mean Arterial Pressure in Spinal Cord Injury (MAPS): Determination of non-inferiority of a mean arterial pressure of 65 mmHg compared to a mean arterial pressure of 85 mmHg in acute human traumatic spinal cord injury. Type: Operating Grant. Role: Principal Investigator. Amount \$20,000
8. Matyas J, **Saló P**, Tomanek B, Trang T, Yates R. Canadian Institutes for Health Research (CIHR). Central and Peripheral Determinants of Acute and Persistent Joint Pain. 07/2016 – 06/2019. Amount \$383,716
9. Matyas J, Biernaskie J, Rosin N, **Saló P**, Stratton J, Trang T, Yates R. Canadian Institutes for Health Research (CIHR). Role of Neuroinflammation in the Development of Chronic Joint Pain. 07/2016 – 06/2019. Amount \$378,429
10. **Nicholls, F.** Analysis of the Implications of Lumbopelvic Alignment on the Alignment of the Cervical Spine. Fraternal Order of Eagles Spine Grant. Amount \$20,000. McCaig Catalyst Grant. Amount \$30,000. Division of Orthopaedic Surgery. Amount \$30,000. Total Funding: \$80,000
11. **Soroceanu A.** Scoliosis Research Society (SRS) Research Grant - Funding received for project entitled "The Effect of Spinopelvic Parameters on the Development of Proximal Junctional Kyphosis in Early Onset Scoliosis", Co-Investigators Dr R El-Hawary (IWK), Dr Kubat (IWK), Dr V Lafage (HSS), Dr F Schwab (HSS).

12. **Swamy G, Salo P, Ronsky J.** Alberta Spine Foundation 2015-2017. Dual Fluoroscopy for In-Vivo Analysis of the 3D Kinematics of Cervical and Lumbar Degeneration". Amount \$18,700
13. **Swamy G & Hart D.** Are sex-differences in degenerative spondylolisthesis and degenerative scoliosis explainable by mechanical differences in the post-menopausal intervertebral disc? McCaig Institute for Bone and Joint Health Clinician-Scientist Grants. 2017-5-29, Award Term: 12 months. Amount: \$10,000. Alberta Spine Foundation, 2017-8-22, Award Term: 18 months. Amount: \$10,000. Total Funding: \$20,000
14. **Swamy G & Ronsky J.** M6 vs Prodisc-C Kinematics. McCaig Institute for Bone and Joint Health – Encore Catalyst Award. 2016-11-25, Award Term: 18 months. Amount: \$25,000
15. **Swamy G & Amiri S.** Intraoperative Localization of Target Vertebral Level in Spine Surgery. Alberta Spine Foundation, 2016-6-22, Award Term: 24 months. Amount: \$14 700
16. **Swamy G & Amiri S.** Evaluation of the Inter-Vertebral Motions during Spine Surgery. Alberta Spine Foundation, 2015-10-5, Award Term: 24 months. Amount: \$15,300
17. **Thomas K.** Calgary Orthopedic Research Education Fund 2017. Neurological complications after lateral lumbar interbody fusion. Amount \$4850





Regional

Bouchard J. Competency by Design Lead, Section Orthopaedic Surgery, Department of Surgery, September 2017 to August 2019

Bouchard J. Accreditation committee member, Post-Graduate Medical Education, University of Calgary, September 2017 to present

Bouchard J. Surgical Foundations Academic Advisor, June 2018 to present

Bouchard J. Elected Academic Staff Member, University of Calgary General Faculties Council, 2015 to 2017

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

Bouchard J. Medical student Appeals Committee, 2009 to present

Casha S. University of Calgary Combined (Orthopaedic and Neurosurgical) Spine Program, April 2018 to present, Director

Casha S. University of Calgary Spine Program, Fellowship Director, April 2013-March 2018

Casha S. Resident Research Director, University of Calgary Division of Neurosurgery, August 2012 to present

Casha S. Educational Committee member, Hotchkiss Brain Institute, University of Calgary, July 2012- July 2017

Ferri-de-Barros F. University of Calgary Spine Program, Pediatric Spine Fellowship Director, Alberta Children's Hospital, 2011- present

Ferri-de-Barros F. Chair of the Annual Gordon Townsend Day Visiting Professor Program, on behalf of the Division of Pediatric Orthopaedics, University of Calgary. November 2013-present

Ferri-de-Barros F. Representation for the Department of Pediatric Surgery, University of Calgary: Child Health Quality Committee, January 2015-present

Ferri-de-Barros F. Representation for the Division of Pediatric Orthopaedics, University of Calgary: Alberta AIM (Access, Improvement, Measures). November 2013-present

Ferri-de-Barros F. Representation for the Division of Pediatric Orthopaedics, University of Calgary: Trauma Quality Management Committee Alberta Children's Hospital. 2013-Present

Ferri-de-Barros F. Representation for the Division of Pediatric Orthopaedics, University of Calgary: Trauma Committee Alberta Children's Hospital (2013-present)

Ferri-de-Barros F. Representation for the Division of Pediatric Orthopaedics, University of Calgary: Orthopaedic Fellowship Committee University of Calgary. January 2011-present

Jacobs WB. Neurosurgery Residency Competency by Design Evaluation Director, Division of Neurosurgery, Department of Clinical Neuroscience, Faculty of Medicine, University of Calgary, 2018 – present

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

Jacobs WB. Member, Division of Neurosurgery AARP Management Committee, 2017 – present.

Jacobs WB. Research Director, Calgary Spine Program, University of Calgary, 2013 – March 2018

Jacobs WB. Fellowship Director, Calgary Spine Program, University of Calgary, March 2018 – present

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

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

Jacobs WB. Hotchkiss Brain Institute, University of Calgary, 2009 – present, Associate Research Member.

Lewkonja P. Orthopaedic Surgery Residency Program Spine Education, 2018 to present, Lead

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

Lewkonja P. Undergraduate Medical Education, University of Calgary, 2015-present, Course II Coordinator

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

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

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

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

Salo P. McCaig Institute for Bone and Joint Health (1998 – present), Member

Salo P. CIP Residency Training Committee, 2015 – present, Member

Soroceanu A. Canadian Spine Outcomes and Research Network (CSORN) – University of Calgary Site Lead, 2015 - present

Soroceanu A. Calgary Orthopaedic Resident Forum (CORF) course, 2015-present, Spine surgery teaching faculty

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

Thomas K. Surgical Executive Committee, Calgary Zone, Member 2013 - 2017

Thomas K. University of Calgary Combined (Orthopaedic and Neurosurgical) Spine Program, March 2013 – April 2018, Director

Thomas K. Section of Spine Surgery, Division of Orthopaedics, June 2011 – April 2018, Head

Thomas K. Orthopaedic Residency Training Committee, April 2015 – April 2018

Thomas K. Orthopaedic Residency Ombudsman, 2006- present

Provincial

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

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

Thomas K. Alberta Spine Foundation, 2018-present, President

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

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

Casha S. Rick Hansen Institute, Cure Program Advisory Committee, October 2013-present, Member

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

Jacobs WB. Executive Committee, Canadian Spine Society, 2013 – present, Member

Soroceanu A. Canadian Spine Society, 2016-2017, Scientific Program Committee

Soroceanu A. Canadian Orthopaedic Association, 2016-2017, Abstract Reviewer

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

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

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

Thomas K. Canadian Spine Society Scientific Abstract Review Committee 2011 - 2017

Thomas K. Executive Committee Board Member, Canadian Spine Society 2013- present

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

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

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

Casha S. AANS and CNS joint guidelines committee, August 2011-present, Member

Ferri-de-Barros F. Editor, Brazilian Journal of Medicine and Human Health, 2017-Present

Ferri-de-Barros F. Reviewer for RBO ("Revista Brasileira de Ortopedia"), Reviewer and adjudication for the 18th Annual Scientific Conference CSS, 2018

Ferri-de-Barros F. QSVI committee, Pediatric Orthopaedic Society of North America (POSNA), March 2015-present, Member

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

Ferri-de-Barros F. International Perthes Study Group (IPSG), March 2012-present, Member of the outcomes subgroup

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

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

Jacobs WB. Rules and Regulations Committee, AANS/CNS Section of Disorders of the Spine and Peripheral Nerves, 2015 – 2018, Chair

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

Jacobs WB. AOSpine North America Education Committee, 2015 – 2018, Member

Jacobs WB. Scientific Program Committee, 2018 Annual Meeting of the AANS/CNS Section of Disorders of the Spine and Peripheral Nerves, Member

Jacobs WB. AOSpine North America Teaching Faculty, 2012 – present, Member

Nicholls F. AOSpine North America, 2017 – present, Faculty

Soroceanu A. International Society for the Advancement of Spine Surgery (ISASS), Scientific Program Committee, 2017-2018

Soroceanu A. Orthopaedic Research Portfolio Committee, 2014-present, Spine representative

Soroceanu A. International Spine Study Group (ISSG), 2017-present, University of Calgary Principal Investigator

Soroceanu A. International Spine Study Group (ISSG), 2013-present, Study group member



Canadian Spine Society

In 2018, 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 Banff Springs Hotel. In addition to consultant presentations, our residents and fellows presented the following talks:



Shandy Fox	Impact of Pelvic Parameters on Short Segment Lumbar Fusion
Alejandro Peiro-Garcia	Sagittal Balance and Spinopelvic Parameters in AIS Patients Managed with Intraoperative Skull-Femoral Traction
Jonathon Bourget-Murray	Quality, Safety and Value of Innovation in Scoliosis Surgery: Intraoperative Skull-Femoral Traction and Navigated Sequential Drilling
Alejandro Peiro-Garcia	Short-term Complications in VEPTR and Magnetically Controlled Growing Rods to Manage Early Onset Scoliosis
Alejandro Peiro Garcia	Staged Magec Rod Insertion to Manage Early Onset Scoliosis
Felipe Nares	Lumbar Surgery in Octogenarians. Really?
Alisson Teles	Surgical Feasibility and Results of Oblique Lateral Interbody Fusion at L5-S1 level.
Michael Yang	Radiographic Outcome after cervical disc arthroplasty: Development of Heterotopic Ossification

Alisson Teles

Use of Methylprednisolone for Acute Spinal Cord Injury: Identification of Patterns of Practice and Reasons for its use Worldwide

Alejandro Peiro-Garcia

Use of Three Rods to Manage Large and Rigid Curves in Adolescent Idiopathic Scoliosis: An Alternative Technique



The 2019 CSS annual meeting will take place in Toronto at the Fairmont Royal York Hotel.

Alberta Spine Foundation

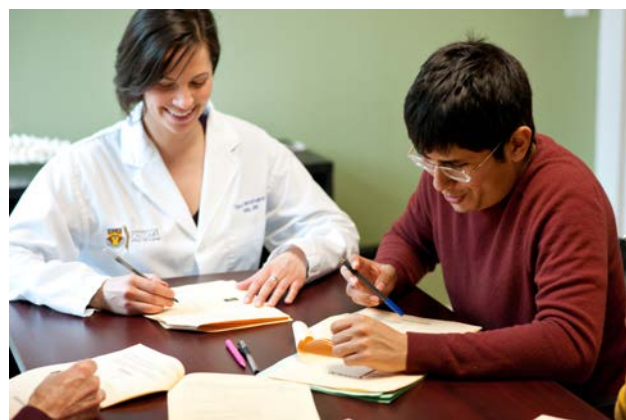
The Alberta Spine Foundation (ASF) is a non-profit organization that was established by the members of the University of Calgary Spine Program and the members of the University of Alberta Spine Program. The objective of the ASF is to advance the delivery of spine care in Alberta through innovative clinical 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.
- The ASF provides education to the public and primary care providers through modules under the education segment of the website. Patients and providers are able to view animations of surgical and diagnostic procedures. They are able to gain knowledge on various clinical problems by viewing our patient education animations of specific diseases affecting the spine.
- Through our fellowship programs, 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.

This year the ASF annual meeting was held in Red Deer in September, under the direction of the Chairman, Dr. Andrew Nataraj.

Canadian Spine Outcomes Research Network (CSORN)

The University of Calgary Spine Program continues to contribute to the Canadian Spine Outcomes Research Network (CSORN), the national spine registry of the Canadian Spine Society. With its inception in 2012 and now with 18 sites actively involved, Calgary is the top recruiting center in Canada – as shown in the figure below. CSORN has approximately 12,657 active enrolments of elective spine surgery. We attribute the success of the Calgary site to a strong collaboration between Surgeons, Fellows, Administrative Assistants and Research Staff.



In 2018, we focused on collecting quality data, prioritizing form completion and ongoing patient follow-up with good results. Our completion rates are as follows:

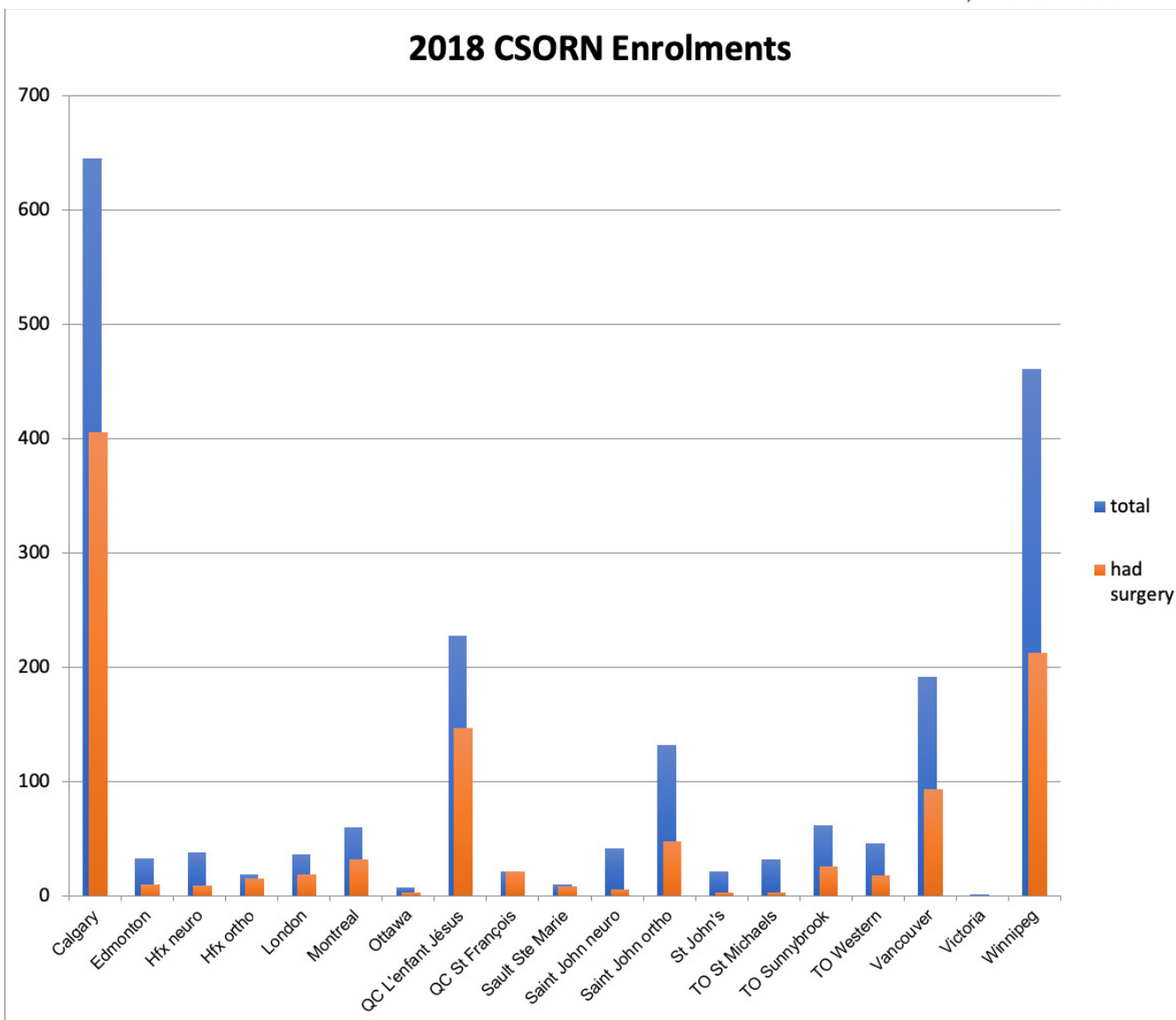
6-18 week follow-up 95%

1-year follow-up 92%

2-year follow-up 87%

CSORN has grown and is now a productive research collaboration with several prospective and many retrospective studies underway or completed.





As the CSORN database continues to grow both locally and nationally, a number of sub-studies have been initiated. Calgary is actively participating in these sub-studies, including a local study for cervical myelopathy and a national degenerative spondylolisthesis RCT and cohort study.

To date the CSORN has produced 80 abstracts, and 7 manuscripts with many more in development and production. CSORN, as the name implies, is a network of individuals interested in placing effort into the betterment of spine care. The registry associated with CSORN is the main vehicle that facilitates this research.

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. Six hundred seventy 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 multisite sub-study collaborations within the registry, recruiting patients specifically to these initiatives and collecting additional data for those research questions. Currently, those sub-studies include: Gastrointestinal and Urinary tract Microbiome after Spinal Cord Injury, Acceptance and empowerment after Spinal Cord Injury, and Liberation from Mechanical Ventilation. 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, the Mean Arterial Blood Pressure in Acute Spinal Cord Injury trial, the creation of a cerebrospinal fluid and serum tissue bank for the study of biomarkers, and a collaboration with SCI Alberta for the collection of community follow-up outcomes. Current new activities in this initiative include the adoption of the revised data set that will shortly be adopted across the 35 RHSCIR sites and transfer of sponsorship for the MASC to the University of Calgary investigators.

International Spine Study Group (ISSG)

In early 2017, the Calgary Spine Program got involved with the International Spine Study Group (ISSG) database; a database that focuses entirely on the treatment of adult spinal deformity. Within the first 6 months, with Dr. Soroceanu as the Principal Investigator, Dr. Swamy, Dr. Thomas, Dr. Nicholls and Dr. Soroceanu completed surgery on a total of 17 patients who were enrolled in ISSG. However, the ISSG committee has since restructured its participation guidelines, and sites were asked to withhold enrolling any patients unless they belonged to the Principal Investigator. Dr. Soroceanu continues to enroll her scoliosis patients in ISSG. Meanwhile, we are continuing to collect follow-up data on the original 17 patients. With the next ISSG committee meeting coming up in April 2019, we are excited to report that all patients have completed 1-year follow up, and 3 patients have completed their 2-year follow-up... and counting.



Surgery Innovations

Foothills Medical Centre

While spine endoscopy remains an interesting technique our pursuit of this technology has slowed due to the current lack of OR financial resources. We will continue to look for ways in which we may implement this technology which will result in less tissue destruction and may translate into less postoperative pain with a quicker return to function/productivity.

Calgary remains a prominent user of the lateral lumbar approach to address single and multiple level pathologies, including thoracolumbar deformity. The use of this technique is unique as compared with other Canadian and most North American Centers. We continue to evaluate surgical outcomes in this area and will make changes as necessary.

Transitional Outpatient Pain Program for Spine (TOPPS)

With the opioid crisis growing in Canada, and Alberta as one of the provinces with the highest rates of prescription opioid use, a multi-disciplinary Transitional Outpatient Pain Program for Spine (TOPPS) was developed as a pilot project for degenerative spine patients undergoing decompressions and short-segment fusions. This project is run by Dr. Tanguay (psychiatry – pain program) and has been in place for just over a year now. Patients are started in this program prior to elective surgery to reduce pain catastrophizing, kinesiophobia, and decrease opioid use, with a goal of breaking the fear avoidance cycle and enhancing recovery prior to spinal surgery.

Members of the TOPPS program then follow patients in the post-operative period 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 to 12 weeks postoperatively. This program has been successful thus far, and we are now working at extending this project to adult spinal deformity patients. These patients represent a more challenging population and have much higher rates of long-term opioid use, both before and after surgery. Dr. Soroceanu, in collaboration with Dr. Tanguay, Dr. Swamy, Dr. Thomas, Dr. Jacobs, and Dr. Nicholls, has recently applied for local funding, along with a bigger CIHR grant, to support this project and prospectively collect data on newly enrolled deformity patients. Their goal is to examine opioid use in spinal deformity patients more closely and assess its impact on peri-operative resource use, healthcare costs, and post-operative patient outcomes.



New Staff

Dr. David Cadotte

David Cadotte completed his medical school and Neurosurgery residency training at the University of Toronto. During residency, David completed a PhD in medical imaging through the Institute of Medical Science at the University of Toronto and the Royal College of Canada Clinician Investigator Program with a special focus on advanced MRI imaging of the human spinal cord. After obtaining Fellowship of the Royal College of Surgeons of Canada in Neurosurgery, David continued his clinical training in the field of complex Spinal Surgery at the University of Calgary with combined exposure to both Orthopaedic and Neurosurgical treatment of spinal disorders. David then joined the Department of Clinical Neurosciences at the University of Calgary as an Assistant Professor in Neurosurgery and Radiology at the Hotchkiss Brain Institute.



Dr. Cadotte's research interests lie in the application of advanced MRI techniques to study degenerative diseases of the cervical spine. Using a combination of cutting edge imaging techniques and novel database and artificial intelligence solutions, it is the Cadotte research groups' vision to create an interactive Natural History registry that serves the people of Southern Alberta by offering a Monitoring and Evaluation strategy to maintain functional independence throughout life. One of the inaugural projects will focus on low-grade cervical myelopathy that will test the hypothesis that patients endure subclinical spinal cord injury for a period of months to years prior to experiencing profound clinical deterioration leaving them with difficulty using their hands or walking. The results of this work will hopefully yield a specific imaging strategy to make patients and surgeons aware of ongoing spinal cord injury such that surgical treatment can be offered to maintain neurological and functional independence rather than treating a patient with severe disability.



Ariana Frederick

Ariana comes to us from the University of Calgary, where she was previously working as a lab manager and researcher in the field of neuroimmunology. She has a Bachelor's of Kinesiology and a Master's in Neurobiology from Concordia University in Montreal, Quebec. She joined the Spine Program in September 2017 with the goal of expanding her work experiences within the clinical research realm. Since joining the program, she has developed a specific interest in adult spinal deformity outcomes.

Social Events

As is our tradition, we celebrated the graduation of our spine fellows as they headed off to new careers in spinal surgery. In December of 2017, we toasted their success at Model Milk and in June 2018 at Alloy.

