



The Canadian Spine Society is a collaborative organization of spine surgeons and health care professionals from across Canada with a primary interest in advancing excellence in spine patient care, research & education.



Canadian Spine Outcomes and Research Network (CSORN):

2024 Annual Report



The Canadian Spine Research & Education Fund (CSREF) is a charitable organization whose mandate is to promote spine research and education in Canada.

Canadian Spine Outcomes and Research Network (CSORN): 2024 Annual Report

On behalf of the Steering Committee and all the investigators and research coordinators who contribute to the success of the Canadian Spine Outcomes & Research Network (CSORN), we present the 2024 Annual Report.

The CSORN initiative continues to provide a national record of the indications, techniques, complications and outcomes of spine surgery across Canada. It is a vehicle to improve spine surgery.

Four key groups contribute to CSORN's success: patients, surgeons, research coordinators and funders. Patients remain willing to answer numerous questions at multiple time points during their treatment. Completing lengthy surgical forms at the end of a long day in the operating room is not pleasant, but our spine surgeons (principal and co-investigators) persist with commitment. Their ability to develop research questions and perform studies is truly outstanding. Our research coordinators remain the backbone (pun intended) of the CSORN initiative. They have the unenviable job of tracking down both surgeons and patients to ensure all the forms are complete. Our coordinators are tireless – often working outside normal business hours – in data collection/entry, phone calls and mailings. A successful registry requires financial support. We are fortunate to have generous sponsorship, through the Canadian Spine Research & Education Fund, from our principal funders, Stryker, Medtronic and Johnson&Johnson MedTech. There would be no CSORN without their annual contributions.

One of many milestones reached in 2024 was reaching 72 in-print/in-press publications. Many healthcare registries have successfully collected data but failed in knowledge transfer. Summarizing numerous pages of results and analyses into manuscripts, then making journal submissions are arduous tasks. Congratulations to our resolute authors for carrying their research ideas to publication and making significant contributions to the medical literature.

CSORN continued to grow in volume, data quality and research output this year. The Annual Report summarizes accomplishments of the CSORN investigators and offers a variety of key data points for the 1653 patients enrolled in 2024.

Greg McIntosh
CSORN Director of Research Operations
December 31, 2024

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Canadian Spine Outcomes and Research Network (CSORN): 2024 Annual Report

Executive Summary

The Canadian Spine Outcomes and Research Network (CSORN) now contains 17863 enrolled patients across 22 sites; n=1653 were added in 2024. Enrolments increased by 5% over last year.

Our five continuing prospective studies added a total of 223 patients. Our degenerative cervical myelopathy study remains the largest single DCM dataset in the world.

The most common principal pathology was stenosis for both cervical and thoracolumbar (TL) patients. For elective surgery cases, fusion (in combination with other operations) was the most common procedure. Approximately 73% of patients had symptoms for one-year or more prior to surgery.

From baseline to 3-month follow up, pain ratings and disability scores improved for cervical and TL patients. Measured by pathology, those with degenerative disc disease had the largest reduction in neck (-3.6 points) and back pain (-4.3 points). Those with disc herniation had the most improvement in arm (-3.5) and leg pain (-5.0), Neck Disability Index (NDI) (-16.3) and Disability scores (-28.6). Three months after surgery, 84% of cervical and 90% of TL patients stated they were satisfied with their outcome.

The CSORN website continues to see modest online traffic and can be accessed at: csorncss.ca

CSORN research initiatives, including abstracts and presentations at scientific conferences, were again prolific; 25 study abstracts were presented at the 2024 CSS Scientific Conference in Whistler BC and 17 abstracts have been submitted to the 2025 Conference.

There were 10 studies published in peer-review medical journals this year; 4 manuscripts have been accepted and are in-press. In total, we have produced 72 in-print/in-press publications.

Key future endeavours over the the next 12-18 months include:

- Implementation of streamlined surgeon assessment and procedure data collection forms
- Transition from the Global Research Platform (GRP) to Praxis Connect, registry technology that will improve data collection/entry and reporting
- Pursuing large team grants for prospective studies and attaining regional grants and bursaries.

Introduction

The Canadian Spine Society (CSS) is a collaborative organization of spine surgeons and health care professionals from across Canada. The CSS mission is to advance excellence in spine patient care, research and education. To help further this mission, the CSS established the Canadian Spine Registry pilot study in 2012; this initiative progressed to a full-scale research project in 2015, becoming the Canadian Spine Outcomes & Research Network (CSORN).

CSORN Mission Statement

“We are Canadian spine surgeons and rehabilitation specialists with an interest in multi-centre research that evaluates operative techniques and their impact on patient outcomes in order to enhance quality of spine practice and patient care in Canada and demonstrate surgical leadership on a global scale.”

Canadian Spine Outcomes and Research Network (CSORN): 2024 Annual Report

Objectives

CSORN's objective is compiling a national registry of indications, techniques, complications and outcomes for spine surgery. Utilizing both prospective trials and retrospective studies, we publish our findings in peer-reviewed medical journals.

Patient Enrolment

Participating academic hospital sites consecutively enrol all eligible patients with cervical, thoracic or lumbar, pathology requiring treatment. Patient enrolment in the CSORN registry does not change clinical management or require additional tests or procedures.

Inclusion / Exclusion Criteria

Eligibility for enrollment requires:

- Male or Female ≥ 18
- Spinal diagnosis with an emphasis on degenerative conditions (deformity, degenerative disc disease, disc herniation, spondylolisthesis or stenosis)
- Able to communicate in English or French and provide informed consent.

Patients who do not complete the Initial Patient Assessment or Consent form prior to surgery are excluded.

Informed Consent

Patients are given ample time to decide if they wish to be enrolled in the registry. Written, informed consent is obtained prior to any data collection. All informed consent processes and documentation follow both national regulations/guidelines and local institutional policies.

Data Collection Process

Following consent, patients provide baseline demographic information, medical history, employment status, previous medical treatment and current medication usage; they complete standardized health questionnaires on pain, function, disability and quality-of-life. Treating surgeons collect clinical assessment, principal pathology, radiographic evaluation, previous medical treatment information and surgical details.

Follow Up

The first post-surgical visits and/or data collection time points are scheduled to coincide with standard clinical follow-up appointments at approximately 6-18 weeks. Further information is collected at one and two years post treatment. Depending on the procedure, some patients may be followed for up to ten years. Data collection focuses on complications related to clinical treatment, current health status, satisfaction with surgery, radiographic outcomes and the same standardized patient questionnaires administered at baseline.

Ethics Approval

The principal investigator at each CSORN site is responsible for submitting the CSORN protocol to their local Research Ethics Board (REB) for approval or annual renewal; no patient enrolments are performed until after this step is completed. Each local REB is informed whenever the CSORN Steering Committee makes any protocol amendments, in accordance with International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) E6 Good Clinical Practices (GCP), local procedures and Canadian regulatory requirements.

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Global Research Platform

CSORN uses the Global Research Platform (GRP) system, developed by the Praxis Spinal Cord Institute, for the collection and storage of all data. GRP is a user-friendly, web-based, secure data collection and research management structure that has been designed specifically for the collection of clinical and outcome information on spinal cord injury and spinal pathology. Praxis Spinal Cord Institute Praxis is a Canadian-based not-for-profit organization that leads global collaboration in spinal cord injury and spinal pathology research, innovation and care.

Privacy

Praxis adheres to a 'gold standard' of data protection through compliance with Canadian legislative requirements, international data protection standards and privacy best practices. Praxis is subject to British Columbia's Freedom of Information and Protection of Privacy Act (FIPPA) for any data they receive from participating CSORN sites. As a privacy best practice, Praxis complies with the federal Personal Information and Protection of Electronic Documents Act (PIPEDA) and all provincial and territorial privacy laws for its' information handling practices. Praxis has implemented a national privacy and security framework for information handling practices by national CSORN staff that is independent from, but complimentary to, the existing local privacy infrastructure already in place at participating CSORN sites.

Data Security

GRP is hosted in a top-tier, secure data centre in Canada and meets global privacy and security require-

ments. The GRP database and servers are held at a secure location in the Toronto area. KPMG evaluated the security of the system and it passed all of their requirements. On two occasions, ethical hackers were hired to attempt to break into the system from outside and within using valid GRP credentials. They were unsuccessful and commented that they had never encountered such strong security. The database is encrypted so that only GRP can read the contents. Encrypted database back-ups are performed nightly to a secondary site. If the database crashes or there is data loss, only data entered on that day will be affected.

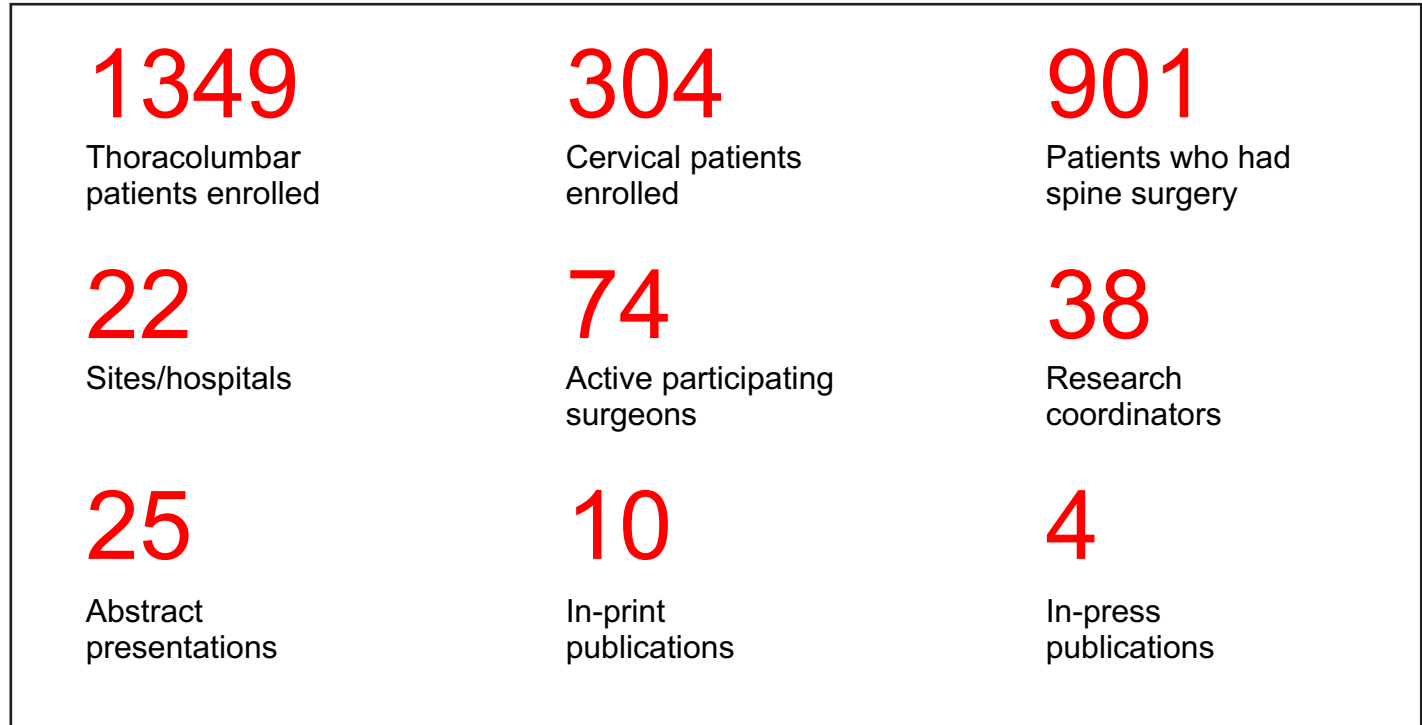
Funding

The Canadian Spine Education and Research Fund, a registered charitable organization, provides financial support for CSORN. Donations to the Fund come from the public, members of the Canadian Spine Society and from the generous contributions of our industry sponsors: Stryker, Medtronic and Johnson&Johnson MedTech.



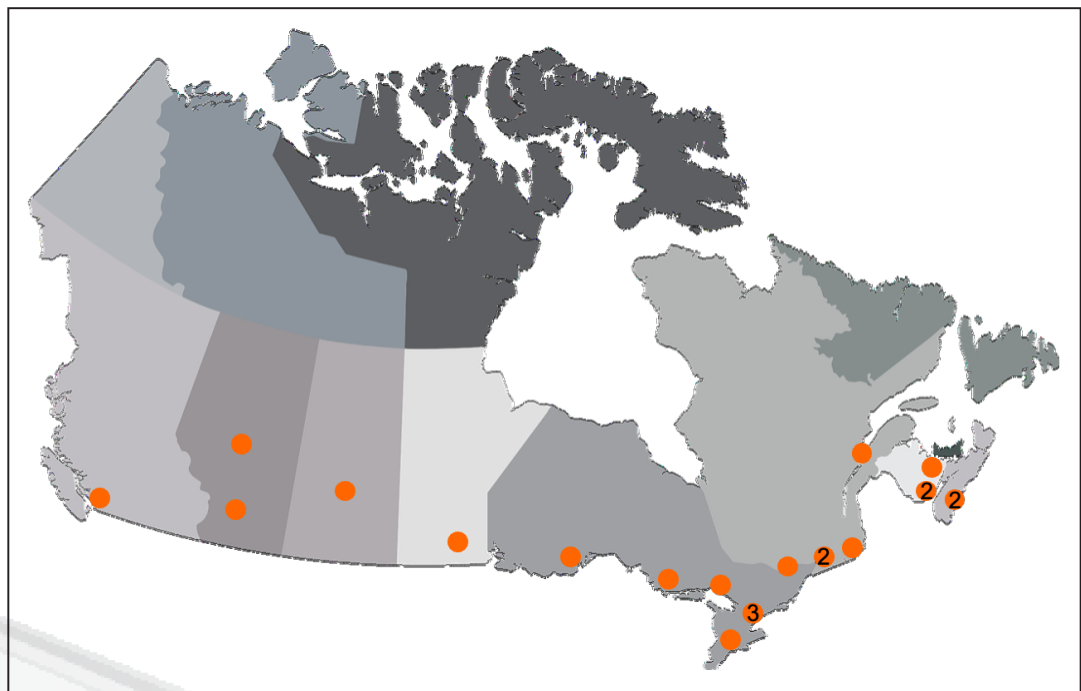
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2024 CSORN Profile in Numbers



CSORN Site Locations

The Network spans eight provinces.



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Website

The CSORN website was launched in 2021 to help improve dissemination of results and provide comprehensive background information on the CSORN initiative. All full-length versions of published manuscripts are available on the website. Please visit csorncss.ca for more details.

Numbers at a Glance

Patient Demographics

- 59.7** average age (standard deviation=14.1, range 18-89)
- 29.3** average Body Mass Index (standard deviation 6.2, range 4.1-56.6)
- 52%** males
- 33%** high school education or less
- 17%** nicotine users
- 50%** greater than 2-year symptom duration
- 58%** exercising regularly
- 79%** >1 comorbidity

Surgical Statistics

- 2.7** days: average length of hospital stay (standard deviation 5.2)
- 23%** with previous spine surgery
- 4.5%** with intra operative adverse event; **5.3%** with a peri-op adverse event
- 1.1%** with tumour diagnosis

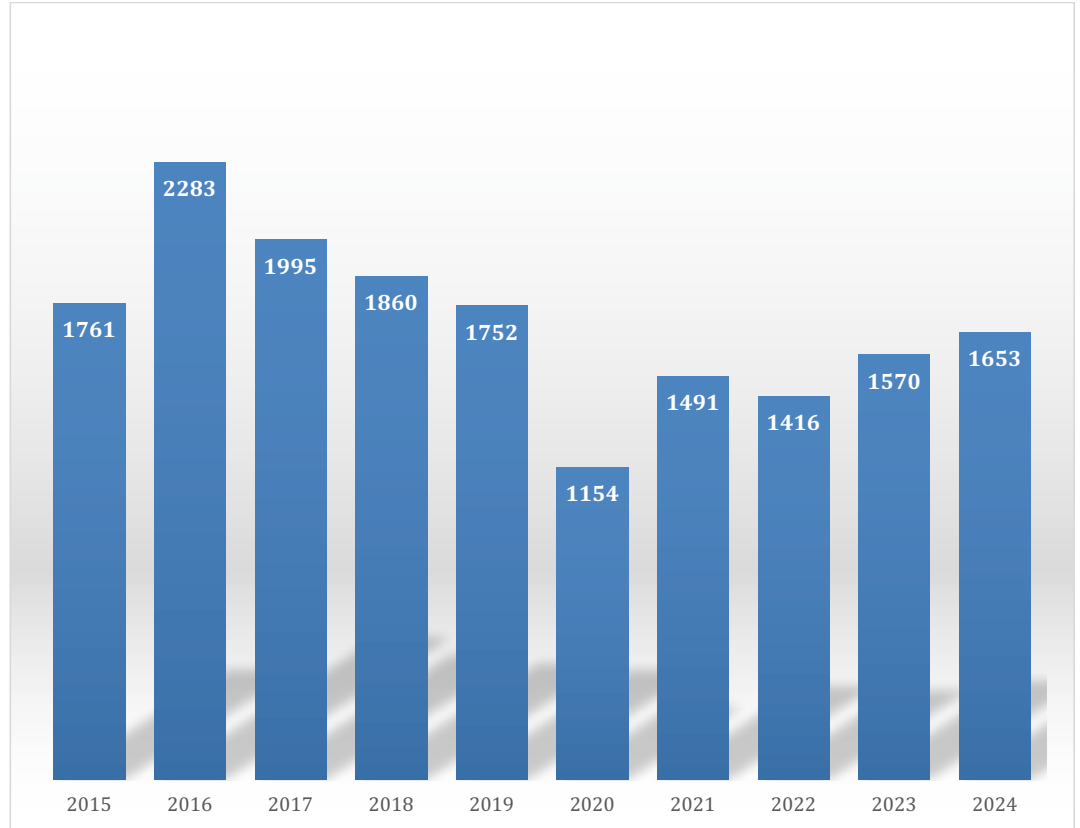
Registry numbers

- 22724** patients enrolled since study inception (including pilot phase)
- 16210** patients enrolled from January 2015 to the end of 2023
- 1653** patients enrolled in 2024

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Enrollments by Year

Enrollments increased by 5.3% compared to 2023.

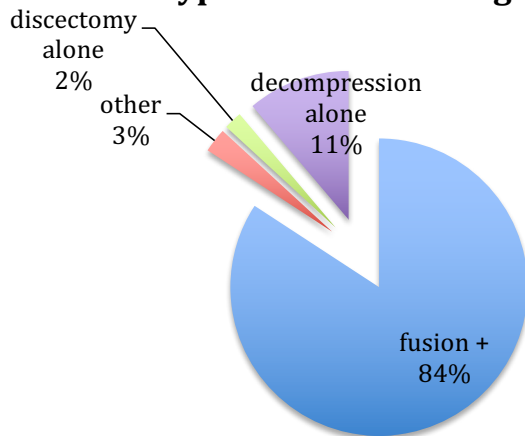


Surgical Data

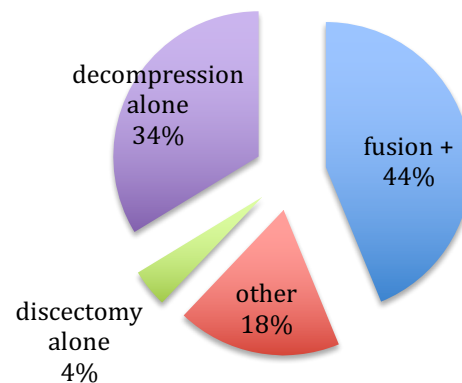
Types of Surgery

For elective surgery cases, fusion (in combination with other operations) was the most frequently performed procedure in both the cervical and thoracolumbar (TL) spine.

Types of Cervical Surgery



Types of TL Surgery

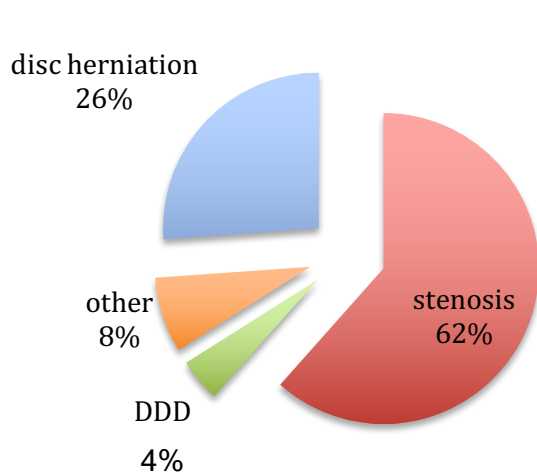


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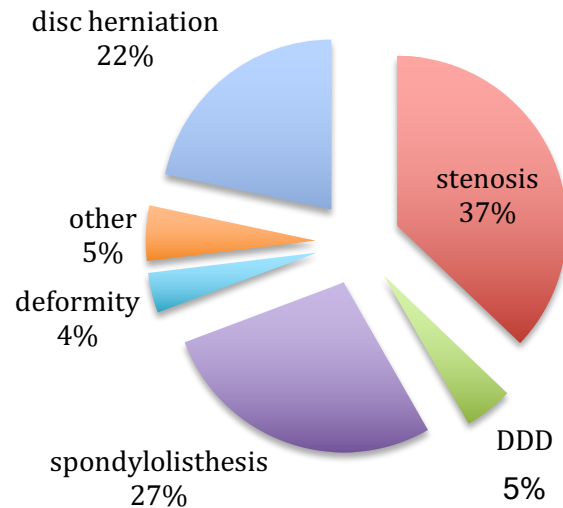
Principal Pathology

The most common principal pathology was spinal stenosis for both cervical and thoracolumbar (TL) patients.

Principal Pathology (Cervical Diagnosis)



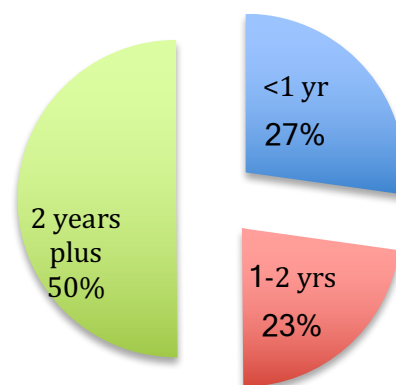
Principal Pathology (TL Diagnosis)



Symptom Duration

Approximately 73% of patients had symptoms for one-year or more prior to surgery.

Symptom Duration

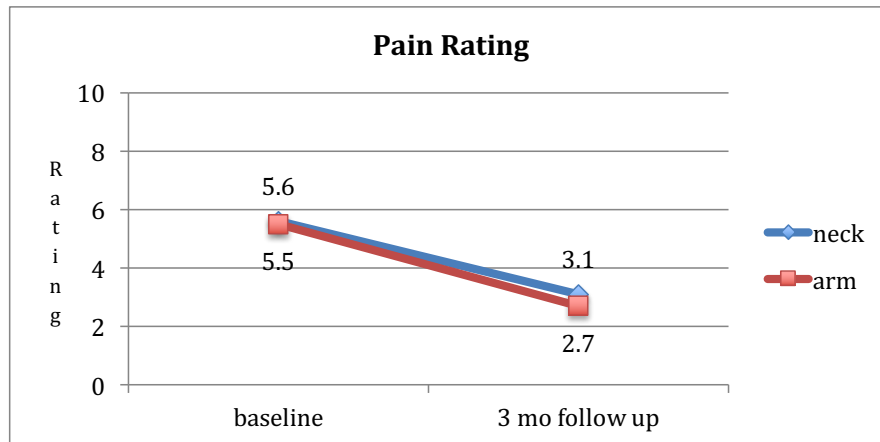


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Selected Patient Reported Outcomes

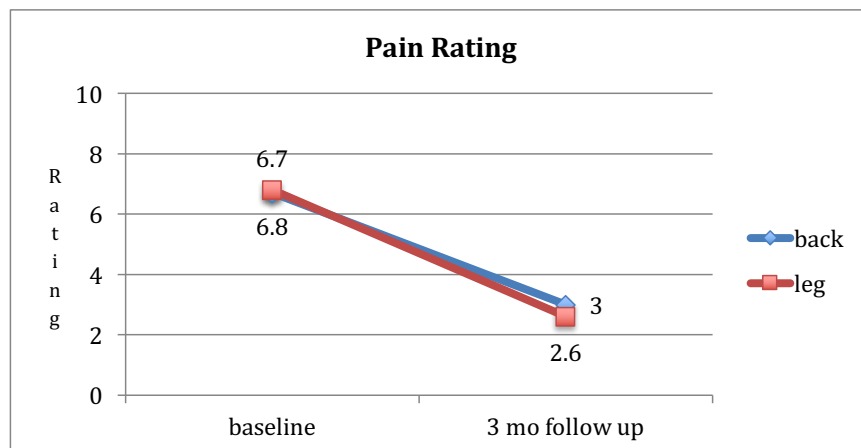
Numeric Pain Rating

Overall mean improvements in cervical pain rating were 2.5 points for neck pain and 2.8 points for arm pain at 3 month follow up. By pathology, those with degenerative disc disease had the largest reduction in neck pain (-3.6); those with disc herniation had the most improvement in arm pain (-3.5).



	Deformity	DDD	Disc Herniation	Spondy	Stenosis
Neck pain change	-	-3.6	-2.2	-	-2.6
Arm pain change	-	-2.6	-3.5	-	-3.1

Overall mean improvements in thoracolumbar pain rating were 3.7 points for back pain and 4.2 points for leg pain at 3 month follow up. By pathology, those with degenerative disc disease had the largest reduction in back pain (-4.3); those with disc herniation had the most improvement in leg pain (-5.0).

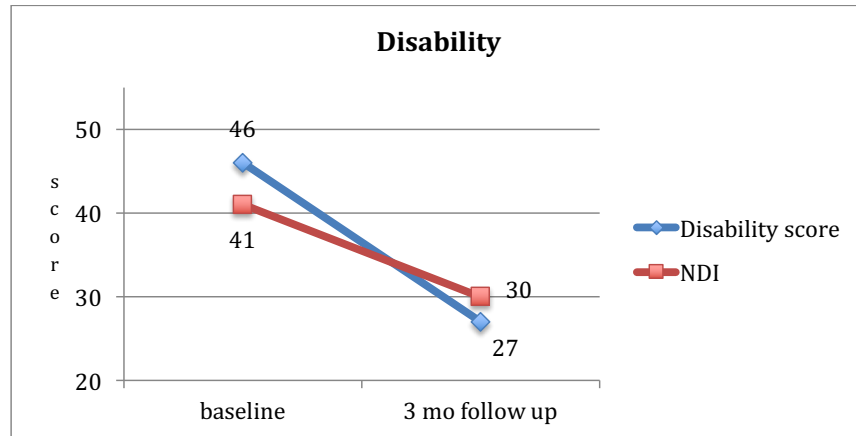


	Deformity	DDD	Disc Herniation	Spondy	Stenosis
Back pain change	-3.9	-4.3	-3.9	-3.8	-3.5
Leg pain change	-3.1	-2.2	-5.0	-4.8	-4.0

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Disability Questionnaires

Measured by standard disability questionnaires at 3 month follow up, overall mean improvements were 11 points for cervical patients and 19 points for thoracolumbar. By pathology, those with disc herniation had largest improvement in Neck Disability Index (NDI) (-16.3) and Disability score (-28.6).

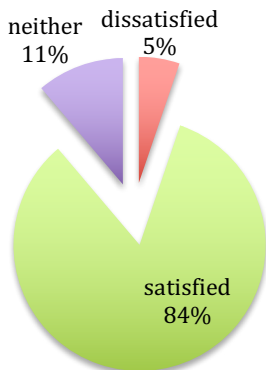


	Deformity	DDD	Disc Herniation	Spondy	Stenosis
Disability Score change	-15.1	-19.2	-28.6	-21.6	-19.0
Neck Disability change	-	-13.3	-16.3	-	-14.3

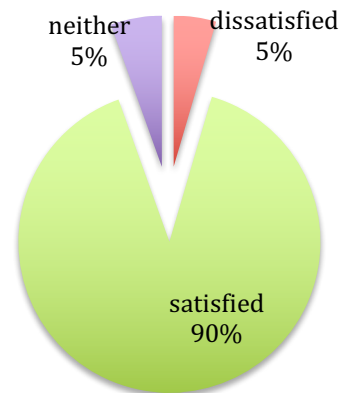
Patient Satisfaction

Approximately 84% stated that they were satisfied three months after cervical surgery; 90% stated that they were satisfied three months after thoracolumbar surgery.

Cervical surgery - satisfaction (3 month follow up)



TL surgery - satisfaction (3 month follow up)



	Deformity	DDD	Disc Herniation	Spondy	Stenosis		Deformity	DDD	Disc Herniation	Spondy	Stenosis
Dissatisfied (%)	-	0	9	-	3	Dissatisfied (%)	0	4	4	4	5
Satisfied (%)	-	86	88	-	83	Satisfied (%)	93	96	88	92	89
Neither (%)	-	14	3	-	14	Neither (%)	7	0	7	4	6

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Research Activities

Prospective Studies

Ongoing in 2024:

Surgical treatment of degenerative spondylolisthesis: a standardized clinical assessment and management plan: CSS multicenter prospective cohort study (18 enrolled; total n=674)

Management and outcome of degenerative cervical myelopathy: a standardized clinical assessment and management plan (123 enrolled; total n=1342)

Surgical treatment of adult spinal deformity (36 enrolled; total n=301)

Anterior vs posterior surgery for lumbar isthmic spondylolisthesis: multicenter prospective cohort study (43 enrolled; total n=82)

Indirect decompression in the Surgical Treatment of Degenerative Spondylolisthesis: a multicenter prospective matched cohort study: A standardized clinical assessment and management plan (3 enrolled; total n=3)

Completed in 2024:

Decompression alone vs. decompression and instrumented fusion for the management of lumbar spinal stenosis associated with stable degenerative spondylolisthesis: a pragmatic randomized clinical pilot trial (total n=61)

General Registry Studies

Projects initiated and abstracts written in 2024:

1. Examining the impact of successive revision spine surgeries on pain, disability, mental health, satisfaction, and length of stay: a Canadian Spine Outcomes and Research Network study

2. Patient's characteristics and outcomes associated with severe neck pain presentation in Degenerative Cervical Myelopathy: An observational study from the Canadian Spine Outcomes and Research Network

3. Anterior versus posterior surgery for degenerative cervical myelopathy: a cost-utility analysis

4. Treatment modality and outcomes in patients with mild DCM

5. Decompression versus decompression plus fusion for stable degenerative lumbar spondylolisthesis: comparing outcomes using propensity-score matched data

6. Delayed surgical treatment for patients with degenerative cervical myelopathy is associated with inferior outcomes for disability and health-related quality of life: A multicentre cohort study from the Canadian Spine Outcomes and Research Network

7. Microbial colonization of orthopedic and spinal implants

8. Assessing construct validity of spine adverse events severity system (SAVES-V2): Impact of adverse event severity grade on longitudinal patient-reported outcomes

9. Research priorities for patients with adult spinal deformity – a modified Delphi approach from the Canadian Spine Outcomes and Research Network

10. Anterior versus posterior surgery for two or three level compression in degenerative cervical myelopathy: Findings from the Canadian Spine Outcomes and Research Network.

11. Machine learning-driven clinical and imaging clustering of degenerative lumbar spondylolisthesis: Implications for stratified surgical care

12. Impact of age and preoperative myelopathy severity on surgical outcomes in degenerative cervical myelopathy

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13. Comprehensive analysis of the prognostic factors associated with reaching minimally clinically important differences across degenerative lumbar conditions: A CSORN Study

14. Reoperation rates for decompression and fusion versus decompression alone for degenerative spondylolisthesis: A comparative analysis

15. Laminoplasty for patients with degenerative cervical myelopathy: An observational and comparative study of posterior cervical approaches from the Canadian Spine Outcomes and Research Network

16. The effects of preoperative psychological health on the outcomes of lumbar discectomy for radiculopathy due to disc herniation

17. Comparison of primary versus revision lumbar spine surgery patients' pre-operative expectations

Presentations

National presentations made in 2024:

1. The effects of peri-operative adverse events on clinical and patient-reported outcomes after surgery for degenerative cervical myelopathy: an observational cohort study from the Canadian Spine Outcomes and Research Network

2. Clinical predictors associated with achieving the minimal clinically important difference in patient reported outcomes after surgery for degenerative cervical myelopathy: A national multicentre cohort analysis from the Canadian Spine Outcomes and Research Network

3. Clinical outcomes after indirect decompression through anterior approaches vs. direct decompression with posterior approaches in lumbar interbody fusion – a propensity-matched analysis using data from the Canadian Spine Outcomes and Research Network

4. Patient expectations and surgical satisfaction in primary versus revision lumbar spine surgery

5. Revision lumbar fusions exhibit worse clinical outcomes when compared with primary fusions: a matched cohort analysis using the Canadian Spine Outcomes and Research Network Registry

6. Clinical outcomes of surgical treatment of degenerative cervical myelopathy; a long-term follow up study

7. A data driven classification of degenerative cervical myelopathy leads to clinically relevant subgroups with distinct pre-operative features and post-surgical outcomes: a CSORN study

8. Characteristics of attrition of patients enrolled into the CSORN registry and prospective studies for Degenerative Spine Surgery

9. Anterior versus posterior surgery for patients with degenerative cervical myelopathy: An observational study from the Canadian Spine Outcomes and Research Network

10. Fulfillment of patient expectations after surgery for degenerative cervical myelopathy. A retrospective analysis of prospectively collected data from the multicenter Canadian Surgical Spine Registry

11. Mild degenerative cervical myelopathy - Patients at risk of conservative treatment failure

12. Impact of 1-2 level MIS vs. open lumbar interbody fusion on post-operative opioid use

13. Impact of surgical wait time on prescription opioid utilisation in patients having surgery for degenerative spinal conditions

14. Outcome prediction following lumbar disc surgery: a longitudinal study of outcome trajectories, prognostic factors, and risk models

15. Waiting for spine surgery in Canada: an evaluation of wait times, wait lists, and surgeries performed before and after the onset of the COVID-19 Pandemic

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16. Comparative analysis of characteristics and clinical outcomes of discectomy without fusion between upper and lower lumbar disc herniations: a Canadian Spine Outcomes Research Network (CSORN) study

17. A comparison of surgical outcome and equitable access for hip, knee and lumbar spine surgery for end-stage Osteoarthritis

18. The relative importance of cervical myelopathy treatment outcomes to spine surgeons and family physicians in Canada; A discrete-choice experiment (poster)

19. Effect of elective cervical spine surgery on mental health of patients with degenerative cervical myelopathy: A CSORN study (poster)

20. Matched-cohort investigation comparing minimally invasive and traditional open lumbar decompression and interbody fusion: A Canadian Spine Outcomes Research Network Study (poster)

21. Describing available preoperative education methods and comparing outcomes for spinal fusion candidates: a cross-Canada study (poster)

22. The effects of using antidepressants for presurgical pain management on postsurgical pain and disability outcomes in patients with lumbar spinal stenosis (poster)

23. The impact of concurrent deformity on patient reported outcome following 1-3 level lumbar surgery not aimed at deformity correction (poster)

24. Decompression and decompression and fusion and the influence of the lordosis distribution index in the outcome of patients with degenerative lumbar spondylolisthesis (poster)

25. Effects of teriparatide on complications, surgical outcomes and health related quality of life in osteoporotic patients undergoing correction of adult spinal deformity (poster)

Publications

All CSORN published studies (in press/in-print) up to the end of 2024:

1. Tripp DA et al. Biopsychosocial factors predict quality of life in thoracolumbar spine surgery. *Quality of Life Research Journal* 2017; 26(11): 3099-3110.

2. Morcos MW et al. Predictors of blood transfusion in posterior lumbar spinal fusion. *Spine* 2018; 43(1): E35-39.

3. Eastwood D et al. Improving post-operative patient reported benefits and satisfaction following spinal fusion with a single pre-operative education session. *The Spine Journal* 2019; 19(5): 840-45.

4. Ayling O et al. Clinical outcomes research in spine surgery: What are appropriate follow-up times? *Journal of Neurosurgery: Spine* 2019; 30(3): 397-404.

5. Morcos MW et al. Predictive factors for discharge destination following posterior lumbar spinal fusion. *Global Spine Journal*. 2019; 9 (4): 403-08.

6. Ailon T et al. Patient reported outcomes following surgery for degenerative spondylolisthesis: Comparison of a universal and multi-tier health care system. *The Spine Journal* 2019; 19(1):24-33.

7. Srinivas S et al. Effect of spinal decompression on back pain in lumbar spinal stenosis. *The Spine Journal* 2019; 19(6):1001-08.

8. Thomas K et al. Decompression alone vs. decompression plus fusion for claudication secondary to lumbar spinal stenosis. *The Spine Journal* 2019; 19(10):1633-39.

9. Sharifi B et al. Consultation and surgical wait times in cervical spondylotic myelopathy. *Canadian Journal of Neurological Science* 2019; 46(4):430-35.

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10. Cushnie D et al. Effect of preoperative symptom duration on outcome in lumbar spinal stenosis. *The Spine Journal* 2019; 19(9):1470-77.

11. Hebert J et al. Patients undergoing surgery for lumbar spinal stenosis experience unique courses of pain and disability: a group-based trajectory analysis. *PLoS ONE [Electronic Resource]*. 14(11):e0224200, 2019.

12. Bond M et al. Treatment of mild cervical myelopathy: Factors associated with decision for surgical intervention. *Spine* 2019; 44(22):1606-12.

13. Canizares M et al. Patients' expectations of spine surgery for degenerative conditions. *The Spine Journal* 2020; 20(3):399-408.

14. Stratton A et al. Opioid use trends in patients undergoing elective thoracic and lumbar spine surgery. *Canadian Journal of Surgery* 2020; 63(3):E306-12.

15. Evaniew N et al. Clinical predictors of achieving the minimal clinically important difference after surgery for cervical spondylotic myelopathy: An external validation study. *Journal of Neurosurgery: Spine* 2020; 33(2): 129-37.

16. Hebert JJ et al. Preoperative factors predict postoperative trajectories of pain and disability following surgery for degenerative lumbar spinal stenosis. *Spine* 2020; 45(21): E1421-30.

17. McIntosh G et al. Development and implementation of a national Canadian spine surgery registry. *Journal of Current Clinical Care* 2020; 10(2): 21-31.

18. Bond M et al. Back pain in surgically treated degenerative lumbar spondylolisthesis: What can we tell our patients? *The Spine Journal* 2020; 20(12): 1940-47.

19. Yang MMH et al. Development and validation of a clinical prediction score for poor postoperative pain control following elective spine surgery. *Journal of Neurosurgery: Spine* 2020; 1-10.

20. Rowe E et al. Predicting recovery after lumbar spinal stenosis surgery: A protocol for a historical cohort study using data from the Canadian Spine Outcomes Research Network. *Canadian Journal of Pain* 2020; 4(4): 19-25.

21. Ayling OGS et al. The effect of peri-operative adverse events on long-term patient reported outcomes after lumbar spine surgery. *Neurosurgery* 2021; 88(2): 420-27.

22. Chan V et al. Comparison of clinical outcomes between posterior instrumented fusion with and without interbody fusion for isthmic spondylolisthesis. *Clinical Spine Surgery: A Spine Publication* 2021; 34(1): E13-18.

23. Aoude A et al. A comparison of patient and surgeon expectations of spine surgical outcomes. *Global Spine Journal* 2021; 11(3): 331-37.

24. Schneider N et al. Lumbar degenerative spondylolisthesis: Factors associated with the decision to fuse. *The Spine Journal* 2021; 21(5): 821-28.

25. Glennie RA et al. The impact of pathoanatomical diagnosis on patients' expectations undergoing elective spine surgery. *Journal of Neurosurgery: Spine* 2021; 35(1): 34-41.

26. Iorio-Morin C et al. Low back pain after lumbar discectomy for disc herniation: What can you tell your patient? *Journal of Neurosurgery: Spine* 2021; 35(6): 715-721.

27. Ayling OAS et al. National AE profile for lumbar degenerative disease and complication rates between hospitals. *Journal of Neurosurgery: Spine* 2021; 35(6): 698-703.

28. Cushnie D et al. Mental health improvements after elective spine surgery. *The Spine Journal* 2021; 21(8): 1332-39.

29. Inculet C et al. Factors associated with using an interbody fusion in low grade lumbar degenerative versus isthmic spondylolisthesis: a retrospective cohort study. *Journal of Neurosurgery: Spine* 2021; 35(3): 299-307.

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30. Glennie RA et al. Variation in surgical treatment of degenerative spondylolisthesis in Canada: Surgeon assessment of stability and impact in treatment. *European Spine Journal* 2021; 30(12): 3709-19.
31. Karim SM et al. Effectiveness of Surgical Decompression in Patients With Degenerative Cervical Myelopathy: Results of the Canadian Prospective Multicenter Study. *Neurosurgery* 2021; 89(5): 844-51.
32. Romagna A et al. Factors associated with return to work after surgery for degenerative cervical spondylotic myelopathy: Cohort analysis from CSORN. *Global Spine Journal* 2022; 12(4): 573-78.
33. Alnaghmoosh A et al. Back dominant pain has equal outcomes to radicular dominant pain following posterior lumbar fusion in adult isthmic spondylolisthesis: A CSORN study. *Global Spine Journal* 2022; 12(8): 1667-75.
34. Evaniew N et al. Lumbar fusion surgery for patients with back pain and degenerative disc disease: An observational study from CSORN. *Global Spine Journal* 2022; 12(8): 1676-86.
35. Singh S et al. Time to return to work after elective lumbar spine surgery. *Journal of Neurosurgery: Spine* 2022; 36(2): 168-176.
36. Evaniew N et al. Cervical Sagittal Alignment in patients with Cervical Spondylotic Myelopathy: An Observational Study from CSORN. *Spine* 2022; 47(5): E177-86.
37. Rampersaud YR et al. Fulfillment of patient expectations following spine surgery is critical to patient satisfaction: A cohort study of spine surgery patients. *Neurosurgery* 2022; 91(1): 173-181.
38. Wang S et al. Postoperative Recovery Patterns Following Discectomy Surgery for Lumbar Radiculopathy. *Scientific Reports* 2022; 12:11146.
39. Karim M et al. Preoperative patient reported outcomes are not associated with sagittal and spinopelvic alignment in degenerative lumbar spondylolisthesis. *Spine* 2022; 47(16):1128-36.
40. Ayling OA et al. Surgical outcomes of Patients That Fail to Reach Minimal Clinically Important Differences: Comparison of Minimally Invasive vs Open Transforaminal Lumbar Interbody Fusion. *Journal of Neurosurgery: Spine* 2022; 37(3): 376-83.
41. Charalampidis A et al. Differentiation of pain related functional limitations in surgical patients with Lumbar Spinal Stenosis (LSS) using the ODI: a CSORN study. *The Spine Journal* 2021; 22(4): 578-86.
42. Cushnie D et al. Outcome of spine surgery in patients with depressed mental states: A CSORN study. *The Spine Journal* 2022; 22(10): 1700-07.
43. Charest-Morin R et al. Does extending a posterior cervical fusion construct into the upper thoracic spine impact patient-reported outcomes up to 2 years after the surgery in patients with degenerative cervical myelopathy? *Journal of Neurosurgery: Spine* 2022; 37(4): 547-55.
44. Elkaim LM et al. Predictors of home discharge after scheduled surgery for degenerative cervical myelopathy. *Journal of Neurosurgery: Spine* 2022; 37(4): 541-46.
45. Banaszek D et al. Practice Variation Between Salaried and Fee-for-Service Surgeons for Lumbar Surgery. *Canadian Journal of Neurological Sciences* 2022; 1-8.
46. Ayling O et al. Patient Reported Outcomes Following Surgery for Lumbar Disc Herniation: Comparison of a Universal and Multitier Health Care System. *Global Spine Journal* 2023; 13(7): 1695-1702.
47. Hathi K et al. Minimally Invasive vs Open Thoracolumbar Surgery for Lumbar Spinal Stenosis in Patients with Diabetes. *Global Spine Journal* 2023; 13(6): 1602-1611.

Canadian Spine Outcomes and Research Network (CSORN): 2024 Annual Report

48. Evaniew N et al. Minimally Invasive Tubular Lumbar Discectomy Versus Conventional Open Lumbar Discectomy: An Observational Study From CSORN. *Global Spine Journal* 2023; 13(5): 1293-1304.

49. Hebert JJ et al. Patients undergoing anterior cervical discectomy and fusion for spondylotic radiculopathy experience heterogeneous clinical outcome trajectories that can be predicted by perioperative prognostic factors. *Journal of Neurosurgery: Spine* 2023; 38(1): 56-65.

50. Evaniew N et al. Timing of recovery after surgery for patients with Degenerative Cervical Myelopathy: An observational study from CSORN. *Neurosurgery* 2023; 92:271-82.

51. Lawrence DC et al. Beneficial effects of preoperative exercise on clinical outcomes of thoracolumbar spinal surgery. *Physiotherapy Canada* 2023; 75(1): 22-28.

52. Evaniew N et al. Deterioration after surgery for Degenerative Cervical Myelopathy: An observational study from the CSORN. *Spine* 2023; 48(5): 310-20.

53. Dandurand C et al. Patient, clinical, surgical, and institutional factors associated with length of stay in scheduled degenerative thoracolumbar spine surgery: National Multicenter Cohort Analysis from CSORN. *Journal of Neurosurgery: Spine* 2023; 38(4): 446-56.

54. Dandurand C et al. Patient's expectations of surgery for lumbar degenerative spondylolisthesis: analysis by type of surgery and patient factors from the Canadian Spine Outcomes and Research Network. *The Spine Journal* 2023; 23(6): 805-15.

55. Power JD et al. Determining minimal clinically important difference estimates following surgery for degenerative conditions of the lumbar spine: Analysis of the Canadian Spine Outcomes and Research Network (CSORN) registry. *The Spine Journal* 2023; 23(9): 1323-33.

56. Ajoku U et al. Temporal Analysis of Complication Rates of Cervical Spine Surgery for Degenerative Spine

Disease between Younger and Older cohorts using the CSORN Registry; Is Age just a number? *European Spine Journal* 2023; 32(10): 3583-90.

57. Dandurand C et al. Cost consequence analysis of waiting for lumbar disc herniation surgery. *Scientific reports* 2023; 13(1): 4519-29.

58. Manansala C et al. Factors associated with non-pharmacological, non-operative treatment utilization prior to thoracolumbar spine surgery in Manitoba: A Canadian Spine Outcomes Research Network (CSORN) study. *Musculoskeletal Science & Practice* 2023; 63:102695.

59. Singh S et al. Effects of Workload on Return to Work After Elective Lumbar Spine Surgery. *Global Spine Journal* 2022.

60. Algarni et al. Does ending a posterior construct proximally at C2 versus C3 impact patient reported outcomes in degenerative cervical myelopathy patients up to 24 months after the surgery? *Global Spine Journal* 2023.

61. Evaniew N et al. Anterior versus posterior surgery for patients with Degenerative Cervical Myelopathy: An observational study from the Canadian Spine Outcomes and Research Network. *Neurosurgery* 2023.

62. Malhotra AK et al. The effects of peri-operative adverse events on clinical and patient-reported outcomes after surgery for degenerative cervical myelopathy: an observational cohort study from the Canadian Spine Outcomes and Research Network. *Neurosurgery* 2024; 95(2): 437-446.

63. Moskven EP et al. Factors associated with increased length of stay in degenerative cervical spine surgery. A cohort analysis from the Canadian Spine Outcomes and Research Network (CSORN). *Journal of Neurosurgery: Spine* 2024; 41:46-55.

64. Hebert JJ et al. Outcome Prediction following lumbar Disc surgery (OPtiDisc): a longitudinal study of outcome trajectories, prognostic factors and risk models. *Journal*

Canadian Spine Outcomes and Research Network (CSORN): 2024 Annual Report

of Neurosurgery: Spine 2024 in press.

65. Althagafi A et al. Pre-operative expectations of patients with degenerative cervical myelopathy: An observational study from the Canadian Spine Outcomes and Research Network. *The Spine Journal* 2024; 24(9):1595-1604.

66. MacLean M et al. Gender differences in spine surgery for degenerative lumbar disease: prospective cohort study *Journal of Neurosurgery: Spine* 2024 in press.

67. Rogers S et al. Impact of Undergoing Thoracolumbar Surgery on Patient Psychosocial Profiles. *Global Spine Journal* 2024 in press.

68. Malhotra AK et al. Development of the cervical myelopathy severity index: a new patient reported outcome measure to quantify impairments and functional limitations. *The Spine Journal* 2024; 24(3):424-434.

69. Yang MMH, Far R, Riva-Cambrin J, Sajobi TT, Casha S. Poor postoperative pain control is associated with poor long term patient reported outcomes after elective spine surgery. *The Spine Journal* 2024; 24(9):1615-24.

70. Chu Kwan W et al. Satisfaction in surgically treated patients with degenerative cervical myelopathy: an observational study from the CSORN. *The Spine Journal* 2024 in press.

71. Shakil H et al. Who Gets Better After Surgery for Degenerative Cervical Myelopathy? A Responder Analysis from the Multicenter Canadian Spine Outcomes and Research Network. *The Spine Journal* 2024 in press.

72. Walker TN et al. Differences in the surgical management of degenerative lumbar spondylolisthesis based on self-reported sex: analysis of the CSORN prospective DLS study. *Journal of Neurosurgery Spine* 2024; 40(6):723-732.

Future Endeavours

The Steering Committee and select investigator working groups have definitive goals for the next 12-18 months:

- Release of a streamlined, more user-friendly surgical procedure and assessment forms that will improve completion rates and data querying for investigators
- Transition from the Global Research Platform (GRP) to Praxis Connect, registry technology that will improve data collection/entry and reporting
- Pursuing large team grants for prospective studies and attaining regional grants and bursaries.

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The Canadian Spine Research & Education Fund (CSREF) has accepted the essential role of funding the **Canadian Spine Outcomes and Research Network (CSORN)**. To honour this commitment, we require help from those most intimately involved with the provision of spinal treatment. Please plan to make a personal annual donation and consider canvassing your patients and colleagues to join your charitable efforts. Promotional materials such as patient solicitation letters and brochures that can be personalized are available through the CSREF office; contact us and order yours today.

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