CANADIAN EVIDENCE-BASED GUIDELINES BY A MULTIDISCIPLINARY GROUP ON SPINAL PROCEDURES TO RELIEVE CHRONIC PAIN

Anuj Bhatia, Philip Peng, Harsha Shanthanna, Yasmine Hoydonckx, James Khan, Elad Dana, Abeer Alomari, Howard Meng, Martina Rekatsina, Ian Gilron, Andrea D. Furlan, Norman Buckley, Ian Beauprie, Roderick Finlayson, Paul Etheridge, Eldon Loh, Christopher Mares, Mohan Radhakrishna, Sebastian Mafeld, John Pereira, Hance Clarke, Shawn Marshall, Magali Robert, Pam Squire, Robert Tanguay, Danielle Alvares

Bhatia: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesia and Pain Management, University Health Network – Toronto Western Hospital, Toronto, Ontario, Canada; Institute of Health Policy Management and Evaluation, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Anuj.Bhatia@uhn.ca

COI: Anuj Bhatia has received consultancy fees from Medtronic, Boston Scientific, and Bioventus. Medtronic has funded a study at his Institution that tracks outcomes of neuromodulation.

Shanthanna: Department of Anesthesia, McMaster University, Hamilton, Ontario, Canada

ShanthH@McMaster.ca

COI: No conflicts of interest reported.

Hoydonckx: Department of Anesthesiology, Cleveland Clinic and Cleveland Clinic Lerner College of Medicine, Clevaland, Ohio, USA

HoydonY@ccf.org

COI: No conflicts of interest reported.

Khan: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesia and Pain Management, Sinai Health System, Toronto, Ontario, Canada

James.Khan@medportal.ca

COI: No conflicts of interest reported.

Dana: Department of Anesthesia , Intensive Care and Pain Medicine, Meir Medical Center, Kfar Saba, Israel; Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel.

EladDana@gmail.com

COI: No conflicts of interest reported.

Alomari: Department of Anesthesia and Pain Management, University Health Network – Toronto Western Hospital, Toronto, Ontario, Canada; Division of Physical Medicine & Rehabilitation, Department of Medicine, University of Toronto, Toronto, ON, Canada

Abeer.Alomari@uhn.ca

COI: No conflicts of interest reported.

Meng: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesiology and Pain Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada

Howard.Meng@sunnybrook.ca

COI: No conflicts of interest reported.

Rekatsina: Department of Anesthesia and Pain Management, Aretaieion University Hospital, National and Kapodistrian, University of Athens, Athens, Greece

MRekatsina@gmail.com

COI: No conflicts of interest reported.

Gilron: Department of Anesthesiology & Perioperative Medicine, Department of Biomedical & Molecular Sciences, Centre for Neuroscience Studies, School of Policy Studies, Queen's University and Kingston General Hospital, Kingston, ON, Canada

Gilroni@QueensU.ca

COI: I.G. has received support from Vertex, Combigene and Abbvie, and has received grants from the Canadian Institutes of Health Research, Physicians' Services Incorporated Foundation, and Queen's University.

Furlan: KITE Research Institute, Toronto Rehabilitation Institute, University Health Network, Toronto, ON, Canada; Division of Physical Medicine &Rehabilitation, Department of Medicine, University of Toronto, Toronto, ON, Canada

Andrea.Furlan@uhn.ca

COI: Receives honoraria as chair of Workplace Safety and Insuranc Board (WSIB) Drug and Technology Advisory Committee (DTAC) and member of the WSIB Health Services Advisory Committee. Receives unrestricted educational grant from the Canadian Generic Products Association (CGPA). Receives research grants from WSIB, CIHR and CGPA. Receives royalties from Google YouTube Partner Program, and books for people with chronic pain. Owner of company that sells online courses for healthcare professionals who treat people with chronic pain and sells booklets for people with chronic pain

Buckley: Michael G. DeGroote National Pain Centre, McMaster University, Hamilton, ON, Canada

BuckleyN@McMaster.ca

COI:

Beauprie: Department of Anesthesia, Pain Management, and Perioperative Medicine, Faculty of Medicine, Dalhousie University, Halifax, NS, Canada

ibeauprie@dal.ca

COI: Ian Beauprie has stock/shares in Merck, a pharmaceutical company that manufactures analgesics.

Finlayson: Bill Nelems Pain & Research Centre, Kelowna, British Columbia, Canada

roderick.finlayson@icloud.com

COI: No conflicts of interest reported.

Etheridge: Bill Nelems Pain & Research Centre, Kelowna, British Columbia, Canada

JohnPaul.Etheridge@interiorhealth.ca

COI: No conflicts of interest reported.

Loh: Department of Physical Medicine and Rehabilitation, Schulich School of Medicine and Dentistry, Western University, London, ON, Canada

eldon.loh@sjhc.london.on.ca

COI: Eldon Loh has received research funding from International Pain and Spine intervention Society.

Mares: Department of Physical Medicine and Rehabilitation, Centre Hospitalier de l'Université de Montréal (CHUM), McGill University, Montreal, QC, Canada

christopher.mares@umontreal.ca

COI: No conflicts of interest reported.

Radhakrishna: Division of Physical Medicine and Rehabilitation and Alan Edwards Pain Management Unit, McGill University Health Centre, McGill University, Montreal, QC, Canada

mohan.radhakrishna@mcgill.ca

COI: No conflicts of interest reported.

Mafeld: Joint Department of Medical Imaging, University Health Network and Mount Sinai Hospital, University of Toronto, Toronto, ON, Canada

sebastiancharles.mafeld@uhn.ca

COI: No conflicts of interest reported.

Pereira: Department of Family Medicine, University of Calgary, Calgary, Alberta, Canada.

John@JohnCPC.com

COI: No conflicts of interest reported.

Clarke: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesia and Pain Management, University Health Network – Toronto General Hospital, Toronto, Ontario, Canada

Hance.Clarke@uhn.ca

COI: No conflicts of interest reported.

Marshall: Division of Physical Medicine and Rehabilitation, Department of Medicine, University of Ottawa and Ottawa Hospital - Rehabilitation Centre, Ottawa, Ontario, Canada

SMarshall@ottawahospital.on.ca

COI: No conflicts of interest reported.

Robert: Cumming School of Medicine, Department of Obstetrics and Gynecology, University of Calgary, Calgary, Alberta, Canada

Magali.Robert@albertahealthservices.ca

COI: No conflicts of interest reported.

Squire: Department of Family Medicine, University of British Columbia, Vancouver, British Columbia, Canada

ps@pamsquire.com

COI: No conflicts of interest reported.

Tanguay: Departments of Psychiatry and Surgery, Cumming School of Medicine, University of Calgary, Alberta);

RTanguay@ucalgary.ca

COI: No conflicts of interest reported.

Alvares: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesia and Pain Management, University Health Network – Toronto Western Hospital, Toronto, Ontario, Canada

Danielle.Alvares@uhn.ca

COI: No conflicts of interest reported.

Peng: Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Ontario, Canada; Department of Anesthesia and Pain Management, University Health Network – Toronto Western Hospital, Toronto, Ontario, Canada

Philip.Peng@uhn.ca

COI: No conflicts of interest reported.

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Network-Sinai Hospital System-Women's College Hospital (Toronto, Ontario), and the Canadian Pain Society. Dr. Alvares was compensated by the Department of Anesthesia and Pain Medicine at the University Health Network-Sinai Hospital System-Women's College Hospital (Toronto, Ontario) for her contributions towards the guideline development process and helping with drafting the manuscript. No authors received any compensation or tokens of appreciation for their contributions to the guideline.

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Short title: Canadian guidelines for spinal procedures to relieve pain

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Corresponding Author

Dr. Anuj Bhatia

McL 2-405, Department of Anesthesia and Pain Management, 399 Bathurst Street, Toronto Western Hospital, Toronto, ON M5T 2S8, Canada

E-mail: Anuj.Bhatia@uhn.ca

LIST OF ABBREVIATIONS

AAPM	American Academy of Pain Medicine
ASA	American Society of Anesthesiologists
ASIPP	American Society of Interventional Physicians
ASRA-PM	American Society of Regional Anesthesia and Pain Management
BMD	Bone Mineral Density
BMI	Body Mass Index
C-ESI	Caudal Epidural Steroid Injection
CFJ	Cervical Facet Joint
CPG	Clinical Practice Guidelines
CT	Computed Tomography
DSA	Digital Subtraction Angiography
EPR	Effective Pain Relief
ESI	Epidural Steroid Injection
FRAX	Fracture Risk Assessment Tool®
HPA	Hypothalamic Pituitary Adrenal
IA	Intra-articular
INS	International Neuromodulation Society
IPSIS	International Pain and Spine Intervention Society
L-ILESI	Lumbar - Interlaminar Epidural Steroid Injections
L-TFESI	Lumbar - Transforaminal Epidural Steroid Injections
LA	Local Anesthetic
LBB	Lateral Branch Block
LBP	Low Back Pain
LFJ	Lumbar Facet Joint
MBB	Medial Branch Block
NDI	Neck Disability Index
NRS	Numerical Rating Scale
ODI	Oswestry Disability Index
PA	Peri-articular
PGIC	Participant Global Impression of Change
PVB	Paravertebral Block
QoL	Quality of Life
RCT	Randomized Control Trial
RF	Radiofrequency
RFA	Radiofrequency ablation
RMDQ	Roland Morris Disability Questionnaire
SIJ	Sacroiliac Joint
SPECT	Single Photon Emission Computed Tomography
US	Ultrasound
USPSTF	United States Preventative Services Task Force
VAS	Visual Analog Scale

ABSTRACT

Background: Interventional procedures to diagnose and treat chronic pain of spinal origin in the spine and the limbs are commonly performed but there is a lack of guidance regarding the indications, frequency, technical aspects, requirements for image guidance, outcomes, and complications of these procedures. The guidelines in this document address these aspects and were developed by a group of clinicians, researchers, patient partners, and representatives from provincial healthcare regulatory and funding bodies.

Methods: Reviews of published literature were performed on commonly performed spinal procedures for pain and the evidence was synthesized using a qualitative approach. Evidence-based clinical practice recommendations for each procedure were graded on a scale from A to D, or as insufficient, according to U.S. Preventative Services Task Force (USPTF) grading of evidence guidelines, with the level of certainty rated as high, medium or low. All consensus recommendations required at least 75% agreement among the guideline panel. Good clinical practice statements for these procedures were also formulated.

Recommendations: The guidelines presented here are clinical practice recommendations and good clinical practice statements for procedures performed for pain originating from the cervical, lumbar spine and sacroiliac joints based on the current literature, consensus, and expert opinion. Clinical indications, evidence for efficacy and suggested frequency for repeated procedures, complications and recommendations for avoiding these have been proposed.

Interpretations: These guidelines provide evidence-based recommendations and good clinical practice statements for performing diagnostic and therapeutic spinal interventions for chronic pain.

INTRODUCTION

Chronic pain in the spine (axial pain) or in the distribution of spinal nerves (radicular pain) is pain that persists or recurs for longer than 3 months (1). The prevalence of low back and neck pain increases with age, with 10–20% of persons over 70 years of age reporting moderate or severe pain (2) with a prevalence of approximately 17.8% in the Canadian population (3) while the prevalence of these morbidities is expected to increase in our aging population (4). Patients with persistent low back, neck and radicular limb pain tend to have high levels of pain and disability with minimal improvements over time (5) and enormous healthcare costs (6).

Interventional procedures including epidural injections, nerve root blocks, procedures on the spinal facet and sacroiliac joints such as intra-articular (in the joint) injections, diagnostic innervation blocks to treat facet pain, and radiofrequency ablative neurotomies are often performed to relieve spinal pain. There has been a rapid increase in the last two decades in the number of image-guided interventional procedures by trained practitioners to relieve axial and radicular pain in the United States (7). However, the Canadian population with these pain syndromes often lack access to trained providers who are credentialed to perform these procedures using appropriate image guidance (fluoroscopy and or ultrasound) in patients with indications that are supported by evidence (8). This gap in care is further exacerbated by mixed interpretation of evidence on interventions for axial and radicular spinal pain from various professional organizations and regulatory bodies (9,10).

Methodologically-sound recent guidelines from professional societies on patient selection and technical aspects for spinal pain procedures (11–13) have not been adopted in recent studies (14,15) or in the Canadian clinical practice (16) because of the differences in the healthcare

delivery and care models in Pain Medicine between other developed countries and Canada. There is also a lack of Canadian perspective in these recommendations given the unique challenges such as long wait times for care for patients with pain (17) and, until recently, lack of a robust training framework in Canada in Pain Medicine (18). It is also important to recognize that interventional procedures for patients with spinal and radicular pain have best possible outcomes when healthcare providers will employ a multimodality care model encompassing the 4Ps (Pharmacology, Physical therapy, Psychology, Procedural treatments) for each patient while recognizing not all modalities will be required for each patient. In general, conservative and less-invasive options should always be utilized prior to offering more invasive treatments.

The objectives of the evidence-based clinical practice recommendations and good clinical practice statements presented in this document are to ensure best possible interventional care, improve the quality of research, and assist with clinical practice pathways and authorization decisions for patients with axial and radicular pain. The guidelines presented here are based on synthesis of the best available evidence with perspectives from patients, researchers, healthcare providers, regulatory and funding bodies. The overarching goal of this process was to ensure patients benefit from the best available evidence for efficacy and safety of these procedures.

SCOPE

The recommendations for developing evidence-based clinical practice guidelines were followed (19). The objectives of the recommendations and statements presented in this document are to guide interventional care, improve the quality of research, and assist with clinical practice pathways and authorization decisions for patients with axial and radicular pain. The population of interest is adult patients with chronic axial and/or radicular spine pain that is not associated with cancer. Evidence was evaluated and recommendations were made for the following procedures that are frequently performed for axial and radicular pain syndromes:

- Cervical and lumbar facet joint procedures: intra-articular injections, joint innervation injections (medial branch blocks), radiofrequency ablation (RFA) of joint innervation
- Sacroiliac joint procedures: intra-articular injections, joint innervation injections (lateral branch blocks), radiofrequency ablation (RFA) of joint innervation.
- Lumbar epidural steroid injections through three approaches: interlaminar, transforaminal, caudal
- Paravertebral nerve blocks and erector spinal plane injections

Good Clinical Practice statements were also issued for following aspects related to the procedures listed above:

- Training and credentialing requirements
- Frequency of lumbar epidural injections in relation to efficacy and safety of administered steroids
- Standards of sterility for axial interventions for pain

The clinical practice recommendations were based on the strength of direct evidence available for these procedures while the good clinical practice statements were based on evaluation of indirect clinical evidence and expert consensus opinion.

RECOMMENDATIONS

The initial searches of medical databases identified 19,191 unique publications. The screening of titles and abstracts resulted in exclusion of 17,618 publications because of lack of relevance to the topics of interest. Out of the 1,573 publications identified for screening of the full text, 1,421 were excluded because these did not meet the inclusion criteria. A total of 50 publications were identified for data extraction and the remainder 102 were excluded because these either did not compare or evaluate interventions or outcomes of interest, had missing data, or were found to be not relevant to the review upon perusal of the methodology (Appendix 1). The summary of results of the 50 included studies are presented in Appendix 4 (Tables I and II).

We developed 23 evidence-based recommendations (**Error! Reference source not found.**). We also developed 19 procedure-specific (**Error! Reference source not found.**) and 6 practice aspects-related good clinical practice statements (**Error! Reference source not found.**) for the five procedure categories - cervical facet joint procedures, lumbar facet joint procedures, sacroiliac joint procedures, lumbar epidural steroid injections, and paravertebral nerve and erector spinal plane injections. Appendix 7 contains the systematic review of literature that underpins the recommendations and the guidelines.

METHODS

Our guideline was developed in partnership with the Canadian Pain Society. We followed the AGREE II framework for the development of this guideline (45). We followed guideline standards from the Guidelines International Network (46), and the Guidance for Reporting Involvement of Patients and the Public (short-form) reporting checklist (47) Appendix 8.

This project received financial and human resource support from the Department of Anesthesia and Pain Medicine at the University Health Network-Sinai Hospital System-Women's College Hospital (Toronto, Ontario), the National Pain Center, McMaster University (Hamilton, Ontario), and the Canadian Pain Society. Grading of the recommendations was done according to the United States Preventive Services Task Force (USPSTF) grading of evidence guidelines (

LEGENDS

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Box 2. United States Preventive Services Task Force (USPSTF) framework for levels of certainty regarding net benefit (20,21).

Appendix 1. Study selection for review of chronic non-cancer axial pain

Appendix 2. An outline of study specific risk of the bias for randomized controlled trials included in the guidelines using the modified Cochrane risk of bias tool version 2.

Appendix 3. A summary of the risk of the bias assessment for randomized controlled trials included in the guidelines using the modified Cochrane risk of bias tool version 2.

Appendix 4. Characteristics of randomized controlled trials included in the guidelines.

Appendix 5. Details of outcomes in the selected randomized controlled trials

Appendix 6. Membership of Committees and Panel for the Guidelines.

Appendix 7. Narrative review of the literature identified to formulate the guidelines.

Appendix 8. Guidance for Reporting Involvement of Patients and the Public (short-form) reporting checklist version 2 (GRIPP2).

Table 1. Summary of clinical recommendations.

Table 2. Summary of Good Clinical Practice statements for specific procedures.

Table 3. Good Clinical Practice statements on practice aspects related to spinal procedures to relieve pain. & **Error! Reference source not found.**) (48,49). This grading system allows conclusions for each topic to be graded on a scale from A to D, or as insufficient, with the level of certainty rated as high, medium or low (27).This system, which has been modified for use in interventional pain management guidelines drafted by many national and international societies (28–31) and it was chosen over others because of its flexibility (32,33) which permits high-grade recommendations in absence of high-quality level I studies, which are challenging to conduct for invasive procedures.

Composition of Participating Groups

This guideline project was composed of five committees or panels with membership from across six Canadian provinces: Steering Committee, Evidence Synthesis Committee, Multidisciplinary Clinical Expert Committee, Guideline Panel and the Patient Partner Committee, The Guideline Steering Committee had four members (JB, NB, PP, JP) with expertise in Pain Medicine and guideline development and it was formed to oversee the process of formulating the guidelines performed by the other committees or panels. This Committee, in consultations with clinicians, researchers and patients with lived experience of pain, identified the topics relevant to interventions for spinal and radicular pain that required clinical recommendations and good clinical practice statements. The consultations were done through electronic communications and

an in-person meeting consisting of 20 stakeholders. The coronavirus pandemic resulted in a temporary pause to this process that lasted until the summer of 2021. The Evidence Synthesis Committee identified and synthesized the evidence relevant to the procedures in the guideline. It consisted of three physicians with clinical expertise in performing procedures and formal methodological training in evaluating evidence with all members possessing a Masters or Doctor of Philosophy in Clinical Epidemiology (AB, HS, YH, JK). These physicians were assisted by a Medical Information Specialist and a team of researchers at McMaster University, Hamilton, Ontario. The Guideline Panel voted on the proposed recommendations for the guidelines. It consisted of 12 clinical experts and researchers, healthcare regulators, administrators and funders, methodologists with expertise in clinical epidemiology, and people with lived experience of pain. Three of the members of this committee who represented a provincial health funder, a patient advocate and a physician regulatory College endorsed the process but withdrew from voting because of a lack of familiarity with the contents of the guidelines. The other 10 members on the panel were clinicians from the specialties involved in caring for patients with pain: Anesthesia and Pain Medicine (3), Family Medicine with a focus on Pain Medicine (1), Physical Medicine and Rehabilitation (2), Psychiatry (1), Obstetrics and Gynecology (1), and Medical Imaging / Interventional Radiology (1) and one representative of a provincial health funder. All personnel involved with the guidelines were asked to declare their conflicts of interest (COI) and these were managed appropriately (e.g., not allowing personnel with a COI to vote on issues impacted by the COI).

The Multidisciplinary Clinical Expert Committee consisted of clinical experts in Pain Medicine who had an in-depth understanding of the role of interventional procedures for spinal and

radicular pain. This committee voted on specific domains of good clinical practice related to spine interventions that did not have sufficient evidence to be addressed by the Guideline Evidence Synthesis Committee. These domains were credentialling, use of image-guidance for procedures, sterility while performing procedures, and frequency of performing procedures. The 10 members on the panel were clinicians from the specialties involved in caring for patients with pain: Anesthesia and Pain Medicine (2), Family Medicine with a focus on Pain Medicine (3), Physical Medicine and Rehabilitation (3), and Medical Imaging (2). The Patient Partner Committee was comprised of seven individuals with lived experience of pain. These partners helped the Steering Committee by identifying procedures for relieving spinal and procedural pain that were a priority, and in reviewing the recommendations approved by the Multidisciplinary Clinical Expert Committee. Three of the members represented the Canadian Chronic Pain Network from Ontario and Nova Scotia (50), one of the five chronic disease networks funded by the Canadian Institutes of Health Research's Strategy for Patient-Oriented Research (SPOR). Two of the members represented the Quebec Chronic Pain Association and the other two members were from Saskatchewan and British Columbia and represented the Canadian Arthritis Alliance and the International Association for the Study of Pain, respectively.

The full list of these guideline committee and panel members along with their backgrounds and affiliations can be found in Appendix 6.

Selection of Priority Topics

Our steering committee employed an iterative process that included numerous tele- and

video-conference calls, email discussions, and in-person meetings to establish five categories of procedures to relieve spinal and radicular pain (cervical facet procedures, lumbar facet procedures, lumbar epidural injections, sacroiliac joint procedures, and paravertebral and erector spinae plane injections) to be addressed in these guidelines. Each procedure category was divided into sub-categories based on the commonly performed interventional approaches for spinal and radicular pain. Published literature on these procedure categories was identified that focused on efficacy, effectiveness and safety of these procedures. A narrative approach to evidence synthesis was adopted (Appendix 7) in view of the heterogeneity of the available literature that prevented meta-analysis.

Literature Review and Quality assessment

A comprehensive search for the evidence was performed by personnel with expertise in this domain (a Medical Information Specialist and four Pain Medicine Physicians with expertise in evidence synthesis methodology) to identify randomized controlled trials that compared interventional procedures of interest to control treatments or conventional medical management. Details of the search strategy have been published (Wang 2021) and it is summarized here for context. A systematic review of randomized controlled trials that explored the effectiveness and harms of interventional procedures for the management of spinal or radicular, chronic, non-cancer, spine pain was performed. Eligible studies were identified through a systematic search of Medline, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials and Web of Science from inception without language restrictions until June 30, 2023. Eligible trials enrolled primarily adult patients (≥18 years old) with spinal or radicular, chronic, non-cancer pain. Participants in these RCTs were randomized to different, currently available, interventional

procedures or to an interventional procedure and a placebo/sham procedure or usual care with at least 10 participants in each arm. Outcomes of interest (accuracy, efficacy, and safety) were measured at least 1 month after randomization. A team of reviewers independently screened articles identified through searches, extracted information, and assessed risk of bias of eligible trials using the modified Cochrane instrument to evaluate risk of bias. Search engines used during composition of the various sections included MEDLINE, Embase, Google Scholar and Cochrane Database of Systematic Reviews with the date range being from inception until December 31, 2024, in addition to examination of the reference sections of all identified the location of pain (e.g., back pain, neck pain, lumbar pain, cervical pain), anatomical pain generators (e.g., lumbar spine, cervical spine), and procedures (e.g., epidural steroid injections, facet joint injections, medial or lateral branch nerve blocks, radiofrequency neurotomy or ablation). The MEDLINE search strategy is outlined in

Appendix 1. A systematic review was conducted and the risk of bias for each included study was evaluated using the modified Cochrane Risk of Bias version 2 tool (

Appendix 2 and

Appendix 3). Relevant literature was also identified from the reference lists of included RCTs and other literature identified through searches of medical databases. Lower levels of evidence including comparative studies lacking randomization, and cohort studies were included in framing of recommendations and good clinical practice statements when these studies were relevant to the topic of interest. Upon careful consideration, it was decided not to conduct a meta-analysis due to substantial heterogeneity in the literature on the nature of interventions, outcome measures of trials evaluating these interventions, and follow-up durations across the

studies. We did nor perform a cost-effectiveness analysis due to the wide variation in costs of interventional procedures of interest and the lack of data for this domain.

Development of recommendations

We divided the recommendations and good clinical practice statements for the spinal procedures to treat pain were divided based on the different parts of the spine (cervical, lumbar, sacroiliac, paravertebral) with sub-divisions based on the targets and types of procedures (facet or sacroiliac joint intra-articular or innervation injections or radiofrequency ablation, epidural or nerve root injections). The Evidence Synthesis Committee synthesized the evidence relevant to the procedures in the guideline, proposed recommendations based on the synthesized evidence using the USPTF system for evaluating the grade of the recommendation and the level of certainty based on the strength of the evidence supporting the recommendation, and presented a draft to the Guideline Panel for voting. The Evidence Synthesis Committee also identified aspects of clinical practice that did not have direct evidence in support of or against the statements and presented these as Good Clinical Practice statements to the Multidisciplinary Clinical Experts Committee for voting. Good clinical practice statements are appropriate when substantial clinical or real-world experience suggests that the included actions will do more good than harm, but little direct research evidence exists (51), a scenario that is common in interventional procedures in Pain Medicine. These statements represent guidance that we considered important but were not appropriate for systematic reviews and formal ratings of certainty of evidence. We were confident that for each statement, the action had a net benefit, each action was useful for health care providers, and no sensible alternatives existed, all of which justify including good practice statements.

For each of our recommendations and good clinical practice statements, relevant data were shared with panelists for review, refinement, and discussion through electronic communications and during four virtual meetings from November 2023 to May 2024. The Evidence Synthesis Committee sourced additional data when our reviews were lacking (e.g., frequency of procedures, sterility) or reassessed the recommendations and the statements when requested by the relevant Committee or Panel. In advance of each panel meeting, the 3 members of the Evidence Synthesis Committee (A.B., H.S., Y.H.,J.K.) wrote the draft recommendations and good clinical practice statements; comments and feedback were documented throughout the review process. We set a 75% threshold for agreement by committee or panel members on recommendations and good clinical practice statements a priori but achieved 100% agreement on most decisions. We followed a formal, consistent process in generating each good practice statement; they were drafted iteratively during guideline development and refinement (52).

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External Review

Following the completion of the initial review from the Guideline Panel and the Multidisciplinary Clinical Expert Committee, the recommendations and good clinical practice statements were sent to the Patient Partner Committee for review during January to March 2025. Feedback was sought actively and incorporated in the recommendations and good clinical practice statements to reflect concerns of persons with lived experience of pain and to enhance comprehension by healthcare providers and patients. We also had two internationally-renowned clinical and research experts in interventional procedures in Pain Medicine (Dr. Samer Narouze from the United States of America and Dr. Jan van Zundert assisted by his colleague Dr. Laurens

Peene from the Netherlands) review the recommendations for scientific accuracy and validity. Both these experts had contributed to guidelines on interventional procedures in Pain Medicine in the past and they provided written feedback after reviewing the document. Their feedback improved the explanation of our document and descriptions of contextual factors that can influence applicability of the recommendations and good clinical practice statements, but did not alter the direction or strength of our recommendations.

Management of Competing Interests

We adhered to the principles and practices recommended by the Guidelines International Network to manage competing interests (53). Members of our steering committee and guideline committees and panels completed individual, signed disclosure-of-interest forms at committee inception, and throughout the guideline development process, when required. Steering committee meetings included dedicated time to query members' changes to any competing interests (adjudicated by the steering committee Chair); any changes prompted members to update their written forms. None of the Committee or Panel members had competing interests related to the recommendations and good clinical practice statements, so no one had to abstain from voting. We collected competing interest forms and stored them electronically.

IMPLEMENTATION

In collaboration with the Canadian Pain Society, the National Pain Center at McMaster University (Hamilton, Ontario), and the Department of Anesthesia and Pain Medicine at the

University Health Network-Sinai Hospital System-Women's College Hospital (Toronto, Ontario), we are developing knowledge transfer resources to support health care providers and patients in discussing interventional procedures for treating spinal and radicular pain in adults with chronic non-cancer pain. In partnership with the Canadian Pain Society and the National Pain Center at McMaster University (Hamilton, Ontario), we are creating a suite of educational resources (e.g., whiteboard videos, infographics) for health care providers and patients. These resources will be shared through multiple venues, including academic and professional conferences, traditional media, and social media channels, and in collaboration with leading national health organizations. The Canadian Pain Society will play a lead role in disseminating and evaluating the uptake of our guideline and will track it over time. These guidelines will be published online for a period of 5 years. At the request of our patient partner committee, we will also create a lay summary of recommendations for easy reading. Following this period, a survey will be sent out to healthcare providers and patients to gather information about public opinion and develop a plan for revising the guidelines. Our steering committee will monitor evidence and partner with the Canadian Pain Society to update the guideline based on regular literature search updates to identify new evidence as it becomes available over the next 3 to 5 years as ongoing multiple centre RCTs are published on some of the procedures addressed in these guidelines.

OTHER GUIDELINES

The interpretation of evidence in our guidelines is aligned with recent international, multi-society guidelines on specific procedures for spinal and radicular pain (11,12,54). However, our

guidelines reflect the realities of the Canadian healthcare environment in terms of the availability of trained physicians, resources (e.g., fluoroscopy and ultrasound machines for procedural guidance, adequately equipped centres to offer these procedures), and wait times for care. Further, unlike some of the international multi-society guidelines (11,12,54), we actively sought and incorporated feedback from a variety of stakeholders throughout the guideline development process including persons with lived experience of pain, members of physician regulatory bodies (Canadian provincial Colleges of Physicians and Surgeons), and payors (members of Canadian provincial Ministry of Health decision makers for funding of healthcare).

A recent publication on interventional procedures for chronic spine pain, based on network meta-analyses, strongly recommended against all the procedures evaluated in it for spinal pain (55) and is in marked contrast to the recommendations by our multidisciplinary panel and other recent guidelines (11,12,54). There were several flaws in the methodological approach adopted for formulating the recommendations in this publication including the violation of the assumption of transitivity that implies that interventions and populations in the studies included in a network meta-analysis are comparable with respect to characteristics that may affect the relative effects (56). Further, combining treatments for patients with different pain syndromes (e.g. cervical radicular pain and sacroiliac joint pain) using a network meta-analysis is similar to combining treatments for different pathologies that is very likely to lead to erroneous conclusions. It is analogous to combining the evaluation of surgery for brain tumors with chemotherapy for lung tumors and then stating surgery for brain tumors does not work for lung tumors, hence the recommendation against surgery for lung tumors. The lack of rationale and scientific merit in this approach is obvious. Unlike other aspects of meta-analyses that can be evaluated statistically

(e.g. heterogeneity), the assumption of transitivity relies on clinical judgement that was sadly lacking in this published guideline.

GAPS IN KNOWLEDGE

Developing our recommendations identified several evidence gaps. We lack up-to-date information regarding the prevalence of spinal and radicular pain in Canada, so the magnitude of

the problem and intervention effects remain unknown. Despite our intention to assess efficacy and safety of interventional pain procedures, our work was limited based on how data were presented in the original studies and how these studies were conducted in terms of blinding of participants and outcome assessors. None of the publications documented intervention effects based on sex, gender, culture, ethnicity, or disease severity, limiting our ability to identify whether intervention benefits and harms varied by subgroups. We have very limited data on interventional procedures for spinal and radicular pain in adults over 85 years of age, identified as a member of a racial or an ethnic minority, or those living with physical disabilities. Few studies reported data on adverse events and complications using a systematic approach proposed a priori; this limit or ability to evaluate potential harms of interventional procedures. There was limited evidence on efficacy and effectiveness of interventional procedures beyond six months, so there is a clear need for data from longer-term trials.

We also identified several knowledge gaps throughout the development of our recommendations and good clinical practice statements. Some examples of these gaps include a lack of:

- Well designed, large, randomized studies are required to compare outcomes of SIJ RFA in patients with and without prior confirmatory diagnostic LBB.
- High quality prospective research is needed to evaluate the safety of cervical RFA.
- Role of ultrasound for guiding lumbar facet procedures and for performing RFA in the cervical, lumbar, and sacroiliac joints needs to be evaluated rigorously.

LIMITATIONS

We focused exclusively on the role of interventional procedures for spinal and radicular pain, recognizing that interventions performed for pain due to musculoskeletal pathologies in the limbs

(e.g., joint injections, procedures on tendons and on peripheral entrapped or injured nerves) are performed frequently and also need guidance for healthcare providers and patients. We intend to address these procedures as our next step in providing evidence-based guidelines.

Developing our guideline using the USPTF rubric, and not GRADE, required us to make judgement calls based on a semi-quantitative interpretation of published evidence, an approach that research methodologists may not entirely agree with. There was substantial heterogeneity in procedural details and frequency that limited us from performing meta-analyses for specific intervention characteristics that may improve health outcomes. Because the literature searches were completed for our meta-analyses in 2024, additional reports may have been published that may impact on the validity of our recommendations in the future.

CONCLUSIONS

Persistent spinal and radicular chronic pain of a moderate to severe intensity is prevalent in adults worldwide. Interventional procedures to diagnose and treat this pain are commonly

performed by physicians and surgeons from a variety of specialties. To improve outcomes for patients with this type of pain, we encourage health care providers, professional regulatory bodies and the healthcare payors to apply and share our guideline so patients can have informed discussions about the balance of benefits and harms for available, acceptable, and feasible interventional procedures.

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LEGENDS

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Appendix 1. Study selection for review of chronic non-cancer axial pain

Appendix 2. An outline of study specific risk of the bias for randomized controlled trials included in the guidelines using the modified Cochrane risk of bias tool version 2.

Appendix 3. A summary of the risk of the bias assessment for randomized controlled trials included in the guidelines using the modified Cochrane risk of bias tool version 2.

Appendix 4. Characteristics of randomized controlled trials included in the guidelines.

Appendix 5. Details of outcomes in the selected randomized controlled trials

Appendix 6. Membership of Committees and Panel for the Guidelines.

Appendix 7. Narrative review of the literature identified to formulate the guidelines.

Appendix 8. Guidance for Reporting Involvement of Patients and the Public (short-form) reporting checklist version 2 (GRIPP2).

Table 1. Summary of clinical recommendations.

Table 2. Summary of Good Clinical Practice statements for specific procedures.

Table 3. Good Clinical Practice statements on practice aspects related to spinal procedures to relieve pain.