



Pre-Surgical Screening Tools and Risk Factors for Chronic Post-Surgical Pain: A Summary

Key Messages

- Evidence-based risk factors
 - Our review identified 19 evidence-based risk factors for chronic post-surgical pain from published systematic reviews.
 - Definitive conclusions could not be made regarding particular risk factors and their association with chronic post-surgical pain. The evidence was either mixed and/or associated with limitations.
- Pre-surgical screening tools or assessments
 - Our review identified 11 pre-surgical screening tools or assessments that were studied for their ability to predict chronic post-surgical pain.
 - Definitive conclusions cannot be made for the use of pre-surgical screening tools or assessments to predict the risk of developing chronic post-surgical pain. The evidence was either mixed and/or associated with limitations.

Context

Chronic post-surgical pain is pain that develops or worsens following surgery and persists for more than 3 months after the acute post-surgical healing period. The transition from acute post-surgical pain to chronic post-surgical pain is complex and is influenced by psychological, socioeconomic, cultural, clinical, and biological factors. Individuals with chronic post-surgical pain are also at a higher risk of persistent opioid use disorder because opioid medications are commonly prescribed for post-surgical pain.

Purpose

This CADTH report identifies and provides brief summaries on the evidence-based risk factors and the pre-surgical screening tools or assessments for chronic post-surgical pain. Identifying these risk factors and tools or assessments may be helpful to identify people who are at increased risk of developing chronic post-surgical pain. This may allow for pain management to be planned and initiated before surgery and for more appropriate and timely pain management during the peri-surgical and post-surgical periods. Genetic risk factors were not summarized in this report because of the inconsistency with access to genetic testing across health jurisdictions.

Methods

A limited literature search and a rapid scan of the literature were used to inform this narrative synthesis.

Results

Evidence-Based Risk Factors

Eight systematic reviews (SRs) that identified evidence-based risk factors for chronic post-surgical pain were included. The following surgical populations were included in the SRs: various surgery types in adults (3 SRs), breast cancer surgery in adults (1 SR), total knee and total hip replacement surgeries in adults (2 SRs), various surgery types in pediatric patients (1 SR), and lumbar disc herniation surgery in adult and pediatric patients (1 SR).

No risk factors were consistently associated with chronic post-surgical pain across all surgery types or age groups. Even within certain age groups and surgery types, definitive conclusions could not be made about the different risk factor associations because of mixed findings or methodological limitations.

Table 1 is a summary of the SRs that reported a positive association, mixed findings, or no association with different risk factors for chronic post-surgical pain. The mixed findings column includes SRs that describe varying associations (e.g., a positive association and no association or negative association) within 1 SR because the association results are dependent on the population or methods used. For full details on the specific findings on the risk factor associations for each surgery subtype, see Table 1 in the [full report](#).

Table 1: Summary of Evidence-Based Risk Factors Identified in SRs and Their Association With Chronic Post-Surgical Pain

Risk factor ^a	Number of SRs that identified		
	Potential positive association	Mixed findings or uncertain association ^b	Potentially no association or unlikely association
Anxiety	4	3	—
Pain catastrophizing (tendency to exaggerate a situation in a negative manner)	3	2	1
Depression	3	2	—
Psychological distress (non-specific symptoms of depression, anxiety, and stress)	3	—	—
Kinesiophobia (fear of movement)	2	1	—
Age	1	1	1
Sex	—	—	2
Other mental health-related factors	1	1	—
Social factors (support)	1	1	—
Pre-surgical pain	1	1	—
Acute post-surgical pain	—	1	—
Race	—	—	1
Body mass index	—	—	1
Health status	—	1	—

Risk factor ^a	Number of SRs that identified		
	Potential positive association	Mixed findings or uncertain association ^b	Potentially no association or unlikely association
Optimism	—	—	1
Education, employment, household-related, income	—	1	—
Knee function	—	1	—
Disability	1	—	—
Scoliosis specific factors	—	—	1

^a The most commonly reported risk factors are at the top and the least reported at the bottom.

^b Includes SRs that describe varying associations (e.g., a positive association and no association or negative association) within 1 SR because the association results are dependent on the population or methods used.

Pre-Surgical Screening Tools or Assessments

Nine articles — 3 SRs, 2 prospective observational cohort studies, 1 longitudinal cohort study, 1 non-randomized study, 1 prospective cohort study, and 1 validation study — were identified to summarize the use of pre-surgical screening tools or assessments to identify patients who are at increased risk of developing chronic post-surgical pain. The screening tools or assessments identified in these articles included various quantitative sensory testing measures (e.g., mechanical, thermal, electrical), validated scales of other conditions, and screening tools.

The following surgical procedures were the focus of the included studies for adults: spine surgery (2 studies), total joint arthroplasty (1 SR), robot-assisted laparoscopic hysterectomy (1 study), and total knee replacement (1 study). For the pediatric population, the surgery types included orthopedic or general surgery (1 study) and major musculoskeletal surgery (1 study). One SR included various surgery types, predominantly in adults, and 1 SR included joint-related, thoracic-related, abdominal- and gynecological-related, and breast cancer surgeries for an unknown age group.

Four of the identified screening tools or assessments were found to predict chronic post-surgical pain. It is unknown whether these can be applied to broader clinical practice (i.e., various surgery types among different age groups) because these screening tools or assessments were only investigated in 1 study among a specific population. These 4 tools or assessments included a pain threshold evaluation performed with a sphygmomanometer (blood pressure monitor comprised of an inflatable cuff) in adults who underwent total knee replacement, the modified Tampa Scale of Kinesiophobia with 13 items (i.e., only the positively scored items) in pediatric patients who underwent orthopedic or general surgery, the Presurgical Psychological Screening algorithm in adults who underwent spine surgery, and the Pediatric Pain Screening Tool in pediatric patients who underwent major musculoskeletal surgery.

The remaining screening tools or assessments that were identified reported either mixed findings or no association with chronic post-surgical pain in various surgical populations.

Table 2 is a summary of the number of publications that reported pre-surgical screening tools or assessments associations with or ability to predict chronic post-surgical pain. The mixed findings column includes publications that describe varying associations (e.g., a positive association and no association) within 1 publication because the association results are dependent on the intervention or methods used. For the full details on the specific findings on the pre-surgical screening tools or assessments associations for each surgery subtype, see Table 2 in the [full report](#).

Table 2: Summary of Pre-Surgical Screening Tools or Assessments Identified in Studies and Their Association With or Ability to Predict Chronic Post-Surgical Pain

Pre-surgical screening tool or assessment	Number of publications that identified		
	Potential positive association or concluded to predict chronic post-surgical pain	Mixed findings ^a	Potentially no association or did not predict chronic post-surgical pain
Quantitative sensory testing			
Conditioned pain modulation	1	2	1
Mechanical sensory testing (e.g., mechanical pain intensity/threshold, pressure pain threshold, pain detection threshold)	1	1	2
Temporal summation of pain	1	2	1
Thermal sensory testing (e.g., heat, warm stimuli)	1	3	—
Electrical sensory testing	2	1	—
Cold stimuli sensory testing	—	—	2
Sphygmomanometer Pain Test (pain threshold evaluation)	1	—	—
Validated scales for other conditions			
Hospital and Anxiety Depression Scale	—	—	1
Tampa Scale for Kinesiophobia	1 ^b	—	—
Pre-surgical screening algorithm			
Pediatric Pain Screening Tool	1	—	—
Presurgical Psychological Screening algorithm	1	—	—

^a Includes publications that describe varying associations (e.g., a positive association and no association) within 1 publication because the association results are dependent on the intervention or methods used.

^b Tampa Scale for Kinesiophobia-13 (modified) concluded to predict chronic post-surgical pain (pain-related disability) but not Tampa Scale for Kinesiophobia-17.



Read the full report and learn more about [chronic post-surgical pain](#) on our website.

■ Disclaimer

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