Topic Brief: Return to Activity After Spinal Surgery

Date: 2/28/2023
Nomination Number: 1036

Purpose: This document summarizes the information addressing a nomination submitted on November 18, 2022 (https://effectivehealthcare.ahrq.gov/get-involved/nominated-topics/activity-after-spinal-surgery) through the Effective Health Care Website. This information was used to inform the Evidence-based Practice Center (EPC) Program decisions about whether to produce an evidence report on the topic, and if so, what type of evidence report would be most suitable.

Issue: There is practice variability in recommendations regarding timing for return to certain physical activities after spinal surgery. A guideline developer would like to use a systematic review to develop a clinical guideline on the issue.

Findings: The EPC Program will not develop a new systematic review because we did not find enough primary studies addressing the concerns of this nomination.

Background

Spinal cord injuries occur when the axons of nerves running through the spinal cord are disrupted. Common causes of spinal cord injuries include vehicle collisions, falls, violence, sports injuries, and medical and surgical etiologies.[1] The global prevalence of traumatic spinal cord injury ranged from 236 to 1298/million, as reported in a systematic review with a search spanning 1950 to 2012.[2] The sports associated with the greatest number of traumatic spinal cord injuries are diving, skiing, rugby, horseback riding, football, cycling, and motor racing.[3]

Treatment for this and other spinal conditions may include surgery. Candidate conditions for surgery may include herniated or ruptured disks, in which disks that cushion the bones of the spine are damaged; spinal stenosis, in which narrowing of the spinal column puts pressure on the spinal cord and nerves; spondylolisthesis, in which one or more bones in the spine slip out of place; vertebral fractures, in which injury to the bones in the spine or by osteoporosis; or degenerative disk disease, in which damage to spinal disks occurs as person gets older. Types of surgical interventions include vertebroplasty and kyphoplasty, spinal laminectomy/spinal decompression, discectomy, foraminotomy, nucleoplasty, spinal fusion, and artificial disk replacement.[4]

Elective lumbar fusion has increased in the United States. In 2015, the prevalence was 79.8 per 100,000 US adults. The largest increases were for spondylolisthesis and scoliosis, disc degeneration, herniation, and stenosis. Hospital costs in the US exceeded $10 billion in 2015 and averaged more than $50,000 per admission.[5]

There is practice variability in recommendations regarding timing for return to certain physical activities after spinal surgery. A systematic review would be used to develop a clinical guideline on the issue.

Scope

What is the comparative benefit and harms of early versus late return to activities in athletes or military personnel following spinal surgery?

Table 1. Questions and PICO (population, intervention, comparator, and outcome)

Questions	Recovery time following spinal surgery
Population	Adults ≥18 years who have undergone spinal surgery and engage in high-impact and/or collision activities (e.g., professional and non-professional athletes, military personnel) By condition: • Degenerative spine disorder of the cervical or thoracolumbar spine • Disc herniation, spondylosis, stenosis, spondylolisthesis • Myelopathy, radiculopathy, neurogenic claudication By surgery type: • Elective cervical non-fusion surgery (e.g., laminotomy, laminectomy, facetectomy, laminoplasty, spinal decompression surgery, arthroplasty) • Elective cervical fusion surgery • Elective lumbar fusion surgery • Elective lumbar non-fusion surgery (e.g., laminotomy, laminectomy, facetectomy spinal decompression surgery, bone spur removal, arthroplasty)
Interventions	Early return to activity (i.e., return to activity less than 90 days after surgery)
Comparators	Late return to activity (i.e., return to activity greater than 90 days after surgery)
Outcomes	Clinical outcomes, neurological functioning, patient-reported outcome measures, adverse events, additional surgery

Assessment Methods

See Appendix A.

Summary of Literature Findings

We did not find any systematic reviews covering the scope of the nomination and found only one primary study[6].

Table 2. Literature identified for each Question

Question	Systematic reviews (1/2020-1/2023)	Primary studies (1/2018-1/2023)
Question 1: Return to activities following spinal cord injury	Total: 0	Total: 1[6] • Retrospective case study: 1

See Appendix B for detailed assessments of all EPC selection criteria.

Summary of Selection Criteria Assessment

There is practice variability in recommendations regarding timing for return to certain physical activities after spinal surgery. A systematic review would be used to develop a clinical guideline

on the issue. We did not find any systematic reviews addressing the scope of the nomination and only found one primary study.

Please see Appendix B for detailed assessments of individual EPC Program selection criteria.

References

1. Bennett J MDJ, Emmady PD. Spinal Cord Injuries. StatPearls. 2022. doi: https://www.ncbi.nlm.nih.gov/books/NBK560721/.
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6. Mai HT, Chun DS, Schneider AD, et al. The Difference in Clinical Outcomes After Anterior Cervical Fusion, Disk Replacement, and Foraminotomy in Professional Athletes. Clinical Spine Surgery : A Spine Publication. 2018 02;31(1):E80-E4. doi: https://dx.doi.org/10.1097/BSD.0000000000000570. PMID: 28719454.

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Conflict of Interest: None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

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Appendix A: Methods

We assessed nomination for priority for a systematic review or other AHRQ Effective Health Care report with a hierarchical process using established selection criteria. Assessment of each criteria determined the need to evaluate the next one. See Appendix B for detailed description of the criteria.

Appropriateness and Importance

We assessed the nomination for appropriateness and importance.

Desirability of New Review/Absence of Duplication

We searched for high-quality, completed or in-process evidence reviews published in the last three years January 17, 2020- January 17, 2023 on the questions of the nomination from these sources:

- AHRQ: Evidence reports and technology assessments
  - AHRQ Evidence Reports https://www.ahrq.gov/research/findings/evidence-based-reports/index.html
  - EHC Program https://effectivehealthcare.ahrq.gov/
  - US Preventive Services Task Force https://www.uspreventiveservicestaskforce.org/
  - AHRQ Technology Assessment Program https://www.ahrq.gov/research/findings/ta/index.html
- US Department of Veterans Affairs Products publications
  - Evidence Synthesis Program https://www.hsrd.research.va.gov/publications/esp/
  - VA/Department of Defense Evidence-Based Clinical Practice Guideline Program https://www.healthquality.va.gov/
- Cochrane Systematic Reviews https://www.cochranelibrary.com/
- University of York Centre for Reviews and Dissemination database https://www.crd.york.ac.uk/CRDWeb/
- PROSPERO Database (international prospective register of systematic reviews and protocols) http://www.crd.york.ac.uk/prospero/
- PubMed https://www.ncbi.nlm.nih.gov/pubmed/
- Joanna Briggs Institute http://joannabriggs.org/
- Epistemonikos https://www.epistemonikos.org/

Impact of a New Evidence Review

The impact of a new evidence review was qualitatively assessed by analyzing the current standard of care, the existence of potential knowledge gaps, and practice variation. We considered whether it was possible for this review to influence the current state of practice through various dissemination pathways (practice recommendation, clinical guidelines, etc.).

Feasibility of New Evidence Review

We conducted a limited literature search in PubMed and PsycInfo for the last five years, January 17, 2018 - January 17, 2023. We reviewed all studies and identified titles and abstracts for inclusion. We classified identified studies by question and study design to estimate the size and scope of a potential evidence review.

Search strategy

Ovid MEDLINE ALL 1946 to January 17, 2023

Date searched: January 18, 2023
1 Cervical Vertebrae/su or Intervertebral Disc Displacement/su or Lumbar Vertebrae/su or Radiculopathy/ or Spinal Cord Compression/ or Spinal Cord Diseases/su or Spinal Cord Injuries/su or Spinal Osteophytosis/su (56587)
2 (((degenerat* or injur* or osteophyt* or stenosis or stenotic) adj3 (spine or spinal or vertebra*)) or ((disc or discs) adj3 hernia*) or spondylo* or spondylolisthesis or myelopath* or radiculopath* or claudication).ti,ab,kf. and (su.fs. or surger*.ti,ab,kf.) (113149)
3 exp Diskectomy/ or Laminectomy/ or Laminoplasty/ or Spinal Fusion/ or Total Disc Replacement/ (43902
4 (((cervical or disc or lumbar or thoracolumbar or thoracic or spine or spinal or vertebr*) adj3 surger*) or discectom* or diskectom* or laminotom* or laminectom* or facetectomy* or laminoplast* or ((arthroplast* or decompress*) adj3 (spine or spinal or vertebra*))).ti,ab,kf. (70680)
5 or/1-4 (205881)
6 Return to Sport/ or Return to Work/ (5859)
7 ("active duty" or ((recommenc* or resum* or restart* or return) adj3 (activit* or dut$3 or play* or professional* or sport* or work*))).ti,ab,kf. (33434)
8 or/6-7 (34797)
9 and/5,8 (1266)
10 9 not ((exp Animals/ not Humans/) or (adolescen* or animal model* or bitch$2 or bovine or canine or capra or cat or cats or cattle or child* or cow$1 or dog$1 or equine or ewe$1 or feline or goat$1 or hamster$1 or horse$1 or invertebrate$1 or juvenile$1 or macaque$1 or mare$1 or mice or monkey$1 or mouse or murine or nonhuman or non-human or ovine or paediatr* or pediatr* or pig or pigs or porcine or primate$1 or rabbit$1 or rat$1 or rattus or rhesus or rodent* or school or sheep or simian or sow$1 or teen* or toddler* or vertebrate$1 or zebrafish).ti.) (1207)
11 limit 10 to english language (1116)
12 limit 11 to yr="2019 -Current" (271)
13 (meta-analysis or systematic review).pt. or (meta-anal* or metaanal* or ((evidence or review or scoping or systematic or umbrella) adj3 (review or synthesis))).ti. (798257)
14 and/12-13 (35)
15 limit 11 to yr="2017 -Current" (378)
16 (controlled clinical trial or randomized controlled trial).pt. or (control or controls or controlled or placebo$1 or random* or trial*).ti,ab,kf. (5703595)
17 and/15-16 (102)
18 Case-Control Studies/ or Cohort Studies/ or Comparative Study/ or Controlled Before-After Studies/ or Cross-Sectional Studies/ or Epidemiologic Studies/ or exp Evaluation Studies as Topic/ or Follow-Up Studies/ or Historically Controlled Study/ or Interrupted Time Series Analysis/ or Longitudinal Studies/ or Prospective Studies/ or Retrospective Studies/ or ("case-control" or cohort$1 or "before-after" or ((comparative or epidemiologic or evaluation) adj3 study) or cross-sectional or follow-up or (historic* adj4 control*) or "interrupted time" or longitudinal$2 or prospective$2 or retrospective$2).ti,ab,kf. (6889947)
19 and/15,18 (246)
20 19 not (14 or 17) (174

Ovid EBM Reviews - Cochrane Central Register of Controlled Trials December 2022
Date searched: January 18, 2023
1 Cervical Vertebrae/ or Intervertebral Disc Displacement/ or Lumbar Vertebrae/ or Radiculopathy/ or Spinal Cord Compression/ or Spinal Cord Diseases/ or Spinal Cord Injuries/ or Spinal Osteophytosis/ (6471)

2 ((((degenerat* or injur* or osteophyt* or stenosis or stenotic) adj3 (spine or spinal or vertebra*)) or ((disc or discs) adj3 hernia*) or spondylo* or spondylolisthesis or myelopath* or radiculopath* or claudication) and surger*).ti,ab. (4912)
3 Diskectomy/ or Diskectomy, Percutaneous/ or Laminectomy/ or Laminoplasty/ or Spinal Fusion/ or Total Disc Replacement/ (1596)
4 (((cervical or disc or lumbar or thoracolumbar or thoracic or spine or spinal or vertebr*) adj3 surger*) or discectom* or diskectom* or laminotom* or laminectom* or facetectomy* or laminoplast* or ((arthroplast* or decompress*) adj3 (spine or spinal or vertebra*))).ti,ab. (10351)
5 or/1-4 (18685)
6 Return to Sport/ or Return to Work/ (305)
7 ("active duty" or ((recommenc* or resum* or restart* or return) adj3 (activit* or dut$3 or play* or professional* or sport* or work*))).ti,ab. (5111)
8 or/6-7 (5170)
9 and/5,8 (221)
10 limit 9 to yr="2017 -Current" (71)
ClinicalTrials.gov

Value

We assessed the nomination for value. We considered whether or not the clinical, consumer, or policymaking context had the potential to respond with evidence-based change, if a partner organization would use this evidence review to influence practice, and if the topic supports a priority area of AHRQ or the Department of Health and Human Services.

Appendix B. Selection Criteria Assessment

Selection Criteria	Assessment
1. Appropriateness	
1a. Does the nomination represent a health care drug, intervention, device, technology, or health care system/setting available (or soon to be available) in the United States?	Yes.
1b. Is the nomination a request for an evidence report?	Yes.
1c. Is the focus on effectiveness or comparative effectiveness?	Yes.
1d. Is the nomination focus supported by a logic model or biologic plausibility? Is it consistent or coherent with what is known about the topic?	Yes.
2. Importance	
2a. Represents a significant disease burden; large proportion of the population	Yes. The prevalence of traumatic spinal cord injury ranges from 236 to 1298/million and has increased worldwide in recent decades.[2]
2b. Is of high public interest; affects health care decision making, outcomes, or costs for a large proportion of the United States population or for a vulnerable population	Yes. The prevalence of traumatic spinal cord injury ranges from 236 to 1298/million and has increased worldwide in recent decades.[2] Hospital costs in the United States exceeded $10 billion in 2015, and averaged more than $50,000 per admission.[5]
2c. Incorporates issues around both clinical benefits and potential clinical harms	Yes.
2d. Represents high costs due to common use, high unit costs, or high associated costs to consumers, to patients, to health care systems, or to payers	Yes. Hospital costs in the United States exceeded $10 billion in 2015 and averaged more than $50,000 per admission.[5]
3. Desirability of a New Evidence Review/Absence of Duplication	
3. A recent high-quality systematic review or other evidence review is not available on this topic	Yes. We did not find any systematic reviews to cover the scope of the nomination.
4. Impact of a New Evidence Review	
4a. Is the standard of care unclear (guidelines not available or guidelines inconsistent, indicating an information gap that may be addressed by a new evidence review)?	There is practice variability in recommendations regarding timing for return to certain physical activities after spinal surgery. A systematic review would be used to develop a clinical guideline on the issue.
4b. Is there practice variation (guideline inconsistent with current practice, indicating a potential implementation gap and not best addressed by a new evidence review)?	Yes. There is practice variation in recommendations regarding timing for return to certain physical activities after spinal surgery.
5. Primary Research	
5. Effectively utilizes existing research and knowledge by considering: - Adequacy (type and volume) of research for conducting a systematic review - Newly available evidence (particularly for updates or new technologies)	Size/scope of review: 1 included primary study out of 306. The estimated size of a systematic review would be limited.
6. Value	
6a. The proposed topic exists within a clinical, consumer, or policy-making context that is amenable to evidence-based change and supports a priority of AHRQ or Department of Health and Human Services	Yes. This topic exists within a clinical context that is amenable to change.

6b. Identified partner who will use the systematic review to influence practice (such as a guideline or recommendation)	Yes. The nominator plans to develop a guideline from a systematic review.

Abbreviations: AHRQ=Agency for Healthcare Research and Quality.