

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Calcium Phosphate Bone Injections During Knee, Hip, or Ankle Repairs in Adults: Clinical Effectiveness, Cost- Effectiveness, and Guidelines

Service Line:	Rapid Response Service
Version:	1.0
Publication Date:	February 6, 2020
Report Length:	6 Pages

Authors: Deba Hafizi, Charlene Argáez

Cite As: Calcium phosphate bone injections during hip, knee, or ankle repairs in adults: clinical effectiveness, cost-effectiveness, and guidelines. Ottawa: CADTH; 2020 Feb. (CADTH rapid response report: summary of abstracts).

Disclaimer: The information in this document is intended to help Canadian health care decision-makers, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. While patients and others may access this document, the document is made available for informational purposes only and no representations or warranties are made with respect to its fitness for any particular purpose. The information in this document should not be used as a substitute for professional medical advice or as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process. The Canadian Agency for Drugs and Technologies in Health (CADTH) does not endorse any information, drugs, therapies, treatments, products, processes, or services.

While care has been taken to ensure that the information prepared by CADTH in this document is accurate, complete, and up-to-date as at the applicable date the material was first published by CADTH, CADTH does not make any guarantees to that effect. CADTH does not guarantee and is not responsible for the quality, currency, propriety, accuracy, or reasonableness of any statements, information, or conclusions contained in any third-party materials used in preparing this document. The views and opinions of third parties published in this document do not necessarily state or reflect those of CADTH.

CADTH is not responsible for any errors, omissions, injury, loss, or damage arising from or relating to the use (or misuse) of any information, statements, or conclusions contained in or implied by the contents of this document or any of the source materials.

This document may contain links to third-party websites. CADTH does not have control over the content of such sites. Use of third-party sites is governed by the third-party website owners' own terms and conditions set out for such sites. CADTH does not make any guarantee with respect to any information contained on such third-party sites and CADTH is not responsible for any injury, loss, or damage suffered as a result of using such third-party sites. CADTH has no responsibility for the collection, use, and disclosure of personal information by third-party sites.

Subject to the aforementioned limitations, the views expressed herein do not necessarily reflect the views of Health Canada, Canada's provincial or territorial governments, other CADTH funders, or any third-party supplier of information.

This document is prepared and intended for use in the context of the Canadian health care system. The use of this document outside of Canada is done so at the user's own risk.

This disclaimer and any questions or matters of any nature arising from or relating to the content or use (or misuse) of this document will be governed by and interpreted in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein, and all proceedings shall be subject to the exclusive jurisdiction of the courts of the Province of Ontario, Canada.

The copyright and other intellectual property rights in this document are owned by CADTH and its licensors. These rights are protected by the Canadian *Copyright Act* and other national and international laws and agreements. Users are permitted to make copies of this document for non-commercial purposes only, provided it is not modified when reproduced and appropriate credit is given to CADTH and its licensors.

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Questions or requests for information about this report can be directed to requests@cadth.ca

Research Questions

1. What is the clinical effectiveness of calcium phosphate bone injections during knee, hip, or ankle repairs in adults?
2. What is the cost-effectiveness of calcium phosphate bone injection during knee, hip, or ankle repairs in adults?
3. What are the evidence-based guidelines regarding the use of calcium phosphate bone substitutes prior to knee, hip, or ankle repairs in adults?

Key Findings

No relevant literature was identified regarding the clinical effectiveness or cost-effectiveness of calcium phosphate bone injections during knee, hip, or ankle repairs in adults. In addition, no evidence-based guidelines were identified regarding the use of calcium phosphate bone substitutes prior to knee, hip, or ankle repairs in adults.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were subchondroplasty or calcium phosphate bone injections and ankle, hip, or knee disorders. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between January 1, 2015 and January 23, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients with bone marrow lesions, periticular cysts of the knee, hip, or ankle, or subchondral bone defects
Intervention	Knee, hip, or ankle repairs also known as arthroplasty, performed using calcium phosphate bone injection or substitutes; also known as subchondroplasty
Comparator	Knee, hip, or ankle repairs performed without calcium phosphate bone substitutes or injections
Outcomes	Q1: Clinical effectiveness (e.g., pain [e.g., measured using pain scales], Oxford scores, conversion rate to joint replacement, failure rate, change in bone quality, quality of life, safety [e.g., rates of adverse events]) Q2: Cost-effectiveness Q3: Recommendations
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

No relevant health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations or evidence-based guidelines were identified regarding the use of calcium phosphate bone injections during knee, hip, or ankle repairs in adults.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

No relevant literature was found regarding clinical effectiveness or cost-effectiveness of calcium phosphate bone injections during knee, hip, or ankle repairs in adults, therefore no summary can be provided.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Economic Evaluations

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Non-Randomized Studies

No Comparator

1. Chua K, Kang JYB, Ng FDJ, et al. Subchondroplasty for bone marrow lesions in the arthritic knee results in pain relief and improvement in function. *J Knee Surg.* 2019 Nov 21.
[PubMed: PM31752023](#)
2. Hajnik C, Akhavan S, Wyland DJ, et al. Two year clinical outcomes of the Subchondroplasty® procedure for treatment of symptomatic bone marrow lesions of the knee. *Orthop J Sports Med.* 2019 Jul;7(7):suppl5.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6667883/>
3. Byrd JM, Akhavan S, Frank DA.. Mid-term outcomes of the Subchondroplasty procedure for patients with osteoarthritis and bone marrow edema. *Orthop J Sports Med.* 2017 Jul; 5(7 suppl6): 2325967117S00291.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5542318/>
4. Cohen SB, Sharkey PF. Subchondroplasty for treating bone marrow lesions. *J Knee Surg.* 2016 Oct;29(7):555-563.
[PubMed: PM26641077](#)

Trials in Recruitment Phase

5. Zimmer Biomet. NCT03494660: SCP hip outcomes study. *ClinicalTrials.gov.* Bethesda (MD): U.S. National Library of Medicine; 2019 Nov:
<https://clinicaltrials.gov/ct2/show/NCT03494660> Accessed 2020 Feb 04.
6. Zimmer Biomet. NCT03430219: Subchondroplasty procedure in patients with bone marrow lesions. *ClinicalTrials.gov.* Bethesda (MD): U.S. National Library of Medicine; 2019 Jan: <https://clinicaltrials.gov/ct2/show/NCT03430219> Accessed 2020 Feb 04.
7. University of Calgary. NCT03699046: Evaluating the effectiveness of Subchondroplasty for treating bone marrow lesions of the knee. *ClinicalTrials.gov.* Bethesda (MD): U.S. National Library of Medicine; 2018 Oct:
<https://clinicaltrials.gov/ct2/show/NCT03699046> Accessed 2020 Feb 04.

Alternative Population

8. Chatterjee D, McGee A, Strauss E, Youm T, Jazrawi L. Subchondral calcium phosphate is Ineffective for bone marrow edema lesions in adults with advanced osteoarthritis. *Clin Orthop Relat Res.* 2015 Jul;473(7):2334-2342.
[PubMed: PM25917421](#)

Case Studies

9. Bernhard K, Ng A, Kruse D, Stone PA. Surgical treatment of bone marrow lesion associated with recurrent plantar fasciitis: a case report describing an innovative technique using Subchondroplasty®. *J Foot Ankle Surg.* 2018 Jul - Aug;57(4):811-815.
[PubMed: PM29631967](#)

10. Chan JJ, Guzman JZ, Vargas L, Myerson CL, Chan J, Vulcano E. Safety and effectiveness of talus Subchondroplasty and bone marrow aspirate concentrate for the treatment of osteochondral defects of the talus. *Orthopedics*. 2018 Sep 1;41(5):e734-e737.
[PubMed: PM30052260](#)
11. Bonadio MB, Giglio PN, Helito CP, Pecora JR, Camanho GL, Demange MK. Subchondroplasty for treating bone marrow lesions in the knee - initial experience. *Rev Bras Ortop*. 2017 May-Jun;52(3):325-330.
[PubMed: PM28702392](#)
12. Dold A, Perretta D, Youm T. Osteomyelitis after calcium phosphate Subchondroplasty a case report. *Bull Hosp Jt Dis (2013)*. 2017 Dec;75(4):282-285.
[PubMed: PM29151016](#)

Review Articles

13. Ververidis AN, Paraskevopoulos K, Tilkeridis K, Riziotis G, Tottas S, Drosos GI. Surgical modalities for the management of bone marrow edema of the knee joint. *J Orthop*. 2020 Jan-Feb;17:30-37.
[PubMed: PM31879470](#)
14. Astur DC, de Freitas EV, Cabral PB, et al. Evaluation and management of subchondral calcium phosphate injection technique to treat bone marrow lesion. *Cartilage*. 2019 Oct;10(4):395-401.
[PubMed: PM29667853](#)

Additional References

15. Holt K, Sorhaindo M, Coady C, Wong IH. Arthroscopic treatment of medial femoral knee osteochondral defect using Subchondroplasty and chitosan-based scaffold. *Arthrosc Tech*. 2019 Apr;8(4):e413-e418.
[PubMed: PM31110940](#)