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Efficacy of hyperosmolar dextrose injection for Osgood-Schaltter disease: a systematic review with meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202520020

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 February 2025 and was last updated on 4 February 2025.

INTRODUCTION

Review question / Objective Is hyperosmolar dextrose injection effective for Osgood-Schlatter disease?

Rationale Osgood-Schaltter disease (OSD) is a common cause of anterior knee pain in physically active adolescents participating in jumping and running. It is an apophysitis of the tibial tubercle due to repetitive traction of the patellar tendon on the developing tibial tuberosity. The condition is often self-limiting but may lead to significant pain and functional limitation. Conservative treatment including activity modification, physical therapy, and short course of nonsteroidal anti-inflammatory drugs (NSAIDs) can be helpful, but some patients experience prolonged symptoms, prompting interests in alternative interventions, including hyperosmolar dextrose injection.
Hyperosmolar dextrose injection, commonly used in prolotherapy, has been used for various musculoskeletal conditions including chronic tendinopathies. It is thought to stimulate local inflammation and promote tissue healing and has been explored in OSD. However, there remains a lack of systematic review synthesizing evidence to support its use. Therefore, the purpose of this systematic review is to evaluate the efficacy of hyperosmolar dextrose injections for OSD.

Condition being studied Osgood-Schlatter disease (tibial tuberosity apophysitis).

METHODS

Search strategy PubMed, Embase, and Web of Science will be searched from their inception to Feb, 2025, for articles evaluating the efficacy of hyperosmolar dextrose injections in patients with Osgood-Schlatter disease. The sample search strategy is as follows but may be modified after consulting librarian:

PubMed
("Osgood-Schlatter disease" OR "tibial tuberosity apophysitis") AND ("dextrose injection" OR "prolotherapy" OR "hyperosmolar dextrose")

Embase
('Osgood-Schlatter disease' OR 'tibial tuberosity apophysitis') AND ('dextrose injection' OR 'prolotherapy' OR 'hyperosmolar dextrose')

Web of Science
ALL=((Osgood-Schlatter disease OR tibial tuberosity apophysitis) AND (dextrose injection OR prolotherapy OR hyperosmolar dextrose)).

Participant or population Pediatric and adolescent patients diagnosed with Osgood-Schlatter disease (tibial tuberosity apophysitis).

Intervention Hyperosmolar dextrose injection (prolotherapy) near/to the tibial tuberosity.

Comparator Placebo injection (saline or lidocaine), other injectable treatments, physical therapy, sham procedures, or no intervention.

Study designs to be included Randomized controlled trials, prospective and retrospective comparative studies, and case series.

Eligibility criteria Randomized controlled trials, prospective and retrospective comparative studies, and case series evaluating the efficacy of hyperosmolar dextrose injection for OSD.

Information sources PubMed, Embase, Web of Science, or other information sources recommended by a librarian.

Main outcome(s) Clinically relevant measures, including patient-reported outcome measures (such as VAS, VISA-P, NPPS score), return to activity/sport, and adverse events.

Quality assessment / Risk of bias analysis Two authors will assess the risk of bias using the revised Cochrane risk-of-bias tool for randomized controlled trials (ROB 2) and the Risk of Bias in Non-Randomized Studies – of Interventions (ROBINS-I) for non-RCTs. Any discrepancies between the two authors will be resolved through discussion with a third author.

Strategy of data synthesis We will conduct random-effects pairwise meta-analyses to account for clinical variability among studies, including possible variations in patient and injection characteristics, provided that at least two or more studies share comparable outcome measures and follow-up durations. Depending on the available outcome measures, either the standardized mean difference (SMD) or weighted mean difference (WMD) will be calculated. Statistical heterogeneity will be assessed using Q and I^2 statistics. Publication bias will be assessed if more than 10 studies are included in the analysis. All analyses will be conducted using STATA Version 16 (StataCorp, LLC, College Station, TX).

Subgroup analysis None planned.

Sensitivity analysis If both RCTs and non-RCTs are included in meta-analysis, sensitivity analysis will be performed by excluding non-RCTs.

Country(ies) involved United States.

Keywords hyperosmolar dextrose injection, prolotherapy, Osgood-Schlatter disease, tibial tuberosity apophysitis.

Dissemination plans Presentation at conferences and publication at peer-reviewed journal.

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