

INPLASY PROTOCOL

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None declared.

Effect of strength training on knee proprioception in patients with knee osteoarthritis. A systematic review and meta-analysis protocol

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Review question / Objective: To analyze the effect of strength training (ST) on knee proprioception in patients with knee osteoarthritis (KOA).

Condition being studied: KOA is a chronic and degenerative joint disease characterized by articular cartilage loss, marginal bone hypertrophy, and inflammatory involvement of periarticular tissue of the knee. Symptoms of KOA are pain, stiffness, reduced range of motion, and muscle weakness, although proprioception may also be affected, contributing to the associated functional limitation.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 May 2023 and was last updated on 28 May 2023 (registration number INPLASY202350102).

INTRODUCTION

Review question / Objective: To analyze the effect of strength training (ST) on knee proprioception in patients with knee osteoarthritis (KOA).

Rationale: Proprioception is the afferent information contributing to postural control and dynamic joint stability. Proprioceptive accuracy can be significantly affected in patients with unilateral KOA, both in the

affected and unaffected knee, which also is associated with increased pain and reduced functionality. KOA's treatment includes physical exercise because it has numerous local and systemic effects. Physical exercise programs appear safe and effective in patients with KOA, mainly referring to improving pain and muscle strength. Because of the latter, ST has become a central component of rehabilitation programs in KOA. Interestingly, clinical trials have shown that

ST can promote proprioception in patients with KOA, so proprioceptive improvement could also become an important outcome associated with these interventions. Previous reviews focused on patients with KOA have reported the effects of ST on several relevant outcomes in the rehabilitation process. However, to date, no review has been conducted that specifically analyzes the effectiveness of ST on proprioception in patients with KOA.

Condition being studied: KOA is a chronic and degenerative joint disease characterized by articular cartilage loss, marginal bone hypertrophy, and inflammatory involvement of periarticular tissue of the knee. Symptoms of KOA are pain, stiffness, reduced range of motion, and muscle weakness, although proprioception may also be affected, contributing to the associated functional limitation.

METHODS

Search strategy: The strategy considered using Medical Subheading (MeSH) terms and common terms in the study field linked by Boolean operators (OR and AND). The search terms were: (i) Population: Osteoarthritis, Knee [Mesh]; Osteoarthritis [Mesh], (ii) Intervention: Resistance Training [Mesh]; "strength training", (iii) Outcomes: Proprioception [Mesh]; Kinesthesia [Mesh]; "joint position sense"; propriocep*; kinesthe*; "position sense"; "sense of resistance".

Participant or population: Patients with primary KOA.

Intervention: Any ST modality applied without any other type of physical intervention.

Comparator: (i) Physical exercise different from ST, (ii) non-exercise-based interventions, (iii) nointervention.

Study designs to be included: Randomized controlled trials (RCTs).

Eligibility criteria: Inclusion criteria: Population: Patients with primary KOA (unilateral or bilateral). Intervention: Any ST modality applied without any other type of physical intervention. Comparison: (i) physical exercise different from ST, (ii) non-exercise-based interventions, (iii) no intervention; (iv) outcome: Knee proprioception assessed by field or laboratory testing; (v) types of studies: Randomized controlled trials (RCTs), with no restriction on language or year of publication. Exclusion criteria: Studies conducted in patients with knee arthroplasty or osteoarthritis secondary to infectious, autoimmune, traumatic, congenital, or metabolic conditions were excluded.

Information sources: Electronic databases Pubmed, CINAHL, Scopus, Web of Science, and PEDro. In addition, a manual search from the reference list of the included studies will be performed.

Main outcome(s): Any specific measurement relative to knee proprioception.

Additional outcome(s): None.

Data management: Records obtained from the databases were imported into the Rayyan electronic platform. After eliminating duplicates, records were screened by titles and abstracts to identify studies that potentially met the inclusion criteria. Then, the full texts of the remaining studies were retrieved to assess their eligibility. This process were performed by two reviewers independently, and selection discrepancies were resolved by consensus.

Quality assessment / Risk of bias analysis: 1) The 11-point PEDro scale for the assessment of the methodological quality of individual studies. (2) Cochrane Revman 5.4 Software. For the assessment of individual and overall risk-of-bias

Strategy of data synthesis: Studies were meta-analyzed (Review Manager® 5.4.1) according to the comparator, and subgroups were generated according to

the type of proprioception measurement. Effect size was expressed as the standardized mean difference using a random-effects model due to the diversity of measurement techniques and statistical heterogeneity. Heterogeneity was evaluated using the inconsistency index (I^2), classified as might not be important (0% -40%), moderate (30% -60%), substantial (50%-90%), and considerable heterogeneity (75%-100%). For the calculation of ES (Hedges' g), the mean, standard deviation, and post-treatment sample size of the experimental and control groups were used and classified as: 0.20-0.49 small; 0.50-0.79 moderate; and ≥ 0.80 high.

Subgroup analysis: Subgroups will be generated according to the type of proprioception measurement.

Sensitivity analysis: None.

Language restriction: No restrictions.

Country(ies) involved: Chile.

Other relevant information: None.

Keywords: Osteoarthritis; Knee; Proprioception; Resistance Training; Strength Training.

Dissemination plans: Peer-reviewed indexed journal.

Contributions of each author:

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