

Strength-based rehabilitation on clinical outcomes in patients post-partial meniscectomy: a systematic review and meta-analysis

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Introduction

- Menisci are structures in the knee responsible for shock absorption and load transmission during weight-bearing
- Arthroscopic partial meniscectomies (APMs) are some of the most common procedures for meniscus tears
- 50% of APM patients develop osteoarthritis 10 to 20 years post-surgery
- Weaker quadriceps muscles can expose articular cartilage to excessive loading in a knee that already lacks shock absorption
- Improving strength post-meniscectomy is important in delaying osteoarthritis in the future
- There is no systematic review currently that examines the literature on the topic of strength-based rehabilitation post-meniscectomy

Objectives

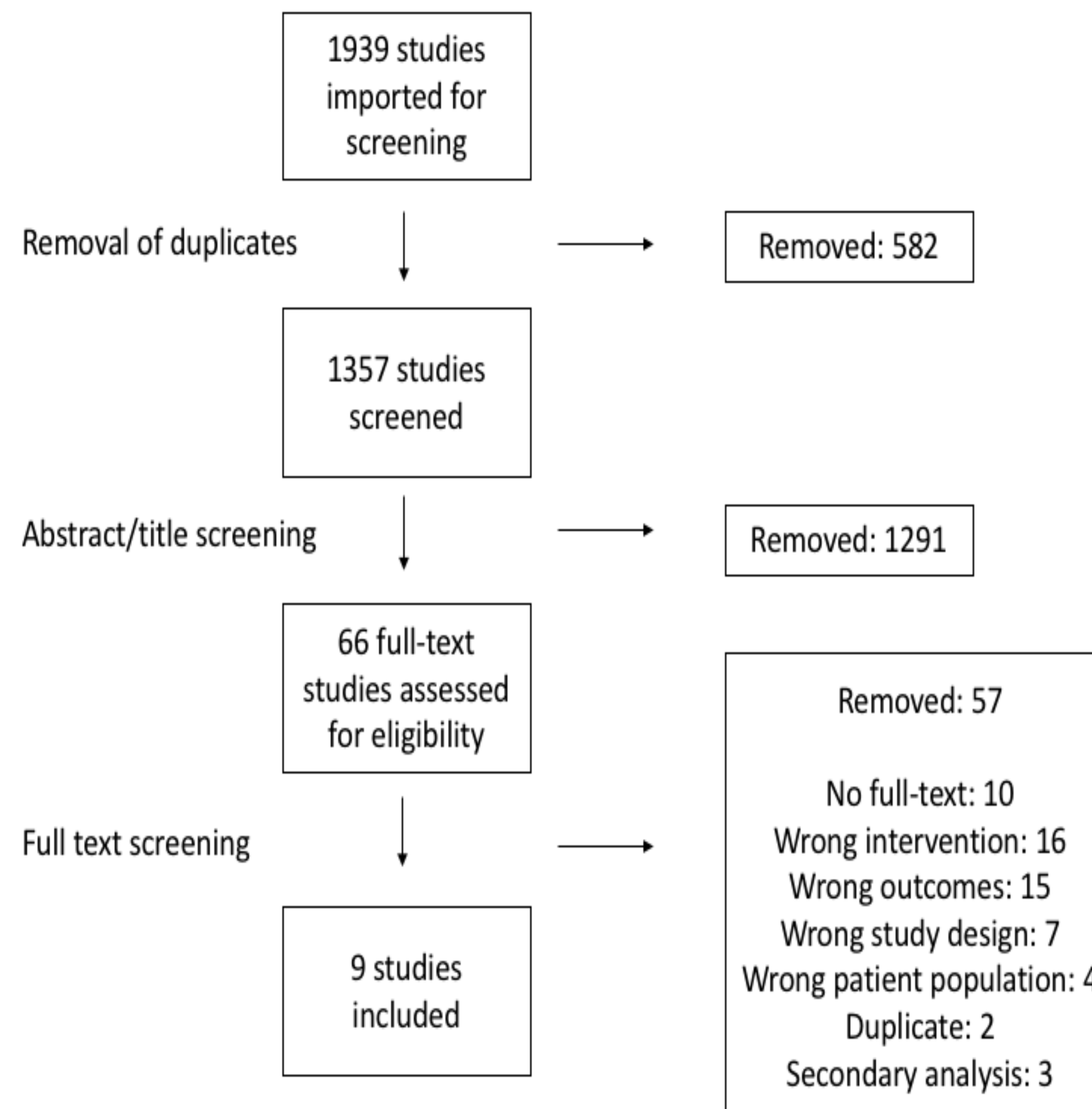
- To examine outcomes in post-partial meniscectomy patients who undergo strength-based rehabilitation and the rehabilitation programs in these studies

Methods

- Three online databases (Pubmed, Ovid(MEDLINE), EMBASE) were searched from database inception to May 9th, 2022 independently by two reviewers
- Inclusion criteria: studies in English, human, subjects of all ages, level I to IV evidence, studies with patients who had meniscal resection, and exercise routines with resistance exercises such as squats and lunges
- Quality assessment carried out using Methodological Index for Non-Randomized Studies (MINORS) appraisal tool

Results

- After systematic abstract/title and full-text screening, 9 articles were identified to meet the inclusion and exclusion criteria
- Reviewers reached almost perfect agreement during title ($k=0.86$, 95% CI (0.80-0.93) and full-text review ($k=0.853$, 95% CI 0.715, 0.991).



Results Continued

- The pooled standardized mean difference in quadriceps strength (peak torque 60°/sec) in four studies comprising 107 patients (1.8% loss to follow-up) in the exercise group was 0.238 (95% CI -0.385-0.860, $p=0.453$, $I^2 = 80.7\%$) whereas the pooled standardized mean difference in quadriceps strength in three studies comprising 70 patients (5.4% loss to follow-up) in the control group was 0.0131 (95% CI -0.339-0.365, $p=0.941$, $I^2 = 13.7\%$).
- The pooled standardized mean difference in hamstring strength (peak torque 60°/sec) in four studies comprising 107 patients (1.8% loss to follow-up) in the exercise group was 0.157 (95% CI = -0.444-0.758, $p=0.607$, $I^2 = 80.7\%$) whereas the pooled standardized mean difference in hamstring strength in three studies comprising 70 patients (5.4% loss to follow-up) in the control group was 0.102 (95% CI = -0.224-0.427, $p=0.538$, $I^2 = 0\%$).
- Five studies consisting of 155 patients (3.1% loss to follow-up) in the exercise treatment group and 59 patients (7.8% loss to follow-up) in the control group reported VAS scores.

Discussion & Conclusion

- The primary findings of this systematic review were that there were no significant differences in quadriceps or hamstring strength between control and exercise groups, and there were significant differences in total KOOS scores between both treatment arms pre and post-intervention.
- The decrease in VAS scores was also greater in the exercise arm as opposed to that of the control arm.
- Strength-based exercise programs for patients post-partial meniscectomy did not result in significantly different improvements in quadriceps or hamstring strength compared to control programs.
- Further studies, specifically well-designed systematic RCTs are necessary in order to elucidate the specifics behind what type of exercises to use in addition to load progression and frequency of training