

# IS MULTI-JOINT OR SINGLE JOINT STRENGTHENING MORE EFFECTIVE IN REDUCING PAIN AND IMPROVING FUNCTION IN WOMEN WITH PATELLOFEMORAL PAIN SYNDROME? A SYSTEMATIC REVIEW AND META-ANALYSIS.

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## ABSTRACT

**Background:** Patellofemoral pain syndrome is one of the most common causes of knee pain, especially in the female population. Conflicting evidence exists on whether a multi-joint strengthening program produces a greater outcome when compared to a single joint approach.

**Purpose:** The aim of this systematic review and meta-analysis was to investigate the effectiveness of a multi-joint strengthening program compared to a traditional single joint strengthening program in reducing pain and improving function in females diagnosed with patellofemoral pain syndrome.

**Study Design:** Systematic Review and Meta-Analysis.

**Methods:** A computer-based search (*population:* women with patellofemoral pain syndrome, *intervention:* multi-joint strengthening exercises, *comparator:* single joint strengthening exercises, *outcome:* pain and function) was performed. Databases including PubMed, CINAHL, SPORTDiscus, Cochrane, PEDro, and Scopus were searched up to May 23, 2017 for randomized clinical trials published since 2004. A hand search of relevant articles and exploration of Grey Literature (including clinical trials.gov, Grey Literature Report, and Open Grey) was also completed. Data was extracted for the following information: exercises prescribed, outcome measures, and overall results from the study.

**Results:** Five studies, each of high quality based on the PEDro scale, met the inclusion criteria for this systematic review and meta-analysis. Statistically different outcomes were found that favored the multi-joint intervention group for short-term and long-term self-reported pain and functional pain, short-term functional performance, and long-term self-reported function.

**Conclusion:** The results of this review show that statistically significant data are available that favor implementing a multi-joint exercise program in comparison to a single joint program for the reduction of pain in females with patellofemoral pain syndrome. Limited statistical evidence, however, is available to support a multi-joint program over a single joint program in the improvement of short-term functional performance and long-term self-reported function in females with patellofemoral pain syndrome.

**Key words:** Hip, knee, multi-joint, patellofemoral pain syndrome, single-joint, strengthening program.

**Level of Evidence:** 1a

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Conflict of Interest statement:  
The authors have no stated conflict of interest.