**Article Full Title**

Effectiveness of Manual Therapy Combined with Physical Therapy in Treatment of Patellofemoral Pain Syndrome: Systematic Review

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**Paper Abstract**

Objectives: The purpose of this study was to conduct a review of randomized controlled trials (RCTs) to determine the treatment effectiveness of the combination of manual therapy (MT) with other physical therapy techniques. Methods: Systematic searches of scientific literature were undertaken on PubMed and the Cochrane Library (2004-2014). The following terms were used: “patellofemoral pain syndrome,” “physical therapy,” “manual therapy,” and “manipulation.” RCTs that studied adults diagnosed with patellofemoral pain syndrome (PFPS) treated by MT and physical therapy approaches were included. The quality of the studies was assessed by the Jadad Scale. Results: Five RCTs with an acceptable methodological quality (Jadad ≥ 3) were selected. The studies indicated that MT combined with physical therapy has some effect on reducing pain and improving function in PFPS, especially when applied on the full kinetic chain and when strengthening hip and knee muscles. Conclusions: The different combinations of MT and physical therapy programs analyzed in this review suggest that

giving more emphasis to proximal stabilization and full kinetic chain treatments in PFPS will help better alleviation of symptoms.

**NIH Risk of Bias Tool**

Systematic Reviews

1. **Is the review based on a focused question that is adequately formulated and described?**

Yes

1. **Were eligibility criteria for included and excluded studies predefined and specified?**

Yes

1. **Did the literature search strategy use a comprehensive, systematic approach?**

No

1. **Were titles, abstracts, and full-text articles dually and independently reviewed for inclusion and exclusion to minimize bias?**

Yes

1. **Was the quality of each included study rated independently by two or more reviewers using a standard method to appraise its internal validity?**

Yes

1. **Were the included studies listed along with important characteristics and results of each study?**

Yes

1. **Was publication bias assessed?**

Cannot Determine, Not Reported, Not Applicable

1. **Was heterogeneity assessed? (This question applies only to meta-analyses.)**

Cannot Determine, Not Reported, Not Applicable

**Key Finding #1**

Manual therapy interventions, including patellar mobilizations, PNF, and stretching, led to improvements in knee motion and pain in adults diagnosed with PFPS.

**Key Finding #2**

Stronger improvements, however, in pain reduction, mobility, and function, were found in participants treated with combined hip strengthening and stretching exercises.

**Key Finding #3**

When manual therapy treatments addressed the full kinetic chain of the lower limb instead of solely local treatments to the knee, participants experienced longer-term decreased pain noted at a 2-month follow-up.

**Key Finding #4**

Lumbopelvic manipulations were not found to affect quadriceps activation in those with PFPS.

**Please provide your summary of the paper**

This systematic review looked at the effectiveness of manual therapy when combined with other physical therapy techniques, mainly strengthening. The findings suggest that manual therapy provides a conservative yet effective treatment option for PFPS, reducing pain and improving functional mobility of the knee joint. However, manual therapy combined with strengthening that both address the full kinetic chain of the lower limb produces greater and longer-term improvements in pain relief and function. There are some limitations of the review though, including that the studies examined utilized dissimilar protocol designs and they mainly investigated the immediate effects of manipulation techniques. Therefore, further investigation into the long-term effects of combined manual therapy and other physical therapy techniques as well as a more standardized protocol are needed.

**Please provide your clinical interpretation of this paper. Include how this study may impact clinical practice and how the results can be implemented.**

While manual therapy has been shown to be effective in reducing pain and improving function of the knee joint in adults diagnosed with PFPS, greater improvements are obtained by combining manual therapy of the knee with strengthening and manual techniques addressing the full kinetic chain of the lower limb, focusing on the muscles around the knee and hip. The exact protocol that is the most beneficial requires further research.