**Article Full Title**

Effectiveness of local exercise therapy versus spinal manual therapy in patients with patellofemoral pain syndrome: medium term follow-up results of a randomized controlled trial

**Author Names**

Enfelsma, Y; Haverkamp, S; Scafoglieri, A; Tamminga, R; Van den Broeck, J; Van der Hoeven, H; Willems, S

**Reviewer Name**

Katherine Terkoski SPT

**Reviewer Affiliations**

Duke University School of Medicine, Doctor of Physical Therapy Division

**Paper Abstract**

Background: Increasing evidence has shown benefits of spinal manipulations in patients with patellofemoral pain syndrome (PFPS). There is scarcity regarding medium term effects of spinal manual therapy on outcome measures in PFPS patients. Therefore, the aim of the present study was to compare the effectiveness of local exercise therapy and spinal manual therapy for knee pain, function and maximum voluntary peak force (MVPF) velocity of the quadriceps in PFPS patients. Methods: Forty-three patients with PFPS were randomly assigned to a local exercise or spinal manual therapy group. The local exercise group received six sessions (one session per week) of supervised training of the knee-and hip muscles with mobilization of the patellofemoral joint. The spinal manual therapy group received six interventions (one intervention per week) of high velocity low thrust manipulations at the thoracolumbar region, sacroiliac joint, and/or hip. All patients were also asked to do home exercises. Maximum, minimum and current pain were measured using the visual analogue scale. Function was assessed with the anterior knee pain scale (AKPS) and MPFV was recorded using a Biodex System 3 dynamometer. Patients were assessed before intervention, after 6 weeks of intervention and after 6 weeks of follow-up. Between-group differences at assessments were analysed by way of analysis of covariance with Bonferroni correction. Results: Pain and functionality improved more following spinal manipulative therapy than local exercise therapy. After 6 weeks of intervention the between-group difference (local versus spinal) for maximal pain was 23.4 mm [95% CI: 9.3, 37.6; effect size (ES): 1.04] and − 12.4 [95% CI: − 20.2, − 4.7; ES: 1.00] for the AKPS. At 6 weeks of follow-up the between-group difference for maximal pain was 18.7 mm [95% CI: 1.4, 36.0; ES: 0.68] and − 11.5 [95% CI: − 19.9, − 3.3; ES: − 0.87] for the AKPS. Conclusions: This study suggests that spinal manual therapy is more effective than local exercise therapy in improving pain and function in patients with PFPS in the medium term. We suggest for future research to investigate whether combining local exercise therapy and spinal manual therapy is more effective than either single intervention on its own.

**NIH Risk of Bias Tool**

Quality Assessment of Controlled Intervention Studies

1. **Was the study described as randomized, a randomized trial, a randomized clinical trial, or an RCT**

Yes

1. **Was the method of randomization adequate (i.e., use of randomly generated assignment)?**

Yes

1. **Was the treatment allocation concealed (so that assignments could not be predicted)?**

Yes

1. **Were study participants and providers blinded to treatment group assignment?**

No

1. **Were the people assessing the outcomes blinded to the participants' group assignments?**

No

1. **Were the groups similar at baseline on important characteristics that could affect outcomes (e.g., demographics, risk factors, co-morbid conditions)?**

Yes

1. **Was the overall drop-out rate from the study at endpoint 20% or lower of the number allocated to treatment?**

Yes

1. **Was the differential drop-out rate (between treatment groups) at endpoint 15 percentage points or lower?**

Yes

1. **Was there high adherence to the intervention protocols for each treatment group?**

Yes

1. **Were other interventions avoided or similar in the groups (e.g., similar background treatments)?**

Yes

1. **Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?**

Yes

1. **Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80% power?**

No

1. **Were outcomes reported or subgroups analyzed prespecified (i.e., identified before analyses were conducted)?**

Yes

1. **Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?**

Yes

**Key Finding #1**

Spinal manual therapy is more effective than local exercise therapy in improving pain and function in patients with PFPS in the medium term.

**Key Finding #2**

There was no difference between the two groups in terms of maximal voluntary peak force.

**Please provide your summary of the paper**

This study aimed to investigate the difference between spinal manual therapy and local exercise therapy in treating patients with PFPS. Forty-three patients with PFPS were assigned randomly to a spinal manual therapy or local exercise group. Both groups received intervention sessions once a week for six weeks. All patients did home exercises additionally. Pain was measured using the visual analog scale, function was measured using the anterior knee pain scale, and MPFV was analyzed using a Biodex System 3 dynamometer. Patients were assessed before intervention, after the sixth intervention session, and six weeks after that for a follow up. The results showed that in the medium term, spinal manual therapy is more effective than local exercise therapy in improving pain and function in patients with PFPS.

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

The study offers a good direction for clinical management of PFPS, however, it can be improved upon. One thing the study stated is that spinal manipulations offer better long term benefits than local exercise therapy and should be utilized due to the chronic nature of PFPS. However, they only tracked the progress 6 weeks after intervention, which would not necessarily correlate with long term results. There appeared to be a few additional variables between the two groups besides what the study aimed to investigate. The exercise group received patellofemoral mobilizations while the manual therapy group did not. The manual therapy group received thoracic based home exercises while the home exercises for the other group were not specified. It cannot definitively be known whether these differences played a role in the results. While there are some gaps in this study, it appears that both spinal manual therapy and local exercise therapy can help reduce pain and function in patients with PFPS, with spinal manual therapy producing slightly better results. This study could be improved upon further with the addition of a control group receiving sham manual therapy and a group combining spinal manual therapy with local exercise therapy.