**Article Full Title**

The Incremental Effects of Manual Therapy or Booster Sessions in Addition to Exercise Therapy for Knee Osteoarthritis: A Randomized Clinical Trial

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**Paper Abstract**

STUDY DESIGN: A factorial randomized controlled trial. OBJECTIVES: To investigate the addition of manual therapy to exercise therapy for the reduc-tion of pain and increase of physical function in people with knee osteoarthritis (OA), and whether “booster sessions” compared to consecutive ses-sions may improve outcomes. BACKGROUND: The benefits of providing manual therapy in addition to exercise therapy, or of distributing treatment sessions over time using periodic booster sessions, in people with knee OA are not well established. METHODS: All participants had knee OA and were provided 12 sessions of multimodal exercise therapy supervised by a physical therapist. Par-ticipants were randomly allocated to 1 of 4 groups: exercise therapy in consecutive sessions, exercise therapy distributed over a year using booster sessions, exercise therapy plus manual therapy without booster sessions, and exercise therapy plus manual therapy with booster sessions. The primary outcome measure was the Western Ontar-io and McMaster Universities Osteoarthritis Index (WOMAC score; 0-240 scale) at 1-year follow-up. Secondary outcome measures were the numeric pain-rating scale and physical performance tests. RESULTS: Of 75 participants recruited, 66 (88%) were retained at 1-year follow-up. Factorial analysis of covariance of the main effects showed significant benefit from booster sessions (P = .009) and manual therapy (P = .023) over exercise therapy alone. Group analysis showed that exercise therapy with booster sessions (WOMAC score, –46.0 points; 95% confidence interval [CI]: –80.0, –12.0) and exercise therapy plus manual therapy (WOMAC score, –37.5 points; 95% CI: –69.7, –5.5) had superior effects compared with exercise therapy alone. The combined strategy of exercise therapy plus manual therapy with booster sessions was not superior to exercise therapy alone. CONCLUSION: Distributing 12 sessions of exer-cise therapy over a year in the form of booster ses-sions was more effective than providing 12 consec-utive exercise therapy sessions. Providing manual therapy in addition to exercise therapy improved treatment effectiveness compared to providing 12 consecutive exercise therapy sessions alone. Trial registered with the Australian New Zealand Clinical Trials Registry (ACTRN12612000460808). LEVEL OF EVIDENCE: Therapy, level 1b-. J Orthop Sports Phys Ther 2015;45(12):975-983. Epub28 Sep 2015. doi:10.2519/jospt.2015.6015 KEY WORDS:arthralgia, OA, physical therapy techniques, randomized controlled trial

**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?**

Cannot Determine, Not Reported, or Not Applicable

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?**

Cannot Determine, Not Reported, or Not Applicable

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**

Patients who received manual therapy in addition to exercise therapy had greater benefits in regards to pain and self-reported disability than those who received just exercise interventions.

**Key Finding #2**

Patients who received booster sessions of exercise therapy over the course of a year had better outcomes than those who received consecutive exercise therapy sessions.

**Please provide your summary of the paper**

This paper sought to evaluate the treatment effects of manual therapy and the delivery of care through booster sessions in those with knee osteoarthritis. The main findings included the increased benefit of manual therapy in conjunction with exercise therapy and of booster sessions to provide exercise therapy as follow up care over a longer period of time. However, in the combined exercise therapy and manual therapy booster session group, there was a lessened treatment effect. The study noted a smaller sample size in this study compared to other studies previously performed and that their results conflict with other research being done in the same field. Further research was recommended to provide more evidence to back the effectiveness of manual therapy and booster sessions.

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

This study can be applicable for those with knee osteoarthritis who have struggled to see improvement from continuous physical therapy exercise interventions. It provides some backing to the use of manual therapy to address pain and self-reported disability and to the expansion of care to cover a longer period of time with booster sessions. This allows for the patient and therapist to use shared decision making to create a treatment plan that is best for the patient and their goals by providing the team options for care that can be individualized and successful. Options could include receiving only exercise therapy, receiving both exercise and manual therapy, having continuous physical therapy visits, and having booster sessions.