**Article Full Title**

Effectiveness of manual physical therapy and exercise in osteoarthritis of the knee. A randomized, controlled trial

**Author Names**

Deyle, G., Henderson, N., Matekel, R., Ryder, M., Garber, M., Allison, S

**Reviewer Name**

Marc Moreno-Takegami

**Reviewer Affiliations**

Duke University School of Medicine, Doctor of Physical Therapy Division

**Paper Abstract**

Background: Few investigations include both subjective and objective measurements of the effectiveness of treatments for osteoarthritis of the knee. Beneficial interventions may decrease the disability associated with osteoarthritis and the need for more invasive treatments. Objective: To evaluate the effectiveness of physical therapy for osteoarthritis of the knee, applied by experienced physical therapists with formal training in manual therapy. Design: Randomized, controlled clinical trial. Setting: Outpatient physical therapy department of a large military medical center. Patients: 83 patients with osteoarthritis of the knee who were randomly assigned to receive treatment (n = 42; 15 men and 27 women [mean age, 60 +/- 11 years]) or placebo (n = 41; 19 men and 22 women [mean age, 62 +/- 10 years]). Intervention: The treatment group received manual therapy, applied to the knee as well as to the lumbar spine, hip, and ankle as required, and performed a standardized knee exercise program in the clinic and at home. The placebo group had subtherapeutic ultrasound to the knee at an intensity of 0.1 W/cm2 with a 10% pulsed mode. Both groups were treated at the clinic twice weekly for 4 weeks. Measurements: Distance walked in 6 minutes and sum of the function, pain, and stiffness subscores of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). A tester who was blinded to group assignment made group comparisons at the initial visit (before initiation of treatment), 4 weeks, 8 weeks, and 1 year. Results: Clinically and statistically significant improvements in 6-minute walk distance and WOMAC score at 4 weeks and 8 weeks were seen in the treatment group but not the placebo group. By 8 weeks, average 6-minute walk distances had improved by 13.1% and WOMAC scores had improved by 55.8% over baseline values in the treatment group (P &lt; 0.05). After controlling for potential confounding variables, the average distance walked in 6 minutes at 8 weeks among patients in the treatment group was 170 m (95% CI, 71 to 270 m) more than that in the placebo group and the average WOMAC scores were 599 mm higher (95% CI, 197 to 1002 mm). At 1 year, patients in the treatment group had clinically and statistically significant gains over baseline WOMAC scores and walking distance; 20% of patients in the placebo group and 5% of patients in the treatment group had undergone knee arthroplasty. Conclusions: A combination of manual physical therapy and supervised exercise yields functional benefits for patients with osteoarthritis of the knee and may delay or prevent the need for surgical intervention.

**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?**

Yes

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

Yes

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**

Patients with osteoarthritis of the knee who were treated with manual physical therapy and exercise experienced clinically and statistically significant improvements in self-perceptions of pain, stiffness, and functional ability and the distance walked in 6 minutes.

**Key Finding #2**

At 1 year, improved performance in the 6-minute walk test was maintained in the treatment group, indicating that the objective gains in functional performance persisted in the absence of supervised exercise and treatment.

**Key Finding #3**

The greater overall improvement compared with results of previous studies may be due to the manually applied treatment, which allowed the therapist to focus treatment on the specific structures that produced pain and limited function for each patient.

**Key Finding #4**

**Please provide your summary of the paper**

In this randomized, controlled clinical trial, 83 patients with knee osteoarthritis were randomly assigned to receive manual therapy and exercise treatment in physical therapy, while the placebo group had subtherapeutic ultrasound to the knee. Both groups were treated twice a week for one month. Outcome measures used to determine effectiveness of the treatements were the 6 minute walk test and the Western Ontario and McMaster Universities Osteoarthritis Index. Clinically and statistically significant improvements in the 6 MWT and WOMAC scores were seen in the treatment group and not the placebo group, both at the one month and 2 month mark. The trial concluded that a combination of manual therapy and supervised exercise yields greater functional benefits for patients with knee osteoarthritis as seen with the decrease in their pain and stiffness and increased distance walked in the 6 minute walk test.

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

As stated in the article, arthritis is the most common cause of disability in the United States. However, with the use of skilled manual therapy along with therapeutic exercise, people suffering from knee osteoarthritis may be able to avoid surgical interventions and manage their pain through physical therapy. This study also demonstrated that it does not take a long amount of time to achieve the benefits of manual therapy and exercise. In this specific trial, the benefits of treatment were achieved in eight clinic visits. That said, this trial did not report if any of the positive effects were sustained after 1 year. Further research may be required to determine which factors are involved in maintaining the long-term positive effects from manual physical therapy and exercise.