**Article Full Title**

The effect of mobilization with movement on pain and function in patients with knee osteoarthritis: a randomized double-blind controlled trial

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**Paper Abstract**

Background

 Few studies have investigated the effects of mobilization with movement (MWM) in patients with knee osteoarthritis (OA) compared to other procedures. Sham procedures are generally more appropriate control than using no or usual treatments. Moreover, studies investigating the widespread hypoalgesic effects of MWM in patients with knee OA are lacking. The aim was to investigate the effect of MWM on function and pain in patients with knee OA compared to sham MWM.

Methods

This is a randomized double-blind (patients and assessor) controlled trial. Forty adult patients with knee OA of grade II and above were recruited to receive either MWM treatment or sham MWM for the knee. The outcome measures included the following: a visual analogue scale (VAS) for pain, the pressure pain threshold (PPT) test, the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index, the timed up and go (TUG) test, knee strength and knee range of motion (ROM). The measurements were taken at baseline, immediately after intervention and 2 days later.

Results

 Compared with sham MWM, MWM resulted in greater immediate improvement in pain [mean difference (95% CI): − 2.2 (− 2.8, − 1.6)], PPT at both the knee [176 (97, 254)] and shoulder [212 (136, 288)], TUG time [− 1.6 (− 2.1, − 1.1)], knee flexor strength [2.0 (1.3, 2.7)] and extensor strength [5.7 (4.1, 7.2)] and knee flexion ROM [12.8 (9.6, 15.9)] (all, p &lt; 0.001) but not knee extension ROM [− 0.8 (− 1.6, 0.1)] (p = 0.067). After 2 days of intervention, patients who received MWM also demonstrated a greater improvement in pain [− 1.0 (− 1.8, − 0.1)], PPT at the shoulder [107 (40, 175)], TUG time [− 0.9 (− 1.4, − 0.4)], knee flexor strength [0.9 (0.2, 1.7)] and extensor strength [2.9 (2.1, 3.9)] and knee flexion ROM [8.3 (4.7, 11.9)] (all, p ≤ 0.026). However, WOMAC scores and knee extension ROM showed no evidence of change at any stage after intervention (p ≥ 0.067).

Conclusions

MWM provided superior benefits over sham MWM in terms of local and widespread pain, physical function (walking), knee flexion and extension muscle strength and knee flexion ROM for at least 2 days in patients with knee OA.

**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)?**

Cannot Determine, Not Reported, or Not Applicable

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)?**

Cannot Determine, Not Reported, or Not Applicable

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?**

Yes

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**

Mobilization with movement (MWM) resulted in clinically relevant reductions in pain in patients with knee OA immediately and after 2 days when compared to patients who completed the same movements without mobilization.

**Key Finding #2**

MWM resulted in significantly improved knee flexion ROM immediately upon intervention in patients with knee OA when compared with patients who completed the same movements without mobilization.

**Key Finding #3**

MWM resulted in significantly improved quadriceps strength up to 1 year follow-up in patients with knee OA when compared to patients who completed the same movements without mobilization.

**Key Finding #4**

MWM resulted in a clinically significant average of 1.6 second reduction in TUG time in patients with knee OA when compared with patients who performed the same movements without mobilization.

**Please provide your summary of the paper**

This study was a randomized double-bind controlled trial looking at the short-term differences in pain levels, physical function, strength, and ROM in patients with knee OA receiving mobilization with movement (MWM) compared with those performing the same movements without manual mobilization. The participants assigned to the MWM group received tibiofemoral glides in all directions to determine which glide was most effective for their pain levels and ROM. That glide was then performed during intervention while the participant flexed and extended his or her knee in open chain with no resistance for three sets of 10 repetitions. In the sham group, the same rep and set scheme was performed with one hand on the tibia and one on the femur with no mobilization applied. Outcome measures were then taken immediately after intervention and 2 days later. These outcome measures include the Visual Analog Scale (VAS), Pressure Pain Threshold (PPT), WOMAC, Timed up and Go, Knee ROM, and motor activity of the knee extensors and flexors. Overall, MWM resulted in significant short-term local and widespread hypoalgesic effects on the knee, increased knee flexion ROM, improved physical function, and improved strength of the knee extensors and flexors.

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

I believe that this paper shines a positive light on performing MWM in the clinic to relieve pain and improve function in the short term for patients with knee OA. However, I do not think the results of this paper can be extrapolated to the long-term in this patient population, which may discourage clinicians from finding value in utilizing MWM on patients with knee OA. Personally, for patients with high pain levels and inadequate function, I think MWM can be valuable to produce short-term improvements and improve quality of life for those with knee OA. Of course the goal of PT is to produce long-term sustainable results for patients upon discharge, but MWM should still be considered to treat patients in the short term based on patients' subjective pain reports and before exercise to improve exercise tolerance.