**Article Full Title**

Immediate effects of Mulligan's techniques on pain and functional mobility in individuals with knee osteoarthritis: A randomized control trial

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**Paper Abstract**

**Background and Purpose:** Mulligan's mobilization with movement was shown to be effective when implemented in multimodal therapy for knee osteoarthritis. However, no study has evaluated the Mulligan's technique in isolation and compared the relative effectiveness with sham-controlled interventions. Hence, the present study examined the immediate effects of Mulligan's techniques with sham mobilization on the numerical pain rating scale (NPRS) and timed up and go (TUG) test in individuals with knee osteoarthritis. **Methods:** Thirty participants (mean age: 55.3 ± 8.3 years) with symptoms at the knee and radiographic diagnosis of knee osteoarthritis were randomized into sham (*n* = 15) and intervention (*n* = 15) groups. The intervention (I) group received Mulligan's mobilization glides that resulted in relative pain relief for three sets of 10 repetitions. For the sham (S) group, the therapist's hand was placed over the joint surfaces mimicking the pain-relieving glides, without providing the gliding force. The outcome measures NPRS and TUG were recorded by a blinded assessor pre- and post-intervention. **Results:** Statistically significant differences were identified between the groups in post-intervention median (interquartile range) NPRS (I group: 4.00 [2.00–5.00]; S group: 6.00 [4.00–7.00]) and TUG scores (I group: 10.9 [9.43–10.45]; S group: 13.18 [10.38–16.00]) with the intervention group demonstrating better outcomes (*p* < .05). Within-group, the post-intervention scores of NPRS and TUG were significantly lower (*p* < .05) compared to the pre-intervention scores in the intervention group. In the sham group, a statistically significant pre–post change was noticed only in the NPRS scores but not in the TUG scores. **Conclusion:** Mulligan's techniques were effective in improving pain and functional mobility in individuals with knee osteoarthritis. The underlying mechanisms for observed effects must be examined further, as participants reported pain relief following sham mobilization.

**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?**

Yes

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

Cannot Determine, Not Reported, or Not Applicable

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**

Posttreatment, both the intervention and sham groups showed statistically significant improvement in numeric pain rating. However, the intervention group also demonstrated a statistically significant improvement in TUG score.

**Key Finding #2**

The study found between group differences in numeric pain rating with an effect size of 0.41 when comparing the intervention and sham groups posttreatment.

**Key Finding #3**

The study found between group differences in TUG score with an effect size of 0.49 when comparing the intervention and sham groups posttreatment.

**Please provide your summary of the paper**

This randomized control trial utilized numeric pain rating and timed up and go measures to study the immediate efficacy of Mulligan's mobilization with movement (MWM) in individuals with knee osteoarthritis (OA). The intervention group receiving MWM was compared to a sham group, which underwent the same process of treatment excluding the gliding force of mobilization. Prior to administration of 3x10 glides, direction of mobilization (medial rotational, lateral rotational, medial translational, or lateral translational) was determined by individualized symptom reduction via 3 trials. Following treatment, both groups received standard therapy as well which was not outlined. Based on blinded assessment after treatment, the intervention and sham groups demonstrated statistically significant reduction in numeric pain rating. Statically significant improvement in TUG score was observed solely in the intervention group. The study found between group differences in numeric pain rating and TUG scores with medium effect sizes. This information suggests that MWM may offer immediate benefit on knee pain and functional mobility in individuals with knee OA.

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

As acknowledged by the authors of this article and other scientists studying manual therapy around the world, the results of this study suggest that MWM is safe and can be beneficial (in this case for knee OA), yet the mechanisms behind why are not yet clear. Biomechanical, neurophysiological, and/or non-specific mechanisms may be considered. This study emphasizes the potential for non-specific effects given that the sham group experienced pain reduction posttreatment as well. Based on the duration of this study with respect to employing sham treatment, the clinical utility may be in the short term, and future areas of research may involve seeking long term effects of MVM.