INPLASY

# Mobilization with Movement on Reducing Pain and Disability for Knee Osteoarthritis : A Systematic Review and Meta-analysis of Randomized Controlled Trials

INPLASY202510057

doi: 10.37766/inplasy2025.1.0057

Received: 17 January 2025

Published: 17 January 2025

Lin, M; Hsieh, GJ; Lin, LH; Chen, HI; Tsai, RJ.

**Corresponding author:**
Long-Huei Lin

cosx9954022@gmail.com

**Author Affiliation:**
School of Physical Therapy and Graduate Institute of Rehabilitation Science, College of Medicine, Chang Gung University, Linkou, Taoyuan, Taiwan, ROC.

## ADMINISTRATIVE INFORMATION

**Support -** This study received no financial support or funding from any organization or institution.

**Review Stage at time of this submission -** The review has not yet started.

**Conflicts of interest -** None declared.

**INPLASY registration number:** INPLASY202510057

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 January 2025 and was last updated on 17 January 2025.

## INTRODUCTION

**Review question / Objective** To investigate the treatment effect of mobilization with movement on pain intensity and disability in kneeosteoarthritis.

**Rationale** Osteoarthritis (OA) is the most common form of arthritis, frequently affecting the knee and leading to pain, functional limitations, and reduced quality of life. Conservative management includes pharmacological options, such as NSAIDs, and non-pharmacological approaches, including manual therapy and strengthening exercises. The Mulligan Concept of Mobilization with Movement, a manual therapy technique, has shown efficacy in knee OA by addressing joint positional faults, reducing pain, and improving function through mechanisms such as hypoalgesia and motor-sympathetic excitation. Although randomized controlled trials support MWM's effectiveness, a meta-analysis comparing its outcomes with other non-pharmacological interventions is lacking. This study aims to systematically review and analyze the impact of MWM on pain and disability in patients with knee OA compared to other conservative treatments.

**Condition being studied** Therefore, we would like to perform The PICO (population, intervention, comparison, outcome) setting of the current meta-analysis included: (1) P: human participants; (2) I: mobilization with movement; (3) C: other treatments; and (4) O: changes in pain scores and disability.

## METHODS

**Search strategy** Two authors made independent electronic searches in the PubMed, Cochrane library, and ClinicalTrials.gov with keyword of ("mobilization and movement" OR "mulligan's mobilization" OR "mulligan concept techniques") AND ("knee osteoarthritis" OR "degenerative knee

arthritis") through the earliest record to January 2025.

**Participant or population** Knee osteoarthritis.

**Intervention** Mobilization and movement.

**Comparator** Other treatments.

**Study designs to be included** Randomized controlled trials.

**Eligibility criteria** (1) RCTs investigating pain intensity and disability before/after Mobilization with Movement; (2) enrolling adults diagnosed with knee OA according to the K-L classification; (3) the intervention groups with mobilization with movement alone or mobilization with movement plus other treatments; and (4) at least one control group using treatments other than mobilization with movement.

**Information sources** Two authors made independent electronic searches in the PubMed, Cochrane library, PEDro and ClinicalTrials.gov with keyword of ("mobilization and movement" OR "mulligan's mobilization" OR "mulligan concept techniques") AND ("knee osteoarthritis" OR "degenerative knee arthritis") through the earliest record to January 2025.

**Main outcome(s)** The primary outcomes were the changes in the pain scores following mobilization with movement or control regimens. The validity and appropriateness of the pain scale used in each trial were also examined by checking the pertinent references.

**Additional outcome(s)** The secondary outcomes were the changes in the disability following mobilization with movement or control regimens. The validity and appropriateness of the disability scale used in each trial were also examined by checking the pertinent references.

**Data management** Two independent authors extracted data from the recruited studies, encompassing demographic data, study design, details of mobilization with movement and control regimens, and values of the outcomes. The evaluators paid special attention to the effect direction of the scale used in each trial to avoid mis-interpretation.

**Quality assessment / Risk of bias analysis** The quality of eligible randomized controlled trials was assessed using the PEDro score, which evaluates 11 criteria, including randomization, blinding, and outcome measurement. The first criterion is excluded from the total score, which ranges from 0 to 10. Studies scoring ≥6 are considered high quality, 4–5 medium quality, and ≤3 low quality.

**Strategy of data synthesis** Because of heterogeneity of the treatment protocols of the enrolled studies, the effect sizes were pooled by using a random-effects model on Comprehensive Meta-Analysis software (version 3,Biostat, Englewood, NJ, United States). A two-tailed p value of less than 0.05 was considered statistically significant. We used Hedges' g to quantify the study outcomes and a value of 0.2, 0.5, and 0.8 were considered small, moderate, and large effect sizes, respectively .I square and Cochran's Q statistics were also employed to evaluate the degree of heterogeneity across studies. A I squares of 25, 50, and 75% were deemed low, moderate, and high grades of heterogeneity, respectively.

**Subgroup analysis** Subgroup analyses based on the mobilization with movement regimens, mobilization with movement program utilized weight bearing or non-weight bearing, K-L grade, and reference to the control group was performed. Meta-regressions of the treatment effects on total treatment duration and session per week were conducted to see if the pain and disability relieving effect of mobilization with movement correlated with the aforementioned parameter.

**Sensitivity analysis** To confirm the robustness of the meta-analysis, the sensitivity analyses were performed using one-study removal method to see if there was a significant change in the summary effect size after removing a particular trial from theanalysis.

**Language restriction** No language limit.

**Country(ies) involved** Taiwan.

**Keywords** knee osteoarthritis, mobilization with movement, physical therapy, meta-analysis.

**Contributions of each author**

Author 1 - Min Lin - Led the research design and overall project planning. Conducted systematic literature searches and screened studies meeting the inclusion criteria. Drafted the primary sections of the manuscript, including the introduction and methodology. Coordinated team efforts and finalized the manuscript for submission.
Email: lmin@vghks.gov.tw
Author 2 - Guo-Jia Hsieh - Assisted with literature searches and screening, verifying the accuracy of

included studies. Led the statistical analysis for meta-analysis, including effect size estimation and heterogeneity analysis. Drafted the statistical results and analysis sections. Contributed to manuscript revisions, particularly in the presentation and discussion of statistical findings.

Author 3 - Long-Huei Lin - Managed data extraction and quality assessment, ensuring accuracy and consistency. Contributed to the methodology section, detailing the processes of data extraction and assessment. Assisted in drafting the results section, particularly the presentation of quality assessment outcomes.
Email: cosx9954022@gmail.com

Author 4 - Hsin-I Chen - Verified the statistical analysis and ensured the reliability and accuracy of the data and visualizations. Drafted the discussion section, interpreting the findings and comparing them to existing literature. Provided recommendations for study limitations and future research directions.

Author 5 - Ren Jei Tsai - Assisted in creating figures and data visualizations to enhance result interpretation. Contributed to the introduction section, summarizing the study background and objectives. Reviewed the entire manuscript to ensure logical coherence and language accuracy.