**Article Full Title**

Acute Effects of Hip Mobilization With Movement Technique on Pain and Biomechanics in
Females With Patellofemoral Pain: A Randomized, Placebo-Controlled Trial

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**Paper Abstract**

People with patellofemoral pain (PFP) present altered lower-limb movements during some
activities. Perhaps, joint misalignment in the hip is one of the reasons for altered movement
patterns in people with PFP. Some mobilization techniques have been designed to address joint
misalignments. Objective: To investigate the acute effects of hip mobilization with movement
(MWM) technique on pain and biomechanics during squats and jumps in females with and
without PFP. Design: Randomized, placebo-controlled trial. Setting: Movement analysis
laboratory. Patients: Fifty-six physically active females (28 with PFP and 28 asymptomatic) were
divided into 4 groups: experimental group with PFP, sham group with PFP, experimental group
without PFP, and sham group without PFP. Intervention(s): The experimental groups received
MWM for the hip, and the sham groups received sham mobilization. Main Outcome Measures:
Pain, trunk, and lower- limb kinematics, and hip and knee kinetics during single-leg squats and
landings. Results: After the interventions, no difference between groups was found for pain.
The PFP experimental group decreased hip internal rotation during squats compared with the
PFP sham group (P = .03). There was no other significant difference between PFP groups for
kinematic or kinetic outcomes during squats, as well as for any outcome during landings. There
was no difference between asymptomatic groups for any of the outcomes in any of the tasks.
Conclusions: Hip mobilization was ineffective to reduce pain in people with PFP. Hip MWM may contribute to dynamic lower-limb realignment in females with PFP by decreasing hip internal rotation during squats. Therefore, hip MWM could be potentially useful as a complementary intervention for patients with PFP.

**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
2. Was the method of randomization adequate (i.e., use of randomly generated
assignment)?
Yes
3. Was the treatment allocation concealed (so that assignments could not be predicted)?
Yes
4. Were study participants and providers blinded to treatment group assignment?
Yes
5. Were the people assessing the outcomes blinded to the participants' group
assignments?
Yes
6. Were the groups similar at baseline on important characteristics that could affect
outcomes (e.g., demographics, risk factors, co-morbid conditions)?
Yes
7. Was the overall drop-out rate from the study at endpoint 20% or lower of the number
allocated to treatment?
Yes
8. Was the differential drop-out rate (between treatment groups) at endpoint 15
percentage points or lower?
Yes
9. Was there high adherence to the intervention protocols for each treatment group?
Yes

10. Were other interventions avoided or similar in the groups (e.g., similar background
treatments)?
Yes
11. Were outcomes assessed using valid and reliable measures, implemented consistently
across all study participants?
Yes
12. 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
13. Were outcomes reported or subgroups analyzed prespecified (i.e., identified before
analyses were conducted)?
Yes
14. 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

consistently across all study participants?

**Key Finding #1**

Hip mobilization with movement technique moderately decreased hip internal rotation during
single-leg squats in females with patellofemoral pain.

**Key Finding #2**

Hip mobilization with movement technique had no effect on pain in both females with and
without patellofemoral pain.

**Key Finding #3**

Hip mobilization with movement technique did not change the kinematics or kinetics of single-
leg squats or single-leg drop vertical jumps in females without patellofemoral pain.

**Key Finding #4**
Excessive hip internal rotation during a jump landing may be a risk factor for the development
of patellofemoral pain and decreasing the degree of hip internal rotation during this movement
may help realign proper patellofemoral joint mechanics.

**Please provide your summary of the paper**

This study applied a lateral glide hip mobilization to both asymptomatic and symptomatic
females during single-leg squats and single-leg drop vertical jumps to see if the glide would
either decrease pain at the patellofemoral joint and/or change the mechanics of the affected
lower limb. The results showed that when performing a single-leg squat, a femoroacetabular
lateral glide mobilization with movement (MWM) technique reduced the degree of hip internal
rotation in females with patellofemoral pain (PFP). The MWM technique did not change pain
levels. The MWM technique had no influence on the kinematics and kinetics of patients without
PFP, inferring that the MWM technique may only be useful for patients whose symptoms are caused by a true positional malalignment of the patellofemoral joint. This study is limited by the sole use of a lateral glide as a MWM technique and potentially underdosing of the mobilization.

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

These findings are significant because it emphasizes the role that the hip joint plays in patients
with PFP. Although the mobilization did not decrease pain levels, the researchers noted that the lack of change in pain could be due to a very small decrease in hip internal rotation that occurred with the MWM technique and that it is possible that with repeated mobilizations, pain levels could be reduced. It is thought that higher degrees of hip internal rotation and adduction increase the load on the lateral patella and lateral patellar cartilage, thus contributing to PFP. In clinical practice, these results imply that imparting a lateral glide movement with mobilization technique to the hip sufficient to not only decrease the degree of internal rotation of the hip but to also decrease pain levels at the patellofemoral joint could be useful in management and treatment of females with patellofemoral pain.