

ISOMETRIC HIP ABDUCTION STRENGTH IS NOT RELATED TO SINGLE-LIMB MINI SQUAT PERFORMANCE IN PARTICIPANTS WITH KNEE AND HIP PAIN

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AIM

The single-limb mini squat (SLMS) test resembles activities of daily living, assessing movement quality rather than movement quantity. A previous study found that a knee-medial-to-foot position was mainly caused by increased internal hip rotation rather than knee valgus movement.

Aim: to investigate if a knee-medial-to-foot position during SLMS is associated with reduced isometric hip abduction strength.

CONCLUSION

No difference was observed in isometric hip abduction muscle strength for participants with a knee medial-to-foot position compared to a knee-over-foot position in the SLMS test.

These results indicate that increased internal hip rotation during the SLMS test is not caused by reduced isometric hip abduction strength.

RESULTS

Participants (n=101): age 59 ± 9.9 years (SD), 63 with knee problems, 62 were female, 49 participants had a knee-medial-to-foot position.

All participants performed the SLMS test on both legs. The most painful leg was used in the analysis.

Unpaired T-tests showed no difference in isometric strength in hip abduction in relation to joint position during SLMS test for either knee or hip as primary complaint or for the total population (Table 1).

Table 1	Knee-over-foot (95% CI)	Knee-medial-to-foot (95% CI)	Difference (95% CI)
Knee, Nm*kg ⁻¹ (n=63)	0.89 (0.73 to 1.04)	0.99 (0.84 to 1.12)	-0.11 (-0.30 to 0.09)
Hip, Nm*kg ⁻¹ (n=38)	0.93 (0.73 to 1.12)	0.78 (0.67 to 0.90)	0.14 (-0.09 to 0.38)
Total, Nm*kg ⁻¹ (n=101)	0.90 (0.79 to 1.02)	0.91 (0.82 to 1.02)	-0.02 (-0.17 to 0.13)

Table 1: Isometric strength for hip abduction in relation to knee position during single-limb mini squat test. A significance level of 0.05 is applied.

METHODS

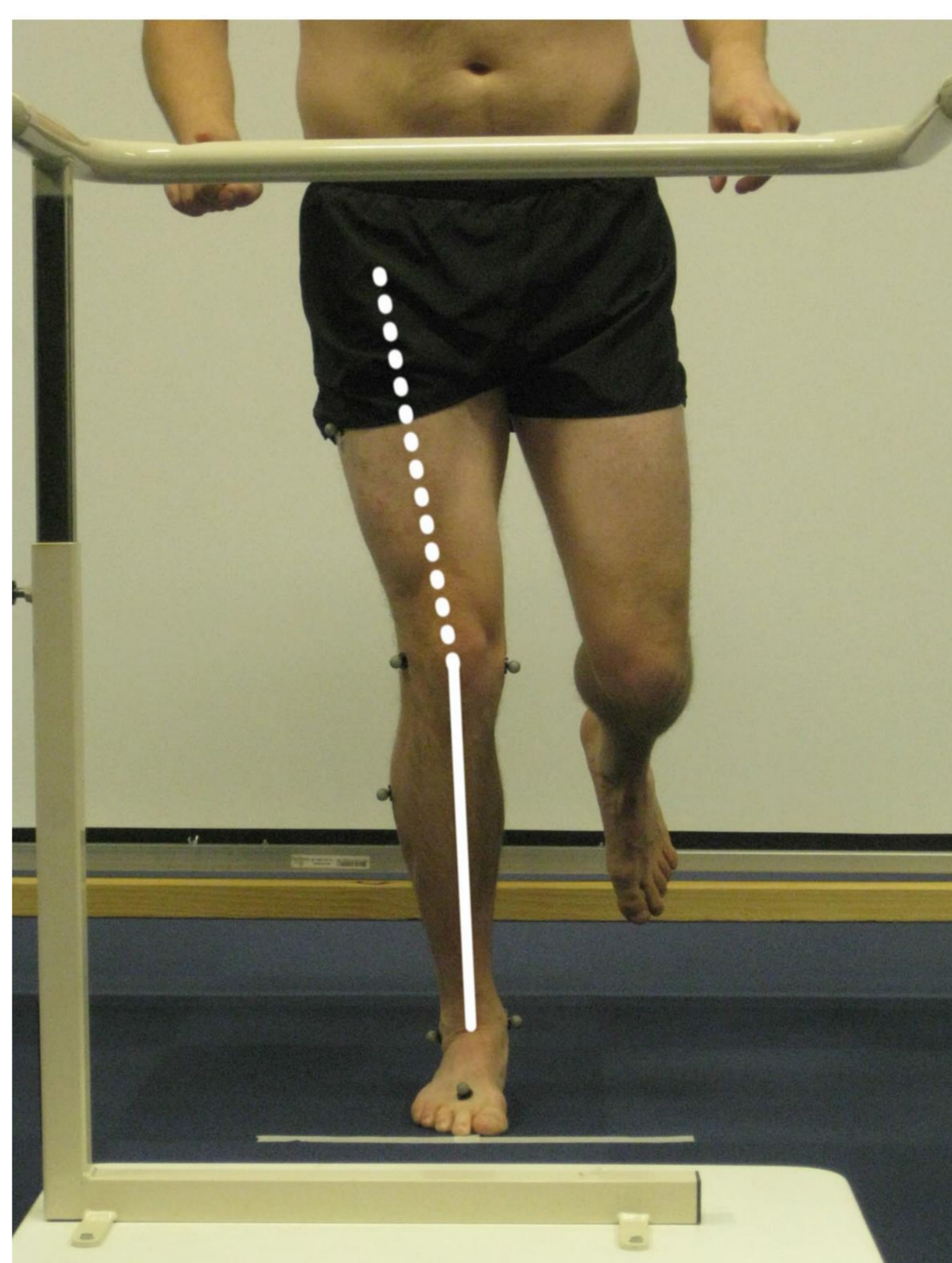
The SLMS test:

- Participants bend their knee until 50 degrees flexion and returned to full extension. Knee bends were performed 5 times at a speed of 20 squats/min.
- Joint position was assessed by observation of alignment between patella and the 2nd toe of the foot during knee flexion.

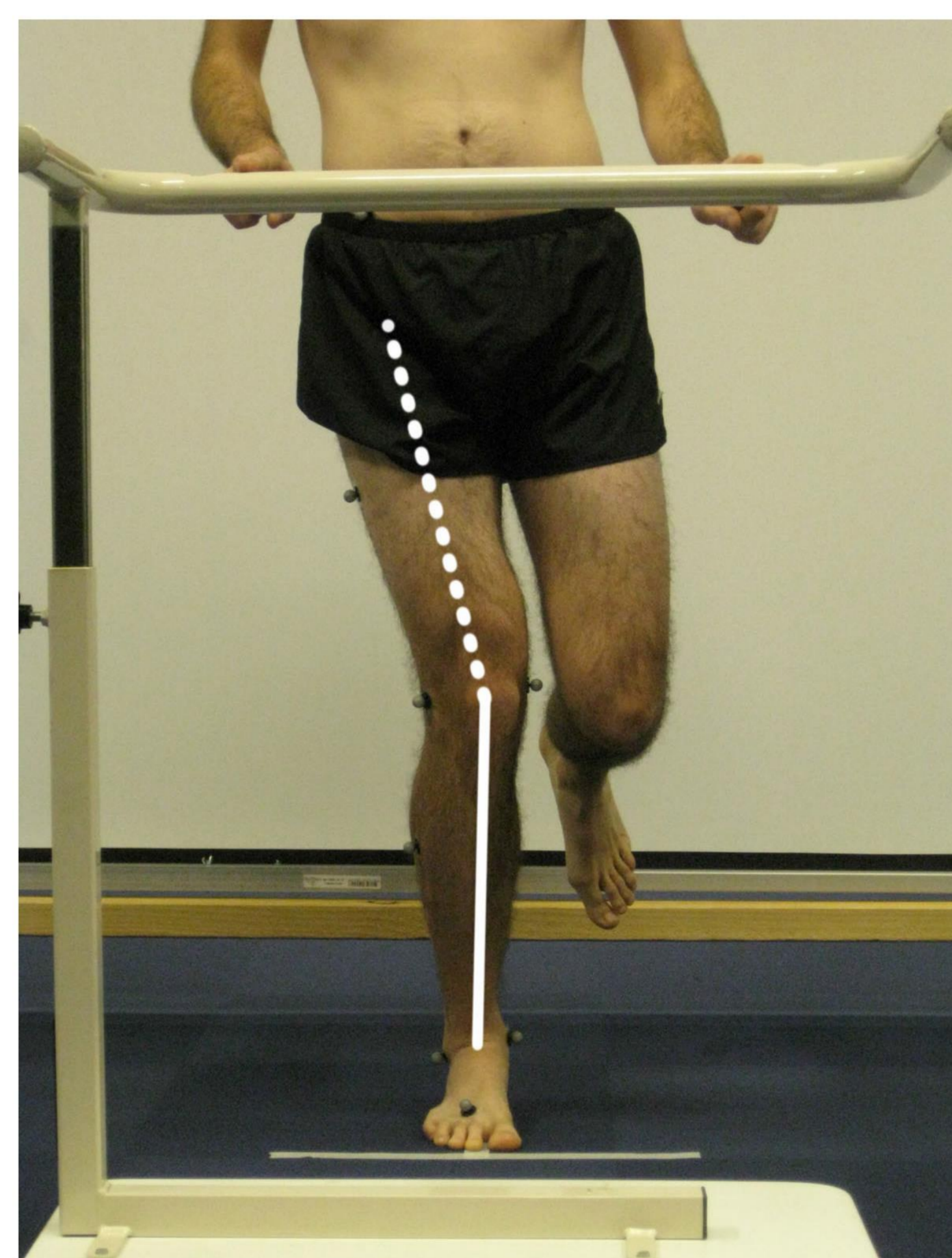
Maximal isometric hip abduction strength:

- Participants lay supine on an examination couch with an extended knee and performed isometric hip abduction against a fixation belt attached to a strain gauge.
- Isometric muscle strength was measured as torque (Nm) and normalized to bodyweight. Three maximal voluntary contractions were performed.

Knee-over-foot



Knee-medial-to-foot



Photos from Ageberg et al, 2010, BMC Musculoskelet Disord 2010;11:126.

