Background and Purpose: The single leg squat test is used to assess faulty biomechanics of the trunk and lower extremity, which may identify individuals at greater risk of injury. The purpose of this study was to investigate test-retest reliability and minimum detectable change (MDC) of knee and hip displacement measurements during the single leg squat test.

Methods and Materials: 25 healthy female participants (mean age=24.4 years) performed 5 single-leg squats from a 20 cm box. Lower extremity joint angles were measured using a 3D Vicon motion analysis system. Participants were retested 2-4 weeks later.

Analyses: Descriptive statistics were collected and analyzed for knee and hip displacements at the point of peak knee flexion. Test-retest reliability coefficients of the displacement data were estimated with intraclass correlation coefficients (ICC).

Results: Test-retest reliability coefficients at the knee were good for sagittal plane measurements (ICC=0.860) but poor for motions measured in the frontal (ICC=0.509) and transverse (ICC=0.477) planes. In contrast, test-retest reliability coefficients at the hip were stronger for frontal plane measurements (ICC=0.825) than for motions measured in the sagittal (ICC=0.650) and transverse (ICC=0.465) planes. MDC values were approximately 8° for sagittal plane knee motion and frontal plane hip motion, but as high as 32° for frontal plane knee measurements.

Conclusions: Several measurements were poorly reliable. Some MDC estimates (e.g., frontal plane knee motion) were of magnitudes that likely exceed the physiologic limits of the joints.

Implications: Poor performance during a single leg squat test may indicate impaired hip muscle function that contributes to excessive hip adduction, internal rotation, and excessive knee valgus. If these motions are assessed longitudinally with a 3D motion analysis system like the Vicon system used in this study (e.g., to examine changes in test performance following an intervention), we suggest the measurements are insufficiently reliable to assess meaningful change.