FUNCTIONAL TESTING is often used to assess components of multilevel tasks. Although functional tests are used regularly, the reliability and validity of the tests are often not thoroughly investigated. The single-leg squat is one such test that is used by clinicians and has been suggested to assess general leg strength and muscle endurance.1 The single-leg squat is described with various techniques including a single-leg squat with hand support, squatting with an external load, and a lunge activity.2 No standardized method is used, and no relationship has been documented to determine what the single-leg-squat test is actually assessing. It has been suggested that the single-leg-squat test can be used to assess various dysfunctions affecting the kinetic chain.3

Zeller et al. used a three-dimensional camera system to report kinematic differences between men and women performing a single-leg squat.2 They reported that women had approximately 4° more hip adduction than men did when performing the single-leg squat.2 Zeller et al. suggest that the increased hip adduction might be caused by difficulty in controlling the hip musculature resulting from a weak gluteus medius muscle.2 No information presently exists on the relationship between hip-adduction angles and gluteus medius strength. The Trendelenburg sign is a very simple test that indicates gluteus medius weakness4 and can be used to identify injuries that result from an unlevel pelvis. The injuries and disorders that can be caused by a weak gluteus medius are numerous and include torn anterior cruciate ligaments, eversion ankle sprains, shin splints, scoliosis, and other malalignment injuries up and down the kinetic chain.4,5 Novice clinicians might find it hard to identify a weak gluteus medius because the underlying cause of these disorders might be caused by the hip but manifest elsewhere along the kinetic chain.

Maintenance of a single-leg stance is necessary during running, cutting, and decelerating activities.2 If a weak gluteus medius is present during these dynamic activities, it might be difficult to observe the pelvic drop as a clinician would during Trendelenburg’s test. A single-leg-squat test includes the static Trendelenburg position but incorporates movement into the test to make it more dynamic. It is hoped that the “dynamic Trendelenburg” can be used to identify gluteus medius weakness during more dynamic tasks than in the original Trendelenburg test.

As an athlete performs a single-leg-squat test, the clinician must visually observe the task and base decisions regarding the athlete’s strength on these subjective observations. These observational practices are commonly used but are rarely put under the scrutiny of scientific examination. Previous research of a clinician’s ability to identify deviations from a normal movement pattern has yielded only low to moderate reliability.6 Thus these tests should be used with caution by clinicians when making decisions regarding athlete care.

Several functional tests are available for clinicians to evaluate their athletes. In order to make sound clini-
eral judgments on function, use of evidence-based clinical tests is valuable. In the process of supporting the use of the single-leg squat to evaluate specific lower extremity dysfunctions, a standardized protocol must be developed. As mentioned earlier, several research articles describe the use of a single-leg squat, but there is little agreement on the protocols to be used. For this reason, we are suggesting a standardized protocol and criterion-based scoring system to evaluate gluteus medius muscle strength using the single-leg squat.

Figure 1 displays the starting position for the test. The athlete stands on the limb being evaluated, with the other leg lifted off the ground so that the hip is flexed to approximately 45° and the knee to approximately 90°. The athlete’s shoulders are forward flexed to 90°, with the elbows in full extension and hands clasped together in front. The athlete is instructed to squat down to approximately 60° (Figure 2) and return to the start position in less than 6 s. When testing higher level athletes, a larger knee angle can be used to increase difficulty. A guide bar can be placed behind the athlete’s buttocks to indicate when the proper knee-flexion angle is reached.

Single-leg-squat performance can be rated using the categories presented in Table 1. Two criteria for the hip and one for the knee are used in the scoring system. We determined standards for the criteria for active-range-of-motion values from previous research and clinical observation.

Currently, research is being performed to determine the correlation of the single-leg-squat test and gluteus medius muscle weakness. Further research is needed to determine the validity and reliability of using the single-leg squat in assessing specific lower limb dysfunctions.

### References


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