

## Reliability of a New Foot Arch Muscle Performance Test

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**Background:** Weakness of the foot's arch is associated with pain, gait abnormalities, and balance deficits. Therefore, measurement of arch strength is relevant in the management of these conditions, but currently there is no method to quantify muscle performance of the foot arch.

**Purpose:** To assess the reliability and measurement error of a novel foot arch muscle performance test.

**Methods:** 11 healthy subjects were recruited and trained to perform the test which involved raising the foot's arch while maintaining contact of the rear- and forefoot. Testing was completed on two separate days by a single investigator blinded to the results. A handheld dynamometer was fixated on the top of the foot's arch near the navicular bone. Subjects pushed their arch into the device which measured peak force production. An average of the three highest trials from each session was used to calculate the interclass correlation coefficient (ICC), standard error of measurement (SEM), and the minimal detectable difference (MDD).

**Results:** The mean peak force of the sample was 17.2 lbs (SD 10.3). Test-retest reliability was high, ICC = 0.881 (95% CI 0.585-0.967). SEM was 3.56 lbs and the MDD was 9.87 lbs.

**Discussion:** Clinicians can feel confident using this testing procedure to quantify intrinsic and extrinsic foot arch muscle performance. Until further analysis with a larger sample, differences less than 4 lbs may be attributed to error of the measure and when tracking outcomes differences less than 10 lbs may not be meaningful.