IS GLUTEUS MAXIMUS FUNCTION IMPAIRED IN WOMEN WHO PERFORM POORLY ON A SINGLE-LEG SQUAT TEST?

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Abstract (Limited to 300 Words):

BACKGROUND AND PURPOSE: The single-leg squat test was developed to identify individuals with impaired hip muscle function that may contribute to knee injuries. Understanding whether impaired muscle strength versus impaired recruitment contributes more strongly to compromised mechanics during the test may help clinicians develop programs to enhance rehabilitation. The purpose of this study was to compare hip muscle recruitment and hip muscle strength between good and poor performers on the single-leg squat test.

METHODS AND MATERIALS: Fifty-seven women were screened. Twenty-one classified as good performers and 21 classified as poor performers completed testing. Maximum hip extension and abduction strength were measured with a handheld dynamometer. Three-dimensional hip and knee kinematics and electromyographic (EMG) signals from the gluteus maximus (GMax) and medius were measured during five consecutive repetitions of the test. ANALYSES: Data were compared between good and poor performers with paired t-tests and relationships among variables were analyzed with multiple regression and partial correlation (α = 0.05).

RESULTS: Poor performers completed the test with more hip adduction and flexion than did good performers. No differences in knee kinematics, hip strength or muscle recruitment were present. Frontal plane knee motion, however, was correlated with transverse and frontal plane hip motion and with GMax recruitment.

CONCLUSIONS: While hip muscle function and knee kinematics did not differ between good and poor performers as we’d hypothesized, frontal plane knee motion was uniquely correlated with GMax recruitment. Increased knee valgus was associated with reduced GMax recruitment. IMPLICATIONS: Impaired motor control rather than impaired strength may contribute to altered lower extremity mechanics during single-leg squats. Exercise programs intended to improve impaired hip muscle function may need to focus more on motor control training and recruitment of the GMax than on strengthening. Whether strategies that enhance GMax recruitment benefit individuals with knee injuries requires further study.