

Symmetry of Performance across Lower Limb Tests between the Dominant and Non-Dominant Legs

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Abstract : Background: To determine the functional limitations of the lower limbs or readiness to return to sport, most rehabilitation programs use some form of testing; however, it is still unknown what the pass criteria is. This study aims to investigate the differences between the dominant and non-dominant leg performances across several lower limb tasks, which are hop tests, two-dimensional (2D) frontal plane projection angle (FPPA) tests, and isokinetic muscle tests. This study also provides the reference values for the limb symmetry index (LSI) for the hop and isokinetic muscle strength tests. Twenty recreationally active participants were recruited, 11 males and 9 females (age 23.65 ± 2.79 years; height 169.9 ± 3.74 cm; and body mass 74.72 ± 5.81 kg). All tests were undertaken on the dominant and non-dominant legs. These tests are (1) Hop tests, which include horizontal hop for distance and crossover hop tests, (2) Frontal plane projection angle (FPPA): 2D capturing from two different tasks, which are forward hop landing and squatting, and (3) Isokinetic muscle strength tests: four different muscles were tested: quadriceps, hamstring, ankle plantar flexor, and hip extensor muscles. The main outcome measurements were, for the (1) hop tests: maximum distance was taken when undertaking single/crossover hop for distance using a standard tape measure, (2) for the FPPA: the knee valgus angle was measured from the maximum knee flexion position using a single 2D camera, and (3) for the isokinetic muscle strength tests: three different variables were measured: peak torque, peak torque to body weight, and the total work to body weight. All the muscle strength tests have been applied in both concentric and eccentric muscle actions at a speed of $60^\circ/\text{sec}$. This study revealed no differences between the dominant and non-dominant leg performance, and 85% of LSI was achieved by the majority of the subjects in both hop and isokinetic muscle tests, and; therefore, one leg's hop performance can define the other.

Keywords : 2D FPPA, hop tests, isokinetic testing, LSI

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