Title: Limb Asymmetries in healthy individuals to determine the effectiveness of return to sport protocols.

Introduction: The knee is the most commonly injured joint by adolescent athletes with greater than 2.5 million sports-related injuries annually. Physical therapists, as well as a wide range of other clinician treat sports related knee injuries and use hop test for return to sport protocol following injury. Currently there is conflicting evidence on the use of single leg hop tests for return to sport because athletes may be able to psychologically alter their results by knowing the purpose of the test, when compared to isokinetic and isotonic testing there are continued asymmetries between legs. Though hop tests are valid and reliable for return to sport protocol they typically compare right to left limb height, distance or time with little emphasis on quality of movement. Our hypothesis is that healthy individuals have limb asymmetries that are significantly different prior to injury and will therefore influence single leg jump height prior to being injured. The purpose of this study is to identify limb asymmetry in healthy individuals to determine the single leg hop tests return to sport protocol effectiveness in determining athlete readiness for return to sport.

Methods: The subjects consisted of two healthy females both aged 23. The subjects were asked to perform a maximum single leg (SL) squat into a maximum vertical jump and land on the same leg. Each subject performed 3 trials on both lower extremities. The subjects performed each trial on a force plate, beginning the SL squat and landing the maximum vertical jump back onto the force plate. Each subject wore 16 reflective markers on bilateral lower extremities for 3-D motion capture. The independent variable measured was the jump leg and the dependent variables included the jump height, ground reaction force, joint angle and moment. Results: For the purpose of our study a 5% difference between limbs was considered significant as per the return to sport protocol. Both participants jump heights were within 2% difference between legs. Both subjects showed a greater than 5% difference between legs in anterior/posterior ground reaction force, ankle moments in flexion and extension, knee moments in flexion, extension, adduction and abduction, and hip flexion, extension, adduction, abduction, internal rotation and external rotation. Discussion: Though each participant jumped approximately the same height with either leg the results of the study show that the hip, knee and ankle moments are not as similar bilaterally therefore they may compensate for another joint if injured. This study only involved two participants and because of outliers were unable to combine results. Future research needs to make clinical judgements on the effectiveness of SL hop in return to sport protocol looking at the quality of movement and not just comparing limbs in terms of height, distance and/or time. Conclusion: Single leg hop tests that look solely at height, distance or time should not be used in isolation to determine an athlete’s readiness for return to sport. To reduce likelihood of re-injury the clinician should additionally examine force production at the hip, knee and ankle, trunk involvement and qualitatively examine sport movements prior to an athletes return to sport.

References:

