RELATIONSHIPS BETWEEN LOWER LIMB BIOMECHANICS DURING SINGLE LEG SQUAT WITH RUNNING AND CUTTING TASKS: A PRELIMINARY INVESTIGATION

F Alenezi, L Herrington, P Jones, R Jones. Knee Biomechanics and Research Programme, University of Salford, Salford, United Kingdom

Background The need to develop screening tests to find athletes who maybe predisposed to knee injuries is of prime importance in order to design individualised intervention programmes. Previous research has found 3D joint kinematics of the hip and knee during a single leg squat (SLS) to be related to those during jogging (Whatman et al., 2011). Thus, further investigation as a potential screening test is warranted.

Objective To investigate the relationship between peak 3D kinematic variables during SLS with those occurring during running (RUN) and 90° cutting (CUT) tasks.

Design A correlational study.

Setting Undertaken in the human performance laboratory at the University of Salford.

Participants 15 recreational athletes, 7 males and 8 females, (age 25.2±5.1 years; height 1.6±7.38 m; and mass 67.6 ±10.93 kg) were recruited.

Interventions A ten-camera motion analysis system (Qualisys) and a force platform (AMTI) were used to collect kinematic variables during SLS, RUN, & CUT tasks. Visual 3D (C-Motion, USA) was used to process all data. Pearson correlation coefficients were used to evaluate the association between 3D variables among the three tasks.
Main outcome measurements  Hip and knee joint angles.
Result  SLS was strongly correlated to run in knee valgus and hip internal rotation ($r=0.70$ and 0.76, respectively), and showed moderate correlation with knee external rotation (0.42).
SLS and CUT were moderate to strongly correlate to each other in knee valgus, knee flexion, and hip internal rotation ($r=0.54$, 0.69, and 0.54, respectively), and moderately in hip flexion ($r=0.38$).
Discussion  The findings of this study provide evidence that performance of SLS relates to performance of other tasks (running and cutting). In those individuals displaying poor motion (excessive angles) during SLS this is likely to be predictive of poor motion during running and cutting, so could negate the need for assessing individuals during these tasks.