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Lower Extremity Power and its Relationship to Qualitative and Quantitative Measures of Landing Performance

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Lower extremity injuries are common in athletic activities. Anterior cruciate ligament (ACL) injuries are a particular concern. Developing effective screening tests to identify high risk individuals is a priority. Movement mechanics, high forces, high rates of loading, and fatigue are factors which may contribute to the occurrence of a lower extremity injury. Improving strength, power, agility, balance, and muscle activation may potentially decrease overall risk. **PURPOSE:** To investigate the relationship between landing mechanics and lower extremity power after fatigue. **METHODS:** 12 male subjects performed 3 trials of the Landing Error Scoring System (LESS) test and vertical jump test before and after a fatigue protocol. The fatigue protocol consisted of body weight squats to 90° knee flexion at 60 Hz until they could not maintain the pace. Vertical ground reaction forces (vGRF) were measured by force plates. Pearson Correlation Coefficients are used to assess the relationship between LESS, peak power, and vGRF, and dependent *t*-tests to identify changes due to fatigue. **RESULTS:** Vertical jump height decreased 63.6±18% ($p<0.001$) after fatigue. Peak power was not related to LESS score before ($r=-0.21$, $p=0.52$) or after ($r=-0.19$, $p=0.56$) fatigue or to peak vGRF before ($r=-0.36$, $p=0.25$) or after ($r=-0.26$, $p=0.42$) fatigue. LESS score is related to normalized vGRF ($r=0.61$, $p>0.05$) but not after fatigue ($r=0.22$, $p=0.5$). Fatigue did not significantly change LESS score (4.7±2.7 vs 5.4±2.6, $p=0.08$), peak vGRF (55.8±18.3 vs 50.3±13.9N/kg, $p=0.25$), or time to peak vGRF (89±28 vs 95±24ms, $p=0.52$). **CONCLUSION:** Fatigue did not significantly alter any dependent variable, consistent with previous observations. Lower extremity power did correlate with either qualitative or quantitative measures of landing performance. Improving power and strength alone may not be sufficient to reduce the risk of ACL or lower extremity injury.