SWACSM Abstract

The Effect of Sex and Age on Lower Extremity Joint Power Asymmetry During a Squat Jump

KYLIE B. GARCIA, ISABELLA MARTINEZ, & MICHELE LEBLANC

Biomechanics Laboratory; Exercise Science Department; California Lutheran University; Thousand Oaks, CA

Category: Undergraduate

Advisor / Mentor: LeBlanc, Michele (mleblanc@callutheran.edu)

ABSTRACT

Previous research has identified greater asymmetry in lower extremity strength tests in older adults with a fall history when compared to older adults without a history of falls and to younger adults (Perry et al., 2007). However, it is not known if these strength asymmetries manifest in asymmetrical movement patterns or if the asymmetries differ for females and males. **PURPOSE**: The purpose of this study was to determine the effect of sex and age on lower extremity joint power asymmetry during a squat jump. **METHODS**: Thirty two subjects including 19 young adults (9F and 10M) between 18-25 years old and 13 older adults (7F and 6M) between 65-75 years old who were healthy, injury-free, and moderately active participated. There was no significant difference in the Physical Activity Rating scale values between sexes or ages. Subjects were asked to perform squat jumps with their hands on their hips from a starting position with at least 120 deg. of knee flexion with no countermovement. Kinematic and kinetic data were collected during each squat jump using a 7-camera Vicon motion capture system and two Kistler force plates. The average over three trials was used for analysis. Dependent t-tests identified differences in peak joint powers (PP), the timing of peak joint powers, and mean joint powers (MP) between the right and left hip, knee, and ankle for each sex and each age group ($p < 0.05$). **RESULTS**: At the hip, there were significant differences in PP and its timing for Older and Male subjects ($p < 0.042$) and in MP for all groups except Older ($p < 0.041$). There were differences in only Younger subjects for knee PP and MP ($p < 0.021$). At the ankle, MP differed for all groups ($p < 0.042$) and PP differed for Younger and Female subjects ($p < 0.019$). When significant differences were identified, the right side PP and MP values were greater in all differences identified at the hip and ankle while the left side values were greater at the knee. **CONCLUSIONS**: The Young subjects exhibited the greatest number of lower extremity joint power asymmetries. It could be that controlling for the minimum knee flexion angle may have minimized the knee differences in the other groups. While the older adults may have strength asymmetries, it appears that they had no greater movement asymmetries than the younger adults.

Research funded by the Swenson Summer Research Fellowship Program.