GENDER DIFFERENCES IN LANDING USING FUNCTIONAL VS. NON-FUNCTIONAL TASKS
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Objective: Previous research involving gender comparison of knee biomechanics during landing has used both functional (i.e. vertical jump) and non functional (i.e. drop landing) tasks. The purpose of this study was to identify whether gender comparisons in lower extremity landing biomechanics would differ between two landing tasks. Design: Subjects performed counterbalanced trials of a vertical drop landing (DL) (61 cm platform) and a vertical jump (VJ) landing (suspended target set at 85% of their maximum VJ). Subjects were instructed to land with their dominant foot on a force plate (AMTI Watertown, MA) flush with biomechanics laboratory floor. Kinematic data from 14 retro-reflective markers placed on the dominant leg was collected using a 6 camera, 3-dimensional motion capture system (Motion Analysis, Inc, Santa Rosa, CA). Initial contact was determined from the vertical ground reaction force data. Trial data collection for video and ground reaction forces was set at 3 seconds and was initiated and simultaneously controlled through an external trigger. Data was processed and stored (Eva software version 6.01; Motion Analysis, Inc) and analyzed using the Kintrak software package (version 6.2 Motion Analysis, Inc). A 2x2 gender (male, female) by landing task (DL, VJ) repeated measures design was used for the study. Subjects: 28 recreationally active subjects, (14 male, age 23.21 +/- 2.94 years, height 176.29 +/- 5.33 cm, weight 80.71 +/- 9.49, VJ 60.41 +/- 8.48 cm kg; 14 female, age 21.50 +/- 2.38, height 165.75 cm +/- 7.06, weight 65.77 kg +/- 11.73, VJ 40.01 +/- 6.68) with no history of significant knee injury. Measurements: Average maximum knee flexion (MNF) angles from 4-6 successful trials for each subject in each task were analyzed using a 2x2 Univariate ANOVA with follow up T-tests (P = .05). Results: A significant overall effect (P = .004) for landing task was detected where MNF angles were greater in the DL (M= 86.73? +/- 14.79, F= 99.88? +/- 16.77) compared to the self initiated VJ (M= 82.84? +/- 15.24, F=79.73? +/- 12.66). Follow up tests revealed that the women's MNF angle increased significantly (P=.001) in the DL task. An interaction was also detected (P = .047), where MNF angles were similar in the VJ between groups, but women had a higher MNF angle compared to men in the DL. Conclusions: When landing from a VJ, subjects MNF angles were similar. However, women responded differently to the DL compared to men. Investigators should consider the appropriateness of the landing task when deciding on research methodology.

Word Count: 395