SWACSM Abstract

The Relationship Between Concussion History and Sex on Lower Extremity Biomechanics During a Cutting Task

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ABSTRACT
Athletes with a history of sports related concussion (SRC) have been shown to exhibit lower extremity (LE) mechanics during high impact landing tasks that are conducive to increased injury risk. The underlying cause, and extent of this phenomena is currently unknown. **PURPOSE**: The purpose of this study was to analyze the relationship between SRC history and sex on LE biomechanics during a land-and-cut task. **METHODS**: College athletes with a history of SRC and a control group of healthy athletes matched by sport, position, sex, and age were recruited for this study. Both groups were comprised of 9 males and 11 females. Athletes performed an unanticipated land-and-cut task. The task consisted of each athlete standing on a 60 cm box with a visual stimulus positioned three meters away from the athlete. Various colors (green, pink, blue, and red) were presented as the visual stimulus. Athletes were instructed to only respond to a green or red light. When a red or green light was shown, athletes were instructed to step off the box, land on both limbs and perform a 45-degree cutting movement to the left or right, respectively. Two separate point biserial correlations were conducted (one for each sex) correlating group (0 = control, 1 = SRC) with the following dependent variables: vertical ground reaction force (vGRF), peak knee extensor moment (pKEM), peak knee abduction moment (pKAM), peak ankle dorsiflexion angle (pDF), peak knee flexion angle (pKFA), and peak knee abduction angle (pKA). A linear regression equation was obtained for significant correlations. **RESULTS**: There was a significant negative moderate correlation between group and KF in males ($r = -.69$, $p < .01$). There were no other significant correlations between group and LE biomechanical variables in either males or females ($p > .05$). A linear regression analysis showed SRC history was a significant predictor of KF ($KF = 63.71 – 12.43(group)$; $R^2 = .473$, $p = .002$) **CONCLUSION**: Males in the SRC group were associated with lower KF. Specifically, the regression analysis indicated that males with an SRC history had a predicted 12.4 degree decrease in KF during the land-and-cut task. This suggests previously concussed males may be at increased risk for LE injury.