

Lower Extremity Musculoskeletal Injury Is Associated with Increased Risk of Concussion in High School Athletes

Adam Lutz, Charles Thigpen, R. Gil Gilliland, John Thorpe, Michael Kissenberth, Ellen Shanley PhD

ATI PT, Steadman Hawkins Clinic of the Carolinas

Objectives: Previous research indicates that concussion increases the risk of lower extremity injuries (LE) after return to sport. However, no study has examined the risk of precedent lower extremity injuries and their relationship to the development of a sport related concussion (SRC). To determine if the risk of combined injuries (LE injury-SRC) is elevated in high school athletes accounting for athlete sport and gender.

Methods: 33,386 high school athletes were monitored over 4 seasons. 4223 LE injuries and 1132 concussions were reported. Injured athletes were identified by their school athletic trainer (AT) time-loss injury during a team-sponsored practice or game. ATs documented the date, mechanism, and sport of injury. Injured athletes were referred to a board-certified sports medicine physician for diagnoses and follow up care. Cumulative injury rates were calculated with 95% confidence intervals. Rate ratios were used to compare frequency of SRC after RTS following a LE injury. Comparisons were made overall cohort between those participating athletes with and without isolated and combined injuries as well as by gender. ($\alpha=0.05$).

Results: A cumulative incidence for athletes sustaining an isolated SRC was 2.3/100 athletes (95% CI= 2.1-2.5) and for isolated LE injury was 11.5/100 (95% CI=11.2-11.9) athletes. Athletes presenting with a LE injury had an increased risk (RR= 4.7; 95% CI = 4.2-5.2) of sustaining a subsequent SRC within 1 year when compared to athletes that did not suffer precedent LE injuries. Male athletes presenting with a LE injury had an increased risk (RR= 4.9; 95% CI = 4.2-5.7) of sustaining a subsequent SRC within 1 year when compared to male athletes that did not suffer precedent LE injuries. Female athletes presenting with a LE injury had an increased risk (RR= 4.4; 95% CI = 3.6-5.2) of sustaining a subsequent SRC within 1 year when compared to female athletes that did not suffer precedent LE injuries. In football, presenting with a LE injury had an increased risk (RR= 5.8; 95% CI = 4.5-7.4) of sustaining a subsequent SRC within 1 year when compared to football athletes that did not suffer precedent LE injuries.

Conclusion: Our results are the first to show that high school athletes who suffer a time-loss LE injury are at 4.4-5.8 times increased risk to suffer a sports related concussion within the next year. Additional studies are warranted to confirm these findings.

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