

Countermovement Jump Performance Trends in High School Football Players Throughout a Competitive Season

SAMUEL T. LAUMAN¹, ALEXA L. LOBATO¹, LINDSEY C. HARTLAND¹, LUCY H. PHAN¹, JOHN P. ABT¹

¹Children's Health Andrews Institute for Orthopaedics and Sports Medicine, Plano, TX

Category: Professional

Advisor / Mentor: Abt, John, FACSM (john.abt@childrens.com)

ABSTRACT

Football is the largest participation sport amongst male high school athletes in the country with over one million participants. Previous research has demonstrated that countermovement jump (CMJ) performance is negatively affected by in-season fatigue in contact sports such as rugby and hockey. However, little data are available to describe how CMJ performance and force metrics change in high school athletes throughout a competitive football season. **PURPOSE:** The purpose of this study was to examine the changes in strength and power metrics in high school football players over a single football season. **METHODS:** Sixty-nine male high school football athletes comprised of 25 offensive skill players, 23 linemen, 12 linebackers 7 defensive backs, and 2 special teams players were tested for maximal lower body force output at the beginning and end of a high school football season. Testing was conducted using three attempts of a maximal hands-on-hips countermovement jump on portable force plates, with the average of the three jumps used for analysis. Pre-testing occurred prior to the first game of the season, and post-test was conducted after the final game of the season with a minimum of 10-weeks between sessions accounted for the time between pre- and post-testing. A dependent-samples t-test was performed to calculate differences between the two time points. **RESULTS:** Significant improvements in jump height (14.15 to 14.89 inches), relative force at minimum displacement (220.36 to 235.77% body weight), peak relative braking force (220.72 to 236.39% body weight), peak relative propulsive force (238.07 to 248.02% body weight), peak braking velocity (-1.17 to -1.30m/s), and takeoff velocity (2.64 to 2.71m/s). No significant differences were seen in relative peak landing force ($t(68) = 0.53, p=0.600$). **CONCLUSION:** At the end of a competitive season, high school football athletes produced more force and increased their movement velocity, resulting in improvements in jump height compared to the beginning of the season. However, there were no significant differences in landing metrics indicating no changes in force absorption capacity. These increases in jump performance do not reflect results previously reported in contact sports such as rugby and hockey where jump performance typically decreased over the course of a season. Future studies may benefit from collecting additional performance data to assess the impact seasonal fatigue has on other body systems separate to lower body power production, and the effect to which practice and strength and conditioning programming impact force metrics. Without appropriate monitoring strategies, coaches are leaving the assessment of load management to chance, which can potentially lead to decreased performance and an increased chance of injury.