TACSM Abstract

The Relationship between Squat Jump Performance and Sprint Profile in Collegiate Track and Field Athletes

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ABSTRACT

The squat jump (SJ) necessitates the inter-play of various biomechanical components for better jump performance. Good sprint performance requires the inter-play of many of the same biomechanical components. Researchers have previously examined how the speed, force, velocity, and power interact during sprinting, but have yet to examine how these measures are associated with SJ performance measures. **PURPOSE**: Examine the relationship between squat jump performance measures and the sprint profile measurements of collegiate track and field athletes. **METHODS**: Twenty-five athletes (18 males and 7 females) completed two squat jump trials with a linear encoder attached to a 45 lbs. bar placed on the athlete's upper back. Measures of interest during the concentric phase of the SJ included jump height, maximum force, maximum velocity, maximum power, and rate of force development. Athletes then completed two 30-meter acceleration sprints. The MySprint mobile application was used to acquire the athlete's sprint profile and to assess maximal theoretical horizontal force, maximal theoretical velocity, optimal velocity, maximal theoretical power, maximal speed, maximal ratio of force, force-velocity slope, and decrease in ratio of force. The best trial was used for statistical analysis. Pearson's or Spearman's correlation coefficients were conducted between SJ measures and sprint profile measures. **RESULTS**: There was a positive correlation between SJ height and maximal speed ($r = 0.402$; $p = 0.042$). Maximal power during the SJ was positively correlated with maximal speed ($r = 0.476$; $p = 0.014$); optimal velocity ($r = 0.469$; $p = 0.018$); maximal theoretical power ($r = 0.462$; $p = 0.018$); maximal theoretical velocity ($r = 0.452$; $p = 0.021$); theoretical horizontal force ($r = 0.431$; $p = 0.028$); and maximal ratio force ($r = 0.428$; $p = 0.029$). Maximal velocity during the SJ was correlated with maximal speed ($r = 0.519$; $p = 0.007$); maximal theoretical velocity ($r = 0.499$; $p = 0.010$); optimal velocity ($r = 0.486$; $p = 0.014$); and maximal theoretical power ($r = 0.484$; $p = 0.012$). No other correlations were significant. **CONCLUSION**: Maximal velocity and power during the concentric phase of the SJ is moderately to strongly correlated with maximal sprinting speed, velocity, and power. SJ height is positively correlated with maximum sprint speed. There is a lack of significant correlations between other measures of the SJ and sprint profile measures. SJ power and velocity are correlated with sprint performance, therefore power and velocity improved through plyometric SJ training may be transferable to achieve better sprint performance.