

## Associations of Changes in Body Composition and Athletic Performance in Collegiate American Football Players

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### ABSTRACT

Football practitioners ubiquitously employ offseason resistance training to improve on-field performance. Early offseason training is frequently designed to emphasize accretion of lean and total body mass. While this is a main objective of sport-specific conditioning, there are few investigations comparing correlated changes in body composition, maximal strength, and football-specific performance tests after an early-offseason training program. **PURPOSE:** The purpose of this analysis was to quantify the relationship between changes in athletic performance and body composition in collegiate American football players. **METHODS:** Before and after a 7-week offseason training program, body composition and athletic performance were assessed in NCAA Division III American football players. Body composition was estimated using dual-energy X-ray absorptiometry (DXA; Hologic Horizon). One-repetition maximum (1RM) strength was assessed for the barbell back squat and front squat exercises. Vertical jump height, 40-yard dash time, broad jump distance, and pro agility shuffle time were also assessed. The sample size ranged from 17 to 19, depending on the specific performance test. Using Pearson's product-moment correlations, the relationships between percent changes in DXA variables and athletic performance outcomes were examined. **RESULTS:** A trend for a positive correlation between changes in lower body FFM and front squat 1RM ( $r: 0.43, p: 0.08$ ), but not back squat 1RM ( $r: -0.03, p: 0.92$ ), was observed. Additionally, a significant positive correlation was observed between pro agility shuffle time and DXA BM ( $r: 0.50, p: 0.03$ ) and total FFM ( $r: 0.49, p: 0.04$ ), but not FM ( $r: 0.06, p: 0.80$ ). In contrast, no correlations between changes in body composition variables and changes in vertical jump height, 40-yard dash time, or broad jump height were observed (range of  $r: -0.36$  to  $0.31, p > 0.05$  for all). **CONCLUSION:** Increases in FFM may predict improvements in front squat 1RM but impairments in pro agility shuffle performance, with no relationships observed for vertical jump height, 40-yard dash time or back squat. Additional phases of training that specialize in developing maximal power and velocity are likely necessary to maximize athletic development.