TACSM Abstract

The Relationship between Shoulder Mobility and Upper Body Muscle Mass on 2-RM Bench Press Performance

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ABSTRACT

INTRODUCTION: Upper body strength is one of the most important factors in American football and thus tested frequently. However, strength may come at the cost of mobility as recent studies have reported an inverse relationship between shoulder range of motion (ROM) and strength, with an increase in strength causing a decrease in ROM (Shitara et al., 2022). **PURPOSE**: The purpose of this study was to determine if upper body muscle mass or shoulder mobility are associated with two-repetition max (2-RM) bench press performance in collegiate football players. **METHODS:** Data from 80 Division I varsity football players (20.5 ± 1.4 yrs., 182.8 ± 6.9 cm, 100.9 ± 22.7 kg) who participated in Spring Football 2023 were examined. Athletes were asked to self-report their most recent 2-RM bench press, underwent a whole body dual x-ray absorptiometry scan (DXA, Hologic W), and DARI marker-less motion capture analysis (DARI Motion, Inc., Kansas City, MO). Upper body lean muscle mass was computed with the DXA variables left and right arm lean mass and trunk lean mass. ROM was assessed using shoulder abduction and adduction, horizontal abduction and adduction, flexion and extension, and internal and external rotation. Statistical analyses included Pearson correlations for shoulder ROM to 2-RM bench press and upper body mass to 2-RM using IBM SPSS 29 (SPPS, Chicago, IL). **RESULTS**: All correlations between DARI shoulder ROM variables to 2-RM bench press performance, were non-significant and very weak to weak (ranging from r = -0.002 to 0.165). Upper body lean mass (44.0 ± 6.2 kg) showed a positive correlation with 2-RM (270 ± 48 lbs.) bench press performance (r = 0.644, p < 0.001). **CONCLUSION**: As recent studies have suggested, ROM and strength, represented by 2-RM bench press, have a weak relationship. Therefore, the weak relationship between shoulder ROM and 2-RM suggests that greater ROM may have no effect on strength performance when assessing 2-RM bench press in collegiate football players. Nonetheless, strength is a function of muscle mass as suggested by the strong positive correlation (r = 0.644) between upper body muscle mass with 2-RM bench press. Hence, upper body muscle mass has a greater effect on 2-RM bench press performance in Division I varsity collegiate football players than shoulder ROM. Therefore, collegiate football players should focus on building muscle mass rather than increasing shoulder ROM in order to improve 2-RM bench press performance.