TACSM Abstract

Reliability and Relationships between Supine Medicine Ball Throw Kinetics and Vertical Jump Height

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ABSTRACT

Supine medicine ball throw (SMBT) assessments have been used previously to evaluate upper-body explosive strength in young adults. Kinetic variables, such as peak force and rate of force development (RFD), can be measured during a SMBT. These variables have been suggested to be important predictors of athletic performance capacities. However, limited data exist regarding the reliability of SMBT peak force and RFD measurements and how they associate with performance during a vertical jump (VJ) test. **PURPOSE**: The purpose of this study was to examine the reliability of SMBT variables and their relationship with VJ height. **METHODS**: Twenty young, healthy women (age = 21 ± 3 years) volunteered for this study. Participants reported for testing on two different occasions, separated by 2-7 days at approximately the same time of day (± 2 hours). For each testing session, participants completed three VJs followed by three SMBT assessments. All VJs were performed on a jump mat. The jump mat measured VJ height (cm) based on flight time. For the SMBTs, participants laid on a force plate in the supine position with their hands on the ball (2.7 kg) and knees and hips flexed at 90°. Participants were instructed to throw the ball explosively upward with as much force as possible, using a motion similar to a basketball chest pass. The vertical force signal (N) from the force plate was recorded during each throw and used to measure peak force and RFD variables. Peak force was calculated as the highest force value. RFDmax was calculated as the highest slope for any 20 ms epoch that occurred over the rising portion of the force signal. RFD30% and RFD40-80% were calculated as the linear slope of the force signal from the onset of the throw to 30% peak force and from 40% to 80% peak force, respectively. The intraclass correlation coefficient (ICC) and coefficient of variation (CV) were calculated between sessions to assess the reliability of SMBT peak force and RFD variables. The relationships between these variables and VJ height were assessed by Pearson correlation coefficients (r). **RESULTS**: The ICC for SMBT RFD30% was 0.55. This ICC was considerably lower than the ICCs for the other SMBT variables (0.82-0.88). The CV value for SMBT RFD30% was 27.2%, whereas the CV values for SMBT peak force, RFDmax, and RFD40-80% were all less than or equal to 14.0%. There were significant relationships between VJ height and SMBT peak force (r = 0.483, P = 0.031), RFDmax (r = 0.484, P = 0.031), and RFD40-80% (r = 0.491, P = 0.028); however, there was no significant relationship between VJ height and RFD30% (r = 0.359, P = 0.120). **CONCLUSION**: The results of this study demonstrated that SMBT peak force, RFDmax, and RFD40-80% were reliable measures for assessing upper-body explosive strength in young, healthy adults. These measurements were significantly associated with VJ height and therefore, may be effective parameters at predicting a person's jumping ability and overall athletic performance potential. RFD30% was unreliable and not significantly correlated with VJ height. As a result, this variable should not be used as a performance measure when conducting SMBT assessments.