TACSM Abstract

The Effects of Using Wedge-Weightlifting Shoes While Performing a Front Squat

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ABSTRACT

Wedged-weightlifting shoes may contribute to a better squatting postural technique by allowing for an increase in ankle dorsiflexion, an increase in hip flexion, and a decrease in the amount of trunk lean. **PURPOSE:** To examine how wedged-weightlifting shoes affect peak power output, trunk lean, hip flexion, and ankle dorsiflexion during the performance of a front-squat. **METHODS:** Six participants (167.875±20.13 lbs., 20.67±1.51 yrs.) completed five-repetition squatting trials while standing on a Bertec force plate. Force data were collected at 100 Hz using the Biopac Acknowledge system during these trials. Simultaneously, the trials were video recorded at 50 Hz in the sagittal plane. Five body landmarks (mid-trunk, hip, knee, ankle, base of the 5th metatarsal, and heel) were digitized using the Vicon Motus Motion Analysis System to generate a lower body model to measure lower extremity kinematics. Squatting trials were completed under two different shoe conditions (barefoot and wedged-weightlifting shoes) and two different loads (no-load and loaded at 50% 1RM). An initial laboratory visit two days prior to data collection was used to measure a 1RM. The middle three repetitions of the five-repetition sequence were analyzed. Ground reaction force data were used to determine peak positive and negative power during each squat repetition. Digitized position data were used to compute trunk, hip, knee and ankle joint angular kinematics. **RESULTS:** A two-way repeated measure ANOVA was used to compare the shoe and load conditions. Shoe type ($F(1,5)=7.81$, $p=.04$, $\eta_p^2=.61$) and load ($F(1,5)=24.72$, $p=.004$) significantly affected peak negative power production. Load accounted for about 83% of the change seen in negative power production ($\eta_p^2 =.832$); as the load increased, the squatter's negative power increased. Negative peak power occurs during the eccentric, or downward, movement of the squat. The means(SD) peak negative power output for wedge-weightlifting shoes, -1874.8(426.4) W, and load, -1242.0(417.1) W. Load ($F(1,5)=18.94$, $p =.007$) significantly affected the ankle angle and accounted for about 79% of change ($\eta_p^2=.79$), causing a decrease in ankle dorsiflexion. The mean(SD) ankle dorsiflexion under the load condition for wedged-weight lifting shoes, 50.9±(6.4)degrees, and barefoot, 49.71±(7.6)degrees. **CONCLUSION:** Although previous studies have suggested that wedged-weightlifting shoes affect performance of squatting, this study found that the wedged-weightlifting shoes did not affect the overall performance of the front squat.