Abstract

Title – The Validity of Wearable Technology for Velocity Based Training

Program of Study – Exercise Science

Presentation Type – Physical Poster

Subtype – Applied

Mentor(s) and Mentor Email – Professor Justin Kilian (jrkilian@liberty.edu)

Student name(s) and email(s) – Abigail McCarty (armccarty@liberty.edu), Abigail Adams (abadams1@liberty.edu), Hannah Moore (hemoore2@liberty.edu), Abigail Conley (aeconley@liberty.edu), Moriah Miller (mmiller41@liberty.edu)

Abstract example: The purpose of this research study is to determine the validity of wearable technology for velocity-based training. Twenty-five college age males on volleyball and hockey club sports teams were recruited for this study. Each athlete's 1 repetition maximum (RM) was measured at least 48 hours prior to testing used as participants performed 1 repetition at 50, 70, and 90% of the 1RM back squat. Velocity was recorded using a linear transducer (LT) and a wearable accelerometer (WA). Validity of the WA was determined by comparison of the values recorded from the LT. During analysis with a one sample T-test, average velocity at 50% of 1RM was significantly lower (p=0.009) in the beast sensor by 0.05m/s (95% CI, 0.01 to 0.09). Peak velocity was significantly lower (p=0.000). The same analysis at higher intensities experienced the same trend. During a paired samples T-test, a strong correlation was found between average velocities at 50, 70, and 90% 1RM (r=0.837, r=0.723, and r=0.735 respectively; p=0.000 all intensities) but a strong correlation was found between peak velocities only at 50% 1RM (r=.764; p=0.000). WA appears to be the most valid while tracking light loads at higher speeds using average velocity as the primary metric based on statistical agreement. Moderate and heavy loads tended to be less valid, but the values trended in a reliable underprediction of bar speed. Wearable technology could assist athletes in shifting the force-velocity curve to produce a

greater amount of force in a shorter amount of time. Wearable technology could be a more convenient method to accurately assess movements like a loaded plyometric exercise or an Olympic lift. Average velocity seems to be a more accurate measure for training at all intensities. In general, average and peak velocities recorded the most accurate values using high speed, lower intensity movements.