

## **Validity of a Weightlifting Accelerometer for Measuring Average Power**

William M. Castor, Joseph C. Watso, Samantha R. Guarnera, Josh M. Bock, Edwin R. Miranda, Victoria R. Meyers, Alec B. Chaves, Scott Mazzetti.  
Salisbury University, Salisbury MD

**PURPOSE:** The purpose of this study was to examine the validity of the Tendo Weightlifting Analyzer versus an infrared photocell laser timing system for assessing average power. A 1 kg-mass fixed to the Tendo was dropped various distances ranging from 0.309 to 0.539m. **METHODS:** The various distances used corresponded to barbell displacements from subjects in a related study who performed four different bench press trials using different load and contraction intensities. As a result there were four different displacements per subject, resulting in 36 different displacements (some subjects' displacements were identical by chance). In this study we performed 4 separate trials (T1,T2,T3,T4) of timed 1kg drops replicating the displacements collected in the four bench press trials described above with the Tendo placed upside-down for a free-fall drop protocol. Because of manufacturer specified concerns with the unit being used upside-down, the drops were then repeated using a second drop protocol (i.e., pulley system) for an additional 4 trials (T5,T6,T7,T8) resulting in a total of 1720 drop repetitions. The times collected were then used to calculate average power (W). The calculated values from the laser were then compared to the values from the Tendo accelerometer. **RESULTS:** Paired T-test results showed significantly greater ( $p \leq 0.05$ ) average power from the Tendo compared to the laser for all trails, where the average power from the Tendo was approximately 1.5 to 2 W greater on average using the upside-down free-fall protocol (for example, T1: Tendo  $12.3409 \pm .58689$  W versus Laser  $11.0373 \pm 0.47084$  W;  $p = 0.0$ ). Similarly, average power from the Tendo was about 1 W greater on average using the pulley system protocol (for example, T5: Tendo  $12.0091 \pm 0.71508$  W versus Laser  $11.4615 \pm 0.66040$  W;  $p = 0.0$ ). **CONCLUSION:** Average power measurements from the Tendo weightlifting analyzer varied when compared to those of an infrared laser timing system, with the Tendo values consistently being about 12% and 3% greater than the laser for the free-fall and pulley drops, respectively.