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Validity of Barbell Velocities Recorded from the GymAware Device during Squat and Bench Press Exercises

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PURPOSE: To assess the validity of the GymAware linear position transducer (LTP) during the squat and bench press exercises. **METHODS:** Thirteen resistance-trained men (age: 21.7 ± 0.4 years; height 1.74 ± 0.07 m; mass: 82.9 ± 9.5 kg; squat 1RM: 149.85 ± 20.68 kg; bench 1RM: 114.77 ± 18.47 kg.) performed three trials of squat and bench press using the following percentages of a one repetition maximum (1RM): 20, 30, 40, 50, 60, 70, 80%. The order of the loads was counterbalanced across the participants. The mean vertical velocity of the barbell during the concentric phase of each repetition was recorded using a 3-D motion analysis system (Vicon; 200 Hz) and the GymAware LTP. Analysis of variance was used to assess the differences in the vertical velocities across the seven load conditions for each of the two exercises. **RESULTS:** Mean velocities were significantly different between devices for both the squat and bench press exercises ($p < 0.05$). Specifically the GymAware LTP provided significantly greater velocities under the 20% 1RM and 40% 1RM load conditions in the squat exercise (mean differences: 0.05 ± 0.03 m/s; 0.02 ± 0.02 m/s; $p < 0.05$) in addition to the 30% 1RM load for the bench press exercise (mean difference: 0.04 ± 0.02 m/s; $p < 0.05$). **CONCLUSION:** The GymAware LTP had a tendency to overestimate barbell velocities during the squat and bench press exercises when compared to the Vicon 3-D motion analysis system, particularly at the lighter loads. Such differences may bring into question the validity of the force-velocity characteristics derived from the LTP device during these resistance exercises.