QUANTIFICATION OF HORIZONTAL FORCE FOR A COMMERCIALLY AVAILABLE RESISTED SPRINT TRAINING DEVICE

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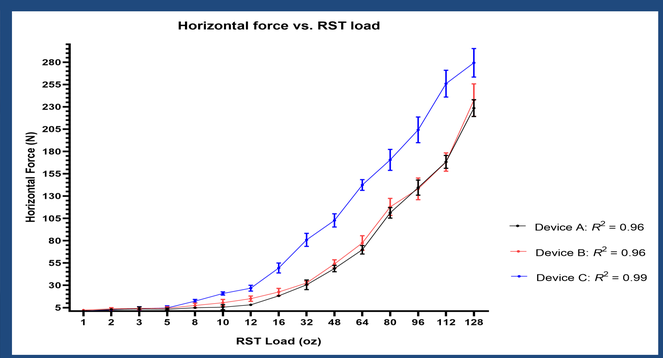
BACKGROUND

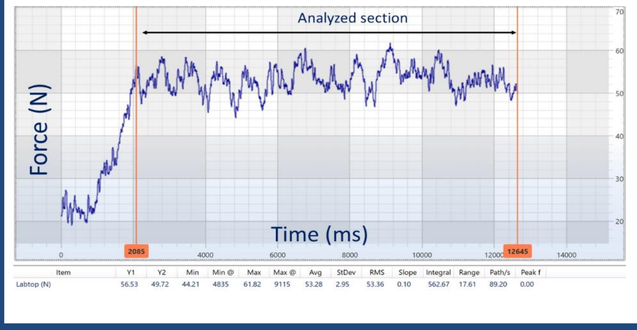
A recent survey study (2022) found that 63% of strength and conditioning coaches integrate a method of resisted sprint training (RST) into their programs. Research that quantifies the pulling force of different devices, which assists coaches on proper use and aids in sprint profiling and training, however, is needed. **PURPOSE** The purpose of the study is to quantify the horizontal force of a commercially available RST device. A secondary aim is to determine the differences in force between three devices—two 36 meter (m) devices (A and B) and a 60 m device (C).

METHODS

Using a motorized winch system (Badland Apex, Calabasas, CA), a lead acid battery (EverStart, Johnson Controls, Cork, Ireland), and an S-beam load cell (MuscleLab, Ergotest Innovation, Norway), the horizontal force in newtons (N) of three Exergenie® (Thousand Oaks, CA) RST devices were analyzed. The winch provided a constant pulling velocity of 0.16 meters per second over a 10-second trial to calculate force-time data. Four winch trials were performed at 15 Exergenie® load settings that range from 1 to 128 ounces (oz) for 60 trials per device, for a total of 180 trials. The mean N force was reported across the four trials for each load setting.

Two separate 36 m devices will produce similar forces up to loads of 128 oz. At identical loads, the 60 m device produces greater horizontal force than the 36 m, particularly at heavier loads.





RESULTS

The mean ± standard deviation of horizontal force and reliability data for each device across the 15 load settings are reported in Table 1. All three devices attained similar force values across the lighter load settings (loads ≤ 5 oz). As the loading progressively increased (loads ≥ 8 oz), RST devices A and B remained comparable, while device C had higher force values, with differences that ranged from 50 to 85 N. The coefficient of variation [CV = 100 x (SD/ mean)] was calculated for each trial. The mean CV% across the four trials was reported. The CV% was extremely high at light loads for each device; however, the CV% sharply decreased to below 10% as loading increased beyond 16 oz. Absolute reliability across the loads was highly acceptable for each device (ICC = 0.99).

CONCLUSIONS

The RST devices produce pulling forces greater than 220 N (~50 lbs) when testing up to 128 oz. For a constant velocity, the 36 m RST devices have similar force outputs for loads of 1 to 128 oz. Beyond 8 oz, the 60 m RST device produces greater horizontal force than the 36 m RST devices at the same load setting.

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