



## INTRODUCTION

The Flywheel Exercise Device (FWED) is an exercise tool that uses angular inertia and momentum to generate resistance, allowing for concentric and eccentric resistance without the need for gravity.

## PURPOSE

The purpose of this study was to measure the consistency of eccentric and concentric power within three sets performed with three different inertial masses.

## METHODS

Nine recreationally active individuals (23.8±2.8yrs, 74.1±17.2kg, 166.4±7.8cm) volunteered. After an initial session (FAM), subjects completed three sessions, separated by 24-48 hours on the FWED. Three sets of 14 maximal effort repetitions of belt squats with a single inertial mass were performed each session. Inertial masses were designated as medium (M, 0.025kg•m<sup>2</sup>), large (L, 0.05kg•m<sup>2</sup>), and extra-large (XL, 0.07kg•m<sup>2</sup>) and were assigned in random order. Eccentric and concentric power were collected and compared using repeated measures ANOVA with alpha set at p≤0.05.

## RESULTS

- There were no statistical differences in the Large mass or Extra-Large mass.
- Medium mass concentric power was significantly different (p=0.05) between set one (376.1±81W), and set three (410.3±100.5W).
- Medium mass eccentric power was significantly different (p=0.004) between sets one (478.1±93.5W), and set two (522.9±108.8W).
- Medium mass eccentric power was significantly different (p=0.004) between sets two (522.9±108.8W) and three (490.1±103.2W).

## LIMITATIONS

Preliminary data were collected from 9 subjects; more data are needed to validate the reliability of what the data is currently telling us. This study used only one FAM session. Only three sets were completed, which limited what reliability between sets may produce with more than three sets per inertial load day.

## CONCLUSIONS

Results indicate there were no differences between sets performed with the XL, and L masses. However, when using the M load, sets one and three were different. This was likely due to difficulty matching cadence with the flywheel rotation velocity using the lighter load.

## Practical Applications

- The medium mass was the only inertial load that showed significant differences between sets.
- **Coaches and Trainers** who want to utilize the FWED in their programs may consider additional FAM sessions to establish a consistent pattern of movement, before pursuing peak power exercises.
- The greatest variation in power production was observed with the medium mass.
- **Researchers** may consider additional screening for power athletes to create a more homogeneous sample.
- Additionally, researchers may consider utilizing standardized elevation platforms for testing and training, as shorter subjects might bottom out their ROM.

