

# The Effects of Blow Flow Restriction (BFR) on Leg Muscular Peak Power

Joseph Sauchelli, Casey Korman, Gabriele Balkius, Mathias Madersbacher, Joseph Liberatore  
Mentor: Dr. Vincent Chen

## PURPOSE

Blood Flow Restriction (BFR) has gained significant popularity in exercise training and rehabilitation. The purpose of this study was to examine the effects of blow flow restriction (BFR) on the electromyogram (EMG) of leg muscles.

## METHODS

Thirty-three Participants underwent two Wingate power test sessions - one with and one without BFR - at least one week apart. During the initial visit, participants' body composition was measured using an InBody machine. A Wingate Power Test without BFR was conducted to measure muscular peak power and EMG activity. During the second visit, participants performed a Wingate Power Test with BFR.

### SUBJECTS

- 33 Participants
  - 18 Males
  - 15 Females
- Age: 20.04 ± 0.32 yrs

### TESTING & MEASUREMENTS

- **Wingate**
  - Monark Cycle Ergometer
  - Resistance: 7.5% Body Weight
  - 30 seconds
  - Maximal Effort
- **Blood Flow Restriction (BFR)**
  - Smart Cuffs (SMART Tools Plus, LLC)
  - An inflatable cuff placed on the upper thigh to moderately restrict blood flow
  - 65% of the Upper Operational Pressure
- **Body Composition**
  - InBody
  - Electrical impedance

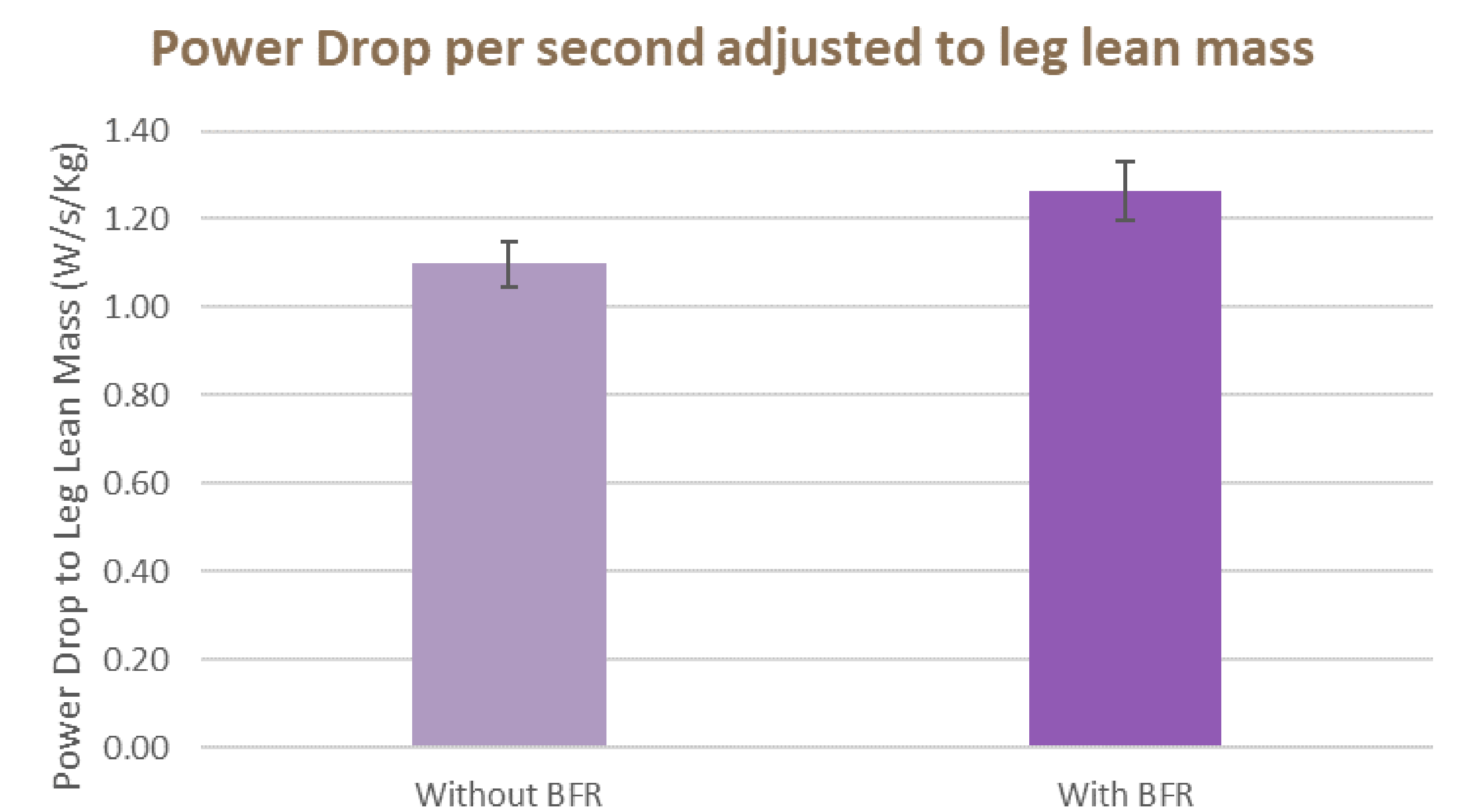
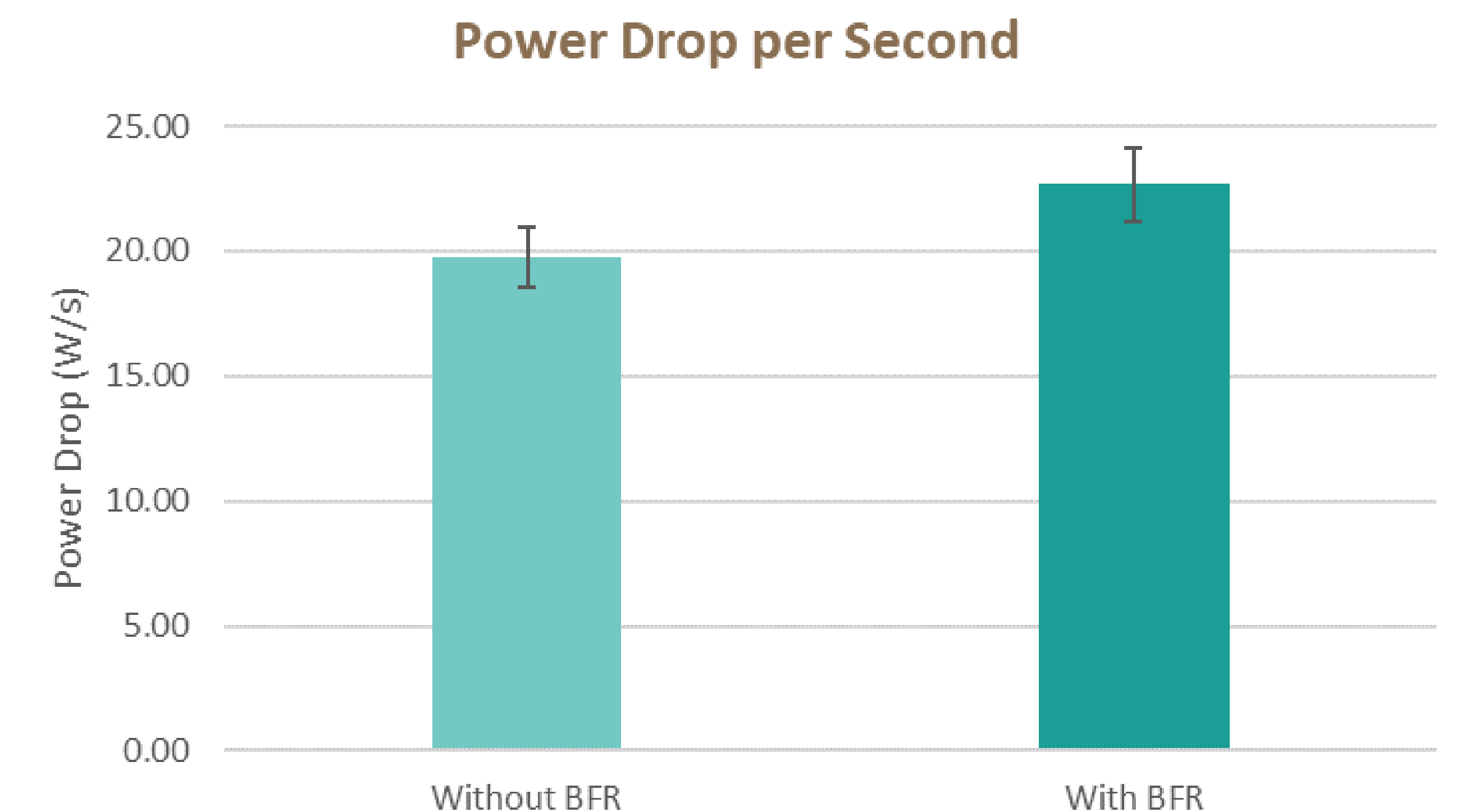
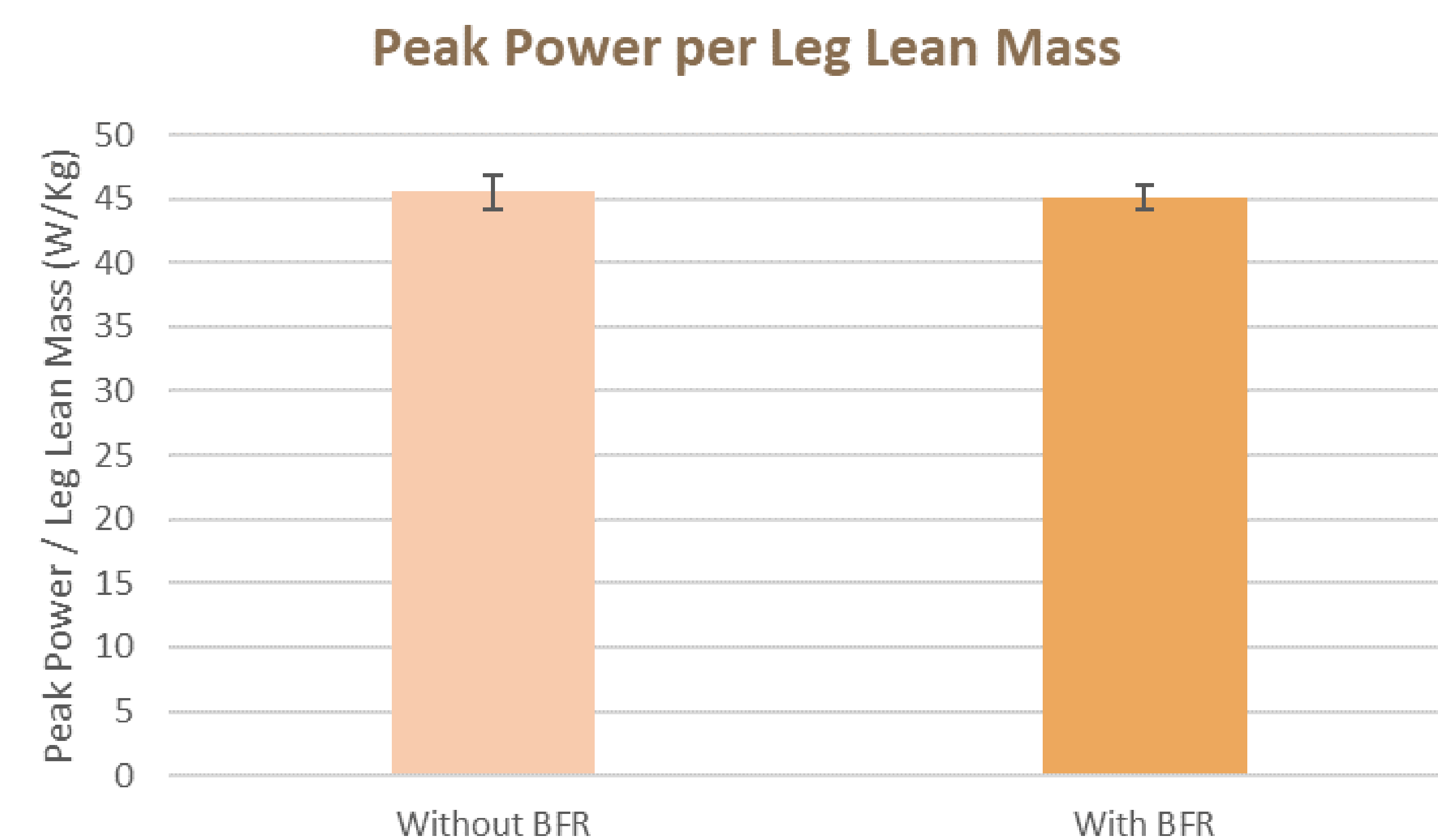
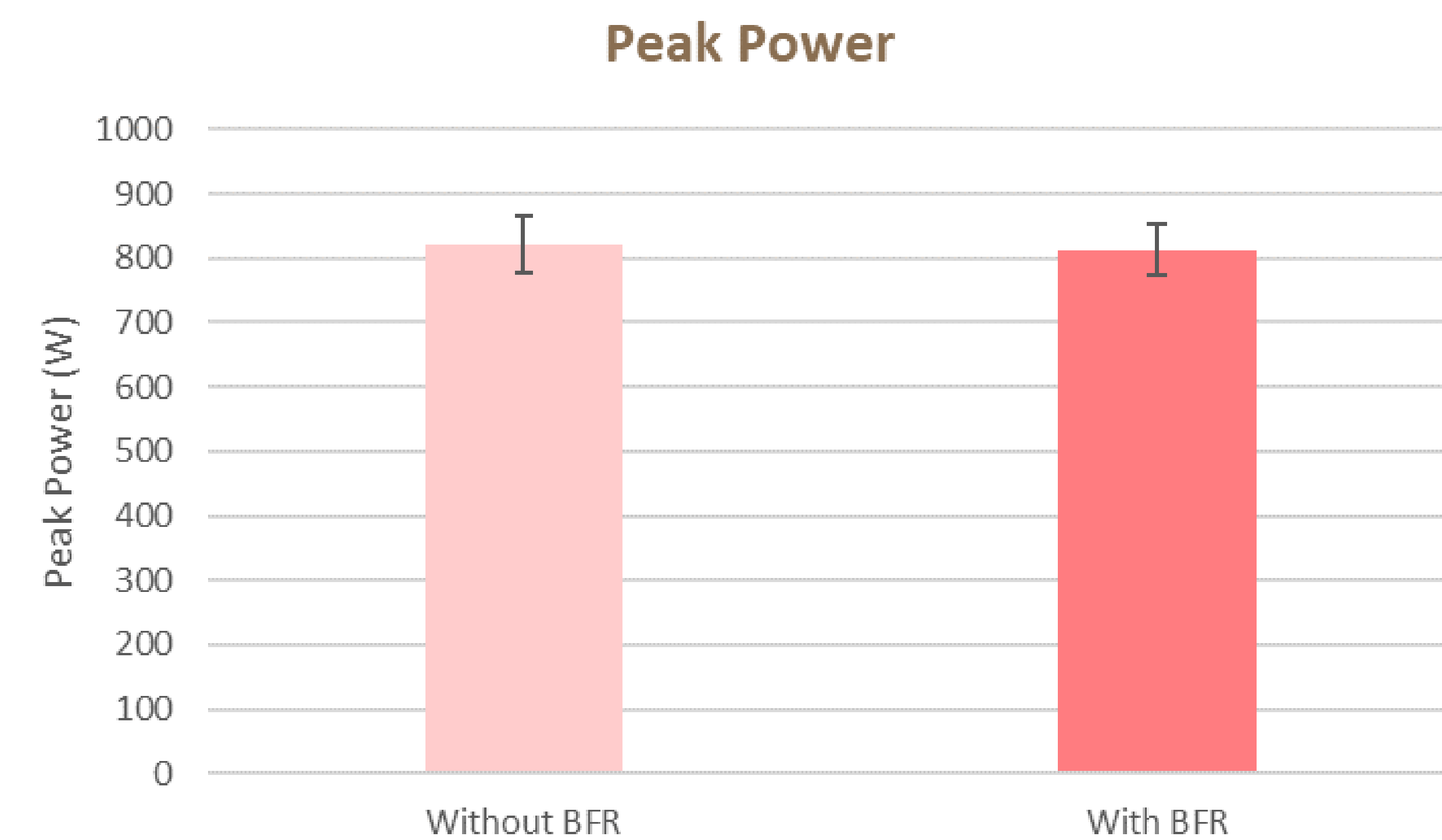
### STATISTICS

- Paired Sample T-Test
- IBM SPSS 28



## RESULTS

There was no significant difference between muscular peak power obtained with and without BFR ( $P=0.496$ ). When adjusted it to the leg lean mass, the peak power obtained with and without BFR remained the same ( $P=0.605$ ). However, the power drop was faster with BFR (absolute power drop per second:  $P=0.023$ , power drop per second adjusted to lean mass:  $P=0.009$ ).



## CONCLUSION

While BFR does not decrease peak power, it leads to a faster muscle fatigue and may induce a more severe muscle microtrauma during maximal-intensity exercises. Therefore, BFR may serve as an effective modality for facilitating muscle remodeling following high-intensity exercise, without adversely impacting immediate training intensity.