The three-minute critical power cycling test (3MT) has shown to be a valid method of determining critical power and anaerobic working capacity within a single maximal exercise bout.

**PURPOSE**

- To evaluate the time course of muscle fiber conduction velocity via surface EMG frequency (MNF and MDF) during a 3MT cycling session.
- To examine which frequency parameter (MNF or MDF) is more suitable for evaluation of changes in neuromuscular function throughout a 3MT.

**METHODS**

- **Subjects**: Eighteen male subjects (mean ± SD: age, 23.5 ± 3.2 y; weight, 85.1 ± 9.5 kg; VO₂max: 40.1 ± 4.7 ml·kg⁻¹·min⁻¹) volunteered to participate in this study. All subjects were habitually active and accustomed to high-intensity exercise.

**Data Collection**

- All study participants completed two testing sessions on nonconsecutive days separated by a minimum of 24 hours.
- During the first testing session (T1), participants performed a standardized warm-up consisting of lower body stretching and cycling. Immediately following the warm-up, subjects completed a graded cycling exercise protocol to exhaustion. A heated gas was analyzed throughout the testing protocol to determine maximal oxygen consumption (VO₂max).
- Participants were asked to return for the second testing session (T2) if their VO₂max was greater than 35 ml·kg⁻¹·min⁻¹. During T2, EMG electrodes were placed on the VL of the participant’s dominant leg, and they were instructed to perform a maximal voluntary contraction (MVC) in order to measure the maximal electrical activity of the VL for later normalization. After the maximal voluntary isometric contraction, the participants performed a warm-up, followed by five minutes rest, and then a three-minute all-out cycling test. EMG signal data during the three-minute all-out cycling test was collected for further analysis.

**RESULTS**

- **Mean (±SD) MNF** during the initial 10-second epoch of the 3MT was 71 (±9) %. MNF significantly decreased from the initial epoch after 70s by 6 (±4) % and remained constant throughout the course of the 3MT. No changes were shown in MDF over the 3MT. Furthermore, PO values, with the exception of an increase during the initial epoch, followed a pattern similar to MNF and showed no significant difference in changes between time points after 70s.

**CONCLUSION**

- EMG frequency, an indicator of muscle fiber conduction velocity, decreased at a first and remained constant in response to the 3MT, which may be reflective of differing patterns of muscle fiber type fatigue throughout the testing session.

**REFERENCES**