Comparison of Classic Fatigability and Peak Torque Tests Used to Estimate Fast-twitch Muscle Fiber Composition

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ABSTRACT
Estimation of skeletal muscle fiber type has long been performed through the classic Thorstensson fatigue test. This non-invasive method has strong practical relevance due to its ease of administration and quickness of estimating fast-twitch fiber type percentage (%FT). The classic Thorstensson fatigue test estimation is based on the first three repetitions and the last three repetitions of a leg extension exercise. However, peak torque may not occur within the first three repetitions, reducing the equation’s accuracy. Including the peak torque repetition may improve accuracy of estimation of %FT. PURPOSE: The purpose of this study was to compare the classic Thorstensson fatigue test (CT) with a new peak torque test (PT).

METHODS: Twenty-four resistance trained men (age=24.9±1.7 yrs; height=179.6±4.6 cm; mass=85.7±11.1 kg) volunteered. All volunteers were seated on a Biodex isokinetic dynamometer and performed 50 maximal knee extensions at 180 degrees per second, measuring dynamic peak torque. RESULTS: The new PT estimation of %FT (72.5±6.9) and torque slope (-2.8±0.6) were significantly greater compared to the CT estimation of %FT (71.4±7.2) and torque slope (-2.7±0.6) (Figure 4). DISCUSSION: The new PT test estimation of %FT and torque slope were greater in the new PT test, thus estimating a greater %FT compared to the CT.

CONCLUSIONS: These results show individuals may not reach peak torque in the first three repetitions. When administering fatigability tests, careful consideration should be given to the method used to evaluate the results. Estimation of %FT can help coaches develop proper training programs. Currently the validity of the new PT test is unknown. Future research should verify this test with muscle biopsy results.