Dissociation of recovery of muscle activation and force following a sustained maximal isometric contraction

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ABSTRACT

Muscle fatigue is a natural consequence of repetitive muscle activity and is characterized by a change in the rate of recovery rather than a deficit in mechanical components (Baker et al., 1999). This study investigated the effect of a single bout of sustained muscle activity on the rate of recovery of muscle activation and force generation. Muscle activation was measured by a surface electromyogram (EMG) and force was measured with a handgrip dynamometer. The handgrip dynamometer was held vertically in the hand of the dominant arm.

Methods:
Muscle fatigue was induced by isometric contractions for 2 minutes and 90 seconds, respectively. The rate of fatigue was the same in both bouts (Bout 1 m = -0.17994; Bout 2 m = -0.1941) despite differences in initial force (see Figure 1).

Results:
Phase 1 slopes were greater than Phase 2; slope of Phase 1 was similar between bouts as were the slopes of Phase 2. There appear to be two phases of fatigue evidenced by the change in slope of the force-time curve (at or around 60 sec) and lack of recovery of peak force between bouts. This suggests a shift in the mechanisms that control the rate of recovery of fatigued muscles.

Conclusions:
There is a dissociation between metabolic and contractile properties during fatigue. The rate of fatigue recovery is faster in the second bout as opposed to the first bout. This suggests a shift in the mechanisms that control the rate of recovery of fatigued muscles.

REFERENCES


CONCLUSIONS

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