

The Effect of Fatigue in Proximal and Distal Muscles of Lower Extremity on Postural Control

Abstract

Introduction: Several studies have shown the effects of muscular fatigue on proprioception and neuromuscular control. However all available researches have studied just the effect of local fatigue in ankle joint muscles on postural control, and no study have found about the effect of fatigue in proximal muscles of the lower extremity on postural control.

Objective: To compare changes in postural control parameters after isokinetic fatigue of proximal and distal muscles of lower extremity.

Materials and Methods: Subjects were Twenty healthy men (age: 22.6 ± 2.4 years, height: 173.7 ± 3.6 cm, weight: 63.3 ± 7.9 kg).

There were 4 test sessions, with a randomized order according to site and plane of fatigue. During each session one of these muscle groups were fatigued using a Biodex isokinetic dynamometer: ankle plantar / dorsi flexors, ankle evtor / inventors, hip flexor / extensors and hip abductor/adductors. The biodex stability system was used to perform dynamic balance test before and after muscle fatigue in each session. Overall, anterior / posterior, and medial/lateral stability indices were recorded. The higher the stability indices, the lower the balancing skill.

Results: Analysis of pre-and post fatigue balance results of all sessions, demonstrated significant increase ($P < 0.05$) in all stability indices. Repeated measures ANOVA performed on the rate of changes in stability indices during each session revealed that hip muscle fatigue caused much more increase in stability indices than ankle muscle fatigue ($P < 0.05$).

Conclusion: Isokinetic fatigue of both ankle and hip muscles significantly decreases postural control ability in healthy young men. In addition, our findings suggest that the hip joint musculature plays a more prominent role in postural control.

Keywords: Muscle fatigue/PosturalControl/LowerExtremity/Isokinetic

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