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The Effect of Isokinetic Fatigue of Ankle, Knee, and Hip Muscles on the Dynamic Postural Stability Index

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Abstract : The purpose of the present study was to investigate the effect of Isokinetic fatigue of muscles around the ankle, knee, and hip on the indicators of dynamic postural stability. Therefore, 15 female university students (age 19.7± 0.6 years old, weight 54.6± 9.4 kg, and height 163.9± 5.6 cm) participated in within-subjects design for 5 different days. In the first session, the postural stability indices (time to stabilization after jump-landing) without fatigue were assessed by force plate and in each next sessions, one of muscle groups of the lower limb including the muscles around ankles, knees, and hip was randomly exhausted by Biodex Isokinetic dynamometer and the indices were assessed immediately after the fatigue of each muscle group. The method involved landing on a force plate from a dynamic state, and transitioning balance into a static state. Results of ANOVA with repeated measures indicated that there was no significant difference between the time to stabilization (TTS) before and after Isokinetic fatigue of the muscles around the ankle, knee and hip in medial – lateral direction ($p > 0.05$), but in the anterior – posterior (AP) direction, the difference was statistically significant ($p < 0.05$). Least Significant Difference (LSD) post hoc test results also showed that there was significant difference between TTS in knee and hip muscles before and after isokinetic fatigue in AP direction. In the other hand knee and hip muscles group were affected by isokinetic fatigue only in AP surface ($p < 0.05$).

Keywords : dynamic balance, fatigue, lower limb muscles, postural control
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