

The Effect of Peripheral Fatigue and Visual Feedback on Postural Control and Strength in Obese People

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Abstract : Obesity is associated with postural instability, might influence the quality of daily life, and could be considered a potential factor for falling in obese people. The fat body mass especially in the abdominal area may increase body sway. Furthermore, loss of visual feedback may induce a larger postural sway in obese people. Moreover, Muscle fatigue may impair the work capacity of the skeletal muscle and may alter joint proprioception. So, the purpose of this study was to investigate the effect of physical fatigue and visual feedback on body sway and strength of lower extremities in obese people. 12 obese (4 female, 8 male; BMI >30 kg/m²), and 12 normal weight (4 female, 8 male; BMI: 20-25 kg/m²) subjects aged 37- 47 years participated in this study. The postural stability test on the Biodex balance system was used to characterize postural control along the anterior-posterior (AP) and mediolateral (ML) directions in eyes open and eyes closed conditions and maximal voluntary contraction (MVC) of knee extensors and flexors were measured before and after the high-intensity exhausting exercise protocol on the ergometer bike to confirm the presence of fatigue. Results indicated that the obese group demonstrated significantly greater body sway, in all indices (ML, AP, overall) compared with the normal weight group (eyes open). However, when visual feedback was eliminated, fatigue impaired the balance in the overall and AP indicators in both groups; ML sway was higher only in the obese group after exerting the fatigue in the eyes closed condition. Also, maximal voluntary contraction of knee extensors was impaired in the fatigued normal group but, there was no significant impairment in knee flexors MVC in both group. According to the findings, peripheral fatigue was associated with altered postural control in upright standing when eyes were closed, and that mechanoreceptors of the feet may be less able to estimate the position of the body COM over the base of support in the loss of visual feedback. This suggests that the overall capability of the postural control system during upright standing especially in the ML direction could be lower due to fatigue in obese individuals and could be a predictor of future falls.

Keywords : maximal voluntary contraction, obesity, peripheral fatigue, postural control, visual feedback

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