Influence of aging on fit elderly female’s gait

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Introduction

Literature has shown differences between elder and younger subjects in the capacity of adjusting the gait to clear obstacles safely (Begg et al, 2000). Supposing that adaptative responses to exercise could counteract the effect of aging on the locomotion, the influence of fitness level on gait pattern of two groups of fit females differing on their age was investigated earlier (André, 2004; Machado, 2004). The older subjects exhibited high levels of capacity in the functional tests (Rikli & Jones, 2001) and a similar gait pattern to the young one’s on the unobstructed path. Despite these results, they demonstrate the need of adaptive strategies to reduce the risk of fall when submitted to specific evaluation in more demanding tasks like ascent and descent.

Therefore, the objective of the present study was to verify if age would be a predictor factor of the results of the variables appraised in the previous study to investigate the effects of aging in the seniors’ behavior.

Methods

The gait of ten elderly women (mean age: 67.60 ± 5.74 yrs, weight: 63.32 ± 9.61 kg, height: 1.54 ± 0.06 m, lower limb height: 0.72 ± 0.04 m) who regularly participate in a step exercise program exhibiting high scores in a functional test (Rikli & Jones, 2001), was appraised by a bi-dimensional kinematic and a foot-ground force analysis during a walking task which included a raised surface of 17.5 cm height. A model of linear regression was used to investigate the effects of the age in gait parameters including time/distances variables, vertical and horizontal clearances, as well as foot-ground impulses for both lead and trail foot. To verify the influence of the older subjects’ functional status levels on their gait pattern, a correlacional study was done among the scores obtained in the tests and the biomechanics variables studied. The significance level of p<0.05 was employed for all statistical analysis considering only the models of linear regression with R² equal or above 0.5.

Results and Discussion

In the unobstructed gait, the results indicated that, in spite of their similar behaviour to the youths in all of the appraised parameters, and of their high functional capacities, the senior subjects revealed a growing need to increase the stability with the age, through a period of higher bilateral support (R² =0.5) and a reduction in the suspension time (R² =0.5). The age didn’t demonstrate to be a predictor factor of the results found in the ground-force impulses in this task, reinforcing the hypothesis of homogeneity of behavior in this group of subjects.

It was also demonstrated that in the accomplishment of more demanding tasks as the ascent and descent, the older the subjects longer time would demand to complete the tasks (R² =0.5), as well as a reduction in the speed during the ascent (R² =0.5), mainly in the phase of support transfer (R² =0.6). The horizontal propulsive impulses of the trail foot tend to decrease (R² =0.8), and the vertical propulsive impulses of the lead foot to increase (R² =0.7) during the stepping-on, revealing further strain on the lead limb throughout the aging. Descending seemed to be the task that evidences larger levels of difficulty for the older seniors, being observed a need to increase the trail foot vertical clearance during the transposition (R² =0.5).

The test "8 Foot Up and Go" of the Rikli and Jones (2001) SFT battery demonstrated to be capable to discriminate the seniors that presented larger stability levels in the condition of descent. The selected tests didn't reveal other correlations with the appraised parameters in the present study, demonstrating little efficiency to distinguish, inside of the seniors' group, the ones who exhibit better capacities for the accomplishment of more demanding locomotive tasks.

Conclusion

Notwithstanding the high levels of physical activity and functional locomotive status of the senior subjects, the results demonstrated a growing need of using pro-active strategies to increase the levels of stability and safety throughout the aging process, which might be probably derived from the functional decline of the systems involved in the locomotion.

References


