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RESUMEN

Effects of exercise with a horse in balance, strength and gait performance of elderly	Aranda-Garcia, S., Iricibar, A., Planas, A., Prat, J.A., y Angulo-Barroso, R.

I.Introduction
It is well-documented that aging could cause negative effects in functionality. Evidence indicates exercise interventions can aid in the maintenance of function or, at least, reduce the effects of aging and consequently delaying the functional dependence in elderly. Furthermore, inclusion of animals in exercise interventions may enhance these positive effects. The purpose of this study was to examine the effect of two different exercise programs in gait speed, muscular strength and balance performance.

II.Methods
41 volunteers were randomly assigned to a control (C: n=13, 71.8 ± 5.2 yr) or two experimental groups (E1: n=17, 70.5 ± 7.1 yr, E2: n=11, 72.9 ± 7.9 yr). Experimental groups participated in a training program (3 sessions/wk for 12 wks). E1 received a typical exercise program for elderly and E2 participated in an exercise program with horses called “centaur method”. Anthropometric data, maximal gait speed, handgrip, maximal knee extensors strength at 60° and 90° (*MaxK60, MaxK90*) and balance in 3 conditions (quiet standing with eyes open (EO), with eyes closed (EC) and with an additional cognitive task (CT)) were collected at baseline and after the intervention. The balance variables were: maximal distance (*MaxD*), peak velocity (*PkV*) and trajectory (*Traj*) of the centre of pressure in the anterior-posterior (AP) and medial-lateral (ML) directions. 3(group)×2(pre-post) repeated-measures ANCOVAs (weight as a covariate) were used for the strength analyses, and 3×2 ANOVAs for the statistical analyses of balance and gait.

III.Results
At the onset of training, there were not significant differences in maximal gait speed between groups. However, the 3×2 showed a tendency to a significant group effect ($F_{(2,38)}$=3.00, p=.062). Furthermore, E2 had a large size effect (η^2=.063) while E1 and C had effect sizes of η^2=.034 and η^2=.000, respectively. Likewise, strength variables did not present differences between groups at pre-intervention. However, there was a pre-post significant effect for the 3 variables while weight and weight×pre-post were also significant. Only E2 showed a large (η^2=.075) and medium (η^2=.047) effect sizes for *MaxK90* and *MaxK60*. In contrast, only C yielded a medium effect size (η^2=.047) for handgrip. Regarding balance, groups were not different at baseline except for *MaxD* in AP for EO where C had a smaller *MaxD* than E2 (p=.034). The main intervention effect was a significant decrease in all ML variables only for E2 in the CT condition while the other conditions showed a similar trend for E2. In the AP direction, less variables and conditions yielded significant pre-post effects for any group.

IV.Conclusions
E2 presented larger improvements in maximal gait speed, knee extensors strength and balance than E1 or C. In contrast, handgrip increased only in C. The intervention effect in balance can be better discriminated in the medial-lateral direction or in the additional cognitive task condition. It seems that an exercise program with horses can improve gait, strength and balance in elderly better than a typical exercise program. This effect could be due to further exploration of strength and balance limits with the horse and/or the E2 group showing, although not significant, decreased gait speed and levels of physical activity at pre-intervention.

IV.Keywords
Aging, intervention, dual-task.