Dog walking on a treadmill helps human postural stability

Costa, L.P.[1]; Souza, M.B.C.[1]; Magre, F.L.[1]; Moraes, R.[2];
Mauerberg-deCastro, E[1].
[1] State University of São Paulo, Rio Claro, São Paulo
[2] University of São Paulo, Ribeirão Preto, São Paulo

When a person walks a dog with a leash there is a continuous transference of haptic information so that the handler can update the animal's position. The leash transfers information that can help or disrupt postural stability of both human and animal. During dog walking, handler and dog are "anchored" to each other via haptic perception. The purpose of this study was to investigate whether or not a dog walking on a treadmill can provide stability to the postural control of a human adult who is challenged with different task constraints (e.g., vision occluded, elevated surfaces). Thirteen blindfolded college students remained still for 30 seconds in a feet-tandem position on four different surface heights (i.e., level, 10 cm, 20 cm and 30 cm high). Experimental conditions included the individual to hold, while standing on the force platform, the leash of a dog that simultaneously walks on a treadmill. Control conditions included full vision, and no dog. Using a power spectral density analysis, we submitted the mean value of the total power of the COP (center of pressure) signal in the medial-lateral ML direction of sway to a three-way ANOVA with repeated measures. Task conditions (baseline *vs*. dog) showed a main effect ($F_{1,12}$=9.5; p= .01; ηp^2 = .4; *Power*= .81), with holding a dog task providing near 50% less amount of sway. Vision condition also showed a main effect ($F_{1,12}$=84,4; $p\leq$ .001; ηp^2 = .9; *Power*= 1) as well as did surface height ($F_{3,36}$=6.7; p= .001; ηp^2 = .4; *Power*= .9). Most importantly, the triple interaction among task *vs*. vision *vs*. surfaces ($F_{3,36}$=7.5; $p\leq$ .001; ηp^2 = .4; *Power*= .9) indicates that dog walking improves control of balance only when individuals are blindfolded regardless the surface height. In the baseline condition, there is a progressive increase in the amount of sway as surfaces increment in height and while individuals are blindfolded. When we performed a two-way ANOVA separately for baseline and dog conditions, the former showed a significant interaction between vision and surface ($F_{3,36}$=9.8; $p\leq$ .001; ηp^2 = .4; *Power*= .9) which indicates that the task complexity of the surface heights affects balance when individuals are blindfolded, but not when their vision is available. When holding the dog's leash, no interactions were observed. This last result indicates that, although vision restriction affects balance, holding the dog has similar effects across surfaces, whether with or without vision. The dynamic activity of the dog walking contributed to the postural orientation of the handler only when challenges were enough to significantly deteriorate the postural behavior (during vision deprivation). However, surface height caused a progressive deterioration in balance only during the baseline condition. Surface height was not a factor to increase sway when dog was coupled in the task. The anchorage between the handler and the dog provided haptic information that was useful to the handler's orientation regardless of surface complexity.

Acknowledgment: PIBIC/CNPq.

E-mail: livia-pilon@hotmail.com