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Foot Posture and Plantar Pressure during Gait in Elderly: A Comparison of Normal, Planus and Cavus Feet

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Background & Aim: Plantar pressure characteristics and area centre of pressure differ according to foot posture increasing the risk for lower limb injuries and falls in the elderly. However this mechanism is not well understood, especially in physically active elderly. Investigate the interaction between foot posture and plantar pressure during gait in elderly will allow a better understanding of the biomechanical function of the lower limb. The aim of study was to investigate the interaction between foot posture and plantar pressure during walking of physically active elderly.

Methods: Forty-five physically active elderly (aged 60 to 85) were classified as either normal (n=15), pes planus (n=15) or pes cavus (n=15) based on the arch index. Barefoot walking trials were conducted using a plantar pressure system (Loran®-x100mps, Kinetec, Italy). A 4 region mask was used that included the medial heel, lateral heel, midfoot and forefoot. Peak pressure, maximum force and contact area were calculated for each region. One way analyses of variance were used to compare the three foot posture groups.

Results: Overall, the largest differences were between the planus and cavus foot groups in mid foot and rear foot for peak pressure, force and contact area. In particular, peak pressures at the rearfoot (medial and lateral) in the cavus foot group were increased compared to the normal ($p=0.010$; $p=0.005$) and planus foot groups ($p<0.001$), while the maximum force at the midfoot was higher in the planus foot group ($p<0.001$). Contact area at the midfoot in the cavus foot group was decreased compared to the normal and planus foot groups ($p<0.001$).

Conclusion: This study confirms that foot posture does influence plantar pressures in elderly. Overloading of plantar pressure in midfoot (planus foot) and rearfoot medial and lateral (cavus foot) impairs foot support during gait, leaving the elderly more vulnerable to falls.

Biography

Ana Paula Ribeiro has completed her PhD from University of São Paulo, School of Medicine and Postdoctoral study from University of São Paulo, School of Medicine. She is a Researcher and Professor, Program of Post-graduation in Health Sciences and Professor at the School of Physiotherapy, University Santo Amaro, SP, Brazil, and Coordinator of the Laboratory of Biomechanics and Rehabilitation Musculoskeletal with emphasis on research in the areas: orthopedics, sports injuries, running and gait biomechanics, musculoskeletal disorders of the knee, ankle and foot (plantar fasciitis, knee osteoarthritis), and corporal posture and biomechanical changes in pregnant. She has published 20 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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