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Title
A review of effect of foot orthoses and shoe characteristics on balance in healthy elderly

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Summary
Foot orthoses improve postural stability via a somatosensory or biomechanical effect. Use of footwear with the proper features can be an appropriate intervention in order to increase the balance in the older population and reduce falls.

Introduction/ basics
Balance maintenance is directly related to the visual, somatosensory and vestibular sensory information available to the central nervous system (CNS) regarding the location of the body's center of gravity (COG) (1). Older adults are predisposed to a reduced quality and quantity of sensory information which is a major contributor to decreased postural stability. Specifically, loss of cutaneous pressure sensation is a normal result of aging and has been linked to postural instability in the older population (2). Foot orthoses are one intervention that have been shown to improve postural stability and could play an effective role in improving postural stability for older people (3).Foot orthoses are used to optimize lower extremity function by supporting and realigning the foot into a more mechanically stable and optimally efficient position (4).

Material method; implementation/ process
The methods for conducting this systematic review and for assessing the quality of evidence were based on using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method. Studies published from 1992 to July 2014 were included in the present review. This review contains those articles that utilized the following: foot orthoses, insoles and footwear, plus those which utilized shoes as an intervention method on postural and dynamic stability in healthy older people. Studies which involved use of other interventions simultaneously were excluded; as well as those studies in which volunteer subjects had other disabilities. Several studies evaluated the effect of foot orthoses in older people with neuropathy

and that those that had a foot problem were excluded. The search strategy was based on the Population Intervention Comparison Outcome method. A search was performed in PubMed, Science Direct, Google scholar and ISI web of knowledge databases.

Results

Although this grouping contains the largest number of studies by far, 14 in all, just one randomized clinical trial was reported among those which evaluated the efficacy of FOs on static balance in older people and twelve studies had a low level of evidence according to the PEDro scale (2/10). The results demonstrated that older people should be advised to wear thin, hard-soled footwear with high collars to reduce the risk of falling. The findings for insoles demonstrated an increase of balance control via vibratory or magnetic insoles, but textured insoles do not appear to be beneficial for balance improvement.

Discussion/ conclusion; conclusion for the practice

The aim of this review was to evaluate the effect of insole designs, foot orthoses and shoe characteristics on balance control in healthy older subjects. It is clear that the wearing of footwear may influence postural stability in either a beneficial or detrimental manner. Although a number of recommendations have been made regarding optimal footwear for older people at risk of falling, the concept of what constitutes an ideal design for stable footwear to prevent falls is still somewhat obscured. Footwear interventions seem to alter underlying strategies controlling static and dynamic movement patterns through a combination of sensorimotor and mechanical mechanisms. Older people should be advised to wear thin, hard-soled shoe with a high collar and topline to reduce their risk of falling. The findings of this review for insoles showed an increase in balance control via vibratory and magnetic insoles, but textured insoles appear to be both non-beneficial and detrimental for balance improvement. The results of the reviewed studies suggest a positive effect of the use of FOs on balance control in older subjects. Studies using high quality methods are still needed to support evidence-based decisions regarding the use of FOs for this population.

References

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