

Y-T. LIU, K-T. LIU, S-W. YANG. **Efficacy of different insole designs on fall prevention of the elderly.** *Gerontechnology* 2012;11(2):341; doi:10.4017/gt.2012.11.02.552.00 **Purpose** Between 28 to 35% of people aged over 65 fall in a year; for those aged over 70 the falling rate is as high as 32 to 42%. Many factors may lead to a fall, and these risk factors can be categorized as either endogenous or exogenous. Proprioception biofeedback and ankle strategy are one of the basic control mechanism to keep posture balance and prevent falling. The purpose of this study was to evaluate different hardness and arch support designs in controlling the posture stability<sup>1-2</sup>. **Method** A group of fifteen ‘fallers’, i.e fall-experienced elderly, (average age 67.7±2.4 years) and eighteen non-faller elderly (average age 68.7±3.1 years) were recruited for this study. The elderly were subjected to an exhaustive examination which included collecting demographic data, a proprioceptive test, a functional balance test, a Berg-balance test, as well as a dynamic balance assessment system tested with the eye open or closed (Biodex Medical System, Inc., USA) with a pressure mat (Xsensor X3, Canada) on top of the platform. Four types of orthotic insoles (Performance, Proactive, and Hardboot from Footdisc®, and Power step from Dr. Kong) (*Figure 1, left*). The insoles each had different arch support hardness used to support ankle stability during ankle rocker motion, and cushions at metatarsal heel regions used to protect sensitive foot structure against strain and proprioception. During each test, foot pressure and the center of pressure (CoP) were recorded and analyzed. Statistical analysis was performance using SPSS v17.0 software. **Results & Discussion** The faller group showed significant larger CoP excursion particularly in the medial-lateral direction, as well as the anterior-posterior mean CoP velocity with the eye opened. In the test with eye closed, the CoP trajectory increased profoundly, although the faller group was larger than the non-fallers, but this was not significant. The increased of media-lateral (ML) sway implies an increased fall risk; poor vision elevated the falling rate<sup>3-4</sup>. With orthotics, the sway trajectory reduced, among that the Proactive insole (arch height 1.75cm) showed the best posture stability control (*Figure 1, right*). It reduced the ML-excursion with an average of 29% for non-fallers and 35% for fallers, respectively.

**References**

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