

Age-Related Ankle Strength Degradation and Effects on Slip-Induced Falls

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(ABSTRACT)

Each year there is an increasing incidence of slip and fall accidents, especially among the elderly population. Existing evidence has identified several aging effects related to slip and fall accidents, yet, the causes of these accidents with advancing age are still little known. The objective of this research was to investigate the factors influencing the initial phase of unexpected slips and falls in younger and older individuals. More specifically, the relationship between ankle strength, the ankle joint power to transfer the whole body center-of-mass during normal gait, and the likelihood of slip-induced falls was identified.

The walking experiment and the ankle strength tests were conducted in the Locomotion Research Laboratory, Virginia Tech. Fourteen old (67-79 years old) and 14 young (19-35 years old) individuals participated in this study (7 male and 7 female for each age group). Within a subsequent 20-minute session of natural walking on a linear track, kinematic and kinetic data were collected synchronously. A slippery surface was introduced to the participant on the purpose of unexpected slip event. The ankle strength tests were performed using a dynamometer.

The results indicated that ankle strength degradation in older individuals was related to the outcome of slips (i.e., higher frequency of falls). The results also indicated that older individuals' RCOF was less than their younger counterparts. However, older individuals fell more often than younger individuals. It is concluded that friction demand characteristics may not be a total deterministic factor of fall accidents. Thus, the further research should focus not only on the dynamic of slips, but also on the dynamics of falls.