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Relationship between age-related gait adaptations and required coefficient of friction

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Abstract

A laboratory study was conducted to evaluate if age-related gait adaptations in walking velocity, step length and heel contact velocity could adversely influence friction demand characteristics (i.e. RCOF) and the likelihood of slip initiation. Additionally, relationship between transitional acceleration of the whole body center-of-mass (COM) and friction demand was assessed between young and older participants. Fourteen younger (7 females and 7 males, 18–30 years old) and 14 older (7 females and 7 males, over 65 years old) adults participated in the study. While wearing a safety harness, all participants walked at their preferred gait speed for approximately 20 min on the linear walking track, and synchronized ground reaction forces and posture data were captured using the force plates and six infrared cameras, respectively.

The results indicated that older adults walked slower with slower heel contact velocity, and produced lower friction demand (i.e. RCOF) in comparison to younger adults. However, ANCOVA indicated that the differences in heel contact velocity between the two age groups were due to effects of walking velocity. The multiple regression and bivariate regression analyses suggested that, for older adults, heel contact velocity was a predictor for the RCOF, whereas, for younger adults, walking velocity, step length and transitional acceleration of the whole body COM were the factors contributing to the RCOF.

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