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Age related effects of transitional floor surfaces and obstruction of view on gait characteristics related to slips and falls

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Abstract

A laboratory study was conducted to examine gait changes between younger and older subjects as they walked across different floor surfaces. Twenty subjects participated in the experiment (five each of older and younger males and females). For half of the trials, subjects carried light loads that blocked their view of the floor surface immediately in front of them. Subjects walked on slippery (soapy water on vinyl) and stable (outdoor carpet) floor surfaces, as well as transitioning from one surface to another. Responses studied included: required coefficient of friction (RCOF), stride length (SL), and minimum toe clearance (MTC). Significant effects were found for the floor surface, load versus no load condition, and some interactions involving age (older versus younger subjects). Not all expected differences due to age were found in this experiment. The lack of significant differences between younger and older subjects could be due to the older subjects that participated in the experiment. They were volunteers at a local medical center, were in good physical shape, and were probably not typical of the population of people over 65 years of age.

Relevance to industry

Slips and falls in industry are costly safety issues in terms of human suffering as well as financial compensation. In many facilities and at home, people make transitions from one floor surface to another many times each day, while carrying loads or just walking. A better understanding of characteristics of people as they walk on slippery floor surfaces and the changes that might occur with age, will allow engineers to design better floor surfaces to reduce the incidence of slips and falls. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Slips; Gait characteristics; Transitional floor surfaces; Gait changes with age

1. Introduction

Among older people, falls are the leading cause of death resulting from injury. The National Safety

Council reported that in 1994, 13,300 Americans met their death by falling, of these deaths, 9923 were people over 65 years of age (National Safety Council, 1995). Falls and hip fractures among older persons rank as one of the most serious public health problems in the United States, with costs expected to escalate to over \$16 billion by the year 2040 (Sattin, 1992; Cummings et al., 1990).

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