Risk of tripping, minimum foot clearance, and step length when crossing a barrier
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Abstract

This study was designed to investigate gait parameters upon crossing a barrier and environmental factors influencing the perceived risk of tripping. These factors included illumination and barrier conditions. Barrier conditions were divided into height, type, and color of the barrier. Illumination conditions included normal and dimmed conditions. Twelve male participants were recruited. They walked on a walkway, moving over a barrier. They gave a subjective rating of risk of tripping (SRRT) both before and after the walk. A research assistant recorded a gait disturbance rating (GDR) of the participant upon barrier crossing. The minimum foot clearance (MFC) of both the leading and lagging foot when moving over the barrier, and the step length of the participant before and after crossing the barrier were calculated. The results indicated that the SRRT, both before and after the walk, was significantly (p < 0.0001) higher when the barrier height increased. Increased barrier height caused significantly (p < 0.0001) higher GDR. The barrier type (p < 0.01) and illumination conditions (p < 0.001) had significant effects on the MFC of both the leading and the lagging foot. The color (p < 0.05) and height (p < 0.05) of the barrier also influenced the MFC of the lagging foot significantly. Step length of the leading foot when crossing the barrier was significantly affected by illumination condition (p < 0.001) and barrier type (p < 0.05). The results of the study are helpful in
understanding the mechanisms brought into play
when moving over barriers on walkways. They provide meaningful information
that will help in reducing trip and fall accidents.

Keyword: Trips & falls, Risk of tripping, Foot clearance, Step length, Barrier crossing