



KEY POINT SUMMARY

OBJECTIVES

To investigate whether flooring materials have a significant effect on objective and subjective parameters related to feelings of fatigue and discomfort.

Effect of flooring on standing comfort and fatigue

Cham, R., Redfern, M. S. 2001 / Human Factors, Volume 43, Issue 3, Pages 381-91

Key Concepts/Context

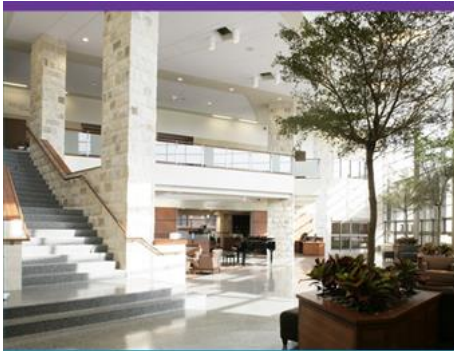
Standing for extended periods of time, especially within restricted areas, has been shown to exacerbate a variety of health problems often related to lower-body tiredness, swelling, and pain. Previous studies investigating how different flooring materials and their varying properties (stiffness, elasticity, and energy absorption) contribute to these health problems have shown conflicting results. This is due to the wide variety of materials and methods used; thus the relationship between these health issues and flooring itself remains unknown.

Methods

Ten participants (between the ages of 18 to 40) with no existing or previous lower-back or extremity issues participated in the study. Participants stood on six different types of flooring over a four-hour period and rated their perceptions of fatigue and discomfort at the end of each hour. A total of seven testing sessions for each participant took place, spaced apart by 48 hours. Researchers regularly took biomechanical and physiological measurements from the participants. All participants wore identical socks and hard-soled shoes during the testing period. Center-of-pressure (COP) weight shifts were measured every 10 minutes.

Findings

No significant differences were found between the different floor types during the first two hours with regard to participant discomfort and fatigue ratings. Differences between fatigue ratings among the different flooring types became significant within the last two hours of each session. Floor A, which was simply a hard steel floor, ranked highest in discomfort and fatigue, while Floor F (the thickest but least stiff mat) ranked highest in discomfort and fatigue among the observed mats. There was a significant correlation between the objective variables measured (COP weight shifts, body temperature) and the subjective perceptions of fatigue



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and discomfort, both of which were notably affected by the condition of the flooring.

Limitations

This study involved a total of 10 participants, and research was carried out under highly uniform and controlled circumstances at intervals of four hours at a time. The authors note that the type of thermometer used to measure skin temperature may have been a source for errors in the data.

Design Implications

Hard flooring (in the case of this study, steel flooring) is shown to be significantly less comfortable to stand on for extended periods of time, with thick but un-stiff floor matting being the second least comfortable. While no conclusions are drawn regarding the ideal material for flooring in these cases, the results imply that a balance between floor mat thickness and stiffness could result in the least amount of discomfort and fatigue over time.

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