

Research model may one day 'inoculate' elderly against slip-related falls

February 4 2009

Training people to avoid falls by repeatedly exposing them to unstable situations in the laboratory helped them to later maintain their balance on a slippery floor, according to new research from the *Journal of Neurophysiology*.

The study furthered the understanding of how the brain develops fall prevention strategies that can be generalized to a variety of conditions. The research could eventually help people, including the elderly, for whom falling is an important health issue.

The study, "Generalization of gait adaptation for fall prevention: from moveable platform to slippery floor," is published online by The American Physiological Society. Tanvi Bhatt and Yi-Chung (Clive) Pai, of the University of Illinois at Chicago carried out the study.

Will training transfer?

The researchers used a moveable platform which could be operated to disrupt a person's balance. Previous studies had shown that people could quickly learn to maintain balance and avoid a fall with a short training period on the platform. In this study, the researchers wanted to see whether training on the platform could transfer to prevent a fall on a slippery floor.

Dr. Pai, who teaches in the department of physical therapy and whose

work has been supported by National Institutes of Health, National Institute on Aging, said he aims to train people to maintain balance in the face of a situation that could cause a slip-related fall.

In the study, eight participants trained on the moveable platform for a total of 37 times. The low-friction platform was set up so that it released unannounced, 24 of those times. This release created a low-friction condition to cause a frontward or backward slip. The platform does not allow the foot to slip from side to side, as would be the case in a real-life fall.

The participants wore a harness to record the amount of assistance needed to catch them when they fell. Motion capture instruments and videos of the sessions also helped to document slip outcomes ("skate-over", "walkover" or "loss of balance") and falls.

The participants were compared to a group of seven controls who did not receive any training on the platform. Both groups were later asked to walk on a vinyl surface that had one slippery spot that they could not see. Instruments and videos were used to record the extent of their slip. The vinyl surface represented a particular challenge following the laboratory training, in part because it could cause the foot to slide in any direction.

Training inoculates against falls

The researchers found:

- None of the trained participants fell on the slippery floor and seven of the eight never lost balance.
- The control group's performance on the slippery floor revealed their lack of training. Their performance was akin to the trained group's first training slip on the platform.

The trained subjects were able to transfer the skill and avoid a fall on the slippery floor because they were better at controlling the landing foot, that is, the foot that is on the ground during the slip. They slowed down the movement of the foot as it began to slide forward. The landing foot of people in the untrained group went out from under them much faster.

"Controlling this foot, which is sliding forward, plays an important role in maintaining stability and prevents a backward fall," Pai said. The researchers also found that the trained group unconsciously changed their gait. They used a flatter landing foot and bent the landing knee more. These changes reduced the landing force and the velocity of the slip. Interestingly, the trained group did this while walking at their customary speed.

May help elderly

The brain is able to generalize fall training from one situation to another by modifying gait to make loss of balance less likely, the authors concluded. These changes give the body greater stability when a slip begins to occur. In addition, the study found that with one session of such training, the brain pre-programs a response to slipping that can be drawn upon quickly to stop a slip or a fall, or even to skate-over the slippery surface without losing balance.

Fall training may be particularly helpful for active elderly persons who put themselves in more challenging situations. Fall prevention training may cut down on hip fractures, surgery, rehabilitation and pain and suffering.

So far, the research team has used younger subjects because the experiments carry some risk of injury. But in one study also funded by National Institutes of Health, the researchers found that older adults were able to learn as quickly as young adults. Further research is now

being conducted to find out if older adults can retain the training as well as the young.

Pai and Bhatt's research so far indicates that the effects of one such training session, as with an inoculation, should last for at least for four months, and perhaps much longer, to protect against one of most dangerous falls, the backward falls.

Source: American Physiological Society

Citation: Research model may one day 'inoculate' elderly against slip-related falls (2009, February 4) retrieved 8 April 2024 from <https://medicalxpress.com/news/2009-02-day-inoculate-elderly-slip-related-falls.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--