

Tripping seniors on purpose to stop future falls

August 28 2014, by Lindsey Tanner



This July 28, 2014 photo shows Clive Pai, a University of Illinois, Chicago physical therapy professor, left, watching as researchers affix sensors to Mary Kaye, 81 before she demonstrates a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously

thought. (AP Photo/M. Spencer Green)

Researchers are tripping seniors on purpose, and it's not some kind of warped practical joke.

The experiment is among techniques being studied to prevent falls, the leading cause of injury in [older adults](#). Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability.

Conventional efforts to prevent falls include exercises to boost strength and balance, but researchers at the University of Illinois in Chicago are trying a completely different approach. It's based on promising, preliminary results with a lab-built walkway that causes people to unexpectedly trip, as if stepping on a banana peel.

Now the same scientists are testing a similar approach with computerized treadmills. If it works, they envision specially designed treadmills in doctors' offices, clinics and [physical therapy](#) centers for training people how to avoid falling.

Clive Pai ('Pye'), a physical therapy professor leading the research, calls the method a potential "vaccine against falls."

Standard fall prevention techniques aim to improve physical condition by strengthening certain muscles and improving range of motion. And they may require dozens of sessions to be effective, Pai said. His research is focusing on building subconscious learning, and evidence so far shows it can happen surprisingly fast.

"This is all implicit learning. We don't give any instruction. They don't

have to be motivated - they're naturally motivated because they don't want to be on the floor," he said.

Pai has a \$1 million, five-year grant from the National Institute on Aging to study and develop the [treadmill](#) system, and plans to enroll 300 participants within the next five years.

The scientists demonstrated the technique recently in Pai's lab with 81-year-old Mary Kaye, who had participated in the preliminary walkway research. Graduate students taped little sensors to Kaye's arms and legs allow her movements to be tracked and analyzed. Then she was hooked up to a harness attached to an overhead cable to help her remain upright if needed.

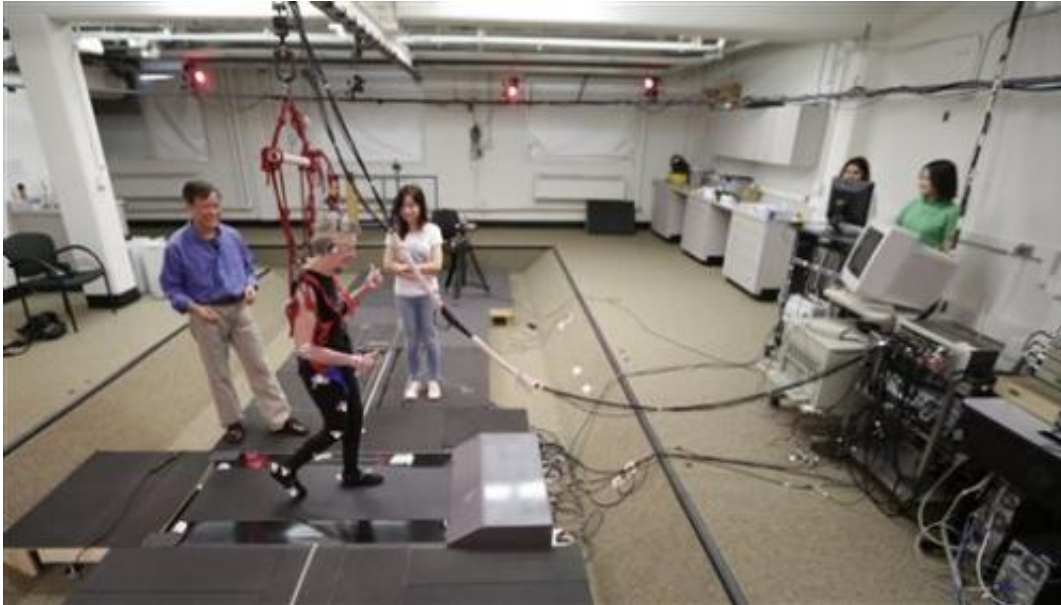
First, she used the walkway, striding several paces before a student clicked the computer mouse to make a sliding walkway section move suddenly under Kaye's feet. Kaye stumbled slightly, but kept her balance.



This July 28, 2014 photo shows a University of Illinois-Chicago physical therapy researcher, left, affixing a sensor to Mary Kaye, 81, before she demonstrates a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Clive Pai, a UIC physical therapy professor, who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

Pai's preliminary research, published in June, found that 24 similar "trips" in just one walkway session taught older adults to learn to catch themselves and reduced their chances of falling outside the lab, during everyday living, by 50 percent up to a year later.

Back in the lab, Kaye next tried the treadmill, set at a steady walking pace that was occasionally interrupted by sudden brief skips. Kaye stumbled at each jolt but managed to stay afoot. Pai thinks Kaye's training in the previous study may have helped keep her steady.



This July 28, 2014 photo shows Clive Pai, left, a University of Illinois-Chicago physical therapy professor and other researchers watching Mary Kaye, 81 as she demonstrates a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai, who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

Retired from the travel industry and public relations, Kaye is fit and healthy and looks a decade younger, but said she still occasionally falls - even after the training.

"I land on my face and it's usually quite disastrous - for my face. But I recover and I try to get through another season," she said.

Kaye tends to trip on Chicago's uneven sidewalks. The last time was

earlier this year, when she landed on her face, splitting her lip and injuring her elbow - not bad enough to be hospitalized, but enough to scare her. Kaye threw out all her ill-fitting shoes and said she hasn't fallen since.



This July 28, 2014 photo shows Mary Kaye, 81, smiling after successfully demonstrating a treadmill balance session at University of Illinois-Chicago. Clive Pai, a physical therapy professor, right, and graduate student Emma Wang, left, un-hook Kaye's safety harness at the end of the session. During the test Kaye walked on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

Older people are at risk for falls for many reasons, including age-related muscle weakness, vision problems and medication issues including side effects and improper doses.

The National Institute of Health announced in June that it is helping sponsor a \$30 million study to test mostly conventional prevention techniques that can be tailored to older adults' individual risks and used in community settings. The government aims to enroll 6,000 adults aged 75 and up at 10 centers nationwide.

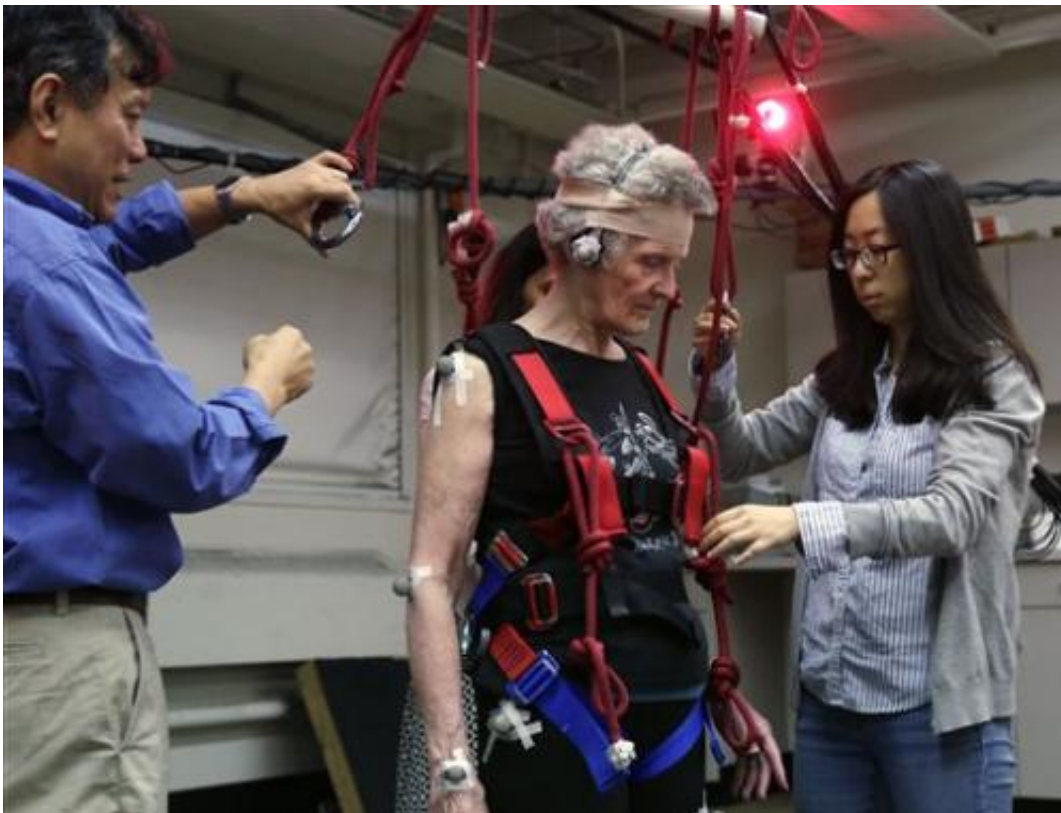


This July 28, 2014 photo shows a researcher's monitor recording Mary Kaye, 81, as she demonstrates a treadmill balance session at University of Illinois-Chicago. During the test, Kaye is supported by a safety harness as she walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Clive Pai, a UIC physical therapy professor who came up with the idea calls it "a vaccine

against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

Pai's treadmill technique will likely need several years of study to prove whether it works. But Dr. Basil Eldadah of the National Institute on Aging said Pai's research is potentially very promising and the training technique might someday be incorporated into standard clinical care.

"We don't want older adults to learn the hard way," Eldadah said.



This July 28, 2014 photo shows Clive Pai, a University of Illinois-Chicago physical therapy professor, left, and graduate student Emma Wang, right, hooking Mary Kaye, 81 into a safety harness before she demonstrates a treadmill

balance session at the school in Chicago. Once in the harness, Kaye walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

Meantime, there are steps older adults can take to reduce their risks for falling. Some from the National Institute on Aging and the federal Centers for Disease Control and Prevention:

- Exercise, including walking and stretching to improve muscle strength and balance.

- Have the doctor review all medications to check for side effects, doses or drug interactions that could cause dizziness or drowsiness.

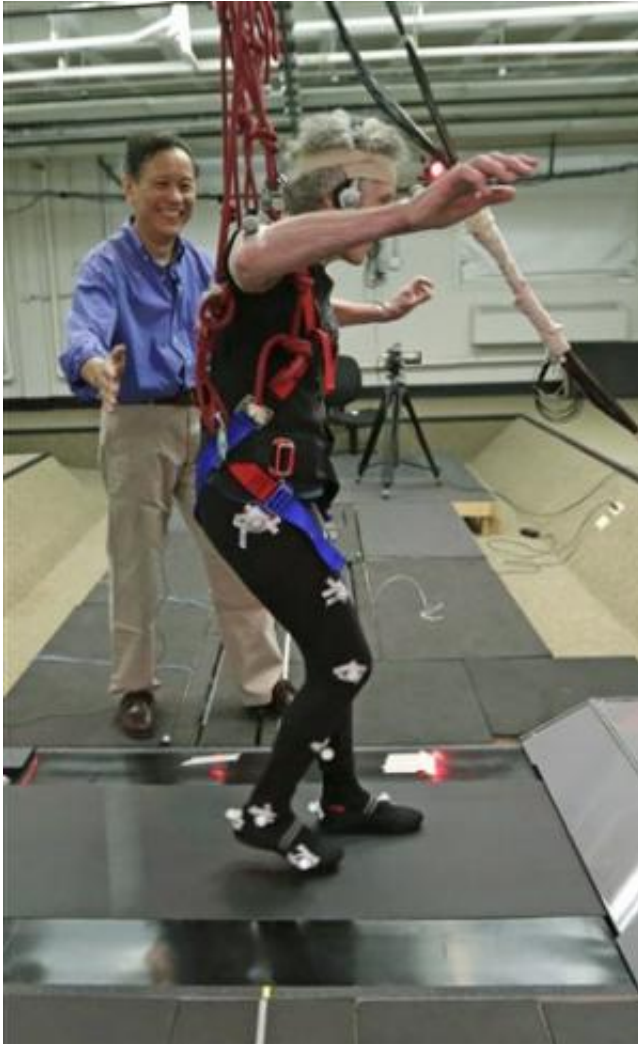
- Get yearly vision exams to make sure eyes are healthy and glasses are the proper strength.

- Reduce risks at home including clutter and poor lighting; and install handrails in tubs and showers.

- Limit intake of alcohol, which can affect balance.

- Stand up slowly: Rising too quickly can sometimes result in a sudden drop in blood pressure, causing dizziness.

- Use a cane or walker if needed for steadiness.



This July 28, 2014 photo shows Clive Pai, a University of Illinois-Chicago physical therapy professor, left, watching Mary Kaye, 81 as she stumbles during a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai, who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)



This July 28, 2014 photo shows Clive Pai, a University of Illinois-Chicago physical therapy professor, left, and physical therapy assistant professor Tanvi Bhatt, right, watching Mary Kaye, 81 as she demonstrates a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Pai, who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)



This July 28, 2014 photo shows a University of Illinois-Chicago physical therapy assistant professor Tanvi Bhatt, left, walking along side Mary Kaye, 81 as she demonstrates a treadmill balance session at the school in Chicago. Kaye, who is supported by a safety harness, walks on a lab-built walkway that causes people to unexpectedly trip and can teach them quickly how to catch themselves and avoid falling. Falls in the elderly cost \$30 billion yearly to treat and can send them spiraling into poor health and disability. Clive Pai, a UIC physical therapy professor, who came up with the idea calls it "a vaccine against falls" and says his research shows that older people's brains can learn and adapt much more quickly than previously thought. (AP Photo/M. Spencer Green)

More information: National Institute on Aging: www.nia.nih.gov

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