

Alternating training improves motor learning

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Learning from one's mistakes may be better than practicing to perfection, according to a study in the Oct. 19 issue of the *Journal of Neuroscience*. The study found that forcing people to switch from a normal walking pattern to an unusual one -- and back again -- made them better able to adjust to the unusual pattern the following day. The findings may help improve therapy for people relearning how to walk following stroke or other injury.

Previous studies in the lab of Amy Bastian, PhD, of the Kennedy Krieger Institute and Johns Hopkins School of Medicine, found that walking on a split-belt treadmill -- which forces one leg to move at a faster speed -- can help correct walking deficits in children and <u>adults</u> with weakness on one side of the body caused by stroke, <u>head trauma</u>, or other conditions. In the new study, Bastian and her colleagues found healthy adults forced to alternate between learning and unlearning an unusual walking pattern on a split-belt treadmill relearned the pattern faster the next day.

"The standard approach to helping <u>stroke patients</u> relearn walking and other motor skills is to tell them how to move better, and then practice it over and over again," Bastian said. "The results of our study suggest that the most effective approach might be to repeatedly challenge patients with new training situations."

In the current study, the researchers trained 52 healthy adults to walk on a split-belt treadmill. One group received 15 minutes of constant exposure to belts moving at different speeds, while another -- the switch



group -- walked on belts that alternated between different speeds and identical speeds. Twenty-four hours later, both groups returned to the treadmill to walk on the belts moving at different speeds. The adults in the switch group relearned how to resume the unusual walking pattern faster than those who had constant exposure to different speeds.

"The people in the switch group 'learned to learn' by experiencing more of the awkward, limping leg pattern that occurs right after a switch in speeds," Bastian said.

Contrary to the researchers' predictions, they also found practicing a completely different walking pattern did not interfere with the ability to relearn the first one. A third group practiced walking on a split-belt <u>treadmill</u> that forced the right leg to move faster for 15 minutes, followed by 15 minutes in which the left leg moved faster. When they returned the next day, they too relearned the initial walking pattern slightly faster than those who trained only on a single pattern.

"This 'learning to learn' effect has exciting potential for the design of therapeutic interventions for patients whose motor skills have been compromised by stroke or injury," said Rachael Seidler, PhD, a motor learning expert at the University of Michigan, who was unaffiliated with the study. "It is particularly intriguing that these effects are specific to the early, more cognitively demanding stages of learning," Seidler added.

Provided by Society for Neuroscience

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