

Study links training conditions to balance gains after stroke

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Performing balance exercises under different sensory conditions can help improve postural stability in post-stroke patients, according to research from Concordia University in Montreal.

Eight weeks of balance training under altered sensory conditions led to statistically significant improvements in center of pressure amplitude were measured in eight patients who performed the same exercises under normal sensory conditions.

"Humans rely on three senses to maintain standing balance: limb sensations, vision, and vestibular information," said Alain Leroux, PhD, an assistant professor of exercise science at Concordia and the lead author of the study. "Stroke subjects rely heavily on their vision to maintain standing balance. We believe that after this type of (altered sensory) training, patients will be more stable when using all senses to balance themselves in daily life situations."

The findings were presented in September at the joint conference of the American College of Rehabilitation Medicine and the American Society of Neurorehabilitation.

All patients exercised for two one-hour sessions per week. Altered sensory conditions included exercising with the eyes closed or on a soft surface.

"The soft surface condition is not used to mimic real-life situations but to challenge standing balance. By doing so we try to decrease the somatosensory information from the ankles and train the two other senses for balance," Leroux said. "We apply the same logic when performing balance exercises without vision."

Before and after the eight weeks of exercise, the researchers measured COP amplitude in all patients using the Matscan system from Tekscan. COP amplitude was measured in two directions (anteroposterior and mediolateral) and under four sensory conditions (eyes open/closed and normal/soft surface).

COP amplitude did not change significantly in the control group patients. However, in the experimental group significant changes were noted in the mediolateral direction with eyes open on a normal surface, and in the anteroposterior direction with eyes open on a soft surface.

Six patients in the experimental group also demonstrated less COP amplitude for the eyes closed, normal surface condition, but that improvement was not statistically significant, Leroux said.

Additional research of a study originally published in the September 2003 issue of Stroke, researchers from the University of Florida found that patients who exercised were more likely to have achieved a higher ambulatory classification (based on a 10-meter walk) by the end of the 12 weeks than those who did not exercise.

Ambulatory categories included "household walkers" (gait speeds less than 0.4 m/sec), "limited community ambulators" (0.4 m/sec to 0.8 m/sec), and "community ambulators" (more than 0.8 m/sec). The percentage of those whose improvements necessitated reclassification was higher in the intervention group than the control group overall, but most notably for those patients who were categorized as "household walkers" at baseline (see table).