



# AOTA Evidence Briefs

## Stroke: Focused Questions

*\*A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

### SFQ #4

## What is relearned after stroke?

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**R**esearch has not yet considered this question. Two hypotheses have been proposed but not studied. One is that what patients relearn after stroke when regaining motor control is the relationship between new sensations of movement and movement outcome (Trombly, 1992, 1993). Another is that patients learn compensatory movement patterns rather than recover original movement patterns (Friel & Nudo, 1998).

Research on learning after stroke still focuses on *that* the stroke patient can and does learn (e.g., Winstein, Merians, & Sullivan, 1999), not *what* he or she learns. Studies and additional hypotheses concerning what patients learn will emanate from a critical mass of research reports that contain observations made during research on recovery or relearning.

For example, Biernaskie and Corbett (2001—Level I) studied the effects of rehabilitation on the recovery of front-paw skills in rats. They noted,

“Interestingly, the enduring reaching deficit in the ischemic animals [which received enriched rehabilitation and housing and made significant gains] appeared to be sensory in nature. After advancing the limb and contacting the pellets, animals seemed unaware that the clasped paw did not contain a pellet because an empty paw was frequently placed into the mouth”. p. 5275

Nudo, Friel, and Delia (2000) offered another example. They noticed that monkeys with ischemic lesions of the primary motor cortex had to inspect their hand visually after retrieving a food pellet to verify that the pellet was there. The researchers concluded that the primary motor cortex, instead of being identified as purely motor as it has been heretofore, plays a significant role in somatosensory processing during the execution of motor tasks. But they did not suggest that the monkeys were relearning, much less what they were relearning.

The references that follow are only tangentially related to this question. Perhaps someone will scour them for hints and pose the hypotheses that will start this line of research.

### Clinical Application

We do not know at this time whether patients relearn the relationship between new sensations of movement and the movement outcome or whether they learn how to move to compensate for weak muscles to accomplish a goal or whether they learn some other, as yet unidentified, mechanism to recover functional movement after stroke. Therapists therefore need to look for clues from their patients concerning what is being learned in response to particular interventions and to share those observations with other therapists.

### References

#### Articles Ranked for Level of Evidence

Biernaskie, J., & Corbett, D. (2001). Enriched rehabilitative training promotes improved forelimb motor function and enhanced dendritic growth after focal ischemic injury. *Journal of Neuroscience*, *21*, 5272–5280.

**Level IC1:** Randomized controlled trial, less than 20 participants per condition, high internal validity, external validity not reported

### Articles for Focused Questions (not ranked)

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This work is based on the evidence-based literature review completed by Catherine A. Trombly, ScD, OTR/L, FAOTA.

For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



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