

Broken arm? Brain shifts quickly when using a sling or cast

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Using a sling or cast after injuring an arm may cause your brain to shift quickly to adjust, according to a study published in the January 17, 2012, print issue of *Neurology*, the medical journal of the American Academy of Neurology. The study found increases in the size of brain areas that were compensating for the injured side, and decreases in areas that were not being used due to the cast or sling.

"These results are especially interesting for rehabilitation therapy for people who've had strokes or other issues," said study author Nicolas Langer, MSc, with the University of Zurich in Switzerland. "One type of therapy restrains the unaffected, or "good," arm to strengthen the affected arm and help the [brain](#) learn new pathways. This study shows that there are both positive and negative effects of this type of treatment."

For the study, researchers examined 10 right-handed people with an injury of the upper right arm that required a sling for at least 14 days. The entire right arm and hand were restricted to little or no movement during the study period. As a result, participants used their non-dominant left hand for daily activities such as washing, using a [toothbrush](#), eating or writing. None of the people in the study had a [brain injury](#), [psychiatric disease](#) or [nerve injury](#).

The group underwent two MRI brain scans, the first within two days of the injury and the second within 16 days of wearing the cast or sling. The scans measured the amount of gray and white matter in the brain.

Participants' motor skills, including arm-hand movements and wrist-finger speed, were also tested.

The study found that amount of gray and white matter in the left side of the brain decreased up to ten percent, while the amount of gray and white matter in the right side of the brain increased in size.

"We also saw improved motor skills in the left, non-injured hand, which directly related to an increase in thickness in the right side of the brain," said Langer. "These structural changes in the brain are associated with skill transfer from the right hand to the left hand."

Langer noted that the study did not look at whether the decreases would be permanent.

"Further studies should examine whether using a restraint for stroke patients is really a necessity for improving arm and hand movement," he said. "Our results also support the current trauma surgery guidelines stating that an injured arm or leg should be immobilized 'as short as possible, as long as necessary.'"

Provided by American Academy of Neurology

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