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Will Gabrielle Giffords recover?

Updated 15:26 12 January 2011 by [Sujata Gupta](#)
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Three days after congresswoman [Gabrielle Giffords](#) was shot in the head, her condition has begun to stabilise. If she survives, will she overcome her injuries and resume normal life?

So far, her survival and responsiveness have been little short of miraculous. Despite being shot at point-blank range outside a supermarket in Tucson, Arizona – an event that left six dead and another 14 injured – the bullet travelled only through the left side of her brain. Had it gone through the centre, she probably wouldn't have survived, says [William Coplin](#), director of neurotrauma at Detroit Receiving Hospital and a member of the American Academy of Neurology.

Before and after surgery, which involved temporarily removing a palm-sized portion of her skull to allow room for the damaged brain to swell, Giffords has been surprisingly engaged, responding to commands such as "open your eyes" or "raise two fingers".

If she survives, though, it is likely she will have cognitive problems. [Media accounts](#) indicate that the bullet entered through the back left side of her head and exited just above her left eye. Her sensory and motor cortices are probably damaged, says [Geoffrey Manley](#), the chief of neurosurgery at San Francisco General Hospital. Because the left side of the brain controls the right side of the body and vice versa, this means she could experience paralysis on her right side.

Sight problems

Moreover, the bullet could have damaged the occipital, temporal and frontal lobes. Because the occipital lobe is involved in processing visual information, that could leave her with vision



What has she lost? (Image: KeystoneUSA-ZUMA/Rex Features)

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problems in the right visual field of each eye.

Given Giffords's ability to follow simple commands, the temporal lobe – which governs language and memory – appears at least partially intact, Manley says. However, she may struggle with more complex tasks.

Damage to her frontal lobe could lead to dramatic changes in character, such as an inability to exercise appropriate judgement, Manley says. [Phineas Gage](#), the railroad worker who in the mid-1800s survived an accident in which an iron rod was driven through his left frontal lobe, was never the same, cursing constantly and belittling others. His friends are reported to have said he was "no longer Gage".

There are some suggestions that [Giffords is left-handed](#), which could change these scenarios: she would have a slightly higher likelihood of using her left temporal lobe for facial recognition and musical abilities rather than speech.

Although almost all right-handed people use the left side of their brain for speech, almost a fifth of left-handed people process speech in the right side of the brain. Many left-handers also use both sides of the brain for speech.

Plastic brain

Interestingly, people with traumatic brain injuries fare better than those suffering from a stroke or Parkinson's disease. In unpublished work, Manley has found that, immediately following brain injury, people connected to an electroencephelogram (EEG) often display no electrical activity in damaged brain regions. Two years on, however, many of those silent regions have become active. Victims of non-traumatic brain damage typically show no such signs.

"There's lots of areas of plasticity in the brain. What can repair? What cannot?" Manley says. Giffords's recovery may put us one step closer to answering those questions.

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