

New therapy helps to improve audio and visual perception in stroke patients

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A team of neuropsychologists at Saarland University has developed a new technique that is helping to restore patients' perception of sounds and images. The patients are shown a cloud of dots on a large screen which move coherently to the left (neglected) side of space. Patients are instructed to fixate the target with the different color and follow it with their eyes to the left of space. Credit: Oliver Dietze

A stroke can cause permanent damage to important parts of the brain, with the result that many stroke survivors require lifelong care and

support. 'It is not uncommon for stroke patients to suffer from an awareness deficit or a reduced response to stimuli on one side of their body. This condition, known as hemispatial neglect, can mean that patients are unable to properly perceive people, images or sounds on that side,' explains Professor Georg Kerkhoff from the Department of Clinical Neuropsychology at Saarland University. 'These phenomena tend to be observed when the right side of the brain is damaged, in which case, the left side of the body is affected.' Another factor that complicates the situation is that patients are often unable to correctly assess their own state of health or even deny that they have a deficit in this area. Experts refer to this aspect of hemispatial neglect as patient unawareness. 'This lack of awareness reduces the chances of therapeutic success and makes treatment more difficult,' says Kerkhoff. 'So far there have only been limited therapeutic options for this group of patients.'

The team of neuropsychologists at Saarbrücken have developed a novel therapeutic approach that has now been tested in two separate studies. In optokinetic stimulation therapy (OKS), [patients](#) are shown a cloud of dots on a large screen in which one of the dots is highlighted in a different colour. The dots move horizontally at a constant speed from one side of the screen to the other. Patients must follow the movement of the dots with their eyes. The direction of motion depends on which side of the patient's body is affected. 'If the left side is affected, the dots move from the right side of the screen to the left,' explains Professor Kerkhoff. The dots therefore move from the healthy side of the body to the neglected side. 'This effectively forces the patient to become aware of his neglected side,' says Kerkhoff. Once the dot has reached the edge of the screen, the patient has to move his or her eyes back to the initial fixation point and the exercise begins again.

In order to check how efficient this new method is, the research team ran a study with 50 subjects in which they compared OKS with visual exploration training (VET), which is currently the most commonly used

therapeutic procedure for patients with neglect. 'Up until now, patients using VET therapy have only been shown rigid patterns, but patients are generally better able to perceive motion,' explains Kerkhoff. The use of visual motion stimuli activates areas of the stroke patient's brain that are involved in eye movements and that facilitate attention towards the neglected side. 'After five OKS sessions, the subjects had measurably improved perception of sounds and images on the neglected side,' says Professor Kerkhoff. 'And the effect was sustained at follow-up.' In contrast, there was no improvement in symptoms using VET.

In a further study, the research team was able to show that OKS not only trains the senses, but also makes patients better able to deal with day-to-day problems such as locating objects and helps to improve their spatial orientation. After undergoing OKS therapy, patients were also better able to assess their own state of health and were no longer in denial about their functional impairments.

'OKS has been shown to be a very effective method of treatment,' says Kerkhoff, summarizing the results of the two studies. 'OKS speeds up recovery and can be deployed early on in stroke rehabilitation programmes, particularly in the case of patients with a severe lack of awareness.'

More information: Kerkhoff et al, Smooth pursuit eye movement training. *Neurorehabilitation & Neural Repair*, 2013, [DOI: 10.1177/1545968313491012](https://doi.org/10.1177/1545968313491012)

Kerkhoff et al, Smooth pursuit "bedside" training. *Neurorehabilitation & Neural Repair*, 2014, [DOI: 10.1177/1545968313517757](https://doi.org/10.1177/1545968313517757)

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