

# High frequency stimulation in pain medicine

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Due to disease-related changes in their brain, pain patients often suffer from an impaired tactile ability in their hands. In a pilot study conducted by scientists at the Ruhr-University Bochum, high frequency repetitive stimulation was investigated as a therapeutic approach for these patients. The results of this study have now been published in the journal *Frontiers in Neurology*. They show that passive stimulation of this kind is a promising new therapy option.

## Passive stimulation: a proven therapy approach

Recent research, for example using a special therapeutic glove for stroke patients, has shown that passive stimulation, like active physical training, can improve sensory performance. The underlying mechanisms are based on neural plasticity - the brain's ability to constantly adapt. Impaired areas of the brain can reorganize themselves through passive stimulation. A team of researchers around PD Dr. Hubert Dinse of the NeuralPlasticity Lab at the Institute for Neuroinformatics, Prof. Dr. Martin Tegenthoff, Director of the Neurological Clinic, and Prof. Dr. Christoph Maier, senior physician of the Department for Pain Medicine, both at the Bergmannsheil University Clinic, have now investigated the effectiveness of this approach in pain patients.

## Electrical stimulation aims to improve sense of touch and pain level

Participants in the [pilot study](#) were 20 patients with Complex Regional Pain Syndrome (CRPS), a complex painful illness, which often follows

fractures or other injuries to the extremities. The study aims to investigate, whether a special type of stimulation is able to improve tactile abilities and to reduce pain. Over the course of five days, a daily 45-minute stimulation session was administered to the afflicted hand. Using a custom-made hand-pad, high-frequency electrical impulses were applied to the fingertips. In order to measure the tactile performance of the participants before and after the stimulation, the 2-point-discrimination threshold was determined. This method measures how far apart two stimuli need to be, in order to be perceived as two separate stimuli. Additionally, participants rated their current [pain level](#) on a scale of 0 to 10.

## **First positive results require further studies**

The scientists were able to show a significant improvement of tactile performance after the stimulation. Despite no significant pain relief overall, individual patients reported substantial improvement. "Some participants had at least 30% less pain after the intervention," reports PD Dr. Hubert Dinse. "Further studies must now be conducted, to find out whether a more intensive and longer period of treatment can not only improve tactile acuity, but also considerably lower pain levels in defined CRPS subgroups."

## **DFG-funding for Collaborative Research Center**

An interdisciplinary team of researchers from such diverse backgrounds as neurology, [pain](#) medicine and neuroinformatics collaborated on this study. Funding was in part provided by the Deutsche Forschungsgemeinschaft to the neuroscientific Collaborative Research Center 874, in which PD Dr. Hubert Dinse and Prof. Dr. Martin Tegenthoff are principal investigators.

**More information:** Marianne David et al. High-Frequency Repetitive

Sensory Stimulation as Intervention to Improve Sensory Loss in Patients with Complex Regional Pain Syndrome I, *Frontiers in Neurology* (2015).  
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