Neuromuscular electrostimulation tested for hand motor recovery in elderly stroke patients

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The front and back of a human right hand. Credit: Wikipedia.

The University of Valencia (UV), in collaboration with FISABIO and the Doctor Peset University Hospital, has conducted a randomized clinical trial comparing the effects of two neuromuscular electrostimulation (EENM) protocols with different frequencies on the motor impairment of the hand in older patients after a stroke. The study

looked at whether changes in hand deficits—such as strength or muscle tone—were related to patients' day-to-day functionality.

Hand motor impairment is one of the most persistent consequences in stroke patients and is associated with a loss of upper limb functionality and impact on the autonomy of people who suffer from it. Studies have measured functionality after applying these techniques, while others have studied what deficits improved after using treatments, but very few have observed what happens when relating two variables.

This study, led by Trinitat Sentandreu, researcher and lecturer at the Department of Physiotherapy at the UV, wanted to see not only whether there were improvements in this type of measure, but also whether changes in deficits were associated with improvements in the functionality of patients after applying different electrostimulation frequencies.

"We have seen that the patients in the study after the intervention with electrostimulation show improvements in terms of hand strength, muscle tone, joint range, etc., but when considering functional measures we observed that the group that received the 35 Hz electrostimulation presented improvements in the Barthel index, which evaluates ten basic daily activities, although this measurement includes activities that involve both the recovery of the lower and upper limbs, so we cannot assure that it is the hand specifically, even if there is a clear improvement in the 35 Hz group," explains Sentandreu.

The research was applied to 61 elderly patients after four and eight weeks of treatment, who were divided into three groups: one of them received conventional treatment from the Doctor Peset Hospital, where the trial was performed. The same procedure was applied to another group with 35 Hz electrostimulation and the third group also received this treatment, but with a frequency of 50 Hz. In this case, according to

the author of the article, "what is assessed is not the effectiveness of electrostimulation alone, but what is interesting is to apply it as a complementary treatment to the conventional protocol."

Apart from the improvements that have been presented in the article, one of the advantages of electrostimulation as a complementary treatment is that it has a low cost, allows for repetitive and intensive treatment and, in turn, reduces the time of intervention by the physiotherapist. "Instead of doing the mobilization, the professional may be carrying out another treatment while applying electrostimulation to the patient," says the researcher. Moreover, this protocol could even be applied by the patient himself from his home, as long as the physiotherapist gives him the corresponding previous instructions and is supervised by a professional, which is very useful, especially since the beginning of the pandemic.

This study began in 2009, with a previous pilot study, but it was not until this year that these results were published, because, as Sentandreu explains, it was very difficult to reach patients with such specific characteristics for research. Specfically, the test has been applied to elderly people who have suffered a stroke and who suffer hemiparesis—paralysis of half of the body, the contralateral side of the injured brain area. Although this is one of the most common effects, they were looking for people with minimal residual activity with very specific parameters. Sometimes they regain the functionality of the lower part, but the upper limb presents greater difficulty, especially the hand, hence the interest of the object of study.

More information: Trinidad Sentandreu-Mañó et al, A randomised clinical trial comparing 35 Hz versus 50 Hz frequency stimulation effects on hand motor recovery in older adults after stroke, *Scientific Reports* (2021). DOI: 10.1038/s41598-021-88607-8