Nintendo Wii improves functionality, balance, daily activities of stroke patients

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A study by the Faculty of Physiotherapy of the University of Valencia (UV), in collaboration with the Autonomous University of Madrid, has shown that a physiotherapy program that uses the Nintendo Wii console improves the functionality, balance and daily activities of patients who have suffered a cerebrovascular accident or stroke. The research, published in the *Journal of the American Medical Directors Association* (*JAMDA*), uses an innovative and efficient, low-cost method compared to more conventional physiotherapy techniques.

The article explains that when the virtual reality of the Wii is added to conventional physiotherapy techniques, the benefits are significant in stroke patients. In addition to improvements in functionality and balance, the study shows that the physiotherapy program using the Wii helps to improve the daily activities of cerebrovascular accident patients.

Previous studies had already shown that the Wii can help conventional treatment to improve the functionality of some chronic diseases, but there was, until now, little evidence in people who had suffered strokes. "Before conducting the study we realized that not much research had been done with stroke patients, so we wanted to know if console games could promote mobility, balance and the day-to-day life of people with this pathology," says Elena Marqués, one of the researchers and professor of Physiotherapy at the UV.

The research split 29 patients into two groups based on whether they used the Wii and conventional techniques or whether they only performed traditional physiotherapy exercises. "The sample is relatively large considering it is comprised by patients who suffered strokes, as because they have many physical limitations, their treatment is usually

much more individualized than that of other pathologies," says the author.

As the study explains, these video games allow therapists to design rehabilitation programs that improve the principles of brain plasticity. But not only that, the console provides real-time answers in terms of performance and progress, which can increase patient motivation, fun, and adherence to treatment. "It should betaken into account that some patients have not performed any exercise before, regardless of the pathology they have, so being presented as a game can be an incentive," says Marqués.

Another benefit of the Wii that the researcher points out is that it is easy to use, relatively affordable and, most importantly, can be used individually and at home, without having to travel to a rehab center. As the Physiotherapy teacher points out, this has been very helpful especially during the confinement.

However, this study only marks one of the first endeavors when it comes to console research as a physiotherapeutic option. It can be used with patients with other pathologies, "because it allows you to work the balance with the console table, both in the chronic phase and in the subacute phase," says Marqués.

Strengthening the mirror neurons

One of the most common tools on the Wii is the remote control, but another feature of the console is a balance table that detects weight transfer by reflecting it in an avatar on the screen, which allows the patient to observe his/her own movements and generate positive feedback.

Thus, when the person observes his/her movements, the plasticity

changes that depend on the use of sensory areas belonging to the mirror neuron system are strengthened. This exemplifies, among other factors, the improvements the Wii can provide in such patients. Moreover, this feedback could lead to a strengthening of the learning mechanisms of different motor and sensory activities that would ultimately improve quality of life.

More information: Elena Marques-Sule et al, Effectiveness of Nintendo Wii and Physical Therapy in Functionality, Balance, and Daily Activities in Chronic Stroke Patients, *Journal of the American Medical Directors Association* (2021). DOI: 10.1016/j.jamda.2021.01.076