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AAGI: Non-Contact Switch System for Patients With Severe Motor Dysfunction to Enhance Normalization and Participation

Topic: Miscellaneous

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BACKGROUND

Patients with neuromuscular diseases often have difficulty adapting to existing input devices as their disease progresses. In this study, we developed the AAGI (Augmentative Alternative Gesture Interface), a non-contact switch that detect minute movements using commercial based camera, and investigated its usability and quality of life (QoL) for patients.

METHODS

The subjects were patients with neuromuscular diseases who were able to move their upper and lower limbs slightly, and who were performing some desk operations but felt inconvenienced. The patients were asked to operate a PC or play video games after adjusting the AAGI system. The System Usability Scale (SUS) was used to evaluate the usability of the device, and the SF-36 was used to evaluate the subjects' QoL after the first trial. The subjects were asked to use the device after three for a longer period of time if they wished, and the evaluation was conducted after three months.

RESULTS

Twenty-four subjects (18 with muscular dystrophy, 2 with myopathy, and 1 with spinal muscular atrophy), 16 male, aged 11 to 44 years (mean 32.1 ± 10.6 years). After the first trial, evaluations were positive (81%) and negative (19%). The eight patients who used over a longer period of time, SUS showed higher ratings for long-term use, ranging from an average of 70.1±7.5 after the initial use to 81.3±5.5 after three months of use.

DISCUSSION

Although the SUS ratings were generally favorable, many of the patients rated “need professional help” at the initial evaluation. On the other hand, after long-term use, the respondents rated the system as “want to use it often”. The QoL scale showed improvement in mental health, suggesting that use may contribute to QoL improvement. Based on these demonstrations, the device was approved as a daily life tool in April 2023 in local government in Japan, and benefits are being provided and now we are spreading to the European countries includes France, Denmark and UK.

CONCLUSION

The AAGI system may improve communication efficiency and usability in patients with severe motor dysfunction. As a non-contact switch system, it may also support normalization and social participation by enabling access to digital activities that are difficult to perform with conventional contact-based switches.

Statement of Disclosures

None

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