Response to Asirvatham (2023): Effects of Robot-Assisted Rehabilitation on Hand Function of People With Stroke

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In Thajus Asirvatham's letter to the editor, one concern expressed was that, in our 2021 study (Lee et al., 2021), sensory function should have been highlighted as much as motor function. In this response, we add some discussion about sensory function.

Sensorimotor function is significantly correlated with Fugl-Meyer Assessment–Upper Extremity (FMA–UE; Duncan et al., 1983) scores, which could affect the interlimb coordination and accuracy of limb positioning during movement. The sensory function did not show significant improvement in our study, which may be due to the motor-focused training that we used. Sensorimotor-focused training should be considered.

We argue that the discussion of sensorimotor function was partially presented in the article. In our study, sensorimotor function was significantly associated with FMA–UE scores (Nordin et al., 2014), which may affect interlimb coordination and accuracy of limb positioning during movement. The results of our study showed no statistically significant improvement in sensory function in stroke patients with sensory impairment after robotic therapy. Previous studies have shown considerable improvements in proprioceptive acuity using rehabilitation robots with vibro-tactile feedback (Elangovan et al., 2019). The training in our study improved the use of proprioceptive input, resulting in better perceptual judgments of passive motion. Our program focused on motor training, but on the basis of the Semmes–Weinstein hand monofilament and the modified Nottingham Sensory Assessment (University of Nottingham, 2007), this may not have been beneficial for sensory function. Sensorimotor-focused training can be considered in future research. The second concern Asirvatham expressed was related to performance- or function-based assessment, such as the Action Research Arm Test (ARAT; McDonnell, 2008) or the Jebsen–Taylor Hand Function Test (JTT; Jebsen et al., 1969). We agree that, rather than using self-report or impairment-based measures to assess hand function, performance- or function-based assessments, such as the ARAT or the JTT, could be used. In our study, the Box and Block Test (Chen et al., 2009) and grip strength meter were functional assessments, and these tools were readily available in our clinical setting. The use of the ARAT and JTT will be considered in future studies.

We thank Asirvatham for the insightful comments about our study, and we appreciate the attention we have received from other readers. Some suggestions have been made about adjustments that we need to make in future studies, and we appreciate the opportunity to respond.

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