

Abstract Digital Health Lab Day

Trunk control training for people after stroke: how does reaching beyond arm's length on a mobile seat affect trunk muscle activity?

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Background: Impaired trunk control is a specific target in stroke rehabilitation, that can be trained for example through reaching exercises. Training in a seated position is required, as patients usually can sit earlier after stroke than being able to stand. The use of an unstable, mobile seat has already shown an additional training effect. However, current products lack adequate safety features and are consequently unsuitable for rehabilitation. Therefore, a new therapy chair allowing a mobile and stable seat was developed. This chair is aimed to be used in a combination with augmented reality, where people can grasp and reach to objects placed in their surroundings. In this study, muscular activity during reaching tasks in people after stroke and healthy participants was investigated, comparing the mobile and stable seat.

Methods: Fifteen healthy people and eleven people after stroke participated. Ipsilateral and contralateral reaching exercises were done on a mobile and a stable seat. Bilateral muscular activities of the Multifidus, Erector spinae and Obliquus externus were captured. The effect of seat condition was analyzed by a within-subject linear mixed model.

Results: Multifidus and Obliquus externus were affected by the seat condition. Multifidus' activity decreased during ipsilateral reaching on the mobile seat for people after stroke, while increasing for healthy participants. For contralateral reaching, this effect was inconsistent, depending on the muscle side. Obliquus externus' activity on the mobile seat decreased for both groups in contralateral reaching, while ipsilateral reaching depended again on the muscle side. The erector spinae showed no condition effect.

Discussion: Muscular activity is influenced by mobile sitting. Exercises with lower muscular activity might be applied in an early rehabilitation phase, while higher activities might be introduced later.