

Determinants of bimanual task performance in the early rehabilitation stage after stroke

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Introduction: Stroke is a major cause of compromised daily activities. Although most daily activities demand the use of both hands, research exploring bimanual activities is scarce. The aim of this study is to investigate determinants of bimanual activities in the early rehabilitation stage after stroke.

Methods: A total of 75, first-ever stroke survivors, aged 18 or older, with unilateral upper limb motor deficits, were recruited and examined within the first week of admission in three rehabilitation centers in Belgium. The evaluation protocol consisted of the Adult Assisting Hand Assessment Stroke (Ad-AHA) evaluating bimanual activities and motor (Upper Extremity Fugl-Meyer Motor Assessment, UE-FMA), somatosensory (Erasmus modifications of the Nottingham Sensory Assessment, Em-NSA), stereognosis part of the original NSA and cognitive outcomes (Montreal Cognitive Assessment, MoCA). Determinants of bimanual activities were evaluated by uni- and multivariate linear regression analysis.

Results: Participants had a mean (\pm SD) age of 67 (\pm 12) years, and a mean time post stroke of 22 (\pm 8) days. Mean Ad-AHA scores were 27 (\pm 32) out of 100. Motor function (UE-FMA) showed the strongest association with bimanual activities: $R^2=0.88$, $p<0.001$, followed by NSA stereognosis: $R^2=0.24$, $p<0.001$, and cognitive function (MoCA): $R^2=0.10$, $p=0.007$. In the multivariate regression model obtained including UE-FMA, stereognosis and MoCA, UE-FMA was retained and explained 88% of the variance ($p<0.001$) together with stereognosis explaining an additional 3% of the variance ($p<0.001$) in bimanual activities.

Conclusion: In the early rehabilitation stage after stroke, motor function and the ability to manually discriminate objects are significant determinants of bimanual activities.