

Quantification of Learned Non-Use of the Upper-Limb After a Stroke

Authors : K. K. A. Bakhti, D. Mottet, J. Froger, I. Laffont

Abstract : Background: After a cerebrovascular accident (or stroke), many patients use excessive trunk movements to move their paretic hand towards a target (while the elbow is maintained flexed) even though they can use the upper-limb when the trunk is restrained. This phenomenon is labelled learned non-use and is known to be detrimental to neuroplasticity and recovery. Objective: The aim of this study is to quantify learned non-use of the paretic upper limb during a hand reaching task using 3D movement analysis. Methods: Thirty-four participants post supratentorial stroke were asked to reach a cone placed in front of them at 80% of their arm length. The reaching movement was repeated 5 times with the paretic hand, and then 5 times with the less-impaired hand. This sequence was first performed with the trunk free, then with the trunk restrained. Learned non-use of the upper-limb (LNUUL) was obtained from the difference of the amount of trunk compensation between the free trunk condition and the restrained trunk condition. Results: LNUUL was significantly higher for the paretic hand, with individual values ranging from 1% to 43%, and one-half of the patients with an LNUUL higher than 15%. Conclusions: Quantification of LNUUL can be used to objectively diagnose patients who need trunk rehabilitation. It can be also used for monitoring the rehabilitation progress. Quantification of LNUUL may guide upper-limb rehabilitation towards more optimal motor recovery avoiding maladaptive trunk compensation and its consequences on neuroplasticity.

Keywords : learned non-use, rehabilitation, stroke, upper limb

Conference Title : ICNR 2015 : International Conference on Neurorehabilitation

Conference Location : Copenhagen, Denmark

Conference Dates : June 11-12, 2015