Accepted Manuscript

Muscle recruitment and coordination during upper-extremity functional tests

Keshia M. Peters, Valerie E. Kelly, Tasha Chang, Madeline C. Weismann, Sarah Westcott-McCoy, Katherine M. Steele

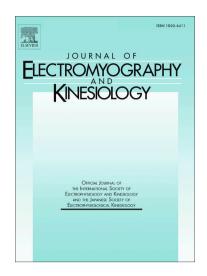
PII: S1050-6411(17)30277-8

DOI: https://doi.org/10.1016/j.jelekin.2017.12.002

Reference: JJEK 2144

To appear in: Journal of Electromyography and Kinesiology

Received Date: 21 July 2017
Revised Date: 7 November 2017
Accepted Date: 6 December 2017



Please cite this article as: K.M. Peters, V.E. Kelly, T. Chang, M.C. Weismann, S. Westcott-McCoy, K.M. Steele, Muscle recruitment and coordination during upper-extremity functional tests, *Journal of Electromyography and Kinesiology* (2017), doi: https://doi.org/10.1016/j.jelekin.2017.12.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Muscle recruitment and coordination during upperextremity functional tests

Keshia M. Peters¹, Valerie E. Kelly², Tasha Chang², Madeline C. Weismann², Sarah Westcott-McCov², Katherine M. Steele¹

¹ Mechanical Engineering, University of Washington, Seattle, WA ² Rehabilitation Medicine, University of Washington, Seattle, WA

Keywords: electromyography, cocontraction, box and block, Jebsen Taylor, Chedoke

Corresponding Author:

Katherine M. Steele Mechanical Engineering, University of Washington Stevens Way, Box 352600 Seattle, WA 98195 206-685-2390 kmsteele@uw.edu

ABSTRACT

Performance-based tests, such as the Jebsen Taylor Hand Function Test or Chedoke Arm and Hand Activity Inventory, are commonly used to assess functional performance after neurologic injury. However, the muscle activity required to execute these tasks is not well understood, even for unimpaired individuals. The purpose of this study was to evaluate unimpaired muscle recruitment and coordination of the dominant and non-dominant limbs during common clinical tests. Electromyography (EMG) recordings from eight arm muscles were monitored bilaterally for twenty unimpaired participants while completing these tests. Average signal magnitudes, activation times, and cocontraction levels were calculated from the filtered EMG data, normalized by maximum voluntary isometric contractions (MVICs). Overall, performance of these functional tests required low levels of muscle activity, with average EMG magnitudes less than 6.5% MVIC for all tests and muscles, except the extensor digitorum, which had higher activations across all tasks (11.7±2.7% MVIC, dominant arm). When averaged across participants, cocontraction was between 25-62% for all tests and muscle pairs. Tasks evaluated by speed of completion, rather than functional quality of movement demonstrated higher levels of muscle recruitment. These results provide baseline measurements that can be used to evaluate muscle-specific deficits after neurologic injury and track recovery using common clinical tests.

Download English Version:

https://daneshyari.com/en/article/8799834

Download Persian Version:

https://daneshyari.com/article/8799834

<u>Daneshyari.com</u>