



Presentation Abstract

Program#/Poster#: 75.10/RR14

Presentation Title: Stretch reflex augmentation by subthreshold TMS is evidence for corticospinal signal integration

Location: Halls B-H

Presentation time: Saturday, Nov 09, 2013, 2:00 PM - 3:00 PM

Topic: ++D.12.a. Reflexes and reflex modulation

Authors: ***A. C. SCHOUTEN**^{1,2}, **M. J. L. PERENBOOM**¹, **M. VAN DE RUIT**³,
J. H. DE GROOT⁴, **C. G. M. MESKERS**⁴;
¹Delft Univ. Tech., Delft, Netherlands; ²Univ. of Twente, Enschede,
Netherlands; ³Univ. of Birmingham, Birmingham, United Kingdom;
⁴Leiden Univ. Med. Ctr., Leiden, Netherlands

Abstract: Reflex adaptation to environment and task at hand plays a key role in motor control. In search for cortical reflex modulation mechanisms, transcranial magnetic stimulation (TMS) has been found to augment muscle stretch reflexes as recorded by electromyography (EMG). However, instead of reflecting true integration of efferent sensory with cortical activity, this augmentation can alternatively be explained by spinal summation of the stretch response with TMS induced motor evoked potentials (MEP). The goal of this study was to confirm true peripheral-cortical signal integration by combining muscle reflex responses with timed subthreshold TMS. Mechanically induced ramp-and-hold stretches (duration: 40 ms, velocity: 1.5 rad/s) of the m. flexor carpi radialis were combined with TMS pulses at 96% of active motor threshold applied between 10 ms before and 120 ms after stretch onset with a resolution of 5 to 10 ms. Significant MEP like augmentation of the EMG response was found when TMS was timed to arrive between 60 and 90 ms after stretch onset with a consistent and short delay between estimated TMS arrival time and peak EMG activity of 5 to 10 ms. Timing and nature of muscle stretch reflex activity augmentation by subthreshold TMS reflect supraspinal integration of peripheral sensory afferent with cortical efferent signals as a mechanism of supraspinal reflex adaptation.

Disclosures: **A.C. Schouten:** None. **M.J.L. Perenboom:** None. **M. van de Ruit:** None. **J.H. de Groot:** None. **C.G.M. Meskers:** None.

Keyword(s): REFLEX

MOTOR CONTROL

TMS