

# Long lasting increase of cortical excitability after Global Postural Reeducation in healthy controls.

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**Background and Aims:** Increasing evidence suggest that global postural reeducation (RPG) could be associated with changes in motor cortex excitability<sup>1</sup>. In this study, applying a repetitive paired associative stimulation (rPAS) protocol on the motor cortex, using Transcranial Magnetic Stimulation (TMS) methods, we investigated that RPG is able to produce a long-lasting increase of motor cortex excitability.

**Methods:** Nine healthy subjects were evaluated using 5 Hz rPAS protocol in two different sessions (GPR maneuvers *versus* no physiotherapy treatment) apart one week in counterbalanced order. 5 Hz rPAS was performed immediately after RPG and consisted of 600 pairs of stimuli, which were continuously delivered, to the left M1 and to the right median nerve at a rate of 5 Hz for 2 minutes<sup>2</sup>. The interstimulus interval between the peripheral stimulus and the transcranial stimulation was set at 25 msec. Before and after rPAS (immediately after and after 15 minutes), we measured the changes of amplitude of motor evoked potentials (MEPs) in right First Dorsal Interosseous (FDI) and in the right abductor pollicis brevis (APB) compared to baseline.

**Results:** We found that 5Hz rPAS is able to produce a long-lasting and specific increase of cortical excitability selectively for APB in both conditions, but that this facilitation is more pronounced after RPG maneuvers ( $p=0.01$ ).

**Conclusions:** These findings provide evidence of the neurophysiological modification associated with RPG therapy.

**References:**

Oliveri M, Caltagirone C, Loriga R, Pompa MN, Versace V, Souchard P. Fast increase of motor cortical inhibition following postural changes in healthy subjects. *Neurosci Lett.* 2012 Nov 14;530(1):7-11.

Quartarone A, Rizzo V, Bagnato S, Morgante F, Sant'Angelo A, Girlanda P, Siebner HR. Rapid-rate paired associative stimulation of the median nerve and motor cortex can produce long-lasting changes in motor cortical excitability in humans. *J Physiol.* 2006 Sep 1;575(Pt 2):657-70