

Fast increase of motor cortical inhibition following postural changes in healthy subjects.

[Oliveri M](#)¹, [Caltagirone C](#), [Loriga R](#), [Pompa MN](#), [Versace V](#), [Souchart P](#).

[Author information](#)

- ¹Fondazione Santa Lucia IRCCS, Rome, Italy. massimiliano.oliveri@unipa.it

Abstract

BACKGROUND AND AIMS:

Postural reactions are associated with changes in the excitability of the motor system. In the present study we investigated the presence of neurophysiological changes of motor cortical areas targeting muscles of the inferior limbs following treatment with a physiotherapy technique aimed to treat postural dysfunctions by stretching postural muscles, global postural reeducation (GPR).

METHODS:

Twenty healthy subjects were evaluated with paired-transcranial magnetic stimulation (TMS) of the motor cortex and recording of motor evoked potentials (MEPs) from peripheral muscles of the inferior limb before and after two GPR manoeuvres applied in different experiments (1 and 2).

RESULTS:

The effects of GPR were posture- and task-specific: indeed, a GPR manoeuvre applied in standing subjects increased inhibition in cortical areas controlling flexor muscles (Biceps Femoris: $p < 0.05$) while increasing the excitation of cortical areas controlling extensor muscles (Tibialis Anterior: $p < 0.05$). On the other hand, following a GPR manoeuvre applied in subjects in supine position, increased inhibition in cortical areas controlling flexor muscles (Biceps Femoris and Soleus) was not paralleled by excitation of extensor ones ($F = 12.2$; $p = 0.005$).

CONCLUSIONS:

These findings provide a neurophysiological basis to the clinical benefits associated to physiotherapy and suggest potential applications of treatments based on postural changes on motor cortical disorders.

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