

## **CAN ANKLE ANTICIPATORY POSTURAL ADJUSTMENTS ASSOCIATED WITH GAIT INITIATION BE MODIFIED IN POST STROKE SUBJECTS SUBMITTED TO A PHYSIOTHERAPY PROGRAM?**

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**Background:** Postural control is a complex ability of the central nervous system, fundamental prerequisite in several motor programs [1], that is often compromised after central nervous system injury [2], particularly in ischemic events involving the middle cerebral artery. Stroke in this territory frequently compromise cortical output from pre-motor and supplementary motor areas and their connectivity with subcortical structures such as reticular formation [3, 4]. The extensive contribution of cortico-reticulospinal system to motor control [5, 6] explain the impairment of anticipatory postural adjustments already demonstrated in stroke subjects [7, 8]. The exploration of the capacity of stroke subjects to modulate anticipatory postural adjustments can be useful to understand their ability to adapt and adjust to external disturbances, being the gait initiation an example of a task that challenge the postural control. The physiotherapy intervention aims to improve postural control knowing that the activity organization can be influenced by movement experience and somatosensory information [9]

**Purpose:** The purpose of this study was to observe the capacity to modulate the ankle control during gait initiation, with respect to anticipatory postural control of soleus and tibialis anterior muscles, in 4 post-stroke subjects who participated in a physical therapy intervention.

**Methods:** Four post-stroke subjects with impairments in anticipatory postural adjustments of contralesional ankle, namely a lack of inhibition (or variation) of soleus muscle activity, or a lack of activation of tibialis anterior muscle during gait initiation were selected to integrate this study. The participants were submitted to an intervention program with a total duration of three months with one session per day of 50 minutes. The intervention program focused on variation of afferent information seeking to organize the muscle tension/length relationship for antigravity postural control. Before and after the intervention program bilateral electromyographic activity of tibialis anterior and soleus muscles was collected during gait initiation to assess the behavior of muscle variation (inhibition or activation) during postural phase of gait initiation. This phase was identified through center of pressure signal collected from one force platform.

**Results:** A modification of the behavior of the anterior tibial muscle, from an inhibition to an activation, was observed in 3 of the participants. In relation to the soleus muscle, it was possible to observe a change in the muscle activity into inhibition, approaching this variation of the typical muscular activity of the anticipatory postural adjustments behavior.

**Conclusion(s):** Ankle anticipatory postural adjustments associated with gait initiation can be modified in chronic post stroke subjects submitted to a physiotherapy intervention program.

**Implications:** The patterns of variation of muscle activity highlights the need for specificity for both assessment and intervention in physiotherapy in post stroke individuals. The ability to recruit and modulate muscle activity requires a selective handling capable of inducing a specific input to influence and optimize the engine control [10].

**Key-words:** 1. Postural control 2. Anticipatory postural control 3. stroke

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