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Modulation of soleus H-reflex during dorsal and plantar flexions in the human ankle joint

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Abstract

Recording of the H-reflex was used to study the changes in the reflex excitability of soleus motoneurons during dorsal and plantar flexions of the ipsilateral and contralateral feet performed with different strengths by 15 healthy subjects. The dorsiflexion of the ipsilateral foot was accompanied by the "classic" reciprocal inhibition of the soleus motoneurons, the degree of the inhibition being directly proportional to the strength of the contraction of pretibial muscles and depending on the presence of foot support. The plantar flexion of the ipsilateral foot was accompanied by changes in reflex excitability, which were inversely proportional to the strength of the flexion. This was apparently related to the activation of a mechanism protecting the muscle against excessive contraction. The dorsal and plantar flexions of the contralateral foot were accompanied by similar changes in the reflex excitability of soleus motoneurons, namely, an increase in the case of weak contraction and a decrease in the case of strong contraction. However, the increase in reflex excitability during contralateral dorsiflexion was smaller and its decrease began at a weaker contraction than in the case of contralateral plantar flexion. The changes in the reflex excitability of soleus motoneurons during movements of the contralateral foot, which were also strength-dependent, confirmed the presence of cross-projections that are likely to be part of the generator of the central pattern of lower limb movement coordination. © Pleiades Publishing, Inc. 2006.

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