ROBOTIC-ASSISTED STEPPING MODULATES MONOSYNAPTIC REFLEXES IN FOREARM MUSCLES IN THE HUMAN.

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ABSTRACT

Although the amplitude of the Hoffmann (H)-reflex in the forelimb muscles is known to be suppressed during rhythmic leg movement, it is unknown which factor plays a more important role in generating this suppression—movement-related afferent feedback or feedback related to body loading. To specifically explore the movement- and load-related afferent feedback, we investigated the modulation of the H-reflex in the flexor carpi radialis (FCR) muscle during robotic-assisted passive leg stepping. Passive stepping and standing were performed using a robotic gait-trainer system (Lokomat). The H-reflex in the FCR, elicited by electrical stimulation to the median nerve, was recorded at 10 different phases of the stepping cycle, as well as during quiet standing. We confirmed that the magnitude of the FCR H-reflex was suppressed significantly during passive stepping compared with during standing. The suppressive effect on the FCR H-reflex amplitude was seen at all phases of stepping, irrespective of whether the stepping was conducted with body weight loaded or unloaded. These results suggest that movement-related afferent feedback, rather than load-related afferent feedback, plays an important role in suppressing the FCR H-reflex amplitude.