SPINAL REFLEX ACTIVITY: A MARKER FOR NEURONAL FUNCTIONALITY AFTER SPINAL CORD INJURY.

Hubli M, Dietz V, Bolliger M.
Source Balgrist University Hospital, University of Zurich, Zurich, Switzerland. mhubli@paralab.balgrist.ch

ABSTRACT

BACKGROUND: Alterations in the function of spinal neuronal circuits underlying locomotion after a spinal cord injury (SCI) are associated with changes in the behavior of spinal reflexes (SRs) in both rats and humans. In healthy subjects, the SR consists of a dominant early reflex component, whereas in chronic, severely affected SCI subjects, a later component dominates.

OBJECTIVE: The aim of this study was to investigate the relationship between SR behavior and walking ability in paraplegic subjects.

METHOD: The SR was evoked by nonnoxious tibial nerve stimulation. Walking ability was assessed by functional tests and questionnaires.

RESULTS: There was a correlation between walking ability and SR behavior in chronic SCI: Severely affected SCI subjects unable to walk showed dominant late SR components, whereas in ambulatory SCI subjects an early SR component dominated. A functional training with an improvement of locomotor ability was accompanied by both a shift from a dominant to a smaller late and the appearance of an early SR component.

CONCLUSIONS: Our findings indicate that SR can serve as a marker for the locomotor ability of SCI subjects. Neuronal plasticity exploited by a functional training is reflected in both an improvement of locomotor ability and a change in balance of SR components toward the early SR component.

PMID:21921130[PubMed - indexed for MEDLINE]