ABSTRACT

PRIMARY OBJECTIVE: This prospective controlled non-randomized study investigated the effects of robotic gait training on electroencephalographic (EEG) brain activity in patients with impaired consciousness due to severe traumatic brain injury (TBI).

METHODS: Twelve TBI patients and 14 healthy controls underwent a single training session on a computer-driven gait orthosis (Lokomat®). The sensory pathways were assessed using sensory evoked potentials (SEPs). The global delta-alpha EEG power ratio (DAR) and latency of the P300 component of the event-related potentials was assessed prior to and following a training session.

RESULTS: Baseline measurements showed impaired SEPs in the majority of patients and significantly larger DAR in patients compared to healthy controls. Robotic gait training resulted in a reduction of the DAR in healthy subjects but not in patients. No changes were observed in P300 latencies after training in either patients or healthy controls.

CONCLUSION: The study showed that robotic gait training induced measurable changes in the EEG power spectrum in healthy individuals, while no changes were observed in patients with severe TBI. The absence of the EEG changes following training might be an indicator of the severity of brain dysfunction.