

Effects of the HBP passive exoskeleton on brain functions: Application on multiple sclerosis patients

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Human exoskeletons are used for enhancing people's strength, endurance and speed in many activities, and they have recently been shown to improve the quality of life in people with disabilities (Rahman et al., 2007). In present study we report the benefits of a passive and fully articulated exoskeleton on multiple sclerosis patients by means of behavioral and electrophysiological measures, paying particular attention to the prefrontal cortex activity. Multiple sclerosis is a neurological condition characterized by lesions of the myelin sheaths that encapsulate the neurons of the brain, spine and optic nerve, and it causes transient or progressive symptoms and impairments in gait and posture. Up to 50% of multiple sclerosis patients require walking aids and 10% are wheelchair-bound 15 years following the initial diagnosis. We tested the ability of a new orthosis, the "Human Body Posturizer", to improve the structural and functional symmetry of the body through proprioception in multiple sclerosis patients. The results showed that a single Human Body Posturizer application improved mobility and ambulation in all tested patients. Most importantly, we associated these effects and brain measurements, particularly prefrontal cortex activity.

References

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Key words

Exoskeleton, electroencephalography, movement-related potentials, prefrontal cortex.