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## Neuro-degenerative and vascular diseases: methodology for functional recovery

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Posture refers to the position of the body in space that is expressed through the interaction of all the districts and systems such as the musculoskeletal system, the central and peripheral nervous system. Alterations in imbalances and associated diseases produce a structural and physiologic reorganization of the anatomical structures to improve postural dynamics. Generally, these changes can occur due to trauma or following the onset of neurodegenerative diseases or vascular problems that, in different ways, ranging to compromising the proper functioning of one of the components involved in postural processes. Currently postural diseases are treated by passive (brace and orthosis) and active (robotic device and traditional rehabilitation) methods according with the severity of imbalance (1). The aim of this study is to evaluate the effects of an innovative exoskeleton, called Human Body Posturizer (HBP), in rehabilitation of different neurodegenerative and vascular diseases. We recruited 37 subjects divided according to the pathology: 9 subjects with Parkinson's disease, 14 with multiple sclerosis, 10 post-stroke patients and 4 with infantile cerebral palsy. Subjects underwent 4 weeks HBP treatment, consisting of 30 minutes, with different timing and duration of treatment depending on the specific pathology. The samples were analyzed by using of Electronic Baropodometer, Stabilometric Platform and Sensorizer FreeSense. Each subject was sampled before and after treatment and differences between pre and post treatment were subjected to statistical analysis. In all groups, we found significant differences in the comparison between the measurements performed before and after treatment with HBP. These changes have allowed to pointing out the improvement in the parameters analyzed in the post-treatment tests. Thus, as demonstrated by other studies (2), the use of HBP could represent an integrative therapy for different postural diseases and it can be inserted as a supportive therapy during the rehabilitation process in neurodegenerative and vascular diseases.

### References

- [1] Ugwonali et al. (2004) Effect of bracing on the quality of life of adolescents with idiopathic scoliosis. *The Spine Journal* 4(3), 254-260.
- [2] Di Russo et al. (2013) A passive exoskeleton can push your life up: application on multiple sclerosis patients. *PLoS One* 8(10), e77348; doi: 10.1371.

### Keywords

Human Body Posturizer; posture; gait; balance.