

Effects of an innovative esoskeleton (Human Body Posturizer) on static balance in patients with Parkinson's Disease

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Parkinson disease (PD) is a progressive neurodegenerative disease, affecting 0.3% of the general population; cardinal symptoms include tremor, rigidity, bradykinesia, and postural instability. Individuals with PD commonly experience gait and postural stability impairments, which may lead to falls, mobility loss, and reduced independence (de Lau et al, 2006). Human Body Posturizer (HBP) is a fully articulated orthosis, light and able to adapt to the physical characteristics of each individual (Di Russo et al, 2013). Our aim has been to preliminary evaluate the role of HBP as an innovative tool for the conservative treatment of gait and postural stability impairments in patients affected by PD. This study analyzed 10 subjects (5 male and 5 female) affected by PD. A bipodal platform (Prokin, Tecnobody) was used to evaluate static balance. All patients were firstly evaluated without HBP and wearing normal clothes; then, patients were asked to wear HBP and, after 40 mins, a second acquisition with HBP was performed. For the static evaluation, the patients performed a stabilometric test, 30 sec with eyes open and then 30 sec with eyes closed; perimeter sway, area of the center of pressure (CoP), anterior-posterior velocity (VA-P), and medial-lateral velocity (VM-L) have been evaluated. Our results showed a significant reduction in VA-P ($p < 0.05$) when patients wear HBP in both open and closed eyes condition. Moreover, a significant reduction ($p < 0.05$) of the CoP area was observed in closed eyes evaluation. Area of the ellipse contained 95% of CoP data points, computed by considering the main axes of the ellipse, estimated using principal component analysis. This variable reflects the ability of balance system to achieve body stability. Our data suggest a stabilizing effect of HBP on anterior-posterior balance, in patients with PD.

References

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Keywords

Esoskeleton, Human Body Posturizer, Parkinson's disease.