

Improvement of the expression of upper limb muscle strength and balance in a group of patients with multiple sclerosis, through a proprioceptive rehabilitation protocol combined with the application of photon emission devices.

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Abstract

In multiple sclerosis (MS) patients, symptoms such as: fatigue, lack of physical energy, spasticity, difficulty in performing movements, and motor coordination disorders, and with tremors, dizziness and postural instability are among the most common complications. Cattaneo et al. (2007) studied the effects of stability training on MS patients and described it as an effective intervention in reducing falls risk, improving stability, and strength. Therefore, the present study aimed to confirm early observations by the application of a proprioceptive rehabilitation program targeting balance and strength on MS patients. 13 subjects with MS, 5 male and 8 female, volunteered in the study. A MAP hand dynamometer was used to determine the handgrip strength, as the maximum isometric grip (MIG), recognized as an important health indicator for determining musculoskeletal function, as well as weakness and disability. Sensor Medica® systems allowed us to carry out baropodometric and stabilometric measurements using the associated program (Freestep® by Sensor Medica®). The device consists in a pressure platform with resistive sensors with conductive rubber. The rehabilitation protocol included: A) 10 minutes of Motomed; B) 10 minutes of Human Tecar proprioceptive path; C) 15 minutes in total of physical exercises; D) 15 minutes of massage therapy of the whole spine. All patients wore the photon emission devices TAOPATCH by TAO technologies, according to a protocol used in a previous study (Amato et al., 2021). Testing procedures were carried out before and after the rehabilitation protocol. The paired sample t-test revealed statistically significant improvements for the baropodometric measures ($p < 0.05$) associated with the intervention. In particular, plantar surface pressure, forefoot and hindfoot pressure improved significantly, as well as the maximal and mean foot pressures and the forefoot and hindfoot loads (figure 1a). In addition, the intervention induced a statistically significant improvement in the right ($p = 0.023$) and left ($p = 0.021$) handgrip strength (figure 1b). The combination of an adequate and specific rehabilitation protocol combined with the application of the photon emission devices Taopatch, emerged as a valid protocol to improve handgrip strength of the upper limbs and the expression of the body weight on the ground in contrast with the force of gravity. Thus, determining improvements in a cluster of parameters severely decompensated in MS patients.

References

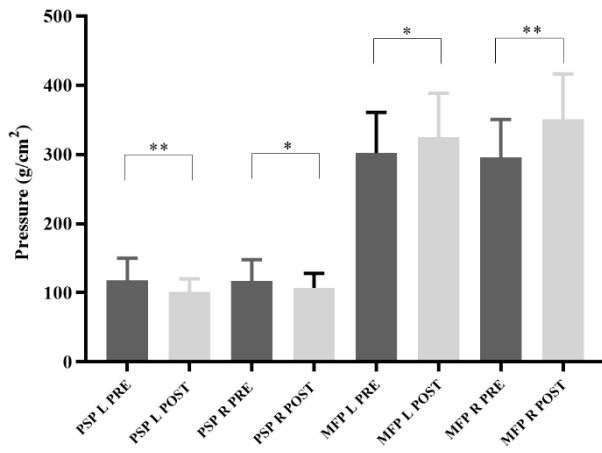
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A)



B)

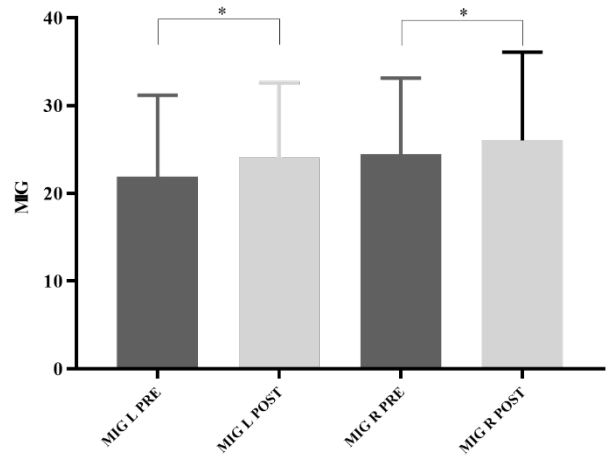


Figure 1 A). Some of the baropodometric parameters considered in the study and their changes from pre to post intervention. **Figure 1 B).** Handgrip strength changes from pre to post intervention. Notes: *: $p < 0.05$; **: $p < 0.01$; PSP: plantar surface pressure, MFP: mean foot pressure; MIG: maximal isometric grip.