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Low-intensity pulsed electromagnetic fields improve physical performance in a dose-dependent manner: an observational study in older adults with rheumatic diseases.

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Background:

Low-intensity pulsed electromagnetic fields (PEMF) have been shown to improve gait parameters in frail older adults.[1] Furthermore, the continuous exposure to PEMF (up to 1 year) have been demonstrated to produce progressive improvements in self-selected gait speed in older adults at risk of falling.[2]

Objectives:

To investigate the effects of two different treatment regimens of PEMF on physical performances in older adults presenting with rheumatoid arthritis (RA), osteoarthritis (OA) or severe osteoporosis (OP).

Methods:

Older adults presenting with RA, OA or OP, at increased risk of falls, evaluated in our Falls Prevention Clinic, were considered for a prospective observational study investigating the effects of PEMF on physical performances. PEMF were supplied by the THS 280 E device (THS-Therapeutic Solutions Srl, Milan, Italy). It provides a new therapeutic approach, named TEPS (Triple Energy Postural Stabilization), that represents an evolution of physical therapy.[1,2] On the basis of the physician judgment, PEMF were administered following an intensive protocol, every 45 days (PEMF-45), or a standard validated protocol[1,2], every 60 days (PEMF-60). All subjects were assessed at baseline and every 3 months with the following tests: 4 meters gait speed test [4MGS, seconds (sec)], timed up and go test (TUG, sec), chair stand test (CST, sec), short physical performance battery (SPPB, score), and hand grip strength (HGS) by hand dynamometer (Kg). Demographic, anthropometric and clinical characteristics, including pharmacological treatments and functional status were evaluated at baseline. Clinical and adverse events were assessed every 45 or 60 days after PEMF administration.

Results:

Overall, 94 patients were enrolled between January and December 2020. Of these, 43 subjects (N=33 PEMF-45, N=11 PEMF-60) with a valid 6-month follow-up assessment were considered for the current analysis. The two groups were comparable regarding the main baseline characteristics, and similar % of patients presented with RA, OA or OP. Mean age

(±SE) was 78±7 in PEMF-45 and 77±7 in PEMF-60. As expected, all physical performance tests improved significantly from baseline to 6 months in both groups. Mean (±SE) 4MGS increased significantly more in PEMF-45 (from 3.24±0.12 sec to 2.83±0.18 sec) compared to PEMF-60 (from 3.22±0.21 sec to 3.02±0.30 sec, p=.018). Likewise, mean (±SE) CST improved more in PEMF-45 (from 12.4±0.9 sec to 8.7±0.4 sec) compared to PEMF-60 (from 11.1±1.5 sec to 9.8±0.7 sec, p=.002). No significant difference between groups was found for the other tests, although a trend toward better results in PEMF-45 was manifest: SPPB improved by 6.4% in PEMF-45 and by 3.0% in PEMF-60, and TUG decreased by 7.8% in PEMF-45 and by 6.1% in PEMF-60. During the 6 months observation period no adverse event was observed.

Conclusion:

Preliminary results of our ongoing prospective observational study suggest that a more frequent administration of PEMF produces greater improvements in some but not all physical performance parameters compared to a standard validated regimen[1,2].

References:

[1]Giusti A et al., Geriatr Gerontol Int 2013. [2]Giusti A et al., J Am Geriatr Soc 2014.

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