The effects of focused pulsed electromagnetic field therapy in patients with knee osteoarthritis. A randomised, placebo-controlled study

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Abstract

Background. Pulsed electromagnetic field therapy (PEMF) is a promising method for the treatment of knee osteoarthritis. An increasing number of placebo-controlled randomised clinical trials have demonstrated its antalgic and exercise capacity improvement effects in knee osteoarthritis patients. Still, there is no standardisation of the optimal frequency and intensity of the PEMF.

Aims. The aim of the trial was to study the effects of exposure to low frequency (1.5 Hz) medium intensity (30 mT) PEMF in patients with bilateral knee osteorathritis, displaying a Kellgren-Lawrence radiologic score of ≥1 and a pain visual analogue scale of ≥4, despite chronical use of nonsteroidal antiinflammatory and chondroprotective drugs.

Methods. 70 consecutive patients diagnosed with knee osteorthritis were randomly divided into two groups: an active and a placebo group, at a 1:1 ratio. The placebo group was treated with local ultrasound therapy (0.5W/cm^2), local peloidotherapy (Techirghiol mud) and a form of continuous magnetic field similar in intensity to the magnetic field of the Earth for 15 minutes a day. The active group was treated with local ultrasound therapy (0.5W/cm^2), local peloidotherapy and a 1.5 Hz frequency and a 300 Gauss intensity (30 mT) focused pulsed electromagnetic field for 15 minutes a day. The total duration of treatment was 10 days.

Results. 65 of the 70 patients included finished the study (32 in the active group and 33 in the placebo group). At the end of the 10 days of treatment, there was a significant improvement in both groups in the pain visual analogue scale and the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) score, compared to the initial evaluation ($p \leq 0.05$). There was no overall statistically significant difference in the improvement of the two parameters in the active versus the placebo group. However, in a subgroup analysis, after having excluded the advanced knee osteoarthritis patients, with Kellgren-Lawrence scores of 3 and 4, the patients treated with PEMF had superior improvement of the pain visual analogue scale and of the WOMAC score ($p \leq 0.05$).

Conclusions. Ultrasound and peloidotherapy are efficient in reducing pain and the WOMAC score in knee osteoarthritis patients displaying a radiologic Kellgren-Lawrence score of ≥1 and a visual analogue scale for pain of ≥4, who had had an unsatisfactory response to nonsteroidal antiinflammatory and chondroprotective drugs. Low frequency (1.5 Hz) medium intensity (30 mT) PEMF added benefit to these therapies, by significantly reducing pain and the WOMAC score in patients with early and moderate knee osteoarthritis (radiologic Kellgren-Lawrence score of 1 and 2).

Keywords: pulsed electromagnetic field, knee osteoarthritis, exercise.