

# DOKUMENTATION AF PEMF- BEHANDLING PÅ ARTHRITIS

## Low frequency pulsed electromagnetic field - a viable alternative therapy for arthritis

Arthritis refers to more than 100 disorders of the musculoskeletal system. The existing pharmacological interventions for arthritis offer only symptomatic relief and they are not definitive and curative.

Magnetic healing has been known from antiquity and it is evolved to the present times with the advent of electromagnetism. The original basis for the trial of this form of therapy is the interaction between the biological systems with the natural magnetic fields. Optimization of the physical window comprising the electromagnetic field generator and signal properties (frequency, intensity, duration, waveform) with the biological window, inclusive of the experimental model, age and stimulus has helped in achieving consistent beneficial results. Low frequency pulsed electromagnetic field (PEMF) can provide non-invasive, safe and easy to apply method to treat pain, inflammation and dysfunctions associated with rheumatoid arthritis (RA) and osteoarthritis (OA) and PEMF has a long term record of safety.

This review focuses on the therapeutic application of PEMF in the treatment of these forms of arthritis. The analysis of various studies (animal models of arthritis, cell culture systems and clinical trials) reporting the use of PEMF for arthritis cure has conclusively shown that PEMF not only alleviates the pain in the arthritis condition but it also affords chondroprotection, exerts anti-inflammatory action and helps in bone remodelling and this could be developed as a viable alternative for arthritis therapy.

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# Magnetic pulse treatment for knee osteoarthritis: a randomised, double-blind, placebo-controlled study

We assessed the efficacy and tolerability of low-frequency pulsed electromagnetic fields (PEMF) therapy in patients with clinically symptomatic knee osteoarthritis (OA) in a randomised, placebo-controlled, double-blind study of six weeks' duration.

Patients with radiographic evidence and symptoms of OA (incompletely relieved by conventional treatments), according to the criteria of the American College of Rheumatology, were recruited from a single tertiary referral centre. 75 patients fulfilling the above criteria were randomised to receive active PEMF treatment by unipolar magnetic devices (Medicur) manufactured by Snowden Healthcare (Nottingham, UK) or placebo. Six patients failed to attend after the screening and were excluded from analysis.

The primary outcome measure was reduction in overall pain assessed on a four-point Likert scale ranging from nil to severe. Secondary outcome measures included the WOMAC Osteoarthritis Index (Likert scale) and the EuroQol (Euro-Quality of Life, EQ-5D). Baseline assessments showed that the treatment groups were equally matched. Although there were no significant differences between active and sham treatment groups in respect of any outcome measure after treatment, paired analysis of the follow-up observations on each patient showed significant improvements in the actively treated group in the WOMAC global score ( $p = 0.018$ ), WOMAC pain score ( $p = 0.065$ ), WOMAC disability score ( $p = 0.019$ ) and EuroQol score ( $p = 0.001$ ) at study end compared to baseline.

In contrast, there were no improvements in any variable in the placebo-treated group. There were no clinically relevant adverse effects attributable to active treatment. These results suggest that the Medicur unipolar magnetic devices are beneficial in reducing pain and disability in patients with knee OA resistant to conventional treatment in the absence of significant side-effects.

Further studies using different types of magnetic devices, treatment protocols and patient populations are warranted to confirm the general efficacy of PEMF therapy in OA and other conditions.

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# The effect of pulsed electromagnetic fields in the treatment of osteoarthritis of the knee and cervical spine

**OBJECTIVE:** We conducted a randomized, double blind clinical trial to determine the effectiveness of pulsed electromagnetic fields (PEMF) in the treatment of osteoarthritis (OA) of the knee and cervical spine.

**METHODS:** A controlled trial of 18 half-hour active or placebo treatments was conducted in 86 patients with OA of the knee and 81 patients with OA of the cervical spine, in which pain was evaluated using a 10 cm visual analog scale, activities of daily living using a series of questions (answered by the patient as never, sometimes, most of the time, or always), pain on passive motion (recorded as none, slight, moderate, or severe), and joint tenderness (recorded using a modified Ritchie scale). Global evaluations of improvement were made by the patient and examining physician. Evaluations were made at baseline, midway, end of treatment, and one month after completion of treatment.

**RESULTS:** Matched pair t tests showed extremely significant changes from baseline for the treated patients in both knee and cervical spine studies at the end of treatment and the one month followup observations, whereas the changes in the placebo patients showed lesser degrees of significance at the end of treatment, and had lost significance for most variables at the one month followup. Means of the treated group of patients with OA of the knee showed greater improvement from baseline values than the placebo group by the end of treatment and at the one month followup observation. Using the 2-tailed t test, at the end of treatment the differences in the means of the 2 groups reached statistical significance for pain, pain on motion, and both the patient overall assessment and the physician global assessment. The means of the treated patients with OA of the cervical spine showed greater improvement from baseline than the placebo group for most variables at the end of treatment and one month followup observations; these differences reached statistical significance at one or more observation points for pain, pain on motion, and tenderness.

**CONCLUSION:** PEMF has therapeutic benefit in painful OA of the knee or cervical spine.

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# Treatment of knee osteoarthritis with pulsed electromagnetic fields: a randomized, double-blind, placebo-controlled study

**OBJECTIVE:** The investigation aimed at determining the effectiveness of pulsed electromagnetic fields (PEMF) in the treatment of osteoarthritis (OA) of the knee by conducting a randomized, double-blind, placebo-controlled clinical trial.

**DESIGN:** The trial consisted of 2h daily treatment 5 days per week for 6 weeks in 83 patients with knee OA. Patient evaluations were done at baseline and after 2 and 6 weeks of treatment. A follow-up evaluation was done 6 weeks after treatment. Activities of daily living (ADL), pain and stiffness were evaluated using the Western Ontario and McMaster Universities (WOMAC) questionnaire.

**RESULTS:** Within group analysis revealed a significant improvement in ADL, stiffness and pain in the PEMF-treated group at all evaluations. In the control group there was no effect on ADL after 2 weeks and a weak significance was seen after 6 and 12 weeks. Significant effects were seen on pain at all evaluations and on stiffness after 6 and 12 weeks. Between group analysis did not reveal significant improvements over time. Analysis of ADL score for the PEMF-treated group revealed a significant correlation between less improvement and increasing age. Analysis of patients <65 years using between group analysis revealed a significant improvement for stiffness on treated knee after 2 weeks, but this effect was not observed for ADL and pain.

**CONCLUSIONS:** Applying between group analysis we were unable to demonstrate a beneficial symptomatic effect of PEMF in the treatment of knee OA in all patients. However, in patients <65 years of age there is significant and beneficial effect of treatment related to stiffness.

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