pulsed electromagnetic field therapy after primary total hip/knee surgery

bone healing/Nonunion

Role of pulsed electromagnetic fields after joint replacements.

World Journal of Orthopedics, 18 Jun 2020, 11(6):285-293
DOI: 10.5312/wjo.v11.i6.285 PMID: 32572365 PMCID: PMC7298453

https://europepmc.org/article/pmc/pmc7298453

Biophysical stimulation and the periprosthetic bone: is there a rationale in the use of Pulsed Electromagnetic Fields after a hip or knee implant?

https://europepmc.org/article/MED/26753669

https://journals.lww.com/jbjsjournal/Abstract/2006/11001/Biophysical_Stimulation_with_Pulsed.9.aspx

LANCET

PULSED MAGNETIC FIELD THERAPY FOR TIBIAL NON-UNION: Interim Results of a Double-blind Trial

https://www.sciencedirect.com/science/article/abs/pii/S0140673684923298

Springer Link

Effect of pulsed electromagnetic field therapy in patients undergoing total knee arthroplasty: a randomized controlled trial

https://link.springer.com/article/10.1007/s00264-013-2216-7

We compared the clinical outcome of 33 patients undergoing TKA randomly assigned to the control or the **pulsed electromagnetic field group (I-ONE therapy).**

Methods

I-ONE therapy was administered postoperatively four hours per day for 60 days. Patients were assessed before surgery and then at one, two and six months postoperatively using international scores.

Results

One month after TKA, pain, knee swelling and functional score were significantly better in the treated compared with the control group.

Pain was still significantly lower in the treated group at the six month follow-up. Three years after surgery, severe pain and occasional walking limitations were reported in a significantly lower number of patients in the treated group.

Conclusions

Advantages deriving from early control of joint inflammation may explain the maintenance of results at follow-up. I-ONE therapy should be considered an effective completion of the TKA procedure.

A double-blind trial of pulsed electromagnetic fields for delayed union of tibial fractures

https://online.boneandjoint.org.uk/doi/abs/10.1302/0301-620X.72B3.2187877

The clinical and radiological outcome of pulsed electromagnetic field treatment for acute scaphoid fractures

A randomised double-blind placebo-controlled multicentre trial

https://online.boneandjoint.org.uk/doi/full/10.1302/0301-620X.94B10.28844?utm_campaign=The_Bone_%

2526_Joint_Journal_TrendMD_0&utm_medium=cpc&utm_source=TrendMD

Peri-operative interventions producing better functional outcomes and enhanced recovery following total hip and knee arthroplasty: an evidence-based review

https://bmcmedicine.biomedcentral.com/articles/10.1186/1741-7015-11-37

I-ONE therapy in patients undergoing total knee arthroplasty: a prospective, randomized and controlled study.

https://europepmc.org/article/MED/22672794

Therapeutic uses of electric and magnetic fields in orthopedics

https://books.google.co.il/books?hl=iw&lr=&id=eblAAQAAQBAJ&oi=fnd&pg=PA13&dq=effects+of+pulsed+electromagnetic+fields+after+tkr&ots=R0B42krQJu&sig=SElDvsdMBwBOlUdoDSKCbkpqJ1M&redir_esc=y#v=onepage&q&f=false

TREATMENT OF UNUNITED TIBIAL FRACTURES: A COMPARISON OF SURGERY AND PULSED ELECTROMAGNETIC FIELDS (PEMF)

https://www.healio.com/orthopedics/journals/ortho/1992-6-15-6/%7B0c579ae3-a2ee-4c37-9fe6-3935b1084961%7D/treatment-of-ununited-tibial-fractures-a-comparison-of-surgery-and-pulsed-electromagnetic-fields-pemf

The value of the magnetic field in bone fractures

https://www.efisioterapia.net/en/the-value-of-the-magnetic-field-in-bone-fractures-t-7066.html

Nonunion treatment with pulsed electromagnetic fields.

https://europepmc.org/article/med/6975692

/https://pubmed.ncbi.nlm.nih.gov/32251502

Effects of Pulsed Electromagnetic Field Therapy on Pain, Stiffness, Physical Function, and Quality of Life in Patients With Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Placebo-Controlled Trials

Xiaotian Yang, Hongchen He, Wenwen Ye, Thomas A Perry, Chengqi He

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- DOI: 10.1093/ptj/pzaa054

Abstract

Objective: Pulsed electromagnetic field (PEMF) therapy is a potentially useful treatment for osteoarthritis (OA), but its effectiveness is still controversial. This study aimed to examine the effects of PEMF therapy and PEMF parameters on symptoms and quality of life (QOL) in patients with OA.

Methods: Cochrane Central Register of Controlled Trials, PubMed, CINAHL, EMBASE, PEDro, clinical trial registers, and reference lists were searched until April 2019. This study examined randomized, placebo-controlled trials, patients with OA, symptom and/or QOL related outcomes, and articles published in English. Two authors extracted data and completed quality assessment.

Results: Sixteen studies were included in our systematic review, while 15 studies with complete data were included in the meta-analysis. Our primary outcome was the standardized mean difference, which was equal to the

treatment effect in the PEMF group minus the treatment effect in the placebo group divided by the pooled standard deviation. For pain, the standardized mean difference was 1.06 (95% CI = 0.61 to 1.51), for stiffness 0.37 (95% CI = 0.07 to 0.67), for function 0.46 (95% CI = 0.14 to 0.78), and for QOL 1.49 (95% CI = -0.06 to 3.04). PEMF parameters did not influence symptoms.

Conclusions: Compared with placebo, there was a beneficial effect of PEMF therapy on pain, stiffness, and physical function in patients with OA. Duration of treatment may not be a critical factor in pain management. Further studies are required to confirm the effects of PEMF therapy on QOL.

Impact: Our study suggests that PEMF therapy has clinically significant effects on pain in patients with OA. The current evidence was limited to the short-term effects of PEMF therapy.

https://pubmed.ncbi.nlm.nih.gov/26705327/

Pulsed electromagnetic fields in knee osteoarthritis: a double blind, placebo-controlled, randomized clinical trial

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- PMCID: PMC4795538
- DOI: 10.1093/rheumatology/kev426

Free PMC article

Abstract

Objectives: This trial aimed to test the effectiveness of a wearable pulsed electromagnetic fields (PEMF) device in the management of pain in knee OA patients.

Methods: In this randomized [with equal randomization (1:1)], double-blind, placebo-controlled clinical trial, patients with radiographic evidence of knee OA and persistent pain higher than 40 mm on the visual analog scale (VAS) were recruited. The trial consisted of 12 h daily treatment for 1 month in 60 knee OA patients. The primary outcome measure was the reduction in pain intensity, assessed through VAS and WOMAC scores. Secondary outcomes included quality of life assessment through the 36-item Medical Outcomes Study Short-Form version 2 (SF-36 v2), pressure pain threshold (PPT) and changes in intake of NSAIDs/analgesics.

Results: Sixty-six patients were included, and 60 completed the study. After 1 month, PEMF induced a significant reduction in VAS pain and WOMAC scores compared with placebo. Additionally, pain tolerance, as expressed by PPT changes, and physical health improved in PEMF-treated patients. A mean treatment effect of -0.73 (95% CI - 1.24 to - 0.19) was seen in VAS score, while the effect size was -0.34 (95% CI - 0.85 to 0.17) for WOMAC score. Twenty-six per cent of patients in the PEMF group stopped NSAID/analgesic therapy. No adverse events were detected.

Conclusion: These results suggest that PEMF therapy is effective for pain management in knee OA patients and also affects pain threshold and physical functioning. Future larger studies, including head-to-head studies comparing PEMF therapy with standard pharmacological approaches in OA, are warranted.

Trial registration: ClinicalTrials.gov, http://www.clinicaltrials.gov, NCT01877278.

Keywords: OA; clinical trial; knee; pain; pain threshold.

https://pubmed.ncbi.nlm.nih.gov/24106421/

Pulsed electromagnetic field therapy for management of osteoarthritis-related pain, stiffness and physical function: clinical experience in the elderly

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- PMID: 24106421

- PMCID: PMC3791961

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Free PMC article

Abstract

Background: Pulsed electromagnetic field (PEMF) therapy has shown promising therapeutic effectiveness on bone- and cartilage-related pathologies, being also safe for management of knee osteoarthritis.

Aim: The aim of this study was to investigate the clinical efficacy of a PEMF device for management of knee osteoarthritis in elderly patients.

Materials and methods: A total of 33 patients were screened, and 28 patients, aged between 60 and 83 and affected by bilateral knee osteoarthritis, were enrolled in this study. They received PEMF therapy on the right leg for a total of three 30-minute sessions per week for a period of 6 weeks, while the left leg did not receive any treatment and served as control. An intravenous drip containing ketoprofen, sodium clodronate, glucosamine sulfate, calcitonin, and ascorbic acid, for a total volume of 500 mL, was administered during PEMF therapy. At baseline and 3 months post-PEMF therapy, Visual Analog Scale (VAS) was used to assess knee pain and Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) was used to measure knee pain, stiffness and physical function.

Results: Changes in VAS and WOMAC scores were calculated for both knees as baseline minus post-treatment. A two sample Student's t-test, comparing change in knee-related VAS pain for PEMF-treated leg (49.8 ± 2.03) vs control leg (11 ± 1.1), showed a significant difference in favor of PEMF therapy ($P < 0.001$). A two sample Student's t-test comparing change in knee-related WOMAC pain, stiffness, and physical function for PEMF-treated leg (8.5 ± 0.4, 3.5 ± 0.2, 38.5 ± 2.08, respectively) vs control leg (2.6 ± 0.2; 1.6 ± 0.1; 4.5 ± 0.5 respectively), also showed a significant difference in favor of PEMF therapy ($P < 0.001$). No adverse reactions to therapy were observed.

Conclusion: The present study shows that PEMF therapy improves pain, stiffness and physical function in elderly patients affected by knee osteoarthritis.

Keywords: elderly; knee; magnet therapy; osteoarthritis; pulsed electromagnetic field.