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Bioelectromagnetics. 2015 Dec;36(8):576-85. doi: 10.1002/bem.21942. Epub 2015 Nov 12.

Effects of PEMF on patients with osteoarthritis: Results of a prospective, placebo-controlled, double-blind study.

Wuschech H1, von Hehn U2, Mikus E3, Funk RH3.

Author information

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Abstract

This study aimed to evaluate effects of pulsed electromagnetic fields (PEMF) in a double blind study on patients with knee joint osteoarthritis. The MAGCELL ARTHRO electrode-less therapy delivered a sinusoidal magnetic field, varying in frequency between 4 and 12 Hz. In 1 cm tissue depth, magnetic flux density was 105 mT. A total of n = 57 patients were randomly assigned to the verum, PEMF or placebo group (placebo device). Their average age was 61.6 ± 12.0 years. According to American College of Rheumatology criteria the osteoarthritis level was 2.8 ± 0.8. Treatment was performed twice a day for 5 min over a period of 18 days. Treatment with the MAGCELL device versus control (sham exposed) showed a highly significant reduction in pain ($P < 0.001$), a significant reduction in stiffness ($P = 0.032$) and a significant reduction in disability in daily activities ($P = 0.005$) according to the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scales-with a good overall treatment tolerance. In the placebo group there was no evidence of a significant change between the initial and final examination in any of the three above-mentioned WOMAC scales. Results of this partly randomized placebo-controlled double-blind study show clinically at any rate, that use of PEMF lead to highly significant better results in the treatment group compared to the placebo group with regard to the total WOMAC global score and especially for visual analogue scale. Patient assessment of the "effectiveness" was rated in 29.5% as very good and good in 27.3% compared to 0.0% and 15.4% in controls. This therapy is thus a useful complementary treatment option with no side effects.

KEYWORDS:
MAGCELL; electrotherapy; inflammation; magnetic field therapy; osteoarthritis

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Pulsed electromagnetic field therapy improves tendon-to-bone healing in a rat rotator cuff repair model.

Tucker JJ1, Cirone JM1, Morris TR1, Nuss CA1, Huegel J1, Waldorff EI2, Zhang N2, Ryaby JT2, Soslowsky LJ1.

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Abstract

Rotator cuff tears are common musculoskeletal injuries often requiring surgical intervention with high failure rates. Currently, pulsed electromagnetic fields (PEMFs) are used for treatment of long-bone fracture and lumbar and cervical spine fusion surgery. Clinical studies examining the effects of PEMF on soft tissue healing show promising results. Therefore, we investigated the role of PEMF on rotator cuff healing using a rat rotator cuff repair model. We hypothesized that PEMF exposure following rotator cuff repair would improve tendon mechanical properties, tissue morphology, and alter in vivo joint function. Seventy adult male Sprague-Dawley rats were assigned to three groups: bilateral repair with PEMF (n = 30), bilateral repair followed by cage activity (n = 30), and uninjured control with cage activity (n = 10). Rats in the surgical groups were sacrificed at 4, 8, and

16 weeks. Control group was sacrificed at 8 weeks. Passive joint mechanics and gait analysis were assessed over time. Biomechanical analysis and μCT was performed on left shoulders; histological analysis on right shoulders. Results indicate no differences in passive joint mechanics and ambulation. At 4 weeks the PEMF group had decreased cross-sectional area and increased modulus and maximum stress. At 8 weeks the PEMF group had increased modulus and more rounded cells in the midsubstance. At 16 weeks the PEMF group had improved bone quality. Therefore, results indicate that PEMF improves early tendon healing and does not alter joint function in a rat rotator cuff repair model. © 2016 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. J Orthop Res 35:902-909, 2017.

KEYWORDS:
PEMF; animal model; supraspinatus repair

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2009 Dec;47(12):939-48.

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

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Affiliations expand

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Cite

Abstract

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 noninvasive, 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 antiinflammatory action and helps in bone remodeling and this could be developed as a viable alternative for arthritis therapy.

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Effectiveness of pulsed electromagnetic field therapy in the management of osteoarthritis of the knee: a meta-analysis of randomized controlled trials.

Vavken P1, Arrich F, Schuhfried O, Dorotka R.

Author information

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Abstract

OBJECTIVE:
To assess the effectiveness of pulsed electromagnetic fields compared with placebo in the management of osteoarthritis of the knee.

DATA SOURCES:
A systematic review of PubMed, EMBASE, and the Cochrane Controlled Trials Register.

METHODS:
Randomized, controlled trials reporting on the blinded comparison of pulsed electromagnetic fields with placebo were included. Validity was tested according to the Jadad Scale. Studies were pooled using fixed-effects and random-effects models after exclusion of publication bias and assessment of heterogeneity. Sensitivity analyses and meta-regression were performed to test the stability of our findings.

RESULTS:
Nine studies, including 483 patients, were pooled. No significant difference could be shown for pain (weighted mean difference 0.2 patients; 95% confidence interval (CI): -0.4 to 0.8) or stiffness (weighted mean difference 0.3; 95% CI: -0.3 to 0.9). There was a significant effect on activities of daily living (weighted mean difference 0.8; 95% CI 0.2-1.4, p = 0.014) and scores (standardized mean difference 0.4; 95% CI: 0.05-0.8, p = 0.029). We saw only statistically insignificant differences between studies with different treatment protocols.

CONCLUSION:
Pulsed electromagnetic fields improve clinical scores and function in patients with osteoarthritis of the knee and should be considered as adjuvant therapies in their management. There is still equipoise of evidence for an effect on pain in the current literature.

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