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# A Review of the Literature on Performance of Pemf Therapy in Decreasing Pain and Promoting Wound Healing

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**ABSTRACT:**
**OBJECTIVE:** The primary purpose of this research is to ascertain whether PEMF therapy can effectively reduce pain and hasten the healing of wounds. The objective of this research is to look over potential benefits of PEMF without copying or referencing information from other sources.
**METHOD:** Ten research studies have been chosen randomly from reputable sources such as Google Scholar, PubMed, and Cochrane Library. Based on inclusion criteria these articles were selected, and the selection timeframe spans from 2013 to 2023.
**RESULTS:** PEMF has been shown to effectively reduce pain and promote wound healing in various studies.
**CONCLUSION:** The investigation has concluded that PEMF is an effective way to diminish pain and facilitate the healing process. This therapy has been proven to be efficacious in reducing both acute and chronic pain caused by connective tissue injuries, as well as reducing inflammation and edema. Additionally, it has shown positive results in the healing of wounds. It's worth noting that PEMF has shown promise in treating recent fractures, malunion, and delayed fractures.

**KEYWORDS:** PEMF, Wound healing, Fracture

## INTRODUCTION:

Over the past three decades, PEMF has been shown to be a successful treatment for illnesses of the bones and joints. The therapeutic benefits of it have been widely recognized, making it a approved choice among patients who are looking for relief from their ailments. Experience the positive effects of PEMF and regain your mobility and well-being. PEMF has demonstrated efficacy in managing various conditions, including recently sustained fractures as well as delayed and malunion fractures, with outcomes often surpassing those of conventional drug therapies.

PEMF uses low-frequency frequencies, from 6 to 500 Hz that can stimulate biological currents and have positive benefits on the treatment of skeletal disorders. This therapy is considered an advanced electrotherapy modality, administered invisibly and noninvasively by influencing patients either generally or locally with a magnetic field presented in impulse bundles.

Physiotherapy treatments offer various techniques to manage pain and injuries, such as cervical and lumbosacral pain. Along with traditional exercise therapy, electrotherapy, and manual therapy, PEMF

therapy is highly effective in reducing acute and chronic pain is often associated with injuries to connective tissues, such as tendons, ligaments, bones, and cartilage. Moreover, PEMF has revealed magnificent results in controlling edema and inflammation, allowing for a quicker recovery.

Latest studies have shown that PEMF can be a game-changer for diabetic patients. The therapy induces angiogenesis and improves microcirculation, which suggests that it has the potential to treat conditions beyond musculoskeletal disorders. The foundation of PEMF therapy is electromagnetism, which states that an electric circuit and a magnetic field combine to create an electromotive force that initiates electromagnetic induction. With such a promising therapy available, diabetic patients can now plan for a better quality of life.

Exposure to PEMF has been shown to modify the excitation of neurons and the development of new neurons associated with Na+ channel activity. Exogenous electromagnetic force excited neurons can interact ephaptically with nearby cells. Additionally, PEMF has been associated with the modulation of various growth factors, contributing to the prevention of autoimmune diseases and inhibition of tissue degeneration.

Although PEMF therapy is a relatively new approach with encouraging outcomes, it is crucial to understand that its efficacy may differ from person to person. Therefore, more comprehensive research is necessary to determine its efficacy in treating various conditions.

**Methodology:**

**Materials and methods:**

Various online search engines are employed to gather scholarly articles, including Google Scholar, PubMed, and Cochrane. The authors identified articles using specific keywords and collected them in full text. Out of the 15 articles initially collected, only 10 were selected for use in this study.

**Study Selection:**

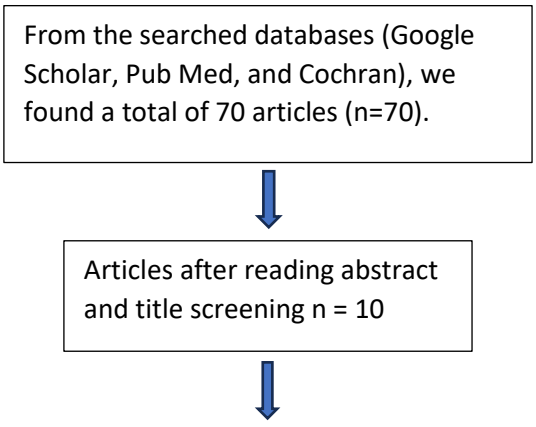
**Inclusion criteria:**

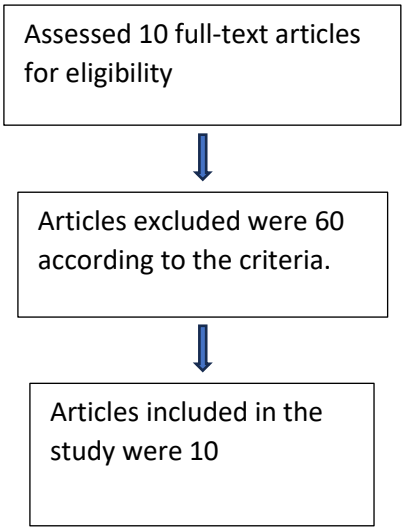
- Articles were included from year 2012 to 2023.
- Articles include the effectiveness of PEMF therapy.

**Exclusion criteria:**

- Articles before the year 2012 will not be included.

**FLOW CHART:**






**REVIEW OF LITERATURE:**

**1. Impact of PEMF on participants with lateral epicondylitis discomfort, pain threshold, and pain-free grip strength**

Ravi Shankar Reddy [Aug 24, 2023]

The occasion of this research was to assess the efficacy of PEMF in treating lateral epicondylitis patients by decreasing pain, raising PFGS, and improving PPT. The study included 22 participants with LE who underwent 6 weeks of PEMF therapy. Ache levels were measured using the VAS, PPT was evaluated in kg/cm2 using a pressure algometer, and PFGS was measured in kg using a handheld dynamo meter.

After the six week PEMF mediation, all participants upgraded in their conditions.

The results of this study indicate that PEMF was successful in lowering pain levels and improving functional outcomes in people with lateral epicondylitis.

**2. PEMF treatment for the treatment of pain, stiffness, and physical function associated with osteoarthritis: clinical experience in the elderly**

Tommaso Iannitti, Gregorio Fistetto, Anna Esposito, Valentina Rottigni & Beniamino Palmieri [19 Oct, 2022]

This study set out to find out how well an elderly patient's knee OA could be managed with a PEMF device. 33 people were initially hidden, and 28 patients with bilateral knee OA who were between the ages of 60 and 83 were chosen for the investigation. For six weeks, the subjects underwent weekly thirty minute sessions of PEMF on their right leg. The left leg was used as a control and was not given any medical attention. The individuals in PEMF received an intravenous drip. After three months of PEMF, baseline assessments, and evaluations were conducted using the VAS to estimate pain and the WOMAC to evaluate pain, stiffness, and physical function.

According to the research, PEMF has revealed significant improvements in knee pain, stiffness, and physical function among elderly patients who suffer from knee OA. The results recommend that PEMF can be an effective intervention to enhance the overall well-being of individuals affected by this condition.

**3. Impact of PEMF therapy on daily living activities and motor functions in parkinson's disease**

KABILAN TR., JAGATHEESAN ALAGESAN, SHIVAKUMAR SINGH, DHILIP KS [March 2022]

Kabilan et al. Carried out an investigation to examine the impact of PEMF on the daily activities and motor functions of individuals with Parkinson's disease. Forty eight patients, ages fifty to seventy-five, who were already receiving medical medication therapy for their motor symptoms participated in the study. For this

prospective cohort study, patients were alternatively assigned to control and experimental groups using a convenience sample process.

The groups participated in the study: the control group and the experimental group. Patients in the Experimental group were given PEMF for 60 minutes daily over 3 weeks, besides to their regular drug regimen.Meanwhile, the Control group continued with their usual drug regimen while not receiving the additional PEMF. According to the study, Parkinson's patients who received PEMF additionally to their usual drug treatment experienced a significant improvement in their motor functions and ability to perform daily activities. This indicates that the use of PEMF may have a beneficial effect on the overall motor functions and daily living activities of individuals diagnosed with Parkinson's disease.

**4. PEMF's effects on depression, walking ability, tiredness, and quality of life in multiple sclerosis adults: a randomized, placebo controlled study**

Anabel Granja-Domínguezaa , Anja Hochsprungb , Carlos Luque-Morenoc,d, Eleonora Magnic , Shahid Escudero-Uribeb , Beatriz Heredia-Camachoe , Guillermo Izquierdo-Ayusoa , Alberto Marcos Heredia-Rizoc [13 Oct, 2022]

Research on the efficacy of low frequency PEMF therapy on fatigue, walk performance, depression symptoms, and life quality. 44 persons with RRms and varied degrees of disability participated in the study; they were randomized to receive a placebo whole body mat or a 4 week program comprising PEMF. Participants in the PEMF group received treatment at a frequency of 15 Hz at beginning, which was progressively raised to 30 Hz, with an intensity ranging from 25 to 35 mT. The FSS and the MFIS were used as the major outcome measures to measure exhaustion levels. Secondary assessments included the multiple sclerosis international QOL questionnaire, the Beck depression inventory-II, and the GAITRite system, which measure walking function. At baseline, following the intervention, and at a three month follow up, data were gathered.

The study found no noticeable distinction in the middle of the two groups in terms of changes in fatigue symptoms originally to the conclusion of the intervention. The findings implied that low-frequency PEMF did not revealed better efficiency in contrast to the placebo in causing changes in fatigue, gait, depression severity, and life quality among individuals with RRMS and varying levels of disability.

**5. RCT: PEMF vs Pulsed Ultrasound for mechanical neck pain treatment**

Amir Mohamed Saleh, Ph.D., *Mohamed Khater Mohamed Gad, BSc, Mohamed Serag Eldein Mahgoub Mohamed, Ph.D. [30 Nov 2021]

This study focused on MNP, which affects about two thirds of middle aged people as an oucome of bad postural habits. The purpose of the research was to compare the efficacy of pulsed ultrasound and PEMF on cervical ROM, functional restriction, and pain intensity in individuals treated with MNP. A randomized controlled trial design was used in the investigation.

Forty five patients with mechanical neck pain were included in a study. Three groups were selected to comprise thses patients. Group C acted as the group under authority, getting only the traditional physiotherapy program. Pulsed ultrasound was administered to Group A furthermore to their usual physical therapy regimen. Group B experienced PEMF furthermore to a conventional physical therapy program. For four weeks in a row, the therapy was administered three times a week.

Following the session, all groups statistically significant gains, according to the study. Group B demonstrated the most significant improvement. According to the findings, the MNP patients who underwent PEMF had the biggest improvements in pain intensity, cervical ROM, and neck impairment. In conclusion, this therapy can be an productive treatment for patients with MNP.

**6. A prospective, randomized controlled trial examined the effects of PEMF on pain, functional status, and quality of life in individuals with persistent non-specific neck pain**

Merve Karakaş, Haydar Gök [May 18, 2020]

This study evaluated whether treating persistent non specific neck pain with PEMF furthermore to traditional physical rehabilitation is beneficial. In this prospective, randomized, double blind, placebo-controlled study, sixty-three individuals who reported mechanical neck pain were involved.

Two groups of study participants were assigned to each group: the control group and the PEMF therapy group. Over the course of three weeks, both groups received 15 sessions of traditional physical therapy. Twenty minute PEMF sessions were given to the active group, and twenty minute sham PEMF sessions were given to the placebo group. Evaluations were conducted before the treatment, and post-treatment evaluations were conducted using the VAS, NPDS, SF-36, and PGA.

The results of the study show that PEMF is a secure and useful therapeutic alternative for people with persistent, non specific neck discomfort. Comparing the outcomes to a traditional physical therapy program alone, however, it appears that include PEMF in the treatment plan did not lead to any further improvements in pain and functionality.

**7. PEMF's beneficial effects on patients with distal radius fractures during cast immobilization**

Lucyna Krzyz˙an´ska, Anna Straburzyn´ska-Lupa , Patrycja Ra¸glewska, and Leszek Romanowski [25 Feb, 2020]

The study aimed to investigate if PEMF therapy could offer any advantages when applied during immobilization cast for distal radius fractures. The focus was on two specific areas: pain relief and limb function. 52 patients with fractures of the distal radius were immobilized in a cast and treated with a pulsed electromagnetic field, assigned at random.

The group that received PEMF treatment showed significant improvements after 3 and 6 weeks of treatment compared to the placebo group. Lower pain levels, increased mobility in the upper limb joints, enhanced exteroceptive feeling and a decrease in upper limb impairment were among these changes.

The findings suggest that PEMF can help patients with distal radius fractures while they are immobilized in a cast. The course of treatment has the potential to lessen pain, boost everyday functioning, increase ROM, and improve exteroceptive sensation.

**8. Effect of PEMF therapy in patients with supraspinatus tendon tear**

Mesut Özdemir , Mustafa Fatih Yaşar , Elif Yakşi [Sept 20, 2020]

In patients with a supraspinatus rupture, Mesut Ozdemir et al. examined the effectiveness of TENS, US, and PEMF to TENS and US therapy alone. The trial involved forty patients in all, who were randomized at random to either the PEMF group or the Sham group. While the sham group did not get any PEMF therapy, the PEMF group underwent 20 minute sessions at a 50 Hz frequency and a 25 G intensity. For ten sessions, each group had electrotherapy and diathermy.

The study measured the effectiveness of using PEMF therapy with conventional physical therapy methods for treating symptomatic supraspinatus tears. Three scales were used to measure outcomes: NRS, UCLA Shoulder Scale, and SPADI. The NRS, UCLA shoulder scale, and SPADI scores significantly improved in both groups following treatment when compared to before. The study findings suggest that, when treating a symptomatic supraspinatus rupture, there is no appreciable difference in efficacy between conventional therapy administered alone and therapy administered in conjunction with PEMF. Therefore, it can be said that there are no extra advantages to using PEMF in addition to standard therapy for symptomatic supraspinatus tears.

**9. PEMF's therapy impact on pain, stiffness, physical function, and quality of life in osteoarthritis patients: A comprehensive review and meta-analysis of placebo-controlled randomized trials**

Xiaotian Yang, Hongchen He, Wenwen Ye, Thomas A. Perry, Chengqi He [Apr 6, 2020]

In order to investigate the effectiveness of PEMF and its parameters on the symptoms and quality of life of patients with OA, Xiaotian Yang and colleagues carried out a systematic study. Randomized, placebo controlled trials with an emphasis on OA patients that evaluated outcomes related to QOL and/or symptoms and published papers in English were the prerequisites for inclusion. Data extraction and quality evaluations were carried out by two writers. The study found that when compared to placebo, PEMF was good for OA patients' pain, stiffness and physical function. The evaluation made clear that more research was required to verify PEMF's beneficial effects on QOL.

**10. An experimental randomized controlled trial using a PEMF therapy device for non-specific low back pain**

Anthony J. Lisi. Mickey Scheinowitz. Richard Saporito. Anthony Onorato [March 12, 2019]

The study directed to test a portable PEMF device in people suffering from non-specific LBP of varying durations. Assessing functional capacity using the ODI at baseline, six week, and twelve week was the main goal of the study.

The results of the study imply that an investigational study using a pulsed electromagnetic field therapy device for non specific low back pain may be feasible. The study proves the device's safety and offers some indications of its potential to help individuals with non specific LBP operate better.

**DISCUSSION:**

The motive of this research was to assess how well PEMF works to reduce pain and speed up the healing of wounds. Compared to conventional medication therapy, PEMF has demonstrated positive results in the treatment of a number of illnesses,including recent fractures as well as delayed and malunion of fractures. Recent research also designate that PEMF therapy stimulates angiogenesis and improves microcirculation in patients with diabetes. Study advised that PEMF therapy not only diminishes pain but also promotes wound healing, with no observed adverse effects.

In a 2023 study, PEMF was shown to be beneficial in lowering pain and enhancing function in lateral epicondylitis patients by Ravi shankar reddy et al. Similarly, in 2022, Tommaso Iannitti et al found that PEMF therapy benefits older people with OA in their knees by reducing pain, stiffness and impairment of physical function. Furthermore, data suggest that PEMF is beneficial in management of neurological diseases like multiple sclerosis and parkinson's disease.

In a study conducted by Amir Mohamed Saleh and his team in 2021, it was concluded that PEMF therapy can be productive in diminishing pain, improving cervical ROM, and reducing neck disability in patients get hurt from mechanical neck pain. The idea that PEMF can be useful in lowering pain, accelerating wound healing, and improving patient's overall QOL for a variety of illnesses is supported by the aggregate findings from multiple research.

**Conclusion:**

Based on this study, our primary conclusion is that Pulsed Electromagnetic Field (PEMF) therapy is frequently employed to address a spectrum of musculoskeletal and neurological conditions. These encompass mechanical neck pain, chronic LBP, osteoarthritis, supraspinatus tendon tear, fractures, Parkinson's disease, and Multiple Sclerosis, among others. Amir Mohamed Saleh and his team (2021)

concluded in their study that the findings strongly indicate that PEMF is an productive intervention for relieving pain and facilitating wound healing, all without adverse effects.

The study has concluded that PEMF therapy is productive in reducing pain and upgrading the overall QOL for patients. This finding reinforces the idea that PEMF therapy is a valuable treatment option for enhancing the well-being of individuals suffering from different health conditions.

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