



ORIGINAL ARTICLE

Pulsed magnetic field versus ultrasound in the treatment of postnatal carpal tunnel syndrome: A randomized controlled trial in the women of an Egyptian population



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Abbreviations: CTS, carpal tunnel syndrome; PEMF, pulsed electromagnetic magnetic field; US, ultrasound; MMDL, median motor distal latency; MSDL, median sensory distal latency; VAS, visual analogue scale; EMG, electromyography; MSDL, median segmental sensory distal latency; NCSs, nerve conduction studies; CTSQ, carpal tunnel syndrome questionnaire; MSCV, median sensory conduction velocity; MMCV, median motor conduction velocity; NCV, nerve conduction velocity.

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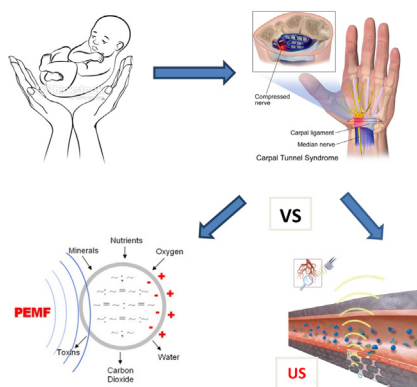
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GRAPHICAL ABSTRACT



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ABSTRACT

The aim of this study was to compare the effects of pulsed electromagnetic field versus pulsed ultrasound in treating patients with postnatal carpal tunnel syndrome. The study was a randomized, double-blinded trial. Forty postnatal female patients with idiopathic carpal tunnel syndrome were divided randomly into two equal groups. One group received pulsed electromagnetic field, with nerve and tendon gliding exercises for the wrist, three times per week for four weeks. The other group received pulsed ultrasound and the same wrist exercises. Pain level, sensory and motor distal latencies and conduction velocities of the median nerve, functional status scale and hand grip strength were assessed pre- and post-treatment. There was a significant decrease ($P < 0.05$) in pain level, sensory and motor distal latencies of the median nerve, and significant increase ($P < 0.05$) in sensory and motor conduction velocities of the median nerve and hand grip strength in both groups, with a significant difference between the two groups in favour of pulsed electromagnetic field treatment. However, the functional status scale showed intergroup no significant difference ($P > 0.05$). In conclusion, while the symptoms were alleviated in both groups, pulsed electromagnetic field was more effective than pulsed ultrasound in treating postnatal carpal tunnel syndrome.

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Introduction

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, which results from median nerve compression [1,2]. Prevalence of CTS in the general population is 3.8% when diagnosed clinically and 2.7% when diagnosed neurophysiologically [3]. Women are more susceptible to CTS, with a 70% incidence rate, especially middle-aged women [4]. CTS is a common complaint during pregnancy, as the existing data show the prevalence rate of CTS during pregnancy to be as high as 62% [5,6]. CTS usually develops in the second half of pregnancy because of fluid retention, due to decreased venous circulation, which causes swelling of tissues [7]. Another factor that increases CTS rates during pregnancy is hormonal alterations, including increased oestrogen, aldosterone, and cortisol levels. In addition, increased levels of prolactin are strongly correlated with CTS symptoms worsening during the night, which coincides with the prolactin circadian rhythm [8]. Further, release of relaxin can lead to relaxation of the transverse carpal ligament, leading to its flattening, and subsequent compression of the median nerve [9]. Although most pregnant women experience symptom relief

following delivery, a significant percentage continue to have some level of complaint up to three years after giving birth [10]. The most typical symptoms of CTS are numbness and tingling in the distribution of the median nerve, burning sensation, pain, as well as loss of grip strength and dexterity [11].

There are several therapeutic options for patients with CTS depending on various factors, including the stage of the disease, the severity of the symptoms, and patients' preferences. Non-surgical intervention is recommended as the first-line treatment, in cases of mild to moderate CTS. Surgery is reserved for patients with severe CTS, and those who have experienced failure of conservative treatment. The same treatment strategy is used for postnatal patients with CTS [12].

Non-surgical treatment modalities used for the management of CTS are numerous and include medical and physical therapy. Primary physical therapy interventions are splinting, nerve and tendon gliding exercises, acupuncture, low-level laser, and ultrasound with or without phonophoresis. Electromagnetic therapy is less widely used than these other therapies as currently there is limited research into the effects of electromagnetic therapy on CTS [13].

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