

# Physical Therapy in Treating Fibromyalgia Syndrome: A Brief Review

## Fibromiyalji Tedavisinde Fizik Tedavi: Kısa Derleme

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### ABSTRACT

The pathophysiology of fibromyalgia syndrome (FM) is poorly understood. A wide variety of interventions are used in the management of FM. There is, however, no clear consensus on the management of choice and FM remains relatively refractory to treatment. Currently, multidisciplinary treatment is considered to be the best therapeutic option for FM and physical therapy has an important role in this approach. The objective of this review is to present the scientific evidence relating to physical therapy methods for the management of FM and give some practical advice for their use. The goals of physical therapy modalities, therapeutic exercises and massage for subjects with FM are to improve or maintain physical function, general fitness, emotional well being, overall health and symptoms, and provide them with a feeling of control over their well being. Therapeutic modalities should be individualised for FM patients based on target symptoms and impairment in functioning. All electrotherapeutic interventions should be performed by a trained physiotherapist to avoid life threatening misuse and side effects of these modalities. In conclusion, the literature to date has assessed the effect of a range of physical therapeutic interventions on various outcomes for FM. At present, use of selected electrotherapeutic intervention or hydrotherapy with aerobic exercises or other exercises programs and massage are indicated. At this time, in the light of literature, none of the currently used physical therapy agents can be refuted in the treatment of FM. (*J PMR Sci 2011;14:28-32*)

**Keywords:** Fibromyalgia, management, physical therapy, rehabilitation

### ÖZET

Fibromiyalji sendromunun (FM) patofizyolojisi tam olarak anlaşılamamıştır. Çok geniş bir yelpazedeki tedavi seçenekleri FM tedavisinde kullanılmaktadır. Tedavi yönetimi konusunda net bir fikir birliği yoktur ve FM nispeten tedaviye dirençli kalır. Şu anda, multidisipliner tedavi FM için en iyi tedavi seçeneği olarak kabul edilir ve fizik tedavi bu yaklaşımda önemli bir role sahiptir. Bu derlemenin amacı FM tedavi yönetimi için fizik tedavi yöntemleri ile ilgili bilimsel kanıt sunmak ve bunların kullanımı için bazı pratik öneriler vermektir. FM li olgular için fizik tedavi modalitelerinin, terapötik egzersizlerin ve masajın tedavi hedefleri fiziksel fonksiyon, genel sağlık, duygusal iyilik halinin korunması ve geliştirilmesi ve semptomlar üzerinde ve genel iyilik halinde bir kontrol duygusunun sağlanmasıdır. Tüm elektroterapötik uygulamalar bu yöntemlerin hayatı tehdit edici yanlış kullanımlarını ve yan etkilerini önlemek için eğitilmiş bir fizyoterapist tarafından yapılmalıdır. Sonuç olarak, şu ana kadarki literatür bu fizik tedavi uygulamalarının FM için çeşitli derecelerde etkili olduğunu tespit etmiştir. Şu an için, aerobik egzersizle veya diğer egzersiz programları ve masajla birlikte uygulanan seçilmiş elektroterapötik ajan veya hidroterapi endikedir. Şu an için, literatür ışığında, güncel kullanımda olan fizik tedavi ajanlarından hiçbirinin FM tedavisinde kullanımı reddedilemez. (*FTR Bil Der 2011;14:28-32*)

**Anahtar kelimeler:** Fibromiyalji, yönetim, fizik tedavi, rehabilitasyon

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## Introduction

Fibromyalgia (FM) is characterized by chronic widespread pain and reduced pain threshold, with hyperalgesia and allodynia (1). Associated features include non-restorative sleep, fatigue, psychological distress, depression, anxiety, cognitive dysfunction, headache, paresthesias and bowel dysfunction (1,2). All these symptoms can have a prominent impact on patient's emotional and physical function and overall health-related quality of life. The current hypotheses of the aetiology of FM include an inflammatory disorder accompanied by changes in the neuroendocrine-immune system and central nervous system pain processing abnormalities containing central sensitization and inadequate pain inhibition (2,3).

Despite the investigations of a wide range of managements, optimal treatment of FM is still unknown. Management of the FM syndrome includes both pharmacologic and non-pharmacologic therapies, but currently, non-pharmacological management strategies cannot replace pharmacological ones. Non-pharmacologic strategies include physiotherapy, exercise, massage, mind-body cognitive/cognitive-behavioral, complementary and alternative therapies (4,5).

Multidisciplinary treatment has proven to be the best therapeutic option to FM syndrome and physiotherapy has an important role in this approach (6). Exercise is recognized as one part of the management of FM (7). Exercise improves psychological distress, physical function, and other quality of life parameters in FM (8). However, the mechanisms through which exercise benefits FM symptoms and all of the clinically relevant and practically important aspects of an exercise prescription need to be elucidated. One hypothesis is that while there are abnormalities in central sensitization and inadequate pain inhibition in individuals with FM, muscle microtrauma or metabolic disturbances in peripheral tissues may contribute to chronic pain through maintaining or even initiating central sensitization (8-10). Thus, exercise may contribute to pain improvement through the process of tissue repair and metabolic adaptations (8,11,12). Another hypothesis is that the benefits of exercise on FM symptoms are mediated by regulation of the cytokine- hypothalamic-pituitary-adrenal (HPA) axis feedback and its anti-inflammatory effects (7,8).

Exercise therapy has been used successfully to alleviate a number of conditions that are also commonly experienced by FM patients. Strength training and aerobic exercises have been found to improve depression in subjects with clinical depression and/or anxiety (13,14). Exercise can also improve sleep in subjects with sleep disturbances (15,16). Exercise training may also improve fatigue, because as one's maximal aerobic capacity improves.

The primary objective of this review was to evaluate the effects of physiotherapy and exercise training including aerobic (cardiorespiratory), muscle strengthening, flexibility exercises on global health related quality of life, fibromyalgia related signs and symptoms, and physical function in

subjects with FM. Alternative treatments such as chiropractic, Thai-chi and acupuncture treatments are out of the objective of this review.

### 1. Exercises

#### 1.1. Aerobic Exercise

AE includes land-based and water based exercises such as walking, cycling, games, dance, rhythmic or boxing movements and aquatic jogging (17,18). Most of the studies showed a positive effect of AE in FM patients. However, in some studies the sample size is very small, assessments and outcomes are not fully comparable. Although studies results are less clear for sleep and overall pain, AE generally was found efficacious for improvement in physical fitness, fatigue, depressed mood, tender points count, and FIQ score (17,18).

Recently, in a systematic review, Häuser et al (18) evaluated the efficacy of different types and volumes of AE in FM syndrome. They concluded that an AE programme for FM patients should consist of regular land-based or water-based exercises with slight to moderate intensity two to three times a week for at least 4 weeks. The patient should be motivated to continue AE after participating in an AE programme.

#### 1.2. Muscle Strengthening Exercises

In a SE exercise program, free weights and/or body weight are used for strengthening of upper, lower limb and trunk muscles (19,20). Individuals begin with frequency of 2-3 days per week, and a minimum of one set of 8-12 repetitions at an intensity of the 8 to 12 Repetition Maximum of each SE. We found only a few studies in the literature evaluating SE in patients with FM. In these studies, fibromyalgia patients were randomized to either an aerobic AE program, a flexibility or a SE program. At outcome measures, AE, flexibility and SE are similarly effective at improving symptoms, tender point count, fitness, depression, and quality of life in fibromyalgia (19-22).

#### 1.3. Flexibility Exercises

Flexibility exercises (FE) include controlled static stretching in which an individual assumes a position and holds it for a certain duration. Properties of a FE program are 3 to 4 repetitions for each stretch held for a duration of 20-30 seconds, intensity to a position of mild discomfort, and frequency of FE equal to or greater than two days per week (23,24).

The FE studies in FM are sparse. In these studies flexibility-only exercises compared to strength exercises have large positive effects on flexibility, but no effect on tender points or depression. Thus more studies, preferably of high quality, are needed to confirm and extend the effects of FE in FM syndrome.

### 2. Hydrotherapy Without Exercises

The mechanisms of action of hydrotherapy are not completely known, but most probably the benefits could be derived from mechanical, physical and chemical factors (25). Muscle tone and pain intensity can be positively influenced. There is moderate evidence that hydrotherapy has beneficial

effects on pain and HRQOL in FM (26). Balneotherapy and Spa therapy without exercises were also reported as an effective, safe, possible alternative treatment for FM syndrome that could improve patients' HRQOL (25-27).

### **3. Massage**

Massage therapy (MT) may be helpful in improving pain, sleep and reducing depression and anxiety symptoms in FM syndrome. It is suggested that the release of  $\beta$ -endorphins is linked with the pain relief and feeling of warmth and well-being associated with MT (28,29). MT is substantially requested by patients with FM seeking symptoms relief (30). MT may promote the restorative sleep in FM (30-32) and in other patients (33,34), alleviate anxiety and depression symptoms (35,36), and relieve acute and chronic pain (37-39).

Painless MT to cervical, thoracic and lumbar spine and paravertebral muscles as well as around tender point sites is more appropriate for treating patients with FM. The sessions should be performed at least 1–2 times a week for 1 to 3 months. In MT of FM patients, in accordance with patient's symptoms it is suggested that intensity of MT should be increased gradually from session to session. However, there is weak evidence of efficacy for MT in the treatment of FM (40).

### **4. Electrotherapeutic Interventions**

It is crucial to mention that all electrotherapeutic interventions should be performed by a trained physiotherapist to avoid life threatening misuse and side effects of these modalities.

#### **4.1. Transcutaneous Electrical Nerve Stimulation (TENS)**

TENS has been used successfully for pain relief in acute and chronic pain conditions. TENS can be used for pain relief at varying frequencies (most commonly between 50 and 120 Hz).

Although not fully understood, it is thought that TENS alleviate pain through activating supraspinal and spinal mechanisms. TENS has resulted in increased levels of  $\gamma$ -amino-butyric acid (GABA), endorphin, enkephalin and dynorphin in spinal cord (41,42). Self-administered TENS yielded comparable temporary pain reduction in patients with FM (43).

#### **4.2. Pulsed Electromagnetic Fields, Repetitive Transcranial Magnetic Stimulation**

Low-frequency pulsed electromagnetic fields (PEMF, 1000 Hz or less), comprise a potentially new modality of therapy for chronic pain conditions such as FM. Exposure to PEMF of low strength (200  $\mu$ T head surface to 35  $\mu$ T deep brain) has been shown to produce analgesic (antinociceptive) effects in humans. This modality can be administered by means of cranial exposure (44,45).

Repetitive transcranial magnetic stimulation (rTMS) is another safe non-invasive technique for electromagnetic stimulating the cerebral cortex. rTMS is also effective in reducing pain in patients with refractory central pain (46). The rTMS parameters for treating FM syndrome in the previous studies were 25 series of eight-second pulses, with 52 s interval between series, at a stimulation frequency of 10 Hz, giving a total of 2000 pulses per session. rTMS was also

found to induce a long-lasting decrease in pain and improved quality of life in patients with FM, without affecting mood or anxiety levels (47-49).

The mechanisms by which electromagnetic forces cause pain reduction are not fully understood. However, there is evidence that electromagnetic forces increase the release of endogenous opioids via the brain's limbic system and a direct effect on thalamic function by changing brain wave activity. In previous studies, PEMF was found effective to improve function, pain, fatigue, and global status in patients with FM (49,50).

#### **4.3. Transcranial Direct Current Stimulation**

Transcranial direct current stimulation (tDCS) is among the techniques of noninvasive brain stimulation. Low amplitude direct current is applied to the scalp via two relatively large anode and cathode electrodes in this technique. Consecutive 5 or 10 daily sessions of 2 mA, 20 min tDCS of the left primary motor (M1) or dorsolateral prefrontal cortex (DLPFC) could be applied. In the previous studies, tDCS was found effective to improve pain, and sleep in patients with FM. A longer treatment protocol involving consecutive 10 daily sessions offer additional, more long-lasting clinical benefits in the management of pain from FM (51,52).

#### **4.4. Low Level Laser Therapy (LLLT)**

The efficacy of this treatment method is controversial in FM syndrome (53,54). It is suggested that prolonged laser exposure may produce photochemical reactions which alter neuronal activity resulting in pain relief. Patients with FM may be treated for 3 min at each tender point daily for consecutive 10 to 15 days at each point with approximately 2 to 10 J/cm<sup>2</sup>.

#### **4.5. Ultrasound Therapy and Interferential Current**

Ultrasound (US) therapy is used for the physiological effects on tissues derived from its mechanical and thermal action. The mechanical action increases cell permeability, decreases inflammatory responses consequently reduces pain by decreasing nerve conduction velocity. As well as US has a thermal action that contributes to local vasodilatation leading to an improvement in muscle spasm and pain (55,56). The pulse parameters of US therapy for FM treatment could be 1MHz and 2.5 W/cm<sup>2</sup> (57).

Interferential current is a type of medium frequency currents which is able to reach deep muscles and nerves. It enhances peripheral blood flow, stimulates active contraction, and promotes analgesia in painful areas. The parameters for interferential current treatment could be 4000-4100Hz, and Amplitude-Modulated Frequency 100Hz. US therapy combined with massage or interferential current might be an effective therapeutic approach for pain and sleep manifestations in FM (57).

In conclusion; At present, use of selected electrotherapeutic intervention or hydrotherapy with aerobic exercises or other exercises programs and massage are indicated. At this time, in the light of literature, none of the currently used physical therapy agents can be refuted in the treatment of FM.

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