

# The Effect of Aerobic Exercise Accompanied by Music on Pain, Quality of Life, and Well-Being in Patients with Fibromyalgia Syndrome

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## ABSTRACT

Fibromyalgia is a medical issue characterised by increased sensitivity to all stimuli. This sensitivity often manifests as joint stiffness, chronic pain at multiple tender points, and systemic symptoms such as cognitive dysfunction, sleep disorders, anxiety, fatigue, and depressive episodes. Fibromyalgia occurs without any identifiable underlying organic disease. Listening to music while exercising has been found to have many advantages in various of physical activities. It may enhance good emotions, enhance physical performance, decrease the perception of effort, and improve physiological efficiency. Furthermore, music has beneficial impact on patients neurological and endocrine systems, evoking significant emotional and cognitive reactions. It also regulates the mental and physiological functions of humans and provides a balance between oxygen and blood in the brain, and wordless music is effective for training pain. In this article, the effects of physical activity accompanied by music on the body in patients with fibromyalgia syndrome, the results of studies on music and exercise, and possible results obtained when music and exercise are used together are discussed. Because of the literature review, physical activity with music was found to have a positive effect on reducing fibromyalgia symptoms.

**Keywords:** Fibromyalgia, physical exercise, music, pain, quality of life, psychological well-being

## INTRODUCTION

Fibromyalgia is a medical condition characterised by persistent and extensive pain in the muscles and skeleton, which is sometimes accompanied by symptoms such as exhaustion, digestive disruptions, and changes in sleep patterns and mood (1). The most common symptoms are widespread musculoskeletal pain, impaired sleep quality, anxiety, depression and decreased quality of life (2). In addition, muscle cramping, headaches, gastrointestinal disorders, waking up without feeling refreshed, cognitive dysfunction, generalised sensitivity, difficulty performing daily activities, and psychosomatic symptoms associated with such conditions can occur (3). Patients with severe depressive disorder and FMS (fibromyalgia syndrome) also frequently have functional somatic symptom, although they are distinct medical disorders (4). The influence of symptoms on pain, physical functionality,

and quality of life is long-lasting (5). This condition disrupts patients daily routines and reduces their well-being.

## Fibromyalgia

Fibromyalgia was first described in the 19th century, and in the 1970s, it was discovered that its aetiology was related to the central nervous system (6). It is a syndrome with an ICD code M79.7 that has no underlying organic disease. Fibromyalgia is the third most common diagnosis in rheumatology clinics (7). The age range in which it generally occurs is 30-35 years (1). It is estimated that 2%-8% of the global population will be affected by fibromyalgia (8). Family history and female sex are among the risk factors. In a study conducted in Turkey, its prevalence in women was 3.6% (9). The prevalence of this condition is greater in women than in men, and it is mostly attributed to elevated levels of anxiety and depression, modified pain response

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behaviour, changed central nervous system (CNS) input, and hormonal influences associated with the menstrual cycle (10).

The diagnosis of FMS is currently based on clinical evaluation. No definitive laboratory test, radiographic examination, or biological marker has been identified. It is thought that abnormal central and/or peripheral pain mechanisms play a role in the development of widespread and chronic pain reported by patients with fibromyalgia, together with genetic factors (11). People with genetic predisposition develop fibromyalgia as a result of exposure to environment-related, physiological, and psychological stresses (12). The pathophysiology of fibromyalgia is influenced by several factors, including autonomic and neuroendocrine system dysfunction hereditary factors, and exposure to environmental stressors (13). Fifty percent of patients with FMS also state that their symptoms started suddenly after a febrile illness; for example, 50% of FMS patients state that their symptoms begin after a febrile illness (14).

There is no definitive cure for fibromyalgia. Treatment is primarily focused on managing symptoms and improving quality of life. To this end, ensuring patient well-being, reducing or eliminating pain, and thus improving quality of life are highly important for both the treatment course and patient. This treatment method necessitates a thorough multidisciplinary strategy that includes the use of medications, lifestyle modification, and the incorporation of various complementary therapies. Pharmacologic therapy is highly recommended as a means of treatment. However, it has a low level of efficacy and some side effects (15). The treatment process requires a multidimensional approach to fibromyalgia management, including pain management, nonpharmacological methods, behavioural therapy, patient education, and exercise (16). Research on alternative therapies that have fewer or no side effects on patients has increased in recent years with physical therapy-oriented nonpharmacologic treatments (17). Unfortunately, conventional medical treatments offer limited benefits. According to statistics, 90% of patients with FMS use complementary medicine to treat their symptoms (1). Alternative treatments for fibromyalgia include physical exercise, aerobic exercise, low to moderate level to acupuncture to improve pain and stiffness, thermal therapies such as body heating and cryotherapy, hyperbaric oxygen therapy (HBOT), exercise, and massage, probiotics, plant extracts, and natural products that reduce the burden of fibromyalgia on quality of life and improve pain and other symptoms. Exercise, which is a nonpharmacological treatment method aimed at increasing the physical functions of patients and improving their general health status, and training and cognitive behavioural therapy programmes that can be applied in different contexts have been found to be effective in the treatment of FMS. Treatment methods using a single modality cannot provide complete efficacy in patients with FMS, and the most effective methods in clinical practise are treatment approaches that combine pharmacological and nonpharmacological treatment methods (18).

One of the most promising and cost-effective nonpharmacological approaches for treating FMS is physical exercise (19). Moderate, low-impact aerobic exercise at 60-70% of the maximum heart rate two to three times a week is one of the therapeutic measures with proven efficacy in improving pain, depression, and stress (20). Although physical activity and exercise are not standard treatments for fibromyalgia regular participation in physical activities has a positive effect on psychological functioning in individuals with FMS (21). According to a meta-analysis, patients with FMS engaged in aerobic, resistance, or mixed exercise showed substantial improvements in physical function. As a result, it was thought that combining exercise with other therapies could help individuals with FMS live better lives, experience less muscle discomfort, and perform better physically (5).

### Music Therapy

Managing music requires evolutionary skills that include social integrity, collaboration, group coordination, and communication. Simultaneously, this task is multifaceted and stimulates several cognitive functions, including perception, emotion, learning, teaching, and memory, in the brain (22). Empirical evidence supports this finding. Music therapy can cause many physiological changes, such as changes in respiration, heart rate, skin conductance, motor patterns, neuroendocrine response, and immunological function (23). Similarly, comparable physiological responses have been observed during physical exertion (24).

A harmonious mind, body, and soul are produced through music. Sound and music have a beneficial effect on pain and anxiety. Music therapy is a successful approach for decreasing pain and anxiety severity intensive care. Music has psychological and physiological effects on people, and although it is quite difficult to analyse these effects, two theories are mentioned. The first theory posits the psychological effects of music due to its physiological effects. The second theory is the effect of music on first degree emotions (25). Music has beneficial effects on patients' neurological and endocrine systems, facilitating the emergence of significant emotional and cognitive responses. Music has a positive effect on hormones such as serotonin, dopamine, testosterone, and adrenaline, which play a role in the development of mental diseases and control human emotions. Furthermore, music maintains the proper balance of oxygen and blood flow in the brain while also regulating physiological processes such as blood pressure and respiration (26). According to recent findings, the endogenous opioid system (EOS) may be activated when there is active sensorimotor synchronisation, including endorphin release, with music (27, 28). Additionally, according to recent evolutionary theories, the ability of humans to coordinate their movements with the beat of music in a group—such as when they sing, clap, drum, or dance—is an evolutionary adaptation because it fosters social cohesion (27, 29). The person feels better as a result.

### Use of music during physical activity

The prevalence of fitness routines involving music has increased over the past 20 years. Research has revealed that incorporating music into exercise has ergogenic effects, meaning that it enhances exercise performance. Additionally, exercise provides psychological benefits, such as improved mood, and psychophysical benefits, such as reduced perception of effort during exercise (24). It has been proven that music has a soothing and relaxing effect. In addition to these qualifications, it has cognitive stimulant properties (30). Music therapy is thought to bypass or compensate for impaired neurological processes, such as pain management, and affect regulation in a multiplex manner. (31). Music has also been recommended as a strategy for improving adherence to physical exercise because of its propensity to elevate emotional states during physical activity (32,33). A meta-analysis revealed that including music in exercise routines yields many advantages in terms of physical activity. These benefits include promoting a more pleasant emotional state, improving physical performance (known as the ergogenic effect), reducing the perception of exertion, and increasing physiological efficiency (34). The results of a study using VIVIFRAIL exercise with music demonstrated that participants felt physically fit, were invigorated, and had positive emotions (35). Another meta-analysis revealed that music has a significant effect on pain treatment with high heterogeneity and that music without lyrics is effective for pain treatment (36). Moreover, music is known to positively affect human mood (37). Accordingly athletes who listened to music while exercising experienced an increase in positive psychological impacts, including self-worth, attention, confidence, and the desire to exercise more. In addition, listening to fast-paced music was found to increase general exercise tolerance and neuromuscular fatigue thresholds. The electromyographic fatigue threshold (EMG FT) was defined functionally as the highest exercise intensity that can be sustained indefinitely without increasing the EMG activity of the working muscle. Listening to fast-rhythm music increases overall exercise tolerance and neuromuscular fatigue thresholds (38). Music can be used to increase motivation during bodily activity or to distract oneself from feelings of wear (39). It may relieve pain, anxiety, and psychophysiological stress. Numerous studies have demonstrated that music can reduce pain and anxiety while also enhancing quality of life for both healthy people and patients. A study conducted in a palliative care unit observed that classical Turkish music therapy increased comfort and functional capacity while also reducing pain and anxiety. (40). Music therapy several beneficial effects, including lowering blood pressure, heart rate, body temperature, and breathing rate; it also promotes relaxation, alters the patient's perception of pain, diverts attention, and lessens nausea caused by chemotherapy; and, most importantly, it enhances the quality of life, particularly for patients approaching the end of their life. Relaxing with music apps reduces anxiety, depression, and stress levels (41). It also alleviate insomnia (42, 43).

Although it is commonly recognised that listening to music can reduce pain, its effects are marginal, and its therapeutic

relevance is questionable. Recent theoretical developments, however, indicate that synchronising with music—whether by tapping, clapping, or dancing—has major evolutionary social implications linked to endogenous opioid system activation, which fosters social bonding and analgesia. Thus, compared with merely listening to music, active sensory-motor synchronization with music may provide greater analgesic benefits (44). In selecting the music to be used during exercise, various musical tendencies should be preferred among the types of music that are relevant to the activities. Fast, loud music can be played to promote optimal exercise, in which loudness and tempo interact (45).

(45). The correct metronome (BPM) count could be applied during exercise (46). The sound of the music should be heard equally by all parts of the exercise environment. Music and exercise should be selected simultaneously. Regardless of the metronome number of the music, the rhythm of the exercise should be at the appropriate synchronization. The use of music in sports is recommended because studies have shown that music has a positive effect on adjusting the breathing rhythm and increasing performance when exercising. In the realization of the design, it is possible to benefit from the fact that the musical form is effective for imagery. Research has shown that listening to fast-paced, energetic music while exercising influences an athlete's heart rate, and that there are parallels between human movement and musical rhythm (37). There are many randomized controlled studies on the effectiveness of music and exercise in patients with fibromyalgia.

### CONCLUSIONS AND RECOMMENDATIONS

Studies have shown that exercise has positive effects on pain perception, quality of life, and physical condition in FMS patients. The positive effects of music on a person's mood are well known. Additionally, a pilot study examining the effect of low-impact aerobic exercise combined with music therapy on patients with fibromyalgia revealed that therapeutic aerobic exercise was effective in improving depression and general discomfort in individuals with FMS. Aerobic exercise is more effective when combined with music therapy. This increased. Based on these data, it is necessary to investigate the effects of exercise combined with music therapy on FMS symptoms and increase the number of studies on this subject. If the applications yield positive results after research, will provide ease of application if the patient can apply them on their own and without being dependent on a healthcare institution. In addition, it is advantageous in many respects because it is a safe, cost-effective intervention. In addition to pharmacological treatments, it can be recommended for patients with fibromyalgia to reduce their symptoms or as a nonpharmacological treatment method. Because of the literature review, physical activity with music was found to have a positive effect on reducing fibromyalgia symptoms in patients.

**Table 1.** Studies on exercise and music therapy among patients with fibromyalgia

Work Performed	Method	Description of the Study	Data Collection Tools	Implementation	Result
Gavi et al. (47)	Randomised Controlled Study	The groups were divided into 2 groups as strengthening exercises (STRE) or flexibility (FLEX) exercises. STRE had different exercises.	Visual Analogue Scale (VAS), Heart Rate Variability (HRV), Treadmill test, Sit and lie test (Wells and Dillon's Bench), Maximal repetition test, and hand grip dynamometry; Quality of life with Fibromyalgia Impact Questionnaire (FIQ); Beck and Idate Special Situation Inventory (IDATE); Short-form health survey (SF-36)	Exercise was performed in both groups twice a week for 45 min for 16 weeks in accordance with the recommendations of the American Sports Medicine Association.	Strengthening activities enhance strength and discomfort more quickly and significantly than flexibility exercises. Both groups experienced improvements in fitness, pain, anxiety, sadness, and quality of life, but there was no change in autonomic modulation.
Assumpcao et al. (48)	This was a three-arm randomised controlled study.	For 12 weeks, individuals with FM underwent stretching and weight training for two days a week.	The Fibromyalgia Impact Questionnaire (FIQ) was used to measure FM symptoms, the SF-36 quality of life scale was used for the Medical Outcome Study, and a visual analogue was used to quantify pain.	In addition to medical treatment, two different exercise programmes were applied to the stretching and resistance groups twice a week for 12 weeks.	Resistance exercise was most beneficial in lowering depression and stretching exercise was most successful in increasing quality of life, particularly in terms of pain and physical functioning.
Busch et al. (49)	Systematic review	Several high-quality RCTs published between 2007 and 2011 were reviewed, including aerobic, strength, flexibility, and mixed-format aquatic and land-based exercise regimens.			Aerobic physical fitness and quality of life are improved while lowering pain, weariness, and depression.
Izquierdo-Alventosa et al. (50)	Randomised controlled study	For a total of 16 sessions, conducted twice a week for 8 weeks, 32 women with fibromyalgia participated in low-intensity physical exercise that included aerobic and low-load resistance exercises with the goal of improving endurance and coordination.	Visual Analogue Scale and Borg Perceived Exertion Scale scores	The first phase (sessions 1 to 4) consisted of 15 min of relaxed walking, 25 min of a 10-exercise circuit, and 20 minutes of cooling down. The exercises were performed using 1-kg dumbbells and weights at a speed determined by a metronome set at 60 beats per minute. The second phase is cooldown	Physical exercise improves pain in women with fibromyalgia. It also improves perceived pain, quality of life, and physical fitness.
López-Roig et al. (51)	A cross-sectional prospective study	The exercise study included 211 female patients with fibromyalgia.	Self-efficacy scale for physical activity, Chronic Pain Self-efficacy Beliefs, International Physical Activity Perception of pain intensity, Perceived impact of fibromyalgia and disability, Commitment to be physically active and exercise Catastrophizing pain scale, and Tampa Kinesiophobia scale scores	The 30 and 60 min sessions are designed for fast walking, performing Daily physical activities, and moderate exercise.	The tool can be a helpful tool for assessing patients' feelings about their abilities and tailoring the goals and methods of physical activity and walking exercise interventions.

**Table 1 continued.** Studies on exercise and music therapy among patients with fibromyalgia

Work Performed	Method	Description of the Study	Data Collection Tools	Implementation	Result
Polat et al. (52)	Randomised controlled, experimental study	Exercise as a virtual reality and traditional training group were randomly assigned to 34 patients with fibromyalgia.	Fibromyalgia impact questionnaire, Visual analogue scale (vas), Hospital anxiety and depression scale, Fatigue severity scale, Symptom severity scale, euroqol-five dimension index scale/VAS, and six-minute walk test	For four weeks, the conventional training group performed conventional exercise (three days a week, 15 min a day) and aerobic exercise (three days a week, 20 minutes a day). For four weeks, the virtual reality group mixed bicycle exercise with virtual reality exercise three days a week for 15 minutes each. Both groups engaged in the identical 4-week at-home workout regimen after the exercise.	Combining virtual reality activities with aerobics exercise improves quality of life, patient satisfaction, and cardiopulmonary capacity in patients with fibromyalgia syndrome. In addition, it could improve patient adherence to exercise.
Medeiros et al. (53)	Randomised single blinded study	Forty-two female patients with fibromyalgia were randomised into two groups, and an exercise programme was applied.	Pain was measured using the Visual Analogue Scale (VAS), function using the Fibromyalgia Impact Questionnaire, sleep using the Pittsburgh Sleep Quality Index, quality of life using the SF-36, fear avoidance using the Fear Avoidance Beliefs Questionnaire, and pain catastrophizing using the Pain Related Destructive Thoughts Scale.	The participants performed Mat Pilates and water aerobic exercise twice a week for 12 weeks. Both baseline and 12-week assessments were completed.	In terms of function and discomfort, both groups showed improvement. There was no discernible variation in any assessed factors between the groups.
Espí-López et al. (19)	Single-blind, randomised controlled pilot study	For 8 weeks, 35 patients with fibromyalgia were divided into three groups: (G1) therapeutic aerobic exercise combined with music therapy (n = 13); (G2) therapeutic aerobic exercise in any rhythm (n = 13); (G3) therapeutic aerobic exercise in any rhythm (n = 13); and (CG) control (n = 9).	Before and after the intervention, measures were taken for depression, quality of life, general discomfort, and balance.		Patients with fibromyalgia who engage in therapeutic aerobic exercise reported reduced overall pain and depression. The efficacy of this treatment is enhanced when combined with music therapy, thereby enhancing balance and quality of life.
Lepping et al. (54)	Double-blind Randomised Controlled Type	9 participants with fibromyalgia were randomly selected to listen to instrumental Western Classical music (5 people) or nature sound (4 people) control.	Pain tolerance and threshold were objectively measured using quantitative sensory tests; first, the Quantitative sensory test (QST) was used to differentiate the central pain phenotype in fibromyalgia. Autonomic nervous system (ANS) reactivity was measured an electrocardiogram.	Patients were first isolated from the sound, and then music was played for 25 min. Meanwhile, QST (quantitative sensory test) and ECG (electrocardiogram) tests were performed. This procedure was repeated at 1-week intervals.	Although the results are cautious, this study provides evidence that some people may benefit more from music and sound stimulation as a treatment than others. Further studies are required.

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