9-2017

Exercise as a Treatment for Fibromyalgia: A Scoping Review

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ABSTRACT

Fibromyalgia is a chronic, disabling condition that is both challenging to manage and frustrating for the patient and primary care provider. The aim of this scoping review is to explore how nondrug treatments, such as exercise, can reduce pain and promote physical function in adults with fibromyalgia (FMS). The body of literature on exercise as a treatment for FMS has identified beneficial effects, but there is no standardized approach for prescribing an exercise regimen in primary care. We conclude with a synthesis of general recommendations for exercise approaches to support care for patients with FMS.

Keywords: exercise, fibromyalgia, pain

INTRODUCTION

Fibromyalgia syndrome (FMS) is a chronic disorder characterized by pain, specific tender points, fatigue, sleep disturbance, and mood disorders.[1,2] FMS was defined by the American College of Rheumatology[3] as a patient having chronic widespread pain for ≥ 3 months, involving at least 11 of 18 tender points, and including fatigue, sleep disturbances, or other somatic syndromes, with symptoms that often begin in middle adulthood.[4] The prevalence of FMS worldwide is 2.7% (4.2% in females and 1.4% in males) of the population. Onset of FMS usually begins at 30-40 years of age.[2] As many as 1 in 20 primary care patients have undiagnosed pain and other symptoms of FMS.[1,4]

Because primary care practices are seeing a number of FMS patients, both effective communication with patients and advocacy on their behalf are needed to assure they receive the quality of treatment necessary to manage their disease.[5] Identification and early treatment of FMS are necessary to address individualized patient needs, their symptoms, and other comorbidities that may also require management related to level of functional impairment.[1]

Despite increased knowledge about FMS, there is currently no cure, but exercise has been shown to improve the individual's well-being over time.[6] The concept of exercise as a possible intervention for treatment of FMS began in the 1970s with a sleep laboratory study.[7] Although the efficacy of exercise in patients with FMS has been documented in multiple investigations, few studies have identified best-practice recommendations regarding exercise programs in the primary care setting.[8-10] The indication for using exercise as a treatment modality in FMS is to prevent inactivity and poor physical conditioning often associated with the pain and fatigue of the disorder. Deconditioning that results from inactivity can worsen the symptoms associated with FMS. Those with FMS who consistently exercised reported fewer symptoms, enhanced physical function, and improved overall well-being.[9]

METHODS

Scoping Review Design and Rationale

The aim of this review was to explore how exercise can reduce pain and promote physical function in adults who have painful conditions due to FMS. Integrating evidence from diverse knowledge sources can assist clinicians in making best-practice clinical decisions. A scoping review was chosen for this study for its systematic approach and narrative overview of the findings. Our 2-fold purpose in this project was to: (1) summarize and disseminate evidence-based findings using a rigorous and transparent method; and (2) identify gaps in the existing research literature.[11]

No previous study using a scoping methodology has focused on an exercise plan for treatment of patients with FMS. The following specific research questions guided this review:

- What is the typical length of time an FMS patient remains in an exercise program to gain relief from symptoms?
- Which types of exercise are typically recommended to patients diagnosed with FMS?
- When patients newly diagnosed with FMS are given information on exercising as a treatment, do they maintain their exercise regimen?
- Which barriers are associated with adopting an exercise program for FMS?

Search Strategy Details: Identification of Relevant Studies From 2010 to 2017

A search strategy was developed to capture the most relevant research on exercise as a treatment intervention for FMS while keeping the search broad enough to be comprehensive. A research librarian at the Medical University of South Carolina in Charleston was consulted for input on the appropriate search strategy, databases, and terms. The search terms included: interventions; treatments; fibromyalgia; musculoskeletal pain; and chronic pain. Terms used to describe consequences that patients may experience included: outcomes; costs; burdens; and consequences. Searches were conducted in CINAHL, Medline, PubMed, and Cochrane. Selected references were chosen from previous reference lists. From 53 research studies, 17 studies were duplicates. Once the duplicates were removed, 36 records were further screened, 11 studies were excluded because FMS was not the primary diagnosis, and an additional group of 15 studies were excluded for not meeting the inclusion criteria or were not relevant. The researchers were left with 10 articles. The quality of evidence was evaluated using the methods described by Melnyk and Fineout-Overholt.[12] Eight of the articles were randomized trials indicating a high level (Level 2) of evidence quality: 1 was a longitudinal study and 1 was a retrospective chart review (both Level 4). A PRISMA-style flow diagram that summarizes the results of the literature search is included is shown in the Figure.

Screening Process: Inclusion and Exclusion Criteria

Studies were included if they provided data on the health and/or social consequences of exercise as a treatment for patients with FMS and if they met the following criteria: published in English; were peer-reviewed; provided care to adults > 20 years old; included men and/or women; involved a primary diagnosis of FMS; and had a publication date between 2010 and 2017. The search included studies involving: (a) patients cared for by different providers, including general medicine, primary care providers, pain management, physiatrists, chiropractors, and rheumatologists; and (b) advanced practice nurses and physician assistants, with a specialty in rheumatology, internal medicine, and/or pain management.

The following exclusion criteria applied: articles that dealt with patients who did not have a primary diagnosis of FMS; acute care patients who did not meet the criteria for FMS (eg, those in acute pain or in an acute care setting, long-term care, or a nursing home or hospice); and articles that did not provide specific information on exercise treatment/interventions/management in FMS.

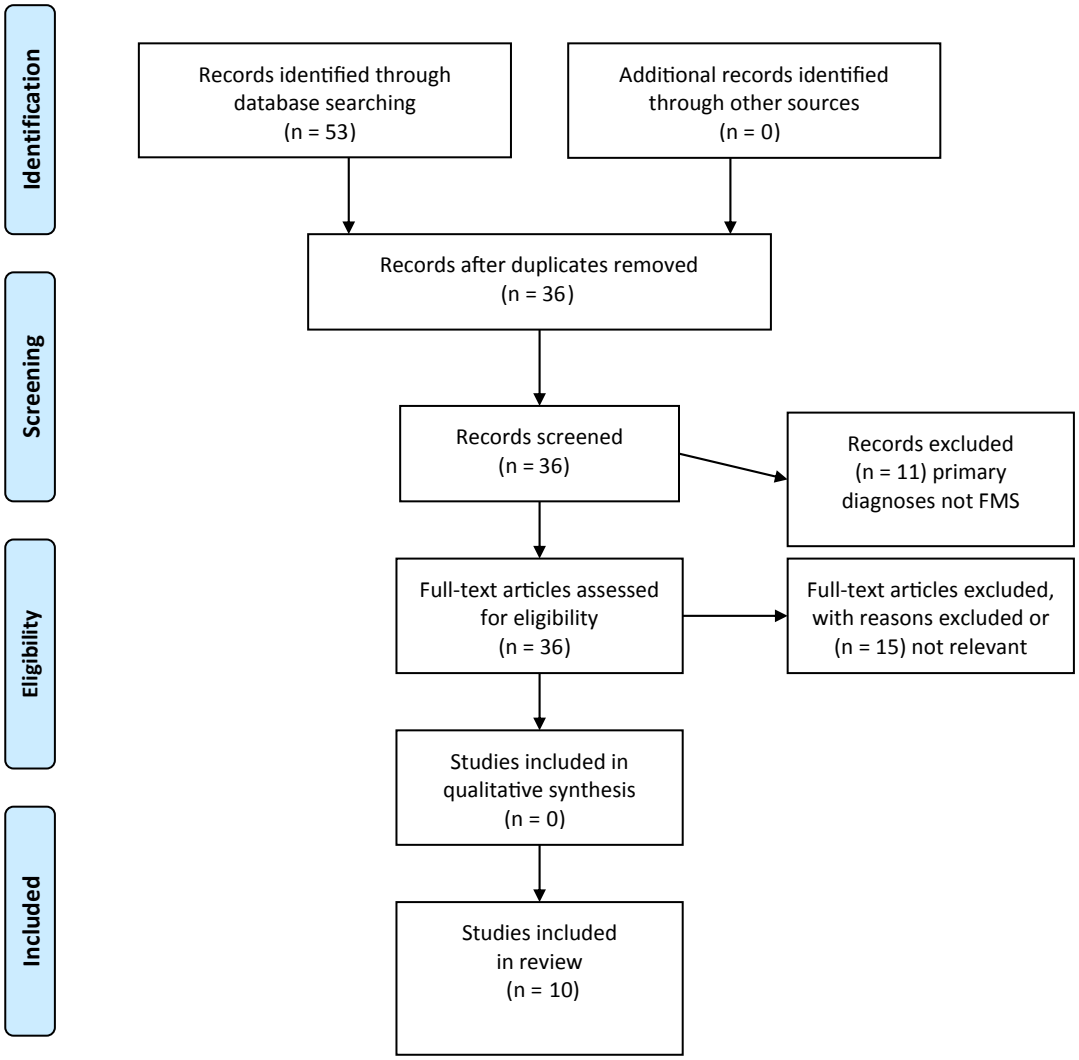
Data Extraction and Charting

Articles were screened for eligibility by both authors, and each selected study was reviewed and the data, if appropriate, were included (see Supplementary Table, available online at http://www.npjournal.org). The following criteria were included: (a) Reference source: author, year of publication, country of origin; (b) Study details: aims of the study, study design, population; (c) Intervention: exercise details; (d) Domains of consequences: outcome measures for exercise as a treatment for fibromyalgia; and (e) Important results: analysis.

RESULTS

The final sample for the scoping review contained systematic reviews and randomized, controlled trials (RCTs) from the United States, Canada, and Europe, during the period from 2010 to 2017. Several studies included both men and women, whereas others included only women. The final set contained 10 research studies. The most common findings within each of the exercise domains are included in the Supplementary Table online and summarized in what follows.

Figure. PRISMA flow diagram. Exercise as a treatment for fibromyalgia—a scoping review.



Aerobic Exercises

In their meta-analysis of 35 RCTs, Häuser et al[13] concluded that pain was reduced ($P < .001$) posttreatment by nonaquatic and aquatic exercise of moderate intensity done 2 or 3 times per week. Only 1 study within their review suggested FMS patients continue exercise at follow-up. In their RCT with female study participants, Sañudo et al[14] assessed whether aerobic exercise (AE) and combined exercises resulted in good patient compliance and results for both exercise groups. They found that a combined exercise program, including strength and flexibility exercises in AE rehabilitation for FMS, led to improvements in patients' shoulder/hip range of motion and handgrip strength.

Both strengthening and AE can reduce pain and improve tender point counts in adults with FMS. García-Martínez and colleagues[15] compared 12 women who completed a 12-week program consisting of aerobic, strength, and flexibility training with a control group of usual-care FMS patients. The study group had improved physical function, self-esteem, self-concept, and quality of life. Hooten et al[16] found that strengthening and aerobic exercise had comparable effects on reducing the severity of pain in patients with FMS. They further reported that

patients with FMS may either do aerobic or strengthening exercises to target their individual preferences with consideration for any comorbid medical conditions that limit participation in strengthening exercises. Nelson[17] conducted a systematic review that provided further support for the importance of muscle strengthening in improving functional outcomes when exercise is tailored to the individual and initiated at a low intensity.

Group Exercise

One study, by Karper,[18] utilized varied intensity group exercise with 7 women with FMS. The women all lived in the same community and drove to their exercise sessions 3 days per week for 60-minute sessions. The length of time participating in the program was 8-15 years. The author reported that the group expressed initial fear that exercise would increase their pain. Individual group members used a variety of other treatment modalities, but all consistently participated in the group exercise. Exercises were adapted to the needs of the group as their conditions changed. The study evaluated strength, walking ability, and patient perception of pain and fatigue. Although individual results varied, the participants consistently reported enhanced feelings of symptom improvement. They also noted that the group dynamic helped motivate them to continue in their participation.

Yoga

Yoga has been a proven mind/body discipline using both breathing and meditation, which may meet the need for both exercise and coping-related aspects of FMS treatment. Carson et al[19] conducted a pilot RCT with a sample of 53 women with FMS. At posttreatment, patients showed improvement in fatigue, pain, sleep, and mood, symptoms common in FMS. They reported that yoga helped them manage their symptoms, decreased tenderness, and enhanced their ability to cope with pain through exercise. These findings warrant further study.

Aquatic Therapy

Bidonde et al,[20] in a 2014 systematic review, found limited quality evidence to support the benefits of aquatic training in improving fitness and well-being in adults with fibromyalgia. The discrepancy between these studies and the perceived value of hydrotherapy warrants additional investigation. Neira and colleagues[21] are currently conducting an RCT in Spain to compare exercise on land versus the same exercise in water. It is a 2-group design with 20 women participating in each group; the results are not yet available.

Isometric Exercises

In their randomized isometric studies with 15 women with FMS, Bement et al[22] discovered that patients with FMS and limited mobility could effectively perform an isometric contraction, which is a significant finding. Pain was reported by age, baseline experimental pain, and changes in FMS pain intensity after the isometric contractions. The authors found that women who had substantial pain before exercise could obtain the greatest relief from isometric exercises.

Resistance Training

Resistance training aims to increase muscle strength. Resistance training programs usually include lifting weights or using resistance machines or elastic bands. Busch et al[23] evaluated 5 studies with a total of 219 women, of whom 95 were assigned to resistance training. Three studies were RCTs, 2 studies compared resistance training to aerobic exercises, and 1 study evaluated low-intensity resistance training. Resistance training was found to provide improvements for physical capacity in FMS.

DISCUSSION

FMS sufferers who exercise experience a decrease in their symptoms if they consistently participate and gradually increase the intensity of exercise. The majority of studies included in this review showed that individualized exercise, including land- or water-based aerobics, strength training, yoga, and stretching activities, are effective in improving physical function for patients with FMS. MacFarlane et al[24] recently published recommendations for the management of FMS that included an association of aerobic exercise and resistance training with improvements in pain and physical function and further noted that there was no difference in effectiveness when the exercise

was performed on land or in the water. There were no articles within the review period that specifically addressed walking as an intervention; however, in their study providing management recommendations for primary care providers, Arnold et al[4] noted that walking is an inexpensive exercise that can have a positive impact on FMS symptoms when gradually increased by sedentary participants. They indicated that FMS patients should begin slowly and gradually increase walking for up to 60 minutes, 2 to 3 times per week, at a low to moderate intensity. When possible, group exercise is beneficial for providing peer support and encouragement,[18] and swimming in warm water was found to be soothing and enjoyable.[20] Time of interventions varied in the studies reviewed; there was no consensus on the time frame from the start of exercise to initial improvement, which was primarily due to differences in individual patients.

The findings support the importance of confirming the diagnosis of FMS and developing a focused plan of care that includes an individualized exercise regimen. Several authors noted that there needs to be an individualized balance because too little exercise will not benefit the patients and too much exercise can exacerbate symptoms.[25] Primary health care providers should recommend FMS patients begin a tailored exercise program that includes monitoring of clinical and functional outcomes that adapt to the individual's goals. However, primary health care providers often lack training regarding the specifics of prescribing an exercise regimen, which is a major obstacle for the FMS patient.[8] A multidisciplinary approach, including a referral to physical therapy, may be of benefit to support comprehensive care for some patients, but this may not always be an option.

More research is needed to understand the process of implementing specific exercise recommendations for FMS patients in primary care settings. The current literature is sparse and older articles were included to reflect foundational understanding of the problem. Further reviews or research on exercise for the treatment of FMS could benefit from the evaluation of a more diverse age group, including younger and older persons living with FMS, to determine the extent to which resilience varies within and between different age groups. Reasons suggested for these age-related differences include age-related protective factors that may decrease the impact of FMS pain on both physical and psychological function.[2] In addition, no articles were identified that included the impact of pain on sleep issues in FMS, yet this would seem to be an area of concern worthy of future study.

RECOMMENDATIONS FOR PRACTICE

The consistent message across studies is that with gradual onset and graded increase in exercise there will be an improvement in symptoms of pain and physical function.

The barrier of pain was described as the greatest challenge for patients when beginning an exercise program. Most successful programs noted that concomitant education was key to motivating patients to begin and sustain an exercise program. In addition, beginning with achievable goals that will offer the patients a measure of success and encouragement was also discussed.

The primary take-home message is that exercise improves pain and physical function in FMS and that engaging in daily exercise is the best way to gain a benefit. What remains unclear is the precise prescription. In fact, there likely is no a one-size-fits-all approach, but there are recommendations.[24,26] Exercises should be individualized to meet the needs and tolerance of the individual patient. The following points are useful when developing an exercise plan:

- Start slow, encourage 10-minute walks that build up gradually to 30 minutes per day.
- Consider water exercise, water aerobics, or water treadmills.
- Yoga is low impact and can have positive results.
- Stretching before any exercise is useful to prevent injury.
- Strength training and aerobic exercises can be started slowly but should be supervised. This may require a referral to physical therapy for additional supervision and guidance, especially when concurrent illness is present.

It is important to know the resources available for local referral. Local community centers, fitness centers, and YMCAs often have low-impact exercise

programs for people with arthritis and other related conditions. Group programs, when available, may provide extra motivation for patients. Fitness trackers and smartphone apps may provide ways for patients to track their pain, engage in social support, and review recommendations for exercise. The sheer number of apps makes specific recommendations challenging and selection should be individualized to a specific patient's needs or preferences. The following web resources may be useful in supporting patient education efforts:

1. Websites that provide useful patient information and education for FMS:
   - Fibromyalgia (no date). http://www.arthritis.org/about-arthritis/types/fibromyalgia/ (retrieved May 05, 2017).
   - Fibromyalgia (2017). https://medlineplus.gov/fibromyalgia.html/ (retrieved May 05, 2017, includes Spanish language material).
2. Website that provides exercise recommendations for FMS:
   - Fibromyalgia exercises (no date). http://rheum.med.ufl.edu/patient-resources/fibromyalgia/fibromyalgia-exercises/ (retrieved May 05, 2017).

SUPPLEMENTARY DATA

The supplementary table associated with this article can be found in the online version at http://www.npjournal.org/. JNP

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In compliance with national ethical guidelines, the authors report no relationships with business or industry that would pose a conflict of interest.

1555-4155/17/$ see front matter

http://dx.doi.org/10.1016/j.nurpra.2017.06.018

Supplementary Table. Matrix of Studies

Source (Year)	Exercise Type	Location	Population and Method	Aim(s)	Results
Ang et al[9] (2013)	Walking	Indianapolis, IN	216 patients with FMS; RCT	Test MI to promote exercise and improve symptoms in FMS patients	MI group: larger increment in 6-minute walk test; short-term benefit
Bement et al[22] (2011)	IE	Milwaukee, WI, physical therapy	15 women with FMS; RCT	Evaluate effects of IE in women with FMS	Multiple regression showed age, pain, and change in FM pain intensity predictors of experimental pain after IE
Bidonde et al[20] (2014)	Aquatics	Canada	16 studies, 439 participants; RCTs	Evaluate aquatic exercise for people with FMS; outcome measures were wellness, fitness, and symptom relief	Overall well-being, physical function, pain, muscle stiffness and strength, and cardiovascular fitness improved
Carson et al[19] (2010)	Yoga	Oregon Health and Science University	53 female FMS patients; pilot RCT for 8 weeks	Assess effects of yoga on the overall outcome for patients with FMS	Postintervention patients showed improvement in symptoms of pain, fatigue, sleep, and mood
Häuser et al[13] (2010)	AE: land or water 2-3 times week for 4 weeks	Germany	2,494 patients reviewed; meta-analysis of 35; RCTs	Assess effectiveness of land or water approaches to aerobic exercise.	AE reduced pain improved physical fitness
Hooten et al[16] (2012)	Strength versus aerobic training program.	Rochester, MN	207 women recruited with FMS; randomized equivalence trial over 16 weeks	Assess the effect of ST and AE	Strength and AE had equivalent effects on reducing pain severity among FMS patients
Karper[18] (2016)	Multitype, changed as needs of group changed	Greensboro, NC	7 women participating 8-15 years; longitudinal	Improve pain, physical fitness, and fatigue	Individual results varied for each woman, but collectively they felt that the program improved symptoms of FMS

Nelson[17] (2014)	Muscle strengthening	Florida	Systematic review, 2000-2014; 11 RCTs included	Review muscle strengthening for improving functional outcomes in FMS	Tailored exercise that included muscle strengthening improved functional outcomes
Sañudo et al[14] (2010)	Aerobic exercise versus CE	Norwich, UK	64 women; RCT; FMS 1-3 groups 45-60 minutes for 24 weeks/RCT; community-based supervised intervention	AE, muscle strengthening, and flexibility exercises with improvement on FIQ	Compliance: attended 85% sessions, 14% FIQ improvement; CE with additional health benefits
Wilson et al[8] (2012)	Aquatics	Arkansas, university rheumatology clinic	Convenience sample, with 122 patients newly diagnosed with FMS; retrospective chart review	Evaluate exercise recommendations in patients newly diagnosed with FMS	Exercise in 47% of (57 of 122) aquatic, then aquatic AE and infrequent AE; only 7% referred (4 of 57) for PT

AE = aerobic exercise; CFS = chronic fatigue syndrome; CE = combined exercise; EI = exercise intervention; FIQ = Fibromyalgia Impact Questionnaire; FMS = fibromyalgia syndrome; IE = isometric exercise; MI = motivational interview; PF = physical function; PT = physical therapy; Pub = published; RCT = randomized = controlled trials; SM = self-management; ST = strength training; UK = United Kingdom.