

What is the benefits flexibility exercise training for adults with fibromyalgia? A Cochrane review summary with commentary

Ayşegül Ketenci¹ , Deniz Evcik² , Birkan Sonel Tur³ 

¹Department of Physical Medicine and Rehabilitation, Istanbul University, Istanbul Faculty of Medicine, Istanbul, Turkey

²Department of Physical Medicine and Rehabilitation, Ankara Güven Hospital, Ankara, Turkey

³Department of Physical Medicine and Rehabilitation, Ankara University, Faculty of Medicine, Ankara, Turkey

Received: July 27, 2020 **Accepted:** November 06, 2020 **Published online:** November 20, 2020

The aim of this commentary is to discuss in a rehabilitation perspective the Cochrane Review “Flexibility exercise training for adults with fibromyalgia” by Kim et al.,^[1] under the direct supervision of Cochrane Musculoskeletal Group. This Cochrane Corner is produced in agreement with the Turkish Journal of Physical Medicine and Rehabilitation by Cochrane Rehabilitation.

Background: Fibromyalgia (FM) is a chronic syndrome with generalized pain, fatigue, sleep disturbances, and cognitive dysfunction with unknown etiology.^[2] The most popular classification criteria were described by Yunus et al in 1990 which included widespread pain for at least three months and the existence of tenderness at least 11 of 18 points on the body.^[3] American College of Rheumatology (ACR) 2010 criteria was defined the widespread pain index (WPI), and the symptom severity scale (SSS). In 2011, ACR 2010 criteria was modified by allowing it as a self-report diagnostic tool. Final revision was reported in 2016 and added the definition of generalized pain, like as having pain in four of the five painful body regions.^[4]

Based on diagnostic criteria, available estimates of the prevalence of fibromyalgia 2-3% in Canada 0.4% in Greece and 0.6% in Thailand to 6.4% in the

United States and 8.8% in Turkey. Worldwide, the estimated prevalence of fibromyalgia based on previous diagnostic criteria is 2.7%, including 4.1% females and 1.4% males. Following the modified 2010 ACR criteria for fibromyalgia, the prevalence of fibromyalgia in the United Kingdom has increased from 1.7 to 5.4%. With these more recent criteria, gender ratios have reduced from 13.7:1 to 2.3:1.^[1]

Fibromyalgia has many symptoms that vary from person to person. Signs and symptoms reported by more than 25% of fibromyalgia patients include; widespread pain, fatigue, morning stiffness, headache, paresthesia, sleep disturbance, subjective swelling, dry mouth, loss of libido, irritable bowel, dysmenorrhea, joint hypermobility, temporomandibular joint dysfunction, dermatographism, Raynaud's phenomenon, and reticular discoloration of the skin.^[4]

Management of FM includes both pharmacological and non-pharmacological treatments with a multidisciplinary approach.^[1,4] The majority of non-pharmacologic treatments consist of exercise training.^[1] Exercise improves the stress, muscle strength, endurance and posture.^[4] The effectiveness of aerobic exercise was shown with a moderate evidence before whereas there is still conflict on flexibility exercises.

Corresponding author: Ayşegül Ketenci, MD. İstanbul Üniversitesi İstanbul Tıp Fakültesi, Fiziksel Tıp ve Rehabilitasyon Anabilim Dalı, 34093 Fatih, İstanbul, Türkiye.
e-mail: draysegulketenci@gmail.com

Cite this article as:

Turan Z, Topaloğlu M, Özyemişçi-Taşkıran Ö, Ketenci A, Evcik D, Sonel Tur B. What is the benefits flexibility exercise training for adults with fibromyalgia? A Cochrane review summary with commentary. Turk J Phys Med Rehab 2020;66(4):468-472.

**This summary is based on a Cochrane Review previously published in the Cochrane Database of Systematic Reviews 2019, Issue 9, Art. No.: CD013419. DOI: 10.1002/14651858.CD013419 (see www.cochranelibrary.com for information).
Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and Cochrane Database of Systematic Reviews should be consulted for the most recent version of the review.*

The views expressed in the summary with commentary are those of the Cochrane Corner authors and do not represent the Cochrane Library or Wiley.

American College of Sports Medicine (ACSM) defined that, “flexibility exercise training is a type of exercise that focuses on improving or maintaining the range of motion in muscles and joint structures by holding or stretching the body in specific positions” in 2013. Low levels of flexibility have been associated with postural problems, pain, injuries, decreased local vascularization, and increased neuromuscular tensions. In fact, flexibility training programs have been used to improve a person's well-being and as a tool for symptom management in different clinical populations such as those with major depressive disorders.^[1]

This Cochrane review examined different types of flexibility exercises (ballistic methods, active or passive static stretching, proprioceptive neuromuscular facilitation) on the effectiveness of FM.

Flexibility exercise training for adults with fibromyalgia (Kim et al., 2019).^[1]

What is the aim of this Cochrane review?

The aim of this Cochrane review is to evaluate the beneficial effects and harms of flexibility exercise training for adults with FM by reviewing the current evidence derived from randomized controlled studies. This review is an updating one of the review published in 2002.

What was studied in the Cochrane review?

The population studied in the Cochrane review included adult patients (≥ 18 years) diagnosed with FM. Studies with different diagnostic and classification criteria were included in this review.

They had presented data on interventions using the Frequency, Intensity, Time, Type, Volume, Pattern and Progression (FITT-VP) principles of exercise prescription outlined for healthy individuals (ACSM 2013).

Flexibility exercise group (ballistic methods, active or passive static stretching, proprioceptive neuromuscular facilitation) was compared with untreated control group, land-based aerobic exercise, resistance exercise, and others including pilates, friction massage, Tai Chi, medication and aquatic biodanza. Studies evaluated the effectiveness of flexibility exercises combined with additional interventions such as educational programs and studies using cross-over or cluster-randomized designs were excluded.

The major outcomes of this review were: Health-related quality of life (HRQoL), pain intensity, fatigue, stiffness, physical function, adverse events, and

number of participants who withdrew or dropped out. Tenderness, depression, and greater than 30% improvement in pain were designated as minor outcomes.

Fibromyalgia Impact Questionnaire (FIQ Total), Short Form Health Survey Questionnaire (either the SF-36 total or the SF-12 total) and the EuroQoL-5D (EQ-5D) for Health-related quality of life, Visual Analogue Scale (VAS), FIQ Pain, McGill pain VAS and Numerical Pain Rating Scale for pain intensity, FIQ subscales for fatigue, stiffness, physical function, different depression scales like Beck Depression Inventory, Hamilton Depression Scale for depression, tender point count for tenderness were used.

Search methodology and up-to-dateness of the Cochrane review?

The investigators searched the Cochrane Library, MEDLINE, Embase, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PEDro (Physiotherapy Evidence Database), Thesis and Dissertation Abstracts (ProQuest), AMED (Ovid) (Allied and Complementary Medicine Database), the World Health Organization International Clinical Trials Registry Platform (WHO ICTRP) (www.who.int/ictcp/en/), and ClinicalTrials.gov up to December 2017 unrestricted by language.

What are the main results of the Cochrane review?

This review included 14 full-text publications (12 primary studies and 2 companion papers), 1 thesis, and 2 trial registry records with a total of 743 participants.

There was one study compared flexibility exercise versus untreated controls. Exercise was applied under supervision with a frequency twice a week and gradually increased to 40 minutes during 12 weeks.^[5] Flexibility versus aerobic training was studied in five studies.^[6-10] Exercise frequency ranged from one to three times a week, duration varied from 8-20 weeks. None of the studies specified the intensity of the stretching exercises. One study compared the flexibility with control which included three groups as flexibility, resistance and control group.^[5] In three studies flexibility versus resistance exercise training.^[5,11,12] were assessed. It was twice a week, for 40-60 minutes, for a duration of 12-20 weeks. Flexibility versus other comparators included four studies.^[13-16] The frequency was two or three times per week, 60 minutes, for a period of 4 to 12 weeks.

According to these studies this review reports that:

Flexibility exercise training versus land-based aerobic exercise training

Health-related quality of life: The analysis showed no evidence of a clinically important benefits in HRQoL, pain, intensity, fatigue, stiffness and physical function for flexibility exercise training compared with aerobic training post-intervention (n=193; mean difference (MD) 4.14, 95% confidence interval (CI) -5.77 to 14.05). Absolute change was 4% worse (6% better to 14% worse). Relative change in the flexibility groups compared to the aerobic groups was 7.5% worse (10.5% better to 25.5% worse).

Pain intensity: The meta-analysis showed no evidence of a clinically important effect on pain with flexibility exercise training compared with aerobic exercise training (n=266; MD 4.72, 95% CI -1.39 to 10.83). Absolute change was 5% worse (1% better to 11% worse). Relative change in the flexibility groups compared to the aerobic groups was 6.7% worse (2% better to 15.4% worse).

Fatigue: Studies showed no evidence of a clinically important improvement on fatigue with flexibility exercise compared to aerobic exercise (n=75; MD -4.12, 95% CI -13.31 to 5.06). Absolute change was 4% better (13% better to 5% worse). Relative change in the flexibility groups was 6.0% better compared to aerobic groups (19.4% better to 7.4% worse).

Stiffness: Authors found a very low-certainty evidence that flexibility exercises effect on stiffness. Absolute change was 30% better (8% better to 51% better). Relative change in the flexibility group compared to the aerobic group was 39% better (10% better to 68% better).

Physical function: The results showed no important difference between flexibility and aerobic groups. Absolute change was 6% worse (4% better to 16% worse). Relative change in the flexibility groups compared to the aerobic groups was 14% worse (9.1% better to 37.1% worse).

Adverse events: There was no clear adverse effects reported for two groups.

All-cause withdrawal: There may be no difference in the proportion of withdrawals between the flexibility exercise training and aerobic exercise training groups (risk ratio (RR) 0.97, 95% CI -0.61 to 1.55).

They found no effect on depression, tenderness and pain improvement with flexibility exercise.

Depression: Post treatment results of flexibility exercise showed no difference in depression scores when compared with aerobic exercise training (n=94; MD -6.28, 95% CI -19.28 to 6.71).

Tenderness: The meta-analysis presented no difference in tenderness between flexibility and aerobic exercise groups (n=253; standardised mean difference 0.20, 95% CI -0.08 to 0.48).

Improvement in pain greater than 30%: No evidence was found.

Flexibility exercise training versus land-based aerobic exercise training, long-term effects

No evidence was found related with outcomes except tenderness (favor for aerobic exercise).

Flexibility exercise training versus untreated control at the end of the intervention

There were no significant statistically differences between groups on major outcomes. Also the authors could not find any data about the minor outcomes.

Flexibility exercise training versus resistance training at the end of the intervention

There was no evidence on the effectiveness of flexibility exercise compared to resistance training regarding to HRQoL, pain intensity, fatigue and minor outcomes. Given the very large degree of heterogeneity, the authors did not perform a meta-analysis for physical function.

Flexibility exercise training versus other interventions at the end of the intervention and long term

In this groups, authors found evidence for the effectiveness of pilates and aquatic biodanza at the end of the intervention. About the major outcomes, flexibility exercise found effective when compared to friction massage and Thai Chi. Long-term effects of these groups were not investigated.

How did the authors conclude?

They concluded that there was low- to very low-certainty evidence for the beneficial effects of flexibility exercise on outcomes comparing to aerobic exercise and resistance training.

They were uncertain if flexibility exercise training was better than other interventions, because of the variability of the interventions and the limited number of studies with very few participants.

What are the implications of the Cochrane evidence for practice in rehabilitation?

Exercise training is the cornerstone of the treatment of FM syndrome.^[4] The effectiveness of aerobic exercise programs are reported before, however there is still lack of sufficient data about flexibility exercise. The results of this Cochrane review are important as Kim et al.,^[1] evaluated flexibility training effectiveness in the light of evidence.

Physical activity has been shown to affect pain pathways in patients with chronic pain. Therefore, it is important to support exercises and physical activity in fibromyalgia, which is a chronic pain model.

However, It is difficult to have a final decision about the effectiveness of flexibility exercises alone as the results of studies are unclear, because there are not enough studies evaluating the effectiveness of different flexibility exercises. Majority of the studies include flexibility training groups as a control group or additional to warming, cooling or aerobic exercise group. Also the exercise programs are not standard in most of the studies. The exercise programs are studied mostly for 35-55 aged Caucasian women. Future studies with, different age, gender, race/ethnicity, disease severity and different activity level with large study population are needed. Future trials including the frequency, intensity, time, type, volume, and progression of the flexibility exercises may change the certainty of evidence and provide more accurate knowledge about it. In addition, different approaches such as support groups, telephone contact, smartphone applications, family support should be investigated together with exercises in order to ensure that the patients who are likely to increase their pain with physical activity in fibromyalgia.

Acknowledgement

The authors thank Cochrane Rehabilitation and Cochrane Musculoskeletal Group for reviewing the contents of the Cochrane Corner.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

- Kim SY, Busch AJ, Overend TJ, Schachter CL, van der Spuy I, Boden C, et al. Flexibility exercise training for adults with fibromyalgia. *Cochrane Database Syst Rev* 2019 2;9:CD013419.
- Andrade A, Dominski FH, Sieczkowska SM. What we already know about the effects of exercise in patients with fibromyalgia: An umbrella review. *Semin Arthritis Rheum* 2020;S0049-0172(20)30022-6. [Epub ahead of print]
- Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Häuser W, Katz RL, et al. 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. *Semin Arthritis Rheum* 2016;46:319-29.
- Evcik D, Ketenci A, Sindel D. The Turkish Society of Physical Medicine and Rehabilitation (TSPMR) guideline recommendations for the management of fibromyalgia syndrome. *Turk J Phys Med Rehabil* 2019;65:111-23.
- Assumpção A, Matsutani LA, Yuan SL, Santo AS, Sauer J, Mango P, Marques AP. Muscle stretching exercises and resistance training in fibromyalgia: which is better? A three-arm randomized controlled trial. *Eur J Phys Rehabil Med* 2018;54:663-70.
- McCain GA, Bell DA, Mai FM, Halliday PD. A controlled study of the effects of a supervised cardiovascular fitness training program on the manifestations of primary fibromyalgia. *Arthritis Rheum* 1988;31:1135-41.
- Richards SC, Scott DL. Prescribed exercise in people with fibromyalgia: parallel group randomised controlled trial. *BMJ* 2002;325:185.
- Valim V, Oliveira L, Suda A, Silva L, de Assis M, Barros Neto T, et al. Aerobic fitness effects in fibromyalgia. *J Rheumatol* 2003;30:1060-9.
- Bressan LR, Matsutani LA, Assumpcao A, Marques AP, Cabral CMN. Effects of muscle stretching and physical conditioning as physical therapy treatment for patients with fibromyalgia. *Rev Bras Fisioter* 2008;12:88-93.
- Matsutani LA, Marques AP, Ferreira EA, Assumpção A, Lage LV, Casarotto RA, et al. Effectiveness of muscle stretching exercises with and without laser therapy at tender points for patients with fibromyalgia. *Clin Exp Rheumatol* 2007;25:410-5.
- Jones KD, Burckhardt CS, Clark SR, Bennett RM, Potempa KM. A randomized controlled trial of muscle strengthening versus flexibility training in fibromyalgia. *J Rheumatol* 2002;29:1041-8.
- Gavi MB, Vassalo DV, Amaral FT, Macedo DC, Gava PL, Dantas EM, Valim V. Strengthening exercises improve symptoms and quality of life but do not change autonomic modulation in fibromyalgia: a randomized clinical trial. *PLoS One* 2014;9:e90767.
- Altan L, Korkmaz N, Bingol U, Gunay B. Effect of pilates training on people with fibromyalgia syndrome: a pilot study. *Arch Phys Med Rehabil* 2009;90:1983-8.
- Calandre EP, Rodriguez-Claro ML, Rico-Villademoros F, Vilchez JS, Hidalgo J, Delgado-Rodriguez A. Effects of pool-based exercise in fibromyalgia symptomatology and sleep quality: a prospective randomised comparison between stretching and Ai Chi. *Clin Exp Rheumatol* 2009;27(5 Suppl 56):S21-8.
- López-Rodríguez MM, Castro-Sánchez AM, Fernández-Martínez M, Matarán-Peñarrocha GA, Rodríguez-Ferrer ME. Comparison between aquatic-biodanza and stretching for improving quality of life and pain in patients with fibromyalgia. *Aten Primaria* 2012;44:641-9.

16. Amanollahi A, Naghizadeh J, Khatibi A, Hollisaz MT, Shamseddini AR, Saburi A. Comparison of impacts of friction massage, stretching exercises and analgesics on pain relief in primary fibromyalgia syndrome: a randomized clinical trial. *Tehran Univ Med J* 2013;70:616-22.