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Br J Sports Med published online June 11, 2010
doi: 10.1136/bjsm.2009.070896

BJSM Online First, published on June 11, 2010 as 10.1136/bjsm.2009.070896

Does a 3-month multidisciplinary intervention improve pain, body composition and physical fitness in women with fibromyalgia?

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Accepted 17 March 2010

ABSTRACT

Objective To determine the effects of a 3-month multidisciplinary intervention on pain (primary outcome), body composition and physical fitness (secondary outcomes) in women with fibromyalgia (FM).

Methods 75 women with FM were allocated to a low-moderate intensity 3-month (three times/week) multidisciplinary (pool, land-based and psychological sessions) programme (n=33) or to a usual care group (n=32). The outcome variables were pain threshold, body composition (body mass index and estimated body fat percentage) and physical fitness (30 s chair stand, handgrip strength, chair sit and reach, back scratch, blind flamingo, 8 feet up and go and 6 min walk test).

Results The authors observed a significant interaction effect (group*time) for the left (L) and right (R) side of the anterior cervical ($p<0.001$) and the lateral epicondyle R ($p=0.001$) tender point. Post hoc analysis revealed that pain threshold increased in the intervention group (positive) in the anterior cervical R ($p<0.001$) and L ($p=0.012$), and in the lateral epicondyle R ($p=0.010$), whereas it decreased (negative) in the anterior cervical R ($p<0.001$) and L ($p=0.002$) in the usual care group. There was also a significant interaction effect for chair sit and reach. Post hoc analysis revealed improvement in the intervention group ($p=0.002$). No significant improvement attributed to the training was observed in the rest of physical fitness or body composition variables.

Conclusions A 3-month multidisciplinary intervention three times/week had a positive effect on pain threshold in several tender points in women with FM. Though no overall improvements were observed in physical fitness or body composition, the intervention had positive effects on lower-body flexibility.

INTRODUCTION

Fibromyalgia (FM) is considered a disorder of pain regulation, but its aetiology is not fully understood.[1] FM is characterised by concurrent existence of chronic, widespread musculoskeletal pain and multiple sites of tenderness.[2] Prominent symptoms include fatigue, stiffness, non-restorative sleep patterns, and memory and cognitive difficulties.[2 3]

Treatment of FM is a complicated and controversial process, but successful management of the disorder is possible.[4] The most common non-pharmacological treatments include physical activity and educational–psychological programmes.[5] Since FM affects the physical and psychological aspects of the patient,[6] a multidisciplinary approach such as exercise combined with psychological therapy could be more effective than pharmacological treatment alone.[1 5] There is evidence about the efficacy of multicomponent therapy to reduce the pain, fatigue and mood depression, and improve the self-efficacy and physical fitness in FM.[4 7]

Developments in behavioural therapy such as acceptance and commitment therapy promotes engaging the person in goal life and the acceptance, in contrast to control, the negative experiences like chronic pain or fatigue.[8 9] This therapy seems effective for reducing fear of pain and movement, and for improving pain severity, physical and psychosocial disability, and life satisfaction in patients with chronic musculoskeletal pain.[10–13]

Exercise therapy in FM patients has usually focused on either pool or land-based exercises. The combination of warm water-based exercise with psychological therapy is likely to be effective in the management of FM[14 15] as well as land-based exercise in combination with psychological therapy.[16 17] There is no conclusive evidence that one type of multidisciplinary programme is better than another, and studies using multidisciplinary programmes including pool, land-based and psychological sessions in the same week are scarce.

The purpose of the present controlled trial was to study the effects of a 3-month multidisciplinary training programme based on exercise (pool- and land-based) and psychological therapy on pain (primary outcome), body composition and physical fitness (secondary outcomes) in women with FM.

METHODS

Study participants

We contacted a total of 255 Spanish female members of an FM patients association (Granada, Spain). Eighty-seven potentially eligible patients responded, and gave their written informed consent after receiving detailed information about the aims and study procedures. The inclusion criteria were: (1) meeting the American College of Rheumatology criteria: widespread pain for more than 3 months and pain with 4 kg/cm of pressure for 11 or more of 18 tender points;[2] (2) not to have any other severe somatic or psychiatric disorders, such as stroke or schizophrenia, allergy to chlorine or other diseases that prevent physical loading; and (3) not to be attending another type of physical or psychological therapy at the same time.

A total of nine patients were not included in the study (eight did not have 11 of the 18 tender points, and one presented locomotion problems). After the first day of the baseline measurements, three patients refused to participate. Therefore, a final sample of 75 women with FM participated in the study. Patients were not engaged in regular physical activity >20 min on >3 days/week. The study flow of patients is presented in figure 1. The sociodemographic characteristics of women with FM in the intervention and usual care groups are shown in table 1.

Study design

The present study was a controlled trial with allocation of participants into the intervention (n=41) or usual care (control) group (n=34). For practical and ethical reasons, it was not possible to randomise the patients. We had an ethical obligation with the Association of Fibromyalgia Patients (Granada, Spain) to provide treatment to all patients willing to participate in the study, but due to limitation of resources, we created a waiting list. Patients from the waiting list agreed to be part of the usual care group (control group) and were offered the intervention programme at the end of the follow-up period. Data collected only during the control period were included in the current analysis.

The research protocol was reviewed and approved by the Ethics Committee of the Virgen de las Nieves Hospital (Granada, Spain). The study was developed between January 2008 and June 2009, following the ethical guidelines of the Declaration of Helsinki, last modified in 2000.

Interventions

The multidisciplinary programme comprised three sessions/week for 12 weeks. The first two sessions of each week (Monday and Wednesday) were performed in a chest-high warm pool for 45 min, and the third session (Friday) included 45 min of activity in the exercise room and 90 min of psychological–educational therapy. The exercise sessions were carefully supervised by a fitness specialist and by a physical therapist who worked with groups of 10–12 women. The psychological–educational sessions were conducted by a psychologist with experience treating FM patients.

Participants in the control group were asked not to change their activity levels and medication during the 12-week intervention period.

Exercise sessions

Each exercise session included a 10 min warm-up period with slow walk, mobility and stretching exercises, followed by 25 min of exercise, and finishing with a 10 min cool-down period of stretching and relaxation exercises. Monday sessions involved strength exercises developed at a slow pace using water and aquatic materials as a means of resistance including a stepped progression during the programme. Wednesday sessions included balance-oriented activities: changes of position, monopodal and bipodal stance, backwards walks, coordination by means of exercises with aquatic materials, and dancing aerobic exercises. Fridays included aerobic-type exercises and coordination using a circuit of different exercises.

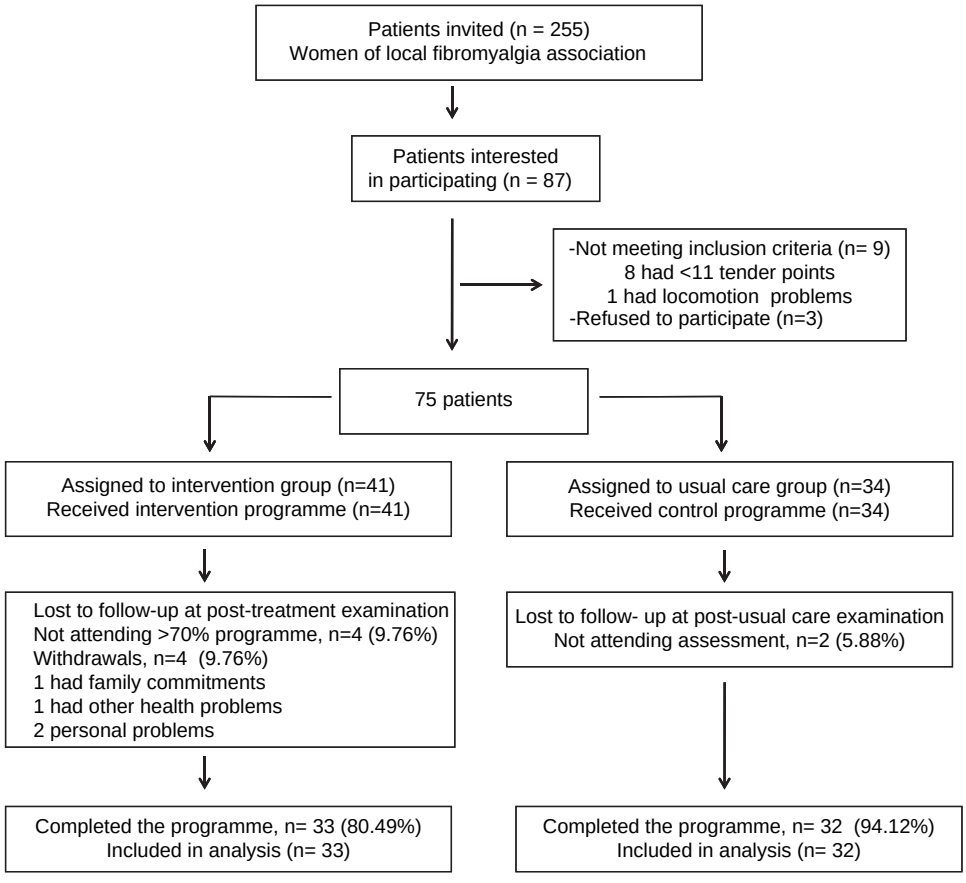

Figure 1 Flow of patients throughout the trial.

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Training intensity was controlled by the rate of perceived exertion (RPE) based on Borg's conventional (6–20 point) scale. The medium values of RPE were 12±2 on Monday, 12±2 on Wednesday and 13±3 on Friday. These RPE values correspond to a subjective perceived exertion of 'fairly light exertion and somewhat hard exertion,' that is, low–moderate intensity.

Psychological–educational therapy

Psychological therapy was based on the acceptance and commitment therapy developed by Hayes *et al*.[8] The sessions consisted in: (1) sessions 1, 2 and 3: general information of the disease from a bio-psycho-social perspective, enhancing the role of physical activity; (2) sessions 4–10: assessment of individual goal life and promotion of actions to develop these goals, while trying to cope with the thoughts and feelings related to pain that act as barriers to achieve this goals; (3) session 11: relaxation exercises aiming to improve body awareness; and (4) session 12: solving doubts, and general conclusions of the intervention. The pedagogical approach was based on the active participation of the patients through discussions, practical exercises and role-playing. Educational materials were provided to improve understanding of FM by the patients.

Outcome measures

Pre- and postintervention assessment was carried out on two separate days with at least 48 h between each session. This was done in order to prevent fatigue and flare-ups (acute exacerbation of symptoms) in the patients. The assessment of the tender-points, blind flamingo test and chair stand test were completed on the first visit, and body composition, chair sit and reach, back scratch, 8 feet up and go, hand grip strength and 6 min walk test on the second day. Both the intervention and usual care groups were assessed the week immediately before the intervention started and the week after the intervention was finished.

Tender points (primary outcome)

We assessed 18 tender points according to the American College of Rheumatology criteria for classification of FM using a standard pressure algometer (FPK 20; EFFEGI, Alfonsine, Italy).[2] The mean of two successive measurements at each tender point was used for the analysis. Tender point scored as positive when the patient noted pain at pressure of 4 kg/cm^2 or less. The total count of such positive tender points was recorded for each participant. The algometer score was calculated as the sum of the minimum pain-pressure values obtained for each tender point.

Body composition (secondary outcome)

We performed a bioelectrical impedance analysis with an eight-polar tactile-electrode impedanciometer (InBody 720; Biospace, Gateshead, UK). We measured weight (kg), and body fat percentage and skeletal muscle mass (kg) were estimated. The validity of this instrument was reported elsewhere.[18 19] Height (cm) was measured using a stadiometer (Seca 22; Seca, Hamburg, Germany). Body mass index (BMI) was calculated (kg/m^2).

Physical fitness (secondary outcome)

Fitness tests were part of the Functional Fitness Test battery by Rikli and Jones.[20] Additionally, we also measured the handgrip strength and the blind flamingo test, which have been used in patients with FM.[21]

Lower-body muscular strength

The 30 s chair stand test involves counting the number of times within 30 s that an individual can rise to a full stand from a seated position with back straight and feet flat on the floor, without pushing off with the arms. The patients carried out one trial after familiarisation.[20]

Upper-body muscular strength

Handgrip strength was measured using a digital dynamometer (TKK 5101 Grip-D; Takey, Tokyo) as described elsewhere.[22] Patients performed (alternately with both hands) the test twice allowing a 1 min rest period between measures. The best value of two trials for each hand was chosen, and the average of both hands was registered.

Lower-body flexibility

In the 'chair sit and reach test,' the patient seated with one leg extended slowly bends forward, sliding the hands down the extended leg in an attempt to touch (or past) the toes. The number of centimetres short of reaching the toe (minus score) or reaching beyond it (plus score) are recorded.[20] We measured two trials with each leg, and the best value of each leg was registered. The average of both legs was used in the statistical analysis.

Upper-body flexibility

The back scratch test, a measure of overall shoulder range of motion, involves measuring the distance between (or overlap of) the middle fingers behind the back with a ruler.[20] This test was measured alternately with both hands twice, and the best value was registered. The average of both hands was used in the analysis.

Static balance

This was assessed with the blind flamingo test.[23] The number of trials needed to complete 30 s of the static position is recorded, and the chronometer is stopped whenever the patient does not comply with the protocol conditions. One trial was accomplished for each leg, and the average of both values was selected for the analysis.

Motor agility/dynamic balance

The 8 feet up and go test involves standing up from a chair, walking 8 feet to and around a cone, and returning to the chair in the shortest possible time.[20] The best time of two trials was recorded and used in the analysis.

Aerobic endurance

We assessed the 6 min walk test.[20] This test involves determining the maximum distance (metres) that can be walked in 6 min along a 45.7 m rectangular course.[24–26]

Data analysis

An independent t test and χ^2 test were used to compare demographic variables between groups. We used a two-factor (group and time) analysis of covariance with repeated measures to assess the training effects on the outcome variables (pain, body composition and physical fitness) after adjusting for age. For each variable, we reported the p value corresponding to the group (between-subjects), time (within-subjects) and interaction (group×time) effects. We calculated the p value for within-group differences by group when a significant interaction effect was present. Multiple comparisons were adjusted for mass significance.[27] We performed an intention-to-treat analysis.

Analyses were performed using the Statistical Package for Social Sciences (SPSS, v. 16.0 for Windows; SPSS, Chicago).

RESULTS

Four women from the intervention group discontinued the programme due to family commitments, personal and health problems, and another four were excluded for attending less than 70% of the programme (attendance: 32.4%, 53.1%, 55.9% and 59.4%). Adherence to the intervention was 84.4% (range 70–96.9%). A total of 33 (80.5%) women from the intervention group and 32 (94.1%) from the usual care group completed both pre- and postintervention assessments and were included in the final analysis. Compliers (n=33) and non-compliers (n=8) were similar in all the studied variables except on weight (71.6±12.7 kg vs 82.1±14.9 kg, respectively, p<0.05) and BMI (28.6±5.0 kg/m^2 vs 33.8±5.7 kg/m^2, respectively, p<0.05).

During the study period, no participant reported an exacerbation of FM symptoms beyond normal flares, and there were no serious adverse events. No women changed from the control group to the intervention group or vice versa, and there were no protocol deviations from the study as planned.

Sociodemographic characteristics of women with FM by group are shown in table 1. Tender points are presented in table 2. We observed no significant differences between or within-groups in all the variables analysed except for the occiput tender point. After adjusting for multiple comparisons,[27] we observed a significant interaction effect (group×time) for the left (L) and right (R) side of the anterior cervical and the lateral epicondyle R tender point. Post hoc analysis revealed that pain threshold in the control group significantly decreased (negative) in anterior cervical R (p<0.001) and L (p=0.002), whereas in the intervention group, the threshold pain significantly increased (positive) in the anterior cervical R (p<0.001) and L (p=0.012) and in the lateral epicondyle R (p=0.010). We did not observe a significant interaction effect (group×time) in the algometer score or tender points count, after adjusting for multiple comparisons.[27] Likewise, we observed no significant interaction effect in body composition (table 3).

There was a significant interaction effect for the chair sit at reach test (table 4), after adjusting for multiple comparisons.[27] Post hoc analysis revealed that there was an improvement on the chair sit at reach test (p=0.002) in the intervention group. No significant improvement attributed to the training was observed in the rest of physical fitness variables.

Table 1 Sociodemographic characteristics of women with fibromyalgia by group

Variable	Usual care group (n=32)	Training group (n=33)	p Value
Age, years	51.4 (7.4)	50.0 (7.3)	0.455
Years since clinical diagnosis, n (%)			0.903
≤5 years	16 (50.0)	17 (51.5)	
>5 years	16 (50.0)	16 (48.5)	
Marital status, n (%)			0.318
Married	24 (75.0)	25 (75.8)	
Unmarried	5 (15.6)	2 (6.1)	
Separated/divorced/widowed	3 (9.4)	6 (18.2)	
Educational status, n (%)			0.543
Unfinished studies	2 (6.2)	1 (3.0)	
Primary school	11 (34.4)	17 (51.5)	
Secondary school	8 (25.0)	7 (21.2)	
University degree	11 (34.4)	8 (24.2)	
Occupational status, n (%)*			0.669
Housewife	14 (46.7)	18 (54.5)	
Student	0 (0)	1 (3.0)	
Working	11 (36.7)	11 (33.3)	
Unemployed	2 (6.7)	2 (6.1)	
Retired	3 (10.0)	1 (3.0)	
Income, n (%)			0.601
€<120000	15 (46.9)	14 (42.4)	
€120100–180000	7 (21.9)	5 (15.2)	
€>180000	10 (31.2)	14 (42.4)	

Values are the mean (SD) unless otherwise indicated.
*Two missing data, one by group.

DISCUSSION

The present study shows that a low–moderate 3-month multidisciplinary intervention training programme was well tolerated and did not have any deleterious effects on patients' health. We observed that the pain threshold increased in several points in the intervention group, whereas there was a decreased pain threshold in several tender points in the usual care group. Although no overall improvements were observed in body composition or physical fitness, the intervention had positive effects on lower body flexibility. Further research is needed in order to determine whether programmes of longer duration (>3 months), higher frequency (>3 sessions/week) or higher intensity (>13 RPE) induce major improvements on pain, body composition and functional capacity in women with FM.

We did not observe any significant changes in tender points count, which concurs with the results observed by Mannerkorpi *et al*[15] (16.3±1.8 vs 15±3.3; n=28) after 6 months of pool exercise (once a week) combined with a six-session education programme. Similarly, Burckhardt *et al*[28] did not observe changes in the number of tender points (15.0 vs 15.3; n=28) after 6 weeks of education plus physical training. Gusi *et al*[29] did not report any improvement after 12 weeks of pool exercise (three times/week). King *et al*[16] did not report any improvements in tender points count (15.8±2.5 vs 14.6±4.0; n=26) with a 3-month intervention that combined exercise and educational programme (three sessions/week). In contrast, Altan *et al*[30] and de Andrade *et al*[31] carried out interventions solely based on pool exercise during 12 weeks (3 days/week) and showed a significant change (15.3±2.2 vs 8.5±3.7, n=24; 15.5±1.9 vs 11.4±2.6, n=19, respectively) in tender points count. Discrepancy among studies could be due to the fact that pain relief is related to a higher length and frequency of warm-water exercise sessions per week.[29] In fact, several studies with intensity balneotherapy programmes (2–3 weeks with bath all days) reported an improvement in tender points count.[32–34] Hydrotherapy (with or without exercise) has been recommended for the management of FM because of the water' buoyancy and warm temperature.[35–37] The buoyancy of the water limits the impact of exercise on weight-bearing joints because the external gravity load applied to the lower extremities is reduced in comparison with the load produced in land-based exercises.[36 37] In addition, the vasodilatory effect of heating may improve muscular ischaemia and help to clear analgesic mediators in FM.[37]

In the present study, we observed a significant improvement in the chair sit and reach test, whereas the improvement in upper-body flexibility was not statistically significant. Tomas-Carus *et al*[21] did not observe improvement in lower-body flexibility (sit and reach test) after a 12-week pool-based programme. Flexibility of upper and lower limbs in FM

Table 2 Effects of 12-week intervention on tender points in women with fibromyalgia

	Group	Pre	Post	p Value for group effect	p Value for time effect	p Value for interaction effect
Occiput R	Control	2.87 (0.11)	2.41 (0.12)	0.043	0.972	0.007
	Training	2.33 (0.11)	2.38 (0.12)			
Occiput L	Control	2.84 (0.12)	2.39 (0.11)	0.012	0.526	0.004
	Training	2.22 (0.12)	2.25 (0.11)			
Anterior cervical R	Control	2.36 (0.12)	1.83 (0.11)	0.130	0.852	<0.001
	Training	1.70 (0.12)	2.05 (0.11)			
Anterior cervical L	Control	2.19 (0.12)	1.84 (0.10)	0.231	0.343	<0.001
	Training	1.73 (0.12)	1.96 (0.10)			
Trapezius R	Control	2.96 (0.15)	2.62 (0.16)	0.143	0.817	0.047
	Training	2.48 (0.14)	2.51 (0.16)			
Trapezius L	Control	3.14 (0.14)	2.73 (0.15)	0.074	0.328	0.016
	Training	2.58 (0.14)	2.63 (0.15)			
Supraspinatus R	Control	3.34 (0.15)	3.05 (0.17)	0.225	0.038	0.012
	Training	2.81 (0.15)	3.10 (0.17)			
Supraspinatus L	Control	3.43 (0.15)	3.16 (0.17)	0.074	0.017	0.004
	Training	2.75 (0.15)	3.12 (0.17)			
Second rib R	Control	2.24 (0.11)	2.16 (0.13)	0.062	0.502	0.278
	Training	1.88 (0.10)	1.97 (0.12)			
Second rib L	Control	2.28 (0.10)	2.06 (0.13)	0.089	0.171	0.006
	Training	1.83 (0.10)	2.00 (0.13)			
Lateral epicondyle R	Control	2.64 (0.11)	2.43 (0.13)	0.154	0.551	0.001
	Training	2.10 (0.11)	2.56 (0.13)			
Lateral epicondyle L	Control	2.76 (0.14)	2.52 (0.15)	0.219	0.607	0.037
	Training	2.32 (0.14)	2.55 (0.14)			
Gluteal R	Control	2.87 (0.17)	3.14 (0.17)	0.944	0.680	0.496
	Training	2.94 (0.16)	3.04 (0.17)			
Gluteal L	Control	2.99 (0.18)	3.34 (0.17)	0.963	0.361	0.581
	Training	3.04 (0.17)	3.26 (0.17)			
Great trochanter R	Control	2.87 (0.15)	2.94 (0.15)	0.598	0.428	0.786
	Training	2.75 (0.15)	2.87 (0.15)			
Great trochanter L	Control	2.97 (0.16)	3.07 (0.17)	0.377	0.261	0.694
	Training	2.74 (0.16)	2.94 (0.17)			
Knee R	Control	2.63 (0.15)	2.78 (0.15)	0.056	0.048	0.478
	Training	2.36 (0.14)	2.35 (0.15)			
Knee L	Control	2.60 (0.15)	2.79 (0.16)	0.206	0.011	0.258
	Training	2.46 (0.15)	2.43 (0.16)			
Algometer score	Control	49.99 (1.88)	47.29 (2.06)	0.108	0.105	0.016
	Training	43.05 (1.86)	45.98 (2.02)			
Total number points	Control	16.26 (0.34)	16.34 (0.47)	0.288	0.081	0.288
	Training	17.11 (0.34)	16.55 (0.46)			

Data are means (SEM).
L, left; R, right.

Table 3 Effects of 12-week intervention on body composition in women with fibromyalgia

	Group	Pre	Post	p Value for group effect	p Value for time effect	p Value for interaction effect
Weight (kg)	Control	68.1 (2.2)	68.3 (2.3)	0.407	0.575	0.053
	Training	71.2 (2.1)	70.4 (2.2)			
BMI (kg/m^2)	Control	27.8 (0.9)	27.8 (0.9)	0.639	0.579	0.250
	Training	28.5 (0.9)	28.4 (0.9)			
Body fat percentage	Control	37.9 (1.3)	37.2 (1.5)	0.868	0.908	0.218
	Training	39.2 (1.2)	36.6 (1.3)			
Muscle mass (kg)	Control	22.8 (0.5)	22.9 (0.6)	0.295	0.781	0.134
	Training	23.0 (0.4)	24.0 (0.6)			

Data are means (SEM).
BMI, body mass index.

patients is markedly below that of healthy-matched people.[38] Flexibility plays a key role in the capacity to carry out the activities of daily living. Decreased flexibility in multiple anatomical sites is involved in the aetiology of physical impairments and related disabilities among older adults;[39] therefore, the improvement observed in our study could be considered as clinically relevant.

We did not observe any significant improvement on a 6 min walk, yet the patients were able to walk for ~22 m more after treatment. Burckhardt *et al*[28] did not observe any changes in this test (488.6 m vs 493.9 m) after a 6-week exercise plus education-based programme. In contrast, other studies reported improvements in the 6-min walk test after multidisciplinary interventions of 6 weeks (72 m; frequency: twice a week),[14] 16

Table 4 Effects of 12-week intervention on physical fitness in women with fibromyalgia

	Group	Pre	Post	p Value for group effect	p Value for time effect	p Value for interaction effect
Chair sit and reach (cm)	Control	−12.3 (2.8)	−15.1 (3.3)	0.193	0.967	0.006
	Training	−12.5 (2.6)	−4.9 (3.1)			
Back scratch test (cm)	Control	−6.5 (2.8)	−8.5 (3.0)	0.261	0.881	0.032
	Training	−13.3 (2.5)	−10.2 (2.8)			
Handgrip strength (kg)	Control	15.9 (1.3)	17.4 (1.3)	0.951	0.757	0.295
	Training	16.7 (1.2)	16.9 (1.3)			
Chair stand test (n)	Control	7 (0.5)	8 (0.5)	0.341	0.376	0.030
	Training	7 (0.5)	9 (0.5)			
8 feet up and go (s)	Control	8.2 (0.4)	7.7 (0.3)	0.813	0.301	0.166
	Training	8.5 (0.4)	7.3 (0.3)			
30 s blind flamingo (failures)	Control	9 (1)	10 (1)	0.996	0.784	0.012
	Training	11 (1)	8 (1)			
6 min walk (m)	Control	458.7 (15.0)	459.3 (14.0)	0.852	0.657	0.181
	Training	451.9 (14.0)	473.0 (13.2)			

Data are means (SEM).

weeks (28 m; frequency: twice a week),[40] 20 weeks (14.5 m; frequency: once a week)[41] and 24 weeks (39.6 m; frequency: once a week).[15] It is likely that the small size of the swimming pool (4×7 m), the frequency and the intensity used in our programme could hamper the possibility to induce greater changes in walked distance.

There was no significant improvement in the blind flamingo balance test after adjustment for multiple comparisons; however the intervention group reported three failures less (27% of improvement) in this test at post-treatment. Due to the fact that FM is associated with balance problems and increased fall frequency,[42] the improvement in this variable would be of clinical relevance. Tomas-Carus *et al*[21] obtained significant improvements (eight failures less) after 12 weeks of aquatic training.

We did not observe any improvements in strength in the upper or lower extremities. Similarly, Tomas-Carus *et al*[21] did not find improvement in handgrip strength after 12 weeks of pool exercise (three times/week), and Altan *et al*[30] did not report any improvement in chair test (1 min) after 12 and 24 weeks of pool exercise. In contrast, Mannerkorpi *et al*[15] obtained significant gains in chair test (1 min) and handgrip strength on the left but not on the right hand after 6 months of pool exercise and education intervention.

The fact that we were not able to randomise the participants into the intervention and usual care group is a limitation of our study. Despite this, there was no difference between groups in all the variables studied. Strengths include the assessment of body composition and physical fitness measures, which are limited in others studies. We applied a correction for multiple statistical tests[27] in order to avoid statistically significant effects by chance.

In summary, a low–moderate-intensity 3-month multidisciplinary training had a positive effect on pain threshold in several tender points. Although no overall improvements were observed on body composition or physical fitness, the intervention had positive effects on lower-body flexibility. Future research might determine whether longer and more intense programmes are necessary to induce significant improvements in body composition and physical fitness in these patients.

What is already known on this topic

The most used non-pharmacological strategies are physical exercise and psychological treatment. Multidisciplinary treatment seem to improve rating of pain, fatigue and depression; however, further studies are needed to determine whether this treatment has a positive effect on tender points, body composition and physical fitness.

What this study adds

A 3-month multidisciplinary intervention three times/week is enough to affect pain threshold positively in several tender points in women with fibromyalgia. Though no overall improvements were observed in physical fitness or body composition, this type of intervention seems to have positive effects on lower-body flexibility.

Acknowledgements The authors would like to thank the researchers for the CTS-545 research group. We gratefully acknowledge all participating patients for their collaboration.

Funding The study was supported financially by the Andalusia Institute of Sport, Center of Initiatives and Cooperation to the Development (CICODE, University of Granada) and the Association of Fibromyalgia Patients of Granada (Spain). This study is also being supported by grants from the Spanish Ministry of Education (AP-2006-03676, EX-2007-1124, EX-2008-0641) and Science and Innovation (BES-2009-013442).

Competing interests None.

Patient consent Obtained.

Ethics approval Ethics approval was provided by the Ethics Committee of the Virgen de las Nieves Hospital (Granada, Spain).

Provenance and peer review Not commissioned; externally peer reviewed.

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