

Efficacy of Biodanza for Treating Women with Fibromyalgia

Ana Carbonell-Baeza, PhD,¹ Virginia A. Aparicio, BSc,^{1–3} Clelia M. Martins-Pereira, BSc,^{1,4} Claudia M. Gatto-Cardia, BSc,^{1,4} Francisco B. Ortega, PhD,^{2,3} Francisco J. Huertas, BSc,¹ Pablo Tercedor, PhD,¹ Jonatan R. Ruiz, PhD,³ and Manuel Delgado-Fernandez, PhD¹

Abstract

Objective: The objective of this study was to determine the effects of a 3-month Biodanza intervention in women with fibromyalgia (FM).

Design: This was a controlled trial.

Setting/location: The study was conducted at a university research laboratory and social center.

Subjects: The study comprised 59 women with FM recruited from a local association of patients with FM. Participants were allocated to the Biodanza intervention group ($n = 27$) or usual-care group ($n = 32$).

Intervention: The Biodanza intervention was carried out once a week for 3 months.

Outcome measures: The outcome measures included the following: Pain threshold, body composition (body-mass index and estimated body fat percentage), physical fitness (30-second chair stand, handgrip strength, chair sit and reach, back scratch, blind flamingo, 8 feet up and go, and 6-minute walk test) and psychologic outcomes (Fibromyalgia Impact Questionnaire [FIQ], Short-Form Health Survey 36, Vanderbilt Pain Management Inventory, Hospital Anxiety and Depression Scale, General Self-Efficacy Scale, and Rosenberg Self-Esteem Scale).

Results: We observed a significant interaction effect (group*time) for pain threshold of several tender points (left [L] and right [R] side of the anterior cervical and supraspinatus, trapezius L and lateral epicondyle R, algometer score, tender points count), body fat percentage, and FIQ total score. In the intervention group, *post hoc* analysis revealed a significant improvement in pain threshold of the anterior cervical R and L and supraspinatus R and L tender points (all $p < 0.05$), algometer score ($p = 0.008$), tender point count ($p = 0.002$), body fat percentage ($p = 0.001$), and FIQ total score ($p = 0.003$).

Conclusions: A 3-month (one session per week) Biodanza intervention shows improvements on pain, body composition, and FM impact in female patients.

Introduction

FIBROMYALGIA (FM) is a chronic diffuse pain condition that probably results from abnormal central pain processing.^{1–3} The symptoms most frequently associated are pain, fatigue, stiffness, sleep disturbance, anxiety, depression, and cognitive difficulties.^{2,4} The level of psychologic distress is higher in patients with FM compared to patients with other pain syndromes.⁵ Likewise, women with FM reported poorer emotional and physical health and lower positive affect than other patients with chronic pain.⁶ Overall, patients with FM report a high impact on their quality of life.⁵

Diagnosis and treatment of FM is a complicated and controversial process, but successful management of the disorder is possible.⁷ The two most common nonpharmacological FM treatments are physical exercise and educational-psychologic programs, which are increasingly recommended for the treatment of patients with FM.^{8,9} During the last decade, physical interventions such as water-based exercise, aerobics, strength training, or a multidisciplinary approach have been extensively used for the treatment of FM. Less is known, however, about the efficacy of complementary and alternative therapies. Patients with FM are prone to use complementary and alternative therapies, despite the fact

¹Department of Physical Activity and Sports, School of Sport Sciences, University of Granada, Granada, Spain.

²Department of Physiology, University of Granada, Granada, Spain.

³Unit for Preventive Nutrition, Department of Biosciences and Nutrition, Karolinska Institutet, Huddinge, Sweden.

⁴Universidade Federal De Paraiba, Paraiba, Brazil.

that there currently is no conclusive evidence about the effects of these therapies in FM.^{8,10,11}

“Rolando Toro’s Biodanza” is a therapeutic strategy of human development and growth that uses music, movement, and emotions to induce integrative living experiences or *vivencias* to group participants.¹² *Vivencia* is a concept borrowed from the German *Erlebnis* meaning a vivid, intensely felt moment in the “here-and-now.” Connections and interactions with self, partners, and the group are also encouraged to improve participants’ health, well-being, vitality, and joy.¹³

Since Biodanza is an integrative dance therapy that combines motor, sensory, and affective exercises performed at low intensity/speed, it can be hypothesized that this complementary approach may have positive effects in persons with FM. The purpose of the present controlled trial was to determine the effects of a 3-month Biodanza intervention, carried out once a week, on pain, body composition, physical fitness, and psychologic outcomes in women with FM.

Materials and Methods

Study participants

We contacted a total of 255 Spanish female members from a local association of patients with FM (Granada, Spain). Seventy-nine (79) 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 reported for 11 or more of 18 tender points²; (2) not to have other severe somatic or psychiatric disorders, or other diseases that prevent physical loading. A total of 7 patients were not included in the study because they did not have 11 of the 18 tender points. After the baseline measurements, 1 patient refused to participate due to incompatibility with job schedule. Therefore, a final sample of 71 women with FM participated in the study. The study flow of patients is presented in Figure 1. Patients were not engaged in regular physical activity >20 minutes on >3 days/week.

Study design

The present study was a controlled trial with participants assigned to either the intervention ($n=37$) or to the usual-care (control) group ($n=34$). For practical and ethical reasons, it was not possible to randomize the patients. We had an ethical obligation with the association of patients with FM (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 program at the end of the follow-up period. Data collected only during the control period were included in the current analysis.

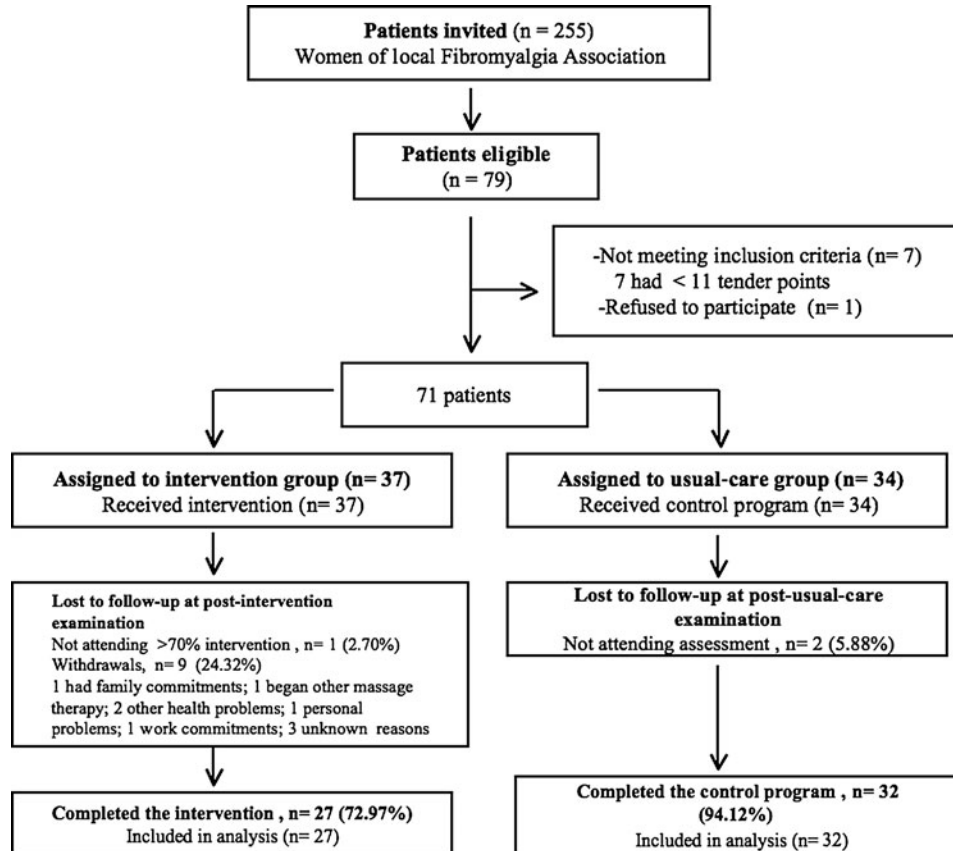


FIG. 1. Flow of patients throughout the trial.

The research protocol was reviewed and approved by the Ethics Committee of the *Hospital Virgen de las Nieves* (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.

Intervention

The program consisted of 12 sessions (one per week). Each session lasted 120 minutes and was divided into two parts: (1) a verbal phase of 35–45 minutes. In the first sessions, theoretical information about the program was provided, and from the third session on, participants (seated in circle) were encouraged to express their feelings and to share with the group their experiences from the previous sessions; (2) the *vivencia* (living experience) itself (75–80 minutes), which involves moving/dancing according both to the suggestion given by the facilitator and the music played. The movements should express the emotions elicited by the songs (~12) as well as be a response to other peers' presence, proximity, and feedback. Dances were performed in three different ways: (1) individually, (2) in pairs, (3) and with the whole group. The exercises proposed in each living experience were chosen according to the objective of the session and belong to five main groups: Vitality, sexuality, creativity, affectivity, and transcendence. Intervention 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 11 ± 1 . These RPE values correspond to a subjective perceived exertion of "fairly light exertion," that is, low intensity.

The Biodanza intervention took place once a week due to the fact that participants may feel these living experiences (*vivencias*) so intensely that they need at least 1 week to assimilate/integrate these experiences. Participants in the usual-care group were asked not to change their activity levels and medications during the 12-week intervention period.

Outcomes

Pre- and postintervention assessment were carried out on 2 separate days with at least 48 hours between each session. This was done in order to prevent patients' fatigue and flare-ups (acute exacerbation of symptoms). The assessment of the tender-points, blind flamingo test, chair stand test, and psychologic outcomes were completed on the first visit. Body composition and the chair sit and reach, back scratch, 8 feet up & go, handgrip strength, and 6-minute walk tests were done on the second day.

Tender points

We assessed 18 tender points according to the American College of Rheumatology criteria for classification of FM using a standard pressure algometer (EFFEGI, FPK 20, 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/cm² 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

We performed a bioelectrical impedance analysis with an eight-polar tactile-electrode impedanciometer (InBody 720, Biospace). Weight (in kilograms) was measured, and body fat percentage and skeletal muscle mass (kilograms) were estimated. Validity of this instrument was reported elsewhere.^{14,15} Height (in centimeters) was measured using a stadiometer (Seca 22, Hamburg, Germany). Body-mass index was calculated as weight (in kilograms) divided by height (in square meters).

Physical fitness

Fitness tests were part of the Functional Senior Fitness Test Battery.¹⁶ Additionally, we also measured the handgrip strength and the blind flamingo test, which have been used in patients with FM.¹⁷

Lower body muscular strength. The "30-second chair stand test" involves counting the number of times within 30 seconds 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 1 trial after familiarization.¹⁶

Upper body muscular strength. "Handgrip strength" was measured using a digital dynamometer (TKK 5101 Grip-D;Takey, Tokyo, Japan) as described elsewhere.¹⁸ The patient performs (alternately with both hands) the test twice, allowing a 1-minute rest period between measures. The best value of two trials for each hand was chosen, and the average of both hands was used in the analysis.

Lower body flexibility. In the "chair sit and reach test," the patient is seated with one leg extended, and slowly bends forward while sliding the hands down the extended leg in an attempt to touch (or pass) the toes. The number of centimeters short of reaching the toe (minus score) or reaching beyond it (plus score) are recorded.¹⁶ Two trials with each leg were measured and the best value of each leg was registered, being the average of both legs used in the 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.¹⁶ 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."¹⁹ The number of trials needed to complete 30 seconds of the static position is recorded, and the chronometer is stopped whenever the patient does not comply with the protocol conditions. One (1) 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.¹⁶ The best time of two trials was recorded and used in the analysis.

Aerobic endurance. The "6-minute walk test" was assessed. This test involves determining the maximum distance (meters) that can be walked in 6 minutes along a 45.7-m rectangular course.^{16,20-22}

Psychologic outcomes

Fibromyalgia Impact Questionnaire (FIQ). The original version of the FIQ was designed by Burckhardt et al.²³ to evaluate the severity of FM on daily activities. This is a self-administered questionnaire, comprising 10 subscales of disabilities and symptoms, and has been validated for the Spanish FM population.²⁴ The total score, which is the mean of the 10 subscales, and the subscales for physical function, feel good, pain, fatigue, morning tiredness, stiffness, anxiety, and depression were applied in the study. The questionnaire is scored from 0 to 100, and a higher score indicates a greater impact of the syndrome.²⁴

The Short-Form Health Survey 36 (SF-36). This is a generic instrument assessing health-related quality of life. It contains 36 items grouped into 8 subscales: physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health. The range of scores is between 0 and 100 in every subscale, where higher scores indicate better health. In this study, we used the Spanish version of SF-36.²⁵

Hospital Anxiety and Depression Scale (HADS). This contains 14 statements, ranging from 0 to 3, in which a

higher score indicates a higher degree of distress. The scores build two subscales: anxiety (0–21) and depression (0–21).²⁶ Zigmond and Snaith²⁶ suggested subscale cutoffs of scores higher than or equal to 8 to indicate the likely presence of clinically significant levels of depression or anxiety at mild intensity and cutoffs of scores higher than or equal to 11 to indicate moderate to severe intensity. The Spanish version of the scale was used in this study.²⁷

Vanderbilt Pain Management Inventory (VPMI). The Vanderbilt Pain Management Inventory²⁸ adapted to the Spanish version²⁹ was used to assess coping strategies. The scale has 18 items divided into two subscales designed to assess how often chronic pain sufferers use active and passive coping. Active coping, when patients attempt to function in spite of their pain; and passive coping, when patients relinquish control of their pain to others, or allow other areas of their life to be adversely affected by pain.

Rosenberg Self-Esteem Scale (RSES). It is a self-report measure designed to assess the concept of global self-esteem.³⁰ The RSES comprises just 10 items scored on a 4-point scale that are summed to produce a single index of self-esteem. In this study we used the Spanish version.³¹

General Self-Efficacy Scale. Self-efficacy was evaluated with a Spanish version translated by Bäßler and Schwarzer.^{32,33} This instrument contains 10 items scored on a 4-point Likert scale from 1 (not at all true) to 4 (exactly true). The scale assesses the individual's beliefs in her/his own capabilities to attain aims. In this case, higher scores indicate a higher level of perceived general self-efficacy.

TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF WOMEN WITH FIBROMYALGIA BY GROUP

	Usual-care group (n = 32)	Intervention group (n = 27)	p
Age, years	51.4 (7.4)	54.2 (6.2)	0.126
Years since clinical diagnosis, n (%)			0.67
≤5 years	16 (50.0)	12 (44.4)	
>5 years	16 (50.0)	15 (45.6)	
Marital status, n (%)			0.527
Married	24 (75.0)	17 (63.0)	
Unmarried	5 (15.6)	5 (18.5)	
Separated/divorced/ widowed	3 (9.4)	5 (18.5)	
Educational status, n (%) ^a			0.692
Unfinished studies	2 (6.2)	2 (8.0)	
Primary school	11 (34.4)	5 (20.0)	
Secondary school	8 (25.0)	8 (32.0)	
University degree	11 (34.4)	10 (40.0)	
Occupational status, n (%) ^b			0.588
Housewife	14 (46.7)	15 (65.2)	
Working	11 (36.7)	5 (21.7)	
Unemployed	2 (6.7)	1 (4.3)	
Retired	3 (10.0)	2 (8.7)	
Income, n (%)			0.407
<1200.00 €	15 (46.9)	10 (37.0)	
1201.00–1800.00 €	7 (21.9)	4 (14.8)	
>1800.00 €	10 (31.2)	13 (48.1)	

^aTwo missing data in the intervention group.

^bFour missing data in the intervention group and two missing data in the usual-care group.

Data analysis

Analyses of data included the following: (1) Intention to treat (ITT). A patient was considered a study participant if she attended at least one treatment session. Participants who dropped out before completion of the study were asked to return for post-testing. When post-test data were missing, baseline scores were considered post-test scores; (2) The analysis was repeated using only those participants with valid data at both baseline and post-test, and with an attendance rate of $\geq 70\%$ of the sessions (i.e., per-protocol analysis). Independent *t* and χ^2 tests 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, physical fitness, and psychologic outcomes) 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 (for *a priori* statistics) were adjusted for mass significance.³⁴ Analyses were performed using the Statistical Package for Social Sciences (SPSS, v. 16.0 for Windows; SPSS Inc., Chicago, IL).

Results

Nine (9) women from the intervention group discontinued the program due to family commitments, personal and health problems, and another 1 was not included in the analysis for attending less than 70% of the program (attendance: 58.3%). Adherence to the intervention was 85.6%

TABLE 2. EFFECTS OF A 12-WEEK INTERVENTION ON TENDER POINTS IN WOMEN WITH FIBROMYALGIA

	Group	Pre	Post	p for Group effect	p for Time effect	p for Interaction effect
Occiput R	Control	2.81 (0.12)	2.40 (0.10)	0.958	0.931	0.042
	Intervention	2.69 (0.13)	2.57 (0.11)			
Occiput L	Control	2.84 (0.12)	2.39 (0.11)	0.521	0.475	0.01
	Intervention	2.70 (0.13)	2.72 (0.12)			
Anterior cervical R	Control***	2.41 (0.13)	1.86 (0.11)	0.837	0.497	<0.001
	Intervention*	2.00 (0.15)	2.33 (0.12)			
Anterior cervical L	Control**	2.25 (0.13)	1.89 (0.10)	0.331	0.291	<0.001
	Intervention**	2.01 (0.14)	2.41 (0.11)			
Trapezius R	Control	3.02 (0.15)	2.66 (0.16)	0.713	0.499	0.091
	Intervention	2.79 (0.16)	2.74 (0.17)			
Trapezius L	Control***	3.21 (0.14)	2.76 (0.15)	0.573	0.161	0.001
	Intervention	2.98 (0.15)	3.21 (0.17)			
Supraspinatus R	Control*	3.41 (0.14)	3.07 (0.16)	0.263	0.204	0.001
	Intervention*	3.24 (0.16)	3.70 (0.18)			
Supraspinatus L	Control*	3.51 (0.14)	3.18 (0.16)	0.142	0.122	<0.001
	Intervention***	3.27 (0.15)	3.99 (0.17)			
Second rib R	Control	2.24 (0.11)	2.14 (0.13)	0.852	0.558	0.042
	Intervention	2.08 (0.12)	2.35 (0.14)			
Second rib L	Control	2.28 (0.10)	2.06 (0.13)	0.089	0.171	0.006
	Intervention	1.83 (0.10)	2.00 (0.13)			
Lateral epicondyle R	Control	2.28 (0.10)	2.05 (0.13)	0.335	0.401	<0.001
	Intervention	2.10 (0.11)	2.53 (0.14)			
Lateral epicondyle L	Control	2.76 (0.13)	2.52 (0.14)	0.811	0.916	0.019
	Intervention	2.54 (0.14)	2.81 (0.15)			
Gluteal R	Control	2.85 (0.16)	3.12 (0.18)	0.102	0.769	0.977
	Intervention	3.22 (0.17)	3.49 (0.20)			
Gluteal L	Control	2.97 (0.17)	3.32 (0.17)	0.042	0.868	0.498
	Intervention	3.34 (0.18)	3.86 (0.19)			
Great trochanter R	Control	2.86 (0.16)	2.93 (0.15)	0.313	0.68	0.359
	Intervention	2.96 (0.17)	3.24 (0.16)			
Great trochanter L	Control	2.96 (0.14)	3.06 (0.17)	0.391	0.788	0.215
	Intervention	2.97 (0.16)	3.39 (0.18)			
Knee R	Control	2.62 (0.16)	2.73 (0.16)	0.465	0.418	0.738
	Intervention	2.43 (0.17)	2.61 (0.17)			
Knee L	Control	2.62 (0.16)	2.77 (0.17)	0.839	0.292	0.643
	Intervention	2.52 (0.18)	2.78 (0.18)			
Algometer score	Control*	50.30 (1.77)	47.29 (1.91)	0.41	0.5	0.001
	Intervention**	48.38 (1.94)	53.39 (2.08)			
Total number of points	Control	16.16 (0.38)	16.38 (0.46)	0.695	0.025	0.002
	Intervention**	16.77 (0.42)	15.32 (0.50)			

Data are means (standard error of the mean). *P* values before adjustment for multiple comparisons. **p* < 0.05, ***p* < 0.01, ****p* < 0.001 for *post hoc* analysis pre versus post. R, right; L, left.

TABLE 3. EFFECTS OF A 12-WEEK INTERVENTION ON BODY COMPOSITION IN WOMEN WITH FIBROMYALGIA

	Group	Pre	Post	p for Group effect	p for Time effect	p for Interaction effect
Weight (kg)	Control	68.5 (2.1)	68.8 (2.0)	0.778	0.876	0.209
	Intervention	68.1 (2.2)	67.5 (2.2)			
Waist circumference (cm)	Control	87.8 (1.9)	86.1 (1.9)	0.95	0.929	0.384
	Intervention	87.1 (1.9)	86.5 (1.9)			
BMI (kg/m ²)	Control	28.2 (0.9)	28.3 (0.9)	0.571	0.707	0.291
	Intervention	27.5 (0.9)	27.4 (0.9)			
Body fat percentage	Control	38.6 (1.2)	37.2 (1.6)	0.036	0.372	0.003
	Intervention*	37.2 (1.2)	31.4 (1.6)			
Muscle mass (kg)	Control	22.6 (0.5)	22.7 (1.4)	0.054	0.652	0.028
	Intervention	23.3 (0.5)	27.2 (1.5)			

BMI, body-mass index. Data are means (standard error of the mean). *p* Values before adjustment for multiple comparisons.

**p* < 0.01, for *post hoc* analysis pre versus post.

(range 70%–100%). A total of 27 (72.97%) women from the intervention group and 32 (94.12%) from the usual-care group completed the 3-month follow-up and were included in the final analysis. Compliers and noncompliers were similar in all the studied variables except on the subscales of FIQ: feel good (8.0 ± 2.1 versus 9.6 ± 0.7 ; respectively, $p < 0.05$) and general self-efficacy (25.8 ± 7.2 versus 17.1 ± 10.0 , respectively, $p < 0.01$).

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.

ITT analysis

Seventy-one (71) patients were included in the ITT analysis (intervention group, $n = 37$ and usual-care group, $n = 34$). After adjusting for multiple comparisons,³⁴ we observed interaction (group*time) effects in the following outcomes: (1) Left (L) and right (R) side of the anterior cervical, supraspinatus L, second rib L (all, $p < 0.001$), supraspinatus

R and trapezius L (all, $p = 0.001$) and occiput L tender points ($p = 0.003$). (2) Algometer score ($p = 0.001$) and tender-point count ($p = 0.003$). (3) Total score of FIQ ($p = 0.001$).

Per-protocol analysis

After adjusting for multiple comparisons,³⁴ we observed interaction group * time effects in the following measures:

1. Tender points. Left (L) and right (R) side of the anterior cervical and supraspinatus tender point, left side of the trapezius and right side of the lateral epicondyle tender points. *Post hoc* analysis revealed that the pain threshold in the control group significantly decreased (negative) on the anterior cervical R ($p < 0.001$) and L ($p = 0.002$), trapezius L ($p = 0.002$), supraspinatus R ($p = 0.045$) and L ($p = 0.030$) tender points. In the intervention group, *post hoc* analysis revealed that the pain threshold significantly increased (positive) on the anterior cervical R ($p = 0.025$) and L ($p = 0.005$) and supraspinatus R ($p = 0.045$) and L ($p < 0.001$) (Table 2).
2. Algometer score and tender-point count. *Post hoc* analysis revealed a significant increase in algometer score ($p = 0.008$) and a decrease in tender-point count ($p = 0.002$) in the intervention group, whereas in the

TABLE 4. EFFECTS OF A 12-WEEK INTERVENTION ON PHYSICAL FITNESS IN WOMEN WITH FIBROMYALGIA

	Group	Pre	Post	p for Group effect	p for Time effect	p for Interaction effect
Chair sit and reach (cm)	Control	-13.2 (2.7)	-15.7 (2.9)	0.114	0.46	0.064
	Intervention	-11.0 (2.8)	-6.3 (3.0)			
Back scratch test (cm)	Control	-7.3 (2.4)	-9.3 (2.4)	0.522	0.578	0.198
	Intervention	-6.5 (2.4)	-5.8 (2.5)			
Handgrip strength (kg)	Control	15.7 (1.0)	17.3 (1.0)	0.22	0.729	0.251
	Intervention	18.1 (1.0)	18.4 (1.1)			
Chair stand test (<i>n</i>)	Control	7 (0.5)	8 (0.5)	0.024	0.897	0.114
	Intervention	8 (0.5)	10 (0.5)			
8 feet up & go (s)	Control	8.3 (0.3)	7.8 (0.3)	0.048	0.318	0.44
	Intervention	7.6 (0.3)	6.8 (0.3)			
30-s blind flamingo (failures)	Control	10 (1)	11 (1)	0.764	0.922	0.246
	Intervention	10 (1)	9 (1)			
6-minute walk (m)	Control	456.6 (12.7)	457.0 (13.1)	0.649	0.764	0.041
	Intervention	448.7 (13.5)	480.9 (13.8)			

Data are means (standard error of the mean). *p* Values before adjustment for multiple comparisons.

TABLE 5. EFFECTS OF A 12-WEEK INTERVENTION ON PSYCHOLOGIC OUTCOMES ASSESSED IN WOMEN WITH FIBROMYALGIA

	Group	Pre	Post	p for Group effect	p for Time effect	p for Interaction effect
FIQ						
Total score	Control	70.1 (2.1)	74.0 (2.8)	0.004	0.399	0.001
	Intervention*	66.9 (2.9)	56.0 (3.1)			
Physical function	Control	4.3 (0.3)	4.8 (0.4)	0.247	0.703	0.005
	Intervention	4.4 (0.4)	3.6 (0.4)			
Feel good	Control	8.3 (0.4)	8.8 (0.4)	0.002	0.347	0.01
	Intervention	7.6 (0.4)	6.1 (0.5)			
Pain	Control	7.3 (0.3)	8.0 (0.3)	0.009	0.788	0.01
	Intervention	6.9 (0.4)	6.1 (0.3)			
Fatigue	Control	8.2 (0.3)	8.5 (0.3)	0.001	0.539	0.009
	Intervention	7.8 (0.4)	6.5 (0.3)			
Sleep	Control	8.0 (0.3)	8.11 (0.4)	0.149	0.687	0.004
	Intervention	8.4 (0.3)	6.4 (0.4)			
Stiffness	Control	7.6 (0.4)	7.9 (0.4)	0.02	0.603	0.077
	Intervention	6.6 (0.4)	6.0 (0.5)			
Anxiety	Control	7.4 (0.4)	7.9 (0.4)	0.002	0.075	0.016
	Intervention	6.2 (0.5)	5.2 (0.5)			
Depression	Control	6.1 (0.5)	7.0 (0.5)	0.087	0.007	0.02
	Intervention	5.7 (0.6)	4.9 (0.6)			
SF-36						
Physical function	Control	39.1 (3.5)	38.0 (3.0)	0.499	0.907	0.091
	Intervention	38.1 (3.8)	44.8 (3.2)			
Physical role	Control	5.2 (3.3)	3.3 (2.6)	0.224	0.382	0.375
	Intervention	6.8 (3.6)	10.0 (2.8)			
Bodily pain	Control	21.8 (2.8)	22.2 (2.2)	0.017	0.538	0.906
	Intervention	30.1 (3.1)	30.9 (2.4)			
General health	Control	26.5 (3.0)	29.0 (3.1)	0.124	0.96	0.998
	Intervention	33.0 (3.2)	35.6 (3.4)			
Vitality	Control	18.1 (2.8)	19.0 (2.9)	0.121	0.125	0.476
	Intervention	22.6 (3.0)	26.4 (3.2)			
Social functioning	Control	44.4 (4.4)	36.7 (3.7)	0.029	0.888	0.024
	Intervention	49.2 (4.8)	55.6 (4.0)			
Emotional role	Control	33.4 (8.0)	38.0 (8.1)	0.437	0.786	0.675
	Intervention	39.4 (8.8)	48.8 (8.9)			
Mental health	Control	45.4 (3.6)	44.9 (4.2)	0.094	0.323	0.092
	Intervention	50.8 (3.9)	57.9 (4.6)			
VPMI						
Passive coping	Control	24.7 (0.8)	24.2 (0.7)	0.017	0.669	0.063
	Intervention	23.2 (0.9)	20.7 (0.7)			
Active coping	Control	16.1 (0.7)	16.1 (0.7)	0.868	0.756	0.602
	Intervention	16.5 (0.7)	16.0 (0.7)			
HADS						
Anxiety	Control	11.2 (0.8)	11.0 (0.8)	0.131	0.997	0.891
	Intervention	9.4 (0.9)	9.1 (0.9)			
Depression	Control	9.3 (0.7)	9.0 (0.8)	0.105	0.554	0.902
	Intervention	7.5 (0.8)	7.3 (0.9)			
Self-Efficacy	Control	25.0 (1.3)	25.5 (1.3)	0.248	0.363	0.624
	Intervention	26.9 (1.4)	27.9 (1.4)			
RSES	Control	28.2 (1.1)	25.4 (1.2)	0.335	0.895	0.037
	Intervention	28.4 (1.2)	28.3 (1.3)			

Data are means (standard error of the mean). P values before adjustment for multiple comparisons.

* $p < 0.01$, for *post hoc* analysis pre versus post.

FIQ, Fibromyalgia Impact Questionnaire; SF-36, Short Form 36; VPMI, Vanderbilt Pain Management Inventory; HADS, Hospital Anxiety and Depression Scale; RSES, Rosenberg Self-Esteem Scale.

- control group, there was a significant decrease in algometer score ($p = 0.05$).
- 3. Body fat percentage (Table 3). *Post hoc* analysis revealed a significant decrease in body fat percentage ($p = 0.001$) in the intervention group. No significant improvement attributed to the intervention was observed in physical fitness (Table 4).
- 4. FIQ. *Post hoc* analysis revealed that there was an improvement in total score of FIQ in the intervention group ($p = 0.003$) (Table 5). We observed no significant

interaction effect and hence no intervention-attributable improvement for SF-36, VPML, Hospital Anxiety and Depression Scale, Rosenberg Self-Esteem Scale (RSES), and general self-efficacy.

Discussion

The main finding of the present study is that a 3-month (one session per week) Biodanza intervention reduced pain and FM impact (measured by FIQ) in female patients. We also observed significant benefits in body fat percentage. We did not observe a significant improvement on physical fitness tests, yet the patients were able to walk ~30 m more in the 6-minute walk test after treatment. The program was well tolerated and did not have any deleterious effects on the patients' health.

FM has a significant impact on a patient's quality of life and physical functioning.^{5,35} The goals of the treatment in patients with FM are relief of pain, which is the main symptom, and increasing the level of functional capabilities.³⁶ We observed that the pain threshold increased by several points in the intervention group, whereas the pain threshold decreased in several tender points in the usual-care group. In addition, there was an improvement in the algometer score and tender-point count after treatment.

We also observed a significant improvement in FIQ, which concurs with the results obtained by other complementary and alternative therapies in female patients with FM.³⁷⁻⁴² Da Silva et al.³⁸ observed significant decreases in FIQ scores but not in pain threshold after 8-week Relaxing Yoga and Relaxing Yoga plus Touch treatment in patients with FM. Menzies et al.³⁹ investigated the effects of a 6-week guided imagery intervention on symptom management in patients with FM. They observed a decrease in FIQ scores and an increase in self-efficacy for managing pain in the intervention group compared to the usual-care group.³⁹ Astin et al.⁴⁰ found improvements in FIQ, pain, and depression, but not in the 6-minute walk test after 8 weeks of multimodal mind-body intervention (mindfulness meditation plus *qigong*). Septhon et al.⁴³ obtained improvements in depressive symptoms after 8 weeks of a mindfulness-based stress reduction intervention. Hammond and Freeman⁴¹ and Taggart et al.⁴² reported improvement in FIQ after treatments based in *t'ai chi* exercises (2 times/week for 10 weeks and twice weekly classes for 6 weeks, respectively). Taggart et al.⁴² observed significant improvement in the dimensions of SF-36 physical functioning, bodily pain, general health, vitality, and emotional role as well. However, they did not report the total FIQ score or tender-point count and they did not establish as inclusion criteria the American College of Rheumatology diagnosis criteria for FM. Therefore, it is not possible to know the level of severity in these patients.

In contrast with these positive results, other studies using similar therapies did not find significant changes after treatments. Assefi et al.⁴⁴ did not observe any improvement in patients with FM after 8 weeks of Reiki (a form of energy medicine) intervention on pain and SF-36. Mannerkorpi and Arndorw⁴⁵ did not find improvement in the FIQ score, chair test, and handgrip strength after 3 months of body awareness therapy combined with *qigong*. In fact, a recent review concluded that no positive evidence could be identified for *qigong* and body awareness therapy in FM.¹¹ Although al-

ternative and complementary therapies have been used in the management of FM, they are still in the ongoing process of being evaluated by scientific research, and future research is needed for better understanding of the potential efficacy of these types of treatments.^{11, 46}

We observed no significant intervention-attributable improvement for SF36, VPML, HADS, RSES, and general self-efficacy. Whether increasing the number of sessions per week, or increasing the time of the intervention (i.e., 6 months) may have a significant impact on these psychologic outcomes remains to be elucidated.

The fact that we were not able to randomize the participants into the intervention and usual-care group is a limitation of our study. Strengths include the assessment of body composition and physical fitness measures, which are limited in others studies. We applied a correction for multiple statistical tests³⁴ in order to avoid statistically significant effects by chance.

Biodanza is an intervention carried out once a week with low intensity; therefore, *a priori* it is an appropriate option for those patients who are sedentary and want to initiate a more active lifestyle. In the light of the improvements observed in this study, we believe that Biodanza may be an effective complementary therapy in the management of FM.

Conclusions

A 3-month (one session per week) Biodanza intervention reduces pain and FM impact in female patients. The results also show that the Biodanza intervention may be, in the short term, a very helpful resource for the management of FM. Further studies should replicate these results and deepen understanding of this therapy.

Acknowledgments

The study was supported by the Instituto Andaluz del Deporte (IAD), the Center of Initiatives and Cooperation to the Development (CICODE, University of Granada), the Association of Fibromyalgia Patients of Granada (Spain), the Spanish Ministry of Education (AP-2006-03676, EX-2007-1124, EX-2008-0641), and the Science and Innovation Ministry (BES-2009-013442). The authors would like to thank the researchers from the CTS-545 research group. We gratefully acknowledge all participating patients for their collaboration.

Disclosure Statement

No competing financial interests exist.

References

1. Sarzi-Puttini P, Buskila D, Carrabba M, et al. Treatment strategy in fibromyalgia syndrome: Where are we now? *Semin Arthritis Rheum* 2008;37:353-365.
2. Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia: Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;33:160-172.
3. Abeles AM, Pillingner MH, Solitar BM, et al. Narrative review: The pathophysiology of fibromyalgia. *Ann Intern Med* 2007;146:726-734.
4. Bennett RM, Jones J, Turk DC, et al. An Internet survey of 2,596 people with fibromyalgia. *BMC Musculoskelet Disord* 2007;8:27.

5. Verbunt JA, Pernot DH, Smeets RJ. Disability and quality of life in patients with fibromyalgia. *Health Qual Life Outcomes* 2008;6:8.
6. Davis MC, Zautra AJ, Reich JW. Vulnerability to stress among women in chronic pain from fibromyalgia and osteoarthritis. *Ann Behav Med* 2001;23:215–226.
7. Goldenberg DL. Multidisciplinary modalities in the treatment of fibromyalgia. *J Clin Psychiatry* 2008;69(suppl 2):30–34.
8. Mannerkorpi K, Henriksson C. Non-pharmacological treatment of chronic widespread musculoskeletal pain. *Best Pract Res Clin Rheumatol* 2007;21:513–534.
9. Goldenberg DL, Burckhardt C, Crofford L. Management of fibromyalgia syndrome. *JAMA* 2004;292:2388–2395.
10. Alvarez-Nemegyei J, Bautista-Botello A, Davila-Velazquez J. Association of complementary or alternative medicine use with quality of life, functional status or cumulated damage in chronic rheumatic diseases. *Clin Rheumatol* 2009;28:547–551.
11. Baranowsky J, Klose P, Musial F, et al. Qualitative systemic review of randomized controlled trials on complementary and alternative medicine treatments in fibromyalgia. *Rheumatol Int* 2009;30:1–21.
12. Toro R, ed. *Biodanza Theory* [in Portuguese]. Fortaleza, Brazil: ALAB, 1991.
13. D'Alencar BP, Mendes MM, Jorge MS, et al. Biodance as process of existential renewal for the elderly. *Rev Bras Enferm* 2008;61:608–614.
14. Lim JS, Hwang JS, Lee JA, et al. Cross-calibration of multi-frequency bioelectrical impedance analysis with eight-point tactile electrodes and dual-energy X-ray absorptiometry for assessment of body composition in healthy children aged 6–18 years. *Pediatr Int* 2009;51:263–268.
15. Malavolti M, Mussi C, Poli M, et al. Cross-calibration of eight-polar bioelectrical impedance analysis versus dual-energy X-ray absorptiometry for the assessment of total and appendicular body composition in healthy subjects aged 21–82 years. *Ann Hum Biol* 2003;30:380–391.
16. Rikli RE, Jones J. Development and validation of a functional fitness test for community residing older adults. *J Aging Physical Activity* 1999;7:129–161.
17. Tomas-Carus P, Hakkinen A, Gusi N, et al. Aquatic training and detraining on fitness and quality of life in fibromyalgia. *Med Sci Sports Exerc* 2007;39:1044–1050.
18. Ruiz-Ruiz J, Mesa JL, Gutierrez A, et al. Hand size influences optimal grip span in women but not in men. *J Hand Surg Am* 2002;27:897–901.
19. Rodriguez FA, Gusi N, Valenzuela A, et al. Evaluation of health-related fitness in adults (I): Background and protocols of the AFISAL-INEFC Battery [in Spanish]. *Apunts Educ Fisica Deportes* 1998;52:54–76.
20. Mannerkorpi K, Svantesson U, Carlsson J, et al. Tests of functional limitations in fibromyalgia syndrome: A reliability study. *Arthritis Care Res* 1999;12:193–199.
21. King S, Wessel J, Bhamhani Y, et al. Validity and reliability of the 6 minute walk in persons with fibromyalgia. *J Rheumatol* 1999;26:2233–2237.
22. Pankoff BA, Overend TJ, Lucy SD, et al. Reliability of the six-minute walk test in people with fibromyalgia. *Arthritis Care Res* 2000;13:291–295.
23. Burckhardt CS, Clark SR, Bennett RM. The fibromyalgia impact questionnaire: Development and validation. *J Rheumatol* 1991;18:728–733.
24. Rivera J, Gonzalez T. The Fibromyalgia Impact Questionnaire: A validated Spanish version to assess the health status in women with fibromyalgia. *Clin Exp Rheumatol* 2004;22:554–560.
25. Alonso J, Prieto L, Anto JM. The Spanish version of the SF-36 Health Survey (the SF-36 health questionnaire): An instrument for measuring clinical results [in Spanish]. *Med Clin (Barc)* 1995;104:771–776.
26. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983;67:361–370.
27. Quintana JM, Padierna A, Esteban C, et al. Evaluation of the psychometric characteristics of the Spanish version of the Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 2003;107:216–221.
28. Brown GK, Nicassio PM. Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients. *Pain* 1987;31:53–64.
29. Esteve R, Lopez AE, Ramirez-Maestre C. Assessment of strategies for confronting chronic pain [in Spanish]. *Rev Psicol Salud* 1999;11:77–102.
30. Rosenberg M. *Society and the Adolescent Self-Image*. Princeton: Princeton University Press, 1965.
31. Vazquez AJ, Jimenez R, Vazquez-Morejon R. Rosenberg Self-Esteem Scale: Reliability and validity in Spanish clinical population [in Spanish]. *Apuntes Psicol* 2004;22:247–255.
32. Schwarzer R, Jerusalem M. Generalized Self-Efficacy scale. In: Weinman J, Wright S, Johnston M, eds. *Measures in Health Psychology: A User's Portfolio Causal and Control Beliefs*. Windsor: NFER-Nelson, 1995:35–37.
33. Bäßler J, Schwarzer R. Measuring generalized self-beliefs: A Spanish adaptation of the General Self-Efficacy scale [in Spanish]. *Ansiedad Estrés* 1996;2:1–8.
34. Holm S. A simple sequentially rejective multiple test procedure. *Scand J Statist* 1979;6:65–70.
35. Mannerkorpi K, Burckhardt CS, Bjelle A. Physical performance characteristics of women with fibromyalgia. *Arthritis Care Res* 1994;7:123–129.
36. de Andrade SC, de Carvalho RF, Soares AS, et al. Thalassotherapy for fibromyalgia: A randomized controlled trial comparing aquatic exercises in sea water and water pool. *Rheumatol Int* 2008;29:147–152.
37. Bertisch SM, Wee CC, Phillips RS, et al. Alternative mind-body therapies used by adults with medical conditions. *J Psychosom Res* 2009;66:511–519.
38. da Silva GD, Lorenzi-Filho G, Lage LV. Effects of yoga and the addition of *Tui Na* in patients with fibromyalgia. *J Altern Complement Med* 2007;13:1107–1113.
39. Menzies V, Taylor AG, Bourguignon C. Effects of guided imagery on outcomes of pain, functional status, and self-efficacy in persons diagnosed with fibromyalgia. *J Altern Complement Med* 2006;12:23–30.
40. Astin JA, Berman BM, Bausell B, et al. The efficacy of mindfulness meditation plus *Qigong* movement therapy in the treatment of fibromyalgia: A randomized controlled trial. *J Rheumatol* 2003;30:2257–2262.
41. Hammond A, Freeman K. Community patient education and exercise for people with fibromyalgia: A parallel group randomized controlled trial. *Clin Rehabil* 2006;20:835–846.
42. Taggart HM, Arslanian CL, Bae S, et al. Effects of *T'ai Chi* exercise on fibromyalgia symptoms and health-related quality of life. *Orthop Nurs* 2003;22:353–360.
43. Sephton SE, Salmon P, Weissbecker I, et al. Mindfulness meditation alleviates depressive symptoms in women with fibromyalgia: Results of a randomized clinical trial. *Arthritis Rheum* 2007;57:77–85.

44. Assefi N, Bogart A, Goldberg J, et al. Reiki for the treatment of fibromyalgia: A randomized controlled trial. *J Altern Complement Med* 2008;14:1115–1122.
45. Mannerkorpi K, Arndorw M. Efficacy and feasibility of a combination of body awareness therapy and qigong in patients with fibromyalgia: A pilot study. *J Rehabil Med* 2004;36:279–281.
46. Rooks DS, Gautam S, Romeling M, et al. Group exercise, education, and combination self-management in women with fibromyalgia: A randomized trial. *Arch Intern Med* 2007;167:2192–2200.

Address correspondence to:
Ana Carbonell Baeza, PhD
Department of Physical Activity and Sports
School of Sport Sciences
University of Granada
Carretera de Alfacar, s/n
Granada 18011
Spain

E-mail: anellba@ugr.es

Copyright of Journal of Alternative & Complementary Medicine is the property of Mary Ann Liebert, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.