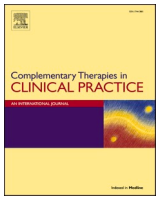
Complementary Therapies in Clinical Practice 51 (2023) 101753

Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice

journal homepage: www.elsevier.com/locate/ctcp



Efficacy of the myofascial approach as a manual therapy technique in patients with clinical anxiety: A randomized controlled clinical trial

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ARTICLE INFO

Keywords:
Myofascial
Anxiety
Manual therapy
Interoception

ABSTRACT

Background: To analyze the efficacy of the myofascial approach in patients with clinical anxiety and to study its relationship with associated symptoms.
Methods: Randomized placebo-controlled clinical trial. Thirty-six adult patients with clinical anxiety were randomized to receive the myofascial treatment (n = 18) or placebo (n = 18). The patients and the evaluators were blinded to this assignation. The treatment consisted of four myofascial sessions of 40 min each for four weeks. The placebo intervention consisted of four sessions of simulated myofascial intervention of the same duration and frequency as the treatment. Follow-up was at one, three and six months. The primary outcome was clinical anxiety measured using the STAI (State-Trait Anxiety Inventory). Secondary outcomes were central sensitization, general health, somatization, depression, and pain.
Results: There were significant differences in the behavior of the groups over time for clinical anxiety (STAI Trait-Anxiety) ($p < 0.001$), central sensitization ($p = 0.005$) and somatization ($p = 0.008$) in favor of the myofascial group, with a large effect size for anxiety and a medium effect size for central sensitization and somatization. Regarding clinical anxiety, after the intervention a mean difference was observed with respect to the baseline of 19.98 points in the myofascial group ($p < 0.001$) and 5.95 in the placebo group ($p = 0.22$). The intention-to-treat principle was used. There were no adverse events or side effects in either group.
Conclusions: The myofascial approach is effective in improving anxiety levels and associated central sensitization processes in patients with clinical anxiety and this improvement is maintained over time.
Clinical Trial Registration: NCT04826302.

1. Introduction

Clinical anxiety occurs when there are high levels of anxiety that interfere with daily life. In this case, the emotional response increases excessively in terms of frequency, intensity and duration, leading to the appearance of limitations in the individual's ability to adapt to their environment. Anxiety disorders are the most common disorders within emotional and mental disorders. Their prevalence varies between 3.8% and 25% [1] and it has increased considerably during the COVID-19 pandemic, reaching up to 31.9% among the general population [2].

An important relationship between anxiety, depression, chronic pain, and other general somatic symptoms, justified by a central sensitization, has been observed in the scientific literature [3–5].

Treatments for anxiety disorders are differentiated into pharmacological treatments and psychological therapy. First-line medications usually consist mainly of selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors. Within psychological therapy the treatment with the highest level of evidence is cognitive behavioral therapy. With respect to other psychological interventions, there is not significant evidence [6].

From physiotherapy, studies have been carried out with psychological outcome measures, mainly from therapeutic exercise, where a priori there seems to be an anxiolytic effect [7,8]. However, due to the methodology of these studies, the results are inconclusive.

Through the interoceptive pathway, the relationship of the fascial system with anxiety seems quite clear. Recent research allows us to create connections between fascia and its dysfunction, interoceptive processes, emotions and underlying allostatic mechanisms [9–16]. Due

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https://doi.org/10.1016/j.ctcp.2023.101753
Received 9 January 2023; Received in revised form 28 February 2023; Accepted 26 March 2023
Available online 29 March 2023

to the systemic nature of anxiety and its observed relationship with interoceptive pathways, myofascial techniques were chosen as the manual therapy techniques best suited to this relationship.

Several systematic reviews and meta-analyses have shown the myofascial approach is an effective tool for the treatment of various pathologies, such as low back pain [17] or fibromyalgia [18]. However, only one relevant study has been found that relates it to psychological outcomes such as anxiety [19]. Hence, this is the first study, according to the literature consulted, that analyzes clinical anxiety as the main outcome after a myofascial approach under a protocol based on interoceptive pathways.

Therefore, the aim of this study was to analyze the efficacy of the myofascial approach in patients with clinical anxiety and to study its relationship with variables of central sensitization, general health, somatization, depression, and pain.

2. Methods

2.1. Design

A randomized, double-blind (patients and evaluators blinded), placebo-controlled clinical trial was conducted in patients with clinical anxiety. The study is single-center, with a 1:1 allocation ratio, and with a patient follow-up of one, three and six months after the end of treatment, following CONSORT standards. The protocol was approved by the Ethics Committee of the Hospital Clínico San Carlos in Madrid, in accordance with the ethical precepts formulated in the Declaration of Helsinki of the World Medical Association on ethical principles for medical research in human beings. It was also registered in ClinicalTrials.gov with identifier NCT04826302 and updated during the different milestones of the study. There were no significant changes in the methodology or outcome variables once the study began.

2.2. Participants

Adult patients with anxiety symptoms who met the selection criteria were recruited. Recruitment was carried out by opportunity sampling through the information channels of the Faculty of Nursing, Physiotherapy and Podiatry of the Complutense University of Madrid in the period between April 2021 and September 2021. An evaluator was in charge of the selection. Likewise, participants were provided with the Patient Information and Informed Consent Form prior to inclusion.

The inclusion criteria were as follows: adults between 18 and 65 years old with high levels of clinical anxiety. This latter outcome was established using the STAI Trait-Anxiety scores from the State-Trait Anxiety Inventory, following the selection criterion of mean score plus one standard deviation for high anxiety scores. Therefore, participants with high levels of anxiety were considered to be those who obtained a score on the Trait-Anxiety subscale of the STAI greater than or equal to 29 in men and greater than or equal to 34 in women, which is equivalent to the 85th percentile (normative data obtained from the Spanish adaptation of the STAI test [20]).

The exclusion criteria were as follows: patients with any contraindication to myofascial treatment [21] (cognitive impairment, systemic pathology, neurological or muscular diseases, diagnosed aneurysm, diagnosed high blood pressure, diagnosed malignant tumor, diagnosed vertebrobasilar insufficiency, diagnosed dermatological condition incompatible with the techniques, epilepsy, pregnant women or with the possibility that they could be pregnant due to the incompatibility of myofascial techniques in the abdomen) and patients who had previously received myofascial therapy. Also, patients were asked in the medical history if they had any additional medical conditions, but in none of the cases was a clear relationship with the anxiety levels determined.

Randomization of patients to the treatment or control group was performed using the free GraphPad software by simple randomization, generating an association between the group and a patient identifier. This process was performed by an investigator with no clinical involvement in the trial, and was blinded, until the end of the study, to the physical therapist who performed the intervention protocol, to the evaluator who was in charge of data collection, and to those responsible for data analysis. The patient was also unaware at any time during the study of the group to which they had been assigned.

2.3. Interventions

The protocol was performed in the period between April 2021 and January 2022 at the Pulsión Physiotherapy Clinic located in Madrid, with which a collaboration contract was signed exclusively for this study. The follow-up of the last patient ended in July 2022.

Patients in the treatment group received the myofascial protocol consisting of 40 min of manual myofascial therapy in four regions (10 min per region). The approach consisted of the application of the following techniques under the parameters of low load and long duration to the myofascial complex until the tissue restriction disappears or the intervention time ends: (1) transverse planes at the pelvic level (lumbosacral region and abdomen), (2) transverse planes at the clavicular level (interscapular region and sternum), (3) suboccipital induction and (4) decompression of the temporals [21]. The frequency of these sessions was once a week for four weeks.

Patients in the control group received a placebo protocol consisting of 40 min of simulated myofascial intervention in the same four regions as in the myofascial protocol (10 min per region) in the same order, without performing any movement, only maintaining contact (involving touch) in the different positions for the required time: (1) abdomen, (2) sternum, (3) suboccipital region and (4) earlobes. The frequency of these sessions was once a week for four weeks as in the myofascial protocol.

A physical therapist with expertise in myofascial therapy and six years of clinical experience in this technique was responsible for the implementation of the intervention protocol. An evaluator blinded to the groups was responsible for data collection before the start of each of the interventions, and after the completion of the interventions, as well as at follow-up at one, three and six months after the end of treatment.

After completion of follow-up (at six months) and once all data were collected, patients in the placebo group received the same treatment as the myofascial group, in order to maintain the ethical principles of the Declaration of Helsinki.

2.4. Outcomes

The sociodemographic variables considered were age, sex, height, weight, body mass index, marital status, and educational level. It was also recorded whether they exercised, smoked, were receiving pharmacological treatment with anxiolytics/antidepressants, and were undergoing psychological treatment.

The STAI inventory was used as the main outcome to determine the levels of clinical anxiety, specifically the STAI Trait-Anxiety questionnaire. It consists of a self-reported questionnaire widely used in the literature to assess both trait anxiety ("most of the time") and state anxiety ("at the present moment"). Each of these subscales has a total of 20 items in a 4-point *Likert* response system according to intensity (0 = not at all; 3 = very much). The total score on each of the subscales ranges from 0 to 60 points. The reliability estimated by Cronbach's α coefficient for the STAI Trait-Anxiety was 0.90 and for the STAI State-Anxiety 0.94, indicating they are psychometrically sound [22].

As secondary outcomes, central sensitization was analyzed using the CSI (Central Sensitization Inventory) [23], general health using the GHQ-12 (General Health Questionnaire) [24], somatization using the PHQ-15 (Patient Health Questionnaire) [25], depression using the BDI-II (Beck Depression Inventory) [26] and pain using the VAS (Visual Analog Scale) [27].

2.5. Statistical method

The free program GRANMO version 7.12 was used for the sample calculation. A sample size of 36 patients randomly distributed between both groups (Myofascial and Placebo) was obtained, which provides at least a statistical power of 80% to detect a difference of 10 units between the two groups in the STAI questionnaire [28]. This calculation assumes a bilateral significance level of 5% and a standard deviation of 10 [20]. A loss-to-follow-up rate of 10% was estimated.

For qualitative sociodemographic variables, frequencies and percentages were calculated and both groups were compared with the Fisher's exact test. For quantitative sociodemographic variables, means and standard deviations were calculated, and independent Student's T-tests were used to compare both groups. For each dependent variable (STAI Trait-Anxiety, CSI, GHQ-12, PHQ-15, BDI-II) a bifactor repeated measures analysis of variance (ANOVA) was performed (Time x Group). In addition, means and standard deviations were calculated for each group and at each time point of the study, and independent T-Students were used for the inter-group analysis. For intra-group analysis, repeated measures ANOVA was used in each group to compare the five time-related samples, and a two-by-two post-hoc analysis of related samples was also performed (Bonferroni correction to maintain alpha risk). Independent T-Student or Mann-Whitney U (for those not following normal distributions) tests were also used to compare the average improvement (before and after) of the four treatment sessions for the intra-session dependent variables, STAI State-Anxiety and VAS. In all statistical comparisons, a $p < 0.05$ was used as the criterion for significance, with a 95% confidence interval. Normality was studied with the Shapiro-Wilk test. To calculate the effect size, the partial Eta-squared (η_p^2) statistic was used for the outcomes of the repeated measures model and Cohen's d for the intra-session outcomes.

3. Results

Fig. 1 shows the flow chart with the selection and allocation of participants throughout the study. A total of 36 patients were included in the study and randomly assigned to the myofascial group (n = 18) and the placebo group (n = 18). One patient in the myofascial group was unable to receive the entire intervention (only the first session) due to personal problems. One patient in the placebo group did not attend the six-month follow-up. All data obtained were analyzed according to the intention-to-treat principle.

The sociodemographic variables are shown in Table 1. No significant differences were found between the myofascial group and the placebo group for any of the sociodemographic variables or for any of the dependent variables at baseline.

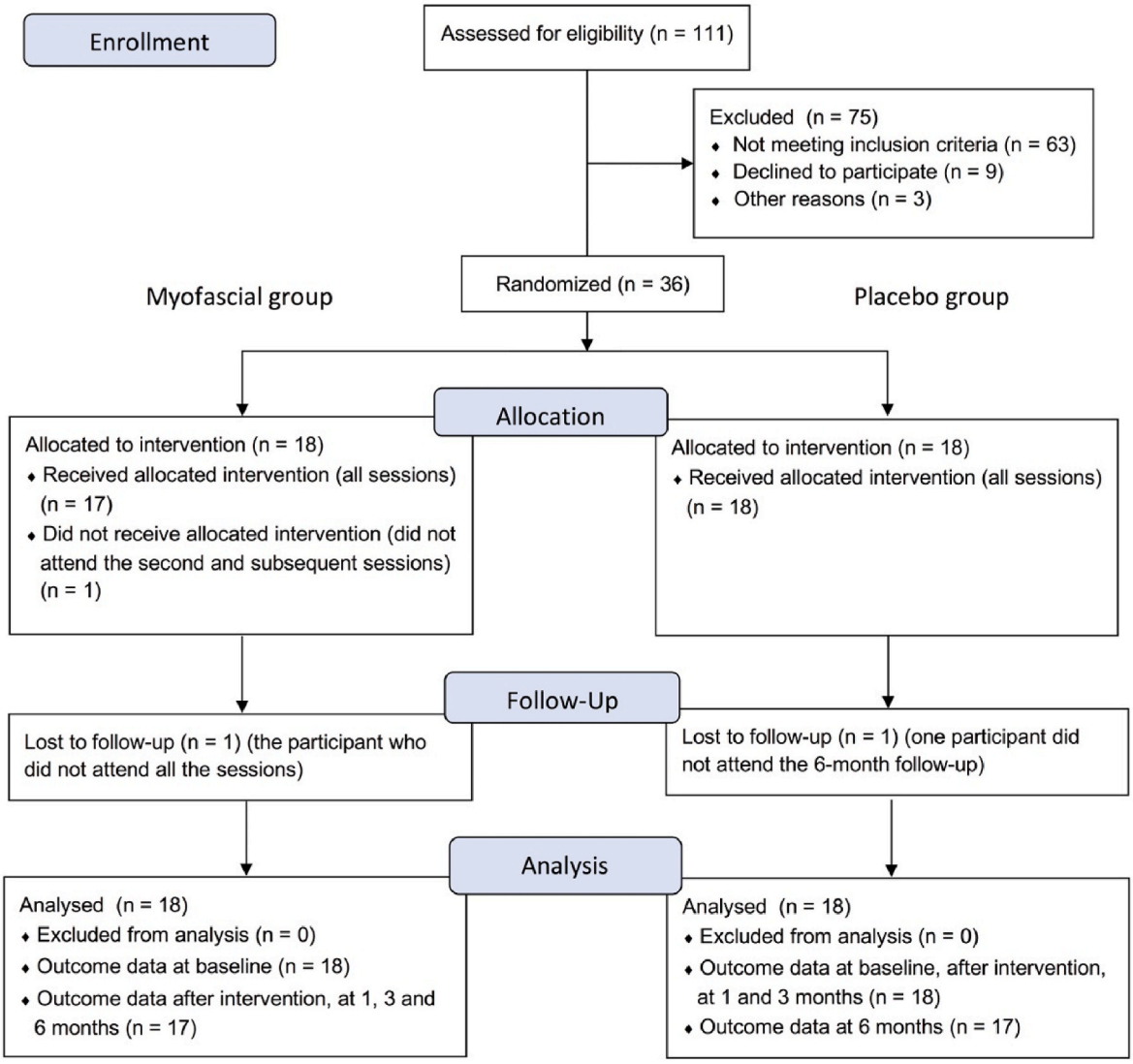

Fig. 1. Participant flow diagram.

Table 1
Sociodemographic characteristics of the participants.

	Myofascial group (n = 18)	Placebo group (n = 18)	Total (n = 36)
	Mean (SD)	Mean (SD)	Mean (SD)
Age	38.78 (10.44)	39.06 (14.50)	38.92 (12.45)
Height	1.67 (0.08)	1.69 (0.09)	1.68 (0.09)
Weight	72.22 (16.37)	70.11 (17.05)	71.11 (16.50)
BMI	25.68 (5.11)	24.40 (4.72)	25.04 (4.89)
	Frequency (%)	Frequency (%)	Frequency (%)
Gender			
Male	6 (33.3)	6 (33.3)	12 (33.3)
Female	12 (66.7)	12 (66.7)	24 (66.7)
Marital status			
Married	7 (38.9)	7 (38.9)	14 (38.9)
Single	10 (55.6)	8 (44.4)	18 (50)
Separated/ divorced	1 (5.6)	3 (16.7)	4 (11.1)
Educational level			
University	14 (77.8)	11 (61.1)	25 (69.4)
Secondary	4 (22.2)	7 (38.9)	11 (30.6)
In psychological treatment?			
YES	9 (50)	3 (16.7)	12 (33.3)
NO	9 (50)	15 (83.3)	24 (66.7)
In anxiolytic/antidepressant treatment?			
YES	7 (38.9)	5 (27.8)	12 (33.3)
NO	11 (61.1)	13 (72.2)	24 (66.7)
Smoker?			
YES	3 (16.7)	3 (16.7)	6 (16.7)
NO	15 (83.3)	15 (83.3)	30 (83.3)
Exercise practitioner?			
YES	14 (77.8)	11 (61.1)	25 (69.4)
NO	4 (22.2)	7 (38.9)	11 (30.6)

BMI: body mass index; SD: standard deviation.

It was observed that there were significant differences at 95% (Greenhouse-Geisser) in the behavior of the groups over time (Time x Group) for the outcome variables STAI Trait-Anxiety, CSI and PHQ-15 in favor of the myofascial group with a large effect size for anxiety and medium for central sensitization and somatization (Table 2).

Significant differences in the inter-group analysis of the STAI Trait-Anxiety questionnaire were observed in favor of the myofascial group after completion, at one month, three months and six months follow-up (Table 3 and Fig. 2). In the intra-group analysis for Trait-Anxiety, after the intervention a mean difference was observed with respect to baseline of 19.98 points in the myofascial group ($p < 0.001$) and 5.95 in the placebo group ($p = 0.22$). In the myofascial group this difference was maintained over time in the two-by-two analysis PRE-1M ($p < 0.001$), PRE-3M ($p < 0.001$) and PRE-6M ($p < 0.001$). The placebo group only showed differences in the PRE-3M ($p = 0.02$) and PRE-6M ($p = 0.02$) analyses.

Significant differences in the inter-group analysis of the CSI questionnaire were observed in favor of the myofascial group after completion, at one month, three months and six months follow-up (Table 4 and Fig. 3). In the intra-group analysis for central sensitization, after the intervention a mean difference was observed with respect to baseline of 20.06 points in the myofascial group ($p = 0.001$) and 3.60 in the placebo group. In the myofascial group this difference was maintained over time in the two-by-two analysis PRE-1M ($p = 0.001$), PRE-3M ($p < 0.001$) and PRE-6M ($p < 0.001$). The placebo group showed no difference in the pre-analysis ($p = 0.07$) so the two-by-two analysis was omitted.

Significant differences in the inter-group analysis of the PHQ-15 somatization questionnaire were observed in favor of the myofascial

Table 2
Differences between groups over time.

TIME x GROUP	Sig. (p-value)	η_p^2	Effect size
STAI Trait-Anxiety	< **0.001***	0.171	Large
CSI	**0.005***	0.126	Medium
GHQ-12	0.19	0.048	Small
PHQ-15	**0.008***	0.107	Medium
BDI-II	0.32	0.035	Small

η_p^2: Partial Eta-squared.
*$p < 0.05$ bifactor repeated measures ANOVA.

Table 3
Differences between the groups in clinical anxiety at each moment of the study.

STAI Trait-Anxiety	Myofascial group	Placebo group	Sig. (p-value)	Mean difference (95% CI)
PRE	42.22 (5.62)	40.06 (5.71)	0.26	
POST	22.24 (8.66)	34.11 (7.09)	< **0.001***	11.88 (6.45–17.30)
1 M	23.35 (9.73)	34.39 (7.62)	**0.001***	11.04 (5.04–17.03)
3 M	22.47 (8.97)	31.56 (6.28)	**0.001***	9.08 (3.79–14.38)
6 M	24.35 (9.68)	31.35 (8.52)	**0.032***	7.00 (0.63–13.37)

PRE: pre-treatment (baseline); POST: post-treatment; 1 M: one month follow-up; 3 M: three months follow-up; 6 M: six months follow-up; CI: confidence interval. *$p < 0.05$ Independent T-Student between groups. Results are expressed as Mean (SD).

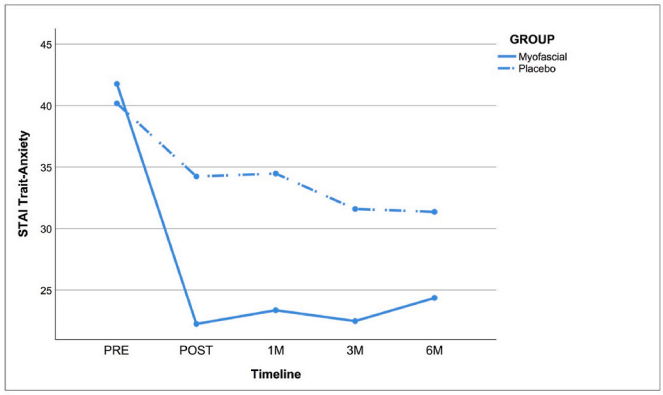

Fig. 2. Evolution of clinical anxiety in each group. The means of the STAI Trait-Anxiety outcome are shown at each moment (PRE: Baseline, POST: After the intervention, 1 M: Follow-up at one month, 3 M: Follow-up at three months, 6 M: Follow-up at six months).

Table 4
Differences between the groups in central sensitization at each moment of the study.

CSI	Myofascial group	Placebo group	Sig. (p-value)	Mean difference (95% CI)
PRE	48.00 (11.75)	48.56 (11.75)	0.89	
POST	27.94 (11.67)	44.56 (12.02)	< **0.001***	16.61 (8.46–24.77)
1 M	29.12 (14.14)	42.94 (12.44)	**0.005***	13.82 (4.52–23.13)
3 M	29.12 (12.72)	42.06 (10.89)	**0.003***	12.94 (4.81–21.07)
6 M	31.12 (14.25)	41.13 (12.08)	**0.038***	10.01 (0.60–19.42)

PRE: pre-treatment (baseline); POST: post-treatment; 1 M: one month follow-up; 3 M: three months follow-up; 6 M: six months follow-up; CI: confidence interval. *$p < 0.05$ Independent T-Student between groups. Results are expressed as Mean (SD).

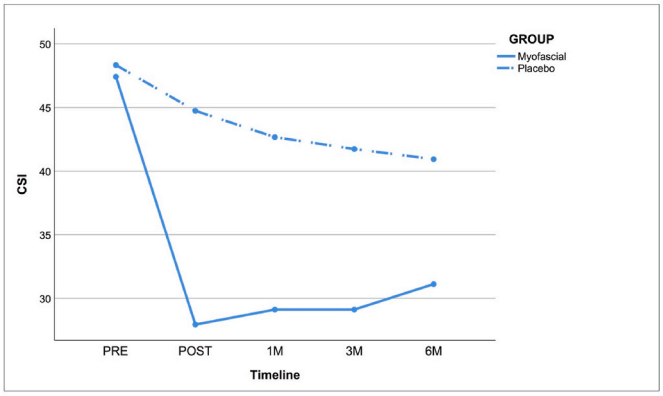

Fig. 3. Evolution of central sensitization in each group. The means of the CSI outcome are shown at each moment (PRE: Baseline, POST: After the intervention, 1 M: Follow-up at one month, 3 M: Follow-up at three months, 6 M: Follow-up at six months).

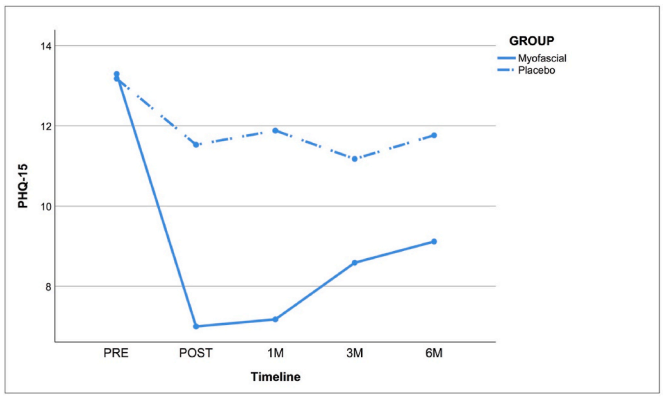

Fig. 4. Evolution of somatization in each group. The means of the PHQ-15 outcome are shown at each moment (PRE: Baseline, POST: After the intervention, 1 M: Follow-up at one month, 3 M: Follow-up at three months, 6 M: Follow-up at six months).

group after completion and at one month follow-up, but these differences were not maintained at three and six months (Table 5 and Fig. 4). In the intra-group analysis for somatization, after the intervention a mean difference was observed with respect to baseline of 6.29 points in the myofascial group ($p < 0.001$) and 1.65 in the placebo group. In the myofascial group this difference was maintained over time in the two-by-two analysis PRE-1M ($p = 0.001$), PRE-3M ($p = 0.016$) and PRE-6M ($p = 0.013$). The placebo group showed no difference in the pre-analysis ($p = 0.27$), so the two-by-two analysis was omitted.

For the outcome variables that showed no significant difference of the groups over time (Time x Group) (GHQ-12 and BDI-II), neither the inter-group analysis at each time nor the repeated measures intra-group analysis for each group was performed.

Intra-session data showed significant differences between groups for the state anxiety outcome (STAI State-Anxiety) with a medium effect size and for the pain outcome (VAS) with a very large effect size as shown in Table 6.

There were no adverse events or side effects in either group.

4. Discussion

The results of this study show that, after four sessions of myofascial intervention, a significant improvement in the levels of trait anxiety, central sensitization and somatization was observed in the treatment group compared to the placebo group. At six months this improvement in the myofascial group was maintained with respect to anxiety and central sensitization values.

In addition, it is worth mentioning the short-term results, immediately after each treatment session, where an improvement of the myofascial group was observed in the state anxiety and pain outcomes compared to the placebo group.

Interoception is the perception of internal states [11] and physiological conditions of the body [29]. It has been shown that anxiety and other somatic disorders are often accompanied by significant disturbances in the processing of interoceptive information. These disturbances usually consist of increased but distorted interoceptive afferences, which are amplified by future belief states or feelings and can generate a sense of threat and an anticipation of adverse events typical of an anxiety process [11,12]. It is possible that this interoceptive pathway is involved in the mechanisms of action underlying the myofascial approach proposed in this study, providing an explanation consistent with the results obtained. Stimulation of myofascial tissue through its multimodal receptors of free nerve endings (mainly C and Aδ fibers) informs the higher centers of the central nervous system related to emotions, such as the insular cortex. It is in this region of the interoceptive pathway (mainly in the anterior insula) where an emotional network that interacts with other limbic and cortical areas modulating decision making is formed. Likewise, this region is involved in numerous processes such as pain processing, social functions or the subjective perception of internal state [9,10,12]. Moreover, the myofascial system is not only a tissue that transmits interoceptive information, but is also richly innervated by nociceptive and proprioceptive receptors [9,10]. Furthermore, the team of Bulbena et al. has been studying the relationship between certain connective tissue pathologies such as hypermobility syndrome and anxiety for years [13,14] and, in recent studies, have introduced the interoceptive pathway into the equation to explain this relationship [15]. In addition to the above, multiple disciplines have converged on an approach of including more and more interventions based on interoception for the treatment of psychiatric pathologies [16]. Therefore, it seems that the interoceptive pathway could explain the results obtained in this study and be a mechanism of action of the proposed myofascial intervention in the improvement of clinical anxiety levels.

Table 5
Differences between the groups in somatization at each moment of the study.

PHQ-15	Myofascial group	Placebo group	Sig. (p-value)	Mean difference (95% CI)
PRE	13.78 (4.88)	13.17(4.25)	0.69	
POST	7.00 (3.37)	11.72 (4.03)	**0.001***	4.72 (2.16–7.28)
1 M	7.18 (3.88)	11.94 (5.24)	**0.005***	4.77 (1.58–7.95)
3 M	8.59 (5.15)	11.33 (4.66)	0.11	2.74 (- 0.63 to 6.12)
6 M	9.12 (5.01)	11.76 (5.20)	0.14	2.65 (- 0.92 to 6.21)

PRE: pre-treatment (baseline); POST: post-treatment; 1 M: one month follow-up; 3 M: three months follow-up; 6 M: six months follow-up; CI: confidence interval. *$p < 0.05$ Independent T-Student between groups. Results are expressed as Mean (SD).

Table 6
Intra-session differences between the groups in state anxiety and pain.

	Myofascial group	Placebo group	Sig. (p-value)	d Cohen	Effect size
STAI State-Anxiety	14.87 (7.67)	9.53 (6.28)	**0.031***	0.76	Medium
VAS	1.70 (0.82)	0.33 (0.58)	< **0.001***	1.94	Very large

Results are expressed as Mean (SD). A mean of improvement (between before and after each day of intervention) of the four sessions was performed.
*$p < 0.05$. For STAI State-Anxiety, T-Student was performed to compare groups because it met normality. For VAS, U Mann-Whitney was performed because it did not meet normality.

In recent years, attention has focused on central sensitization as one of the mechanisms underlying chronic pain. It has also been postulated as a possible explanation for some "medically unexplained symptoms". The term central sensitization could be defined as the hyperexcitability of neurons in the central nervous system. This hyperexcitability is characterized by triggering processes of hyperalgesia, allodynia and changes in pain modulation through descending pathways [30]. Through the interoceptive pathway and the fascial system, it seems that symptoms related to central sensitization processes could be improved [31]. In addition, an important relationship between anxiety, chronic pain and other general somatic symptoms, justified by central sensitization, has been observed [3–5]. For all of the above, it is possible to explain the improvement in the treatment group with respect to the variables of central sensitization and somatization.

The myofascial protocol used was designed ad hoc for this study in the absence of existing myofascial protocols in the scientific literature specific to psychological variables. That is, there were no protocols where anxiety was analyzed as a main outcome. This design is based on the number of interoceptive receptors that exist in different regions within the fascial system and that coincide with areas where the patient experiences increased feelings of anxiety [32]. It would be interesting in the future to design a study to evaluate the reliability of this protocol.

At the start of the study, and as already described in the sociodemographic data, some of the patients were receiving anxiolytic/antidepressant pharmacological treatment or psychological treatment. These variables were included in the statistical model and were not seen to affect the results. The reason for not restricting the selection criteria and not excluding patients who were receiving either of these two types of treatment was to try to observe, in a first study, how myofascial treatment behaved in patients with clinical anxiety and to extrapolate the results to the reality of today's society, in which some patients with anxiety are on medication, others receive psychological treatment and others do not receive any type of help despite having high levels of anxiety [6].

Within physical therapy there are no specific techniques or protocols for the treatment of clinical anxiety. There are studies that propose that therapeutic exercise has an anxiolytic effect, but the latest systematic reviews and meta-analyses on how exercise affects anxiety levels do not provide conclusive results, to some extent due to the high risk of bias in the studies and the heterogeneity of the exercise protocols [7,8].

The latest systematic reviews and meta-analyses on myofascial intervention have studied how this treatment affects low back pain [17] and fibromyalgia processes [18] with results in favor of the application of myofascial techniques for these pathologies. However, only the study by Castro-Sánchez et al., has analyzed anxiety as an outcome measure [19], demonstrating benefits in favor of myofascial treatment compared to placebo one month after the intervention.

Some of the strengths of the present study with respect to other studies, not only of myofascial techniques but of manual therapy in general, is that the placebo group received a simulated myofascial protocol, that is, a placebo *hands-on* protocol, instead of disconnected electrotherapy or no treatment (wait-list control group). Moreover, other studies that have used myofascial techniques (such as "Self myofascial release") cannot be explained a priori by the same interoceptive mechanism of action as mentioned above because of the way they were implemented. In addition, the present study did not present any adverse event or side effect in any of the groups, unlike other treatments for anxiety, mainly pharmacological ones.

The limitations of the present study include the fact that, although a sample calculation was made prior to the study, the sample obtained was relatively small. Furthermore, the patients included in the study were patients with clinical anxiety (patients with high values in the STAI Trait-Anxiety questionnaire) and not patients with a diagnosis of anxiety or included in any group of anxiety disorders included in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) [33] or ICD-11 (International Classification of Diseases) classifications.

It would be interesting to analyze in future studies how the inclusion of the myofascial approach within an interdisciplinary framework (physiotherapy, psychology, medicine, exercise, etc.) affects the efficacy observed, as well as to carry out specific studies according to specific anxiety disorders and stratified by age.

Based on the literature consulted, this study is the first randomized controlled clinical trial to demonstrate that manual therapy, specifically the myofascial approach, is effective in reducing the levels of clinical anxiety and its associated symptomatology and that this improvement is maintained over time.

5. Conclusions

The myofascial approach reduces clinical anxiety levels and associated central sensitization processes in patients with clinical anxiety and this improvement is maintained over time.

Ethical approval

Ethics Committee of the Hospital Clínico San Carlos in Madrid (C. I.21/078-EC_X).

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author statement

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Declaration of competing interest

The authors declare that there are no economic, personal or any other type of conflicts of interest that could have influenced the work carried out.

Acknowledgments

The authors would like to thank the staff of Pulsión Physiotherapy Clinic in Madrid and the Faculty of Nursing, Physiotherapy and Podiatry of the Complutense University of Madrid for their support in recruitment, as well as all the patients who participated in the study.

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