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ORIGINAL RESEARCH

Results of an Active Neurodynamic Mobilization Program in Patients With Fibromyalgia Syndrome: A Randomized Controlled Trial

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Abstract

Objective: To examine the effects of an active neurodynamic mobilization program on pain, neurodynamics, perceived health state, and fatigue in patients with fibromyalgia syndrome (FMS).

Design: Randomized controlled trial.

Setting: Local fibromyalgia association.

Participants: Patients with FMS (N = 48).

Interventions: Patients were randomly allocated to an active neurodynamic mobilization program or a control group. The intervention was performed twice a week.

Main Outcome Measures: Pain was assessed with the Brief Pain Inventory and Pain Catastrophizing Scale; neurodynamics were evaluated using neurodynamic tests for upper and lower limbs. The functional state was evaluated with the Health Assessment Questionnaire Disability Index, and perceived fatigue was evaluated with the Fatigue Severity Scale.

Results: Significant ($P<.05$) between-groups differences were found in the values of pain, upper and lower limb neurodynamics, functional state, and fatigue. Also, significant pre- to postintervention within-group differences were found in the intervention group, whereas no significant changes were found in the control group.

Conclusions: A neurodynamic mobilization program is effective in improving pain, neurodynamics, functional status, and fatigue in patients with FMS.

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Fibromyalgia syndrome (FMS) is a common chronic condition involving widespread pain, cognitive symptoms, nonrestorative sleep, fatigue, and a number of somatic symptoms, along with a reduced quality of life.[1] Additionally, other recognized symptoms include generalized morning rigidity, cephalea, irritable bladder, dysmenorrhoea, extreme sensitivity to cold, restless legs, an undefined pattern of numbness, tingling, and intolerance to exercise.[2] The prevalence of FMS in European countries is approximately 2.9%, which translates to approximately 6 million people with FMS. The prevalence is higher among women (3.4%) than men (0.5%); it rises in middle-aged adults and peaks at 7.4% among those between 70 and 79 years old.[2]

Pain has been described among the most frequently reported, bothersome, and disabling symptoms in FMS, taken into account that catastrophizing is an important variable in understanding the experience of pain.[3] Catastrophizing of pain may be an important factor to consider when evaluating evoked pain intensity during neurodynamic testing. Neurodynamics is a concept that integrates biomechanical, physiological, and morphologic functions of the nervous system.[4] Although most of the treatments focus on pain, there are other important symptoms that affect the functionality

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and development of activities of daily living. Patients with FMS have been previously shown to feel disabled regarding the perception of high impact of the syndrome on their health and quality of life.[2] Fatigue has also been reported to be a common problem in patients with FMS, constituting an important impediment in tasks performance.[5]

A systematic review found marked disagreement among rheumatologists regarding how to manage FMS.[6] Numerous treatment strategies have been proposed to induce clinical remission. Physical and other nonpharmacologic therapeutic proposals have focused on the elimination of tender points, restoration of range of motion, and improvement of muscle strength, quality of life, and sleep.[6] Manual therapeutic techniques have shown significant improvements in pain intensity and range of motion in patients with FMS, including joint mobilization techniques, traction, and glide, which are often used to stretch the joint capsule, to improve physiological accessory motions and limited range of motion and to reduce pain.[7]

The neurodynamic mobilization technique is a form of manual therapy that directs force to neural structures through the positioning and movement of multiple joints. It has been described as an approach to physical treatment of pain that has been reported to be effective for certain conditions.[4] A neural mobilization program has been associated with decreased ratings of pain and disability in several neurogenic and musculoskeletal disorders.[4,8] It has been suggested that neurodynamic interventions provide a peripheral stimulus, which may interrupt the sensitization process through a peripheral effect.[8] This neurophysiologic mechanism may also be related to the activation of descending inhibitory pathways.[9] The mobilization of a nerve may also reduce the pressure existing within the nerve and could therefore result in an improvement of blood flow; this mechanism could improve axonal transport and nerve conduction. Similarly, the elongation of the nerve bed induces nerve gliding, which increases nerve tension and intraneural pressure.[10]

Some studies have focused on active neurodynamic interventions in other pathologies (eg, carpal tunnel syndrome,[8] low back pain,[11] other disorders of nerve-related neck and arm pain[12]). However, no previous study has assessed the results of an active neurodynamic mobilization program in patients with FMS. The objective of this study was to evaluate the effects of an active neurodynamic mobilization program on pain, neurodynamics, perceived health state, and fatigue in patients with FMS. It was hypothesized that an 8-week neurodynamics intervention would improve the pain, neurodynamics, perceived health state, and perceived fatigue of patients with FMS.

Methods

Design

The design consisted of a single-blind randomized controlled trial. The study protocol was approved by the University of Granada Ethics Committee (Granada, Spain), and the procedures followed were in accordance with the 1975 Declaration of Helsinki, as revised in 2013.

The Consolidated Standards of Reporting Trials guidelines[13] were followed during the course of the research. The study was carried out from January to April 2014. Before participation, individuals gave informed consent.

List of abbreviations:

BPI	Brief Pain Inventory
FMS	fibromyalgia syndrome
HAQDI	Health Assessment Questionnaire Disability Index
PCS	Pain Catastrophizing Scale
SLR	straight-leg raising
ULNT	upper limb neurodynamic tests

Participants

A formal invitation to participate in the study was sent to the members of a local association of FMS (Granada, Spain). A total of 56 patients gave their written informed consent after receiving detailed information about the aims and study procedure. Participants were included in the study if they were clinically diagnosed with FMS according to the American College of Rheumatology criteria[1] (widespread pain for >3mo and pain with 4kg/cm^2 of pressure reported for ≥11 of the 18 tender points), were aged between 50 and 65 years, did not suffer from concomitant somatic or psychiatric disorders, were able to ambulate without assistance from another person or a walking frame, and were capable and willing to provide informed consent. The participants were excluded if they had cognitive impairment or comprehension deficits that prevented them from following verbal commands, if they had visual or acoustic limitations, and if they had been diagnosed with a neurologic condition other than FMS. After being assessed for eligibility, a final sample of 48 subjects participated in the study.

Randomization

The participants were randomly assigned to an experimental group or control group. The randomization sequence was drawn up and kept off-site by a statistician who was not aware of the study aims, using a random number generator in blocks of 8 with no stratification. The sequence of subjects included in the experimental or control groups was mailed from the statistician to the recruiter. The design of the study and participants' distribution between groups are shown in figure 1.

Measurements

After the allocation, baseline measures were taken. All the data were collected by an independent researcher who was blinded to the allocation group of the patients. Clinical and sociodemographic characteristics of participants were collected at baseline to describe the sample. These measures included age, sex, and body mass index. Academic studies were obtained by self-report. The clinical records of participants were also reviewed, and the disease duration and medication intake were noted. The FMS symptoms and functional deficits were assessed by the Revised Fibromyalgia Impact Questionnaire.[14] Additionally, anxiety and depression were measured with the Beck Anxiety Inventory[15] and Beck Depression Inventory[16] at baseline. Participants were instructed to follow their normative schedule of medications and physical activity, including not starting any new exercise program or drug treatment throughout the course of the study. The main outcome measure was neurodynamics. The secondary outcome measures were pain (intensity and interference of pain and pain catastrophizing), functional status, and perceived fatigue.

Pain

The pain was assessed using the Brief Pain Inventory (BPI) and Pain Catastrophizing Scale (PCS). The BPI[17] measures the degree of interference of pain with various aspects of life, including