

'Tai Chi in Fibromyalgia Therapy

¹Rosa Grazia Bellomo, Michele Gardarelli, Isidoro Li Pira, ²Roberto Coppola, ¹Claudia Barbato

¹ Department of Biomolecular Sciences, University of Study of Urbino Carlo Bo,
Urbino, Italy

² Kore University, Enna

ABSTRACT

Tai Chi Chuan, simply known as Tai Chi, is an ancient Chinese practice that combines fluid body movements with deep breathing to promote mind-body balance and facilitate the flow of internal energy. It is called Qi.

This discipline has become popular worldwide due to its health benefits.

Fifty community-dwelling adults aged 60 years and older with fibromyalgia participated in the study. The participants attended eight 50-minute sessions per month over a three-month period, completing a total of 24 sessions. The sessions were conducted online rather than in person due to the COVID-19 pandemic.

Research has confirmed that Tai Chi can improve aerobic capacity, muscular strength, balance, and psychological well-being, as well as enhance health-related quality of life. Recent studies have also demonstrated that Tai Chi is safe and effective for various conditions, including neurological, rheumatological, orthopaedic, cardiovascular, chronic obstructive pulmonary diseases, and breast cancer. The results show that the treatment has also been significantly effective from a statistical standpoint.

keywords: Fibromyalgia, Tai Chi, Physical activity

INTRODUCTION

Fibromyalgia is one of the most common conditions affecting the muscles, presenting pain, stiffness, and altered sensitivity in the muscles, tendons, and joints. The involved tissues are not accompanied by evidence of inflammatory processes; therefore, despite the disabling pain, patients with fibromyalgia do not currently exhibit evident tissue damage or deformities. Pain typically affects the neck, buttocks, shoulders, arms, back, and chest. "Tender points" are sites of "trigger" pain that spreads and causes muscle spasms if stimulated. Studies by Russell et al. suggest that the painful symptoms of fibromyalgia can also involve aberrations in descending pain inhibition pathways.

The transmission of sensory information to the brain is inhibited by the activation

of fibres descending from the brainstem to the dorsal horn, mainly through the release of neurotransmitters associated with pain and mood variations (e.g., noradrenaline and serotonin).

Among individuals with fibromyalgia, the function of this endogenous pain inhibition system may be influenced by deficiencies in the levels of these neurotransmitters in the central nervous system.

Russell and colleagues found that, compared to healthy controls, patients with fibromyalgia exhibit low serum levels of serotonin, as well as low levels of serotonin metabolites, norepinephrine, and dopamine in cerebrospinal fluid.

The frequent comorbidity of fibromyalgia with mood disorders suggests an important role in stress response and neuroendocrine abnormalities.

The hypothalamic-pituitary axis is a critical component of stress adaptation. In fibromyalgia, the adaptive stress response is disrupted, leading to the onset of symptoms. It is estimated that fibromyalgia (FM) affects more than 5 million Americans (2 to 5% of the adult population), making it one of the most common widespread chronic pain disorders in the United States.

Fibromyalgia is the second most common disorder encountered by rheumatologists (after osteoarthritis) and represents a significant subset of patients seen in primary care.

Patients with fibromyalgia often report the onset of symptoms after a car accident, surgery, or some other trauma, frequently in the occipital region. The pathophysiology of fibromyalgia involves a range of factors, including abnormalities in the autonomic and neuroendocrine systems, genetic factors, psychosocial variables, and environmental stress.

These factors are also involved in other disorders that often coexist with fibromyalgia and are also characterized by persistent or recurrent pain, such as irritable bowel syndrome, temporomandibular disorder, major depressive disorder, and anxiety disorders.

Fibromyalgia can also co-occur with chronic inflammatory diseases such as rheumatoid arthritis (RA), osteoarthritis, and systemic lupus erythematosus. The presence of one or more of these coexisting conditions can complicate the diagnosis and treatment of fibromyalgia.

Patients with fibromyalgia often experience sleep problems, including non-restorative sleep, insomnia, early morning awakenings, and poor sleep quality. In a study by Roizenblatt et al., sleep quality was significantly lower in patients with fibromyalgia compared to controls, and patients reported worsening of pain symptoms after sleep deprivation.

Polysomnography studies frequently show alpha-delta patterns associated with fragmented and non-restorative sleep in patients with fibromyalgia.

Sleep disturbances are linked to the lack of energy and fatigue commonly observed in these patients. The observation of alpha waves during sleep with delta waves has been associated with reduced GH and IGF 1 production.

Since GH and IGF 1 are necessary to repair muscle microtrauma, sleep disturbances can affect the healing of muscle tissue injuries, thus prolonging the transmission of delta waves. sensory stimuli from damaged muscle tissue to the central nervous system and improving muscle pain perception.

In turn, this increased perception of pain contributes to increasing sleep disturbances, thus maintaining the patient's fatigue and insufficient repair of muscle tissue. This multidimensional nature of fibromyalgia has made it difficult to define and assess its severity.

The uncertain etiology and lack of specific disease markers exacerbate the problem of assessing fibromyalgia severity. Although several studies have investigated the potential use of biological markers, the correlation of these markers with symptoms was ambiguous, making them ineffective as indicators of severity.

Research, including neuroimaging investigations, shows abnormalities in neurotransmitters and an abnormal response to pain. Altered pain processing at peripheral and central levels contributes to central sensitization and a dampened effect of diffuse noxious inhibitory control (DNIC).

It has been shown that Tai Chi improves pain symptoms in patients with fibromyalgia, but its long-term effects and related mechanisms remain to be clarified. In this study, we investigated the effects of long-term Tai Chi training on symptoms in fibromyalgia patients. More importantly, the beneficial mechanisms of Tai Chi remain unclear.

Animal studies on neurodegenerative diseases show that physical exercise can improve the production of neurotrophic factors, neurotransmitters, and hormones, promoting synaptic plasticity, neurogenesis, angiogenesis, and autophagy.

Several studies focused on the mechanisms of Tai Chi have demonstrated improvement in brain metabolism and muscle energy using brain proton magnetic resonance spectroscopy (1H MRS) and muscle 31P MRS, as well as improved default mode network (DMN) connectivity using resting-state functional magnetic resonance imaging (fMRI).

However, the mechanisms of Tai Chi training in fibromyalgia patients have not been studied. In this study, we conducted a randomized controlled trial lasting four months to investigate the long-term effect of Tai Chi training on symptoms in patients with fibromyalgia.

Characteristics of Tai Chi

The origins of Taijiquan are lost in the shadows of Chinese mythology. However, everything points to the astonishing backdrop of martial arts in fabulous epochs on the one hand, and on the other, to the schools of Taoist thought, centered on the inseparable alternation and continuous blending of Yin and Yang. Understood as constituent principles of the "Ten Thousand Creatures": a poetic definition for the vastness of Nature, originating from the great, indescribable Dao, the primordial energy articulated through the Yin and Yang duality.

Thus, the very name defines the essential features and purpose of the Art: Taiji or Supreme Principle, Quan or boxing, martial art.

The repeated codification into different yet similar styles by families of great artists and martial combatants occurred between the 1800s and the early 1900s. Meanwhile, philosophy, with the contributions of Buddhism and Confucianism, greatly enriched its cultural foundations.

The most widespread style is the Yang style, created by the eponymous family. From this, and thanks to a profound knowledge of other martial styles, Grandmaster

Wang Zhuanghong originated the Water Style in Hong Kong in the second half of the 20th century: an interpretation of Taijiquan that marvellously blends traditional culture, martial art, and health care. This was achieved through a particularly deep study of the effects of gravity in this discipline.

His first disciple and witness, Grandmaster Wang Zhixiang, a traditional Chinese medicine practitioner and calligraphy painter from Shanghai, highly esteemed in his homeland, has been spreading this style in Europe for a quarter of a century.

When Law 4/2013 initiated regulations for otherwise unregulated professional activities, some of his Italian students worked towards public recognition of their teaching, obtaining the qualification of "professionals" in the field.

It is in this context that the Professional Wang Academy, their representation, has identified professionals willing to experiment with partners affected by various fibromyalgia manifestations.

The basic criterion of the program, coordinated by Master Isidoro Li Pira, the first disciple of Grandmaster Wang Zhixiang, stems precisely from the origins of Taijiquan: to be highly skilled combatants, one must know how to exploit every small resource of one's psycho-physical potential.

Hence, the care for the Heaven/Earth position, i.e., posture and spine function.

Through progressive exercises; the exploration of the perception of gravity force throughout the body as a balancing factor; self-massage, from gentle strokes on the sensory system of the skin to systems of very light vibrational percussion; the work of opening and closing the joints, in successive stages, starting from the larger ones; exploration of spatiality with movements guided by the hips and torso; some guiding principles of the School to try to perceive homogeneity and completeness in the unified movement of the body; the constant search for connection between mind and body, with imagination projected to 'visualize' the respective energy pathways.

Methods

A convenience sample of 40 male and female subjects participated in the study. Their initials identified each subject for privacy reasons. The subjects were recruited by the Fibromyalgia Committee Italy (CFU Italy) in collaboration with the Italian Tai Chi School. The sessions were carried out online and not in person due to the Covid pandemic

All subjects underwent evaluation with pre-and post-treatment questionnaires using the Tai Chi methodology. The subjects were individually examined through kinesiological evaluation, and the data obtained for each subject were subsequently recorded in a Microsoft Excel spreadsheet.

The subjects attended eight fifty-minute lessons per month for three months, totalling twenty-four lessons.

EXERCISES (standing and/or seated):

Assume the Heaven/Earth position: vertical alignment between the top of the head, perineum, and the midpoint between the feet.

Exploration of the sensation of gravity (baihui or crown of the head) and body oscillations (seaweed swaying): guided oscillations from position no. 1 through imagination. To "listen" to the body, improve the sense of balance, activate the energetic component of balance, soften the body, and release superficial tensions (tendons and muscles).

Self-massage of the head: gentle rubbing with the concave palm stimulates the acupoints of the most important meridians and activates energy networks.

Stroking the skin (head – chest/arms – buttocks/abdomen – legs): stimulation of sensitivity and perceptivity of the epidermal tissue and awakening of frequencies in the body.

Light vibrational percussion on the chest, abdomen, arms, and legs (refreshing): using the fingertips instead of the palm of the hand. To awaken energy circulation and refresh.

Subtle rotational work on major joints (fingers, wrists, elbows, shoulders, ankles, knees, hips): mobilization of joints with propulsion from within rather than direct input to the musculature.

Meditative slow-walking back and forth (natural): movement control, body listening, work on gravity, and balance search – initiating movement from point 1.

Mapu position and lateral counter-rotations of hips/shoulders: activity to release stiffness in the lumbar area. We are seeking motor connection between hips and shoulders.

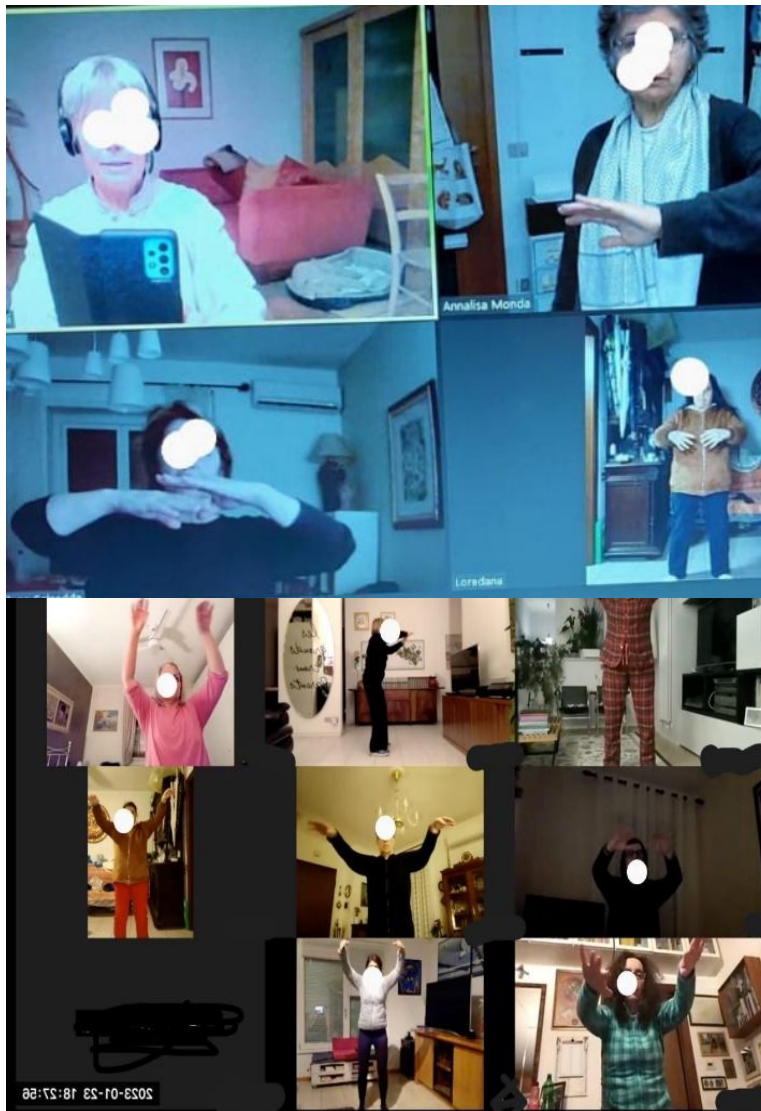
Root/Trunk/Branches (lower limbs and then together with upper limbs): seeking softness in arms and legs and consequently movement of limbs. We seek movement as a "natural" undulatory flow and gradual release of "voluntary" force.

Expansion and concentration. Lateral arm rotations, forwards and backwards (principle of indirect force, outer moves and inner follow): applying principles from previous points and the 'open and close' principle guiding the Cardio-circulatory System and Breathing. Work/Sensation Enriches Through Relationship With External Space And "Indirect Force".

Side arm openings guided by wrists: as in the previous point.

Point/Line/Surface/Volume (8 Directions): Sensitization to the multiple spatial directions of movement. Up/Down, Back/Forth, Right/Left, In/Out.

Zhanzhuang (Tree Meditation) Breathing and Rotating: Static, Semi-Static, and Moving Positions for Energetic Enhancement. Purpose of Study.



Statistical Analysis

The variables extrapolated from this analysis were: FIQR-function domain, FIQR-overall domain, FIQR-symptom domain, and FIQR-total score. All statistical analyses were done by SPSS v. 21.0 (SPSS Inc. Chicago, IL, USA). Data were preliminarily checked for missing values, outliers, and normal distribution using the Kolmogorov-Smirnov test. Continuous variables were expressed by mean and standard deviation (SD), and the pre-and post-differences were evaluated using a paired t-test. All tests were two-sided and the level of significance was set at $p \leq 0.05$.

Results

The results show a statistically significant reduction in all variables ($p < 0.001$). From the observation of the averages (Table 1), it is already possible to see how there has been a clear improvement in the conditions at the expense of the less invasiveness of the symptoms.

Table 1. Mean and standard deviation pre and post-treatment. P-value derived from paired t-test. SD=Standard Deviation.

Variable	Before treatment		After treatment		p-value
	Mean	SD	Mean	SD	
FIQR-function domain	37.80	25.22	17.93	14.32	<0.001
FIQR-overall domain	7.83	5.97	2.63	3.10	<0.001
FIQR-sympton domain	43.40	23.65	16.25	11.18	<0.001
FIQR-total score	42.13	23.07	16.72	11.11	<0.001

Conclusion

Tai Chi is a Chinese traditional conditioning exercise that integrates breathing exercises into body movements.

The literature paper reveals that Tai Chi has benefits in health promotion and has a potential role as an alternative. Therapy in neurological, rheumatological, orthopaedic, and cardiopulmonary diseases. There are several reasons to recommend Tai Chi as an exercise program for healthy people and patients with chronic diseases. First, Tai Chi does not need special facilities or expensive equipment; it can be practised anytime and anywhere.

Second, Tai Chi effectively enhances aerobic capacity, muscular strength, and balance and improves cardiovascular risk factors. Third, Tai Chi is a low-cost, low-technology exercise. It is concluded that Tai Chi effectively promotes health and can be prescribed as an alternative exercise program for patients with certain chronic diseases.

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