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Mind Body Therapies in the Rehabilitation Program of Fibromyalgia Syndrome

Susanna Maddali Bongi and Angela Del Rosso

Division of Rheumatology, Department of Biomedicine, University of Florence, Italy

1. Introduction

Fibromyalgia syndrome (FMS) is characterised by chronic widespread pain for more than 3 months and bilateral sites of focal tenderness (tender points) (Wolfe et al, 1990) associated with fatigue, stiffness, non restorative sleep, depression, anxiety, difficulty concentrating, forgetfulness, and psychological distress that alter, sometimes severely, quality of life.

Recently, new American College of Rheumatology (ACR) criteria for the diagnosis of FMS were developed, basing on widespread pain and symptoms severity (since, at least, 3 months) and not considering tenderness at tender points (Wolfe et al, 2010). However, in all the studies considered and discussed in this chapter, the patients were enrolled if fulfilling ACR classification criteria (Wolfe et al, 1990).

The optimal care for FMS patients requires a specific and individually tailored multidisciplinary approach combining pharmacological and non pharmacological treatment (Goldenberg et al, 2004; Häuser et al, 2010).

Non pharmacological interventions aim to deal with the long term consequences of FMS, such as disability, psychological distress, muscular deconditioning and fatigue. Overall, reviews of literature showed these approaches to be more effective than pharmacological treatments (Rossy et al, 1999).

Many studies were published about rehabilitation, especially concerning physical training (comprising hydrotherapy, cardiovascular exercises, muscular strengthening or stretching), useful in re-conditioning the patients, in breaking the pain-tension cycle, and in improving disability. Strong evidence of efficacy was shown for cardiovascular exercises (Busch et al, 2008), although their effects were often not maintained beyond the end of the intervention.

Although well defined rehabilitation guidelines for FMS are not validated yet, non pharmacological treatments, including education, self-management programs, exercises and mind body therapies (MBT) are taken into account in sets of guidelines and recommendations for FMS treatment drawn by different Scientific Societies (Burckhardt et al, 2005; Carville et al, 2008; Häuser et al 2005; Häuser et al, 2010).

MBT are useful in modulating central pain processing and pain perception and in dealing both with musculoskeletal pain and tenderness and with FMS central derived symptoms, such as depression, anxiety and fatigue, as they are able to interfere on putative pathogenic mechanisms of FMS.

Although the causes and the mechanisms underlying FMS pathogenesis are not completely known yet, most investigators interpret FMS as led by disordered central pain processing (Cook et al, 2004; Dadabhoy et al, 2008).

According to a recent proposal (Costigan et al, 2009), FMS can be included, as well as irritable bowel syndrome and interstitial cystitis (often associated to FMS), among dysfunctional pain syndromes. Dysfunctional pain reflects malfunctioning sensory processing within the central nervous system and occurs in the absence of identifiable noxious stimuli, inflammation, or damage to the nervous system. Pain induces, and is partially maintained by, a state of central sensitization in which an increased transmission of nociceptive information allows normally non noxious stimuli to be amplified and perceived as noxious. Also peripheral nociceptive inputs may initiate and maintain central sensitizations, ultimately leading to disordered central pain processing and dysfunctional pain (Cook et al, 2004; Costigan et al, 2009).

As the pathogenesis of FMS is not, however, fully understood, the management of the disease represents a huge burden that traditional western medicine is currently failing to approach efficaciously.

MBT, defined as “interventions that use a variety of techniques designed to facilitate the mind’s capacity to affect bodily function and symptoms” (Health Information: Mind-Body Medicine. National Center for Complementary and Alternative Medicine, 2006) may be useful in the rehabilitation programs of FMS patients. In fact, despite their conceptual and technical differences, they all yield a global approach and involve both physical and mental dimensions of the subjects by focusing on the relationships among the brain, mind, body, and behaviour, and their effect on health and disease.

Both concentration based and movement based MBT have no or low physical impact and allow the patients themselves to play a more active role in their treatment (Wahbeh et al, 2008). In FMS patients, MBT, acting by different modalities that depend on the peculiarities of the methods, help to cope with pain and to disconnect the affective response to pain, thus decreasing pain catastrophizing and the potentially associated emotional distress and sympathetic activation.

Thus, MBT are efficacious in approaching chronic pain, the cardinal clinical feature of FMS, as well as its central derived symptoms such as fatigue, difficulty sleeping and relaxing, depression, anxiety, and psychological distress, and, thereby, to improve activities of day living, mood, self efficacy and quality of life, often severely affected, and to reduce disability.

However, all MBT relies on a good compliance and an active participation of the patients to the treatment. Furthermore, especially in concentration based MBT, such as cognitive behavioural therapies (CBTs), that are administered by a psychologist, the patients are needed to be aware of and to cope with the psychological determinants of FMS (Carville et al 2008).

In FMS, MBT should be chosen and tailored according to pain intensity, function and other associated features, such as depression, fatigue and sleep disturbance, according to the preferences and the expectations of the patients (van Koulil et al, 2007). Patients with relatively high levels of psychological or emotional distress seem to benefit most by MBT, whose efficacy may be improved by offering tailored treatment, administered at an early stage by operators skilled in their technique and expert in dealing with FMS (van Koulil et al, 2007).

Different concentration based MBT, such as Cognitive Behavioural Therapies, Hypnosis, Guided Imagery and Mindfulness Meditation have been used in FMS, as well as movement based techniques, such as body awareness technique, Mensedieck system, Yoga, Tai Chi and Qi Gong. Also Pilates method was used in FMS patients (Table 1.). In our experience, we used with success Rességuier Method, a rehabilitative intervention somewhat resembling MBT, as a novel non pharmacological tool to treat FMS patients.

Concentration based mind body therapies

- Cognitive Behavioural Therapies (CBTs)
 - ◆ *Single method CBTs*
 - ◆ education programmes
 - ◆ relaxation techniques (progressive relaxation, biofeedback, autogenic training)
 - ◆ *Multi method CBT*
- Hypnosis
- Guided Imagery
- Mindfulness Meditation

Movement based mind body therapies

- Body Awareness Technique
- Mensedieck system
- Yoga
- Tai Chi
- Qi Gong
- Rességuier Method and Body Movement and Perception method
- Pilates Method

Table 1. Mind body therapies in Fibromyalgia Sindrome.

2. Concentration based mind body therapies

2.1 Cognitive Behavioural Therapies (CBTs)

Cognitive Behavioural Therapies (CBTs) are among the most used treatments for FMS, whose cardinal symptom is chronic and widespread pain. The transition of acute to chronic pain, independent of a biomedical cause, as in FMS, is described by biopsychosocial models. In acute pain, three response systems are involved: behavioural reactions (e.g avoidance behaviour), cognitive reactions (e.g increased attention to bodily sensations and catastrophizing) and physiological reactions (e.g a high autonomous arousal and muscle tension). These behaviours are appropriate adaptive short-term reactions to acute pain, but they become less functional and also detrimental when applied in a long term period, and in response to chronic pain (Evers et al, 2001; Turk & Flor, 1999; van Koulil et al, 2007). The main objective of CBTs is to change these behaviours into positive attitudes. A distinction can be made between single method interventions, such as education and relaxation programmes, and multimethod CBTs, incorporating various methods from cognitive behavioural approaches (van Koulil et al, 2007).

2.1.1 Single method Cognitive Behavioural Therapies

Educational programmes include information about pain self-management, coping and relaxation techniques, the importance of physical activity and social support and strategies for behavioural changes.

Educational programmes as single method interventions yield some benefits in FMS patients in pain-coping skills (Burckhardt et al, 1994) and self efficacy (Vlaeyen et al, 1996), but not in reducing pain and disability nor in improving mood (van Koulil et al, 2007). Moreover, the only trial including a follow-up period failed to find any effect of education on pain, disability and mood (King et al, 2002).

Fibromyalgia Self-Help Course (FSHC), an educational programme teaching FMS patients about the condition and self-management skills (to accomplish daily activities, manage symptoms, suggest ways to incorporate wellness activities and exercise into daily life) had minor effects on disability, quality of life, fatigue, depression and self-efficacy than FSHC added to exercises (Rooks et al, 2007).

Other single method CBTs such as **relaxation techniques** (progressive relaxation, biofeedback and autogenic training) were used in FMS to reduce muscular tension and interrupt the pain-tension cycle. Despite the studies could be underpowered due to a low number of enrolled subjects, some improvements were reported on pain, although the effect was not maintained at follow-up. However, no efficacy on disability or mood was shown (Buckelew et al, 1998; Ferraccioli et al, 1987; van Santen et al, 2002).

2.1.2 Multi method Cognitive Behavioural Therapies

Multi method CBTs emphasize the role of cognitive processes in shaping affective experience and hypothesize that problematic emotions, such as anger, depression, and anxiety, result from irrational or faulty thinking.

Differently from classical psychoanalysis, providing 'deep insight' and needing, sometimes, a long time to reach some effect, CBTs offer short-term, goal-oriented psychotherapy, that emphasizes changes in thought patterns and behaviours, with beneficial effects potentially achieved in 10-20 sessions.

They use a combination of various elements, such as cognitive restructuring, pain-coping skills, problem-solving techniques, goal setting, increasing activity levels, activity pacing, stress management adjustment of pain-related medication, and frequently also comprises educational and relaxation components (van Koulil et al, 2007).

Taken together, the results obtained from the several studies conducted on FMS show that multi method CBTs are effective in diminishing pain and depression, in improving disability and mood, with the results, sometimes, maintained also at a long follow-up (van Koulil et al, 2007).

A study assessed, in 40 subjects with FMS admitted in a inpatient clinic, the effects of a 5 week protocol of operant pain treatment comprising reduction of medication; increase of bodily activity; reduction of interference of the pain in the usual activities; reduction of pain behaviours in dealing with the medical system and training in assertive pain incompatible behaviour. The patients reported a significant and stable reduction in pain intensity, interference, solicitous behaviour of the spouse, medication, pain behaviours, and an increase in sleeping time. Also the number of doctor visits, and days at a hospital were reduced in the year after the intervention (Thieme et al, 2003).

In studies combining multi method CBTs and exercises in FMS patients, improvements on pain (confirmed at follow up), disability and mood were shown (Keel et al, 1998; Lemstra et al, 2005).

Basing on the literature and on the opinion of the experts, CBTs (together with exercise) are recommended in the global management of the patients with FMS by different sets of recommendations and guidelines (Burckhardt et al, 2005; Carville et al, 2008; Häuser et al, 2005).

The guidelines for FMS management of the American Pain Society (APS) (Burckhardt et al, 2005) and of the Association of the Scientific Medical Societies in Germany (AWMF) (Häuser et al, 2005) gave the highest level of recommendation to CBTs. In both guidelines, it is suggested to include CBTs into a multimodality treatment approach to reduce pain, enhance self-efficacy, and improve function in FMS patients.

Differently, according to evidence based recommendations of European League Against Rheumatism (EULAR) for the management of FMS, especially focused on pharmacological treatments, CBTs are advised in the management of patients with FMS only funding on expert's opinion (level of evidence "IV", strength of recommendation "D", the lowest grades in both scales, ranging from I to IV and from A to D, respectively) (Carville et al, 2008).

In a systematic review with metaanalysis assessing the efficacy of CBTs in FMS, 14 out of 27 randomised controlled trials were included. CBT reduced depressed mood, improved self-efficacy (with the results maintained at follow up) but no significant effect was found on pain, fatigue, sleep, and quality of life at post treatment and follow up. Operant behavioral therapy significantly reduced the number of physician visits at follow up. (Bernardy et al, 2010).

However, in a recent metanalysis evaluating the effects of psychological interventions for FMS, CBTs were shown to act significantly better than other psychological treatments in reducing short-term pain and to have the greatest effect sizes on the assessed outcome measures (reduction of long-term pain, sleep problems, depression, functional status and catastrophizing). (Glombiewski et al, 2010).

2.2 Hypnosis and guided imagery

In the field of the concentration based MBT, the use of hypnosis/guided imagery as a complement to pharmacological and non pharmacological treatments was recommended by the German interdisciplinary guideline on FMS, basing on expert consensus (Thieme et al, 2008). The efficacy of the two techniques on FMS symptoms was recently reviewed. (Bernardy et al, 2011).

Hypnosis is used to encourage and to evaluate responses to suggestions. In this procedure, one person (the subject) is guided by another (the hypnotist) to respond to suggestions.

Guided Imagery is a dynamic, psychophysiologic process in which a person, guided by a psychologist, imagines and experiences an internal reality in the absence of external stimuli, with the aim to promote changes in subjective experience, alterations in perception, sensation, emotion, thought or behaviour by suggestion and/or imagination.

All the studies assessing the effects of hypnosis and guided imagery on FMS were performed on small cohorts of patients. Taken together, the results of the reviewed trials indicate that the patients treated with the two techniques, compared to controls, improved in pain perception at the end of the treatment but not in quality of life. Large effects sizes on pain and medium effects sizes on sleep at the end of treatment and at follow-up were shown.

Basing on their findings and on methodological limitations of the studies, the authors of the review conclude that further studies with adequate sample sizes are necessary to prove treatment efficacy (Bernardy et al, 2011).

2.3 Mindfulness-based stress reduction (MBSR)

Mindfulness-based stress reduction (MBSR) program, centered on the principles and practice of mindfulness meditation and using stress-reduction skills including sitting meditation, hatha yoga, and a somatically focused technique called the "body scan", was developed to relieve suffering in patients with chronic pain (Kabat-Zinn, 1982). MBSR encourages nonjudgmental awareness of one's cognitive and somatic experience on a moment-by moment basis. This decentered stance is thought to disconnect cognitive and affective mental events in an adaptive manner and may reduce the negative impact of thoughts and sensations associated with chronic pain.

In FMS, a 8 week intervention of MBSR, administered by a clinical psychologist, ameliorated (versus a wait-list control group) cognitive and somatic depressive symptoms, with the improvement maintained also at a 2 months follow-up (Sephton et al, 2007) and reduced activation of sympathetic nervous system in patients with FMS (Lush et al, 2009). However, this technique was not different in ameliorating quality of life when compared to an active control procedure (utilised as control treatment in order to check for nonspecific effects of MBSR), although patients in the MBSR group appeared to benefit most. In fact, in a pre-post-analysis, they were improved in quality of life, disability, depressive and anxious symptoms, sleep, pain perception, and physical symptoms (Schmidt et al, 2011).

From these data, MBSR appears to be a promising intervention for FMS, especially to treat depressive symptoms that, as in other chronic pain syndromes, can interact reciprocally with physical symptoms, impairing quality of life.

3. Movement based Mind Body Therapies

3.1 Mensendieck system and body awareness technique

The **Mensendieck System** focuses on teaching patients to understand the concepts of functioning of their bodies by pedagogically designed exercises and aims to enable them to change suboptimal patterns of movement.

Body awareness technique (BAT) combines a series of exercises related to posture, coordination, free breathing and awareness. Turning the attention both to the patient's own performance and to what is experienced during the exercises is a central element of BAT, that stimulates mental presence and awareness aiming to provide an increased body consciousness.

In a study comparing the effects of two programs based on Mensendieck system and BAT in 20 female patients with FMS, the subjects treated with Mensendieck system report better scores in fibromyalgia related disability, self-efficacy and coping strategies, with some results maintained at 18 month follow-up, than patients who executed BAT (Kendall et al, 2000).

However patients with irritable colon, often associated to FMS, when treated with a 24 weeks program of BAT, improved significantly in gastrointestinal and psychological symptoms. Concomitantly, body pain as well as coping ability improved (Eriksson et al, 2007).

3.2 Yoga

Yoga is a MBT potentially fulfilling the need for both exercise and coping skills in FMS patients. Yoga varies greatly in the style and comprises, beyond the physical poses identified with it, meditation and breathing exercises.

In FMS, **Relaxing Yoga** (administered once a week for 2 months), consisting in stretching, breathing, and relaxing yogic techniques, improved FMS related pain and disability, with 30% improvement in overall symptoms (da Silva et al, 2007).

Yoga of Awareness is a comprehensive technique that, in a 8-week intervention program, complements yoga poses with mindfulness meditation, breathing exercises, yoga-based coping instructions and group discussion. At post-treatment, subjects assigned to the yoga of awareness program, that was adapted and tailored for FMS patients, showed significantly greater improvements, versus a waiting list control group, on standardized measures of FMS symptoms and functioning, including disability, pain, fatigue, and mood, and in pain catastrophizing, acceptance, and other coping strategies. No effect was shown on tender point counts, muscle strength and balancing (Carson et al, 2010).

From these preliminary results, Yoga seems to be suitable and efficacious in FMS patients, acting both on somatic and on central-derived symptoms.

3.3 Qi Gong

Qi Gong (QG) is an ancient Chinese method, integrating body, energetic, respiratory, and mental training with the aim to achieve optimal status of both mind and body by increasing and restoring the flow of "qi" (vital energy). QG helps physical, psychic and emotional rebalancing, thus improving posture, respiration, and concentration by low impact movements. Although Chinese practitioners have applied various forms of QG for thousands of years to treat diseases and improve health, the term Qi Gong currently used by health care professionals to include all exercises dates since the 1950s.

Internal and external QG can be distinguished: the first is self-directed and involves the use of movements and meditation. External QG is performed by a trained practitioner using the hands and any part of body to direct "qi" energy into the patient.

For its characteristics, QG has potential therapeutic benefits in patients with FMS, but the result shown by different studies are discordant.

In a pilot study, a protocol of external QG lasting 3 weeks improved in FMS patients tender points, pain, disability and depression, with the results maintained at a 3-month follow-up (Chen et al, 2006).

In a subsequent study, FMS patients treated with a 7 weeks protocol of QG significantly improved in pain, psychological health and distress in respect to a control group, with the data confirmed after a 4 months long period (Haak et al, 2008).

However, when tested in children affected with FMS, QG was as effective as aerobic exercise in improving anaerobic function, tender point count, pain, and symptom severity, but did not ameliorate physical function, functional capacity, quality of life, and fatigue, that were improved only in the group performing aerobic exercises (Stephens et al, 2008).

The contradictory results derived from these studies are probably due to the differences on QG techniques used, period of application and selection of patients. However, in our opinion, QG, better if tailored and focused on characteristics of the patients, may be a promising tool in the non pharmacological treatment of FMS.

3.4 Tai Chi

Tai Chi is a MBT that, originated in China as a martial art, is practised since many centuries. It combines meditation with many fundamental postures flowing imperceptibly and smoothly from one to the other through slow, gentle, graceful movements as well as deep diaphragmatic breathing and relaxation, with the aim to move “qi” throughout the body. It may be regarded as a multicomponent intervention integrating physical, psychosocial, emotional, spiritual, and behavioural elements and promoting the mind body interaction (Wang, 2011).

Over the past 2 decades, Tai Chi was shown to provide great benefits for patients with a variety of chronic diseases and, among the others, in rheumatic conditions such as rheumatoid arthritis (Wang, 2008) and osteoarthritis (Wang et al, 2009). In longstanding diseases, Tai Chi improves physical function and psychological well being by reducing stress, anxiety, depression, and mood disturbance and increasing self esteem (Wang, 2011).

The good results on FMS yielded by a Tai Chi program in a previous study (Taggart et al, 2003) were confirmed by a recent work, showing a notable efficacy of a 12 weeks program of the classical Yang-style Tai Chi (with sessions lasting 60 minutes, executed twice a week) in FMS patients. Patients following Tai Chi program ameliorated in all the assessed outcome measures, both at physical and at psychological level. Tai Chi improved FMS related disability, sleep quality, patient and physician global assessment of pain, self efficacy, depression, physical and mental quality of life and, notably, physical performance (assessed by 6-minute walk test), versus a control intervention (consisting of wellness education and stretching). The improvements were maintained also at a 24 weeks follow-up (Wang et al, 2010).

Thus, Tai Chi, integrating physical elements with relaxation, and cognitive behavioural features, may be regarded as an useful potential tool in patients with FMS.

3.5 Rességuier and body, movement and perception methods

Recently, we applied the rehabilitation method conceived by Jean Paul Rességuier (**Rességuier Method** -RM-), inspired by Merleau-Ponty phenomenology (Vitali Rosati, 2007) somewhat resembling MBT, in patients with FMS. The method, executed in individual sessions, aims to obtain patient nonjudgmental awareness and control of bodily perceptions and, in particular, nociception.

Its mainstay is the relationship between therapist and patient based on the continuous attention to the patient during all the session (regarded as “accompanying posture”).

During the individual session, the therapist continuously controls patient attention and perception by verbal and manual contacts and leads to perform bodily active and conscious movements and respiratory exercises in different positions (supine, sitting and standing). The exercises are respectful of the pain threshold and tailored for the patients.

In FMS patients, we showed that the application of RM (once a week for 8 weeks) improved significantly quality of life, disability, relaxation and sleep. The most notable result was obtained on perceived pain, significantly reduced in respect to initial values. This datum was confirmed by the reduction of analgesics assumed weekly by the patients. Interestingly, the improvement of all the items evaluated, apart from disability, was confirmed after a follow-up of 6 months.

RM induces self-observation and thoughtful responses to pain, thus, it potentially disconnects the affective response to pain and break the vicious circle of chronic pain-stress typical of the FMS.

For its characteristics, RM is a promising rehabilitative tool in fibromyalgic patients, potentially helpful also as a “first step intervention” when other techniques are difficult to be used (e.g. in subjects that are poorly conditioned and/or with a low pain threshold that avert them from whichever technique implying exercises) (Maddali Bongi et al, 2010a).

In a pilot study on FMS, we also assessed the effects of the “**Body Movement and Perception**” (BMP) method, a group gymnastic applied for 8 weeks (2 sessions-50 minutes each- a week) allowing to treat little groups of patients with RM. This method, based on aware body perception, low impact physical movements, and relaxation integrates the principles of RM with low impact bodily movements. The exercises, always respectful of the pain threshold, partly derives from soft gymnastics and partly are specifically conceived for the BMP. They consist in active movements of the body, more specifically of head, trunk, upper and lower limbs and in exercises of conscious respiration. BMP induces reduction of intensity and duration of pain and awareness to pain, confirmed, as we already showed also for RM, by a significant reduction in analgesic assumption and by improvement of tender point scores. Moreover, patients executing BMP improved in postural control, body alignment, muscle contractures, fatigue, irritability, wellbeing, quality of movement, postural self control, ability to relax, movement perception (Maddali Bongi et al, 2011a).

Resseguier and Body Movement and Perception methods relies on the principles of patient nonjudgmental awareness and control of nociception, guided by therapist. In our experience, both methods are feasible and useful in the management of FMS patients. Subjects with a low pain threshold and a high grade of hyperalgesia may be approached consequentially with Resseguier method and then with Body Movement and Perception method, that presents low impact movements and may help to gently reconditioning the patients.

3.6 Somatic Practises

The term "Somatics" or "Somatic Practises" was introduced by the philosopher Thomas Hanna in the 1970s to include distinct contemporary mind body techniques sharing a global body centered approach that aim to reach mind body rebalancing, psycho-physical awareness and well-being through movement practices (Eddy, 2009).

The common concepts shared by these techniques are that body and mind are both part of a living process. Thus, body-mind integration and freedom from restrictions in body and mind are common goals. A mainstay of these practises is that growth, change, and transformation are always possible at any age.

The classic somatic techniques began to be developed at the turn of the twentieth century and include, among the others, Mensendieck system, Feldenkrais Method, Pilates Method, Rolfing, Gerda Alexander Euthonie, Alexander Technique, Rosen Method Bodywork (Eddy, 2009).

Although only few studies were undertaken to assess the feasibility and the utility of these techniques in rheumatic diseases and in FMS, they could be suitable for fibromyalgic subjects in improving body awareness and mind body relationship, in reducing the vicious circle of chronic pain-stress and the muscle contractures, by allowing optimal movement pathways and harmony through physical exercises.

3.7 Feldenkrais and Core Integration Methods

Feldenkrais Method is a somatic educational system, designed by Moshe Feldenkrais since 1949, to improve movement repertoire, aiming to expand and refine the use of the self through awareness, in order to reduce pain or limitations in movement, and promote

general well-being. Feldenkrais Method tends towards being a form of self-education as opposed to a manipulative therapy (Landi, 2007).

Feldenkrais Method, in patients with chronic musculoskeletal chronic disorders was as efficacious as body awareness therapy and more efficacious than conventional physiotherapy in improving psychological distress, pain and self image (Malmgren-Olsson et al, 2001).

Core Integration Method maintains the principles of Feldenkrais method, but by developing specific pathways of movement, is mainly focused on functional recovery of movement (Landi, 2007)

In our opinion, although not specifically evaluated in clinical trials, but supported by results obtained in patients with chronic pain and on pilot experiences conducted by our group, both methods could be feasible and potentially useful in the management of FMS (Maddali Bongi & Landi, unpublished data).

3.8 Pilates Method

The Pilates or Physicalmind Method, developed in the 1920s, is a low impact, non aerobic fitness routine that combines stretching and strengthening exercises, concerned with economical movement. It relies on kinesthetic monitoring in developing balanced muscle use for ease of motion. The Pilates method promotes balance, strength, flexibility and muscle development, while also helping to relieve muscle tension, focusing to the quality of the movement as opposed to quantity. As an approach that combines sensory awareness with physical training, Pilates can lead to balancing of mental and body relationship and may be potentially included in MBT.

In a group of FMS patients, a 12 week program of Pilates exercises, compared to a home exercises protocol, improved pain and disability, but only the improvement in disability was maintained over time. However, the comparison of the 2 groups showed significantly high improvement in pain and disability for patients who executed Pilates at week 12 but no difference between the groups at a 24 weeks follow-up (Altan et al, 2009).

From these preliminary data, Pilates may be regarded as an effective and safe exercising method for FMS patients. However, given the wide diffusion and visibility of the method, available in a quantity of gymnasium, FMS patients should practise Pilates only under the guide of a certified teacher of the method, that should be also a physiotherapist skilled in rheumatic diseases and, in particular, in FMS management. In fact, fibromyalgic patients need tailored and personalised exercises that should be specifically standardized and validated for the disease.

4. Combination of different Mind Body Therapies in FMS patients

The different studies evaluating the effects of the combination of MBT in FMS, chosen to synergize and integrate their effects potentially acting on different FMS symptoms, yielded interesting but somewhat conflicting results.

A 8 week multimodal mind-body intervention combining the movement based QG with Mindfulness Meditation in a complex mind body approach, was able as well as an educational and informative program on FMS in improving pain, disability, depression and myalgic score. The changes occurring at the end of the protocols were largely maintained by both groups throughout the 6 month follow-up period (Astin et al, 2003).

Concordantly, in a 3 month study, BAT combined with QG, in patients with FMS leads to a significant improvement in movement harmony, while no differences were found in the FMS-related disability and in the functional tests in respect to a control group (Mannerkorpi & Arndorw, 2004).

On the contrary, an open study evaluating a 2 month protocol including education/cognitive-behavioural component, formal relaxation/meditation training, and QG practise in FMS patients improved significantly disability, self-reported physical activity, sleep, depression, quality of life, coping strategies, tender points counts and pain threshold, with the improvements sustained till 4 months after the end of the intervention (Creamer et al, 2000).

MBT somewhat similar in their approach could also be used consequentially, in order to synergize and improve their effect. We used a protocol integrating RM and QG. RM aims to develop body awareness and perception and QG also comprises exercises and adequate postures of the body in the space. From our preliminary experiences, 2 protocol lasting 15 weeks integrating consequentially RM and QG (group 1) and QG and RM (group 2) reduced significantly, with the same effect size, disability, pain, tender point count, and improved sleep and anxious and depressive symptoms, with most of the results confirmed after a 12 week follow-up (Maddali Bongi et al, 2011b).

Despite the non completely positive results reported in these studies, programs including the combination of different MBT should be taken into account in the treatment of FMS.

5. Conclusions

Despite many MBT have been used since many years and, as for Yoga, Qi Gong and Tai Chi, many centuries, they have been standardized and evaluated by scientific methods since few decades, especially in the last twenty years. Thus, although spontaneously sought and utilised by FMS patients, (Baranowsky et al, 2009; Lind et al, 2007) evidence based data on MBT efficacy are not widely available.

The results of the studies are not unequivocal because the clinical trials on MBT suffer from different biases such as: little number of enrolled patients, sometimes also heterogeneous in their clinical characteristics (van Koulil et al, 2007); different outcome measures; the lacking of clinical indicators addressing the patients that may benefit more from a specific treatment; the lacking, sometimes, in movement based MBT of exercises and postures tailored and differentiated for FMS patients (presenting with pain, tenderness, low pain threshold, fatigue); the non definition of an ideal period of treatment, the lacking of congruous follow-up periods.

However, taken together, the effects of MBT in FMS are promising and the clinical trials present in literature address the efficacy and the safety of MBT in FMS.

These data are supported by opinion of the experts, that, in different panels of guidelines and recommendations, advise the use of MBT in the management of FMS patients (Burckhardt et al, 2005; Carville et al, 2008; Häuser et al 2005).

5.1 Future development

Basing on the results of the clinical trials, reviews, and on our experience, different aspects should be taken into account in order to improve the efficacy of MBT interventions in patients affected with FMS.

5.1.1 Early treatment

The non pharmacological treatments, including MBT, in patients early diagnosed with FMS, may prevent the vicious cycle of disability and psychological distress associated with chronic widespread pain, that leads to long-term dysfunction and chronicity. Moreover, an early intervention, especially with concentration-based MBT, may afford and prevent the maladaptive patterns of pain-coping and illness behaviours, arising in patients with a long term disease, that render difficult to modify their comportment (van Koulil et al, 2007).

Some evidence indicates that early intervention is indeed an important factor in improving the outcomes of non pharmacological treatment in FMS. In a study assessing the efficacy of a program integrating CBTs, relaxation, physical exercises and education versus autogenic training, a subgroup of patients with a shorter disease duration responded best to treatment (Keel et al, 1998).

5.1.2 Selection of the patients and tailoring of the treatment

In FMS, the limited effects of non pharmacological interventions may also be attributed to the variability within the patients enrolled in the studies (van Koulil et al, 2007).

It should be better clarified which patients are most likely to respond positively to particular MBT and which psychosocial, contextual, and personal and clinical variables (i.e, emotional distress, readiness to change, desire for control) might be taken into account, so that the treatments could be tailored on the clinical subgroups of FMS (de Souza et al, 2009) and on the patients' principal symptoms and expectations.

In a recent study, by a cluster analysis conducted basing on the Fibromyalgia Impact Questionnaire (FIQ), specifically assessing FMS-related disability, two distinct clusters of FMS patients were identified: FMS-Type I and FMS-Type II. Both clusters reported high levels of pain, fatigue and stiffness, but high levels of anxiety and depressive symptoms were peculiar of FMS-Type II (de Souza et al, 2009).

These findings may help to individualise and to tailor the treatments in FMS. Given that a common set of physical symptoms is reported by all the patients, some aspects of the treatment should be homogeneous and deal with hyperalgesia, stiffness and fatigue.

In fact, it may be necessary to treat depressive and anxious symptoms in FMS-Type II patients with CBTs, mindfulness-based stress reduction program and other meditation based MBT, while movement based MBT could be feasible and potentially useful in all FMS patients (Calandre et al, 2010; de Souza et al, 2009).

On the basis of psychosocial and behavioural characteristics, previous studies identified, among FMS patients, a dysfunctional group characterised by low levels of activity, high levels of pain interference and psychological distress and showed that this kind of patients are likely to benefit most from non pharmacological intervention (van Koulil et al, 2007).

It should be underlined that, in the clinical setting, MBT should be chosen and addressed by the rheumatologist, basing on the psychophysical characteristics and preferences of the patients and on their disease type (Calandre et al, 2010; de Souza et al, 2009). With regard to this, we should consider that not all FMS patients may have an adequate compliance and are prone to participate actively to the treatment.

Thus, the rheumatologist should coordinate the global management of the FMS patient, laying out and following up not only the pharmacological therapy, but also all the rehabilitation program, that include MBT.

The demographic, medical or psychosocial factors of the patients should address also the tailoring and the individualization of the chosen MBT, concordantly with the therapist (Keefe et al, 2004).

Of pivotal importance is that patients affected by FMS and other rheumatic conditions characterized by chronic pain, disability and psychological distress should be approached and treated by operators and therapists skilled in their technique and specialized in the management of rheumatic patients (Maddali Bongi, 2010b), mainly of FMS subjects. This is true especially for movement based MBT. Therapists should firstly assess the patients and then choose the exercises more suitable to their condition and tailor the movements on the individual characteristics, in order to reach optimal compliance and benefits from the treatment.

Predictors of treatment outcome, funded on clinical, clinimetric and psychometric measures, should be also taken into account in order to understand which patients could benefit more from a specific intervention.

Moreover, the outcome measures to be used and the aims to be reached should be differenced according to the different MBT.

In order to work efficaciously in FMS patients, MBT might be combined in protocols in which they could be used together or consequentially and integrated in a global multimodal program of management and care comprising education and movement (Kroese et al, 2009). In this context, also aerobic, stretching and strengthening exercises together with home rehabilitative gymnastique (always respectful of the pain threshold) should be included gradually according to the different preferences of the patients.

5.1.3 Concluding remarks

In our opinion, we'd advise a wide use of MBT in the management of patients affected with FMS. In particular, we recommend regular cycles of MBT, that should be chosen by the rheumatologist, the physiotherapist and the patients, taking into account the clinical and psychological characteristics, the needs and the compliance of the subjects, and that should be potentially integrated and/or alternated with low impact aerobic exercises. The MBT as well as the exercises should be tailored on the characteristics of FMS and integrated with pharmacological treatment and educational measures.

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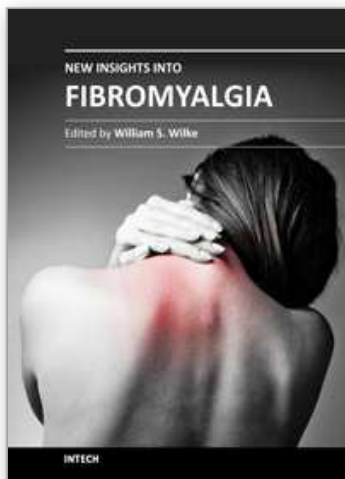
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Given the potential problems that can obscure any scientific enterprise, inconsistent results across studies are bound to occur. How are we to decide what is true? Let's turn to philosophy for a reasonable answer. The mathematician-philosopher Bertrand Russell approached a similar problem in his monograph *The Problems of Philosophy* (Russell B, 1912). He addressed the following question: How do we know that anything is "real"? Is the only reality subjective and simply in our minds, as Bishop Berkley challenged, or can we mostly believe the objective reality? His pragmatic answer: All possibilities may be true, but when the preponderance of evidence indicates that objective reality and knowledge are the most probable case, go with it. If the preponderance of all evidence about the clinical description of fibromyalgia and it's pathogenic mechanisms and treatment strategies indicate a highly probable interrelated hypothesis, go with it. The direction of the literature on the whole trumps the less likely tangents. At the same time, remember Bertrand Russell and his pragmatic answer, and keep an open mind.

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Phone: +86-21-62489820
Fax: +86-21-62489821

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