Fibromyalgia Treatment using Alternative and Complementary Care: A Literature Review

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A senior research project submitted in partial requirement

for the degree Doctor of Chiropractic

June 21, 2012

ABSTRACT

Objective: This article provides an overview of literature in discussing etiology and diagnosis of fibromyalgia and different treatment approaches. Emphasis is given to forms of alternative and complementary care approaches such as; manipulative, exercise therapy, acupuncture, and cognitive behavioral therapy. The efficacy of the above treatments is explored.

Data Collection: A computer search using PubMed and EBSCO Host generated articles relevant to fibromyalgia, chronic fatigue, chiropractic or manipulation, acupuncture, exercise, cognitive behavioral therapy, alternative care, and complementary care. Referenced sources were identified from individual search and from acquired relevant literature. PubMed, EBSCO Host, and searches generated over 6,500 articles on fibromyalgia, 35 articles on fibromyalgia AND chiropractic or manipulation, over 100 articles on fibromyalgia AND acupuncture, over 600 article on fibromyalgia AND exercise, 45 articles on fibromyalgia AND alternative care, and 48 article on fibromyalgia AND complementary care.

Data Synthesis: Fibromyalgia is a complicated disorder, diagnosed on the basis of its characteristic symptoms along with the exclusion of other musculoskeletal disorders, making its diagnosis one of uncertainty. Treatment plans are very difficult to formulate and assess due to fibromyalgia's diagnosis of uncertainty. Therefore, treatment research is crucial to effectively managing it's symptoms.

Conclusion: After reviewing multiple articles and studies on fibromyalgia and treatment approaches, it appears that there are many fairly effective conservative measures that can be utilized to control many of the symptoms that affect those suffering. Emerging research on the cause of fibromyalgia has aided in the formulation of new drugs that help to decrease the symptoms, but with the addition of conservative or alternative therapies their effectiveness can be enhanced. These therapies shown to be effective in decreasing symptomatology include; allopathic, manipulative, exercise, acupuncture, and cognitive behavioral therapy.

Key Indexing Terms: *fibromyalgia, chiropractic or manipulation, exercise, acupuncture, cognitive behavioral therapy, alternative care, complementary care*

INTRODUCTION

Fibromyalgia is characterized as a chronic diffuse musculoskeletal pain syndrome with multiple tender points that are found throughout the body symmetrically. The mean annual medical expenditures for patients suffering from fibromyalgia is $10,911.[1] Not only is there a medical financial burden associated, but fibromyalgia also places a significant cost associated with absence from work and decreased work productivity.[2] The effects of fibromyalgia or any chronic pain cycle are burdensome and many struggle with anxiety, depression, and decreased quality of life. There are many theories that try to explain the phenomenon that causes the chronic pain in those who suffer from fibromyalgia, but there still is a deficiency in the understanding of the process. The unknown and theorized causes of fibromyalgia make treating it very challenging. Many strategies have been attempted in the hopes of alleviating some of the most debilitating symptoms; these strategies include the allopathic approach of medication, manipulative therapy, exercise therapy, acupuncture or traditional Chinese medicine, and cognitive behavioral therapy. This review attempts to examine the relevant recent research regarding not only those therapies considered complementary and alternative but also those that are more traditional. A discussion outlines the history and science behind fibromyalgia, allopathic care, manipulative therapy, exercise therapy, acupuncture, and cognitive behavioral therapy. The purpose of this review is also to examine the possibility of effectiveness in treating fibromyalgia utilizing an approach that is multidisciplinary.

DISCUSSION

Fibromyalgia: Approximately 2% of the general public in the United States suffers from fibromyalgia, with women affected 10 times more often than men.[3] Fibromyalgia was said to be the second leading rheumatological disorder in the United States in 2009, affecting 4-6 million Americans.[4] Fibromyalgia has been defined as a chronic pain syndrome with fluctuating chronic generalized muscular pain with reduced pain threshold.[5] It also demonstrates other characteristics, such as non-restorative sleep, fatigue, stiffness, and mood disturbance.[5] Due to it's at times debilitating symptoms,

fibromyalgia affects all aspects of activities of daily life. For example sixty-two percent have difficulty climbing stairs, fifty-five percent have difficulty walking more than 2 blocks, and thirty-five percent have difficulty with activities of daily life.[6] Women with fibromyalgia consistently tend to score lower in the quality of life measures than women suffering from rheumatoid arthritis, osteoarthritis, chronic obstructive pulmonary disease, or insulin dependent diabetes mellitus.[7]

There has also been noted comorbid conditions associated with fibromyalgia. Along with the classic signs and symptoms of fibromyalgia, patients commonly also suffer from migraine headache, irritable bowel syndrome and a history of depression and chronic fatigue.[8] Another source also noted restless leg syndrome, temporo-mandibular joint syndrome and myofascial pain as comorbid factors.[8]

Diagnosis is done utilizing criteria from the American College of Rheumatology (ACR), the criteria includes widespread pain in at least 3 of the 4 body quadrants for at least 3 months duration and localized pain on palpation of 4-kg of force in 11 or more of the 18 selected muscle-tendon junctions or tender points.[9] The points are located bilaterally at the base of the occiput, anterior aspect of the interspaces between the transverse processes of C5-C7, trapezius at the mid point of the upper border, supraspinatus above the scapular spine, second rib, lateral epicondyle, anterior edge of the gluteus maximus, greater trochanter, and the medial knee joint line.[8] To meet all of the criteria set by the American College of Rheumatology along with the above stated they must also have pain in the axial skeleton, pain in the right and left sides of the body, and pain above and below the waist.[10]

As of 2004 the ACR's classification criteria for the diagnosis of fibromyalgia provided a sensitivity and specificity of nearly 85% in differentiating fibromyalgia from other musculoskeletal disorders.[11] Because the diagnostic validity of the criteria from the ACR outside of rheumatological context has not been tested, nor has the differentiation of fibromyalgia from other somatoform or affective disorders been tested, the classification and diagnosis of fibromyalgia remains a matter of controversy.[10] The reliability of testing and diagnosing fibromyalgia is questionable due to three reasons: the verbal instructions given from the physician to the patient during testing is not standardized; there is no set standard of instructions in palpating the tender spots and no specification

on how long and how to measure the pressure applied to the points; and, finally, the entity "tenderness" is inadequately subjective.[10]

The cause of fibromyalgia remains an area of active debate and many of the theories that explore it's etiology include factors such as socio demographics, physical attributes and psychosocial influences.[3] It has been referenced as a medically unexplained syndrome and recently with newer developments in research particularly in the area of neurophysiology, as a central sensitivity syndrome.[12] It was thought to be difficult to research the etiology due to its lack of objective findings on physical exam, laboratory, and imaging modalities.[13]

Although these factors are controversial there are some common features that have been noted during research of its diagnosis. These common features include alteration in the hypothalamic-pituitary-adrenal axis with low production of cortisol, an elevation of cerebrospinal fluid substance P levels, increased levels of hyaluronic acid and increased levels of serum cytokines, decreased pain thresholds, morphological and metabolic changes with muscle fibers, and psychological symptoms.[5]

Another common feature of fibromyalgia is deficient serotonin levels in the cerebral spinal fluid, although this is believed to be a direct consequence of the altered sleep pattern associated with fibromyalgia.[14] The increase in substance P levels in the cerebral spinal fluid is believed to play a role in the pain signaling, integration and modulation, suggesting that patients have an increased sensitivity to pain.[14]

In addition, central sensitization is another proposed mechanism to the heightened pain sensitivity associated with fibromyalgia. This mechanism includes spontaneous nerve activity, expanded receptive fields (this explains the widespread pain of fibromyalgia), and augmented stimulus responses with the spinal cord.[15] The mechanism also involves triggering of an N-Methyl-D-aspertate receptor, which in turn is assumed to be associated with an abnormal temporal summation of pain stimuli.[16]

Muscular pathology has also been theorized as the cause of tender points associated with fibromyalgia.[14] This is thought to be caused by a decrease in the concentration of growth hormone, which is important to normal muscular function.[14] This may explain the extended muscle pain that occurs after exertion in patients.[17]

There is also a correlation with familial aggregation in cases of fibromyalgia. There are currently two different theories that explain this supposed familial aggregation. One suggests that it may be due to learned patterns of behavior and the other suggests that it is due to the gene expression. In the early genetic research they thought that the association was caused by linkage to human leukocyte antigens. Burda et al confirmed the possibility when he reported that the HLA1 DR4 antigen was detected in 64% of patients with fibromyalgia versus 30% of the healthy controls. Other studies observed a higher frequency of serotonin transporter gene promoter in patients with fibromyalgia compared to healthy controls.[14] Although correlation between human leukocyte antigens and fibromyalgia is present, the debate is also still present on whether there is a true correlation between a genetic factor and the syndrome.

In literature there is also a reference to a relationship between fibromyalgia and a past history of negative life events. In patients who suffer from fibromyalgia there is an increased history of post-traumatic stress disorder associated with childhood abuse, trauma or anxiety have also been reported.[14] It is hard not to assume that there is a psychological component considering approximately 30-50% of patients with fibromyalgia have anxiety, depression, somatization or hypochondriasis.[18]

Allopathic care: The allopathic physician bases their method of treating fibromyalgia on what they deduce is cause of the syndrome or the symptoms involved. So in many cases the approach is based using an intervention such as medicine to target the mechanism that is causing the patient's heightened pain sensitivity. With this being stated, many rheumatologists, neurologists, and pain specialists, consider fibromyalgia syndrome to be an illness associated with connective tissue changes that are characteristic of functional abnormalities in the central nervous system.[10] With this concept in mind the European League Against Rheumatism, a board of mainly rheumatologist experts, note that the highest-level of therapeutic effect in treating patients with fibromyalgia is with medications.[10] Another approach includes the consideration that fibromyalgia is a type of somatoform disorder or a type of affective disorder. The psychiatric conception leads to an approach utilizing psychotropic medications.[10]

Until 2007, there was no specific pharmacologic agent approved by the Food and Drug Administration (FDA) for the treatment of fibromyalgia so pharmacological therapy was called "off-label". In 2007 the first FDA drug approved for the treatment of fibromyalgia was pregabalin, an alpha-2 delta ligand and antiepileptic drug. With the first FDA fibromyalgia drug in 2007, two others followed duloxetine and milnacipran. Many classes of drugs used as "off label" in the treatment of fibromyalgia included antidepressants, tricyclic antidepressants (TCA), selective serotonin reuptake inhibitors (SSRIs), serotonin norepinephrine reuptake inhibitors (SNRIs), alpha 2-delta ligands, and other centrally acting agents.[7]

Antidepressants and tricyclic antidepressants (TCA) make up the majority of clinical trials for fibromyalgia. TCAs, especially amitriptyline and cyclobenzaprine, have been used in treating the symptomatology of fibromyalgia decreasing symptoms of pain, poor sleep, and fatigue. Most TCAs decrease symptomatology by increasing levels of serotonin and/or norepinephrine by directly blocking their respective reuptake sites.[7] Uceyler et al[19] performed a systemic review on the effectiveness of treating fibromyalgia with antidepressants and included amitriptyline, and 13 random controlled trials (RCTs), finding that it was moderately efficient in reducing pain ratings. The study found a pain reduction by a mean of 26 percent and improvement in quality of life by 30%.[19] Many TCAs have been called "dirty" drugs in that they bind to too many receptors causing significant adverse reactions.[7]

Selective serotonin reuptake inhibitors (SSRIs) in general are poor agents to provide analgesia for pain. Although they are not very effective in blocking painful stimuli due to the fact that they are mostly to selective and are unable to inhibit the reuptake of norepinephrine.[7] SSRIs that are less selective (fluoxetine, paroxetine, and sertraline), have been suggested to affect norepinephrine reuptake and thus might provide limited analgesia in fibromyalgia.[7] The only problem with using the less selective SSRIs is in order to achieve effective decreased pain the dose needed is much higher than the average dose and still provide less analgesic potency than SNRIs and TCAs.[20]

Serotonin norepinephrine reuptake inhibitors have an influence of inhibiting not only norepinephrine uptake but also serotonin uptake.[7] They are also better tolerated by patients than the traditional TCAs, causing fewer adverse reactions.[7] Duloxetine and

milnacipran are two SNRIs that have undergone many trials and have been approved by the FDA in the treatment of fibromyalgia.[21,22] Choy et al analyzed data from 4 double blind, randomized, placebo-controlled studies with the use of duloxetine and milnacipran.[23] The conclusion of the data provided showed that duloxetine and milnacipran effectively improve fibromyalgia symptoms of pain, level of fatigue, physical function, and discomfort. Although the outcomes seemed promising there was still the deterrent of adverse reactions which was responsible for 20% of patients discontinuing in the short term treatment studies and in the 1 year trials.[23]

Pregabalin an alpha-2-delta ligand drug works in reducing pain and fibromyalgia symptoms because it is a gamma-aminobutyric acid (GABA) analog antiepileptic drug which binds to the alpha-2-delta subunit of calcium channels.[7] Pregabalin was tested during the FREEDOM trial (fibromyalsia relapse evaluation for efficacy for durability of meaningful relief).[24] In the study there was a 26 week double blind treatment and at the end, 61% in the placebo group had loss of therapeutic response but only 32% in the pregabalin group.[24] Hauser et al performed a meta-analysis on pregabalin for fibromyalgia and again had decreased pain and symptomatology; but he also noted that there were adverse reactions or side effects; dizziness and somnolence were common, in nearly 1 out of every 5 patients, and other side effects such as weight gain, confusion and euphoria.[25]

There are other pharmacologic therapies hypothesized to help combat the symptoms of fibromyalgia but are still under investigation; those include: human growth hormone, dehydroepiandrosterone (DHEA), 5-hydroxytryptophan, topisetron, and pramipexole. Most of these drugs attempt to reduce the symptoms of fatigue, rigidity, insomnia or poor sleep.[13]

The three FDA approved fibromyalgia agents, pregabalin, duloxetine and milnacipran, were shown to be superior to the placebo, but there still was the inconvenience of the following side effects: duloxetine for fatigue, milnacipran for sleep disturbances, and pregabalin for depressed mood.[25] Considering that pharmacological intervention achieves symptom relief for less than 50% of the time and is associated with side-effects such as weight gain, morning "hang-over", gastrointestinal distress, and

increased tolerance to drug therapy, it's easy to understand why nearly 91% of individuals suffering from fibromyalgia have used some form of alternative medicine.[4]

Manipulation therapy: Manipulative therapy has had a growing body of evidence that supports the efficacy of manual therapy for the treatment of acute musculoskeletal conditions, but research involving chronic pain syndromes is less abundant. Manual modes of therapy such as manipulation have been promoted as a therapeutic option in treating fibromyalgia and other chronic pain syndromes, but controlled studies are lacking.[26] The research on this subject is grossly understudied. Considering that manipulative therapy does have evidence supporting its efficacy in acute musculoskeletal conditions.

After searching Pubmed and Ebscohost there were three studies located that investigated the effects of manipulation on treating fibromyalgia symptomatology. Out of the three articles located, only two were relevant and recent studies performed that had any correlation with manipulation. One was performed by an osteopathic doctor and another study that investigated the effectiveness of resistance training and chiropractic.

The first study was performed by a Russel G. Gamber et al, in his trial he included twenty four female patients meeting the ACR criteria for fibromyalgia and currently under pharmaceutical care and placed them in four different treatment groups. The treatment groups included (1) manipulation, (2) manipulation and teaching group, (3) moist heat, and (4) control group, which received no additional treatment other than current medication. The patients pain was assessed using pain thresholds measured with a 9-kg dolorimeter, the Chronic Pain Experience Inventory, and the Present Pain Intensity Rating Scale.[26]

The Gamber study found a positive correlation with manipulation and decreased symptomatology. He found that the patients receiving manipulation had higher pain thresholds at the tender points upon examination. They were also statistically more satisfied, comfortable, relaxed and less confused as compared with the patients who did not receive manipulation. Most significant was that the manipulated group reported fewer symptoms related to failure, frustration, inhibition, struggling, helplessness, guilt,

incapacity, wakefulness, and tiredness associated with pain.[26] The results of the study favored the treatment of manipulation for fibromyalgia symptomatology.

The study performed by Panton et al investigated the effects of resistance training in conjunction with chiropractic care as a treatment approach for those suffering from fibromyalgia. The study had a rather small sample size; only 27 women out of the 140 that showed interest in participating in the study. The 27 women who participated were evaluated prior to treatment utilizing techniques that measured the number of tender points, the FM Impact Questionnaire, their maximal strength was measured for the upper and lower body using MedX^{TM} Chest Press and Leg Extension, and they underwent a 16-item Continuous-Scale Physical Functional Performance test.[27]

After first obtaining a baseline on all of the patients they were then placed in one of two treatment groups: a resistance training group only and resistance training group with chiropractic treatment. Both groups met twice a week for sixteen weeks and either received only resistance or resistance and chiropractic treatment. The chiropractic treatment utilized consisted of ischemic compression (Travell and Simons technique) and diversified technique spinal adjusting only. The resistance training consisted of one set of 8-12 repetitions of 10 different exercises including; the chest press, leg extensions, leg curl, leg press, arm curl, seated dip, overhead press, seated row, abdominal crunch, and one body weight exercise for the lower back extension.[27]

At the conclusion of the study both groups had increased their upper and lower body strength. There was a significantly higher adherence to the training plan in the group that received chiropractic care (92.0+or- 7.5%) as compared to resistance training only (82.8+or- 7.5%). There were also similar improvements between both groups in the fibromyalgia impact evaluations. There was only one other major difference between the two treatment groups; the group that received chiropractic care had significantly improved between the pre- to post-functional tests in flexibility, balance/coordination, and endurance.[27]

So in conclusion the study by Gamber found that manipulation decreased the patient's anxiety and pain sensitivity.[26] The Panton study found that resistance training by itself is effective in increasing strength and functionality, while decreasing fibromyalgia symptomatology.[27] And with the addition of chiropractic care there is a decrease in

dropout rates to the resistance training and an even greater improvement in functionality.[27] Although both studies supported manipulation as an effective treatment for fibromyalgia there is still a need for more evidence based research and randomized controlled studies.

Exercise therapy: Exercise therapy has been shown to counteract peripheral vasoconstriction and to relieve stress, depression, and fatigue and even improve sleep. This helps to explain how exercise can interrupt pain and decrease psychological stress in those suffering from fibromyalgia. This and the large amount of literature supporting these conclusions recommend exercise as an important treatment approach.[28]

A study performed by Gusi et al evaluated the effect of pool based exercise therapy for women suffering from fibromyalgia. The study conducted included 35 women randomly assigned to one of two treatment groups. One group consisted of exercise and one group remained the control group. The exercise group trained 3 times a week for 12 weeks. Each session lasted an hour and was conducted in waist high water. The training consisted of 10 minutes of warm up, 10 minutes of aerobic exercise, 20 minutes of overall mobility and lower limb strengthening, another 10 minutes of aerobic exercise, and then a cool down with low intensity exercises. After the completion of the 12 weeks of training, the patients were instructed to avoid exercise for the next 12 weeks. This 12 week break was described as the de-training session or period. Patients were evaluated pre-training period, post-training period and then after the de-training period. They were evaluated using isokinetic muscle strength measurements, health related-quality of life and pain questionnaire (HRQOL), and the visual analog scale (VAS).[29]

At the conclusion of the study patients exhibited a strength increase of 20% in the knee extensors in both limbs and these improvements were maintained in the second evaluation. There was also an improvement of 93% in the HRQOL and and 29% decrease in pain rating in the exercise group at the end of the training period. Although at the end of the 12 weeks post exercise period or de-training period pain ratings returned close to the pre-training levels. The study found that exercise improved quality of life and strength long term, but pain reduction was only a short term benefit.[29]

In the Kingsley study et al the objective was to determine the effects of resistance training on disease severity in the fibromyalgia population. The study consisted of 29 premenopausal women, 9 of which were diagnosed with fibromyalgia and 20 healthy controls. The participants were evaluated before and after the 12 week resistance training period. They were evaluated by the number of tender points, myalgic score, and Fibromyalgia Impact Questionnaire. Individualized supervised training occurred twice a week for 12 weeks. The training included 3 sets of chest press, seated row, leg extension, leg press, and leg curl exercises.[30]

At the conclusion of the study there were similar increases in maximal strength, between the healthy control and fibromyalgia patients. The number of tender points, myalgic score, and FIQ score were decreased in the fibromyalgia group. It was concluded that resistance training reduces the severity of symptomatology in those suffering from fibromyalgia and is an acceptable treatment choice.[30]

Another study performed by Kingsley et al investigated the benefit of strength training in women with fibromyalgia. The study consisted of 29 women diagnosed with fibromyalgia. Subjects were randomly assigned to either the wait-listed/control or the strength exercise group. The wait-listed exercise group was instructed to continue their normal daily activities for 12 weeks and then they would begin an exercise routine. The strength training consisted of two workouts a week for 12 weeks. There were 8 to 10 reps completed of 11 exercises, performed on either a resistance machine or utilizing the subject's body weight for resistance. These exercises included chest press, leg extension, standing leg curl, shoulder press, lumbar extension, abdominal crunch, bicep curl, tricep extension, standing row, calf raises, and Swiss ball squats. The subjects were evaluated pre and post training session. They were evaluated by measuring for strength, tender point sensitivity, and fibromyalgia impact.[31]

The study concluded that strength training was effective in increasing the subject's functionality by improving their overall strength without increasing their heart rate. The study did not find a significant difference in the other outcome measures pre and post training. Although the study does contemplate that this may be due to the other measures being subjective in nature, considering that there was a change in objective measures which would implement an increase in the patient functionality.[31] Another

study performed by Valkeinen et al involved strength training with a duration of 21 weeks and at the conclusion of his study he measured a reduction in tender points.[32] Rooks et al also performed a study with aerobic exercise and strength training and found a 28% decrease in Fibromyalgia Impact Score.[33] With these other studies in mind Kingsley should maybe consider changing the duration or intensity of strength training to assess if that may contribute to a greater decrease in symptomatology.

Many studies have concluded that there is a significant decrease in fibromyalgia symptomatology with patients who are actively exercising. These findings are important because they support the use of exercise therapy for those suffering as a means of treatment. One of the biggest factors in the efficacy of exercise is patient compliance. Patient compliance is very important considering that research has shown only short term relief for exercise therapy.

Acupuncture: Traditional Chinese Medicine (TCM) theory, deduces that fibromyalgia is caused primarily by emotional upsets, which affects the liver.[34] TCM believes in an energy source found in channels that course throughout the body and believe that health is achieved by balancing these energy sources, known as "qi" or "chi". The TCM theory for fibromyalgia states that there is stagnation of qi in the liver, which leads to a stasis of blood and causes pain throughout the body.[34] The treatment for fibromyalgia is to regulate the qi and blood, while also dispelling the Cold and removing the Damp.[35] There are many ways to achieve this goal utilizing TCM methods, which includes treatments using acupuncture needles, moxibustion, herbal medicine, and massage or point stimulation.

In a study performed by Targino et al they enlisted females 20-70 years old, who met the ACR criteria for fibromyalgia, and had moderate to severe pain levels and put them in two different treatment groups. Group one received acupuncture and standard care and group two only received standard care. Group one underwent 20 sessions of acupuncture twice a week for ten weeks. They utilized a classic pattern of acupuncture and the standard care included; standard medication, physical activity instructions, and mental relaxation exercises. They assessed each patient's pain intensity using the visual

analog scale and the number of tender points below 4kg/cm2. They also measured each patient's quality of life using a short form health survey.[36]

The Targino study outcome measuring the pain intensity suggested that acupuncture added to usual care was more effective than standard care alone. At 3 months the VAS median for the group with the acupuncture was 5.0 compared with 8.0 in the group that received usual care only. VAS evaluations at 6, 12 and 24 months' follow-ups were not statistically different between the 2 groups, suggesting that the results are effective short term only. So in conclusion the study demonstrated that, in the short term, 88% of the patients in the acupuncture group experienced a relevant improvement in pain intensity, 79% showed improvement in quality of daily life, and 88% showed improvement in number of tender points.[36]

In the Assefi et al clinical randomized trial, the effects of acupuncture on 100 fibromyalgia patients was studied. There were four different trial groups and only one of the groups received specific acupuncture points for fibromyalgia. In the other three groups the points utilized were, (1) non-specific to fibromyalgia,(2) treatment points not recognized by ancient Chinese medicine, and (3) a treatment without insertion of needles. The groups were treated for 12 weeks, twice a week and 30 minutes each treatment. At the conclusion of the study there was no significant difference observed in pain, fatigue, sleep or general wellbeing, in any of the groups.[37]

Leibing et al constructed a study in the hopes of showing that acupuncture treatment could be utilized to reduce chronic pain in fibromyalgia. They conducted a randomized, blinded, placebo-controlled trial study, where 131 fibromyalgia patients were placed in three different treatment groups for 12 weeks of treatment. The treatment groups included; (1) a control group, (2) an acupuncture group which received traditional acupuncture, and (3) a "sham" acupuncture group which received simulated acupuncture. At the end of the study it was concluded that there was a significant decrease in anxiety and pain observed in both acupuncture groups with a slightly higher effect in the traditional acupuncture group.[38]

Another trial performed by Harris et al studied 114 fibromyalgia patients randomized into four different treatment groups. The groups consisted of; traditional and non-traditional stimulation, with presence or absence of manual needle stimulation. All

groups received a treatment plan of once weekly, followed by twice weekly, and finally by three times weekly, totaling 18 treatments. Each increase in frequency was by 2 transitioned with 2 weeks of no treatment. At the end of the treatment plan, it was noted that 25-35% of the patients had expressed an overall improvement in pain; although there was no difference between treatment groups or frequency of care.[39]

Huijuan Cao's et al systemic review of 25 RCT demonstrated that acupuncture, acupuncture combined with cupping and conventional medication had a significantly higher efficacy than conventional medication alone in reducing pain and the number of tender points in patients with fibromyalgia. The study also found that there was a similar therapeutic effect between acupuncture and sham acupuncture with pain reduction.[34]

Nearly one million Americans undergo acupuncture every year in an attempt to relieve pain from a variety of ailments. The US National Institutes of Health concluded that acupuncture may be useful as an adjunctive therapy or may even be an acceptable alternative therapy in a multidisciplinary approach to treating fibromyalgia.[36] The following studies reviewed all showed improvement with the utilization of some form of acupuncture. The only issue found in these studies is that there seems to be similar results found in trials involving traditional acupuncture and sham acupuncture. These similar findings warrant more research to be performed to discover if there is a difference between TCM and random point placement.

Cognitive behavioral therapy: Behavioral and cognitive therapy or treatments are based on the idea that you can modify an individual's responses to their condition, which will then reduce their disability and suffering from chronic pain.[40] Researchers have studied and observed that patients that suffer from chronic pain tend to struggle with dysfunction, while others seem to adjust relatively well to the chronicity of pain. This lead to research that examined the range of efficacy of patients' ability to cope with pain.[41] The research identified that most coping strategies unfortunately are more commonly detrimental rather than adaptive. For example, people in pain tend to cope by resting or guarding which have shown a strong positive relationship with disability and distress.[42,43]

A therapeutic approach to treating patient with fibromyalgia or chronic pain is acceptance based interventions. Acceptance based interventions attempt to teach the

patient to connect and feel their emotion and bodily sensations fully without avoidance and to be open to the presence of pain without following, resisting, believing or disbelieving them.[40] It is important to remind the patient that although avoidance behavior may be beneficial in short term, it is linked with a decreased quality of life due to the fact that avoidance behavior has been linked to disability.[40] This is difficult to convey to a patient because the natural response to a painful stimuli is to avoid the sensation and emotions as well as any thoughts or memories associated with pain.[40]

In a study performed by Rodero et al they took 167 patients from 41 different healthcare centers and used inclusion criteria that included the ACR criteria for the diagnosis of fibromyalgia. They used a variety of pain-related variables including the visual analog scale, physical symptoms obtained from a standardized symptom checklist, chronic pain acceptance questionnaire, chronic pain coping inventory-42, hospital anxiety and depression score, medical outcome study short form, and a fibromyalgia impact questionnaire. They then compared the acceptance of chronic pain therapy and the behavioral coping in predicting change to chronic pain.[40]

The study found that patients gained greater results with utilizing the acceptance of chronic pain; they had less pain, symptoms, anxiety, and depression and a lower fibromyalgia impact. They also exhibited an increase in general health, vitality and physical and social functioning. Those who focused on behavioral coping did not have the same outcomes. They tended to guard and rest more regularly, which consistently was associated with a greater fibromyalgia impact and tended to present with less healthy functioning.[40]

Another study by Alda and Luciano et al researched the effectiveness in utilizing cognitive behavior therapy for the treatment of catastrophization in patients with fibromyalgia. Pain catastrophising focuses on pain as a negative vision or magnification and dwells on pain and the impossibility of controlling pain. Catastrophization has been associated with more intense pain, heightened pain behavior, increased consumption of analgesics, reduced physical exertion, increased disability, suicidal tendencies, and greater healthcare costs and utilization. Pain catastrophization has been associated with fibromyalgia and is also a common risk factor.[44]

In the Alda and Luciano et al study they conducted a six-month, blinded, parallel group, controlled trial in which they randomly assigned patient into three different treatment groups, (1) received cognitive behavioral therapy, (2) received recommended pharmacological treatment, and (3) a control group.(13) The study concluded that those who received cognitive behavioral therapy were able to decrease their global pain catastrophization at the six month follow up, with effect sizes of Cohen's d=0.73 and 1.01 compared with those who received recommended pharmacological treatment and those with treatment as usual. Cognitive behavioral therapy was found to decrease pain, anxiety, and increase the patient's quality of life effectively. It was found not to effect depression ratings in the patient in any of the three groups. The question that the study addresses in its' conclusion is whether or not combined treatment with cognitive behavioral therapy and pharmaceutical therapy would be even more beneficial in treating the symptoms of fibromyalgia.[44]

A randomized controlled trial conducted by Woolfolk and Allen et al assessed the effectiveness of an individualized form of cognitive behavioral therapy for patients suffering from fibromyalgia. The individualized form of cognitive behavioral therapy included relaxation training, activity regulation, facilitation of emotional awareness, cognitive restructuring, and interpersonal communication training. This study attempted to assess to see if there was any difference in success in treating fibromyalgia with individual therapy versus the more traditional approach of group based therapy. They decided to name this individualized approach affective cognitive behavioral therapy.[45]

The participants in the Woolfolk and Allen et al study were randomly assigned to two different treatment groups; one that received affective cognitive behavioral therapy as well as treatment as usual with current medications and the other group only received treatment as usual with current medications. The participants in group one received 10 sessions of affective cognitive behavioral therapy in the hopes that patients who cannot or do not willingly access and experience emotions could channel and adapt to their emotions or pain. The study found that at post treatment 65.8% of those who received the affective cognitive behavioral therapy exhibited at least 30% decrease in pain ratings according to the visual analog scale, where only 5.6% of those who received treatment as usual had at least a 30% decrease in pain.[45]

The validity of cognitive behavioral therapy has been supported in a great deal of research, which supports the role of pain acceptance as increasing the daily functioning capability of people suffering from chronic pain. In clinical studies, acceptance of pain has been shown to improve pain levels, decrease stress and disability and increase patients' psychological wellbeing.[40] Also in treatment based outcome studies, acceptance based methods are related to decreased healthcare use most likely due to improved emotional, psychological and physical functioning.[40]

CONCLUSION

The purpose of this review was to investigate the effectiveness of other alternative and complementary forms of treatment for fibromyalgia. Considering that pharmacological intervention achieves symptom relief for less than 50% of the time and is associated with side-effects such as weight gain, morning "hang-over", gastrointestinal distress, and increased tolerance to drug therapy, it's easy to understand why nearly 91% of individuals suffering from fibromyalgia have used some form of alternative medicine.[4] The alternatives treatments investigated included manipulative therapy, exercise therapy, acupuncture and cognitive behavioral therapy.

The literature regarding manipulative therapy was limited but the two studies that were reviewed showed the positive effects of manipulation on decreasing fibromyalgia symptoms, but more research needs to be conducted. Exercise therapy had an abundance of literature and evidence based research, it appears that many different forms of exercise were effective in short term management of symptoms and increasing strength and endurance. The literature on acupuncture was conflicting; many of the studies conducted showed a positive correlation purely with insertion of the needles, it did not matter where the needle was placed. Both TCM acupuncture placement and sham acupuncture placement caused a positive effect of patient symptomatology there is still a debate over a "placebo" effect. Cognitive behavioral therapy when used in group or individual setting tended to decrease not only symptomatology but also healthcare expenditures.[40]

Overall all the forms investigated had a positive effect on decreasing the signs and symptoms associated with fibromyalgia. The major difference between the therapies was

the amount of research conducted. It appears that exercise and cognitive behavioral therapy have the most current and relevant research that best supports their uses as primary treatment approaches. The research on acupuncture and manipulative therapy are inconsistent or limited, although they still tend to show a positive impact. In conclusion, although there is increased knowledge about fibromyalgia, there still is no cure. Hauser et al states that the results of various alternative treatments have been modest and inconsistent and that results of various effectiveness has led to the development of many different treatment approaches.[47] It appears that until the underlying cause is completely understood that treatment approaches will vary from patient to patient and that any of the alternative approaches should be considered as possibly effective ancillary care to traditional allopathic care.

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