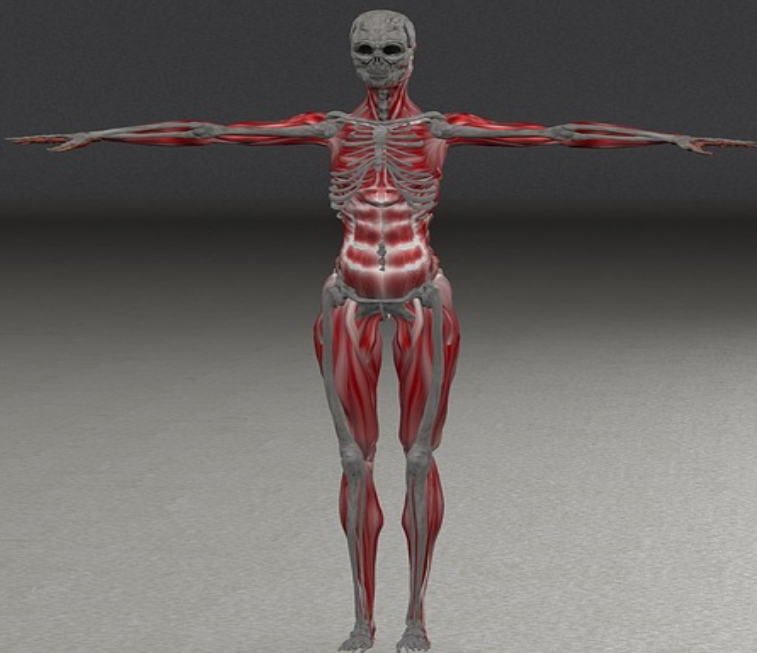


FLEX CEUs



Fibromyalgia



OCCUPATIONAL THERAPY FOR FIBROMYALGIA

Flex Therapist CEUs

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INTRODUCTION

More than just a problem for the affected individual, musculoskeletal diseases place a large burden on healthcare systems and society at large. (Verbunt, 2008). Fibromyalgia (FM) is one such disease. It is defined as a pain disorder, but can affect the body in many adverse ways, such as stiffness, soft tissue tenderness, fatigue, and sleep disturbances. FM is a relatively rare disorder, affecting only 2-4% of the population, but of those affected, 80% are women. It is a chronic disease and successful treatment options are few and far between. There is no known cure. People with a fibromyalgia diagnosis often have difficulty maintaining employment and managing medical costs, leading to decreased quality of life overall. Not much is known about the onset of fibromyalgia, but a connection between long-term, localized pain has been found. It is thought that symptoms may manifest as a response to this persistent pain. (Jensen, 2012).

Fibromyalgia has gone by many names: fibrositis, nonarticular rheumatism, the chronic fatigue syndrome, myodysneuria, fibromyositis, and muscular rheumatism, among others. Like many diseases about which little information is known, there is no specific test for fibromyalgia. Evidence of fibromyalgia does not show up on any radiographic or imaging studies, thus, it is a diagnosis of exclusion. The only current physical method used to help diagnose fibromyalgia is soft tissue palpation. Due to the difficulty in diagnosis, many individuals with fibromyalgia have spent years looking for answers. Many patients have instead been labeled as neurotic or hypochondriacal. It is only recently the diagnosis has gained widespread acceptance in the medical community. (Behm, 2012).

DIAGNOSIS

Diagnosis of fibromyalgia is difficult. The American College of Rheumatology (ACR) is the body that sets the criteria for a FM diagnosis. “ To be diagnosed with fibromyalgia, one must have experienced widespread pain for at least 3 months and have a minimum of 11 out of the 18 specified points on the body that are painful under relatively mild, firm pressure (<11 points classified ACR-; > 11 points classified ACR+); the other diseases that could mimic fibromyalgia symptoms should be excluded” (Baron, 2014). FM is also “associated with symptoms like fatigue, irritable bowel, sleep disorder, chronic headaches, jaw pain, cognitive or memory impairment, etc.” (Puccio, 2013). “More recently, in an attempt to address the subjectivity in performing these tender point exams and thus simplify diagnosis in primary and specialty care, preliminary diagnostic criteria that eliminates the requirement for a physical or tender point exam have been proposed by the ACR. These updated criteria consist of both the widespread pain index (WPI) and the symptom severity (SS) scale that are to be completed by the clinicians.” (Baron, 2014) Though this is an improvement, fibromyalgia diagnosis remains challenging,

mostly due to widespread differences between patients, various comorbidities that may mask symptoms, and similarities to other disorders. Though skepticism on the existence of FM among physicians has decreased overall, awareness and experience with this condition is still limited. (Baron, 2014).

The process for receiving a fibromyalgia diagnosis is also challenging for patients. Many people first contact their PCP, who may not have specific training in diagnosing fibromyalgia. It is likely that an individual will require multiple consultations and many tests in order to be diagnosed. Misdiagnosis is also common. This process, combined with the actual symptoms of the disease itself, greatly reduces quality of life for patients as well as contributes to overall healthcare costs. (Baron, 2014).

Besides pain, fatigue and difficulty sleeping are other major symptoms of fibromyalgia. “Women with FM have described their fatigue in terms of sleepless nights, physical weakness, social withdrawal, loss of mental energy, and overwhelming exhaustion. Socio-demographic aspects such as female gender, younger age, low working capacity, and low level of education have been shown to be associated with higher levels of fatigue in FM” (Ericsson, 2016).

Fatigue, while generally assessed singularly using a visual analog scale (VAS), has greater implications. It can affect both physical and mental functioning; fatigue is often related to muscular tenderness, decreased sleep quality, and stress. “Higher ratings on the subscales of physical fatigue and reduced activity, which are included in the Multidimensional Fatigue Inventory (MFI-20), have been associated with low working capacity, low level of physical activity, and impaired physical capacity in women with FM” (Ericsson, 2016).

[POSSIBLE CAUSES AND PATHOLOGY](#)

There are certainly a number of proposed physiological causes of fibromyalgia. In this section, we will go through in depth a number of possible causes indicative of the complexity of FM.

“The cause of fibromyalgia remains an area of active debate and etiological theories implicate socio-demographic, physical, and psychosocial factors, while some consider this syndrome the ‘medicalization of misery.’” (Busse, 2008). While the newness of this disorder leads to varied opinions and theories on its cause, there are a few things we do know with some certainty: FM is related to many different body systems including the CNS, the adrenal system, and the immune system. (Behm, 2012). We also know that FM is more common in patients with autoimmune disorders, further strengthening this link. (Behm, 2012). “As early as 1988, it was noted that aberrant expressions of immune mediators such as cytokines may

contribute to the onset of disease symptoms. However, reports on changes in serum cytokine levels in FM patients have revealed conflicting results.” (Behm, 2012). Decreased levels of peripheral blood mononuclear cells is another correlation found in FM patients. (Behm, 2012).

Stress is another possible factor in fibromyalgia. “FM is influenced by factors such as stress, illness, and pain in some – but not all patients – as well as by certain neurotransmitter and neuroendocrine changes, including reduced biogenic amine levels, increased excitatory neurotransmitter concentrations, and alterations in the hypothalamic-pituitary-adrenal axis and in autonomic nervous system activity. Studies of cortisol levels and the hypothalamic-pituitary-adrenal axis are motivated by the high prevalence of stress and depression reported for patients with FM.” (Álvarez, 2008). It is possible the interaction with cortisol and the adrenal system results in the fatigue that often accompanies FM. (Álvarez, 2008). Decreased cortisol production can also be linked with reduced endurance, mood swings, sleep disorders, and depression. (Álvarez, 2008). Such factors should be taken into consideration when suggested recommendations for lifestyle changes are inadequate to improve the FM patient’s ability to perform their required Activities of Daily Living (ADLs).

A problem with pain dysregulation in the CNS is another possible cause. “Brain imaging studies suggest that FM is associated with 1) augmented brain responses to experimental pain stimuli; 2) changed resting-state functional connectivity; 3) changes in brain morphology (atrophy) in brain regions implicated in pain processing, and 4) altered function of brain neurotransmission. A number of behavioral studies have suggested that the Descending Pain Modulatory System (DPMS) is impaired in FM” (Jensen, 2012).

Results have shown “that FM patients failed to activate the rostral anterior cingulate cortex (rACC) - a key region for the descending inhibition of pain. Also found [was] decreased thalamic activation, indicating altered regulation of incoming pain signals in FM.” (Jensen, 2012). This shows that people with FM may have less connectivity between areas involved in pain inhibition compared to other individuals. This further indicates that DPMS dysfunction is significant to FM pathology. (Jensen, 2012).

Though not well understood, differences in pain processing related to central sensitization (CS) occur in FM. “ In the CS model, pain hypersensitivity and enhanced receptive field characteristics of the disease may be explained as a consequence of increased neuronal membrane excitability, synaptic facilitation, and nociceptive pathway disinhibition mediated at the molecular level by the modification of receptor kinetics (which results in enhanced neuronal and nociceptive pathway functions” (Zanette, 2014).

Brain-derived neurotrophic factor (BDNF) is a protein used in the central nervous system (CNS.) It affects the way various neurons function, and can strengthen excitatory (glutamatergic) synapses and weaken inhibitory (GABAergic) synapses. (Zanette, 2014). “BDNF produced in the CNS is transported through the blood–brain barrier via saturable systems, and contributes to 70-80% of circulating BDNF. Although circulating levels of BDNF have been found to be elevated in FM compared with controls, its association with the patients’ clinical complaints remains elusive” (Zanette, 2014). In addition to this, glutamate (Glu) itself has also been found to be present in higher concentrations in people with FM. (Harris, 2010). Through proton magnetic resonance spectroscopy (H-MRS), it has been found in many regions of the brain involved in pain processing. (Harris, 2010). While this method has long been used to show brain differences with other disorders such as depression, Alzheimer’s disease, and epilepsy, only recent studies have used it show a difference in FM patients as well. (Harris, 2010).

It has been reported that there are “elevated levels of Glx, a combined measure of Glu and glutamine, within the posterior cingulate of FM patients. Moreover, they observed negative correlations between Glx in the patient group and pressure pain thresholds, and positive associations with these metabolites and scores on the Fibromyalgia Impact Questionnaire, suggesting that elevated levels of Glx in the posterior cingulate are associated with increased pain and tenderness in FM. The posterior cingulate region of the brain is also a key component of the default mode network (DMN), a constellation of brain regions activated during self-referential thinking. In FM patients, the DMN appears to have greater functional connections with the insula, a key pain processing region, and this enhanced connectivity is directly related to the spontaneous clinical pain in these patients.” (Harris, 2010). This indicates that there may be molecular differences in the brains of people with FM. (Harris, 2010). Three separate studies have reported these findings, indicating a good direction for research to head going forward. This research may also have implications for past research involving MRIs of patients with FM, though caution should be taken. “It is tempting to conclude that the reason why previous [studies] have observed augmented neural activity is due to an elevation of Glu leading to neuronal hyperexcitability. At the present moment, however, [this cannot be concluded] for the following reasons: first, H-MRS-derived levels of Glu are often contaminated in part by glutamine,...second, within brain tissue, Glu exists in the neurotransmitter pool as well as a metabolic pool and [it is not known] if the neurotransmitter pool is where the elevation is occurring; and finally, the cellular compartment from where the elevated Glu signal is originating is unknown” (Harris, 2010).

S100B is a protein that exists in a wide variety of cells. Elevated levels of S100B serum have been correlated with both mood disorders and TBIs. It is possible that this may also be true for fibromyalgia. “Results support the hypothesis of a correlation between serum BDNF and S100B in FM patients and their association

with [the pressure-pain threshold (PPT)]. Furthermore, [it was] observed that both serum BDNF and S100B were higher in FM patients with lower PPT. Thus, the serum levels of S100B may represent white matter structural changes, which, at the cellular level, indicate that this serum mediator might be a proxy of neuroglia changes." (Zanette, 2014).

Fibromyalgia can affect participation with ADLs. Though the primary experience of FM is physical pain, the mental component is often more debilitating. "A prominent explanatory model for pain related disability in which biopsychosocial factors are integrated is the fear-avoidance model, championed by Hasenbring. According to this model, catastrophic thoughts about pain may lead to an increase of pain-related fear, which in turn is associated with avoidance behavior. Depression and disuse (i.e., a state of inactivity) may evolve, which in turn are associated with decreased pain tolerance and a higher level of disability." (Verbunt, 2008). Besides this model, competing theories on chronic pain and its effect on function have been proposed. "Hasenbring hypothesized that, in addition to patients using avoidance strategies as a coping mechanism, other patients with pain will have the tendency to cope with pain using persistent strategies. These patients persist in the performance of activities and appear to ignore their pain and overload their muscles (overuse), resulting in muscular hyperactivity. Long-term muscular hyperactivity can eventually cause chronic pain and long term false straining of the muscles eventually can result in chronification of pain." (Verbunt, 2008).

Van Houdenhoven expanded on this theory with the concept of "action proneness." "According to van Houdenhoven, personality features, such as a high achievement motivation, obsessive-compulsive traits, perfectionism, "workaholism," and self-sacrificing tendencies seem to be related to an overactive lifestyle as a way of coping to prevent anxiety and depression." (Verbunt, 2008). It is known that anxiety and depression have a high correlation with how disabled an individual feels by fibromyalgia. To compound on this, studies have shown women with fibromyalgia are five times as likely to have co-occurring anxiety disorders compared to the general population. If these individuals are limited by pain, and thus unable to engage in this preferred coping strategy, they may become more distressed. (Verbunt, 2008).

Another theory may relate to the persistence of these behaviors. "Higgin's self discrepancy theory postulates that each person has three basic domains of selves; the actual self (e.g., describes what attributes an individual believes they actually possess), the ideal self (the characteristics that an individual would ideally like to possess in the future), and the ought self (the attributes that an individual believes they ought to or should possess). Individuals are motivated to work towards a condition where the actual self matches the ideal self or ought self. In this, people strive to keep the discrepancies between the actual-ideal and the actual-ought selves as small as possible, as these give rise to negative psychological situations

that are associated with specific emotions.” (Verbunt, 2008). . It is thought that discrepancies between selves cause extreme negative emotions which eventually result in disability. The theory goes on to expound that these negative feelings are exponential: the greater the discrepancy of self, the larger impact it has upon a person’s psyche. (Verbunt, 2008).

To combat this, education by the occupational therapist in energy conservation, pacing, and body awareness techniques can help patients learn to develop more beneficial coping strategies. The occupational therapist should certainly incorporate these concepts when establishing goals. Occupational therapists can work with clients to develop a schedule that alternates rest with work and leisure for optimal symptom management.

The body’s response to stress is also thought to be involved in fibromyalgia. Stressors can be both psychological and biological in nature. The way humans respond to stress is a delicate and dynamic process involving the ANS and various neurotransmitters. “Catecholamines are the sympathetic neurotransmitters. The naturally occurring catecholamines are norepinephrine, epinephrine, and dopamine. The three substances act as neurotransmitters within the central nervous system. The major metabolic transformation of catecholamines involves methylation and oxidative deamination. Methylation is catalyzed by the enzyme catechol-*O*-methyltransferase (COMT) and occurs throughout the body, whereas oxidative deamination is promoted by monoamine oxidase and takes place mainly in the synaptic cleft. The COMT gene has abundant functional polymorphism. It has been shown that a particular COMT gene haplotype named HPS gives rise to a defective enzyme. Interestingly, this HPS haplotype is associated with high pain sensitivity in healthy females. This newly generated evidence supports the notion that the intensity of sympathetic function is in part genetically determined, and that a ‘hyperadrenergic state’ is associated with pain hypersensitivity” (Lavin, 2007). It is thought that there may be a “ceiling effect” on how much stress a person can handle. If a person is no longer able to process stress, physical manifestations such as fatigue, stiffness, difficulty sleeping or even digestive problems can occur. (Lavin, 2007).

Another facet of the nervous system known as “sympathetically maintained pain” may be related to fibromyalgia. This type of pain often occurs after an injury but has no specific physical trigger, much like fibromyalgia. Studies have shown that many people diagnosed with FM previously had high rates of physical or emotional trauma prior to developing symptoms. (Lavin, 2007).

TREATMENT

While no singular method has been found to cure FM, a multidisciplinary approach may help to alleviate symptoms. Education, medication, exercise, and CBT have all

been shown to improve quality of life. Exercise in particular can increase feelings of energy and decrease fatigue across a variety of conditions. Aerobic exercise, resistance training, flexibility exercise, and body awareness therapy may help people with fibromyalgia manage their symptoms. (Ericsson, 2016). While current fibromyalgia treatment generally focuses on increasing the level and quality of physical activity in which a person engages, attitudes toward this method may prohibit its success. Instead, patients may benefit from a more behavioral approach - one that includes strategies for reducing negative emotions associated with the condition and assistance for structuring daily activities. (Verbunt, 2008). Many people affected with fibromyalgia also use complementary and alternative medicine (CAM) or the services of other allied health providers such as chiropractors, occupational therapists, and physical therapists. (Busse, 2008).

OCCUPATIONAL IMPLICATIONS

The occupational implications of living with fatigue are widespread. A client's daily occupations, roles, habits, routines, and relationships will all be affected by fatigue. Consequently, clients will be faced with daily decisions about how they should spend their energy. Clients may passively decrease participation in leisure activities because such activities are often considered optional relative to activities such as grooming, dressing, parenting, homemaking, and work. Eliminating leisure activities may leave more energy for basic activities of daily living, but a client's quality of life may be negatively influenced as a result. Occupational therapy researchers have found that participation in meaningful leisure activities is more closely linked to well-being than participation in other occupations (Stout and Finlayson, 2011)

EXERCISE

Exercise for individuals who have a muscular pain disorder may seem counterintuitive. However, most research indicates that certain types of exercise can actually improve FM symptoms. One type of exercise is resistance training. (Jones, 2015). Resistance training seeks to improve strength and endurance through progressive resistance applied through weights, bands, or even body weight. Resistance training also improves overall balance, coordination, and agility. (Jones, 2015). "Support for the benefits of resistance training in FM can be found in a recent Cochrane Database review. The authors concluded that resistance training improves multidimensional function, pain, tenderness, and muscle strength in women with FM. Having FM poses hurdles that need to be overcome before reaping the rewards of resistance training. People with FM are less physically active compared with age-matched controls. Deconditioned muscle is a potent pain generator owing to delayed-onset muscle soreness (DOMS). This is a result of an inflammatory response during the repair and adaptation process of building muscle (e.g.,

microtrauma, repair, and growth). Not surprisingly, sedentary persons may have difficulty in initiating or maintaining an exercise program because of both immediate pain and DOMS. Simply put, being inactive will eventually lead to more pain on exertion, and for many will result in a symptom flare. ” (Jones, 2015). Regular but smartly structured resistance training can help prevent this from happening.

Resistance training has also been shown to positively affect the fatigue component of fibromyalgia. “Participating in resistance exercise combined with working fewer hours per week at baseline predicted greater improvement in the MFI-20 subscale for physical fatigue. Variables that have been previously found to be associated with dimensions of fatigue were included in correlation analyses; however, only a few variables appeared to be associated with change over time in fatigue. The participants’ age or duration of pain did not appear to have an influence on change in fatigue, nor did their level of psychological distress or physical capacity.” (Ericsson, 2016). It is likely, then, that people with FM may be able to decrease fatigue by use of resistance exercise, despite differences in severity, age, or function. (Ericsson, 2016)

Aerobic activities are another type of exercise that may help people with fibromyalgia. “Aerobic exercise has been shown to improve the MFI-20 dimension of reduced motivation in female patients with FM and global outcome measures of physical capacity and, to some degree, pain and the number of tender points in FM. Resistance exercise has shown positive effects on limitations in activity, pain, global fatigue, depression and muscle strength in patients with FM” (Ericsson, 2016).

OCCUPATIONAL THERAPY AND EXERCISE:

Occupational therapists can help patients with fibromyalgia work exercise into their daily lifestyles. “One of the biggest keys to patient success in a therapy program is the patient’s grasp of two concepts:

1) **Exercise is required.** Patients are instructed to think of exercise as a medicine, like high blood pressure pills. People with fibromyalgia must exercise.

2) **There is no magic cure.** If patients’ expectations are that they will be “cured”—have no pain or fatigue—they are destined to be disappointed. It is important that therapists work with patients to establish realistic goals.”

(<http://www.fmaware.org/articles/successfully-working-with-pt-and-ot/>) An occupational therapist’s skill in finding ways to embed interventions into daily routines will be valuable here.

LIFESTYLE INTERVENTIONS

While medication is an option for people with fibromyalgia, it comes with a host of concerns. Typical treatments are usually costly, have side effects, and run the risk of causing addiction. Often, medications are not even fully successful. Because of this, more holistic options have been explored. “Kim and colleagues are the first to examine the association between alcohol consumption and FM symptom severity and quality of life. Among adult FM patients reporting low or moderate alcohol consumption (≤ 3 or > 3 to 7 drinks per week), there was lower FM symptom severity and better quality-of-life scores compared with those who reported no alcohol consumption (non-drinkers). However, these associations were not observed in patients who were heavy drinkers (> 7 drinks per week) compared with non-drinkers. Interestingly, after exploring possible mechanisms for their findings, Kim and colleagues speculated that alcohol consumption may attenuate FM symptoms and improve quality of life by mediating psychological benefits and stress relief or by promoting factors associated with social integration. Another possible mechanism proposed is central nervous mediation via the modulating gamma-aminobutyric acid (GABA) system” (Chung, 2013). Though one must be careful with regulating the amount, it appears that controlled alcohol consumption may greatly increase the quality of life of individuals with fibromyalgia.

OCCUPATIONAL THERAPY AND FATIGUE MANAGEMENT INTERVENTIONS

The goal for occupational therapy practitioners in fatigue management intervention is to maximize a client’s participation in meaningful occupations while minimizing the impact of fatigue. Occupational therapy interventions should work toward this overarching goal, using evidence-based strategies. There are a few fatigue management programs described in the literature that are designed for delivery in a group-based setting with specific patient populations (e.g., Managing Fatigue: A Six-Week Course for Energy Conservation and the Occupational Therapy Lifestyle Management Program). Managing Fatigue: A Six-Week Course for Energy Conservation was developed for patients with CFS and fibromyalgia. It contains six sessions, each 2 hours in length, and is designed for delivery in a community-based group format. Each session of the program covers various fatigue management strategies, including planning and scheduling rest, analyzing activity, understanding body mechanics, and using tools and technology to manage fatigue.

The Occupational Therapy Lifestyle Management program was developed for clients with CFS based on principles of cognitive behavioral therapy (CBT) and graded activity. The program focuses on client-identified problems, uses meaningful activity as an intervention medium, and consists of 10 sessions that can be delivered either individually or in a small group. A quasi-experimental study was conducted (N=97),

with 72% of the experimental group reporting better management of their CFS after participating in the program. (Stout and Finlayson, 2011)

“Occupational therapy focuses on the whole person through their activities of daily living (ADL). By learning adaptive techniques, energy conservation, pain management, relaxation techniques, problem solving, sleep hygiene, communication techniques, and goal-setting, patients are able to determine life changes that will allow them to optimize their function within their limitations. With therapist assistance, patients develop a daily and weekly schedule that they will continue after discharge. The schedule is designed to provide the balance of work, rest and play needed for optimal symptom management.”

<http://www.fmaware.org/articles/successfully-working-with-pt-and-ot/>

CONCLUSION

Fibromyalgia, a common pain disorder, has many signs and symptoms, none of which are specific to the condition itself. Instead, FM must be diagnosed on an exclusionary basis. It is probable that FM is caused by a combination of physical and psychological etiologies. The most beneficial treatment for FM requires a multidisciplinary approach combining education, pharmacological treatment, exercise, and cognitive behavioral therapy.

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