

Fibromyalgia



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An Osteopathic Approach to Fibromyalgia

A patient-centered, health-oriented approach that includes utilization of manual diagnosis and treatment as a complement to medication, counseling, and nutritional advice.

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An osteopathic approach to the patient entails viewing all aspects of health (physical, mental, emotional, and spiritual) as a combination of coordinated body functions that make up that unique individual patient. It is a patient-centered focus, emphasizing health-oriented principles of patient care and adds the osteopathic touch—i.e., hands on manual diagnosis and treatment to address mechanical dysfunctions that impede normal motion throughout the body. Joint motion is essential in each body region as it facilitates vascular and lymphatic drainage from the region back to the general circulation. The osteopathic philosophy is founded on core beliefs about health, disease and patient care that can be summarized in four basic tenets that stem from the sciences of anatomy and physiology:^{1,2}

- ① The human being is a dynamic unit of function.
- ② The body possesses self-regulatory mechanisms that are self-healing in nature.
- ③ Structure and function are interrelated at all levels.
- ④ Rational treatment is based on these principles.

Though we learn anatomy and physiology in parts and systems, the first tenet recognizes that the person is a dynamic unified whole, not the mere compilation of unrelated anatomical parts or physiologic systems. The patient with fibromyalgia has wide spread pain that is bilateral, involving all body regions. Although signs on physical exam manifest as select tenderpoints in the musculoskeletal system, other body systems are involved. Common complaints often include gastrointestinal and nervous system dysfunctions. Additionally, what is going on in the person's environment, social life, diet and nutrition, drugs used or abused, sleep patterns, emotions, beliefs and other behavioral factors play a role in the generation and recovery from fibromyalgia. All of the body's systems are working together as a coordinated unit, helping the patient adapt to environmental and social challenges.

The second tenet stresses that the body is capable of self-regulation, self healing, and health maintenance. This capability is inherent, but at times may require assistance in the form of osteopathic manipulative treatment (OMT), surgery, exercise, nutritional advice, medications, or counseling. The third tenet states that structure and function are inter-related at all levels. Altered form leads to altered function; altered function leads to altered form. This is true at the molecular, cellular, tissue and organ levels. In assessing the patient, a search for areas of altered form and function within the neuromusculoskeletal and other systems will help identify entry points for treatment using OMT and other therapies. The fourth tenet, that rational treatment is based upon the three previous principles emphasizing the need to consider the unity of the human body, mind and spirit, the patient's self-healing and regulatory capabilities, and the inter-relationship between structure and function in developing a management plan.

Case Study

E.D. is a 46-year-old female that complains of three years of progressive widespread pain including her arms, legs, neck, back, and head that is not alleviated by non-steroidal anti-inflammatory medications or acetaminophen. Symptoms have been worse in the past six months to the point of interfering with her work. She has missed 10 days in the past two months due to the pain and fatigue. She has had difficulty working lately, with poor concentration and stamina, getting tired easily. Symptoms are better with rest and worse with prolonged sitting or standing and repetitive activities. She has irritable bowel symptoms, non-restorative sleep and difficulty falling asleep at night, but falls asleep sometimes while sitting at her computer at work during the day. She has been suffering from a depressed mood for several months, loss of interest in hobbies and fun activities, is not doing any exercise, seeks solitude, has poor appetite at times, though has not lost weight, and denies suicidal ideations. She has not sought psychiatric help nor taken antidepressants and has no history of psychiatric treatment or hospitalizations.

Although she has no history of organic diseases, she has had three automobile collisions in the past twenty years, rear ended twice, that have caused her considerable neck and back pain. She denies social problems at work or home. She denies using illicit drugs. However, she does smoke a pack of cigarettes a day for the past 25 years. On physical exam, she not only has

bilateral tender points in each body region, 14 of the 18 classic points ascribed to fibromyalgia syndrome,³ but also has generalized allodynia—light touch anywhere on the left arm, for instance, elicits shooting pain into the limb not in a dermatome distribution. Neck motion is significantly limited: extension is only to 45 degrees and neck flexion is to two fingerbreadths above the chest. The neurologic exam is otherwise unremarkable and non-lateralizing.

There were spinal motion restrictions at several cervical, thoracic and lumbar vertebral joints. Cervical radiographs displayed degenerative bone and disc disease and a follow up MRI showed a moderate to severe spinal stenosis between C3-C5. A sleep study diagnosed severe sleep apnea. Her diagnoses are cervical spinal stenosis, depression, fibromyalgia, somatic dysfunction, irritable bowel syndrome and sleep apnea.

Discussion

The question at hand is whether these six conditions all stem from one primary problem, i.e., fibromyalgia?⁴ Or are they co-morbidities with separate and distinct etiologies? Is fibromyalgia the end result of the conglomerate of these other disorders? Each condition affects the nervous and musculoskeletal systems. In this instance, to restore normal functionality, rational treatment would consist of OMT to alleviate the somatic dysfunction, exercises, medications, C-PAP at night, counseling and nutritional advice. Alleviating somatic dysfunction using OMT and exercises improved her efficiency of motion, decreased neural irritability and facilitated self-healing and recovery. Aerobic exercises, counseling, nutrition and medications, such as pregabalin, duloxetine or milnacipran, along with C-PAP, may help further decrease neural irritability, improve restorative sleep, and stabilize emotions.⁵

As fibromyalgia involves muscle pain and dysfunction, it is helpful to look at the roles the musculoskeletal system plays in restoring and maintaining health and well-being. The musculoskeletal system is integral in five basic integrated and coordinated body functions that aid healthful adaptation to life and its circumstances:

- ① Posture and motion, including fundamental structural and biomechanical reliability. The primary structural components for these functions are the back and extremity muscles. Patients with fibromyalgia have structural asymmetries and palpable somatic dysfunction amenable to OMT.⁶
- ② Respiratory and circulatory functions are influenced by intercostal muscle tensions and costal cage compliance.⁷ Respiratory function and cardiovascular activity is altered in patients with fibromyalgia.⁵
- ③ Neurologic integration, including central, peripheral, autonomic, neuro-endocrine, neuro-circulatory, and their reflex relationships manifest in musculoskeletal resting tone and function. Musculoskeletal pain and tenderness are manifestations of alterations in nervous system processing and reflex activity.⁸ Fibromyalgia patients also have central

nervous system processing and reflex activity.⁷ Fibro-myalgia patients also have central sensitization in addition to peripheral sensitization.^{5, 9}

- ④ Metabolic processes of all types, including endocrine-mediated, immune-regulatory and nutritionally-related biochemical processes support the musculoskeletal system's energy demands. Dysfunctions and injuries involving the musculoskeletal system conversely affect the body's energy expenditure and exchange. Fibromyalgia patients are typically fatigued and have alterations in cellular bio-energetics.^{5, 10}
- ⑤ Psychosocial relationships, cultural beliefs and practices, attitudes and psychological state affect how active the patient is and how the muscles are used in daily life. The degree to which dysfunction of the musculo-skeletal system affects the lives and attitudes of these patients are variable. Fibromyalgia patients often suffer from depression, anxiety, sleep disturbances, decreased activity and exercise, poor concentration and socio-economic problems.⁵

Using these five perspectives are analogous to viewing a patient through a lens. By altering the focal length of the lens one could view different aspects of the patient's struggle to maintain health. This would open many avenues for diagnosis, treatment and management, including the use of palpatory diagnosis and osteopathic manipulative treatment. It is important to keep in mind that these five perspectives from the point of view of the musculoskeletal system are merely expressions of normal physiological functions that maintain health and play key roles in adaptation to stressors—as well as in recovery from the various aspects of fibromyalgia.

The musculoskeletal system can be viewed as the core that links these five coordinated body functions.¹¹ The osteopathic profession calls this viewpoint the "Five Models of Osteopathic Patient Care."³

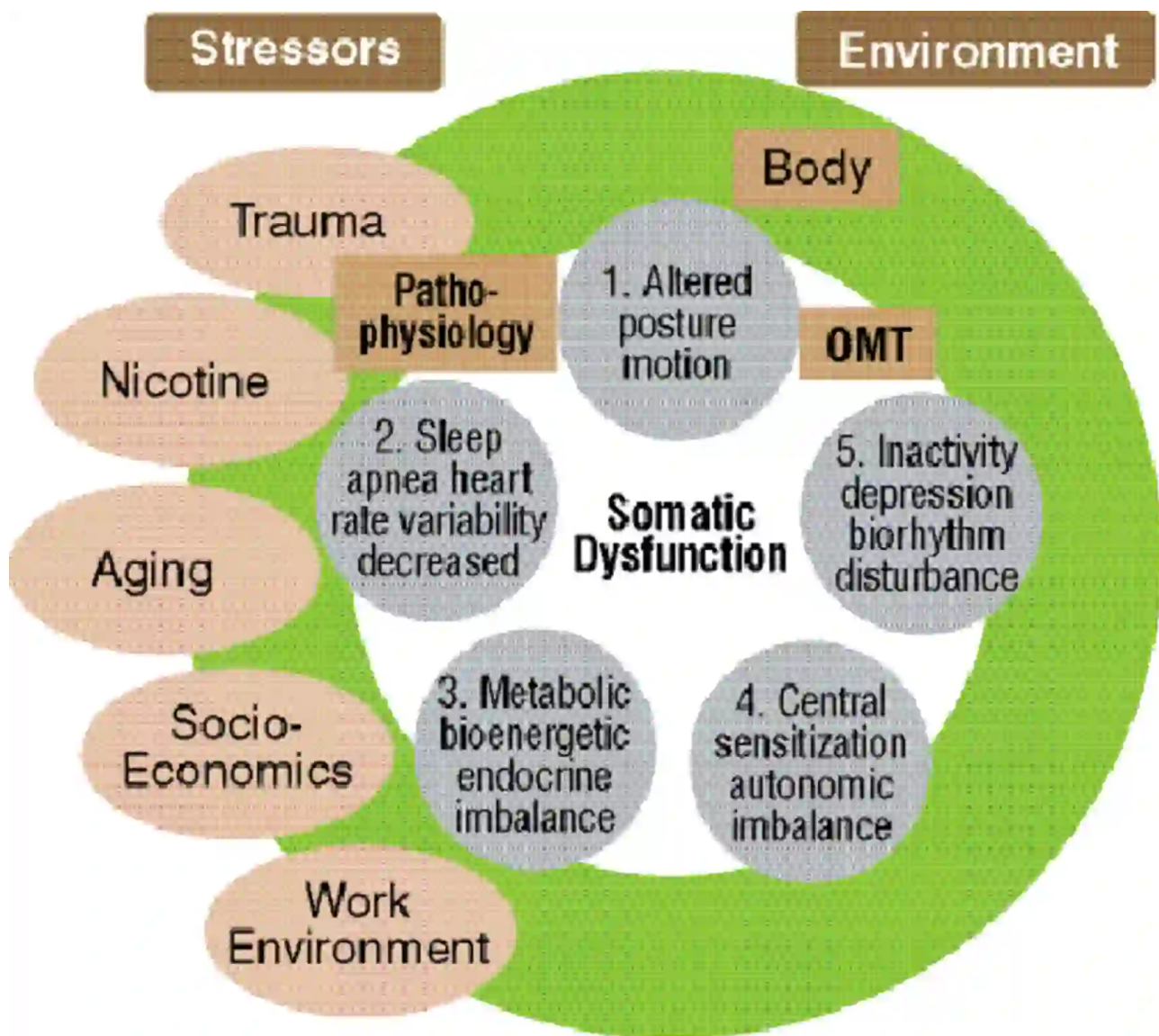


Figure 1. *Dysfunction of the five osteopathic functional domains in a patient with fibromyalgia.*

Figure 1 depicts somatic dysfunction of the musculoskeletal system challenged by environmental stressors. The body (green circle) encompasses the musculoskeletal system (white inner circle). The inability to adapt to the stressors leads to pathophysiological processes in each of the five functional domains or models:

- ① biomechanics,
- ② respiration/circulation,
- ③ metabolic/energy,
- ④ neurologic, and
- ⑤ behavioral.

Somatic dysfunction is the manifestation of these disturbances in the musculoskeletal system. OMT is used to alleviate somatic dysfunction and its effects on the five functions, reverse the pathophysiological processes and restore optimal function, health and the patient's adaptive potential. Careful observation and educated palpation help make the musculoskeletal system a natural entry point for both diagnosis and treatment to improve these five physiological processes. Typically, a combination of approaches will be appropriate for an individual fibromyalgia patient. The combination chosen is modified by the patient's differential diagnosis, co-morbidities, personal abilities, beliefs and attitudes, and other therapeutic regimens.

Biomechanical Model

The Biomechanical model views the patient from mechanical and structural (bones, joints, muscles, connective tissues) perspectives. In the patient above, her spinal stenosis and other spinal somatic dysfunction cause altered posture and motion. Decreased connective tissue compliance around these areas of diminished joint motion impede local microvascular, lymphatic and neurologic functions. Associated local cellular metabolic processes, as well as overt behaviors (neck and spinal movement), are also compromised. Depending on the person's adaptive capabilities, this can lead to disturbances in various body functions, including sleep, breathing and mental functions. Lack of concentration and fatigue ensue. Exercise and social activity is adversely affected and economic consequences follow. The biomechanical perspective leads the osteopathic physician to assess the patient for structural impediments, e.g., somatic dysfunction. Somatic dysfunction is defined as "impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial, and myofascial structures, and related vascular, lymphatic, and neural elements."¹ The alleviation of somatic dysfunction through application of OMT enables the patient to regain associated structural, vascular, neurologic, metabolic and behavioral functions. The objective is to optimize the patient's adaptive potential through restoration of structural integrity and function.

In the case study, the patient had been in several automobile collisions that resulted in whiplash-type injuries and subsequent difficulty in moving her neck and back. Due to the lack of motion, muscle spasms, and development of osteoarthritis in the cervical spine, the patient began to feel shooting pains into her arms. She cannot maintain an exercise routine, has difficulty sleeping and cannot concentrate or do her work very well. Her structural problems have caused motion restrictions that have affected her other main physiological functions. Alleviation of her somatic dysfunction using OMT helped her regain better posture and spinal motion which led to improvement in her breathing and blood circulation; her shooting arm pains diminished and her appetite picked up. She started doing daily neck muscle stretches and walked three times per week. Her sleep at night improved even without the C-PAP, likely due to reduced collapse of her nasopharyngeal airway. However, her restorative sleep was better with the C-PAP. She awakened refreshed, energetic and able to concentrate at work.

Respiratory/Circulatory Model

Approaching the patient from the perspective of the respiratory/circulatory model entails focusing on respiratory and circulatory processes and their relationship to her neuromusculoskeletal dysfunctions. This includes using OMT to improve diaphragm and costal cage motion, compliance of the thoracic inlet myofascial structures, and cranial compliance. Consideration is given to the interdependency of respiratory-circulatory functions and musculoskeletal, neurologic, metabolic and behavioral functions. Her sleep apnea is of greatest concern in this regard. Alleviating sleep apnea helped her maximize oxygenation of her body's tissues, improved metabolic processes, decreased fatigue and improved concentration at work.

Neurological Model

The neurologic model views the patient's problems in terms of aberrancies or impairments of neural function that are either caused by, or cause, pathophysiologic responses in structural, respiratory-circulatory structures and functions, metabolic processes and behavioral activities. This patient has tenderpoints and widespread pain in all body regions. Therapeutic application of OMT within this model focuses on the reduction of mechanical strains and stresses and the elimination of nociceptive drive. The goal of treatment in this model is to restore optimal neural function. Alleviation of allo-dynia through gentle OMT techniques aimed at decreasing nociceptive afferent stimuli from the peripheral soft tissues improved neural integrative and regulatory functions and enabled pain-free movement. This in itself helps local vascular and metabolic functions, and, ultimately, overt behavior in the form of increase in activities and exercise.

Metabolic/ Energy Model

In viewing the patient from the perspective of the Metabolic/Energy Model, focus is placed upon the metabolic and energy-efficiency of her organ systems. Fibromyalgia patients have been shown to have low cortisol levels,¹² CoQ10 deficiency, oxidative stress, and extensive mitophagy can contribute to cell-bioenergetics imbalance and thus compromise cell functionality.¹⁰ Her irritable bowel symptoms indicate disturbed peristaltic motion and possibly problems with digestion of nutrients and elimination of wastes. As well, poor posture and motion mechanics cause increased energy demands on the organism as a whole. OMT improves efficiency of posture and motion, improves arterial supply and venous and lymphatic drainage,¹³ and balances neurologic functions.¹⁴ Nutritional counseling and increased regular use of high fiber products and foods will help regulate bowel functions. Proper nutrition promotes normal biochemical processes and cellular functions as well. Another therapeutic application using this model includes prescribing medications to improve and stabilize metabolic and systemic functions. Some patients have a hypothyroid condition and may require replacement hormones.⁵

Behavioral Model

Behavioral model

The Behavioral model views the patient's health from the perspective of mental, emotional and spiritual state of being as well as personal lifestyle choices. Exploration of why this patient had so many motor vehicle collisions may provide insight into occult problems of concentration and attention. Inactivity and lack of exercise, use of tobacco or other addictive substances, and poor dietary choices all serve to diminish her adaptive capacity. The musculoskeletal system expresses feelings and emotions, and stress manifests in increased neuromuscular tension. Somatic dysfunction affects the musculoskeletal system's reaction to biopsychosocial stressors. OMT is employed within this model with the goal of improving the body's ability to effectively manage, compensate or adapt to these stressors. It also functions to improve rapport with the patient. Counseling and education seems more successful when the patient trusts the physician and feels comfortable and relaxed while receiving vital instructions, such as the need for tobacco cessation.

The whole person—body, mind and spirit—is considered in the individualized management plan. Behavioral health counseling and perhaps antidepressants may be required in stabilizing her emotions and improving sleep and concentration. She required medical leave of absence from work until her fatigue, sleep apnea, concentration abilities and emotional state improved. Preventive care strategies were discussed, stressing regular aerobic exercise, proper dietary and lifestyle choices and alleviation of toxic substances such as tobacco. The osteopathic physician and the entire professional health care team, including family and friends, need to provide psychological support and encourage the patient to work towards the goal of restoration of health by removal of the offending agent (tobacco and its related chemicals). Medications to decrease cravings and addiction may be needed. Additionally, aerobic exercises will help diminish the painful musculoskeletal components.¹⁵

Summary

The osteopathic approach to the patient with fibromyalgia addresses each of the presenting problems within the context of the musculoskeletal system and its interdependence with other physiological functions—especially posture and motion, respiration and circulation, neurological and metabolic processes, and overt behaviors. This approach is characterized by a comprehensive, functional, health-oriented, patient-centered management plan that restores the patient's adaptive potential. The outcome of OMT for this patient means that her fibromyalgia no longer controls her life but still demands attention and patient self-care efforts to maintain health.

REFERENCES