

# Fibromyalgia Syndrome (FMS): Neural Therapy as a Key to Pain Reduction and Quality of Life

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## ABSTRACT

Fibromyalgia syndrome (FMS) is a complex chronic pain disorder characterized by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive impairments. Its global prevalence is estimated at 2–3%, with women between the ages of 30 and 60 being most commonly affected. The pathophysiology of FMS is multifactorial, involving central sensitization processes, dysfunctions of pain inhibition mechanisms, and chronic inflammatory and neuroendocrine disturbances.

### Pathophysiological Mechanisms:

- **Central sensitization:** Increased pain processing in the central nervous system.
- **Neuroendocrine dysfunction:** Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, altered cortisol and serotonin levels.
- **Lymphatic dysfunction:** Edema, inflammation, and accumulation of toxins.
- **Silent inflammation:** Chronic inflammatory processes with elevated cytokine activity (e.g., TNF- $\alpha$ , IL-6).

### Neural Therapy as a Treatment Approach

Neural therapy addresses autonomic dysregulation and restores the balance between the sympathetic and parasympathetic nervous systems. Key therapeutic strategies include:

- **Local infiltrations:** Procaine or lidocaine injections to reduce pain sensitivity.
- **Segmental therapy:** Treatment of spinal reflex zones to regulate the autonomic nervous system.
- **Interference field therapy:** Identification and treatment of chronic irritative foci.

Adjunctive measures, such as manual lymphatic drainage, anti-inflammatory nutrition, and micronutrient therapy, can enhance treatment efficacy. The combination of neural therapy and regulatory medicine shows promising results in reducing pain, improving sleep quality, and restoring quality of life.

**Keywords:** Central Sensitization; Neuroendocrine Dysfunction; Silent Inflammation; Autonomic Dysregulation; Interference Field Therapy and Lymphatic dysfunction.

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## INTRODUCTION

Fibromyalgia syndrome (FMS) is a condition that has affected numerous patients across multiple generations. Advances in modern technology and a widerange of studies employing diverse methodologies have enabled researchers to characterize FMS as a highly complex disorder that remains only partially understood.[1-4]

FMS is a chronic pain disorder characterized by widespread musculoskeletal pain, fatigue, and a variety of additional symptoms, including sleep disturbances and cognitive impairments. This condition significantly reduces the quality of life and leads to substantial medical costs. Although the pathophysiology of FMS has not yet been fully elucidated, central sensitization and dysfunction of pain processing systems are believed to play a crucial role.[1,4,5]

Recent research suggests that dysfunction of the lymphatic system may also play a significant role in the pathogenesis of FMS, though the exact mechanisms remain unclear.[6,7]

The study by Üçeyler et al. (2013), published in *Brain*, provides groundbreaking insights into the pathological involvement of small nerve fibers in patients with FMS.[1] The detection of reduced intraepidermal nerve fiber density in FMS patients offers substantial evidence for the neuropathic components of the disease.[1]

The study indicates that FMS cannot be regarded solely as a central sensitization disorder but also involves peripheral nerve pathologies. This finding broadens the understanding of fibromyalgia from a purely central pain processing disorder to a combined central-peripheral dysfunction.[1,8]

### Medical History and Comprehensive Examination

A thorough physical examination should include dermatological, neurological, internal medicine, and orthopedic assessments. The integration of manual medicine (MM), physical and rehabilitative medicine (PRM), and general medicine is essential. A holistic approach to patient symptoms, with a strong emphasis on patient-centered care, is crucial for effective diagnosis and management.[6,9,10]

### Definition and Epidemiology

Fibromyalgia predominantly affects women between the ages of 30 and 60 and has a global prevalence of approximately 2% of the population. The characteristic symptoms include:

- Clinical Symptoms: Chronic widespread pain,

fatigue, sleep disturbances, cognitive impairments, headaches, irritable bowel syndrome, and menstrual pain.

- Diagnostic Criteria: Chronic pain persisting for at least three months and tenderness at a minimum of 11 out of 18 defined tender points, according to the American College of Rheumatology (ACR) criteria.

Arzu Yagiz and colleagues from Ege University in Izmir (Turkey) argue that distinguishing between fibromyalgia syndrome (FMS) and chronic widespread pain (CWP) is inadequate. In their recent study involving 284 patients, they applied both the 1990 and 2010 ACR diagnostic criteria. Their findings revealed that 65% of patients met the 1990 criteria, whereas 94% fulfilled the 2010 criteria. These results suggest that FMS exists on a continuum with CWP. The authors contend that FMS does not represent a distinct diagnostic entity and that differentiation from CWP is unnecessary, given that the multimodal treatment approaches for both conditions are largely identical.[11]

### Pathophysiology

The exact causes of fibromyalgia remain incompletely understood. However, current research suggests that central sensitization processes and dysfunctions within the endogenous pain inhibition system play a pivotal role. Patients with fibromyalgia frequently exhibit low serotonin levels and elevated concentrations of substance P, which may contribute to heightened pain sensitivity.[4,6,12]

Central Sensitization (CS) is a proposed physiological phenomenon in which dysregulation of the central nervous system (CNS) leads to an abnormal amplification of pain, resulting in hypersensitivity to both noxious and non-noxious peripheral stimuli.[6,13] Manifestations of CS include lowered thermal and mechanical pain thresholds, exaggerated responses to painful stimuli, persistent pain even after stimulus removal, and spreading sensitivity to otherwise normal tissues. The term "central sensitization" was first introduced by Clifford Woolf and colleagues in 1980.[14] Since then, significant advancements in genetics, neurochemistry, neurophysiology, molecular biology, immunology, and neuroimaging have substantially enhanced our understanding of CS. These developments have helped elucidate the pathophysiological mechanisms underlying chronic pain disorders that lack an identifiable organic cause and are commonly referred to as "functional syndromes." A considerable portion of this knowledge has been gained through research on FMS.[5,15]

The neuroendocrine system plays a crucial role in managing stress and other functional factors.[9,16] It is essential to recognize that various stressors can influence the onset and severity of functional pain conditions such as fibromyalgia.[6,9,10] Evidence from both human and animal studies has demonstrated this relationship. Daily stressors, personally significant life events, and post-traumatic stress disorder (PTSD) can trigger symptoms associated with FMS.[16-18] A stressor may alter autonomic and endocrine nervous system conditions, predisposing patients to chronic pain after a symptom-free interval. This has been observed in epidemiological studies as well as in experiments with healthy individuals subjected to sleep deprivation or restricted physical activity.[5,19-21]

Although the primary symptom of fibromyalgia is pain localized at specific musculoskeletal sites, the presence of multiple somatoform and psychological disorders suggests a common underlying dysfunction, likely originating in higher CNS levels or neuromodulatory triggers (interference fields).[5,6,22,23]

The lymphatic system plays a vital role in immune regulation, interstitial fluid balance, and waste removal from the body. Lymphatic vessels interact directly with the circulatory system, transporting fluid back to the heart. If this system is impaired in FMS patients, it may lead to complications such as lymphatic edema, toxin accumulation, and inflammation.[6,9,10,24]

Recent studies have examined the entire endocrine profile of FMS patients following simultaneous stimulation of the pituitary gland with corticotropin-releasing hormone (CRH), thyrotropin-releasing hormone, and growth hormone-releasing hormone. Findings suggest that increased activity of CRH neurons may not only contribute to many of the symptoms observed in FMS but also account for deviations observed in other hormonal axes, as demonstrated in studies analyzing hormone and luteinizing hormone-releasing hormone levels.[5,6,25,26]

The etiology of fibromyalgia syndrome (FMS) is multifactorial. Another theory posits a central regulatory dysfunction of muscle tension combined with altered subjective pain perception, commonly referred to as central nervous sensitization. Environmental medicine has also explored potential connections between FMS and environmental influences, such as heavy metals/particulates, metabolic disorders, hormonal imbalances, viral infections, or immune dysfunction. According to

this perspective, chronic pain originates from an inflammatory response within the immune system, leading to a "silent inflammation".[5,6,21,27]

Several studies investigating the link between FMS and silent inflammation have identified sustained activation of an inflammatory process, including increased cytokine activation of TNF- $\alpha$ , interleukin-1 (IL-1), and interleukin-6 (IL-6). These markers can be measured in specialized laboratories.[1,5,13,21,27,28]

Compared to healthy controls, FMS patients exhibit elevated TNF- $\alpha$  serum levels (Gur A. et al., 2002). Skin biopsies from FMS patients have demonstrated mRNA expression of IL-1 $\beta$ , IL-6, and TNF- $\alpha$ , whereas these findings were absent in healthy controls.[6,21,29] Additionally, an inflammatory state in FMS patients has been confirmed, often accompanied by an altered stress response, characterized by elevated circulating cortisol and norepinephrine levels. Increased release of pro-inflammatory cytokines (IL-1 $\beta$ , TNF- $\alpha$ , IL-6, IL-10, IL-18) by monocytes has also been observed in FMS patients compared to control groups.[1,6,9,20,21,28]

There is substantial evidence that nociceptive processing within the central nervous system is altered in FMS patients and that psychological factors such as stress may exacerbate pain perception. Emerging research suggests that additional mechanisms, including involvement of the peripheral nervous system in pain generation and the role of systemic inflammation, warrant further investigation.[21,28]

#### The Noticeable Effects of Lymphatic System Dysfunction in FMS

The significant impact of lymphatic system dysfunction in fibromyalgia syndrome (FMS) can be explained as follows:

- 1. Swelling and Edema:** Swelling of the eyelids (lid edema), swelling of the fingers and feet, a sensation of breast tension before hormonal fluctuations, and general fluid retention in the body are commonly observed in FMS patients, particularly in the early morning. These conditions may be attributed to inadequate lymphatic drainage.[6,10,24,17,31]
- 2. Lymphedema and Nociceptor Activation:** When lymphatic fluid is not properly drained, inflammatory substances can accumulate in the interstitial tissue. This accumulation leads to central sensitization and neuroinflammation through continuous nociceptor activation. As a result, widespread pain and heightened sensitivity in FMS patients increase.[7,24]

### 3. Fascial and Lymphatic Compression:

Lymphatic system dysfunction can cause circulatory disturbances at the fascial level. In particular, the activity of transforming growth factor beta 1 (TGF- $\beta$ 1) may contribute to fascial inflammation and further impair lymphatic flow. This results in both physical and biochemical stress.[7,6,9,24]

#### Laboratory Investigations

- Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and cytokine activation of TNF- $\alpha$ , interleukin-1, and interleukin-6; complete blood count.
- Rheumatologic markers (e.g., polymyalgia rheumatica, rheumatoid arthritis).
- Creatine kinase (e.g., in muscular disorders).
- Calcium levels (e.g., hypercalcemia).
- Thyroid hormones (e.g., TSH to assess hypothyroidism).
- Radiographic examinations in cases of specific clinical indications.

#### Fibromyalgia from the Perspective of Neural Therapy and Regulatory Medicine

The symptoms experienced by patients must be considered comprehensively and taken seriously. A patient-centered approach is essential. Fibromyalgia is a chronic condition characterized by widespread pain, fatigue, and various functional disturbances. From the perspective of neural therapy and regulatory medicine, fibromyalgia can be understood as a complex syndrome arising from dysregulation of multiple body systems.

A crucial aspect of therapy is the identification and elimination of interference factors that exacerbate symptoms, with consideration given to psychosocial, physical, and metabolic stressors.[9,10,28]

Neural therapy aims to reactivate the body's self-regulatory mechanisms, particularly addressing neurovegetative processes and potential interference fields. This holistic approach not only alleviates symptoms but also addresses underlying functional disturbances.[6,28,32]

The innervation of internal organs is governed by the sympathetic and parasympathetic nervous systems, as well as, in some cases, the phrenic nerve. Each organ has autonomous regulation via the autonomic nervous system (ANS), which is modulated by spinal and hypothalamic autonomic centers. These centers play a critical role in regulating organ function and

circulation.[33-38]

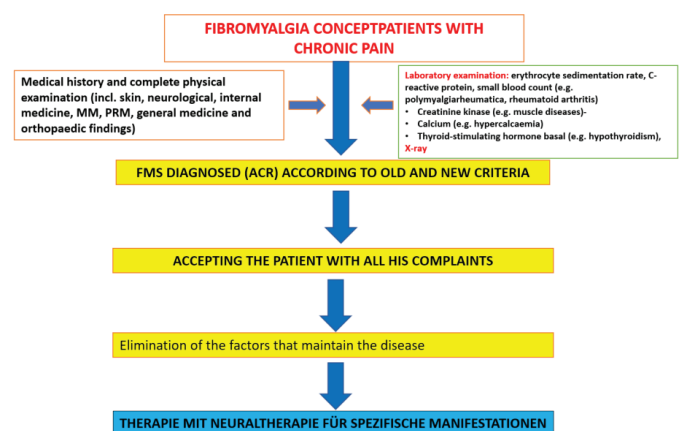
Disruptions in autonomic innervation can lead to functional impairments of affected organs. If these disturbances persist, structural changes such as degeneration or inflammation may develop. Fibromyalgia (FMS) is one such example, where autonomic dysregulation is a key pathogenetic factor. Patients frequently report visceral symptoms, such as irritable bowel syndrome (IBS), in which dysregulated innervation plays a crucial role.[35] Additionally, impaired perfusion of affected tissues is a significant issue in FMS patients, exacerbating symptoms such as pain and fatigue.[39-41]

#### Therapeutic Approach in Neural Therapy for Fibromyalgia Syndrome (FMS)

The core therapeutic focus in neural therapy for FMS is a holistic assessment of multiple interrelated factors. As depicted in Figure 1, it is crucial to consider the patient's symptoms in their entirety. This includes:

- Lymphatic drainage dysfunctions
- Neuroendocrine dysfunctions
- Sleep disturbances
- Impaired muscle oxygenation
- Biochemical imbalances
- Autonomic nervous system (ANS) dysfunction due to chronic stress
- Peripheral and central pain mechanism anomalies

Furthermore, immunological dysfunctions and psychiatric stressors play a significant role. In many cases, these factors interact, further increasing the complexity of the condition.[6,9,10]



**Figure 1:** Diagnosis and Treatment of Fibromyalgia – From Medical History to Specific Neural Therapy.[6]

The following section outlines the key aspects of fibromyalgia from the perspective of neural therapy, as described by Nazlikuleight essential steps:[6,9,10,42]

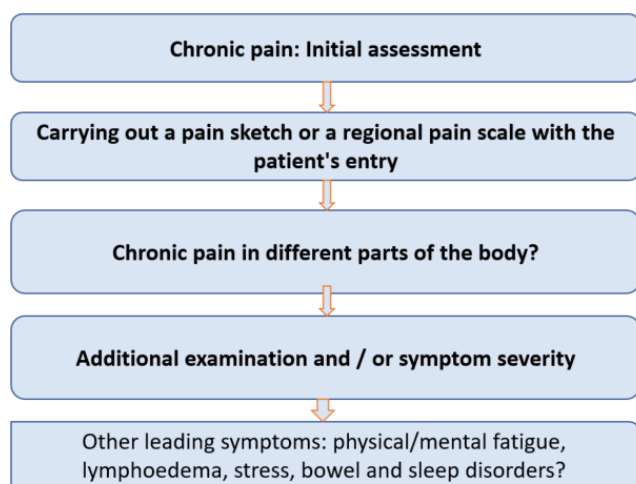


1. Chronic pain
2. Chronic stress
3. Hormonal dysfunction
4. Sleep disturbances
5. Lymphatic dysfunction
6. Gastrointestinal disorders
7. Increased pain while lying down – Indicating thoracic blockages
8. Interference field = Neuromodulatory trigger

## 1. Chronic Pain

Chronic pain is the primary symptom of fibromyalgia. It often arises due to central sensitization, in which the nervous system becomes overly responsive to pain signals.[6,9,16] This imbalance is illustrated in Figure 2.

- **Neural Therapy Approach:** Local infiltrations with procaine or lidocaine can be administered in painful muscle regions or trigger points to reduce nervous system hyperactivity. In particular, the treatment of segmental blockages along the spine can help disrupt pain patterns.[32,36,38,43-45]
- **Regulatory Medicine:** Pain reduction is further supported by enhancing mitochondrial function and reducing oxidative stress.



**Figure 2:** Structured Assessment of Chronic Pain – From Initial Evaluation to Comprehensive Symptom Analysis.

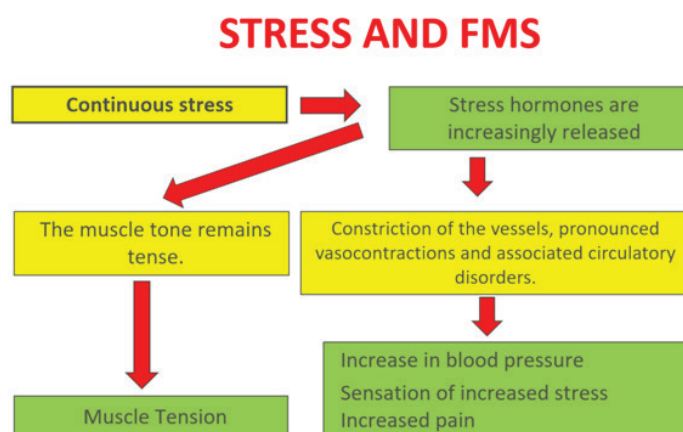
## 2. Chronic Stress

Chronic stress can dysregulate the autonomic nervous system (ANS), leading to persistent overactivation of the sympathetic nervous system.[6,9,19,46,47]

Martinez-Lavin[40] and Nazlikul[6] emphasize the crucial role of the vagus nerve (VN) in the

pathogenesis and potential therapeutic approaches for fibromyalgia syndrome (FMS), highlighting its anti-inflammatory properties and its impact on autonomic balance. This imbalance is illustrated in Figure 3.

- **Neural Therapy Approach:** Injections into the stellate ganglion or trigger points along the ANS can reduce sympathetic tone and promote parasympathetic activity.[6,37,38,45,82]
- **Regulatory Medicine:** Adaptogenic herbs (e.g., Ashwagandha) and micronutrients such as magnesium support stress management and reduce the burden on the ANS.[6,35]



**Figure 3:** There is substantial evidence suggesting that fibromyalgia symptoms may appear as a physical illness (soma = body), but they arise from the interaction of the body, mind, and soul. Therefore, they must be treated holistically.

## 3. Hormonal Dysfunction

Fibromyalgia patients often exhibit anomalies in hormone regulation, particularly involving cortisol, melatonin, and sex hormones.

- **Neural Therapy Approach:** Interference fields affecting endocrine glands (e.g., thyroid, adrenal glands) can be treated locally. Segmental infiltrations in the cervical spine region and the superior cervical ganglion may promote hormonal balance.
- **Regulatory Medicine:** Targeted hormone replacement therapy and dietary adjustments can help correct hormonal imbalances.

## 4. Sleep Disorders

Sleep disturbances are a core symptom of fibromyalgia, exacerbating both pain and fatigue.

Sleep Disturbances and Chronic Pain

The relationship between sleep disorders and

widespread chronic pain is of significant clinical and scientific interest. McBeth J investigated the bidirectional influence of these conditions and explored potential interventions to break this vicious cycle. The study highlights that improving sleep quality plays a crucial role in reducing chronic pain. [48]

- Neural Therapy Approach: Local injections into the pterygopalatine ganglion or paraspinal regions can help regulate sleep patterns by restoring autonomic balance. [22,36,49,50]
- Regulatory Medicine: Melatonin, valerian root, and other natural sleep aids are frequently used as complementary interventions.
- It is well established that sleep disorders, particularly disruptions in deep sleep phases, can heighten pain perception through central sensitization. Conversely, chronic pain negatively impacts sleep quality, creating a self-perpetuating cycle. Neural therapeutic approaches are considered promising strategies to interrupt this cycle. These interventions may be effective both through autonomic nervous system regulation and by reducing inflammation. [6,9,10]

## 5. Lymphatic Dysfunction

Impaired lymphatic drainage can lead to tissue edema and chronic inflammation, thereby exacerbating fibromyalgia symptoms. [6,27,51]

- Neural Therapy Approach: Lymphatic trigger points (e.g., along the axillary or inguinal lymph nodes) can be specifically treated to enhance drainage.
- Regulatory Medicine: Manual lymphatic drainage, along with support for liver and kidney function, constitutes a fundamental component of therapy.

## 6. Gastrointestinal Disorders

Gut dysbiosis and irritable bowel syndrome (IBS) are frequently observed in fibromyalgia patients and contribute to systemic inflammation.

- Neural Therapy Approach: Treatment of visceral reflex points along the celiac plexus (solar plexus)

can help regulate gastrointestinal function.

- Regulatory Medicine: Probiotics, prebiotic nutrition, and anti-inflammatory supplements support a healthy gut microbiome.

## 7. Increased Pain While Lying Down: Indications of Thoracic Blockages

Fibromyalgia patients frequently report intensified pain while lying down, which may indicate thoracic spinal blockages or diaphragmatic dysfunction. [52,53,54]

- Neural Therapy Approach: Paravertebral injections into the thoracic segments or directly into myofascial trigger points can help release blockages.
- Regulatory Medicine: Breathing exercises and targeted strengthening of the accessory respiratory muscles support the therapeutic process.

## 8. Interference Field = Neuromodulatory Trigger

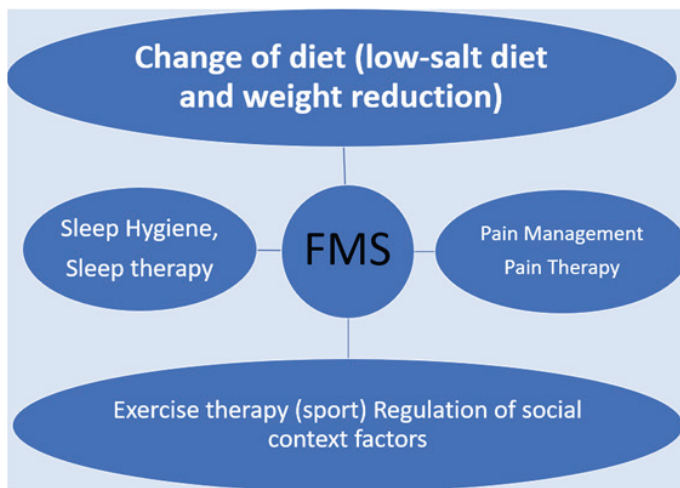
Interference fields, such as scars, chronic inflammatory foci, or undiagnosed infections, may contribute to the persistence of fibromyalgia symptoms. [30,49,55]

- Neural Therapy Approach: Identification and treatment of interference fields (e.g., scar infiltrations with procaine) can deactivate neuromodulatory triggers and restore nervous system balance.
- Regulatory Medicine: Complementary detoxification measures and reducing toxic burdens (e.g., heavy metals) support the healing process.

## Therapeutic Approaches

Fibromyalgia syndrome is a multifactorial condition, influenced by central sensitization mechanisms, autonomic imbalances, and immunological factors. Consequently, successful therapy requires targeted regulation of the autonomic nervous system, while also addressing biochemical and psychological factors.

A holistic approach is essential for effective treatment, as illustrated in Figure 4. [6,9]



**Figure 4:** A Holistic Approach to Fibromyalgia (FMS): The Importance of Pain Management, Sleep Hygiene, Exercise, and Healthy Nutrition. This graphic illustrates the multifactorial treatment of fibromyalgia, emphasizing the crucial role of a combination of pain management, sleep therapy, exercise therapy, and dietary modifications. A low-salt diet and weight reduction can help alleviate symptoms, while physical activity and the regulation of social factors can enhance both physical and mental resilience. Considering these elements can contribute to a sustainable improvement in the quality of life for FMS patients.

### Multidisciplinary Approaches

Effective management of fibromyalgia requires a multidisciplinary approach that integrates both pharmacological and non-pharmacological treatments:

- Pharmacological Treatments:
  - o Antidepressants (e.g., Amitriptyline, Duloxetine)
  - o Anticonvulsants (e.g., Pregabalin, Gabapentin)
  - o Pain relievers (e.g., NSAIDs)
- Non-Pharmacological Treatments:
  - o Neural Therapy (NT)
  - o Aerobic exercise and strength training
  - o Cognitive Behavioral Therapy (CBT)
  - o Acupuncture
  - o Physiotherapy and massage therapy
  - o Eye Movement Desensitization and Reprocessing (EMDR)

### Neural Therapy (NT)

Neural therapy is an individualized treatment approach based on the patient's symptoms and clinical findings. It integrates various therapeutic methods, including

neural therapy, manual medicine, physical therapy, and pharmacological support.[6,10,28,42]

In neural therapy, local anesthetics such as procaine or lidocaine are used for both diagnostic and therapeutic purposes. This injection-based treatment leverages the regulatory and neuroplastic properties of the nervous system, with a particular focus on the autonomic nervous system.[56-59]

### Mechanism of Action

Neural therapy utilizes local anesthetics to interrupt pathological reflex circuits and normalize autonomic functions.[60-64] The anti-inflammatory effects of local anesthetics play a crucial therapeutic role. Procaine and lidocaine trigger a signal transduction in G- $\alpha$ -q-proteins located in the cell membrane, which reduces or suppresses the expression of inflammatory mediators, including TNF- $\alpha$ , IL-1, and IL-6.[60,63,64,65]

A precise stimulus from the needle, combined with the temporary selective deletion of engrams via local anesthetics, creates a reset effect. This reset modulates the nervous system organization and improves tissue perfusion, particularly microcirculation. After this reset, the nervous system has the opportunity to reorganize itself, breaking the vicious cycle of pain and inflammation. The pathological excitability of both the sympathetic and nociceptive systems in peripheral, spinal, and supraspinal reflex circuits is restored to a normal level. Importantly, the therapeutic effect persists well beyond the duration of anesthesia. [32,38,43,66,67]

Restoring autonomic balance, particularly the equilibrium between the sympathetic and parasympathetic nervous systems, can have a positive impact on many diseases and pain conditions.[68,69]

### Therapeutic Applications

Neural therapy involves injections into various structures, including:

- Skin (wheal injections)
- Myofascial trigger points
- Fasciae
- Painful tendon insertions
- Joints

These interventions help relieve pain and improve nerve function.

Neural therapy includes:

- Local therapy ("loco dolendi") – Injections are

administered directly at the affected site.

- Segmental therapy – Due to the polysegmental reflex connections between the skin, musculoskeletal system, and internal organs, this therapy involves infiltrations at nerves, peripheral arteries, the peri-arterial sympathetic plexus, and sympathetic ganglia.[6,58,61,69]

By addressing dysfunctions within the autonomic nervous system, neural therapy plays a key role in regulating pain and restoring physiological balance.

#### Interference Field Therapy and the Role of Intravenous Lidocaine in Fibromyalgia Treatment

In addition to the local and segmental therapy described above, interference field therapy (Störfeldtherapie) is also applied in neural therapy.

An interference field is defined as a chronic irritative focus anywhere in the body that is too subtle to cause direct symptoms at its site of origin, yet triggers pain and inflammation in distant areas beyond segmental boundaries (previous definition).[28,55]

#### Modern Understanding of Interference Fields

In modern neurophysiology, the concept of strict segmental limitations in disease processes has been reconsidered due to cross-segmental sensitization processes, neuroplastic changes, immune responses, and neurogenic inflammation.[55] Consequently, interference fields are now referred to as "neuromodulatory triggers".[55]

Common interference fields include:

- Scars
- Chronic tonsillitis
- Impacted teeth and residual dental roots
- Otitis in the root canal area
- Post-pleuropneumonia or hepatitis conditions
- Mononucleosis infectiosa
- Post-fracture irritations
- Chronic irritations in the urogenital system

Following infiltration of a suspected interference field, the so-called "distant complaints" often disappear for an extended period. If the response is favorable, repeated injections may lead to desensitization to pain and inflammation.[22,32,36,55]

#### Intravenous Lidocaine for Fibromyalgia – Evidence and Clinical Studies

A systematic review by Freire de Carvalho and

Skare,[70] published in the World Journal of Psychiatry, examined the efficacy and safety of intravenous lidocaine in fibromyalgia treatment. The analysis included 10 studies with a total of 461 patients, with the majority being women (95–100% of participants). The results indicated that lidocaine significantly reduced pain intensity, both in the short-term and long-term.[70]

This review confirmed the short-term effectiveness and safety of intravenous lidocaine in fibromyalgia patients. However, further studies with long-term follow-up are needed to comprehensively assess the sustained benefits and safety of this therapy.[70]

#### Clinical Findings on Intravenous Lidocaine and Procain in Fibromyalgia

- Wilderman et al. demonstrated that increasing the intravenous lidocaine dose to 7.5 mg/kg resulted in a significant reduction in pain intensity in fibromyalgia patients, with prolonged pain relief.[71]
- Wren et al. reported that intravenous lidocaine infusions substantially reduced pain in chronic neuropathic conditions, including fibromyalgia, offering a viable alternative to opioid-based treatments with minimal side effects.[72]
- Another study found that escalating doses of intravenous lidocaine up to 7.5 mg/kg were both safe and effective for long-lasting pain relief in fibromyalgia patients. However, larger prospective clinical trials are needed to validate these findings.[71]
- DeCaria and Anitescu discussed the use of intravenous lidocaine infusions as an effective option for chronic pain management, including neuropathic pain and fibromyalgia, due to their action on voltage-gated sodium channels.[73]
- There is strong evidence suggesting that short-term intravenous lidocaine administration can induce pain relief lasting well beyond the infusion period and the drug's half-life.[74]
- Reuter et al. (2017) emphasized the therapeutic potential of procaine-based infusions in pain therapy, highlighting their anti-inflammatory effects and their role in treating chronic pain conditions, including fibromyalgia (FMS). Their vasodilatory and autonomic regulatory effects further support their application in fibromyalgia management.[65]



## CONCLUSION

The growing body of research supports the therapeutic value of neural therapy, interference field therapy, and intravenous lidocaine infusions in fibromyalgia treatment. These approaches target central and peripheral sensitization mechanisms, reduce inflammation, and help restore autonomic nervous system balance, contributing to significant and lasting symptom relief.

### Effectiveness of Neural Therapy and Lidocaine Injections in Fibromyalgia Treatment

Muscle injections with lidocaine reliably reduce mechanical and thermal hyperalgesia in fibromyalgia patients, emphasizing the role of peripheral pain mechanisms. This intervention provides a safe option for reducing clinical pain in FMS.[75]

Following neural therapy, a statistically significant increase in range of motion and a statistically significant decrease in the mean scores of the Visual Analog Scale (VAS) and Quick DASH Score were observed.[76]

A retrospective analysis evaluating the effectiveness of neural therapy in fibromyalgia treatment was conducted on 113 fibromyalgia patients. The assessment of patients after undergoing neural therapy showed that the majority of participants experienced improvement, which lasted for an average of  $17.7 \pm 15.4$  months.[10]

The present study investigated the effectiveness of neural therapy in fibromyalgia patients, with the primary aim of enhancing quality of life, reducing pain intensity, and improving functional parameters. The study results demonstrate significant improvements in quality of life, pain intensity, and functional health in fibromyalgia patients. These findings highlight the potential of neural therapy as an effective alternative treatment option for patients with chronic fatigue syndrome and FMS.[77]

### Key Findings from Batur and Atan:[77]

#### Improvement in Quality of Life (QoL):

- The social functioning score showed a significant improvement only in the neural therapy group, based on within-group comparisons ( $P < 0.001$ ).
- VAS, FIQ, and SF-36 Scores:
- Significant improvements were observed in the Visual Analog Scale (VAS), Fibromyalgia Impact Questionnaire (FIQ), and all SF-36 parameters, except for role limitations due to physical health ( $P < 0.001$ ).

- Comparison with the Control Group:
- The neural therapy group demonstrated significantly better outcomes compared to the exercise group (which performed stretching and strengthening exercises).

These results suggest that neural therapy is a promising therapeutic approach for fibromyalgia management, offering superior benefits in pain reduction, functional health, and quality of life improvements compared to standard exercise-based interventions.

### Further Studies on Neural Therapy in Fibromyalgia Treatment

A Turkish study investigated the effects of neural therapy in 20 women diagnosed with fibromyalgia syndrome (FMS). The mean age, height, and body mass index (BMI) of the participants were  $42.65 \pm 8.2$  years,  $156.2 \pm 15.1$  cm, and  $24.56 \pm 5.2$  kg/m<sup>2</sup>, respectively. All SF-36 parameters, particularly physical function and bodily pain perception, showed significant improvement after neural therapy. Additionally, a significant reduction in VAS scores was observed.[78]

The study by Altinbilek, published in the Turkish Journal of Physical Medicine and Rehabilitation, examined the effectiveness of neural therapy in fibromyalgia patients. The study aimed to evaluate its impact on pain, quality of life, depression, anxiety, and functional parameters. The findings suggest that neural therapy offers significant benefits in pain and depression management in fibromyalgia patients. When combined with exercise therapy, it may serve as an effective treatment option.[79]

### Key Findings from This Study:

#### Baseline Data:

- Mean disease duration:  $34.3 \pm 9.3$  months
- Mean VAS score:  $7.3 \pm 2.2$
- Mean FIQ score:  $58.4 \pm 13.2$

#### Significant Improvements:

- Post-treatment, there were significant improvements in VAS, FIQ, SF-36, BDI (Beck Depression Inventory), and BAI (Beck Anxiety Inventory) in both groups ( $p < 0.05$ ).
- Neural Therapy Group:
- Post-treatment BDI and VAS scores were significantly lower in the neural therapy group compared to the control group ( $p = 0.038$ ;  $p = 0.049$ ).

A study conducted by Bicer (2020), published in the

Journal of Complementary Medicine, Regulation, and Neural Therapy, compared the effectiveness of a holistic regulatory therapy approach with conventional treatment methods in fibromyalgia syndrome (FMS). The study assessed the impact of treatment on quality of life using the Fibromyalgia Impact Questionnaire (FIQ).[79]

## Key Findings from This Study

### FIQ Scores Before and After Treatment:

- **Before treatment:** The FIQ scores of patients were  $66.96 \pm 25.25$  (range: 45.64–96.15).
- **After 4 weeks of treatment:** The scores significantly decreased to  $34.84 \pm 33.40$  (range: 8.54–75.35) ( $p < 0.05$ ).

### Improvement in Quality of Life:

- The significant reduction in FIQ scores indicates a notable improvement in patients' quality of life through the regulatory therapy approach.

The effectiveness of a holistic regulatory treatment approach, including neural therapy, in improving the quality of life of fibromyalgia patients was demonstrated by a significant reduction in FIQ scores. These findings confirm the therapeutic value of this treatment option.[42]

## Application of Neural Therapy:

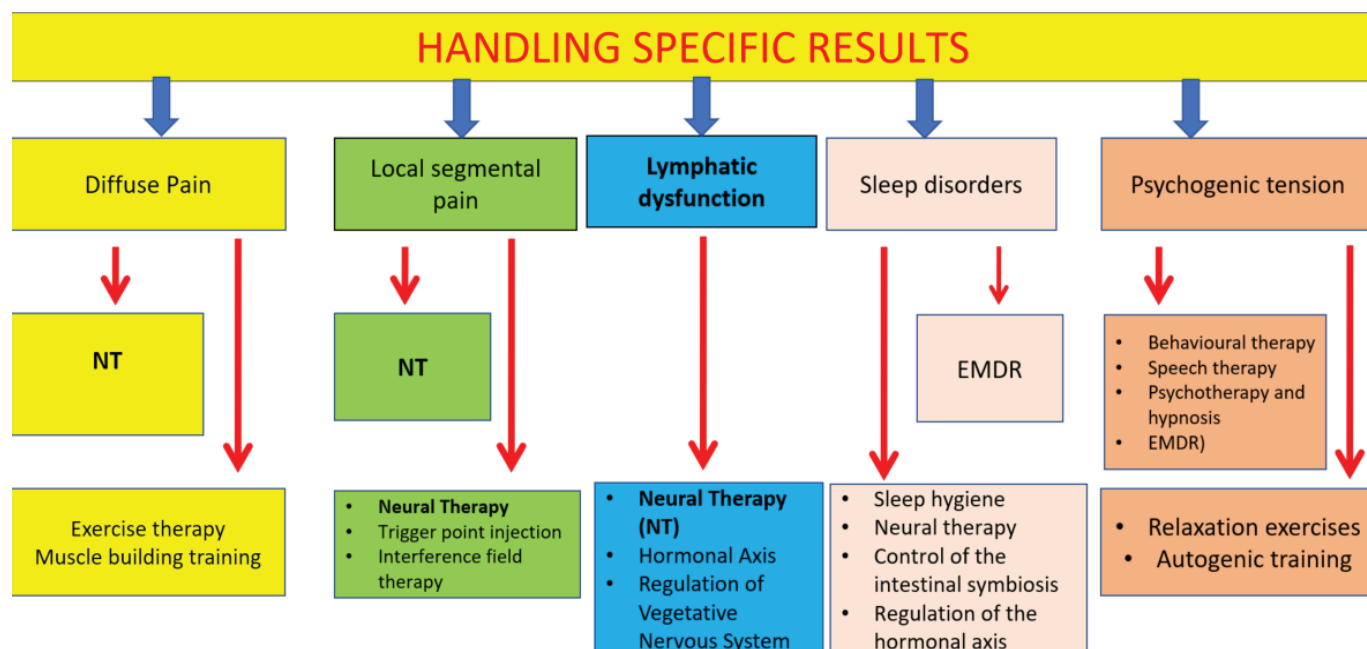
Neural therapy can be applied in various forms, including:

- **Local treatment:** Injections into painful areas or trigger points.
- **Segmental treatment:** Injections along the spine or into autonomic ganglia.
- **Connective tissue regulation:** Treatment of scars and other interference fields.

## Effectiveness of Neural Therapy

Studies have shown that neural therapy can lead to significant improvements in fibromyalgia patients, including:

- **Pain reduction:** Significant decrease in pain intensity.
- **Improved sleep quality:** Reduction in sleep disturbances.
- **Hormonal regulation:** Normalization of cortisol and serotonin levels.
- **Anti-inflammatory effects:** Reduction of inflammatory markers.



**Figure 5:** Treatment Approach for Fibromyalgia Syndrome (FMS) – Integration of Neural Therapy into Specific Therapeutic Strategies This graphic illustrates the structured treatment approach for fibromyalgia, targeting different symptom patterns in a systematic manner. Neural therapy (NT) is particularly used for: Diffuse pain, Localized and segmental pain, Lymphatic dysfunctions. Additionally, NT supports the regulation of: The autonomic nervous system and Hormonal balance. When combined with other therapeutic modalities such as exercise therapy, relaxation techniques, and psychotherapy, neural therapy contributes to a comprehensive and individualized treatment plan for FMS.

## RESULTS

The findings demonstrated that neural therapy led to significant improvements in pain reduction, sleep quality, hormonal balance, and psychological stress. The combined application of both therapies proved to be particularly effective.

## DISCUSSION AND CONCLUSION

Fibromyalgia syndrome (FMS) is one of the most prevalent musculoskeletal disorders and presents a significant challenge for both patients and healthcare providers. Affected individuals often experience persistent widespread pain, sleep disturbances, morning fatigue, as well as lymphatic and tissue swelling. Since the exact etiology of FMS remains unclear, treatment focuses primarily on symptomatic relief, necessitating a multimodal approach that integrates both pharmacological and non-pharmacological interventions.[6,9,10,42,77,78]

Recent studies have demonstrated that neural therapy using 0,5-1% procaine/lidocaine injections can effectively reduce pain by modulating the autonomic nervous system, offering potential benefits in the management of chronic pain conditions, including fibromyalgia.[6,42,77,78,93]

### The Role of Neural Therapy in Fibromyalgia Management

The application of neural therapy presents a promising approach for FMS treatment. Clinical observations and studies indicate that targeted administration of procaine and lidocaine, two well-established local anesthetics, can have a significant impact on pain and fatigue management. Neural therapy exerts its effects by modulating the autonomic nervous system, which plays a critical role in the pathogenesis of chronic diseases and hormonal imbalances.[6,9,10,38,55]

Through local and segmental injections into painful regions, myofascial trigger points, or interference fields (e.g., scars), pathological reflex circuits can be disrupted, leading to restoration of neurovegetative regulation. This therapeutic intervention often results in:[50,53,54,55,69,83]

- Improved blood circulation
- Reduction of inflammatory processes
- Normalization of autonomic nervous system balance

Neural Therapy as Part of a Multidisciplinary Treatment Strategy

The available evidence suggests that neural therapy not only alleviates FMS symptoms but may also positively influence disease progression. When combined with other therapeutic modalities, such as manual lymphatic drainage, dietary modifications, and physical therapies, neural therapy can make a substantial contribution to restoring health and improving the quality of life in FMS patients. [6,9,10,24]

### The Connection Between FMS and Lymphatic Dysfunction

Emerging research suggests that FMS may be closely linked to lymphatic system dysfunction. This dysfunction can exacerbate symptoms through swelling, inflammation, and increased pain sensitivity. Consequently, therapeutic approaches aimed at supporting lymphatic function can significantly enhance the well-being of FMS patients. A deeper understanding of the lymphatic system's role in FMS may facilitate the development of novel and more effective treatment strategies.[6,7,10,24]

In light of current findings, neural therapy represents a valuable complementary approach to FMS management, particularly given its potential to modulate autonomic dysregulation, alleviate pain, and restore physiological balance. Future research should further explore its long-term efficacy and integration into comprehensive treatment protocols that address the multifactorial nature of fibromyalgia.

### Impaired Vascular Perfusion and Lymphatic Drainage in Fibromyalgia

Disruptions in vascular perfusion and/or lymphatic drainage can lead to the accumulation of inflammatory substances in the interstitial space, resulting in continuous nociceptor activation. This process contributes to pathophysiological conditions such as central sensitization and neuroinflammation. [61,62,84,85,93]

#### These pro-inflammatory cytokines can:

- Deactivate the local lymphatic pump mechanism
- Impair vascular perfusion through sympathetic nervous system activation
- Induce additional stagnation via the expression of transforming growth factor beta 1 (TGF- $\beta$ 1), which leads to direct fascial compression of pre-lymphatic pathways.[7,91]

Meta-Analytical Findings on Local Anesthesia vs. Dry Needling

Meta-analyses have demonstrated a significant improvement in VAS pain scores, with a mean reduction of 1.585 units after 4 to 6 weeks in the local anesthesia group compared to the dry needling group (95% confidence interval: -2.926 to -0.245;  $p = .020$ ). [86]

### **The Therapeutic Potential of Neural Therapy and EMDR**

This study provides compelling evidence that neural therapy and Eye Movement Desensitization and Reprocessing (EMDR) are effective treatment modalities for fibromyalgia. The combined application of these therapies has shown particularly promising results.

Future studies with larger sample sizes and longer follow-up periods are necessary to further validate these findings and optimize therapeutic strategies for fibromyalgia management.[5,7]

### **Neural Therapy and Lymphatic System Dysfunctions**

Neural therapy has emerged as an effective approach for treating lymphatic system disorders. It helps reduce swelling and inflammation by regulating lymphatic flow. Additionally, neural therapy balances the autonomic nervous system (ANS) and supports fluid exchange between tissues. When combined with manual lymphatic drainage (MLD), it yields highly effective results.[6,9,10,88]

### **Combined Treatment Approach**

The combined application of manual lymphatic drainage and neural therapy has a strong anti-inflammatory effect and reactivates the lymphatic pump mechanism. This integrative approach is particularly beneficial in reducing symptoms, especially lymphedema.[6,9,87,89,90]

### **Regulation of the Lymphatic System in Fibromyalgia Treatment**

Supporting the lymphatic system can play a crucial role in alleviating fibromyalgia symptoms. The following strategies are recommended:

- **Manual Lymphatic Drainage (MLD):** This technique enhances lymphatic flow, reducing swelling and improving circulation.
- **Exercise and Movement Therapy:** Gentle activities such as swimming, walking, and yoga are recommended to stimulate lymphatic circulation.
- **Anti-inflammatory Diet:** A diet rich in anti-inflammatory foods, such as omega-3 fatty acids and antioxidants, supports lymphatic function.

- **Neural Therapy and Acupuncture:** Both therapies can improve lymphatic flow and peripheral circulation.
- **Nutritional Supplements:** Supplements such as vitamin C, vitamin D, and magnesium enhance lymphatic system function and immune response. [80]

### **Potential of rTMS in Fibromyalgia Management**

Ansari et al. investigated the effectiveness of repetitive transcranial magnetic stimulation (rTMS) in fibromyalgia treatment. Their findings highlight its potential to reduce pain, anxiety, depression, and sleep disturbances, thereby improving overall patient quality of life.[81]

### **CONCLUSION**

Fibromyalgia syndrome (FMS) presents as a heterogeneous clinical condition, with its etiology determined by various pathogenetic factors. The intensity of therapeutic interventions in FMS correlates with its severity, and pharmacological treatment is not mandatory.

Fibromyalgia requires a holistic and individualized approach. Neural therapy and regulatory medicine offer a synergistic treatment concept that addresses the complex mechanisms underlying the disorder. By combining segmental treatments, interference field therapy, and systemic interventions, effective symptom relief and improved quality of life can be achieved.

FMS is a clinically well-defined pain syndrome, often accompanied by additional symptoms. These can be quantified using the Widespread Pain Index (WPI) and the Symptom Severity Score (SSS), both of which have established threshold values for the diagnosis of FMS.

Following the diagnostic process, a comprehensive patient education is essential to ensure that the patient is fully informed about the findings and is empowered to make an educated decision regarding further treatment options. Based on this, an individualized treatment plan should be developed, taking into account the specific needs and requirements of the patient.

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## DECLARATION OF CONFLICTS OF INTEREST

H. Nazlikul and F. Gülçin Ural Nazlikul declare

that no conflicts of interest are associated with this publication. The authors have no competing interests to disclose and state that there are no competing financial interests.

## Ethical Approval

No studies involving human or animal subjects were conducted by the authors for this publication. The studies referenced in this manuscript comply with the ethical guidelines specified in their respective sources.

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## Author Contributions

The contributions of H. Nazlikul and F. Gülçin Ural Nazlikul are considered equal throughout the manuscript.

## Consent Statement

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## Data Availability Statement

Not applicable.

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