# Long-Term Effects of Neural Therapy in Fibromyalgia – A Retrospective Multicenter Analysis Effectiveness of Neural Therapy in Patients with Fibromyalgia

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**ABSTRACT**: **Background:** Fibromyalgia syndrome (FMS) is a chronic pain condition associated with widespread musculoskeletal discomfort, persistent fatigue, and diminished quality of life. Many patients show limited response to conventional treatments. Neural therapy (NT), a core modality of regulatory medicine, aims to restore autonomic balance and modulate inflammatory reflexes through targeted injections of local anesthetics.

**Objective:** This retrospective multicenter study evaluates the long-term effectiveness of NT in 565 patients with treatment-resistant fibromyalgia who previously failed to respond adequately to standard therapies.

**Methods:** Data were collected from five neural therapy clinics between 2017 and 2024. Standardized outcome measures were assessed at baseline, immediately post-treatment, and at 3, 6, and 12 months:

- Pain intensity: Visual Analog Scale (VAS)
- Disease burden: Fibromyalgia Impact Questionnaire (FIQ)
- Quality of life: Short Form-36 (SF-36), including subdomains (physical function, pain, energy/fatique, social function, general health perception)

Statistical analysis employed the Friedman test for repeated measures.

**Results:**

- VAS scores dropped from a mean of 8.5 to 1.9 post-treatment and remained below 3.0 over 12 months.
- FIQ scores decreased from a baseline mean of 78.1 to 18.6 and remained significantly improved (mean 24.9 at 12 months).
- SF-36 physical function increased from 33.5 to 82.0, with sustained gains at all follow-ups.
- Social functioning, general health perception, pain and vitality domains showed similar sustained improvements.
- The treatment completion rate was 92.9%, indicating high tolerability and patient satisfaction.

**Conclusion:** Neural therapy produced significant and sustained improvements in pain, physical functioning, energy, and social participation in fibromyalgia patients. Its multimodal effects—autonomic modulation, anti-inflammatory action, and improved microcirculation—support its use in integrative and regulatory pain medicine. This study presents strong evidence for neural therapy as an effective, safe, and cost-efficient option in patients with resistant fibromyalgia.

Further randomized controlled trials are needed to confirm these findings and establish standard treatment protocols.

**Keywords:** Neural therapy, fibromyalgia, chronic pain, autonomic regulation, regulatory medicine, SF-36, FIQ, VAS, lymphatic system.

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## 1. INTRODUCTION

Fibromyalgia syndrome (FMS) is a complex, non-inflammatory chronic pain disorder characterized by widespread musculoskeletal pain, persistent fatigue, and a broad range of accompanying symptoms such as sleep disturbances, cognitive impairments, and autonomic dysfunctions. Despite its high prevalence, the condition is frequently underdiagnosed or inadequately managed. Women between the ages of 20 and 60 are predominantly affected, accounting for approximately 90% of cases [1–6].

The diagnosis of fibromyalgia is based on clinical criteria, particularly the revised ACR diagnostic guidelines from 2010 and 2016. These criteria emphasize the distribution of pain, the extent of somatic symptom burden, and the exclusion of alternative medical explanations for the symptoms. Fibromyalgia is often associated with significant functional limitations and a substantial reduction in quality of life. Moreover, patients typically endure a prolonged and frustrating diagnostic and therapeutic journey, as conventional treatment approaches are frequently insufficient or ineffective [1–8].

## 2. THE ROLE OF NEURAL THERAPY IN AN INTEGRATIVE TREATMENT APPROACH

Neural therapy is a key modality within regulatory medicine. It involves the targeted injection of local anesthetics such as procaine or lidocaine to modulate segmental and suprasegmental reflex arcs and directly influence the autonomic nervous system. The primary objective is to restore self-regulatory capacity, especially in cases involving functional disturbances without an identifiable structural cause [1,3,6,9–11].

When combined with manual medicine, nutritional interventions, micronutrient support, and psychological care, neural therapy increasingly demonstrates its potential as an effective strategy for managing complex pain syndromes such as fibromyalgia [1,3,11–14].

## 3. Background and Aim of the Study

A wide range of therapeutic options exists for managing fibromyalgia; however, many of these approaches show only limited efficacy—particularly in patients who are resistant to conventional treatments. Neural therapy (NT) offers a promising regulatory approach by modulating neurophysiological mechanisms through targeted injections. This technique may improve pain symptoms and functional impairments [1,3,6,9–11,13,14].

This multicenter Study aimed to assess the long-term effectiveness of neural therapy in patients with treatment-resistant fibromyalgia who had previously undergone conventional therapies with insufficient clinical response. Patients' health status was systematically evaluated at baseline, immediately after the therapy, and at follow-up intervals of three, six, and twelve months to determine the sustained therapeutic benefits of neural therapy.

### 3.1. Objective of the Present Study

This retrospective analysis's objective was to evaluate the effectiveness of neural therapy in patients diagnosed with fibromyalgia syndrome (FMS) who had shown insufficient response to conventional medical treatments. A total of 565 patients who were treated at our clinic between 2017 and 2024 were included in the evaluation.

All participants were classified as treatment-resistant, meaning they had not achieved adequate symptom relief through standard biomedical interventions. The neural therapeutic approach was implemented holistically, considering autonomic, somatic, and psychogenic contributing factors.

Standardized instruments were used to assess treatment outcomes to measure pain intensity (VAS), quality of life, and functional capacity—collected at baseline and again at 3, 6, 9, and 12 months after the intervention.

Particular emphasis was placed on changes in pain perception, physical functioning, and overall quality of life. Assessment tools included the Fibromyalgia Impact Questionnaire (FIQ), the Short Form-36 (SF-36) for physical and social function, and the Visual Analog Scale (VAS) for pain intensity. Statistical analysis was performed using the Friedman test to detect significant differences across the various time points [2,3,10,11, 14–20].

### 3.2. Relevance and Outlook

The findings of this Study aim to contribute to advancing evidence-based therapeutic strategies for treating treatment-resistant fibromyalgia. In particular, the Study seeks to determine whether neural therapy can be integrated as a sustainable, regulatory, and cost-effective alternative to existing treatment modalities.

This investigation evaluates clinical outcomes over time to support the development of updated therapeutic recommendations and assess the potential of neural therapy as a valid and economically viable component within integrative care models for fibromyalgia.

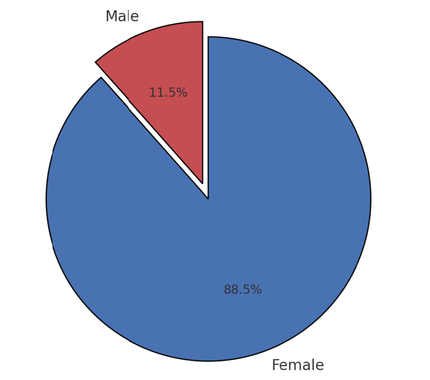


***Figure 1:****This pie chart illustrates the gender distribution of the sample population. Most participants are female, accounting for 88.5%, while males represent only 11.5%. This indicates a significant predominance of female individuals in the surveyed or analyzed group.*

### 3.2.1 Gender Distribution of Patients

In addition to the age distribution illustrated in Figures 1 and 2, the gender composition of the patient group represents an important demographic parameter. Figure 1 displays the gender-specific distribution, while Figure 2 shows the age-related breakdown. Understanding the gender distribution provides insight into which groups are more frequently affected and may offer indications of gender-specific differences in disease progression and therapeutic response.

### Analysis of Gender Distribution

The gender breakdown of the study population is as follows:

- **Male patients:** 65 individuals, representing 11.5% of the total population.
- **Female patients:** 500 individuals, accounting for 88.5% of the total.
- **Total sample size:** 565 patients (100%).

### Graphical Evaluation and Interpretation

As shown in Figure 1, the vast majority of patients included in this Study were female (88.5%), while only 11.5% were male. This ratio aligns with previous epidemiological data indicating that fibromyalgia is significantly more prevalent among women than men [1–3,6–8,14,15,18,19].

The high percentage of female patients may be attributed to several contributing factors, including hormonal, genetic, and immunological influences that play a role in the pathophysiology of fibromyalgia. Additionally, greater health-seeking behavior and heightened sensitivity to bodily symptoms among women may influence diagnosis rates [3,19,20].

Note: This analysis reveals an apparent gender-related prevalence with a strong predominance of female patients. These findings can inform more targeted diagnostic strategies and individualized treatment planning. Future research should focus more intensively on gender-specific variables in the pathogenesis and treatment of fibromyalgia in order to develop personalized therapeutic approaches.

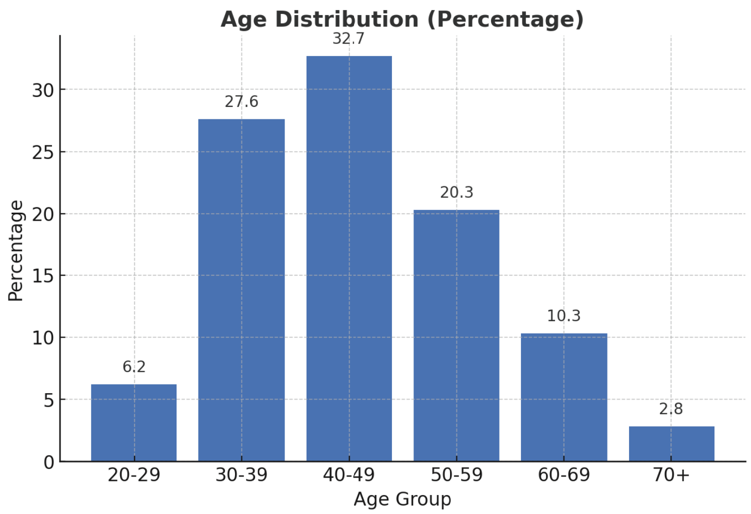


***Figure 2:*** *This bar chart illustrates the percentage distribution of individuals across different age groups. The largest segment is the 40–49 age group, comprising 32.7%, followed by the 30–39 age group at 27.6% and the 50–59 age group at 20.3%. The 20–29 age group represents only 6.2%, while those aged 70 and above make up just 2.8%. The data suggest that most of the population or target audience is concentrated in the middle-aged demographic.*

3.2.2 Age Distribution of Patients and Demographic Assessment

This Study also examined the age distribution of the included patients to gain a deeper understanding of the demographic characteristics of the study population. Age may play a critical role in both the clinical course of fibromyalgia and its response to treatment. The findings are presented in both tabular and graphical formats.

Analysis of Age Distribution

The patient distribution across age groups is as follows (as shown in Figure 2):

- 20–29 years: 35 patients (6.2%)
- 30–39 years: 156 patients (27.6%)
- 40–49 years: 185 patients (32.7%) – the largest subgroup
- 50–59 years: 115 patients (20.3%)
- 60–69 years: 58 patients (10.3%)
- 70 years and older: 16 patients (2.8%)

A total of 565 patients were included in this analysis.

**Graphical Interpretation and Commentary**

The visual representation indicates that the highest proportion of patients falls within the 40–49 age group, followed by the 30–39 age group. Combined, these two groups represent 60.3% of the total sample, suggesting that fibromyalgia is particularly prevalent during middle adulthood.

A notable decline in patient numbers beyond 50 may indicate that the disorder is more frequently diagnosed among working-age individuals. The relatively low number of patients over 70 could reflect either a lower participation rate in this age group or an age-dependent variation in prevalence.

This age-related analysis provides important insights into the epidemiological patterns of fibromyalgia [1,3, 15]. The finding that the largest subgroup comprises patients aged 40–49 suggests that this age bracket is especially affected. Furthermore, the considerable proportion of patients in the 30–39 age group indicates that younger adults are increasingly experiencing symptoms consistent with fibromyalgia.

***Note:** These findings can serve as a foundation for understanding age-related risk factors and adapting therapeutic strategies to different age groups. Future studies should explore age-specific treatment responses to develop personalized therapeutic approaches tailored to each adult life stage.*

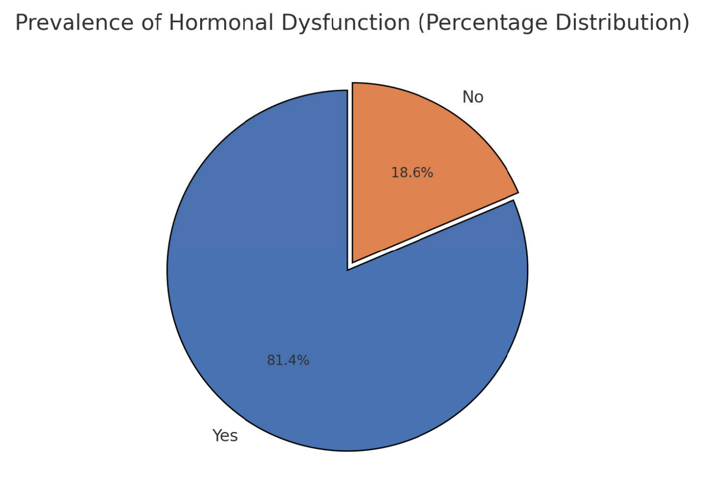


***Figure 3:****This pie chart illustrates the prevalence of hormonal dysfunction among the studied group. A significant majority of participants (81.4%) were found to have signs of hormonal dysfunction, while only 18.6% showed no indications. This highlights the high hormonal imbalance within the population examined.*

**3.2.3 Evaluation of Hormonal Dysfunction in the Study Population**

As illustrated in Figure 3, hormonal imbalances play a significant role in the pathophysiology of many chronic disorders[3,21,22]. Disruptions in the endocrine system can significantly affect metabolism, immune regulation, and overall well-being[3,22,23]. In this Study, the prevalence of hormonal dysfunction among patients diagnosed with fibromyalgia was systematically evaluated.

Analysis of Hormonal Dysfunction

The distribution of hormonal disturbances among the 565 patients was as follows:

- Four hundred sixty patients (81.4%) exhibited clinical or laboratory signs of hormonal dysfunction.

- One hundred-five patients (18.6%) showed no evidence of hormonal imbalance.
- Total patient population: 565 patients (100%).

### Graphical Interpretation and Clinical Significance

The graphical representation highlights that over 80% of the patients demonstrated some form of hormonal dysregulation [3,10,11]. This finding supports the hypothesis that endocrine disorders may represent a core component in the complex pathogenesis of fibromyalgia.

Hormonal imbalances may manifest in various forms, including:

- Thyroid disorders (hypothyroidism, hyperthyroidism)
- Adrenal insufficiency or hyperfunction
- Estrogen and testosterone imbalances
- Disturbed insulin and glucose metabolism
- Dysregulation of stress-related hormones such as cortisol

Given this cohort's high prevalence of hormonal abnormalities, a comprehensive endocrine evaluation appears essential for optimizing clinical outcomes. When integrated into a broader regulatory medicine framework, tailored hormonal interventions may enhance the effectiveness of fibromyalgia management.

### Clinical Implications and Outlook

*Note: This analysis reveals that more than four out of five patients exhibited signs of hormonal dysregulation, underscoring the need for early identification and integration of endocrine factors into routine clinical assessment. An integrative treatment strategy that addresses hormonal and other systemic dysfunctions may significantly improve patient care and therapeutic outcomes (3, 11, 19, 23, 24).*

Future research should explore:

- The therapeutic targeting of specific hormonal pathways,
- The interactions between hormonal imbalances, chronic inflammation, metabolic conditions, and autonomic nervous system dysfunctions.

These investigations may help to define personalized treatment algorithms for fibromyalgia and related chronic disorders.

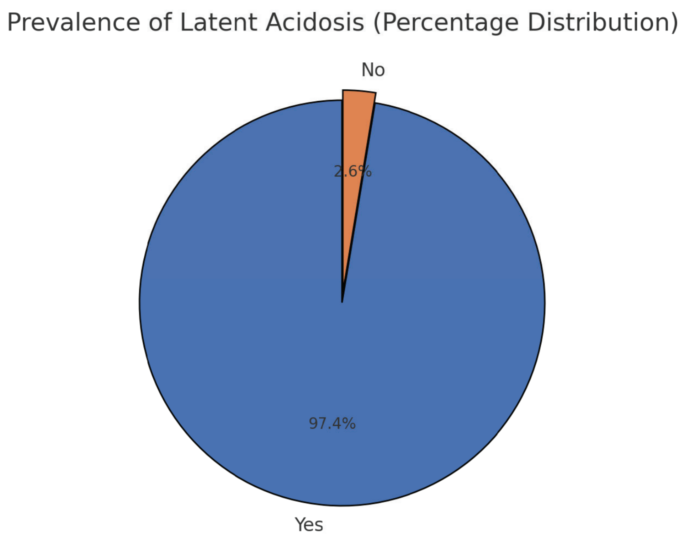


***Figure 4:****This pie chart displays the prevalence of latent acidosis within the analyzed group. An overwhelming 97.4% of individuals were identified as having latent acidosis, while only 2.6% did not show signs of it. This indicates that latent acidosis is a highly prevalent condition among the participants.*

### 3.2.4 The Significance of Latent Acidosis and Lymphatic Dysfunction

The high prevalence of latent acidosis observed in this patient cohort suggests that it may play a central role in the development and persistence of chronic symptoms [1,3,6,13,16–18,24]. Chronic acid-base imbalances can contribute to a wide range of clinical manifestations, including:

- Muscle pain and tension
- Chronic fatigue and lack of energy
- Joint discomfort and inflammatory symptoms
- Impaired lymphatic drainage and detoxification capacity

Lymphatic dysfunction may arise as a direct consequence of persistent tissue acidosis. Acidification of the interstitial environment can negatively affect lymphatic flow properties, compromising detoxification processes. This can, in turn, amplify systemic inflammation and exacerbate the clinical picture of chronic illnesses [1,3,6,9–11,18,24].

These assessments are based on the fundamental principles of biophysics, which highlight the body's regulatory capacity as a dynamic and self-organizing system. From a biophysical perspective, latent acidosis is not merely a chemical imbalance, but rather a functional manifestation of impaired systemic regulation—particularly within the connective tissue matrix [24].

Diagnostic techniques such as heart rate variability (HRV) analysis and electroacupuncture testing (EAV/Vega test) offer valuable insights into autonomic and cellular-level responses that are not typically detected by standard biochemical diagnostics. This underscores the importance of evaluating metabolic stress not only through laboratory parameters but also through functional energetic regulation, a core concept in bioregulatory medicine [24].

All other parameters were checked using standardised laboratory reference values, which served as the basis for the measurements.

### Clinical Implications and Observations

The current analysis shows that over 80% of patients exhibited signs of hormonal dysfunction, while a striking 97.4% showed evidence of latent acidosis. This finding highlights the urgent need for early detection and clinical consideration of both hormonal and acid-base imbalances in patients with chronic multisystem complaints.

A targeted therapeutic approach that combines regulation of the acid-base balance with the support of the endocrine system may substantially enhance treatment outcomes, improving both symptom control and overall patient well-being[3,18–27].

Research Outlook

Future studies should aim to:

- Develop effective interventions to correct latent acidosis and hormonal dysregulation,
- Explore the interactions between these factors and chronic inflammation, metabolic disorders, and autonomic dysfunctions.

Clarifying these interrelationships may pave the way for personalized regulatory therapies in fibromyalgia and other chronic pain syndromes.

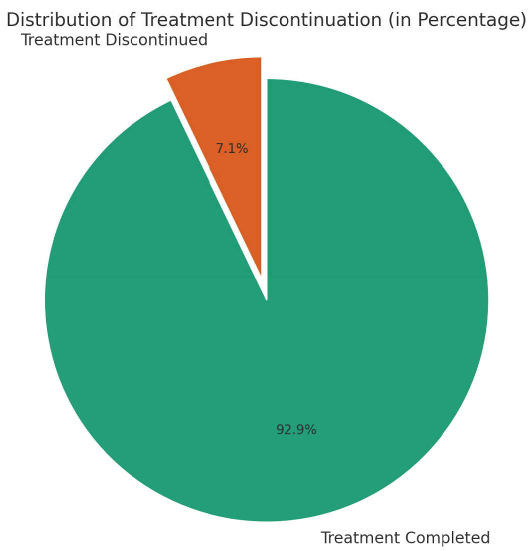


***Figure 5**:This pie chart shows the percentage distribution of treatment dropouts among the participants. Notably, 92,9% of respondents stated that they completed the treatment to the end, and only 7,1% of respondents discontinued treatment. This indicates a good quality of treatment.*

### 3.2.5 Evaluation of Therapy Discontinuation in the Study

An important aspect of this Study was the analysis of treatment adherence, specifically the number of patients who completed the therapy protocol and the number who discontinued treatment prematurely (see Figure 5). Understanding the underlying reasons for treatment dropout can offer valuable insights into factors that promote or hinder successful therapeutic outcomes.

Analysis of Treatment Discontinuation

The distribution of therapy completion among the 565 patients is as follows:

- 40 patients (7.1%) discontinued the therapy prematurely.
- 525 patients (92.9%) completed the therapy successfully.
- Total number of patients: 565 (100%).

**Graphical Interpretation and Clinical Significance**

As depicted in the pie chart, most patients (92.9%) completed the full course of therapy. This reflects a high level of treatment adherence within the study population, suggesting that the intervention was generally well-tolerated and that most participants were willing and able to follow through with the therapy plan.

The relatively low dropout rate of 7.1% may be attributed to various factors, including individual health-related challenges, personal circumstances, or external influences. Future studies should systematically investigate the specific causes of treatment discontinuation to optimize patient support and improve therapy planning.

Note: Most participants completed the treatment protocol, indicating high patient satisfaction and compliance. This further supports the intervention's tolerability and perceived effectiveness. Nevertheless, it remains essential to understand and address the reasons for the therapy dropout to develop targeted strategies that enhance patient engagement and reduce attrition in future clinical applications.

### 3.3. Significant and Sustained Improvements in Quality of Life, Pain Intensity, and Functional Capacity Following Neural Therapy – 12-Month Outcomes

**Table 1: Evaluation of Therapy Outcomes Based on Different Score Parameters**

| Score Name | Before Therapy | After Therapy | 3 Months Later | 6 Months Later | 12 Months Later | P* |
|---|---|---|---|---|---|---|
| FIQ Score | Mean±SD: 78.1±8.0 | 18.6±17.6 | 20.6±18.9 | 23.8±21.0 | 24.9±22.2 | P<0.001 |
| | Median (min.-max.): 77.4 (53.2-95.3) | 11.2 (4.9-82.4) | 11.7 (4.9-82.4) | 12.6 (4.9-82.6) | 12.8 (4.9-82.6) | |
| SF-36 Physical Function | Mean±SD: 33.5±9.7 | 82.0±14.3 | 79.8±14.9 | 76.7±16.3 | 74.8±17.2 | P<0.001 |
| | Median (min.-max.): 30 (15-55) | 85 (40-95) | 85 (40-95) | 80 (35-95) | 80 (25-95) | |
| SF-36 Pain Score | Mean±SD: 24.9±12.1 | 75.1±17.9 | 77.6±21.9 | 72.6±23.5 | 71.7±24.3 | P<0.001 |
| | Median (min.-max.): 22.5 (0.0-45) | 77.5 (22.5-90) | 77.5 (22.5-100) | 77.5 (22.5-100) | 77.5 (10-100) | |
| SF-36 Social Function | Mean±SD: 39.7±9.6 | 76.3±16.2 | 77.9±18.1 | 79.6±22.6 | 74.3±20.7 | P<0.001 |
| | Median (min.-max.): 37.5 (12.5-62.5) | 75 (25-100) | 87.5 (37.5-87.5) | 87.5 (37.5-100) | 87.5 (37.5-87.5) | |
| SF-36 General Health Perception | Mean±SD: 25.5±6.4 | 54.2±10.9 | 64.2±15.0 | 63.8±16.8 | 61.8±18.5 | P<0.001 |
| | Median (min.-max.): 25 (10-40) | 60 (25-70) | 70 (25-80) | 70 (20-85) | 70 (20-85) | |
| SF-36 Energy/ Fatigue Score | Mean±SD: 31.4±5.2 | 72.2±13.5 | 70.7±13.3 | 66.1±15.6 | 65.5±16.1 | P<0.001 |
| | Median (min.-max.): 30 (20-40) | 75 (30-86) | 75 (30-86) | 70 (30-85) | 70 (25-85) | |
| VAS Pain Score | Mean±SD: 8.5±0.7 | 1.9±2.01 | 2.3±2.2 | 2.7±2.3 | 2.8±2.4 | P<0.001 |
| | Median (min.-max.): 9 (0-10) | 1 (0-8) | 2 (0-8) | 2 (0-8) | 2 (0-8) | |

**Statistical Method:**

Related-Samples Friedman's Two-Way Analysis of Variance by Ranks

Notes:

- FIQ: Fibromyalgia Impact Questionnaire
- SF-36: Short Form-36 Health Survey
- VAS: Visual Analog Scale

### Use of the Friedman Test for Repeated Measures

The Friedman test for repeated measures (also known as Friedman's two-way analysis of variance by ranks for related samples) is used to determine whether there are statistically significant differences between three or more related groups. This non-parametric test is particularly appropriate when the same group of participants is measured at three or more distinct time points, and the data do not meet the assumptions of parametric tests such as normal distribution or homogeneity of variances.

In this study, the Friedman test was used to assess whether there were statistically significant changes in pain intensity (VAS), functional ability (FIQ) and health-related quality of life (SF-36) before treatment and at different follow-up intervals (e.g. 3, 6 and 12 months). The results can be found in Table 1.

This test is suitable only when certain conditions are met, particularly when:

- The data consist of ordinal-level measurements or non-normally distributed interval data;
- The same individuals are assessed at multiple time points.

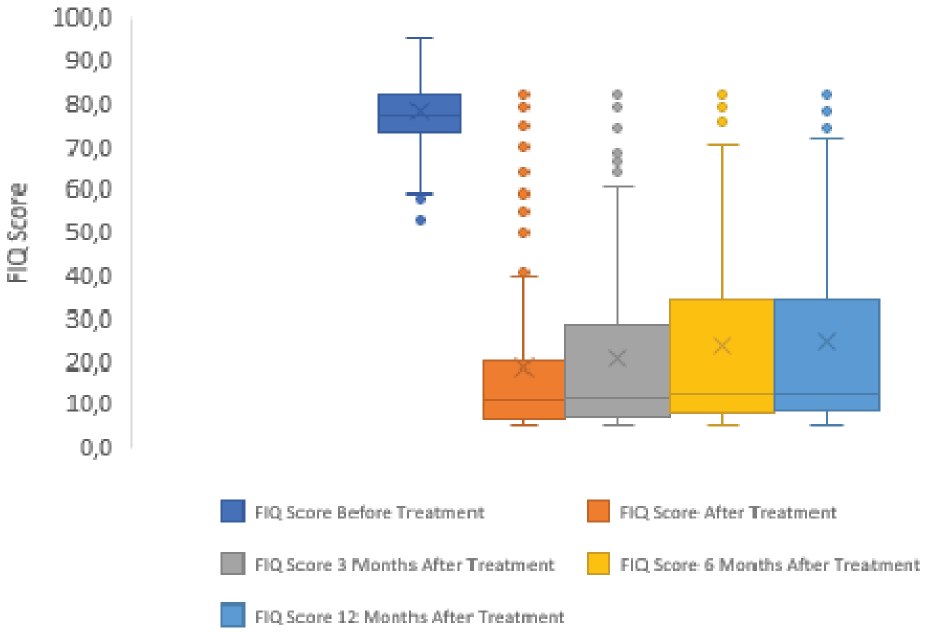


***Figure 6:*** *Boxplot illustrating changes in FIQ scores among fibromyalgia patients before and after neural therapy, including 3-, 6-, and 12-month follow-up assessments. Significant improvement is observed post-treatment with partial fluctuation over time, yet scores remain lower than baseline.*

### 3.3.1 Evaluation of Treatment Outcomes in Fibromyalgia Patients Based on FIQ Scores

Fibromyalgia is a chronic disorder characterized by widespread pain, fatigue, and significantly reduced quality of life. While a wide range of therapeutic options exist, the effectiveness of many approaches remains limited. In this Study, the impact of neural therapy on patients with fibromyalgia was assessed using the Fibromyalgia Impact Questionnaire (FIQ), a validated and disease-specific tool for measuring the severity of symptoms and daily functional impairment (see Figures 6–12).

The FIQ evaluates multiple dimensions of fibromyalgia through various subscales, including physical functioning, pain intensity, fatigue, sleep quality, stiffness, anxiety, and depression [3,28,29]. Revised and extended versions such as FIQ-R and FIQ-S offer even more precise measurements of symptom burden [2,10, 28,29].

### Use of the FIQ in Fibromyalgia

The FIQ is widely recognized as one of the most reliable instruments for assessing disease impact and monitoring therapeutic effectiveness in fibromyalgia patients [28,29].

### Methodology

FIQ scores were recorded at the following time points:

- Baseline (prior to therapy)
- Immediately after therapy
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

The results were visualized using boxplots, depicting how patients' conditions evolved.

### Results and Interpretation

The graphical representation reveals a substantial and sustained reduction in FIQ scores across all time points:

- At baseline, patients demonstrated elevated FIQ scores, reflecting a high degree of disease burden and impaired quality of life [28,29].
- Immediately after treatment, there was a significant decline in FIQ values, indicating rapid symptomatic improvement.
- At 3, 6, and 12 months, FIQ scores showed slight increases over time but remained well below baseline levels, suggesting a lasting therapeutic benefit.

The boxplots also reduced score variability following treatment, indicating a more consistent positive response among patients (see Figure 6). Although some individuals experienced a partial return of symptoms, the average disease burden remained considerably lower than at baseline.

*Note: These findings underscore the effectiveness of neural therapy in managing fibromyalgia. The significant and sustained reduction in FIQ scores suggests that neural therapy can induce short-term relief and contribute to long-term improvements in quality of life. Future research should further explore the long-term efficacy of this intervention and refine individualized treatment strategies for optimal therapeutic outcomes.*

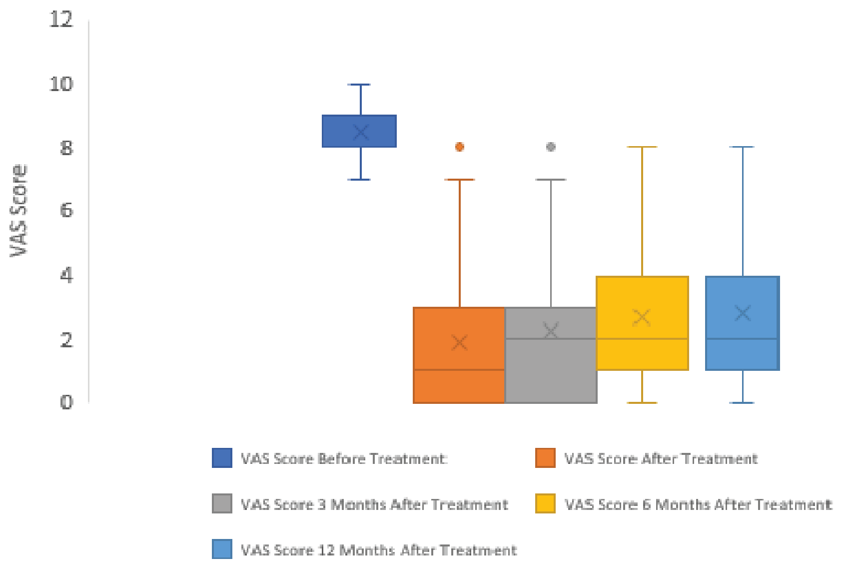


***Figure 7:*** *Boxplot illustrating the reduction in VAS pain scores among fibromyalgia patients before and after neural therapy, as well as at 3, 6, and 12 months post-treatment. A significant pain reduction is observed after therapy, with partial increases over time but still below baseline levels.*

### 3.4 Evaluation of Pain Reduction in Fibromyalgia Patients Using the VAS Scale

Fibromyalgia is a chronic pain disorder that can significantly impact a patient's daily functioning and overall well-being. The Visual Analog Scale (VAS) is a key component in evaluating the effectiveness of therapeutic interventions, allowing for a quantifiable assessment of pain intensity. This Study analyzes changes in VAS scores before and after neural therapy to assess its therapeutic impact.

### Methodology

VAS measurements were recorded at five different time points:

- Baseline (prior to treatment)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

The results were illustrated using boxplots, providing a visual overview of pain score distribution and progression over time.

**Results and Interpretation**

The diagram reveals a marked reduction in VAS scores over the study period:

- Before treatment: Pain intensity was consistently high, with average VAS ratings close to 8–10, indicating substantial pain burden.
- Immediately after treatment: A significant decrease in VAS values was observed. Most patients reported a reduction in pain to levels between 2 and 4.
- At 3, 6, and 12 months: While some patients experienced a slight increase in pain levels over time, the majority remained well below baseline, suggesting a sustained therapeutic effect.

The boxplot visualization also showed decreased data variability post-treatment, indicating a more uniform treatment response across the patient group (see Figure 7). Although some individuals experienced a partial return of symptoms, the overall trend remained positive and clinically meaningful.

Note: The analysis of VAS scores confirms that neural therapy can result in significant and lasting pain relief in patients with fibromyalgia. The observed decline in pain intensity supports the use of this method as an effective long-term strategy for managing chronic pain. Future research should explore the long-term effects in greater detail and evaluate potential refinements to the therapeutic protocol.

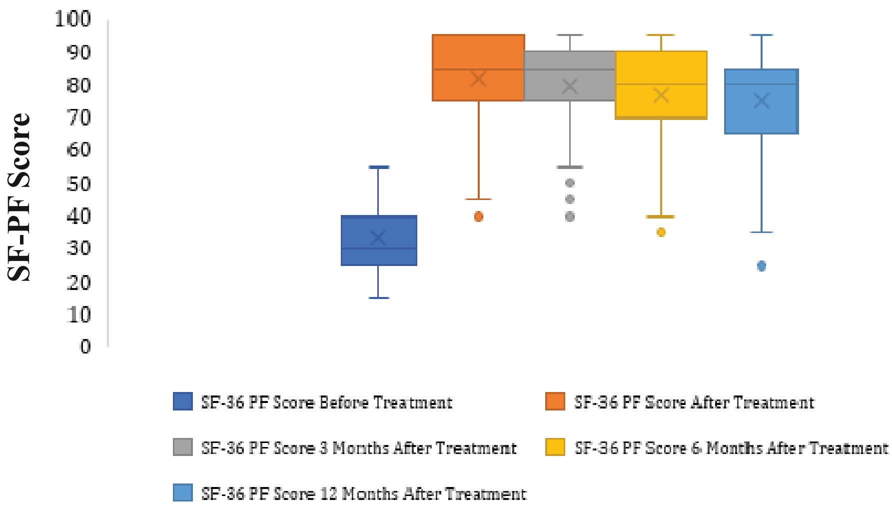


***Figure 8:*** *Boxplot showing the improvement in SF-36 Physical Function (PF)scores in fibromyalgia patients before and after neural therapy and at 3, 6, and 12-month follow-ups. A marked increase in physical function is observed immediately after therapy, with sustained improvement throughout the follow-up period.*

### 3.5 Evaluation of Functional Improvement in Fibromyalgia Patients Based on the SF-36 Physical Functioning Score (SF-36-PF)

The SF-36 is a widely used, standardized 36-item questionnaire to assess overall health status and health-related quality of life. It covers eight key dimensions [30,31]:

- Physical functioning
- Role limitations due to physical health problems
- Bodily pain
- General health perceptions
- Vitality (energy/fatigue)
- Social functioning
- Role limitations due to emotional problems
- Mental health

Use in Fibromyalgia:

The SF-36 is commonly used to evaluate the physical and psychological aspects of fibromyalgia in patients. It is particularly effective for assessing changes in quality of life before and after therapeutic interventions [30,31].

Given the profound limitations in physical performance, fatigue, and pain experienced by fibromyalgia patients, this Study specifically focused on the Physical Functioning subscale of the SF-36 (SF-36-PF) to objectively evaluate functional improvement following neural therapy across multiple time points [3,10,11,30, 31].

### Methodology

The SF-36-PF score was assessed at five time points:

- Before treatment (Baseline)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

Boxplots were used to graphically present the distribution and progression of physical functioning improvements over time.

### Results and Interpretation

The boxplot analysis demonstrated a statistically significant improvement in physical functioning following neural therapy:

- **Baseline:** Mean SF-36-PF scores were low, reflecting substantial impairment in physical capacity.
- Immediately after therapy: A marked increase in scores indicated rapid improvement in physical functioning.
- At 3, 6, and 12 months: Although scores slightly declined, they remained significantly higher than baseline, indicating sustained therapeutic benefit.

The boxplot also showed reduced variability in the post-treatment data, suggesting a more consistent treatment response among patients (see Figure 8). While some participants experienced a mild decline in function after six to twelve months, the overall improvement persisted.

Note: The analysis of SF-36 Physical Functioning scores suggests that neural therapy leads to significant and lasting improvements in the physical capabilities of patients with fibromyalgia. These functional gains contribute meaningfully to the overall enhancement of quality of life. Further research is warranted to investigate the long-term effects and to develop adjunctive therapeutic strategies to sustain and optimize treatment outcomes.

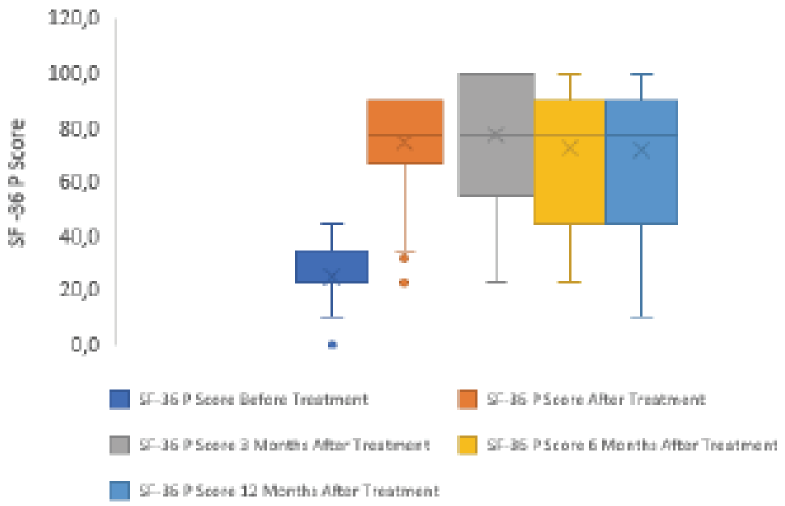


***Figure 9:*** *Boxplot representation of SF-36 Pain (P) Scores before and after treatment, as well as at 3, 6, and 12 months post-treatment. A significant improvement in quality of life scores is observed following the intervention, with sustained effects over time.*

### 3.5.1 Evaluation of Functional Improvement in Fibromyalgia Patients

The quality of life in patients with fibromyalgia is significantly impaired due to persistent pain, fatigue, and limitations in mobility. To objectively assess general health status and physical functioning, this Study utilized the Short Form-36 Health Survey (SF-36) as a validated instrument [3,30,31]. The objective was to evaluate changes in SF-36 scores over time to determine the long-term effectiveness of neural therapy[3,10,11].

### Methodology

SF-36 scores were recorded at five defined time points:

- Before treatment (Baseline)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

Data were presented using boxplots to illustrate the progression and distribution of functional improvements throughout therapy.

### Results and Interpretation

The graphical analysis revealed a statistically significant improvement in both general health status and physical functioning following neural therapy (see Figure 9):

- The mean SF-36 score at baseline was low, reflecting substantial limitations in general health and daily activity levels.
- Immediately after therapy, scores markedly increased, indicating notable improvements in overall health and function.
- Although a slight decline was noted over time at 3, 6, and 12 months, the scores remained significantly above baseline, suggesting a sustained therapeutic effect.

The boxplot analysis also revealed reduced data variability post-treatment, suggesting that most patients responded positively to the intervention. While a few participants reported some decline between six and twelve months, the overall functional gains remained stable.

**Note:** This analysis of SF-36 scores demonstrates that neural therapy can lead to significant and sustained improvements in general health and physical function among patients with fibromyalgia. These functional gains play a critical role in enhancing overall quality of life. Further research is warranted to explore the long-term outcomes and refine complementary therapeutic strategies to optimize patient care.

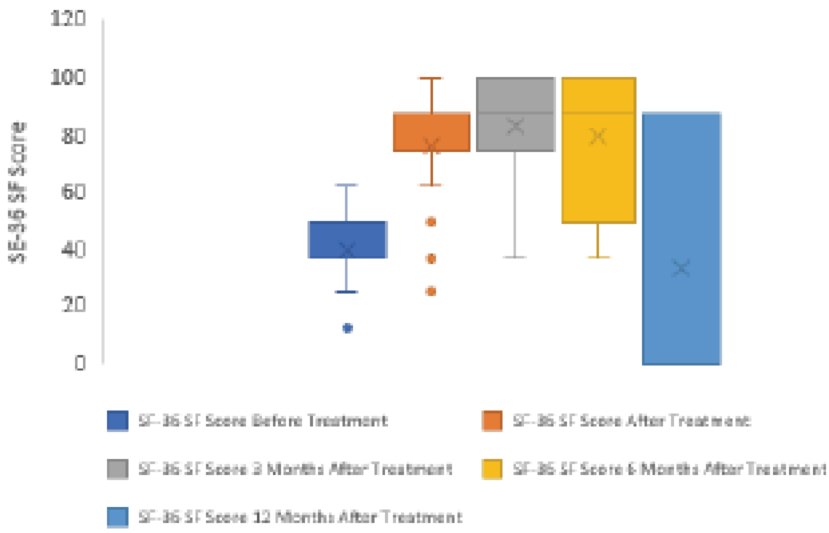


***Figure 10:*** *Boxplot showing the improvement in SF-36 Social Function (SF) scores among fibromyalgia patients before and after neural therapy and at 3-, 6-, and 12-month follow-up intervals. The results indicate a marked and sustained improvement in social functioning following therapy.*

### 3.5.2 Evaluation of Functional Improvement in Fibromyalgia Patients Based on SF-36 Scores

Chronic pain, fatigue, and restricted mobility significantly compromise the quality of life in individuals with fibromyalgia. This Study employed the Short Form-36 Health Survey (SF-36) to assess general health status and physical functioning objectively. The goal was to analyze changes in SF-36 scores across multiple time points to evaluate the long-term efficacy of neural therapy.

### Methodology

SF-36 scores were collected at the following five-time points:

- Before treatment (Baseline)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

The results were visualized using boxplot diagrams to illustrate the distribution and progression of functional improvements over time.

### Results and Interpretation

The graphical analysis demonstrated a significant improvement in both general health and physical functioning among the patients:

- The mean SF-36 score was low at baseline, indicating marked limitations in overall health and activity levels.

- Immediately after treatment, a noticeable score increase reflected a substantial improvement in general physical functioning.
- Although a slight decline was observed at 3, 6, and 12 months, the scores remained significantly higher than baseline, indicating a lasting therapeutic benefit.

The boxplot also revealed a narrowing in score variability post-treatment, suggesting that most patients responded positively to neural therapy (see Figure 10).

While some patients experienced a moderate decrease in function between six and twelve months, the overall improvement remained stable.

Note: This analysis of SF-36 scores confirms that neural therapy can induce significant and sustained improvements in general health and physical functioning in patients with fibromyalgia. These functional gains play a critical role in enhancing quality of life. Further research is needed to explore the long-term effects and develop complementary treatment strategies for optimized outcomes.

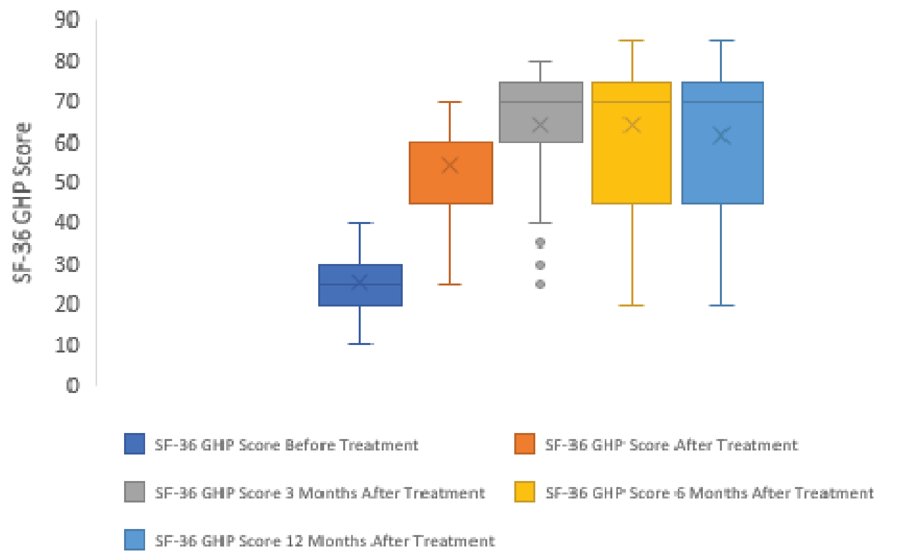


***Figure 11:*** *Boxplot illustrating changes in SF-36 General Health Perception (GHP) scores among fibromyalgia patients before and after neural therapy and at 3-, 6-, and 12-month follow-ups. The results show decreased perceived general health scores after therapy and a gradual recovery.*

### 3.5.3 Evaluation of General Health in Fibromyalgia Patients Based on SF-36 General Health Perception (GHP) Scores

#### Introduction

In patients with fibromyalgia, quality of life is influenced not only by physical pain and functional limitations but also by the subjective perception of overall health. The SF-36 General Health Perception (GHP) score reflects how patients evaluate their general health status. This Study analyzes changes in SF-36-GHPover time to assess the long-term effectiveness of neural therapy.

#### Methodology

The SF-36 General Health Score was measured at five distinct time points:

- Before treatment (Baseline)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

The results were visualized using boxplots to illustrate the trajectory of subjective health perception over time.

#### Results and Interpretation

The graphical analysis revealed a significant improvement in patients' perceived general health:

- Before treatment: Patients reported low GHP values, indicating a highly compromised perception of their health.
- Immediately after treatment: A marked increase in the score indicated a positive shift in perceived health status.
- At 3, 6, and 12 months, The scores remained consistently above baseline, demonstrating a stable improvement in subjective health perception over time.

The boxplot also showed reduced variability post-treatment, suggesting that most patients experienced a uniform enhancement in their health perception (see Figure 11). Although a slight decline in scores was observed in some individuals over the long term, the average improvement remained substantially higher than pre-treatment levels.

Note: The analysis of SF-36 General Health Perception (GHP) Scores indicates that neural therapy not only alleviates physical symptoms but also leads to a significant and sustained improvement in patients' self-perceived health. This enduring effect is essential in enhancing the overall quality of life in fibromyalgia patients. Future research should identify the factors contributing to improvements in stronger or weaker health perceptions to refine and personalize therapeutic strategies.

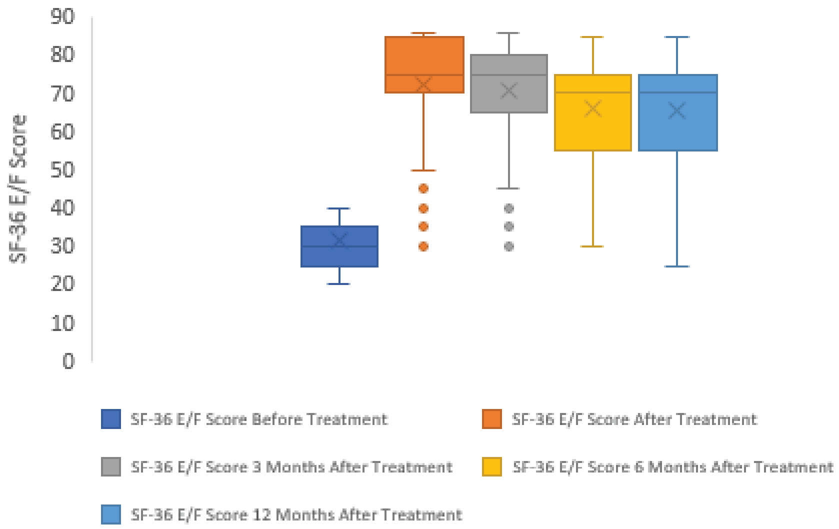


***Figure 12:*** *Boxplot showing the changes in SF-36 Energy/Fatique (E/F) scores in fibromyalgia patients before and after treatment and at 3, 6, and 12-month follow-ups. A marked improvement in E/F scores is observed after treatment, with sustained effects over time.*

### 3.5.4 Evaluation of Energy and Vitality Improvements in Fibromyalgia Patients Based on SF-36 Energy/ Fatique Scores (E/F)

Fibromyalgia is characterized not only by chronic pain but also by persistent fatigue and a lack of energy and motivation (see Figure 12). To assess the impact of neural therapy on patients' energy levels and vitality, this Study analyzed changes in the SF-36 Energy/ Fatique subscale (E/F) over time to evaluate long-term therapeutic effects.

#### Methodology

The SF-36 E/F scores were recorded at the following five time points:

- Before treatment (Baseline)
- Immediately after treatment
- 3 months post-treatment
- 6 months post-treatment
- 12 months post-treatment

Boxplot diagrams were used to visualize changes in energy and fatique throughout the observation period.

#### Results and Interpretation

The graphical analysis demonstrated a significant improvement in patients' energy and vitality levels following neural therapy:

- Before treatment: Patients reported low energy levels, reflected in low SF-36 E/F scores.
- Immediately after treatment: A notable increase in scores indicated that patients experienced immediate improvement in their sense of vitality.

- At 3, 6, and 12 months: Although minor fluctuations were observed, scores remained significantly higher than baseline, suggesting a sustained increase in energy and vitality over time.

The boxplot visualization also revealed reduced score variability following treatment, indicating a consistent positive response among most patients. While some individuals reported a slight decline in vitality over the long term, average scores remained above baseline values.

Note: This analysis of SF-36 Energy/Fatique scores confirms that neural therapy contributes to pain reduction and significant and lasting improvements in energy and vitality among patients with fibromyalgia. These enduring effects play a key role in improving overall quality of life. Future research should focus on identifying the individual factors that influence the degree of improvement in energy levels to personalize further and optimize therapeutic strategies.

## 4. Introductory and Preliminary Discussion

This Study demonstrates that neural therapy (NT) represents an effective and sustainable treatment option for patients with fibromyalgia. The significant reduction in pain intensity and the marked improvement in functional capacity suggest a profound regulatory effect of this therapeutic approach. It is also important to note that many conventional treatment modalities are associated with high costs and often fail to provide long-term benefits. Neural therapy may, therefore, serve not only as an alternative but also as a valuable adjunct to conventional pain management strategies—contributing to improved patient care and potentially reducing healthcare expenditures.

The findings of this investigation confirm that neural therapy is a promising and durable intervention for individuals who have treatment-resistant fibromyalgia. The significant improvements observed in pain intensity (VAS), functional capacity (FIQ, SF-36), and overall quality of life align with previous scientific evidence highlighting the regulatory influence of neural therapy on the autonomic nervous system.

## 5. Neural Therapy as a Regulatory Treatment Approach

Neural therapy is based on the targeted administration of local anesthetics (e.g., procaine or lidocaine) into specific interference fields to modulate the autonomic nervous system (ANS) and inhibit neurogenic inflammation (3, 32–46). These mechanisms are particularly relevant in fibromyalgia, a condition marked by dysregulation of pain inhibition, autonomic imbalance, and chronic neurogenic inflammation[3,10,11,33, 37,38,43].

Numerous studies have established the central role of central sensitization processes in the pathophysiology of fibromyalgia. For instance, Martinez-Lavin et al. (2014) emphasized that sympathetic nervous system dysfunction can amplify pain perception [47,48,63]. Our Study's findings support this hypothesis, demonstrating that neural therapy can lead to sustained pain relief through targeted modulation of autonomic regulatory mechanisms [33,43,47,48,63].

### 5.1 Comparison with Conventional Treatment Options

Standard treatments such as pharmacotherapy, physical therapy, or cognitive behavioral therapy often produce limited results and fail to achieve long-term symptom relief in a substantial proportion of patients. Studies show that conventional pharmacologic approaches (e.g., antidepressants, anticonvulsants) are frequently associated with adverse effects and yield only moderate pain reduction in select patient groups [3,49,63].

In contrast, our findings indicate that neural therapy reduces significant pain and sustains improvements in energy levels, sleep quality, and social participation. These holistic effects can be attributed to neural therapy's multimodal action mechanisms, which influence neurophysiological and microcirculatory processes.

### 5.2 Mechanisms of Action: Procaine and Lidocaine

The local anesthetics (LA) used in neural therapy—primarily procaine and lidocaine—are well-established agents with a broad spectrum of therapeutic effects. In addition to their analgesic properties, they also exhibit antiinflammatory antiinflammatory, microcirculatory-enhancing, and autonomic-modulating effects:

- Antiinflammatory effects: Procaine has been shown to inhibit pro-inflammatory cytokines and reduce neurogenic inflammation, which plays a key role in fibromyalgia [3,45,46,63].
- Improved microcirculation: Through vasodilatory action, procaine and lidocaine enhance perfusion in muscular and fascial structures, thereby improving the nutritional supply of affected tissues[3,11,36,37, 46,52–63].

- Autonomic regulation: Procaine and lidocaine help restore sympathetic-parasympathetic balance by acting on voltage-gated sodium channels, reducing central sensitization[50–63].

### 5.3 Long-Term Effects and Economic Relevance

One of this Study's most noteworthy findings is the sustained efficacy of neural therapy over a 12-month follow-up period. This suggests that neural therapy may be a symptomatic and causally efficacious intervention that positively influences long-term pathophysiological processes[3,36,61,62].

From a health economics perspective, integrating neural therapy into standard care pathways, particularly in primary care and musculoskeletal medicine, could help reduce the economic burden associated with fibromyalgia. Early application of neural therapy has the potential to decrease long-term medication use and reduce work absenteeism due to illness.

This constitutes a crucial insight, reaffirming that patients with chronic, therapy-resistant fibromyalgia may derive substantial benefit from neural therapy. As a non-invasive intervention, it presents a viable alternative to pharmacologic treatment—not only for fibromyalgia but potentially for other chronic pain syndromes as well.

We are all familiar with the challenges and complications associated with pharmacological pain management, especially opioid therapy. For this reason, greater emphasis should be placed on the effectiveness and regulatory depth of neural therapy within integrative pain medicine.

## 6. DISCUSSION

Fibromyalgia syndrome (FMS) is one of the most prevalent chronic pain and regulatory disorders affecting the musculoskeletal system. Despite extensive research, its etiology remains multifactorial and unclear, so treatment typically focuses on symptom relief rather than addressing underlying causes. Conventional approaches—including pharmacologic pain management, psychotherapy, and physical therapies—often yield only limited success, highlighting the need for alternative or complementary treatment modalities[3].

This retrospective multicenter analysis provides strong evidence that neural therapy (NT), when applied as a regulatory treatment approach, can lead to significant and sustained improvements in patients with treatment-resistant fibromyalgia. Particularly notable are the effects observed in pain reduction, physical functioning, energy levels, and social participation. Improvements were maintained for up to 12 months, suggesting a long-term reorganization of autonomic and neuroinflammatory regulation circuits.

Neural therapy acts via targeted injections of local anesthetics such as procaine and lidocaine, which modulate pathological reflex arcs through the autonomic nervous system. Its mechanisms include:

- Normalization of autonomic dysregulation
- Enhancement of microcirculation
- Reduction of neurogenic inflammatory processes

This therapeutic approach appears particularly effective in patients presenting with autonomic imbalance, hormonal dysregulation, and lymphatic burden—patterns frequently observed in fibromyalgia. Other integrative modalities, such as nutritional therapy, micronutrient supplementation, manual medicine, and psychological support, further enhance the therapeutic efficacy.

The low therapy dropout rate observed in this cohort (only 7.1%) indicates high patient acceptance, tolerability, and treatment satisfaction. Furthermore, integrating neural therapy into primary care and rehabilitation settings could enhance clinical outcomes and offer substantial health economic benefits.

## 7. CONCLUSION

This retrospective analysis confirms the significant effectiveness of neural therapy (NT) in patients with fibromyalgia. It leads to a long-term reduction in pain and functional limitations, resulting in a sustained improvement in quality of life. Further randomized controlled trials (RCTs) are needed to consolidate these findings and develop standardized protocols for applying neural therapy in fibromyalgia management.

The results of this multicenter Study demonstrate that neural therapy is an effective, safe, and sustainable treatment option for individuals with treatment-resistant fibromyalgia. Key findings include:

1. Significant and lasting reduction in pain intensity
2. Improvement in functional capacity and overall quality of life
3. Positive effects on energy levels, sleep quality, and social participation
4. Regulation of the autonomic nervous system and reduction of neurogenic inflammation

Given these promising results, additional RCTs should be conducted further to elucidate neural therapy's long-term mechanisms of action and establish evidence-based treatment protocols for clinical practice.

Considering its positive clinical outcomes and high patient satisfaction, neural therapy should be increasingly integrated into treatment strategies for fibromyalgia, particularly in general practice, neurology, physical and rehabilitative medicine (PRM), orthopedics, and pain management.

In summary, neural therapy can be regarded as a holistic and economically viable treatment option for fibromyalgia—one that offers valuable benefits not only at the individual level but also from a broader healthcare system perspective, complementing and enhancing existing therapeutic approaches.

## ABBREVIATIONS:

Autonomic nervous system (ANS),

Energy/Fatique Scores (E/F),

Fibromyalgia Impact Questionnaire (FIQ),

Fibromyalgia syndrome (FMS),

General Health Perception Scores (GHP) ,

Health-related quality of life (SF-36),

Neural therapy (NT),

Physical and rehabilitative medicine (PRM),

Randomized controlled trials (RCTs),

Short Form-36 (SF-36),

Social Function scores (SF),

The local anesthetics (LA),

Visual Analog Scale (VAS)

## Declaration of Conflicts of Interest

Declaration of Conflicts of Interest

The authors declare that they have no conflicts of interest related to this publication and no competing interests to disclose.

The authors confirm that no competing financial interests are associated with this work.

No human or animal studies were conducted by the authors for this contribution. The studies mentioned in this publication adhere to the ethical guidelines specified in their respective sources.

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Author Contributions

Prof. Dr. Dr. H. Nazlikul and Prof. Dr.F.G. Ural Nazlikul's contributions were central throughout the article and equally influential in conceptual organization and content development.

Both authors contributed their extensive experience in physiotherapy, manual medicine, neural therapy, and pain management, significantly advancing the understanding of neural therapy's mechanisms of action in fibromyalgia (FMS).

As academics specializing in pain physiology and integrative pain management, they provided in-depth insights into the pathophysiological role of increased sympathetic tone, an essential factor in the pathogenesis of fibromyalgia.

Furthermore, their substantial expertise in diagnosing and treating mechanical and functional dysfunctions, particularly from the perspective of manual medicine, was thoroughly integrated into the analysis of clinical correlations. Their holistic and regulation-based therapeutic view contributed to a multidimensional understanding of fibromyalgia, encompassing both neurovegetative and structural components.

Prof. Dr. Dr. H. Nazlikul, Prof. F. G. Ural, Dr. N. Özkan and Dr. PhD.T. Acarkan conducted a retrospective statistical analysis of patient data from five clinics. They conducted a comprehensive analysis of clinical cases involving fibromyalgia patients who were treated with neural therapy between 2017 and 2024. Most patients were treated at the Nazlikul Clinic and its affiliated centres. The precision with which they selected patients, documented cases and analysed data forms the basis for the clinical relevance of the article.

Prof. Dr. Y. Tamam supported the project by compiling and critically analyzing an extensive body of literature on non-inflammatory and multifactorial mechanisms in fibromyalgia. He focused on the contribution of muscular, ligamentous, and myofascial dysfunctions as initiating and perpetuating elements in complex FMS syndromes. As a board-certified neurologist and university lecturer, he also contributed a classical medical viewpoint to diagnosing and treating fibromyalgia. He provided valuable input regarding its integration with neural therapy.

Prof. Dr. M. Orak significantly contributed to the statistical evaluation of the data, the interpretation of clinical outcomes across different patient groups, and provided valuable literature support related to fibromyalgia syndrome (FMS).

Prof. Dr. M.D. Bilgin contributed his expertise in neuroanatomy, segmental innervation, and autonomic nervous system regulation in the context of fibromyalgia. He was instrumental in the conceptual structure, scientific writing, and final critical revision of the manuscript. His input added a biophysical and interdisciplinary perspective on fibromyalgia's autonomic and neurogenic aspects, enhancing the article's scientific quality and clinical applicability.

## Ethical Approval

Not applicable.

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