

Nociplastic Pain in Postural Dysfunctions A New Integrated Therapeutic Approach and Exploration of Treatment with Low-Dose Therapies: A Case Report

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Abstract

Humans have a keen interest in understanding pain, yet scientific research has not fully explained it due to pain's connection to suffering, which holds a deeper significance. Pain serves as a sensory and emotional warning system that alerts individuals to tissue damage or degenerative processes occurring on physical, emotional, and spiritual levels. Neurophysiological studies have advanced through various theories, such as intensity and the complexity of connections, leading to the discovery of the spinothalamic pathway and the gate control hypothesis. Concepts like neuroplasticity and the neuromatrix have expanded understanding of pain beyond just specific anatomical structures, highlighting a complex neural network involved in pain perception.

The neuromatrix hypothesis describes pain as arising from a network involving sensory-discriminative, neurohormonal, immune, motivational-affective, and cognitive-evaluative components. Pain signatures are seen as part of the whole self, with the brain responding to stimuli based on their relevance, influenced by stress. Recent attention has been directed towards chronic pathologies that can greatly impact quality of life, often presenting with nonspecific pain linked to the neuromyofascial system. These conditions can be classified as "Chronic Benign Pain Syndromes" (CBCS) and "Myofascial Pain Syndromes" (MPS).

Chronic pain syndromes can include sensory issues and affective problems such as mood swings and anxiety, leading to a decrease in quality of life and often manifesting as nonspecific pain. Pain can be classified into three types: nociceptive pain from tissue damage, neuropathic pain from nervous system complications, and nociplastic pain which occurs from altered central nervous system signal processing without clear peripheral damage, exemplified by fibromyalgia. Nociplastic pain is often chronic and can be related to postural issues and nervous system sensitization, though reliable diagnostic tests for it are lacking. Managing nociplastic pain necessitates a combination of physical approaches, like postural re-education and physiotherapy, along with cognitive interventions to alter pain perception.

This case report discusses a 55-year-old patient with postural syndrome and several health issues, displaying multiple painful symptoms. Initial therapy involved a neuromuscular bite device and physiotherapy. Further treatment focused on bioregulation medicine, utilizing low-dose medications to manage chronic inflammation.

Subsequent treatments focused on mitochondrial support supplements aimed to improve energy production to address her chronic fatigue and enhance cellular function. The patient experienced further symptom improvements and regained ability to perform daily tasks. Six months later, the therapeutic effects persisted.

This case report underscores the links between posture and low-grade inflammation and emphasizes the need for a comprehensive approach in addressing complex pain syndromes. The therapy proposed aims to respond to prevalent musculoskeletal disorders and those related to chronic inflammation, suggesting that bioregulation medicine may further aid in long-term management of chronic conditions alongside established therapies. Recognizing specific postural signs and chronic inflammation requires careful consideration and showcases the challenges faced by medical professionals in providing effective patient care.

Keywords: Pain, CBCS, MPS, Chronic pain syndromes, Nociplastic pain, Neuromatrix, Bioregulation medicine, BrSM

Introduction

Humankind's interest in pain is inherent in its nature, and all the scientific research that has followed to date has ultimately not provided a completely exhaustive explanation, because pain is associated with the component of suffering, which has also a transcendent value [1].

Objectively, pain represents a sensory and emotional alarm system, which aims to rapidly signal a tissue damage or a degenerative process that is taking place on multiple levels: physical, emotional, and spiritual.

In modern times, neurophysiological studies have undergone significant acceleration with the theory of intensity, which was followed by that of the "complexity of connections" and the discovery of the spinothalamic pathway, up to the gate control hypothesis by Merzak and Wall [2-4]. At the same time as this latter development, Hebb's studies gave rise to the concepts of neuroplasticity and cellular assembly, which was followed by the concept of the neuromatrix—a network that interprets the "mundus doloris"—moving away from the previous interpretation that only certain anatomical structures were responsible for this perception [5, 6].

The Pain Matrix

The neuromatrix hypothesis is evolving, and today the pain component is interpreted as an expression of a complex neural network comprising several components: the sensory-discriminative (peripheral), the neurohormonal, the immune and, last but not least, the motivational-affective component (limbic system), as well as the cognitive-evaluative (S1 and S2 cortex) component, which can also change in response to sensory experiences.

According to this theory, there is a network of tissues whose structures are not specific solely to nociception. The "pain signature," as it is defined, would therefore be an aspect of the "all-body-self" and thus the brain's response to stimuli would be attributable to the relevance of the sensory input, whether it originates from nociceptors or non-nociceptors. Consequently, parts of the cortex would be activated by such inputs regardless of their origin, where stress is also an important factor (Figure. 1).

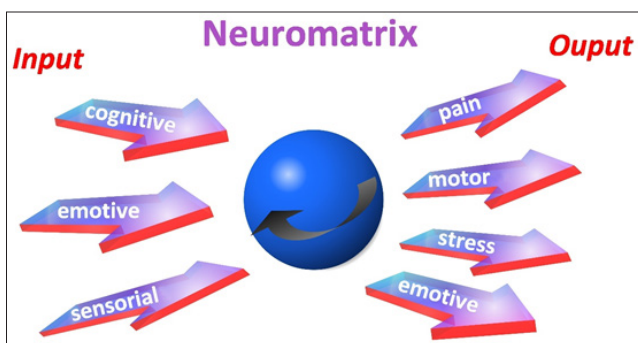


Figure 1: The neuromatrix, all-body-self

Furthermore, in recent years, due to the exponential increase in incidence, attention has also been directed towards pathologies

that, over time, become chronic and can compromise the quality of life and that manifest themselves with nonspecific, painful symptoms, often related to the neuromyofascial system.

Dr. Da Cugna had already indicated that such situations could originate from a dysfunctional alteration of the proprioceptive and postural systems, which involved sense organs and/or related systems with one or more predominant manifestations: the so-called "primary attractor" in a complex system [7].

Such pathological situations can now be codified as "Chronic Benign Pain Syndromes" (CBCS) in which one aspect concerns "Myofascial Pain Syndromes" (MPS) [8].

Types of Pain

We know that pain is primarily classified, based on the pathophysiological mechanism that causes it, into three main types: nociceptive, neuropathic, and nociplastic.

Nociceptive pain, which results from actual or potential damage to tissues (skin, muscles, organs, bones), is divided into somatic (localized, acute) and visceral (internal organs, dull, or diffuse); neuropathic pain, caused by a lesion or disease of the somatosensory nervous system, often described as burning, tingling, electric shock, or stabbing; and nociplastic or functional pain, which results from an alteration in the signal processing mechanisms of the central nervous system, in the absence of clear tissue or peripheral nerve damage, an example of which is fibromyalgia [9-11].

Postural Syndromes and Nociplastic Pain

Postural syndromes may also be accompanied by nociplastic pain. When associated with postural syndromes, this pain manifests as a condition in which altered postures, structured over time and reaching the limit of physiological compensation, are manifested by the activation of the painful component.

The nervous system can undergo changes in its decoding due to an alteration at the level of the primary (S1) and secondary (S2) somatosensory cortex.

Unlike nociceptive and neuropathic pain, which are reversible, nociplastic pain is persistent. Therefore, while postural syndromes are often the initial cause or clinical manifestation, their chronicity is supported by an alteration at another level.

Its characteristics are that it must persist for more than 3 months, involve multiple body regions, with acuity in at least one, not be completely explained by nociceptive or neuropathic mechanisms, with a history of allodynia evoked by thermal (hot/cold) and tactile stimuli, hypersensitivity to sounds and/or light and/or odors.

The presence of a nociceptive or neuropathic pain source does not exclude the presence of nociplastic pain.

The clinical criteria for the evaluation of nociplastic pain (Figure. 2) are based on studies by the International Association for the Study of Pain (IASP), which introduced the term in

2017, and an initial investigative questionnaire in 2021, which is completed by the patient with the support of the referring physician [11].

The aim of the evaluation system is to identify a level of high probability that can indicate whether a patient is suffering from nociopathic pain; however, clinically proven and objective diagnostic tests to confirm the presence of this altered nociception are still lacking.

If, in the future, more precise diagnostic tests are developed and validated, the term "definite nociplastic pain" could be introduced [11].

Managing nociplastic pain requires both physical (bottom-up, i.e., postural re-education, physiotherapy exercises in professional centers and at home) and cognitive (top-down) interventions to modify the patient's perception of pain.

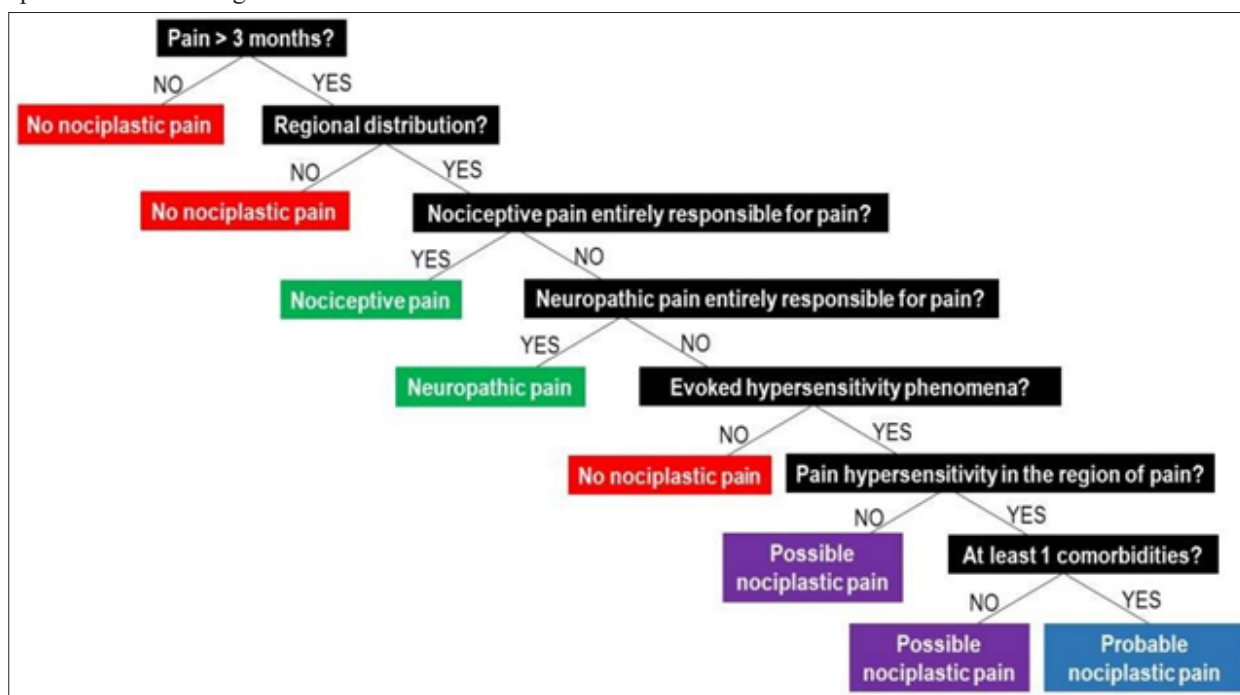


Figure 2: Clinical decision-making tree of the IASP clinical criteria for nociplastic pain [11].

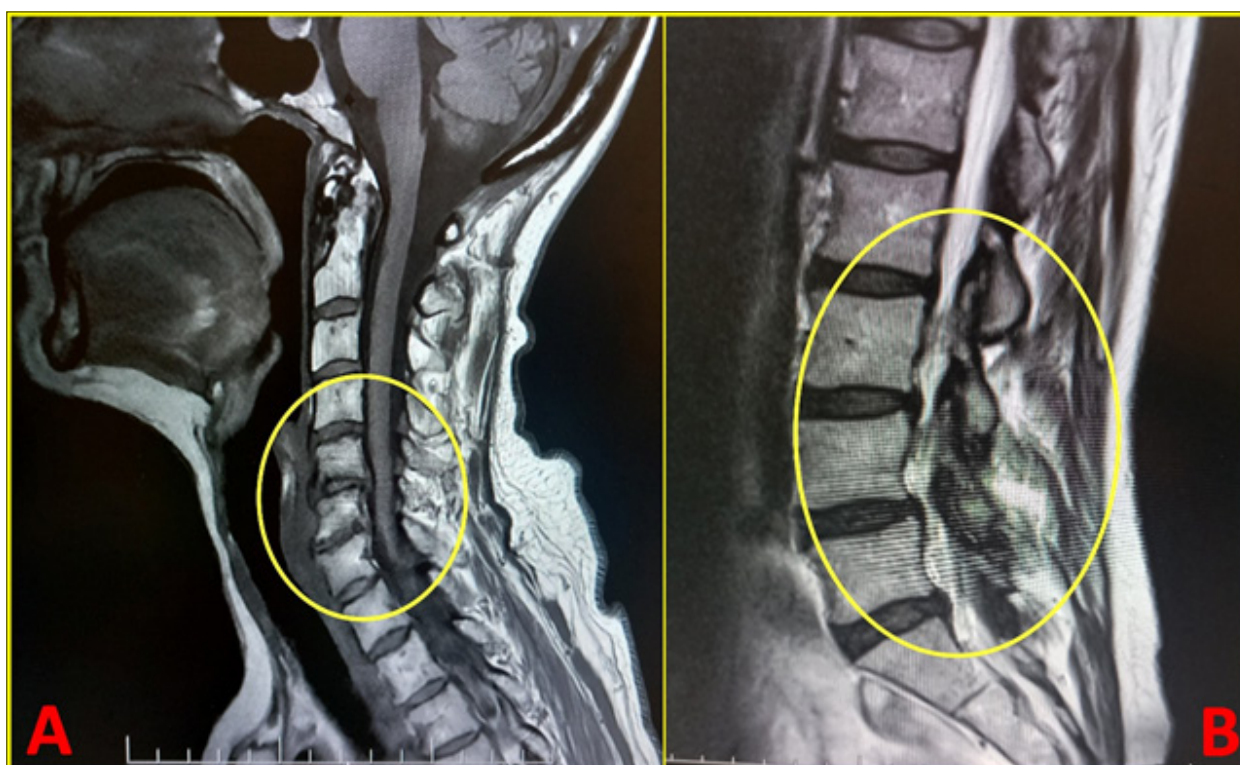


Figure 3: C4-C5 (A) and L5-S1 (B) disc degeneration (with neuropathic effects in the right leg)

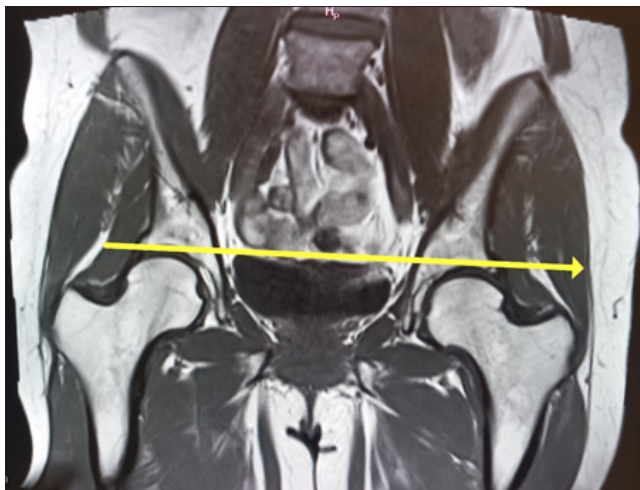


Figure 4: Pelvic asymmetry on MRI with midline inflammatory changes in the right acetabulum.

Clinical Case Description

The case report I propose is of a 55-year-old patient diagnosed with postural syndrome, with several systemic pathologies, emotionally challenged by concomitant family situations, job loss and change of job. The signs and symptoms are: general ailments, widespread cranio-cervico-mandibular trigger points, cervical and lumbar hernias, pelvic length discrepancy, right pes cavus with tender knees (the latter invalidating further investigations with baropodometric and stabilometric tests). Figures. 3-4.

The postural dysfunction was of a mixed type, namely cranio-caudal (descending) and caudo-cranial (ascending), with movement limitations due to herniation flare-ups [12, 13].

Furthermore, the patient's anamnesis revealed widespread pain, Herpes Zoster (reactivated after a dose of the COVID-19 vaccine), complained of nighttime grinding (bruxism), and suspected fibromyalgia, which prompted further investigation with the nociplastic pain questionnaire, which showed a "strong positivity" with the presence of all the signs and symptoms described in this regard (allodynia, hypersensitivity, photophobia).

Therapeutic Phase 1

The therapy began with a lower bite with neuromuscular action (Figure. 5), a Drop-type plate according to the AIROP school and reworked by myself, which, with a central spring, respects the torsional movements of the mandible and accompanies the Primary Respiratory Mechanism (PRM), dedicated sessions of physiotherapy and osteopathic manipulation of the CCM district and the indication to resume the use of foot orthotics, abandoned in 2019 [12, 14, 15]. (Table 1)

During a concurrent orthopedic visit, the patient was prescribed cortisone for chronic inflammation of her right hip, but she refused the treatment.

At the follow-up visit, with a second analysis of the overall situation, the therapeutic choice was oriented towards systems bioregulation medicine (BrSM), through the use of low-dose drugs to rebalance the patient's inflammatory status. Therefore, the more biodynamic treatment was combined with a biochemically active one: the symptoms and signs were classified as manifestations of a "Low Grade Chronic Systemic Inflammation" (LGCSI), which includes "Chronic Benign Pain Syndromes" (CBCS) and "Myofascial Pain Syndromes" (MPS) [8].



Figure 5: Drop-type plate with neuromuscular action, which, with a central spring, respects the Primary Respiratory Mechanism

RELEVANT MEDICAL ANAMNESTIC DATA	GNATHOPOSTURAL TREATMENT – PHASE 1
• Dizziness • Muscle pain • Trigger points • Sciatica in the right leg • Flat foot on the left side • Cervical herniated discs • Shingles • Suspected fibromyalgia • Bruxism	• Bite drop-type • Physiotherapy and osteopathic manipulation • foot orthotics

Table 1: Medical anamnestic data and therapeutic phase 1

Therapeutic Phase 2

Therefore, the following indications were added for this second phase:

- Galium Heel 20 drops twice a day for 45 days with draining action on the extracellular matrix (16, 17). When toxins accumulate in it, they can become a trigger with the initiation of a low-grade chronic inflammation in reaction to the inability of a truly effective physiological drainage.
- Cuprum Hell, 1 every 12 hours for 30 days with a muscle relaxant action for the striated muscles of the cranio-cervico-mandibular system [18].
- Arnica complex Heel, 1 every 12 hours, sublingual, for 30 days, the drug of choice for CBCS and in MPS which acts in all six phases of inflammation and modulates with their action all its manifestations (Calor, Rubor, Tumor, Dolor, but also on Sepsis and the damaged Function) (19); unlike NSAIDs, which inhibit prostaglandin synthesis, particularly cyclooxygenase (COX-2).(Figures. 6-7)

The three-month results showed an improvement in the signs and symptoms of trigger points.

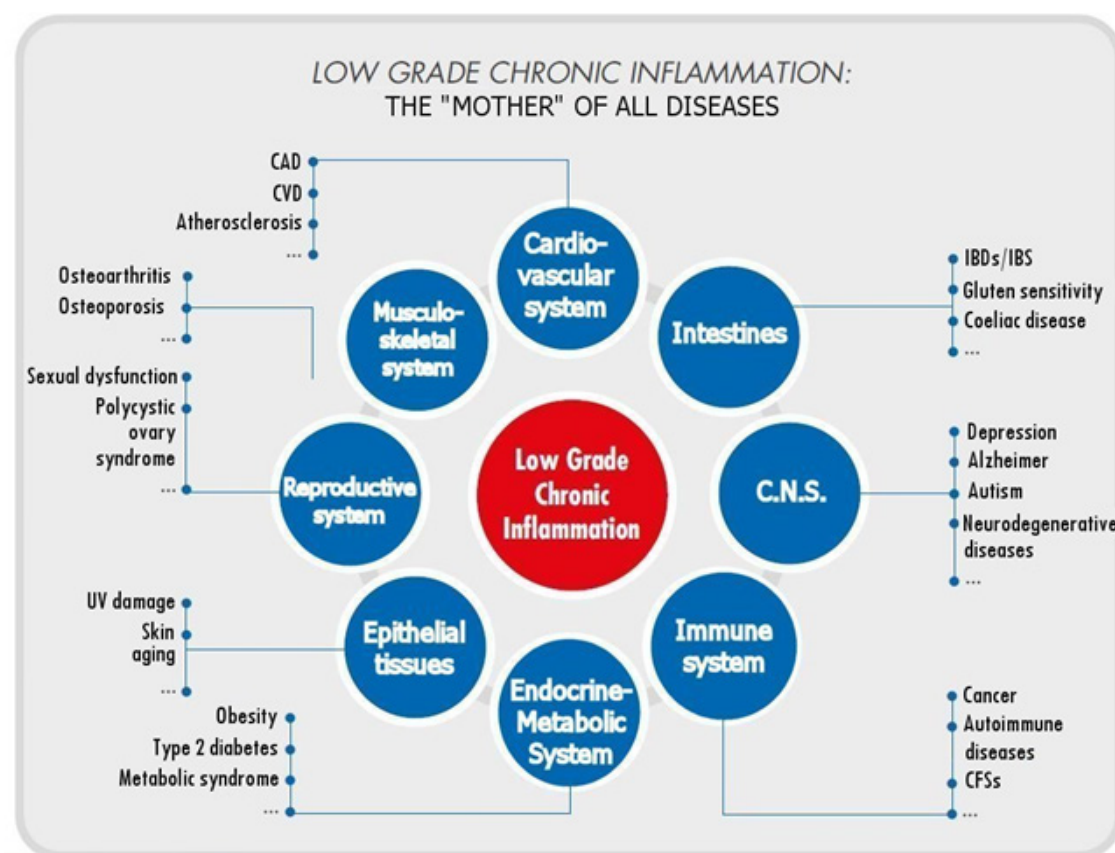


Figure 6: Low Grade Chronic Inflammation

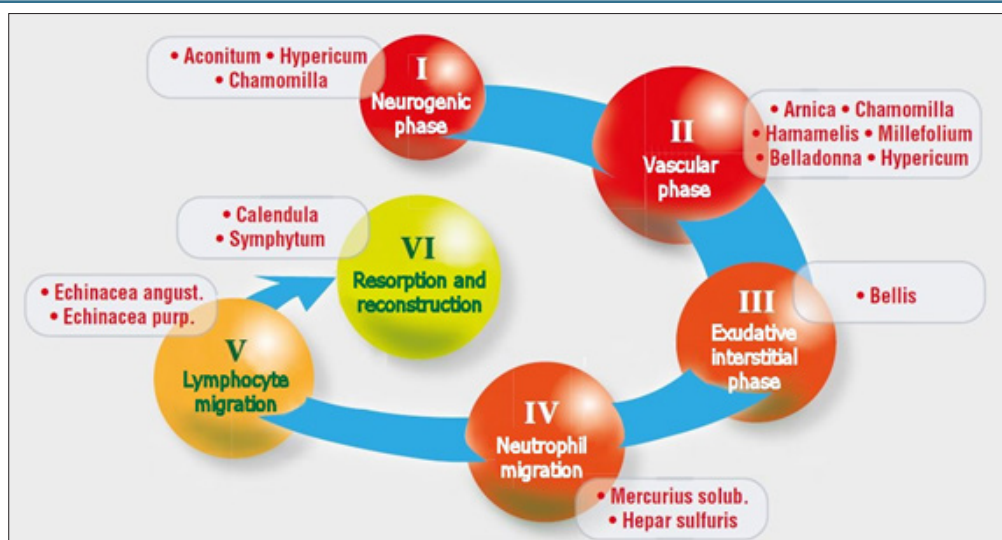


Figure 7: Stages of Inflammation

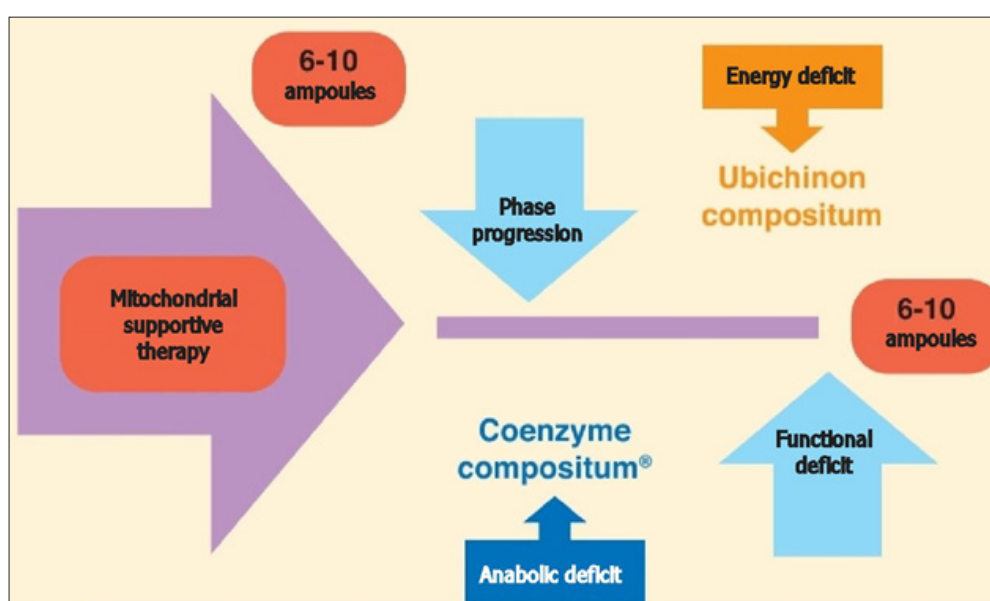


Figure 8: Coenzyme compositum and Ubichinon compositum

Therapeutic Phase 3

In this phase, after verifying the improvement in the myofascial component with the NPRS (Numeric Pain Rating Scale) questionnaire, the patient began to experience difficulty carrying out the basic needs of daily tasks, a characteristic present in nociplastic syndromes along with the others already mentioned.

Having not identified other obvious contributing causes, this condition was attributed to a basal energy deficit, which is also common in postural syndromes due to an increased energy demand from the proprioceptive systems responsible for maintaining the problems described.

Chronic fatigue leads to a less efficient action of aerobic respiration, with deficiencies in the malfunctioning of mitochondrial functions, the Krebs cycle, and oxidative phosphorylation, and consequent reduced production of ATP: the main energy source of the cell and therefore of the entire organism [20].

Hence the need to act to restore intracellular functionality. To that purpose, two supplements with this objective were added.

Mitochondrial support was provided to the patient through two multicomponent-multitarget bioregulators that act on various steps of the Krebs cycle: *Coenzyme compositum*, which has a fundamentally anabolic effect and acts as a support for cellular energy metabolism and the reactivation of intracellular enzymatic mechanisms, and *Ubiquinone compositum*, which has a catabolic effect and acts as a support in conditions of psycho-physical asthenia, and in all situations of low energy, distress, and intellectual overwork [21, 22].

Coenzyme compositum was administered with a sublingual vial twice a week on an empty stomach for 5 weeks (Mon&Thu), while *Ubiquinone compositum* was administered with a sublingual vial twice a week on an empty stomach for 5 weeks, the same dosage 2 days apart from the Coenzyme (Wed&Sun). Figure. 8

Due to the positivity of nociplastic pain (Table 2), also interpreted as an alteration towards a state of low grade chronic system inflammation, I prescribed the patient *Interleukin-10*, (20 sublingual drops once a day for a period of 2 months) [16, 17]. This cytokine exerts a regulatory effect between

those components that fuel acute inflammation (trigger points, muscle pain, sciatica), which sees the production of interleukin 1, 6, 8, 17 and TNF α as the main protagonists, and those that contrast them and which have interleukin 4, 10, Anti IL-1 and TGF-B as the responsible proteins.

NOCIOPLASTIC PAIN	TREATMENT OF NOCIOPLASTIC SYNDROME
• Chronicity • Spread to various parts of the body • Coexistence with nociceptive pain (hernias) • Allodynia (touch, pressure) • Hypersensitivity (heat/cold, sounds, lights, odors) • Fatigue and difficulty concentrating	• Coenzyme compositum • Ubichinone compusitum • Interleukin 10

Table 2: Nociplastic pain and its treatment

Results

The initial results of the treatments were seen between the first and second month of therapy and primarily concerned the dysfunctional biomechanical components.

The subsequent support of low-dose *Arnica* and *Cuprum*, which acted on the neuromyofascial components, produced a further improvement in the patient's pain symptoms, going from a 7 to a 3 on the NPRS (Numeric Pain Rating Scale).

In the second phase, the changes were more subtle, but were gradually evident in the patient's feedback.

After the extracellular matrix (ECM) detoxification period and the use of energy support therapy with *Coenzyme and Ubiquinone Compositum*, three months after starting the therapy, there was a significant improvement in symptoms, a characteristic always present even for those with a nociplastic component, with a decrease from 5 to 2 on the NPRS scale, and a return to daily life and a progressive increase in ability to perform ordinary daily tasks: work, family, and leisure. At 6 months, the effects of the therapy persist on all levels addressed.

Discussion

The concepts of posture and low-grade inflammation have been associated and verified through clinical studies that refer to fascia and stress. As is well established, the fascia is the link between all the body's organs that are enveloped and immersed in it [23]. Stress, however, especially in phase 2, the resistance phase, activates the hormonal mechanisms needed to overcome difficult situations, modifying the bio-tensegrity characteristics of the fascia itself through sympathetic activity and the production of cortisol, which then affects posture [24, 25].

The context of these changes is the fluids of the extracellular matrix (ECM), which, as Pischinger has identified, is the environment that surrounds every cell in our body [26]. It is not just a structural support, but an active regulatory system that connects cells, the autonomic nervous system, the immune system, and the microcirculation: a dynamic network that ensures biochemical and electromagnetic communication between all the functional units of the body.

Physiologically, the matrix acts as a filter and a vehicle for biochemical information. In the case of oxidative stress overload or micronutrient deficiency, this function deteriorates and a phase of systemic disorganization occurs, often silent, sometimes painful, but progressive.

This "interstitial space" is therefore the first and last stage of any physiological or pathological process. Therefore, when the EMC's capacity for exchange decreases, the entire biological system suffers, and the loss of self-regulation manifests as low-grade chronic inflammation (LGCI).

It is in this context that manual therapies, corrective biomechanical supports (gnathological bite and foot orthotics), low-dose therapy – as medicine of the biological and biochemical context – have found their peculiar application in the clinical situation of the case report discussed.

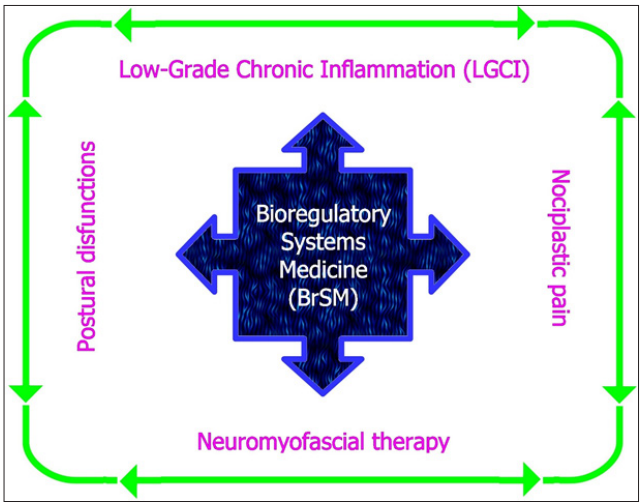


Figure 9: The correlations. The key element is LGCI. Postural dysfunctions can be a primary cause, powered and generated by LGCI. Nociplastic pain can be a chronic consequence of a central alteration, powered by the various causes of LGCI. Neuromyofascial therapy (biomechanical, osteopathic, physiotherapeutic) can positively influence postural dysfunctions and nociplastic pain. BrSM therapy, in different forms, is therapeutic on all components, acting on LGCI.

Conclusion

The therapy proposed in this case report, which encompasses critical issues affecting various biological systems, aims to provide a further response to common musculoskeletal disorders, as well as those associated with low-grade chronic inflammation, with a specific focus on nociplastic pain.

The complexity of similar cases, which are presenting with an exponential increase in incidence, is difficult to standardize, and the limited scientific literature currently available offers solutions that are not always unequivocal.

BrSM, Bioregulatory Systems Medicine may represent a further step forward, addressing symptoms and rebalancing the individual's innate self-regulation mechanisms, especially in situations that tend to become chronic. It stands alongside the already well-established manipulative and biomechanical therapies that are most commonly used.

The ability to recognize specific postural signs, to identify and decipher low-grade chronic inflammation syndromes, leaves the physician unable to provide immediate solutions to the patient (who consulted him), but isn't this precisely the challenge of medicine in the therapeutic dialectic?

The authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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