

# Myofacial Pain Dysfunction Syndrome: Insights and Management

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## Abstract

Myofacial pain dysfunction syndrome (MPDS) is a form of temporomandibular disorder reflected by dull, aching, radiating pain that may become acute during the use of jaw, and mandibular dysfunction that generally involves a limited mouth opening. MPDS is a functional disease that is related to the masticatory muscles, the neural structures, and the temporomandibular joint structures. Myofacial pain is overlooked as a conjoint cause of chronic pain because of its frequent association with joint dysfunction and supplementary pain disorders. Noxious stimulation such as mechanical, emotional, infectious, metabolic, nutritional, or a mixture of these may lead to the development of spasms with loss of capacity for voluntary relaxation and exhibit an overactive stretch reflex leading to involuntary shortening of one or more muscles with an eccentric position of condyles. There are improper jaw movements and trismus, and pain due to spasms and decreased relaxation of muscles. This review article focuses on the pathophysiology and management of MPDS. Since the etiology of MPDS is multifactorial, the treatment of MPDS should be geared towards complete management rather than symptomatic cure.

**Keywords:** Myofacial pain dysfunction syndrome, Temporomandibular disorders, Masticatory muscle problems, Trismus, Etiology

## Introduction

The study of pain is vast, as pain may be present in different aspects of life described in terms of physical as well as psychological. Facial pain and its diagnosis have always posed a dilemma for clinicians. Temporomandibular joint (TMJ) pain dysfunction syndrome is a term covering a variety of problems that include the entire scope of temporomandibular joint disorders originating either intra-articular or extraarticular. Myofacial pain dysfunction syndrome (MPDS) is a stomatognathic system disturbance, which consists of pain, jaw movement irregularities, and muscle spasms. Hyperexcitation of peripheral sensory neurons causes a reaction of induction in the motor neuron and then spasms of the masticatory muscles follow. Long-term spasm causes muscular pain and irregular mandibular motion. Pain is the most important inducer and therefore must be managed firstly to manage the muscle spasms (1).

With ever-increasing refinements in diagnostic and treatment modalities, dramatic advances have been made in understanding the causes of facial pain related to joint and surrounding musculature. Still, the mystery exists regarding the precise diagnosis and treatment of facial pain. Myofacial pain dysfunction syndrome (MPDS) is one particular type of temporomandibular disorder.

Historically, clinicians and researchers have subclassified TMDs into either intracapsular disorders or masticatory muscle disorders. TMJ internal derangement may not be involved with MPDS. However, when a temporomandibular joint irregularity occurs along with the symptoms of MPDS, the complete problematic condition should be considered as temporomandibular joint disease. All masticatory organs participating in oral function may or may not be involved in MPDS (2).

The condition is characterized by dull, aching, radiating pain that may become acute during the use of the jaw, and mandibular dysfunction that generally involves a limitation of mouth opening. MPDS is a functional disease related to the masticatory muscles, the neural structures, and the temporomandibular joint structures. Frequently, Myofacial pain is overlooked as a common cause of chronic pain because of its frequent association with joint dysfunction and other pain disorders (3).

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## Etiology

Myofacial pain-dysfunction syndrome has a multifactorial etiology and the information about the probable etiological factors seem to have enhanced over a while. The relationship between muscle malfunction and MPDS is a two-sided delinquent, where each affects the other. Muscle malfunction triggers MPDS, while MPDS causes impairment of masticatory movements. Travell and Rinzler first proposed skeletal muscles in spasm could be the source of pain. They described the painful areas within the muscles and called them "Tigger areas which were related to pains, spasms, tenderness, and dysfunction. Schwarzl adapted Travell's work and suggested the term temporomandibular joint pain-dysfunction syndrome. He postulated that stress was a significant cause of clenching and grinding habits, which resulted in muscle spam with occlusal abnormalities playing a subordinate role.

The next significant development toward understanding this aspect of facial pain occurred when Laskin presented a wide-ranging explanation of the problem and proposed his Psychophysiological theory. He suggested that mechanical factors related to occlusion cause this condition by producing muscular overextension or contraction leading to muscle fatigue but is the main factor responsible for signs and symptoms of pain-dysfunction syndrome (4).

Laskin's theory is established on the result of emotional rather than occlusal or mechanical factors. According to Weinberg, every patient has variation which is determined by his psychological makeup. In a given patient, an occlusal interference may elicit the patient's acute symptoms and emotional stress may sustain them. Christensen and Yemm demonstrated that in chronic cases, an inflammatory stage occurs in affected muscles of mastication succeeding the classic spasm. This myositis perpetuates the symptoms of pain and dysfunction. The peripheral neural receptors that are situated in and around the posterior teeth periodontal ligaments and in the dental pulp create ongoing masticatory muscle hyperactivity that can lead to the clinical appearance of MPDS symptoms (5).

## Pathophysiology of MPD Syndrome

Noxious stimulation such as mechanical, emotional, infectious, metabolic, nutritional, or a combination of these may lead to the development of spasms with a loss of capacity for voluntary relaxation and exhibit an overactive stretch reflex leading to involuntary shortening of one or more muscles with eccentric position of condyles. There is disorientation of jaw movements restricted opening of the mouth, and pain due to spasm and decreased relaxation of muscles. Women are affected by MPDS more frequently than men. The greatest incidence appears to be in the 20 to 40 years of age. Myofacial pain is characterized by pain referred from a few hypersensitive areas termed trigger areas zones. A trigger point is defined as a localized tender

area in a taut band of skeletal muscle, tendon, or ligaments. Points occur frequently in the head, neck, shoulder, and lower back.

Any pressure on these areas may initiate pain referred to distant areas (called as zone of reference). Patients suffering from MPDS usually present with complaints of pain in a zone of reference. Trigger areas develop due to direct and indirect trauma (parafunctional habits) to muscles. Palpating trigger points with deep finger pressure elicits alternation in pain, in the zone of reference or causes radiation of pain towards the zone of reference. The patient's behavioral reaction to firm palpation of trigger points is a distinguishing characteristic of Myofacial pain and is termed a positive 'jump sign'. Signs and symptoms of Myofacial pains are often accompanied by other pathological conditions and other problems such as tingling, numbness, blurred vision and excess lacrimation. Gastrointestinal symptoms include as nausea, constipation, and indigestion. Musculoskeletal symptoms include fatigue, tension, and stiff joints. Otologic symptoms include tinnitus, ear pain, and diminished hearing (6-8).

## Management of MPDS

The treatment modalities of MPDS are generally classified into non-surgical and surgical treatment:

### Non-Surgical management

- Initial therapy
- Reassurance

It is very significant to make the patient aware of the condition, its treatment options available and the prognosis. Reassurance of the patient is very essential that no serious problem is there and can be managed, for quick recovery of the patient and prevents him from any psychogenic trauma (9).

### Diet

Diet plays an important role in the leading of MPDS. Hard and sticky food should be excluded from the patient's diet to prevent stress on the masticatory muscles. The patient must be put on a soft and liquid diet (9).

### Rest

Rest is very key to relieving the strain on the muscles. This is likely by making the patient aware of the condition, and unconscious postural, swallowing, and grinding habits (9).

## Pharmacological Therapy

### Analgesics

Opioid and non-opioid analgesics are used depending

on the degree of pain. The opioid analgesics act on the central nervous system and induce sleep, whereas, non opioid analgesics like NSAIDS do not interact with CNS and help in reducing mild to moderate pain (10).

### **Anti-inflammatory**

It aids in reducing the inflammations in muscles by preventing the release of arachidonic acids (10).

### **Muscle relaxants**

Reduces muscle strains, e.g., thiocholchicine (11).

### **Anxiolytics**

It acts as a caring therapy. Anxiolytics do not have any direct effect in reducing muscle pain but it may help in eradicating patient's stress produced due to the disorder (11).

### **Local anesthetics**

Reduces the pain directly thus providing relief to the patient allowing complete muscular movement. Once the area is anesthetized, it is easy to diagnose the trigger points and its radiating path (12).

### **Thermotherapy**

Hot and cold fermentation is the finest and first advised to the patient. It is based on the premise that heat upsurges the circulation and reduces inflammation. Moist heat is superior than dry heat. The patient is advised to keep a moist towel over the skin surface for 10-15 min continuously (12).

### **Trans-cutaneous electro galvanic stimulation**

The principle of muscle contraction by electrical stimulations is based on the premise that continuous electric contraction and relaxation of the muscle helps to break the myospasm. It is active on the peripheral large A-delta fibers to reduce muscle pain. TENS is an adjunctive therapy proven to give very good results in patients (13).

### **Infrared rays**

IR rays have a synergistic effect on the muscle. It increases the blood flow and induces mild anti-inflammatory reactions mediated through histamine and prostaglandin-promoting vasodilatation (14).

### **Occlusal therapy**

If there is a small occlusal disturbance it may lead to pain in the muscles and joints. Occlusal splints are given to the patient to get rid of the occlusal disharmony. The various appliances used are bite planes, occlusal appliance, night guard, mouth guards (15).

### **Other modalities**

#### **Dry needling**

It acts as a therapeutic agent to release the intracellular potassium to stop nerve conduction temporarily.

#### **Stripping massage**

It is a stroking massage on the skin to lubricate the muscle by putting digital pressure on the muscle in a circular motion (16).

#### **Acupuncture**

It is the body's anti-nociceptive mechanism to diminish the level of pain. Stimulating acupuncture areas causes a discharge of endorphin molecules by blocking the transmission of noxious impulses due to which pain sensation is reduced (3).

#### **Surgical management**

If the pain is not relieved, surgery is considered to be the last option which includes condylotomy, meniscectomy, myotomy, and arthroscopy (4).

### **Recent trends in the management of MPDS**

#### **Botulinum toxin an injection**

Injection of BTX-A in the masseter and temporalis muscle fibers extra orally under electromyography prove to be effective. These muscles are most commonly involved and radiate the pain to the ear and temporal headache which may lead to the limitation of the mandibular movement and develop MPDS (5).

#### **Ultrasound**

It upsurges the cell membrane permeability by altering the sodium-potassium ion gradient. It increases the exchange of gases, which stimulates healing and reduces inflammation (17).

#### **Iontophoresis**

It is a technique of passing low amperage current to the tissue of the area involved. A pad is positioned over the skin of patient and electric current is passed through it into the tissue (18).

#### **Cold and soft laser therapy**

Application of the low-level laser therapy (LLLT) has been pursued to promote healing, and reduce inflammation. It hastens collagen synthesis, increases vascularity, and decreases the number of microorganisms and pain (19,20).

### **Conclusion**

Myofascial Pain Dysfunction Syndrome (MPDS) predominantly affects the masticatory musculature,

manifesting as chronic muscular pain, recurring temporal headaches, masticatory discomfort, muscle weakness, trismus, and parafunctional habits such as clenching and bruxism. Accurate diagnosis necessitates comprehensive history-taking and meticulous examination of the masticatory muscles.

MPDS is primarily a stress-induced psychophysiological disorder originating in the muscles rather than a temporomandibular joint dysfunction. Therefore, therapeutic intervention should focus on stress reduction, occlusal rehabilitation, and muscle relaxation protocols. Establishing an accurate diagnosis is crucial before initiating treatment modalities.

Symptomatic treatment alone yields limited long-term success. Similarly, isolated interventions such as trigger point injections and management of tender spots are insufficient for optimal outcomes. A comprehensive treatment approach should incorporate patient counseling and structured jaw exercises. When managed through an evidence-based, multifaceted approach, the treatment of Myofacial Pain Syndrome can achieve favorable outcomes.

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