

# Myofascial Pain Dysfunction Syndrome and its Management: A Systematic Review

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**Abstract:** *Background:* Myofascial pain dysfunction syndrome (MPDS) is a condition in which patients experience symptoms of pain, tenderness of the muscles of mastication, clicking or popping noise in the temporomandibular joints (TMJ), and limitation of jaw function. A variety of therapies have been described in literature for its management. *Objectives:* The aim of the study was to systematically review the effectiveness of three different treatment modalities i. e., Pharmacological, Physical and Occlusal therapy, in the management of MPDS. *Materials and Method:* This study was written in accordance with PRISMA guidelines, The PICO format is used to show clinical questions with obvious inclusion criteria. This systematic review search uses an "myofascial of the MeSH browser" and "", "trigger points", "myospasms", "myofascial pain dysfunction syndrome", "facial myalgia", and "taut bands". and limited by "Human", "English". An extensive search of literature was performed on database such as MEDLINE, PubMed and Google Scholar. Two reviewers will independently screen articles for inclusion, extract data, assess risk of bias (revised Cochrane risk of bias tool) for included studies. A third reviewer arbitrated in the case of discrepancy of reviewers' opinion following discussion. *Result:* The result obtained is that the three interventions that is occlusal, pharmacological and physiotherapy are effective in treatment of patient with mpds. *Conclusion:* The result obtained is that the three interventions are effective in treatment of patient with mpds but further studies should be conducted with large sample size and exclusive comparison between drug, occlusal therapy and physical therapy. This review of treatment in MPS finds that most interventions demonstrate a limited body of evidence for their use.

**Keywords:** trigger points, myospasms, myofascial pain dysfunction syndrome, facial myalgia, taut bands

## 1. Introduction

With a prevalence of 40 to 60% in the community, Temporomandibular disorders (TMDs) are the major etiology of non-dental pain in the orofacial region, involving more frequently women than men. One of the most common types of TMDs is the myofascial pain dysfunction syndrome (MPDS).<sup>(1-3)</sup> The MPDS is a dull, deep-radiating muscle-related pain or ache centered in the preauricular area; the pain may also extend to the areas around the temporal, masseter, and other muscles of mastication. Pain, discomfort and disability associated with myofascial pain dysfunction can greatly affect a person's quality of life, as well as perpetuate a headache, commonly described by the patients as tension headache, or even cause a migraine.<sup>(4, 5)</sup> Psychological disorders, especially distress and anxiety and occlusal interferences have shown to play a part in its etiology.<sup>(1,6)</sup>

A variety of treatment modalities have been suggested including pharmacological management, occlusal appliances, physiotherapy and many others.<sup>(4,7)</sup> Since pain is typically the reason for the patients with TMDs to seek medical care, pharmacological therapy is most often indicated as the first line of treatment.<sup>(1)</sup> A wide variety of drugs ranging from short-term treatment with non-steroidal anti-inflammatory drugs and muscle relaxants to the long-term administration of antidepressants for less well-characterized pain have been used. Although several

medications are typically prescribed, many lack evidence for this specific pathology and are rather empirical.<sup>(1, 8)</sup>

Occlusal splints are removable interocclusal appliances that are usually fabricated out of hard acrylic.<sup>(4)</sup> Occlusal splint therapy is chosen for the treatment of pain and dysfunction in the orofacial region for several reasons. It is relatively simple, noninvasive and reversible. Moreover, a high degree of patients' acceptance has been reported, especially with the soft splints.<sup>(9)</sup> Occlusal splints effectively eliminate occlusal interferences and alter the relationship of the mandible to the maxillae as determined by tooth intercuspation. Because occlusal splints alter the relationship of the mandible to the maxillae, mandibular movement and, therefore, occlusal contacts are altered temporarily. This temporary change in muscle function and occlusion is likely related to a reorientation of the teeth within the periodontal spaces. It is anticipated that use of occlusal splints will encourage jaw muscles to function more normally and thus result in altered occlusal contacts<sup>(10)</sup>.

Physiotherapists have long been associated with orthopedic surgeons in the management of Musculo-skeletal disorders. Conservative physical therapy plays a prominent role in the treatment of TMDs through a wide range of techniques, including manual therapy (for example, joint mobilization/manipulations and soft-tissue mobilization), therapeutic exercise, electrotherapy (for example, low-level laser therapy (LLLT), transcutaneous electrical nerve stimulation, therapeutic ultrasound, and shortwave), dry needling, and acupuncture.<sup>(11, 12)</sup>

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There is lack on literature on the comparison of outcomes of various treatment modalities used in management of M. P. D. S. Thus, the aim of the study was to systematically review the effectiveness of three different treatment modalities i. e., Pharmacological, Physical and Occlusal therapy, in the management of MPDS.

## 2. Materials and Method

This study was written in accordance with PRISMA guidelines (Selected Reporting Items for Systematic Review and Meta-Analysis) to report studies evaluating health care interventions. The PICO format (Population, Intervention, Comparison, Results) is used to show clinical questions with obvious inclusion criteria. Questions characteristics and criteria for inclusion are clinical studies involving management of myofascial pain dysfunction syndrome treatment, diagnosis of myofascial pain dysfunction syndrome.

### Search Strategy

This systematic review search uses an “myofascial of the Mesh browser ” and “”, ”trigger points”, ”myospasms”, ”myofascial pain dysfunction syndrome”, “facial myalgia”, and ”taut bands”. and limited by "Human", "English". An extensive search of literature was performed on database such as MEDLINE, PubMed and Google Scholar.

### Eligibility Criteria

The inclusion and exclusion criteria in this systematic review were the following: Inclusion Criteria were on management of myofascial pain dysfunction syndrome with three different treatment modalities i. e., Pharmacological, Physical and Occlusal therapy, patient diagnosed with myofascial pain dysfunction syndrome and article published in English. Exclusion criteria were article language other than English, no editorial abstract, only published articles, no dissertation, auditorial or case report. No date limits were applied to guarantee the inclusion of all relevant articles.

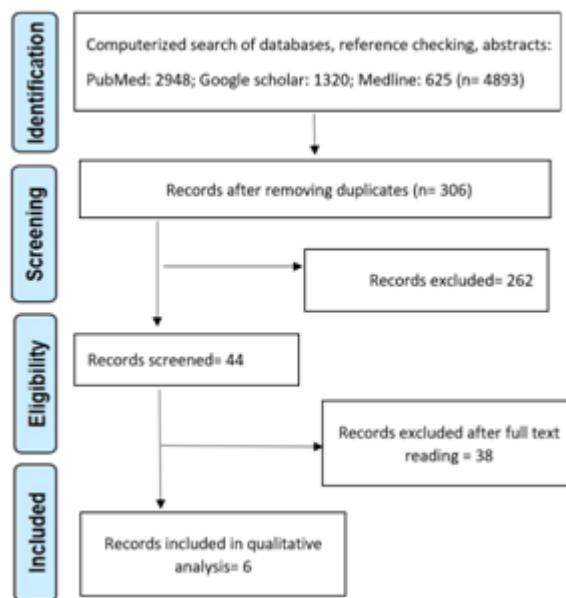
### Selection of Studies

The characteristics of the keywords used by the participating authors to sort the articles were based on the abstract read or the whole text complete. In general, the author then chose the manuscript based on the predetermined inclusion criteria. Then, all selected abstracts and full texts were evaluated. The eligibility criteria priority sequence is participants, study design, type of intervention, outcome measures and absence of exclusion criteria. If an article could not be excluded based on its title and abstract, it was judged for potentially relevance, and its full text was examined. If an article was ambiguous with regard to inclusion or exclusion, the full text was examined. Authors were approached by email, if

required for clarity (a maximum of two attempts1 week apart). Articles were included if there was an agreement between both reviewers about the eligibility criteria. A third reviewer arbitrated in the case of discrepancy of reviewers’ opinion following discussion. The agreement between reviewers was reported. A PRISMA flow diagram was used to present the included and excluded articles with reasons for exclusion.

### Extraction of Data

The author involved conducted evaluation of article based on inclusion and exclusion criteria. Data extracted were on management of myofascial pain dysfunction syndrome with three different treatment modalities i. e., Pharmacological, Physical and Occlusal therapy, patient diagnosed with myofascial pain dysfunction syndrome. Both reviewers had independently extracted information. Any discrepancies between reviewers were mediated by a third reviewer.



## 3. Result

Figure 1 stated the initial search resulted in 4893articles. After removing the duplicates and screening the title and reviewing the full-text articles, 44 articles were screened. After screening, reviewing and selecting those articles, only 6 articles met the inclusion criteria. Table 1 describes the6 articles in this systematic review, which are clinical trials that concerns three different modalities in the management of myofascial pain dysfunction syndrome that is Pharmacological, Physical and Occlusal therapy. The clinical study has no date limits applied.

Study	Population	Sample Size (patients)	Demographic Details (years)	Groups	Outcomes
Venkatesh Naikmasur et al	Indian	40	17-55	Group A-20 PATIENTS with pharmacotherapy Group B-20 patients with occlusal therapy	Occlusal splint therapy has better long-term results in reducing the symptoms of MPDS.
P. Nicolakis	Austrian	20	11-34	20 patients received exercise therapy	Exercise therapy seems to be effective in management of MPDS
Patricia H.	Australian	34		Group 1-20 patients with Local	relaxation therapy with biofeedback was

Trott et al				treatment to the temporomandibular joint Group 2-14 patients with General relaxation therapy with biofeedback	successful in 19 of 24 patients (80 %) treatment aimed at restoring a painless range of movement to the TMJ was successful in six of 10 patients
Payal Tripathi et al	Ndian	60	17-55	Group A-30 patients received TENS Group B-30 patients received occlusal splint therapy	Occlusal splint therapy has better long-term results in reducing the symptoms of MPDS. It has better patient compliance, has fewer side effects
Charles S. Greene et al	American	90	25-60	Each patient received meprobamate or placebo	Of the 90 patients studied, 58% reported some improvement after taking the drug
A. M. Talaat, MC H et al	Egyptian	120	13-57	Group 1-40 patients received methocarbamol plus acetyl salicylic acid Group 2-40 patients received shortwave diathermy Group 3 consisted of 40 patients who received ultrasonic therapy for 5 minutes daily	Evaluation revealed marked relief of symptoms by the use of physical therapy, and the best results were obtained by the use of ultrasonic therapy

### Effectiveness of Occlusal Therapy

Two studies examined the effect of occlusal therapy on myofascial pain dysfunction syndrome. One study examined the efficacy of occlusal splint therapy and compare it with transcutaneous electrical nerve stimulation (TENS) in the management of MPDS. Payal Tripathi et al found that there was a progressive decrease in VAS, number of tender muscles, TMJ clicking, and tenderness with various jaw movements, and there was a significant improvement in mouth opening in patients on occlusal splint therapy during the follow-up period when compared with TENS therapy group and concluded that Occlusal splint therapy has better long term results in reducing the symptoms of MPDS. Venkatesh Naikmasur et al did a prospective study to evaluate the efficacy of occlusal splint therapy and compare it with pharmacotherapy in the management of Myofascial Pain Dysfunction Syndrome. concluded that Occlusal splint therapy has better long-term results in reducing the symptoms of MPDS. It has better patient compliance, fewer side effects, and is more cost-effective than pharmacotherapy; hence, it can be chosen for the treatment of patients with MPDS.

### Physical Therapy

Three studies examined the effect of physical therapy on myofascial pain dysfunction syndrome. In one study Myofascial Pain Dysfunction (M. P. D.) syndrome of the masticatory system were investigated and treated using physiotherapy techniques. Concluded that generalized relaxation therapy with biofeedback was successful in 80 % of the patient. P Nicolakis et al did a study on effectiveness of exercise therapy on management of myofascial pain dysfunction syndrome and he found that exercise therapy seems to be useful in the management of myofascial pain dysfunction syndrome. AM tall at et al did a study of the effectiveness of physical therapy for patients with myofascial pain dysfunction syndrome. In this study he compared the physical therapy with pharmacotherapy and electric diathermy. Evaluation revealed marked relief of symptoms by the use of physical therapy, and the best results were obtained by the use of ultrasonic therapy.

### Pharmacotherapy

Charles S. Greene et al did a study on effectiveness of Meprobamate therapy for the myofascial pain-dysfunction (MPD) syndrome. Ninety patients with the MPD syndrome

were evaluated for the effectiveness of Meprobamate therapy and he found that of the 90 patients studied, 58% reported some improvement after taking the drug.

## 4. Discussion

The successful management of patients with MPD syndrome is dependent on establishing an accurate diagnosis and using proper therapy based on an understanding of the etiology of the disorder. Establishing an accurate diagnosis is accomplished by taking a careful history, doing a thorough examination, and having a knowledge of the various other conditions that can produce signs and symptoms similar to those of MPD syndrome. Using proper therapy is related to recognition that MPD syndrome is a stress-induced psychophysiological disease originating in the muscles of mastication and not an organic disease arising in the temporomandibular joint.<sup>(13)</sup>

The unifying concept proposed by Lermank-holds that MPDS results from the interplay of an unbroken chain of etiological factors.<sup>(14)</sup> The psychologic factors leads to an overall increase in masticatory muscle activity, while other factors such as occlusal and anatomic lead to selective increase in muscle activity.<sup>(15)</sup> Thus, therapy should be directed at reducing stress, relaxing tense jaw muscles, and creating an awareness by the patient of the causes of the problem, rather than at analyzing occlusion, measuring joint spaces, and producing irreversible structural changes in the dentition and the articulation.<sup>(16)</sup> Spasms of the elevator muscles can be relieved by allowing the patient to open his jaws in the terminal hinge.<sup>(17)</sup> The MPD syndrome is a psycho physiologically altered condition involving the muscles of mastication and cervical group of muscles. The condition characterized by dull aching, radiating pain often results in muscle spasm and restricted movements.<sup>(18)</sup> Various treatment modalities for MPDS have been tried and tested over time. Choosing a specific conservative treatment modality for patients with MPDS depends on clinicians' expertise, patient presentation, and elimination of possible etiologic factors<sup>(19)</sup>. This study evaluates the efficacy of occlusal therapy, pharmacotherapy and physical therapy in the management of myofascial pain dysfunction syndrome.

Deep stroking massage is a safe and effective method applied directly to the TrP. Effectiveness of trigger point massage depends largely on ability to recognize referred pain and to trace it back to the trigger point that is causing it.

<sup>(20)</sup> Ultrasound therapy using sound waves transmitting through sound conducting gel to the tissues leads to break down of scar tissue, relaxation of muscle and improvement in local circulation. Some researchers claim that use of ultrasound in myofascial disorders is based on empirical experience and lacks firm evidence for concluding statistically significant pain improvement after ultrasound therapy. While Majlesi and Unalan 2004 are in favor of use of high-power ultrasound than conventional ultrasound for treating patients of acute myofascial pain. Transcutaneous electric nerve stimulation involves application of electrodes connected to a small battery-powered unit along the painful muscle and is a form of electroanalgesia. <sup>(21)</sup> A low level of electrical stimulation is applied to relieve muscle tension and pain. Graff-Radford et al. 1989 studied the effect of TENS on myofascial pain and trigger point sensitivity and observed pain reduction occurs with 100 hz, 250 ms stimulation followed by 100 hz, 50 ms. No pain reduction found in 2 hz, 250 ms. They suggested that high frequency, high intensity TENS is effective in reducing myofascial pain without having any effect on local trigger point sensitivity. <sup>(20, 21)</sup>

Biofeedback is a method of providing training to the patients to control certain involuntary bodily functions. The three most commonly used forms of biofeedback therapy are: EMG: Which measures muscle tension; thermal biofeedback: Which measures skin temperature; neurofeedback or EEG: Which measures brain wave activity. Turk et al. compared the effect of intraoral appliance and biofeedback for pain management in 80 patients with TMD. They found intraoral appliance to be more effective than the biofeedback treatment in reducing pain initially after treatment, but at a 6-month follow-up the intraoral appliance group significantly relapsed, especially in depression, whereas patients on biofeedback therapy maintained improvements on both pain and depression and continued to improve. They also found combined treatment approach was more effective than either of the single treatments alone. <sup>(20, 22)</sup>

Aim of occlusal splint therapy is to establish neuromuscular harmony in the masticatory system by creating a mechanical disadvantage for parafunctional forces with removable appliances. Occlusal splints allow relaxation of masticatory muscles, protect the teeth and jaws from the adverse effects of bruxism, and normalize periodontal ligament proprioception. Occlusal splints also allow repositioning of the condyles and jaws into centric relation. Even small occlusal interferences can cause changes in muscle activity coordination. Occlusal splints promote muscle relaxation by providing a platform for the teeth that allows for equal distribution of tooth contacts, immediate posterior tooth disclusion in all movements (with anterior guidance), and reduced stress on the joint. <sup>(20)</sup> In patients who have symptoms associated with increased nocturnal muscle activity, a soft occlusal splint is likely to be contraindicated. <sup>(11)</sup>

As myofascial pain commonly result of clinical states like increased muscle tension, muscle spasm, spasticity and trigger point formation therefore the role of muscle relaxants in relieving pain is found to be beneficial and repeatedly being investigated. Tizanidine is the one most frequently used centrally acting muscle relaxant having alpha-2-adrenergic agonist properties, which decrease the muscle spasm, and is thought to prevent release of excitatory amino acids by suppressing polysynaptic excitation of spinal cord interneurons. Nonsteroidal anti-inflammatory drugs (NSAIDs) are one of most commonly used drugs for MPS as they are readily available and have a relatively mild side-effect profile. Their use is appealing because of their analgesic and anti-inflammatory properties. <sup>(19)</sup> Thiocolchicoside is another agent that functions as an anti-inflammatory and analgesic, as well as a muscle relaxant. It exhibits selective affinity for the inhibitory gamma-aminobutyric acid and glycinergic receptors. It has an agonistic action at the spinal-strychnine-sensitive receptors that could mediate its myorelaxant effect. Since stress and psychiatric disorders are one of the factors predisposing to myofascial pain therefore antidepressant medications has been considered for pain control in such patients. Hence tricyclic antidepressants (TCA's) are also group of drugs included by many clinicians in the prescription given to patients of myofascial pain. TCA's have a more predictably positive effect on sleep continuity and slow-wave sleep than do the popular selective serotonin reuptake inhibitors.

**Table 2: Risk of Bias**

Study	Unclear	Low	Moderate	High
Venkatesh Naikmasur et al		#		
P. Nicolakis		#		
Patricia H. Trott et al		#		
Payal Tripathi et al		#		
Charles S. Greene et al		#		
A. M. Talaat, MC H et al				#

## 5. Conclusion

The result obtained is that the three interventions are effective in treatment of patient with mpds but further studies should be conducted with large sample size and exclusive comparison between drug, occlusal therapy and physical therapy. This review of treatment in MPS finds that most interventions demonstrate a limited body of evidence for their use. The MPD syndrome is a psychophysiologically altered condition involving the muscles of mastication and cervical group of muscles. Occlusal disharmony and psychosocial variable also have been shown to play an aggravating role in MPDS. An accurate diagnosis is accomplished by careful history taking and thorough examination. Myofascial trigger points are a likely source of musculoskeletal disorders, especially in the workplace, and are commonly overlooked as a cause. The treatment for MPS should focus primarily on identifying and correcting the underlying cause of the symptoms. The complex pathology of MPS with its underlying central and peripheral neural mechanisms may contribute to the difficulty in treating MPS, particularly in the chronic setting. Treatment of MPDS finds that most interventions have demonstrated a limited body evidence for their use.

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