

# Management of myofascial pain: a systematic review



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## Abstract

**Objective:** To investigate the current treatment on myofascial pain in the last 5 years.

**Methods:** Electronic database were systematically searched in PubMed and Wiley to find articles related to treatment of myofascial pain that were published in last 5 years.; Keyword or MESH that used in this study were management, treatment, myofascial pain, myofascial syndrome and temporomandibular disorder.

**Results:** There were 86 articles found in initial search, and only 17 were used as final articles after a selection using PICO questions. The number of female experiencing myofascial pain is 385 (94%) while men only 23 (6%) of the total sample of 408 people. The muscle involved in this

study were masseter and temporal, with 3 (20 %) involved masseter and 12 (80 %) involved both muscle. The studies reported that the treatment use for this case were 7 (41%) with low-level laser therapy, 4 (23%) used treatment with drugs, 3 (17%) used occlusal device therapy and the other used dry needle, masseter nerve block and massage on temporal and mass muscle.

**Conclusion:** This systematic review concluded that low level laser therapy was the most selected treatment in the last 5 years studies. Myofascial pain was predominantly found in female than male and muscle that involved in this treatment were masseter and temporalis muscle.

**Keyword:** Management, Myofascial, Myofascial Syndrome, TMD, Treatment

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## Introduction

The Epidemiological studies have shown that 75% of the population have at least one TMD sign and 33% at least one symptom.<sup>1</sup> The etiology of myofascial pain is known for multiple factors including psychological factors, occlusion imbalance, para-functional habits, hereditary factors and psychological factors of systemic. Some of the patient's symptoms such as headache, facial pain and neck and limitations open mouth.<sup>2</sup>

The vicious cycle theory shows a triggering factor of myofascial pain as a muscle that is often used which results in a reflex of pain causing fatigue and muscle spasms. In general, patients with myofascial pain disorder have difficulty in the process of mastication hard food or chewy.<sup>3</sup>

The pathogenesis of TMJ disease, however, is still being investigated. Major elements identified in this multifactorial disease process include trauma and joint overloading (e.g. bruxism), hypoxia-reperfusion cycles, oxidative injury, accumulation of inflammatory mediators in the synovial fluid (ie. PGs, LTs, ILs, and TNF-alpha), psychological factors (i.e. anxiety and depression), stress, genetic alterations (i.e. connective tissue mutations), hormonal factors, low pain thresholds, inadequate pain modulation, and others.<sup>4</sup> The first step in the clinical management of temporomandibular disorders is to distinguish the source a problem,

classifying into a problem of muscle or joint, which has been understood to be an important process. Although the exact mechanism for the symptoms or pathology of these conditions has not yet been clarified, muscle parafunction or hyperfunction has been recognized to play an important role in the etiology of TMD.<sup>5</sup>

Many treatment modalities have been described for the treatment of musculoskeletal disorders. In the case of TMD, the treatments available vary according to the involvement of muscle and joint structures, to the clinical signs and to the onset of the problem. The treatments of choice are usually conservative and reversible and involve education and counseling of the patients, cognitive behavioral therapy, pharmacotherapy, use of interocclusal devices and physiotherapy, normally used in a combined way depending on the TMD diagnosis. The treatment goal for patients with myofascial pain aims to control pain and to recover masticatory function.<sup>6</sup>

This study provides a description, alternative and effective treatment of myofascial pain associated with TMD over the past 5 years.

## Methods

The systematic review is written using the PRISMA guidelines (Preferred Reporting Items for Systematic reviews and Meta-Analyses), using

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PICO question (population, intervention, control, outcome) in systematic review: management of myofascial pain.

Kriteria Inklusi; articles in English, any research study published between January 2013 to December 2017, research that explains treatment / management myofascial associated with TMD, comply the criteria in PICO questions, the author gets a full text journal, keywords used relate to temporomandibular disorders. Kriteria Eklusi; all of which are not included in the inclusion criteria, journals that by systematic review method.

Search using the “management” or “treatment” and “Myofascial Pain” or “Myofascial Pain Syndromes” and “temporomandibular” keywords on Pubmed and wiley search engines. As shown in [figure 1](#), there are 77 journals in pubmed and 9 journals on wiley but there are 2 journals that have the same title on both search engines totaling 84 journals. After screening on title and abstract there are 21 journals with expected inclusion criteria and 64 journals with exclusion criteria. There are

4 relevant journals that do not have full text. finally the authors got 17 journals accordingly.

## Results

The results of systemic analysis showed that most of myofascial pain suffered by women 94% (n = 385) than males 6% (n = 23). However, some journals also have no research subjects in their study [figure 2](#). Muscles involved in 17 journals as much as 80% (n = 12) in masseter and temporal muscles, 20% (n = 3) were only temporal muscle and there was not masseter muscle involved but 3 study not available were muscle involved [figure 3](#).

It was reported that 7 treatments were performed in 5 years ago. The use of low-level laser therapy is mostly used 41% (n = 7), treatment with drugs (Botulinum toxin A, tizanidine, ciclobenzaprine, melatonin) amount 23% (n = 4), occlusal device therapy as much as 17% (n = 3) and dry needle, masseter nerve block, massage on temporal and mass muscle severally 1 report [figure 4](#).

**Table 1** The reviewed studies based on PICO-like structured reading

No.	Study first author, year	Population	Intervention	Comparasion	outcome	Location
1	Nick Thomas, 2017	n = 52 female patients All patients were evaluated and treatment of TMJ and myofascial arthralgia at university michigan in 2011 and 2014	intramuscular injection of botulinum toxin A given to the masseter and temporalis muscles.	Patients who refuse treatment are due to costs covered	Botulinum toxin A clinically decreased the pain score compared to the control group.	Masseter and temporalis
2	Lais Valencise Magri, 2016	n = 91 female aged between 18 and 60 years	Low level laser therapy applied to the established point, twice a week, eight sessions (780 nm; masseter and anterior temporal = 5 J / cm <sup>2</sup> , 20 mW, 10 s; Area TMJ = 7.5 J / cm <sup>2</sup> , 30 mW, 10 s).	None	Low level laser therapy active or placebo is effective in reducing subjective perceptions myofascial pain (VAS index and SF-MPQ);	Masseter and anterior temporalis
3	Paloma María Blasco-Bonora, 2016	17 subjects (11 female, 6 male) aged 39 ± 13 years (range 23-66) was diagnosed with myofascial, Sleep Bruxism and TMD	Dry Needle on muscle masseter and temporalis. The procedure is based on the needle method described by Hong where the muscle is repeatedly stabbed rapidly, then partially withdrawn, the needle in and out of Myofascial trigger point, bringing up a local twitch response with some insertion.	none	Dry needle active muscle masseter and temporalis in myofascial patients TMD and Sleep Bruxism show statistically significant and clinically important rapid on recovery in pain within 1 week.	Masseter and temporalis

**Table 1** *Continues*

No.	Study first author, year	Population	Intervention	Comparasion	outcome	Location
4	Bethânia Molin Giaretta De Carli, 2015	n = 15 subjects unilateral or bilateral myofascial pain conditions lasted more of a month male and female not available	Laser group, Seven applications performed at 48 hour intervals between each app (session), excluding weekends. The laser dose is determined according to the manufacturer's protocol (DMC).	Toxin group, 500 U of type A botulinum toxin was used. In the first Session, 30 U is applied per dot, in two shallow points of the maseter muscle and at one point the temporal muscle (the center). Fifteen A few days later, 15 U was applied per point, as well as the first session	Both therapies are effective in reducing pain, but low-grade laser effects are faster than the use of BTX-A. Both treatments were not showed statistically significant increase in mouth opening.	Masseter and temporalis
5	Samuel Y. P. Quek, 2015	n = 60 subject between 17 and 90 years old male and female are not available	n = 20 masseteric nerve block.	n = 20 intra-oral stabilization, n = 20 trigger point injection or	masseteric nerve block provides immediate and ongoing therapeutic effects for management Myofascial pain at least two weeks.	masseter
6	Yoshiko Arij, 2015	n = 41 subjectTMD with myofascial pain (8 male, 33 female, Average age: 46 years)	Massage using Robot with two types of massage: Petrissage and effleurage Petrissage involves rotational motion at two points on each muscle. Egleurage consists of movement of friction along the muscle surface.	none	This study proves the safety of massage treatments. Massage is effective in 70.3% of patients	Masseter and temporalis
7	Larissa Soares Reis Vilanova, DDS,, 2014	n = 50 male with myofascial pain	The stabilization device were used for 8 weeks	Before to treatment using a stabilization tool	Pain reduction after use of the stabilization device	Not available
8	Fransisco Guedes pereira de alencar juni, 2014	n = 55 subject diagnosis myofascial pain	Using treatment TZA group therapy (tizanidine 4 mg), or CYC group (cyclobenzaprine 10 mg).	placebo-control clinical trials to evaluate effectiveness addition of cyclobenzaprine or tizanidine to the patient	Use of tizanidine or cyclobenzaprine was ineffective than placebo for the management of patients with myofascial pain when awakened	masseter
9	Nermin Demirkol, 2014	n = 30 subject diagnosis myofascial pain	The first group is occlusal splint (OS) group A (n = 10)	The same parameters and the application duration was used for the placebo group, but the patients were not irradiated	There was no significant difference between low level laser therapi and occlusal splint groups after treatment. effective for lowering Myofascial Pain. In addition, LLLT is as effective as occlusal splint to relieve pain.	Masseter
10	Jeniffer Holley Rodrigues, 2013	n = 10 subject 9 female and 1 male	axes I and II of RDC / TMD after Laser Phototherapy.	axes I and II of RDC / TMD before Laser Phototherapy.	Laser Phototherapy (LPT) is able to relieve pain and improvement of jaw movement in elderly patients with TMD	Not Available

Table 1 Continues

No.	Study first author, year	Population	Intervention	Comparasion	outcome	Location
11	Melissa de Oliveira Melchior, 2013	n = 12 subject female between 18 – 60 years old	laser applications were performed in two sessions every week for four consecutive weeks, totaling eight sessions.	Prior to laser treatment application	Low intensity laser therapy significantly reduce pain immediately after treatment	Masseter and temporalis
12	BILGE GÖKÇEN-RÖHLIG1, 2013	n = 20 (14 female and 6 male)	Patients exposed to laser applications from a distance of 2 mm three times each week, a total of 10 sessions.	Twenty healthy volunteers were included in this study as a control group.	This type of low level laser therapy is effective for pain relief but does not give effect to physical improvement	Masseter and temporalis
13	Liliane Pinto Vidor, 2012	n = 32 Subject Female between 20 -40 years old	For four weeks (28 days), per oral melatonin tablet 5 mg given at bedtime	For four weeks (28 days), placebo therapy given at bedtime	This study provides additional evidence supporting the analgesic effect of melatonin on pain and analgesic consumption in patients with chronic myofascial TMD pain from mild to severe. Furthermore melatonin improves sleep quality but its effect on pain does not seem to depend on changes in sleep quality.	Masseter and temporal
14	Mila Leite de Moraes Maia, 2012	n = 21 subject 19 female and 2 male	The low level laser therapy was applied in emission mode and in essence application mode, perpendicular to the radiation area; Frequency twice a week for 1 month, for a total of eight sessions.	group placebo programmed for used in wavelength (660 nm)	Both groups showed decreased pain intensity at the end of treatment	Masseter and temporal
15	Andrew J. Sidebottom, 2012	n = 62 subject female	botulinum injections into masticatory muscles (masseter, temporalis, or pterygoid) are diagnosed clinically masticatory myofascial pain.	None	Botulinum Injection can not completely excite myofascial pain, but it usually has some beneficial effects in correcting the symptoms, and should be is considered an alternative treatment for masticatory myofascial pain if conservative methods have failed.	Masseter and temporal
16	M. DOEPEL, 2011	n = 65 Subject woman or mal not available	Prefabricated device, made of polymethylmetacrylate	appliance stabilization device	Both of devices have the effectiveness of reducing TMD pain.	Not available
17	P. C. R. CONTI, 2012	n = 51 subject woman or mal not available	1. This group consists of 21 subjects got a stabilization devices with acrylic and counseling for habits and behavioral changes 2. This group consisted of 16 subjects who received nociceptive trigeminal inhibitory	(NTI) therapy and an explanation of behavior change Consisting of 14 patients with counseling for behavioral change, without using intra-oral devices.	The simultaneous use of occlusal devices appears to produce an earlier improvement.	Msseter and temporal

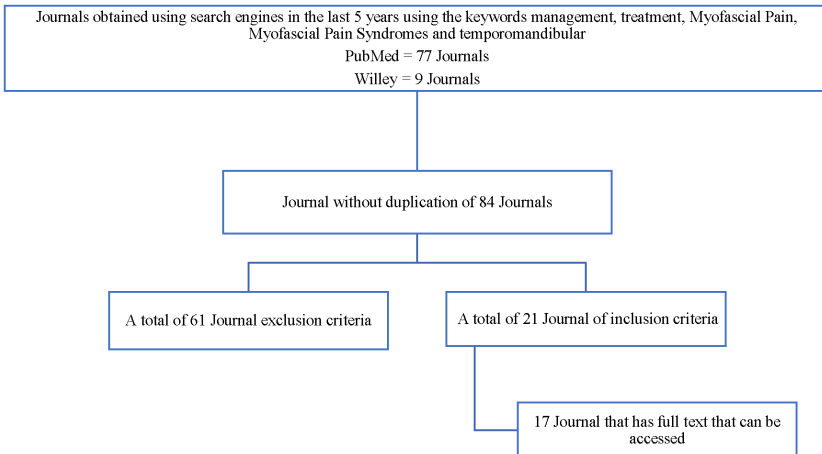


Figure 1 Article selection flow chart

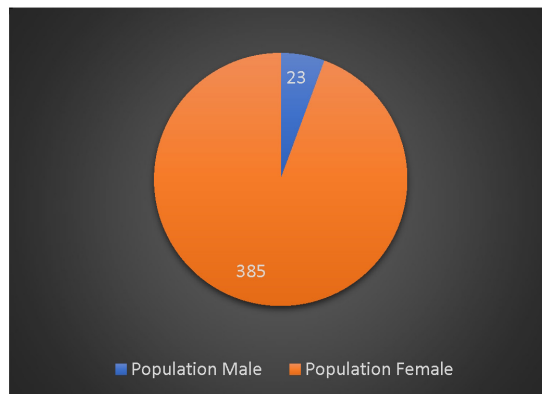


Figure 2 Total Sample Study

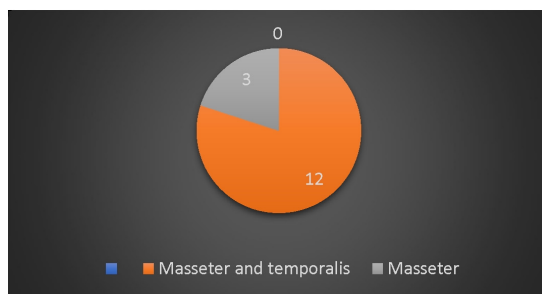


Figure 3 The muscle involved in this study

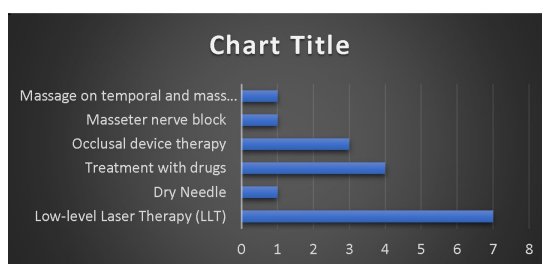


Figure 4 Treatment myofascial pain

## Discussion

In the last 30 years, there has been growing interest in investigating the effects of low laser therapy and its various clinical applications in different medical specialties, as either a single or a complementary therapy.<sup>7</sup> Low Level Laser Therapy is a non-pharmacological therapeutic modality that is easy to apply, safe, and affordable. A meta-analysis published in 2015 provides the best current evidence effectiveness in the treatment of TMD. The Low Level Laser Therapy has proven to have anti-inflammatory and analgesic effects when applied in specific regions, such as the inflamed TMJs of rats.<sup>1</sup> another study report that Low-level laser therapy is frequently used to treat various pain associated conditions, including musculoskeletal pain disorders, because of its analgesic, myorelaxant, tissue-healing and biostimulation effects.<sup>8</sup>

In other studies the laser therapy showed an effects which demonstrated, such as the release of endogenous opioids, reduction in the production of COX-2 and prostaglandin, lymphocyte metabolism and the secretion of histamine, kinins and cytokines, such as TNF- $\alpha$ , IL- $\beta$ , IL-6, and TGF- $\beta$ .<sup>9</sup>

The 4 study reported using treatment of drugs (Botulinum toxin A, tizanidine/cyclobenzaprine, analgesic melatonin). Non-surgical treatment modalities (i.e. soft diet, NSAIDs, oral appliances, etc.) represent the first line of treatment for temporomandibular disorders. The benefits of using botulinum toxin A for myofascial pain in the setting of temporomandibular disorders include minimal administration time, proven reduction in bite force, potential reduction in pain score, and low risk of complications. The disadvantages include cost (although comparable to occlusal appliance therapy and physical therapy), unpredictable response, and possible need for repeat injections.<sup>4</sup> Tizanidine acts as a central muscle relaxant. It has been demonstrated in animal studies that doses below those required for producing muscular relaxation have an antinociceptive effect.<sup>10</sup> Cyclobenzaprine has effects similar to those of tricyclic antidepressants on the improvement of sleep quality and pain, with an additional muscle relaxant effect.<sup>11</sup>

The occlusal device therapy is a noninvasive and reversible biomechanical method commonly used for myofascial pain treatment and had been reported to decrease pain symptoms between 70% and 90%. Its may increase the vertical dimension, thereby reducing the load on the TMJ structures,



which eliminates occlusal interferences and increases peripheral input to the central nervous system.<sup>3</sup> General practitioners claim that adjustment of a stabilisation appliance is a difficult and time-consuming procedure. It is therefore of interest to find an easier procedure for fabricating an appliance that has the same effectiveness as the stabilisation appliance.<sup>12</sup>

Different conservative treatments deep dry needling in which a solid filament needle is inserted into the myofascial trigger points. Applied dry needling with intramuscular stimulation of temporalis and masseter in patients with myofascial TMD pain and observed immediate improvements in pain and tenderness, but not pain-free maximal jaw opening.<sup>13</sup>

The therapeutic effect of the block appeared to outlast the duration of the action of the local anesthetic effect in patients. However, Side effects of masseteric nerve block can temporary loss of contraction of the orbicularis oculi muscle on the side of the block, bruising and infection. local anesthetic effect may temporarily impair both the sensory and the motor innervation to the muscle. The masseter was selected because the masseter is a single muscle, and the masseteric nerve is easily accessible.<sup>14</sup>

Massage is one of methods of physical therapy. Massage repeatedly compresses muscles, drains pain mediators to the lymphatic system, and stimulates blood circulation. it effectively reduces muscle swelling, restores the normal osmotic pressure of interstitial fluid, and thus reduces muscle edema. Massage improves muscle imbalance, and then relieves pain, and improves mouth opening.<sup>15</sup>

This study showed more female than male diagnosed myofascial pain related to several hypotheses in the literature about the high prevalence of TMD, such as hormonal and bio-behavioral factors. This is supported with Silveira, et al. found the index percentage of females with TMD to be higher than males. (16) The masseter and temporalis have been found to be the most prevalent muscles presenting active MTrPs in patients with myofascial TMD.<sup>13</sup>

This study had some limitations, the source of the references obtained in the last 5 years using only 2 search engine journals and this study did not discuss characteristic about each treatment performed.

## Conclusion

Based on published systematic review for the last 5 years from pubmed and willey serach engine, the low laser therapy is the most treatment used.

The both of masseter and temporalis muscle are involved on myofascial pain and the number of patients with myofascial pain most female than male.

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## Conflict of Interest

The authors report no conflict of interest.

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