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Effectiveness of Counselling and Home Care Self-Management Strategies in Reducing Masticatory Muscle Pain: A Review

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Summary

This systematic review summarizes the effectiveness of counselling strategies by health professionals on self-management and home care in reducing masticatory muscle pain. A literature search of Medline, Cochrane database, Google scholar and a manual search of the references of the shortlisted articles from 2006 to 2016 was performed following a PICO question resulted in finding 76 articles. When inclusion and exclusion criteria were applied, six randomized controlled trials were selected and critically appraised. The six studies were divided in to three groups. In group A (splint therapy versus home care), Truelove (2006) ($p<0.0001$) and Conti (2012) ($p<0.05$) reported a significant decrease in the pain intensity from the baseline to the follow up visits with no difference between the groups; Michelotti (2012) favored self-care strategies over splint therapy ($p=0.17$). In group B (manual therapy versus home-care), Craane et al (2011) reported no difference between the experimental and control groups after a 1-year follow-up ($p>0.2$). Tuncer et al (2012) concluded that in the short-term, manual therapy in conjunction with the home physical therapy was more effective than home physical therapy alone ($p =0.009$). In group C (pharmacologic treatment versus home-care), Alencar et al (2014) reported no added benefit of a muscle relaxant with the home care strategies ($p<0.0001$). In conclusion, home-care, counselling and self-education should be the first line of treatment for the patient with masticatory muscle pain. Other therapies' are adjunct management approaches. Pain conditions must be managed within a biopsychosocial framework and the dentist–patient relationship is important.

Keywords: Facial Pain; Orofacial Pain; Myofascial Pain Syndrome; Temporomandibular Disorders; Temporomandibular Joint Dysfunction Syndrome; Self-Care; Counselling; Education; Home-Care

Introduction

Temporomandibular disorders (TMDs) are a broad term that contains a number of disease entities, such as pain in the masticatory muscles and temporomandibular joints, headache, disturbances in jaw movements and sounds in joints while opening and closing the mouth (1).

Biological, anatomical, biomechanical, behavioral, environmental and/or emotional factors affect the masticatory system, contributing to the development of signs and symptoms and/or perpetuation of TMD. Therefore, TMD can be considered a multifactorial disease entity (2). Table 1 shows the different theories for TMD which were proposed.

TMDs are a significant public health problem affecting approximately 5% to 12 % of the popula tion (3). TMDs are the second most common musculoskeletal condition (after chronic low back pain) resulting in pain and disability. Pain related TMD can impact individual's daily activities, psychosocial functioning, and quality of life.

Masticatory muscle pain (MMP) is the most common form of TMD. The main symptoms of this condition are pain, limited jaw movements or a combination of the two, and they usually are aggravated by function and movement (4).

Other symptoms that patients with masticatory muscle pain frequently experience are psychological disturbances such as anxiety and depression and

poor sleep quality (13).

Overall, the annual management cost for TMDs in the USA, not including imaging, has doubled in the last decade to $4 billion. This creates a growing financial burden on healthcare system (3).

According to Wright and Schiffman (1995), self-care management has been considered effective in 60% to 90% of patients' with myofacial pain and should be included as a standard procedure in the initial treatment plan because home-care strategies will reduce the cost to the patient and overall cost to the health care system (14).

Table 1: Theories concerning etiology of TMD origin - (2).

Name of the theory	Statements of the theory
Mechanical displacement (Costen) (5)	Lack of support in lateral teeth or functional occlusal premature contacts lead to direct eccentric positioning of the condyle in the glenoid fossa; this leads to pain, ear symptoms, adverse muscle activity and TMD
Trauma theory (Zarb and Speck)(6)	The principal factor of TMD is micro-/macro-trauma; trauma can cause structural alternation to the muscles or directly to the joint structures
Biomedical (Reade)(7)	The disorder is initiated by trauma; specific factors (malocclusion, parafunctions, occupational activities) cause the progression of the symptoms
Osteoarthric (Stegenga)(8)	Osteoarthrosis is a main cause of TMD; muscular symptoms and systemic diseases are secondary to TMJ pathology
Muscle (Travell and Rinzler)(9)	Masticatory muscles are the primary etiologic factor to TMD; myalgia (caused by chronic myospasm) is secondary to parafunctions and can refer pain to TMJ
Neuromuscular (Ramfjord)(10)	Occlusal problems cause TMDs, the loss of occlusal equilibrium leads to the incoordination of muscles and spasms
Psychophysiological (Schwartz and Laskin)(11)	TMD occurs outside of the physical factors; psychosocial factors play a crucial role in TMD pathogenesis – the main factor of hypertension and over contraction of the muscle is due to the parafunctions performed to relieve stress
Psychosocial theory (Dworkin)(12)	Emotional disturbances induce hyperactivity of the muscles and lead to parafunctional habits and occlusal anomalies; the muscle contractivity is accentuated with teeth clenching, and repeatability leads to pain

The objective of this systematic review is to summarize the literature on the effectiveness of counselling strategies imparted by health professionals such as dentists (who are not formally trained in counselling) on self-management and home care in reducing signs and symptoms of masticatory muscle pain and compare the results with other treatment approaches.

Material and Methods

To identify the studies that compare home care self-management and any other methods for the treatment of masticatory muscle pain, a literature search was carried out through Medline via OvidSP, Cochrane database of systemic review via OvidSP, Google scholar as well as manual searches from the references of the selected articles. Figure-1 shows the PICO question for the literature search.

The literature review covered the period 2006 to 2017 and used the following MeSH heading terms: 'facial pain', 'orofacial pain', 'myofascial pain syndrome', 'temporomandibular disorders', 'TMD', 'temporomandibular joint dysfunction syndrome', 'habit reversal', 'self care', 'counselling', 'education' as shown in Figure 2

A PICO question was developed and followed for the search

"How effective is the counselling and home care self-management strategies in reducing the signs and symptoms of masticatory muscle pain in comparison to other treatment approaches?"

P – Patient diagnosed with the masticatory muscle pain (MMP)
I – Counselling and home care self-management strategies
C – Other strategies than mentioned in the intervention
O – Reduction in signs and symptoms of masticatory muscle pain

Figure-1 PICO question for the literature search

With this search 74 studies were retrieved. Titles or abstracts of all studies were read. With the basic scan 17 articles were short listed. Based on the inclusion and exclusion criteria five studies were in

cluded in this literature review. References of these studies were hand searched and one more study was added to the review. All together six article were critically appraised and results were concluded. The process of including articles in the review is shown in the Figure 3.

The reasons for exclusion of 12 studies:

- No control group
- Review articles
- Not a randomized controlled trial
- Study group not including masticatory muscle pain

Inclusion criteria

- Studies published in English
- Randomized control trials between 2006 to 2016
- Studies comparing home-care self-manage strategies for the MMP

1	facial pain.mp. or exp Facial Pain/	9583
2	orofacial pain.mp.	1270
3	exp Myofascial Pain Syndromes/	6099
4	temporomandibular disorder$.mp.	3182
5	TMD.mp.	3687
6	temporomandibular joint dysfunction syndrome.mp. or Temporomandibular Joint Dysfunction Syndrome/	4829
7	1 or 2 or 3 or 4 or 5 or 6	18394
8	habit reversal.mp.	175
9	self care.mp. or exp Self Care/	51325
10	Counseling/ or counselling.mp.	45704
11	Education/	19261
12	8 or 9 or 10 or 11	115259
13	7 and 12	188
14	limit 13 to "review articles"	25
15	13 not 14	163
16	limit 15 to english language	146
17	limit 16 to yr="2006 - 2016"	74

Figure 2: Shows the search in the Medline via Ovid SP

Exclusion Criteria

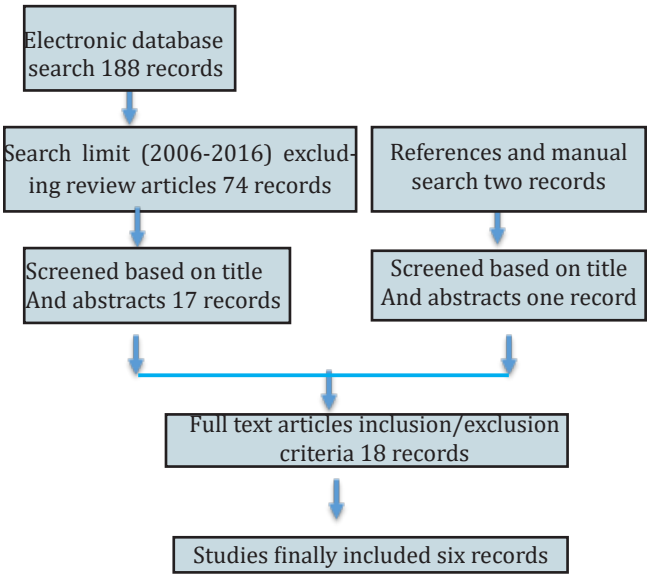
- Review article
- Studies with systemic impaired patients or another health complication
- Studies with sample that receives a regular prescription of medications or involved in physical or cognitive behavior therapy guided by professional psychology and/or physiotherapy professionals
- Sample with major psychologic disorder

Results

Table 2 and 3 shows included studies in this review with the follow up period, study groups involved, sample size, outcome measures, outcome and study limitations.

Five of the studies included (15,16,17,18,20) were single blinded randomized control trials while one study (19) was a double blinded randomized controlled trial.

Four studies (16,17,18,19) had a very short duration of follow up (from 3 weeks up to 3 months). Two studies (15,20) had a follow up period of 1 year.



In all studies the most common home – care recommendation were:

Explanation to the patient for the etiology of the disease and reassurance of the benign nature of the condition

1. Encouragement of patients to rest their masticatory muscles
2. Observation and reduction in parafunctional habits
3. Avoidance of excessive mandibular movements
4. Maintenance of soft diet and recommendation to chew carefully
5. Performance of simultaneous bilateral mastication
6. Improvement of posture and sleep position
7. Application of the moist heat around the painful muscles

- Studies comparing the effectiveness of 'splint and home-care instruction' versus 'home – care instruction alone' (6,8,9)

Truelove (2006) and Conti (2012) reported a significant decrease in the pain intensity from the baseline to the follow-up visits $p<0.0001$ and $p<0.05$ respectively. They reported no difference between the groups.

Michelotti (2012) favored self-care strategies over splint therapy ($p=0.17$). This was the only study where the author has not given self-care strategies to the splint group patients which shows the effect of each strategies on its own.

- Studies comparing effectiveness of 'manual therapy and home care' versus 'home-care instru ction alone' (7,11)

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TABLE 2 : Shows included studies in this review with the follow up period, study groups involved and the sample size				
Author/Year	Follow-up period	Title	Study groups	Sample
Truelove et al (2006) (15)	3,6 and 12 months	The efficacy of traditional, low-cost and non-splint therapies for tempo-romandibular disorder	• Usual treatment group(UT) – self-care strategies • Hard splint group (HS)– self-care strategies + full arch acrylic splint • Soft splint group(SS)- Self-care strategies + thermoplastic vinyl athletic mouth guard splint	200 Patients 28 Male |172 Female Mean age 36 +12 years
Tuncer et al (2013) (16)	4 weeks	Effectiveness of manual therapy and home therapy in patients with temporomandibular disorders: A randomized controlled trial	• Home physical therapy • Manual therapy in conjunction with home physical therapy	40 Patients 9 Male | 31 Female Age 18-72 years
Conti et al (2012) (17)	2 weeks 6 weeks , 3 months	Behavioral changes and occlusal splints are effective in the management of masticatory myofascial pain: a short –term evaluation	• Stabilizing appliance + counselling (n=21) • Nociceptive trigeminal inhibitory (NTI) device + counselling (n=16) • Control group counselling (n=14)	51 Patients Gender not mentioned Mean age 35-38 years
Michelotti et al (2012) (18)	Every 3 weeks for 3 months	Evaluation of short-term effectiveness of education versus an occlusal splint for the treatment of myofascial pain of the haw muscles	• Education program only • Occlusal acrylic splint only, no education	44 Patients 10 Male | 34 Female Age 18-53 years
de Alencar Junior et al (2014) (19)	3 weeks	Patient education and self-care for the management of jaw pain upon awakening: A randomized controlled clinical trial comparing the effectiveness of adding pharmacologic treatment with cyclobenzaprine or tizanidine	• Placebo + self-care program + awareness of the etiology • Cyclobenzaprine + self-care program + awareness of the etiology • Tizanidine + self-care program + awareness of the etiology	45 Patients 2 Male | 43 Female Mean age 37 years
Craane et al (2012) (20)	3, 6 weeks, 3, 6, 12 months	One- year evaluation of the effect of physical therapy for masticatory muscle pain: a randomized controlled trial	• Home care strategy group • Physical therapy + home care group	53 Patients. 14 Male | 39 Female Mean Age 36-34 years

Table 3 : Shows outcome measures and limitations in the literature reviewed			
Author/Year	Outcome measures	Outcome	Study limitations
Truelove et al (2006) (15)	Self-reported findings – The average score for the pain intensity decrease from a mean 5.5 at base level to 2.3 at 12 months follow up p<0.0001 All groups showed comparable decreases in pain across the study p>0.40 Clinical examination findings Range of motion – no significant difference at Baseline , three and 12 months p>0.2 Joint sound – no difference over the time p>0.2 Muscle and TMJ palpation pain – number of painful palpation sites for extraoral muscles and the TMJ sites decreases from BL comparably for all groups. P>0.2	Data from this RCT supports more conservative treatment protocols than have been advocated traditionally, since self–reported pain and symptoms and muscle and joint palpation scores decreased significantly across all three groups over time	The treating clinicians were not blinded, they could have some influence in the treatment and influence on the home-care strategies for the patients
Tuncer et al (2013) (16)	Pain intensity at rest and chewing with the VAS scale decrease in both the group p<0.001 Mean change score for VAS with chewing MT-HPT =91.3% HPT=35.7% (P=0.009) Pain free maximum mouth opening increased in both the group p<0.001	In the short-term, manual therapy in conjunction with home physical therapy is more effective than home physical therapy alone	The follow up period was just 4 weeks. The study did not assess the subjects' compliance level with the recommended home treatment. Sample size is very small, the results cannot be generalized
Conti et al (2012) (17)	-VAS value – significant decrease in the baseline and final evaluation noted p<0.05 -Time interval for VAS value reduction Group I - 2 weeks, Group II & III- 6 weeks 50% decrease in VAS value, Group I 88.2%, Group II - 77.9%, Group III - 33.3%, - PPT Value No significant difference notes from the baseline to the final evaluation	Behavior changes are effective in the management of pain in masticatory myofascial pain patients. However the simultaneous use of stabilization splint, appears to produce an earlier improvement	Very small sample size (n=51) Very short follow up duration Control group consist of only 9 patients

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Author/Year	Outcome measures	Outcome	Study limitations
Michelotti et al (2012) (18)	Pain free maximum mouth opening changed significantly over three months' period (p=0.001, F=12.1).No difference between treatment group (p=0.325) Spontaneous muscle pain Changes significantly across time in education group (p=0.17).No change in the occlusal splint group (p=0.540) Pain during chewing and headache Not significantly influenced by time and treatment p>=0.106	Study reported that the during a short period, education was slightly more effective than an occlusal splint therapy	Very small sample size (n=44) and short follow up period. Results cannot be generalized
de Alencar Junior et al (2014) (19)	Mod SSI measurements - Significant difference in pain –intensity measurements from pretreatment to post-treatment for all groups; no difference amongst the group p<0.0001 PSQI evaluation – Statistical difference in the pretreatment or post-treatment measurement. No post-treatment statistical difference amongst the group p<0.0001	In short-term the use of tizanidine or cyclobenzaprine , in addition to self-care management and patient education, was not more effective than adding a placebo medication	Sample size very small (n=45), results cannot be generalized. - Follow up period very short 3 weeks only. For the patient to realize the change in quality of sleep might take more than 3 weeks. -Cyclobenzaprine 10mg and Tizanidine 4mg was given once a day where the studies which shows the effectiveness of the above medication used that 3 times a day
Craane et al (2012) (20)	Pain Variables Pain Visual analog scale - VAS Pain Pressure threshold masseter and temporalis muscles Decreasing significantly overtime, no difference between the groups p<0.001 Function Variables Mandibular functional impairment questionnaire-MFIQ Maximum mouth opening (MMO) active and passive Increased significantly over the time in both the groups p<0.05.No significant difference between the groups p>0.2	The study results indicated that independence of the treatment provided, all participants improved over time. The absence of time-therapy interaction indicates no specific therapy effect of physical therapy in masticatory muscle pain	Sample size is very small (n=53) results cannot be generalized

Craane et al (2011) reported no difference between the experimental and control groups after a follow-up period of 1 year (p>0.2). In this study the authors also reported that there was a significant improvement in the pain (p<0.0001) and functional variables (p<0.05) over the 1-year period for both groups. In contrast, Tuncer et al (2012) concluded that in the short-term, manual therapy in conjunction with the home physical therapy is more effective (p =0.009)

- Study comparing 'pharmacologic treatment and home-care' and 'home-care instruction and placebo' (10)

This study reported no added benefit of the muscle relaxant compound with the home care strategies as the placebo group after 3 weeks of follow up period (p<0.0001).

Discussion

A review of the evidence for a use of counselling and self-management therapies reveals a number of studies with a randomized clinical trial (RCT) design. The inclusion of RCT with the blinded examiners in this review enables exploration of highest quality of scientific evidence available with minimal risk of bias. A small sample size was verified in the majority of the studies probably due to the difficulty in performing such trials.

- Studies comparing the effectiveness of 'splint and home-care instruction' versus 'home – care instruction alone' (6,8,9)

Occlusal stabilizing splints are the most popular treatment modalities for TMD and it has been used for many years (21). Researchers in several trials have reported that occlusal splints are clinically successful. The possible mechanism of actions of this modality are: the reestablishment of proper occlusal relationship and stable physiologic mandibular posture; the cognitive effect; making the patient aware of oral parafunction habits and reeducation in muscular activity and placebo effects. The actual mechanism of action has not yet been proven (22).

Included studies in the review reported that the use of the splint, in association with self-care treatment, does not provide additional benefit and has the disadvantage of making treatment more expensive. The findings are also supported by several studies which found a statistically significant association between daytime clenching, grinding and myofascial pain, confirming that the clenching and grinding is an important risk factor for myofascial pain (23).

Furthermore, an electromyographic study identified a range of minimal muscular activity in the first 3 to 4 millimeters of mouth opening, confirming that a jaw posture with few millimeters of intraocclusal resulting space results in a great reduction in masticatory muscle activity and supports the validity of clinical advice to patients to keep the teeth apart (24).

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- Studies comparing effectiveness of 'manual therapy and home care' versus 'home-care instruction alone' (7,11)

Tuncer et al (2012) concluded that in the short-term, manual therapy in conjunction with home-care is more effective than home physical therapy alone. The author has given the reasons as follows:

- The physical therapist could assess the signs and symptoms at each phase of the recovery process.
- Proper instruction and interaction by the physical therapist can exert a positive psychological effect on the subjects, thus alleviating their symptoms to a certain extent.
- A treatment session tends to motivate a patient to be more compliant with the exercises.

These finding are supported by Kalamir et al in the systematic review of the literature where the authors emphasized that manual therapy is a viable and useful approach for the management of TMD (25). Feine et al, also reported that those groups who received more treatment modalities showed better results than those who received fewer (26).

In contrast Craane et al (2011) reported no added effect of adding physical therapy with the home-care instructions for the long-term management of the masticatory muscle pain. This illustrates the impact of the educational process in treatment. Michelotti et al also reported the importance of education and counselling as a way to reduce pain and dysfunction in subjects suffering from masticatory muscle pain (27).

- Study comparing 'pharmacologic treatment and home-care' and 'home-care instruction and placebo' (10)

Alencar et al (2014) reported that the use of a muscle relaxant, in addition to self-care management and patient education, was not more effective than adding a placebo medication. However, caution must be use with the results of this study as the sample size and follow-up period was only 3 weeks. In addition, the dose of muscle relaxant was lower than the maximum dose can be given, the author has mentioned that the dose could be titrated and a higher quantity could have been given.

Another study highlighted that preventive medications used to manage myofascial pain could act by improving a patient's sleep quality and/or decreasing jaw pain (28). In several chronic pain conditions, drugs such as analgesics, opioids, antidepressants, and anti-epileptics have been found to be effective in relieving pain (29). The positive effects of drugs must be weighed against possible adverse and toxic effects as well as the risk of dependency.

Effect of Counselling and Home-Care

The interconnectivity between psychological and behavioral aspects are strongly related to TMD. In most studies, it is a consistent finding that TMD sufferers show more anxiety and depression. Indeed, patients with higher anxiety levels have more excitable muscles than those with lower anxiety scores. (30).

Dworkin concluded that carefully structured minimal interventions with self-managed strategies offers a real benefit in addressing both physiological and psychological factors by means of stress management resulting in a better long-term outcome in the management of TMD (4). Patients in the education group received extensive information and considerable patient-doctor interaction. If this is the case, participants' improvement could be linked to the positive effects of psychophysiological mechanisms associated with education and reassurance.

Counselling and home-care is an approach that does not require an in-depth knowledge of the psychological domain and strategies of treatment, such as cognitive behavioral treatment and psychotherapies. Because of this, this approach can be applied for masticatory muscle pain treatment by any health professional with the experience in TMD.

Limitation to the Studies

Most of the studies had a small sample size, with a limited duration of follow-up. Because of this, results should be carefully applied to the general population when considering them for the long-term management. Most studies in this literature review restricted their analysis to patients with the masticatory muscle pain alone thus results should not be extrapolated when referring to other classes of TMD. Studies reviewed lacked a control group where no treatment was given. Hence the future studies could address the above limitations.

Conclusion

Home care, counselling and self-education should be the first line of treatment for the patient with masticatory muscle pain; other therapies' such as splint therapies, cognitive behavioral and physical therapies are adjunct management approaches. Overall, pain conditions must be managed within a biopsychosocial framework where the dentist–patient relationships are of paramount importance.

Conflicts of Interest

The authors declare no conflicts of interests.

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