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RESEARCH ARTICLE

TO EVALUATE THE EFFECT OF MOIST HEAT FOMENTATION THERAPY IN RELIEVING SYMPTOMS OF PAIN RELATED TEMPOROMANDIBULAR MUSCLE PAIN DISORDER

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ABSTRACT

Temporomandibular muscle pain disorder comprise a broad array of peculiar disorder that produces symptoms of unpleasant feeling, discomfort and pain of temporomandibular joint and muscles of mastication. Self management instructions routinely inspire patients to restrict movement and rest their masticatory muscles by intentionally limiting their usage, the self management instructions also promote cognizant and encourage patients to reduce their parafunctional habits. The aim of this in vivo study is to evaluate the effectiveness of the moist heat fomentation therapy in relieving the symptoms of temporomandibular muscle pain dysfunction and to establish therapeutic value of a non invasive self managed treatment modality for temporomandibular joint muscle pain dysfunction.

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INTRODUCTION

Temporomandibular muscle pain dysfunction includes a wide variety of disorders, that produces symptoms of unpleasant feeling and discomfort of temporomandibular joint and muscles of mastication. It is a musculoskeletal pathology that causes pain within the masticatory muscle fibers. Many physicians' think, temporomandibular muscle pain disorder is a single disorder. But, the fact is such that patient's give a history of various sub diagnosis (e.g. masticatory muscle soreness, temporomandibular joint inflammation, myofascial pain, restricted jaw movements, tenderness in muscles of mastication) (Edward *et al*., 2009; Okeson Jeffrey, 2008; Seraj *et al*., 2009). Temporomandibular muscle pain can be palpated intraorally and extraorally in the preauricular, masseter and temporalis muscle region (Okeson Jeffrey, 2008). The quality of this pain is either in the form of a pressure, sharp pain, and/or dull aching and radiating type of pain and sensation. (Edward *et al*., 2009) Present trends and recent concepts regarding the causes of temporomandibular muscle pain disorder, include behavioural stress, continuously clenching and holding the muscles in tension for long duration of time and direct or indirect blow and trauma to the muscles of mastication (Truelove *et al*., 2006). Treatment recommendations vary and range from physiotherapy, self-management therapy, splint therapy and permanent treatment modalities includes restorative reconstruction and surgical management. (Truelove *et al*., 2006) Moist heat fomentation therapy can improve function and reduce pain; this treatment modality can decrease inflammation, pain and also promote healing of compromised muscle tissue.

(Sridhar V, Vasudevan, 1997) Self-management is a standard treatment modality for patients with temporomandibular muscle pain disorders, it is an easy and effective home care managementand has proven that patient's reported improvement in their symptoms after using self-management therapy (Edward *et al*., 2009; Melissa Joan Pierson, 2011)

The purpose of this study is to analyse the effect of moist heat fomentation therapy, in relieving the symptoms of pain of temporomandibular muscle pain disorder, so far no study, no recommendations has been done on how much of moist heat fomentation to be applied in home care management.

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Diagnostic criteria (Eric Schiffman *et al*., 2014)

Myalgia

Pain of muscle origin that is affected by jaw movement, function, or para function, and replication of this pain occurs with provocation testing of the masticatory muscles.

Positive for both the following:

1. Pain in the jaw, temple, in the ear, or in front of ear
2. Pain modified with jaw movement, function or parafunction.

Positive for both the following:

1. Confirmation of pain location in the temporalis or the messator muscle
2. Report of familiar pain in the temporalis or messeter muscle with at least one of the following provocation tests:

A. Palpation of temporalis or messetor muscle
B. Maximum assisted or unassisted opening movement.

Inclusion Criteria

1. The symptoms of temporomandibular muscle pain dysfunction.
2. No previous history of rheumatic disorder, fracture, surgery.
3. No previous history of treatments done (medication, splints, surgery).

Exclusion Criteria

1. Neurological disorders.
2. Patients with chronic systemic illness.
3. Fractured cases (head and neck)
4. Existing restoration not taken into consideration.

Material and Method of data collection

Study Design

Sample sizes of 40 adult subjects were selected with temporomandibular muscle pain dysfunction. This group of 40 subjects with temporomandibular muscle pain dysfunction was further divided into 2 groups. The group of 30 subjects was taken up as study group and the group of 10 subjects was taken up as placebo group. Informed written consent to participate in this study was obtained from each subject and agreed to be available for periodic recall. The study was conducted in A.B. Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore. Ethical clearance was obtained for the study from ethical committee, Nitte University.

All subjects were examined and diagnosed for muscle pain dysfunction by palpating the muscles of mastication by digital palpation, therefore if a subject reported discomfort and uneasiness during palpation of a particular muscle, it can be inferred that the specific muscle tissue has compromised by fatigue and/or trauma. (Okeson Jeffrey, 2008; Irby William 1980, Davies and Gray, 2001)

Palpation of the muscles can be established mainly by palmer surface of index finger with middle finger and forefinger testing and comparing with the adjacent healthy areas. Soft but firm pressure with circular motion is applied to specific muscle. A firm thrust of 1 or 2 seconds duration is usually recommended. (Okeson Jeffrey, 2008)

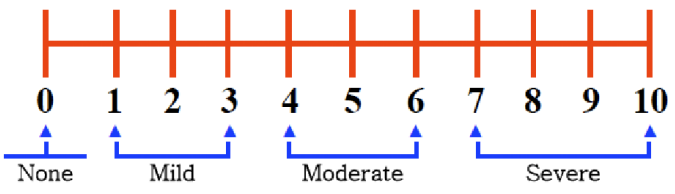
The following muscles Temporalis, Masseter, Inferior Lateral Pterygoid. Superior Lateral Pterygoid, and Medial pteryrgoidwere palpated and examined to diagnose the pain intensity. (Okeson Jeffrey, 2008; Irby William 1980, Davies and Gray, 2001)

Moist Heat Fomentation Therapy

A group of 30 subjects with temporomandibular muscle pain dysfunction were selected as a study group and were subjected to moist heat fomentation therapy for 20 minutes (Poindexter *et al*., 2002), twice daily at the duration interval gap of 8 hours for a period of one week. The pre numeric rating scale (NRS) and post numeric rating scale (NRS) score were recorded. The moist heat is applied by laying a hot, moist towel over the symptomatic muscle. The temperature of water was maintained around 50 degree (Okeson Jeffrey, 2008) by advising the subjects to boil 2 liters of water for 14 minutes and then allow it cool for 30 minutes and subjects were also advised to fold the towel 8 x 8 inches widthwise twice. Wet each folded towel in warm water for 5 minutes, roll it up, and squeeze out excess water and apply it over the symptomatic muscle.

The remaining 10 subjects were considered as placebo group, these subjects were advised to use normal water (room temperature) fomentation therapy for 20 minutes twice daily at the interval of 8 hours, for a period of one week, the pre NRS and post NRS score were recorded before the treatment and after the treatment, same patients were then subjected to moist heat fomentation therapy for 20 minutes twice daily at the interval of 8 hours for a period of one week and the data was recorded.

The **Numeric Rating Scale (NRS)** (Breivik *et al*., 2008) was prepared, the scale depicts the pain intensity and it was explained to the patient that the scale is marked from 0 to 10, where score 0 was interpreted as no pain and score 10 was interpreted as maximum pain intensity, the patients were asked to mark on the readings on scale. 0 denotes no pain, 1 to 3 mild pain, 4 to 6 moderate pain, 7 to 10 severe pain on the scale before and after rendering the treatment to assess the variation in pain intensity and the data obtained was statistically analyzed.



RESULTS

Table 1. Effect of moist heat fomentation therapy in relieving the symptom of pain related temporomandibular muscle pain disorder (Study group)

Severity of pain	Study group		
	Before intervention	After Intervention	p-value#
Severe	2(6.7%)	0	<0.001*
Moderate	26(86.7%)	0(0.0%)	
Mild	2(6.7%)	27(90.0%)	
No pain	0	3(10.0%)	
Total	30(100.0%)	30(100%)	

Wilcoxon test
*p-value <0.05 statistically very highly significant.

Table 2. Effect of normal water fomentation therapy in relieving the symptom of pain related temporomandibular muscle pain disorder (Placebo group)

Severity of pain	placebo group(room temperature)		
	Before intervention	After Intervention	P value#
Severe	3(30.0%)	3(30.0%)	1.000(NS)
Moderate	6(60.0%)	5(50.0%)	
Mild	1(10.0%)	2(20.0%)	
No pain	0	0	
Total	10(100%)	10(100%)	

Wilcoxon test
*NS- p-value >0.05 not statistically significant.

Table 3. Effect of moist heat fomentation therapy in relieving the symptom of pain related temporomandibular muscle pain disorder (Placebo group)

Severity of pain	Placebo group(moist heat)		
	Before intervention	After Intervention	p-value#
Severe	3(30.0%)	0	P=0.004
Moderate	6(60.0%)	4(40.0%)	
Mild	1(10.0%)	4(40.0%)	
No pain	0	2(20.0%)	
Total	10(100%)	10(100%)	

Wilcoxon test
*p-value <0.05 statistically significant

Table 4. Comparison of NRS scores before and after intervention in each of the groups

Groups		Study group (n=30)	Control group (n=10)	
			Room temperature	Moist heat
Pre-NRS mean(SD)	Mean(SD)	5.10(1.094)	5.70(1.41)	5.70(1.4)
	Median (interquartile range)	5(4-6)	5.5(5-7)	5.5(5-7)
Post –NRS	Mean(SD)	1.33(0.758)	5.40(1.64)	2.8(1.2)
	Median (interquartile range)	1(1-2)	5.5(4-7)	2.5(2-4)
Z Value#		-4.888	-1.732	-2.831
p-value		.000	.083	.005

Wilcoxon test
*p-value <0.05 statistically significant

DISCUSSION

The most frequent complaint among the patients with functional disturbances of the masticatory system is muscle pain. Patients commonly report that the pain is associated with functional activities, such as chewing, swallowing and speaking. The pain is more aggravated by manually palpating or by functionally manipulating the muscles of mastication. Restricted mandibular movement is common.(Edward *et al*., 2009; Truelove *et al*., 2006; Okeson Jeffrey, 2008; Seraj *et al*., 2009) A common clinical sign of compromised muscle fiber may be physical trauma or overutilization of muscle tissue.Increased muscle activity or muscle spasm can lead to a reduced blood flow, decreased supply of nutritional requirement for normal health and functioning of cell within the muscle tissue, reduced blood flow might also accumulate metabolic waste products that might be the cause of pain within the muscle tissue. (Okeson Jeffrey, 2008; Seraj *et al*., 2009)

The application of moist heat fomentation therapy on various affected muscles help reduce pain, by dilating the blood vessels and improving circulation by altering vasoconstriction and vasodilation of blood vessels,(Melissa Joan Pierson, 2011)increase inflow of oxygen and nutrients to affected muscle, helps to heal and soothe damaged tissue and hence, it can be observed that there is relief in muscle and joint pain dysfunction by inducing analgesic effect, improving flexibility of collagenous tissue, and lowering the pain sensation by reducing excitation of nerve endings. (Demir, 2012; Day Jane *et al*., 1987; Roger J, Allen, 2006; Benaiffer Agrawal, Kirti Somkuwar, 2011)

In this present study, 40 subjects with temporomandibular muscle pain dysfunction were selected, they were divided into two groups of which 30 subjects were considered as study group and 10 subjects were considered as placebo group. The subjects in study group were rendered with moist heat fomentation therapy. Before and after the intervention the pre numeric rating scale and post numeric rating scale was given to the patients and the data was recorded. Among the 30 subjects of study group, 2 suffered with severe pain, 26 with moderate pain and another 2 with mild pain. Following moist heat fomentation therapy, 27 subjects showed reduction in pain intensity and 3 subjects were completely relieved of pain. Statistical analysis of the data showed statistically very highly significant improvement (Table 1).

Ten subjects who were selected as placebo group, 3 suffered with severe pain, 6 with moderate pain, 1 with mild pain, following intervention with normal water (room temperature) fomentation therapy. On statistical analyzing data showed no statistical significant changes (Table 2).

Later when the subjects in placebo group were rendered with moist heat fomentation therapy, they showed reduction in pain intensity where 4 reported to have moderate pain and 4 with mild pain and 2 were completely relieved of pain. The data collected was statistically analyzed that showed statistical significant reduction in pain (Table 3).

When NRS scores before and after moist heat fomentation therapy in study group and placebo group with temporomandibular muscle pain dysfunction was compared, study group showed mean pain intensity of 5.10 ± 1.094 on a numeric rating scale with median 5, following moist heat fomentation therapy it was observed that mean reduction in pain was 1.33±0.758 on numeric rating scale with median 1. The data was analyzed using Wilcoxon test, showed z value of -4.888 and p value 000* inferring statistically significant decrease in pain intensity on numeric rating scale. Placebo group showed mean pain intensity of 5.70 ± 1.41 on a scale with numeric rating median 5.5, following room temperature fomentation therapy it was observed that there was very mild mean reduction in pain was 5.40 ± 1.64 and on numeric rating scale with median 5.5. Later when same subjects in placebo group, were treated with moist heat fomentation therapy it was observed that mean reduction in pain was 2.80 ± 1.229 on numeric rating scale with median 2.5. These data was analyzed using Wilcoxon test showed z value of -2.831 and p value 0.005 inferring statistically significant decrease in pain intensity on numeric rating scale (Table 4).

However various studies, were conducted in management of temporomandibular muscle pain dysfunction which includes physiotherapy, exercise, medication, splints, surgical management, though moist heat fomentation therapy is well known treatment modality no much documentation was been done, on this specific treatment modality. The patients were thought how to use moist heat fomentation therapy as a home care remedy in relieving temporomandibular muscle pain disorder as it is a most simple, non invasive and self management treatment modality. So probably increasing the duration of moist heat fomentation therapy for prolonged period of 2-3 weeks might improve the prognosis. This treatment modality can be used along with other physical therapy like exercise, physiotherapy, stretching, ultrasonic devices, might improve the results further. However it is important to identify the cause of the disorder and treat accordingly.

Summary

A study was conducted to evaluate the effect of moist heat fomentation therapy in relieving the symptoms of temporomandibular muscle pain dysfunction. This study concluded that moist heat fomentation therapy is an effective home care remedy which could be prescribed to the patients with temporomandibular muscle pain dysfunction, hence moist heat fomentation therapy is simple, yet effective self-management treatment modality.

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