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Effectiveness of trigger point release technique and jaw exercise in patients with temporomandibular joint dysfunction–an experimental study

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Abstract
Objectives: To analyse the effectiveness of Trigger point release technique and Jaw exercise in patients with temporomandibular dysfunction.
Background: Pain is the primary factor that limits the patient in a functional aspect, the study aims at deducing this factor by combining trigger point therapy and jaw exercise in the management of pain in patients with acquired temporomandibular disorders
Design: Pre and posttest experimental design.
Setting: The Oxford Dental College, the Oxford College of Physiotherapy.
Methodology: This study included 30 subjects with acquired temporomandibular joint disorders, between the age group of 25-40yrs, they were divided into two groups, experimental (trigger point release&jaw exercise) group & control (NSAIDs) groups randomly. Experimental group was treated with trigger point release therapy followed by jaw exercises and control group were treated with NSAIDs each subject in the experimental group was treated for a period of 15 consecutive days with one session of treatment per day. Pre and post VAS scale and maximal mouth opening range was measured.
Results: Paired t-test was used for statistical analysis and results showed significant reduction in pain and improvement in function in the experimental group when compared with control group.
Conclusion: This study shows that there is a significant reduction of pain in patients with acquired temporomandibular joint disorders when treated with trigger point therapy and jaw exercises as compared to treatment with NSAIDS, and that there is a significant effect of trigger point therapy and jaw exercises in the management of pain in patients with acquired temporomandibular joint disorders.

Keywords: temporomandibular joint dysfunction, trigger point release therapy, jaw exercises

Introduction

The term Temporomandibular Joint Disorders is an umbrella term covering a number of acute and chronic problems related to areas of the head, jaw, face and neck. Temporomandibular joint and muscle disorders, commonly called "TMJ," are a group of conditions that cause pain and dysfunction in the jaw joint and the muscles that control jaw movement. Temporomandibular Joint Disorders affects more than 10 million Americans and is more common in women then men [1]. Most people affected by this syndrome have multiple signs and symptoms of pain in the Temporomandibular Joint jaw joints, face, and muscles of the head and neck.

Muscles account for more than 60% of the human body mass, making up the largest part of our bodies. When we want to move or use our muscles, the muscle contracts, and this is typically a voluntary action. However, sometimes the entire muscle contracts involuntarily, which we call a spasm. Muscles are also subject to another condition, known as a Trigger Point, which is essentially an involuntary contraction of only a small portion of the muscle, creating pain and dysfunction within the muscle [2].

Ordinary muscle cramps and contractions release with movement or stretching Trigger points do not. Instead they lock into spasm, a strong painful contraction. This spasm is basically a localized hardening of the muscle. Once it hardens, it becomes locked in a state and creates a self perpetuating cycle of pain and spasm. Often, single muscle have multiple trigger points. Applying systematic direct pressure to these points is one of the few way of releasing the spasm and break the pain cycle. This systematic application of sustained pressure is known as TRIGGER POINT RELEASE THERAPY. It is recognized as one of the most effective ways to achieve long lasting relief from on-going pain and spasms. Painful disorders involving the temporomandibular joint (TMJ) and associated soft tissues are relatively common with prevalences ranging from 16-59% for reported symptoms and 33-86% for clinical signs [3].

Disease and dysfunction of the Temporomandibular joints and the adjacent structures effect a large number of persons. Over 20% of the average population at one time or the other has symptoms relating to Temporomandibular joint [4]

Treatment currently used

1. Pain relief [5]

2. Physical therapy approach [6]

The challenges posed by TMJ disorders span the research spectrum, from causes to diagnosis through treatment and prevention. So it is necessary to focus not only to gain a better understanding of the temporomandibular joint and muscle disease process, but also to improve quality of life for people affected by these disorders.

Objectives of the Study
- To find out the effectiveness of trigger point release technique with exercises in reducing pain and disability in patients with TMJ dysfunction
- To compare the effectiveness of trigger point release technique and exercises with that of conservative medical treatment in reducing pain and disability in patients with TMJ dysfunction

Hypotheses
Alternate Hypothesis
- There will be significant reduction in pain and disability when treated with trigger point release techniques and exercises
- There will be significant difference in reduction of pain and disability when treated with trigger point release techniques and exercises when compared to conservative medical treatment

Null Hypothesis
- There will be no significant reduction in pain and disability when treated with trigger point release techniques and exercises
- There will be no significant difference in reduction of pain and disability when treated with trigger point release techniques and exercises when compared to conservative medical treatment

Methodlogy
Research Design: The research study is a Pre- Post test experimental design.

Population: Population for the study included the age groups of 25 years to 40 years. Both male and female subjects were selected

Sample size: Sample size of 30 subjects was taken for the study.

Sample sources: The samples were selected from, The Oxford College of Sciences, Bangalore.

Sample design: The sample design followed was convenient sampling with the subjects allocated randomly into 2 groups using a sequential random number generator.

Selection Criteria
Inclusion Criteria
- Subjects of either sex referred by dentist for Temporomandibular Dysfunction after examination.
- Diagnosed as TMJ dysfunction based on The Research Diagnostic Criteria for temporomandibular disorders
- Age group: 25-40 yrs
- Acute dysfunction with symptoms not more than a week.
- Muscular anomalies

Exclusion Criteria
- Any Neoplasm.
- Hemorrhage.
- Sensory affection.
- Infection.
- Neurological and vascular impairment
- Disc related and degenerative changes of TMJ

Instrumentation:-Materials used
- Ruler
- Couch
- Gel

Measurement tools
- Visual analogue scale (VAS) for pain measurement.
- Ruler method measurement for maximal mouth opening. (MMO)

Procedure
After selection of subjects, the purpose of the study was explained and an informed consent was taken and the procedure was explained with clear instructions.
The subjects were then randomly assigned into two groups based on random number generator
GROUP 1: experimental group
15 subjects were taken
VAS Score and MMO was taken before the treatment
Subjects were given trigger point release technique along with jaw exercise for a period of 14 days

Technique of Application
- The trigger point release is performed in the following steps:
- Lightly contact the fascia with relaxed hands.
- Slowly stretch the fascia until reaching a barrier/restriction.
- Maintain a light pressure to stretch the barrier for approximately 3–5 minutes.
- Prior to release, the therapist will feel a therapeutic pulse (e.g. heat).
- As the barrier releases, the hand will feel the motion and softening of the tissue.
- The key is sustained pressure over time.
- Trigger point release was given for Masseter, temporalis and sternocleidomastoid

Followed by jaw exercises once the VAS shows a reduction in pain Jaw exercises For TMJ Exercises prescribed are
- **Isometric exercises**
  Exercise 1: place the top of your tongue against the roof of your mouth exert slight upward pressure. Breathe through your nose using stomach muscle. Throughout the exercise do not change the position of the jaw. Now place your thumb beneath the chin and push upwards. Resist the opening of the mouth. Hold it for ten seconds.

Exercise 2: resume the position of the tongue and jaw, Place ends of index and middle finger of right hand on the right side of the jaw and push the jaw to the left side. Resist this by holding your jaw steady. Similarly vice versa for the left side. Hold it for few sec followed by repetions

- **Active exercise**
  Exercise 1: Open and closing of the mouth within pain free range
  Exercise 2: side to side movement of the jaw

- **Strengthening**
  Gentle resistance can be provided in all direction of active jaw exercises on the end of second week VAS score and MMO was recorded

Group 2: control group 15 subjects, control group, treated with NSAIDS.

Pre – post VAS scores and MMO were taken.

Duration of the study

- Two months including data collection and evaluation Statistics

Statistical Methods

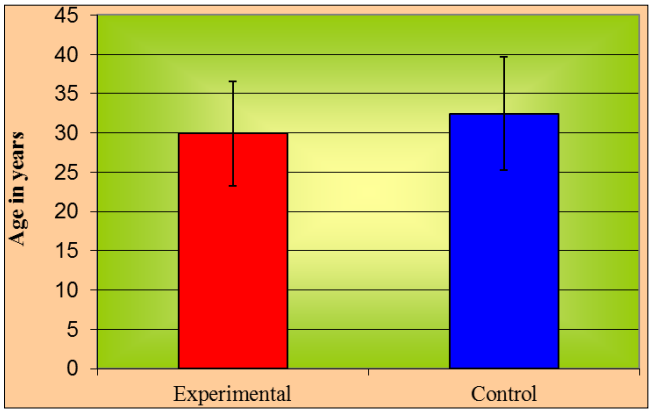
Student t test (two tailed, Independent) was used to find the significance of VAS and MMO between the two groups and to find the significance of outcome between two groups. Student t test (paired) was used to find the significance of VAS and MMO between pre-intervention and Post intervention for each group

Study design: A Experimental study consisting of two groups, each with 15 subjects in Experimental (trigger point release therapy and jaw exercise) and 15 subjects in Control (Conventional) was undertaken to study the effect of trigger point release therapy and jaw exercise over the conventional based on VAS and MMO (maximal mouth opening) score.

Table 1: Basic characteristics of the study

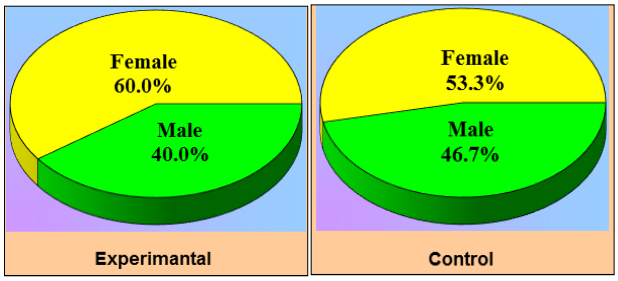
Basic characteristics	Experimental	Control	Remarks
Number of subjects	15	15	-
Age in years (Mean ± SD)	29.93±6.64	32.47±7.23	Samples are age matched with P=0.326
Gender			Samples gender are matched with P=0.713
Male	6 (40.0%)	7(46.7%)	
Female	9 (60.0%)	8 (53.3%)	

Table shows that samples are age & sex matched with P= 0.326 & P= 0.713 respectively



Graph 1: Age distribution

Graph. 1, 2 Shows the age distribution in experimental & control groups.



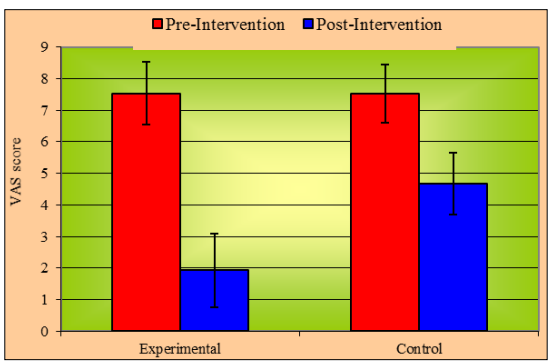
Graph 2: Sex Distribution

Shows the sex distribution illustrating greater percentage of females in both experimental & control groups

Table 2: Comparison of VAS (Pre & Post Intervention) between Experimental and Control group Results are presented in Mean ± SD (Min-Max)

Study period	VAS score		P value
	Experimental	Control	
Pre -Intervention	7.53±0.9 (6-9)	7.53±0.92 (6-9)	0.999
Post-Intervention	1.93±1.16 (0-5)	4.67±0.98 (3-7)	<0.001**
P value	P<0.001**	P<0.001**	-
% Change	74.36%	37.98%	-

Table 2 & graph 3 shows significant P value P<0.001 for both experimental groups with greater percentage change 74.36% in experimental group as compared to 37.98% in control group, indicating a significant improvement in the experimental group.

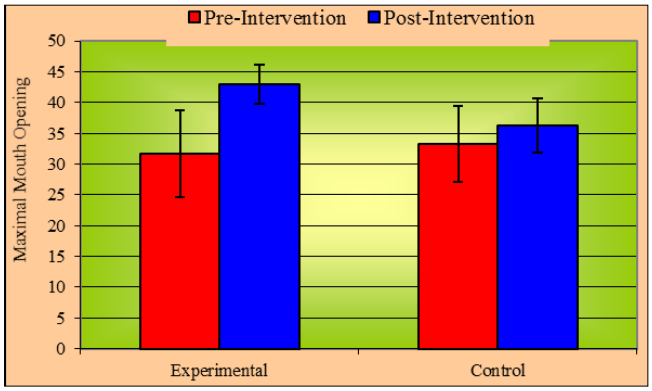


Graph 3: Comparison of VAS (Pre & Post Intervention)

Table 3: Comparison of MMO (Pre & Post Intervention) between Experimental and Control group Results are presented in Mean ± SD (Min-Max)

Study period	Maximal Mouth opening		P value
	Experimental	Control	
Pre –Intervention	31.67±6.98 (20-40)	33.33±6.17 (20-40)	0.494
Post-Intervention	43.00±3.16 (35-45)	36.33±4.41 (25-40)	<0.001**
P value	P<0.001**	P<0.001**	-
% Change	35.78%	9.01%	-

Table 3 & Graph 4 shows significant P value P<0.001 for both experimental groups with greater percentage change 35.78% in experimental group as compared to 9.01% in control group, indicating a significant improvement in the experimental group.



Graph 4: Comparison of MMO (Pre & Post Intervention)

Results

The number of subjects taken for the study was 30 (n=30). In the experimental group, the treatment given was trigger point release therapy and jaw exercises. In the control group the treatment given was with NSAIDS.

Before the treatment started, scores on VAS and Maximal mouth opening were taken as measures for comparison. These measurements were repeated after the treatment.

Student t-test (two tailed, independent) was used to find the significance of VAS and MMO between the two groups and to find the significance of outcome between the two groups.

Student t-test (paired) was used to find significance of VAS and MMO between pre intervention and post intervention for each group. There was a significant reduction in pain and increase in mouth opening found in experimental group and hence the null hypothesis is rejected and the alternative hypothesis is accepted.

Discussion

The aim of the study was to find out the effectiveness of trigger point release technique and jaw exercise in reducing pain and increasing mouth opening in subjects with temporomandibular dysfunction. 30 subjects were taken and were divided into 2 groups. Both the groups underwent treatment for TMJ dysfunction for two weeks. The pain and maximum mouth opening were the main outcome used and the intervention of the groups was measured by using VAS and MMO scale. In both the groups there was significant difference in post test score than the pre test scores, but when compared between the groups, experimental group showed reduction in pain and improvement in mouth opening

- In this study both the groups showed a marked reduction in pain with improvement in maximal mouth opening. And there was a significant difference in the gain scores observed between the two groups.
- When the effect of trigger point release therapy and jaw exercises was compared with NSAID therapy, a statically significant difference was found in pre and post treatment VAS and MMO scores. This shows that improvement was found in both groups but the percentage difference in the scores 74.36% in VAS and 35.78% in MMO suggests that the greater difference in the experimental group was due to the effect of trigger point release therapy and jaw exercises.
- The study also shows the predominance of the condition in females (60% in experimental group and 53.3% in control group) as illustrated in various studies and clinical reviews
- This study shows that trigger point release therapy and jaw exercises can be used to alleviate pain in temporomandibular joint disorders which is the factor that limits the functional aspects of the patient with this condition, and improve the maximal mouth opening range, hence improving the functional status of the patient.

Limitations

- The study sample size was relatively small
- A short-term follow up was done until the last day of the treatment session. A longer follow up of the subjects would provide a better insight into the effect of the treatment given.
- The dosage and type of drug (NSAID) was not monitored, this if performed and its effects compared with trigger point release therapy will provide a better insight of the treatment given.
- Sub acute cases and chronic cases were not taken for the study

Recommendation

- A large sample size with prolongation of follow up time is highly recommended to make the study more reliable.
- With long duration of follow up scores of VAS and MMO scores to make the study more reliable
- Monitoring the dosage, sessions and type of specific NSAID drug administered can be performed and then a comparison of its effects with trigger point release therapy will provide a better insight of the treatment given.
- Sub-acute and chronic cases should be considered

Conclusion

- The study shows that the treatment with trigger point release therapy produces improvements in patients with temporomandibular joint disorders and contributes to significant variations in the outcome measures of the patients and hence the conclusion of the study is that there is a positive and large effect of trigger point release therapy along with jaw exercise in the management of pain in patients with muscular temporomandibular disorders, and that there is a marked difference in the reduction of pain threshold (VAS) in these patients when treated with trigger point release therapy and jaw exercise as compared to patients treated with NSAIDS.

Summary

This study is done to analyze the effect of trigger point release therapy and jaw exercises in subjects with Muscular Temporomandibular dysfunction.

This study included 30 patients with temporomandibular joint pain, who were divided randomly in two groups (group I and group II). Group I was treated with triiger point release and jaw exercises and Group II was treated with NSAIDS. Study design is pre and post test experimental design. Source of data was collected from The Oxford Dental College and the Out patient department of The Oxford College of Physiotherapy. Both the groups showed statistically significant improvement In VAS with $P<0.001$ and MMO with $P<0.001$ and the percentage change being greater in group I. This study shows that trigger point release therapy and jaw exercises is statistically significant in reduction of pain in patients with muscular temporomandibular disorders.

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