

POST OPERATIVE PHYSIOTHERAPY MANAGEMENT OF TEMPORO-MANDIBULAR JOINT ANKYLOSIS

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ABSTRACT

Introduction: Temporomandibular joint (TMJ) ankylosis is a pathologic condition where the mandible is fused to the fossa by bony or fibrotic tissue. This interferes with mastication, speech, oral hygiene, and normal life activities. During growth period, it can cause gross facial deformities especially, when not identified in time or if treatment is delayed. Surgical treatment is the only choice of treatment in this condition. One main drawback is that despite of extreme care during surgery, facial nerve get damage.

Materials and Methods: The study was of an experimental design, with 15 subjects, 6 were female, 9 were male, and all subjects were assigned according to criteria (inclusion & exclusion) and carried out at physiotherapy OPD of CSS Hospital, Meerut. Maximum mouth opening movements were assessed using the measuring scale & reduced facial movements by House Brackmann Score. The subjects were reassessed after completion of 3 weeks of intervention. The collected data was of mean and standard deviation of MMO & HBS and has been analyzed using SPSS software. The study was done to determine the effect of electrical stimulation & facial exercises for improving the motor function of facial nerve & mouth opening exercises in patients with reduced mouth opening.

Results: The results showed that there was significant difference in the MMO & Facial movements respectively after the treatment.

Conclusion: Study concluded that the difference from 1st day of 1st week to 6th day of 3rd week in MMO & HBS which shows that mouth opening exercise are effective in patients with reduced mouth opening & electrical stimulation along with facial exercises are effective in improving the motor function of facial nerve.

KEY WORDS: Temporomandibular joint (TMJ) ankylosis, Maximum mouth opening(MMO), facial nerve injury & House Brackmann Score (HBS).

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Access this Article online

Quick Response code



DOI: 10.16965/ijpr.2017.198

International Journal of Physiotherapy and Research

ISSN 2321- 1822

www.ijmhr.org/ijpr.html

Received: 05-07-2017

Accepted: 02-08-2017

Peer Review: 06-07-2017

Published (O): 11-09-2017

Revised: None

Published (P): 11-10-2017

INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is usually seen during the first decade of life. The most common etiology of this condition is trauma; followed by infection. Other factors may include arthritis, tuberculosis, previous TMJ surgeries, congenital deformities, idiopathic factors [1,2] & iatrogenic causes etc [3,4]. TMJ ankylosis in growing patient can result in dentofacial deformities especially, when not identified in time or

if treatment is delayed.

The management goal in TMJ ankylosis is to increase the patient's mandibular function, correct associated facial deformity, decrease pain, & prevent reankylosis.

Surgical treatment is the only choice of treatment in this condition. The approach for the joint is varied; however, preauricular incision and its modifications are mostly preferred.

One main draw back in this approach is the Facial nerve and its branches, which courses along the entire length of the incision. Facial nerve is one of the most vulnerable anatomic structures that should be given utmost importance while performing the surgery for TMJ ankylosis. Despite extreme care taken during the procedure, the facial nerve may get affected [5].

Permanent facial nerve injury following the TMJ ankylosis surgery is a rare complication, however, temporary nerve injury is a relatively common finding due to swelling, edema, hematoma in this region, and more commonly due to heavy retraction. The incidence and degree of temporary nerve injury due to heavy retraction causing compression and or stretching of nerve fiber results in neuropraxia.

Most frequently involved are the temporal and zygomatic branches leading to weakness of frontal and orbicularis oculi muscle. Therefore, identification, evaluation, and follow-up of this surgical complication are very important. Among the clinical methods employed for evaluation of frequency and degree of nerve injury, the House-Brackmann grading system appears to be quick, comprehensive, and widely used [6].

Aims and Objective: To assess the efficacy of mouth opening exercises in patients with reduced mouth opening & electrical stimulation for facial muscle weakness along with facial exercises in improving the motor function of facial nerve after TMJ surgery.

Hypothesis

Experimental Hypothesis: There is significant effect of mouth opening exercises in patients with reduced mouth opening & electrical stimulation along with facial exercises in improving the motor function of facial nerve after TMJ surgery.

Null Hypothesis: There is no significant effect of mouth opening exercises in patients with reduced mouth opening & electrical stimulation along with facial exercises in improving the motor function of facial nerve after TMJ surgery.

Limitation of study: Small sample size, The duration of study was small, research was done only among the particular age group, Only patients with the facial nerve injury after TMJ surgery was taken in the study.

MATERIALS AND METHODS

The study was conducted on fifteen subjects, with the history of TMJ ankylosis. All of them were treated surgically. The patients were having the complain of reduce mouth opening & reduced one side facial movements.

The study was conducted in the out patient department of Subharti College of physiotherapy, Subharti University, Meerut, India.

Dependent Variables: Maximum mouth opening & House Brackmann Score. MMO was measured in millimeter using the measuring scale.

House Brackmann grades:

Grade	Description	Characteristics
I	Normal	Normal facial function in all areas
II	Mild dysfunction	Slight weakness noticeable on close inspection; may have very slight synkinesis
III	Moderate dysfunction	Obvious, but not disfiguring, difference between 2 sides; noticeable, but not severe, synkinesis, contracture, or hemifacial spasm; complete eye closure with effort
IV	Moderately severe dysfunction	Obvious weakness or disfiguring asymmetry; normal symmetry and tone at rest; incomplete eye closure
V	Severe dysfunction	Only barely perceptible motion; asymmetry at rest
VI	Total paralysis	No movement

Sample selection: Convenient sample of 15 subjects ,according to the inclusion and exclusion criteria, randomly assigned in the study. This study was conducted in physiotherapy OPD of CSS Hospital Subharti University Meerut.

Inclusion Criteria: Age- 20 – 40 years, Males and females with reduced mouth opening & facial movements after surgical management of TMJ ankylosis.

Exclusion Criteria: No other pathology, Facial palsy due to any other cause.

Instrumentation: Treatment couch , divider, measuring scale, gloves, ice cream sticks, mirror for visual feedback, Nerve muscle stimulator, Stationary (Pen, Pencil&Paper) and Consent Form.

Protocol: Before the treatment sessions, mouth opening was assessed as the inter-incisal distance as measured from the mesio-incisal edge of the upper left central incisor tooth to the mesio-incisal edge of the lower left central incisor tooth. The measurement was made using a geometric divider and scale and was recorded in millimeters [7].

Temporomandibular joint mobilization was given by Antero-inferior glides to improve jaw depression; lateral glides for improving mandibular deviation with joint distraction were done. (fig 1)

Also the release of pterygoid muscle was given, which involves palpating the muscle with a finger in the back of the mouth. Accessible is the medial pterygoid muscle, which can be felt all the way in the back of the mouth behind the bottom wisdom teeth. The muscle runs along a vertical axis. It is pressed for 5-10 seconds. Patient were asked to breathe deeply and relax as much as possible while applying the technique.

The elevator jaw muscles were stretched by moving the jaw downwards (opening the mouth) [8,9].



Fig. 1: Temporomandibular joint mobilization.

Patients were also taught home exercise programme to maintain the joint in distraction by placing ice-cream sticks between the jaws and increasing one by one to provide stretch and maintaining for 3-5 minutes for 2-3 times a day [10,11]. For evaluation of degree of facial nerve injury, the House-Brackmann Grading system were used.

Facial exercises and electrical stimulation were used to stimulate & recover the function of facial nerve (Fig 2). Patients were also asked to do facial exercises at home, in front of the mirror [12,13]. Treatment was given six days per week for three weeks.

Fig. 2: Stimulation of motor points of face.



Data Analysis: All analysis was obtained using SPSS version 21.0. Demo graphic data of the patients including age and gender were summarized. The dependent variables for the statistical analysis were MMO and HBS. A base line data was taken at the beginning of the study (pre test values) and after the completion of the treatment (post test values) to analyze the difference between the pre and post values; paired t-test was used. A level of 0.001 was used to determine the statistical significance.

RESULT

A sample size of 15 was studied individually for MMO & HBS at base line 1st day of 1st week & 6th day of 3rd week.. (Table-1) presents the Mean & S.D. of MMO and (Table-2) presents the Mean & S.D. of HBS.

The Paired ‘t’ test was applied to find the significant difference between Pre and Post MMO & HBS which shows a significant difference at 1% level of significance P<0.001).

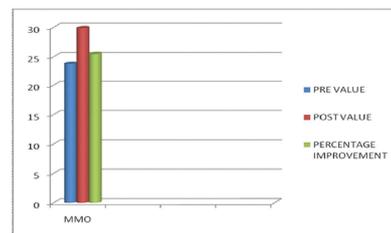
Table 1: Mean & Standard Deviation . of MMO.

MMO	Mean	SD	P-value	t-value
Pre value	23.8	5.38	<0.001 (sig.)	12.32
Post value	29.86	5.08	<0.001 (sig.)	12.32

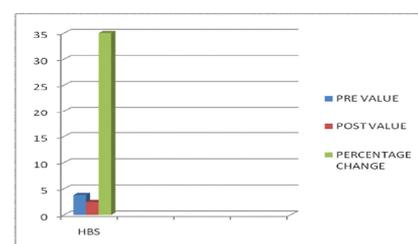
Table 2: Mean & Standard Deviation of HBS.

HBS	Mean	SD	P-value	t-value
Pre value	3.8	0.941	<0.001 (sig.)	10.58
Post value	2.47	0.743	<0.001 (sig.)	10.58

Graph 1: Pre & Post values of MMO & Percentage improvement post treatment



Graph 2: Pre & Post values of HBS & Percentage change post treatment.



DISCUSSION

The results of the present study demonstrate the success of mouth opening exercises and electrical stimulation along with facial exercises in patients with reduced mouth opening and facial movements after surgical management of TMJ ankylosis.

The data showed that with the use of three weeks protocol there was significant difference in post treatment values of MMO & HB score, taken on 6th day of 3rd week.

The subjects in the study demonstrated the improvement in mouth opening after three weeks of mouth opening exercises. Our result is in accordance with Vijayakumar M, Priya D who studied role of Physiotherapy for improving mouth opening & tongue protrusion in patients with Oral Submucous Fibrosis [10].

There was also improvement in House–Brackmann scores in subjects after giving electrical stimulation and facial exercises. This was also supported by Tucany *et al.* who noted that the addition of Electrical Stimulation to physical therapy and corticosteroids significantly improved House–Brackmann scores in subjects with acute Bell’s palsy [14]. And LM Pereira *et al* who performed a systematic review & found Facial exercise therapy is effective for facial palsy for the outcome functionality [12].

Subjects in our study also showed improvement in MMO by stretching exercises which is supported by McNeely ML *et al* who noted effectiveness of physical therapy interventions for temporomandibular disorders in systemic review [15]. Exercises for stretching and relaxation are prescribed as a first-choice therapy when painful symptomatology is present. Basically, they are aimed to decrease pain by means of increasing local circulation. They also work to improve flexibility and range of motion.

Our result also shows that despite care, facial nerve gets injured in surgical management of TMJ ankylosis which is also seen in the study done by Nogueira *et al.* who found that, out of the 9 patients in whom gap arthroplasty was carried out, 2 patients had Grade 4 injury of which 1 patient recovered to Grade 3 after 1 week, Grade 1 after 1 month. The second patient showed no recovery after 1 week;

however, recovered to Grade 2 after 1 month and Grade 1 after 3 months. In contrast, in this study, out of 32 joints in which gap arthroplasty was performed, 2 patients had Grade 4 facial nerve injury after 24 hours of surgery which recovered to Grade 3 injury after 1 week and remained so after 1 month. However, 3 months later it recovered to Grade 1 [16].

CONCLUSION

Study concluded that the difference from 1st day of 1st week to 6th day of 3rd week in MMO & HBS which shows that mouth opening exercise are effective in patients with reduced mouth opening & electrical stimulation along with facial exercises are effective in improving the motor function of facial nerve.

Conflicts of interest: None

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How to cite this article:

Danish Nouman, Kayinat Hassan. POST OPERATIVE PHYSIOTHERAPY MANAGEMENT OF TEMPOROMANDIBULAR JOINT ANKYLOSIS. *Int J Physiother Res* 2017;5(5):2320-2324. DOI: 10.16965/ijpr.2017.198