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# Effectiveness of Physiotherapy Intervention on Trismus (Lock –Jaw): A Case Report

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**Abstract**---Trismus is a condition which is not very common among general population. Therefore, most of the people are not aware regarding this. Basically medical and surgical management is provided and very few go for physiotherapy management. In this case study 30 year unmarried female came to physiotherapy clinic with the problem in mouth opening and pain in jaw. She went for complete assessment before intervention in which via 3 methods we measured maximum mouth opening. Intervention:-In this study we gave 4 weeks of intervention with 5 sessions/week to the patient. In all the 4 weeks intervention was same. Dry heating was given for 20 minutes followed by ultrasound and stretching exercises. In outcome measures mouth was observed and leveled with the help of Modified Mallampati score. Maximum mouth opening was measured with measuring scale, 3 finger width test and measurement via vernier caliper. All the parameters showed the significant results after the interventions.

**Keywords**---maximum mouth opening, vernier caliper, 3 finger width test, modified mallampati score.

**Introduction**

Trismus is a condition in which there is decrease range of motion of jaw opening or restriction in jaw opening <sup>1</sup>. The other name for this condition is lock jaw .In this patient has difficulty in swallowing, chewing the food, opening of the mouth, speaking or oral hygiene problems.<sup>2</sup> there are number of causes for this lock law. Normal mouth-opening ranges from 35 to 45 mm. <sup>3</sup> Males usually have slightly greater mouth opening than females. (40–60 mm, average of 50 mm). The normal lateral movement is 8-12 mm, <sup>4</sup> and normal protrusive movement is approximately 10 mm. Some have distinguished mild trismus as 20–30 mm interincisal opening, moderate as 10–20 mm and severe as less than 10 mm.<sup>5</sup>

### Relevant anatomy/pathological process

For mouth opening to occur, sensory and motor neural activity of TMJ is required. They are two primary groups of muscles that determine mandibular (jaw) motion these are temporalis, masseter and medial pterygoid responsible for mandibular elevation (mouth closure). While the lateral pterygoid, is responsible for depression (mouth opening) of the mandible. Opening is assisted by the mylohyoid, anterior belly of digastric, geniohyoid and infrahyoid muscles and possibly the posterior belly of digastric. All the muscles of mastication have motor and afferent sensory supply from mandibular division of the trigeminal nerve except infrahyoid muscles being supplied by branches of the ansacervicalis. The muscles of closure are approximately 10 times more powerful than the opening muscles and are made up slow twitch fibres. This fact is helpful in exercising planning for trismus patients. The masticatory muscles act in antagonism, as neurogenic stimulation of one group causes reflex neural inhibition of the other. In trismus, while the inciting insult may be unilateral, the reflex activated is bilateral.

### Causes of trismus

There are many causes for trismus .The most common cause are problem with in the temporomandibular joint or outside the joint. There may be trauma, infection, fractures, Prolonged Immobilization, TMJ dislocation, Meniscus displacement, post-surgical edema, recent dental treatment, osteomyelitis, carcinoma, seizures, stroke and many more.

### Mouth examination

Can be done by Mallampati scoring. In this we advise the patient to be in sitting position and try to open your mouth and protrude your tongue out of mouth as trying to touch the base of chin. Then we can examine the oral cavity by visualizing the base of uvula, faucial pillars and soft palate. After this we can score according to Mallampati score.

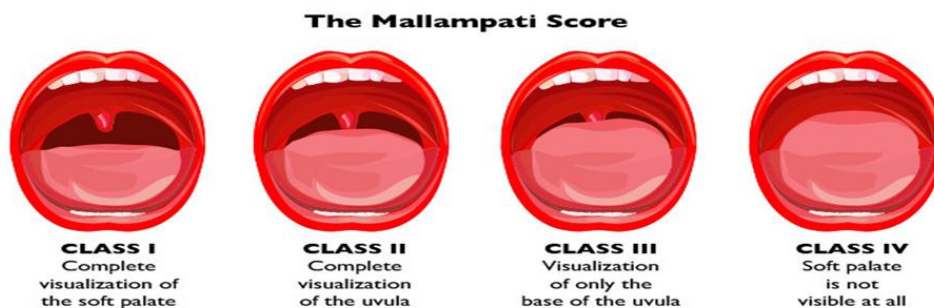


Figure 1. Levels of Modified Mallampati score

Modified mallampati Scoring has four levels. In class I soft palate, uvula, fauces and pillars are visible. In class II soft palate, major part of uvula, fauces are

visible. In class III soft palate, base of uvula is visible and in class IV only hard palate is visible.

### **Mouth examination can be done by 3 methods**

- Measurement of three fingers width (index, middle and ring fingers) at the first distal interphalangeal folds using Vernier caliper: - In this width of three fingers (index, middle and ring fingers) at the first distal interphalangeal folds of right hand are measured with the help of vernier caliper. Measurement of maximum mouth opening was recorded by asking the subject to open their mouth as wide as possible, while the examiner measured the maximum distance from the incisal edge of the maxillary central incisors to the incisal edge of the mandibular central incisors at the midline. The ability to vertically align three fingers up to the first distal interphalangeal folds with the mouth maximally opened was checked.(Fig 2(a) and (b) ).



Figure 2(a)



Figure 2(b)

- Direct 3 finger width test:- In this we ask the patient to try to open this mouth completely and try to put three fingers in mouth and move in and out. If patient is able to do then there is complete range of motion of mouth.(Figure 3)



Figure 3

- Measurement of three fingers width (index, middle and ring fingers) at the first distal interphalangeal folds using calibrated scale.



Figure 4

XRAY and CT SCAN are being taken to rule out the problems in TMJ and its surrounding areas. In this case mostly medical and surgical treatment is being provided to the patient. Underlying condition is being treated with dental treatments. Along with this physiotherapy is also provided to the patient in which major concentration is given to passive range of motion exercises of mouth to help in opening of the mouth. Speech therapy is also provided to those who have swallowing difficulties. In medical management patient is provided pain killers and muscle relaxant.

### **Physiotherapy treatment**

#### **Aim/Objective of physiotherapy treatment**

- Reduction of edema
- Soften of nearby tissues
- Increase the range of motion of TMJ
- Increase the strength of muscles of mastication.
- Heat: A heat emitting modality such as ultrasound is commonly used as an adjunct to stretching exercises involving the muscles of mastication. This is very helpful in decreasing the stiffness of joints, decreasing the pain and spasm. Along with this increasing the extensibility of the collagen tissues.
- Massage: By massage there is increase in the blood flow and relaxation to the muscles of mastication.

- Exercise: Active and passive stretching/strengthening exercises to the muscles of mastication have been advocated by various authors in the treatment of trismus. As they work to stretch scar tissue, relax the muscle that are in spasm and increase muscle strength, bringing about increased range of motion of the TMJ.
- Sugarless Chewing Gum: This is another means of providing lateral movement of the TMJ.
- Trismus Devices: In conjunction with physiotherapy, they are devices designed for mandible motion rehabilitation. The devices are divided into externally and internally activated. Externally activated devices cause forcible stretching of the elevator muscles by depressing the mandible. While the internally activated device stretches the affected elevator muscles and other tissue that limits mandibular opening.

### **Case description**

A 30 years old unmarried female with weight 80 kg and height 5'2" came to worldcare physiotherapy centre, Gurdaspur with chief complaint of pain in right jaw, with difficulty in opening her mouth and presence of clicking sound while opening of mouth. Patient also complaint of deviation of mouth to right side while opening the mouth. History of present illness states that patient is facing the above mentioned problems from last one month. He took analgesic for the pain and pain subsides after taking medicine but there is no improvement in range of motion of opening of mouth. History of past illness states that patient was admitted to multispecialist hospital 6 months back for about 6 days as patient got severe chest infection along with difficulty in breathing. So, in hospital he was given medical management and nebulization for 6 days. After which patient recovered and was discharged from the hospital. Under still she was under medication for one month. According to patient many times when she goes for mouth examination by doctor she was not able to open the complete mouth according to doctors. Medical history states that she is having tonsillitis since birth. In addition to this she is hypotensive since 10 years & hypothyroidism since 4 years. For which she is under medication. For hypothyroidism she is recommended thyrox 50 tablet on daily wages. Surgical History as well as drug allergy history is not present. By occupation patient is a phd scholar. She is non-vegetarian, non-smoker and non-alcoholic according to her personal history.

- On observation it was observed that there was deviation of mouth to right side while patient tries to open the mouth. Along with this there is incomplete opening of the mouth. We classify the condition to class IV according to mallampati score.
- Pain was evaluated on right side of face. Type of pain was dull with continuous in nature. Site of pain was right TM joint. On numerical pain rating scale patient reported pain at rest as 5 and 8 while opening the mouth.
- Mouth examination was done by all the three methods during assessment:
  - Direct 3 finger width test:- In this test patient was not able to use 3 fingers width. He only uses 2 fingers width.

- Measurement of three finger width (index, middle and ring fingers) at the first distal interphalangeal folds using Vernier caliper.:- In this measurement value was 2.5cm
- Measurement of three finger width (index, middle and ring fingers) at the first distal interphalangeal folds using calibrated scale.:- In this the range of mouth opening was only 2 inches.

### **Diagnosis**

Xray of TMJ was advised to patient before assesment.So,Xray of the TMJ revels there was no any bon pathology present.

### **Intervention**

In this study 4 weeks of intervention was set for the patient with 5 sessions/week Through out 4 weeks same treatment protocol was followed .Outcome measures were measured after all the 4 weeks to rule out the significant improvement. In all the four weeks patient was given dry heating at right TMJ for about 20 minutes.Then ultrasound was given for 3-5 minutes in continous mode at 1.5 w/cm<sup>2</sup>.After this stretching exercises were advised to the patient.

### **Stretching exercises**

Was recommended to the patient who helps in relieving the joint tension and increasing the range of motion of mouth:

- Exercise 1:- In this we advise the patient to open the mouth and try to touch the roof of the mouth with the tip of the tongue. Try to open your mouth as wider as possible and then hold this position for 5-10 seconds.
- Exercise 2:-In this we advise the patient to open the mouth and try to touch the roof of mouth with the tip of tongue .Then try to move your lower jaw in and out as far as possible and hold this position for for 5-10 seconds in each position.
- Exercise 3:-In this we advise the patient to open the mouth as wider as possible keeping tongue at neutral position for 5-10 seconds
- Exercise 4:- In this we advise the patient to open your mouth as wider as possible and try to move your lower jaw forward and backward. Then hold this position for 5-10 seconds. Then close your mouth.
- Exercise 5:- In this we advise the patient to open your mouth and try to move your lower jaw towards right and hold it for 5-10 seconds and then to opposite side again with a hold time of 5-10 seconds.
- Exercise 6:- Place a thin object, such as a pencil or paintbrush, in between your front teeth. Slide your lower jaw forward so that the object rests in between your back teeth and front teeth. Hold for 20 seconds.

Perform all these exercises for about 15-20 repetitions in one session.

### Outcome measures

Outcome measures were taken after first, second, third and fourth week of treatment to rule out the significant improvements.

### Pain outcome measures

Table 1  
Pain outcome measures after 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> week

NPRS	After 1 <sup>st</sup> week	After 2 <sup>nd</sup> week	After 3 <sup>rd</sup> week	After 4 <sup>th</sup> week
At rest	5	3	2	0
During movement	7	5	4	3

### Direct 3 finger width test

Table 2  
Direct 3 finger width test

	After 1 <sup>st</sup> week	After 2 <sup>nd</sup> week	After 3 <sup>rd</sup> week	After 4 <sup>th</sup> week
Direct 3 finger width test	2 fingers	2 fingers	3 fingers	3 fingers

### Measurement of width of three fingers (index, middle and ring fingers) at the first distal interphalangeal folds using Vernier caliper

Table 3  
Measurement of 3 finger width via vernier caliper

	After 1 <sup>st</sup> week	After 2 <sup>nd</sup> week	After 3 <sup>rd</sup> week	After 4 <sup>th</sup> week
Measurement via vernier caliper	3cm	3.5cm	4cm	4.5cm

### Measurement of width of three fingers (index, middle and ring fingers) at the first distal interphalangeal folds using calibrated scale. - In this the range of mouth opening was only 2 inches

Table 4  
Measurement of 3 finger width via scale

	After 1 <sup>st</sup> week	After 2 <sup>nd</sup> week	After 3 <sup>rd</sup> week	After 4 <sup>th</sup> week
Measurement via scale	2 inches	2.5 inches	3 inches	3.5 inches

## Mallampati score

Table 5  
Mallampati scoring after 1st, 2nd, 3rd and 4th week of Treatment

	After 1 <sup>st</sup> week	After 2 <sup>nd</sup> week	After 3 <sup>rd</sup> week	After 4 <sup>th</sup> week
Mallampati Score	Class IV	Class III	Class III	Class II

## Discussion

There are many theories about the medical and surgical management in trismus patients but there are very less studies in physiotherapy regarding this condition. Even there are many case studies explaining differently on observation, examination and intervention methods. But this is the first trial study to explain the observational, examinational method and physiotherapy management in mouth opening problem with various methods. Though mouth observational method i.e. modified mallampati score has not been implemented in the assessment format of any trismus patient before. According to certain researchers and writers modified mallampati score is only used during airway management in ICU patient if we have to provide the patient Or pharyngeal Airway, Nasopharyngeal airway or other airway managements. But this is the first trial to rule out the mallampati score during assessment of trismus patient and after intervention. In this study we have got significant outcome results of mallampati scoring from level IV to level II. So, we can suggest that we can use mallampati scoring for assement of patients with mouth opening problems.

In addition to this ,we have used 3 methods for mouth opening measurements i.e. measurement via calibrated scale, measurement via vernier caliper and measurement by 3 finger width test. In most of the studies we are using only one method according to our convenience but in this study we have used 3 measuring methods to rule out which method is more efficient in measuring outcome measures but from result we come to conclude that all the 3 measuring methods provide us the significant desired outcomes. So, we can implement any measuring method for trismus patient. Along with this in intervention we had not used any special advance technique for management of mouth opening. We got good results by just recommending normal stretching exercises instead of very harsh and complicated exercises.

## Conclusion

This case study depicts the positive significant result of physiotherapy management in trismus patient. In observation Modified mallampati scoring has showed highest improvements after the intervention. Along with this 3 methods chosen for maximum mouth opening also showed significant positive results. So, we can choose any method for measurement in mouth opening. Furthermore studies could be done to overcome this problem with some advance management.

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