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Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology

Journal homepage: [www.joooo.org](http://www.joooo.org)**Case Series****Management of trismus using novel physiotherapy appliance: A case series**G. V. Ramachandra Reddy<sup>1,\*</sup>, Christopher V Shinde<sup>1</sup>, Shubhi Maheshwari<sup>1</sup>, Sadiya Tarannum Shaikh<sup>1</sup>, Saumya Khare<sup>1</sup>, Swati Suresh<sup>1</sup><sup>1</sup>Dept. of Oral Medicine & Radiology, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India**ARTICLE INFO***Article history:*

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**ABSTRACT**

Trismus refers to the restriction of the range of movements of the jaw commonly referred to as “lockjaw”. We report case series of trismus in patients who came with chief complaint of reduced mouth opening and pain with various aetiologies. These patients were successfully treated by Shekar’s physiotherapy appliance. Thus, this novel oral physiotherapy appliance is simple, easy to use, custom made and perhaps be employed as an effective method to treat trismus.

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For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)**1. Introduction**

Trismus termed as “lockjaw” originated from the Greek word meaning gnashing. Trismus refers to the restriction of the range of movements of the jaw.<sup>1</sup> Previously trismus referred to sequel occurring after tetanus, but currently, it refers to restriction in the mouth opening due to diverse aetiologies.<sup>2</sup> This condition may impair eating, oral hygiene maintenance, restrict access to dental procedure and adversely affect facial appearance and speech. Management of trismus is symptomatic and depends upon the etiological factors, ranging from analgesics, muscle relaxants, heat therapy, soft diet & physiotherapy. We present four cases of trismus of varied causes, one is post-traumatic, two cases following odontogenic infections and a case of sub mucous fibrosis. Although they had varied aetiologies but were managed successfully by using a novel physiotherapy appliance.

**2. Case Report 1**

A 44-year-old female patient reported to the department with complaint of reduced mouth opening and pain in left ear region since 1 month. Patient gave a history of fall on the roadside while walking injuring her face. Mouth opening was restricted to 13mm and there was a deviation of mandible towards left side. On palpation tenderness was present on left TMJ. Following trauma primary treatment was done by means of sutures on nose and upper lips. She was medicated but didn’t get any relief. Later, patient experienced pain and reduction in the mouth opening.

**2.1. Diagnostic assessment**

Orthopantomogram revealed no evidence of fracture or bony changes in TMJ. On the basis of history, clinical and radiographic examination, diagnosis of trismus due post to condylar trauma was made.

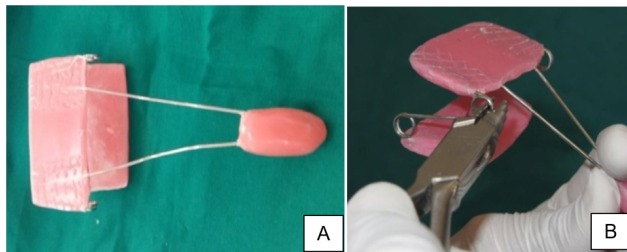
**2.2. Therapeutic intervention**

To keep the condylar movements active physiotherapy was planned. Appliance was fabricated using 0.9 gauge stainless

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steel wire after taking measurement of the width of both arches (Figure 1).<sup>3,4</sup>

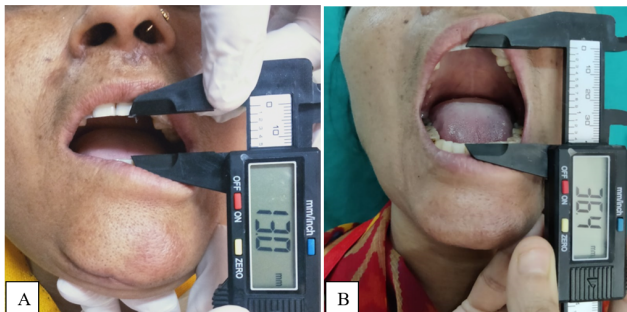


**Fig. 1: A): Appliance design; B): Appliance activation**

Appliance was inserted and patient was asked to do open and close exercise to keep the condylar movement active. Patient was advised to repeat the exercise at home 4-5 times a day for 10-15 minutes (Table 1).

### 2.3. Follow-up

At the end of the treatment maximum opening achieved was 36.4 mm within one month (Figure 2). Patient did not complain of pain or discomfort. The patient is under continuous follow-up for a month with no signs of recurrence.



**Fig. 2: Case 1: A): Pre treatment; B): Post treatment**

## 3. Case Report 2

A 45-year-old female patient reported to our department with a complaint of reduced mouth opening since 20 days. Patient had pain in left side of the face and then developed swelling in the left ear region for which she was medicated and got relief from pain and swelling but difficulty in mouth opening persisted.

### 3.1. Diagnostic assessment

Mouth opening was 12 mm on further examination disto-proximal caries with draining sinus in 37, missing 36 and dental caries with 46. Left submandibular lymph node was enlarged, tender and mobile. On the basis of history, clinical

**Table 1: Timeline case-1**

7/6/2021	Primary treatment of the trauma
19/6/2021	Patient was medicated for pain and trismus
8/7/2021	Patient came to our department with the complaint of reduced mouth opening and pain in left ear region. Mouth opening was restricted to 13mm. On the basis of history, clinical, radiographic examination provisional diagnosis of post traumatic trismus was given. Patient was prescribed Ibuprofen 400 mg and Shekar's appliance was fabricated and was advised physiotherapy.
10/7/2021	Patient was recalled for follow up. Mouth opening increased to 15.7mm. Appliance was activated further and advised to continue physiotherapy.
22/7/2021	Second follow-up after 12 days mouth opening was increased to 27.2mm. Appliance was activated by 4mm.
27/7/2021	Third follow-up mouth opening was further increased to 32mm. Patient did not complain of pain or discomfort.
14/8/2021	Fourth visit mouth opening increased to 36.4mm. Patient was advised to continue physiotherapy for a week and stop

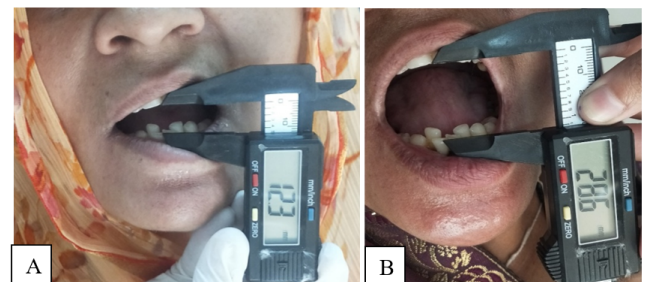
and radiographic examination diagnosis of trismus due to sub massetric space infection following periapical abscess in relation to 37 was made.

### 3.2. Therapeutic intervention

Since mouth opening was restricted it was decided to start physiotherapy in the early phase of treatment along with anti-inflammatory medication. Appliance was fabricated and patient was advised to do mouth opening exercises.

### 3.3. Follow-up

After two weeks of follow up the maximum mouth opening achieved was 35 mm (Figure 3). Patient was referred to oral surgery for extraction of 37 (Table 2).



**Fig. 3: Case 2: A): Pre treatment; B): Post treatment**

**Table 2:** Timeline case-2

2/10/2021	Patient had pain in left side of the face and then developed swelling in the same region, started experiencing difficulty in mouth opening. She consulted a doctor and was prescribed medication. She got relieved of pain and swelling but difficulty in mouth opening persisted.
22/10/2021	Patient came to our department with the complaint of reduced mouth opening. Mouth opening was 12 mm. On the basis of history and clinical examination provisional diagnosis of trismus due to submassetric space infection following periapical abscess in relation to 37 was made. Patient was prescribed Tab. Ibuprofen 400 mg for pain and advised physiotherapy with the appliance and keep the muscles relaxed.
25/10/2021	First follow up mouth opening was 23mm, appliance was activated by opening the coil by 4mm.
30/10/2021	Second follow up mouth opening was 29 mm. Appliance was further activated and patient was advised to continue physiotherapy.
4/11/2021	Third follow up mouth opening was increased to 35mm. Patient was referred to oral surgery for extraction of 37

#### 4. Case Report 3

A 30-year-old male patient was referred to Oral Medicine from prosthodontics department as they were not able to insert impression trays for fabrication of FPD. History revealed patient had undergone treatment for OSMF three months back and mouth opening was limited to 20.4mm.

##### 4.1. Therapeutic intervention

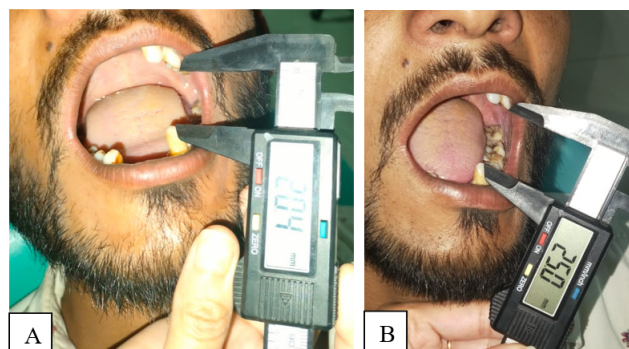
To increase the mouth opening physiotherapy was planned, appliance was fabricated and patient was instructed to keep the muscle in relaxed state while appliance was in position so that force is exerted on the cheek mucosa.

##### 4.2. Follow-up

On third follow up visit the mouth opening achieved was 25.0 mm (Figure 4). Prosthodontist was satisfied with the mouth opening and was able to make impression (Table 3).

#### 5. Case Report 4

A 28-year-old female patient reported to our department with a complaint of reduced mouth opening since 1 month. Patient had pain in the left lower third of face and then developed swelling in the same region. She was medicated and got slight relief from pain and swelling but difficulty in mouth opening persisted.

**Fig. 4:** Case 3: **A):** Pre treatment; **B):** Post treatment**Table 3:** Timeline case-3

27/5/2022	Patient was referred from Prosthodontics as they were unable to make impression due to reduced mouth opening. On examination mouth opening was 20.4mm. History revealed the patient was treated for OSMF three months back. Shekar's appliance was fabricated and patient was advised physiotherapy.
1/6/2022	First follow up, mouth opening was 22.6mm. Appliance was activated by opening the coil by 4mm
4/6/2022	On second visit mouth opening was 23.8mm. Appliance was further activated.
7/6/2022	Third follow up visit mouth opening increased to 25.0 mm. Prosthodontist was satisfied with the mouth opening and were able to take the impression.

##### 5.1. Diagnostic assessment

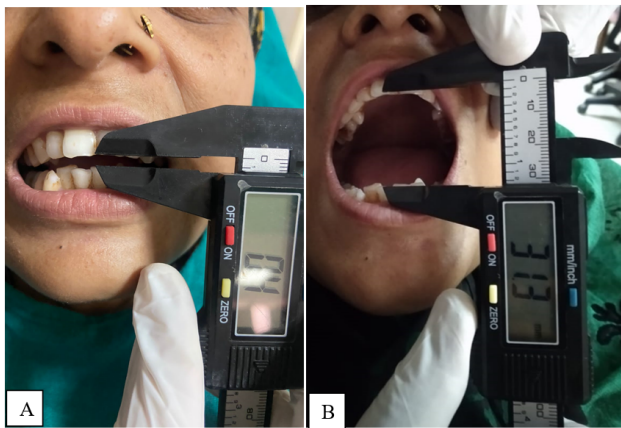
Mouth opening was restricted to 0.4mm on further examination grossly carious with draining sinus wrt 38. Left submandibular lymph node was enlarged, tender and mobile. On the basis of history, clinical and radiographic examination diagnosis of trismus due to left pterygomandibular space infection following periapical abscess in relation to 38 was made.

##### 5.2. Therapeutic intervention

Since mouth opening was restricted it was decided to start physiotherapy in the early phase along with anti-inflammatory medication. Initially patient was advised to use ice cream sticks to increase interincisal distance for insertion of the appliance. Finally, appliance was fabricated and patient was advised to do mouth opening exercises.

##### 5.3. Follow-up

After two weeks of follow up the maximum mouth opening achieved was 31.3 mm (Figure 5). Patient was further referred to oral surgery for extraction of 38 (Table 4).



**Fig. 5:** Case 4: **A):** Pre treatment; **B):** Post treatment

**Table 4:** Timeline case-4

16/08/2022	Patient had pain in left side of the lower third of face and then developed swelling in the same region and started experiencing difficulty in mouth opening. She was medicated and got some relief in pain and swelling but difficulty in mouth opening persisted.
22/08/2022	On examination, mouth opening was 0.4 mm. On the basis of history and clinical examination provisional diagnosis of trismus due to left pterygomandibular space infection following periapical abscess in relation to 38 periapical abscess in relation to 38 was made. Patient was prescribed Tab. Ibuprofen 400 mg for pain and advised to use ice cream sticks for insertion of appliance into the mouth. Further appliance was fabricated for physiotherapy.
25/08/2022	First follow up mouth opening was 7.4 mm, appliance was activated by opening the coil by 4mm.
30/10/2022	Second follow up mouth opening was 10 mm. Appliance was further activated and patient was advised to continue physiotherapy.
4/11/2022	Third follow up mouth opening was increased to 31.3mm. Patient was referred to oral surgery for extraction of 38.

## 6. Discussion

Trismus is limitation of jaw movements due to varied aetiologies. Trismus may be due to involvement of the temporomandibular joint itself (TMJ) or extraarticular aetiologies. Others causes include infectious, traumatic, and neoplastic sources. Trismus may also be iatrogenic, resulting from prescribed interventions and treatments. Clinical presentation of trismus varies, from pain to inability to open mouth.<sup>3,5</sup>

In our case-1 trismus was due to post condylar trauma, maximum mouth opening was achieved. Trauma TMJ result in intra articular hematoma causing hypoxia eventually

gets organized and ossified. Indirect immobilization of the joint after trauma due to swelling and pain may result in reduction in the jaw movement. Hypoxia in the fracture site plays an important role in determining the amount of callus formation.<sup>6,7</sup> This appliance exerts force in the areas where there is resistance. When resistance comes from the TMJ itself as in case of trauma to the joint, patient must be advised jaw opening and closing exercise with this appliance.

In our case-2 trismus was due to submasseteric space infection where we achieved significant mouth opening. Odontogenic infection associated with mandibular molars commonly spreads to submasseteric and pterygomandibular space leading to trismus. Most of these cases the trismus is transient and self limited, when identified in certain patients like TMJ arthritis and aged individuals' early physiotherapy is mandatory to prevent further complications (Table 2).

In our case -3 with OSMF adequate mouth opening was achieved. In OSMF the resistance comes from fibrous bands. Patient should be advised to exercise with the appliance and keep the muscle relaxed so that force is exerted on to the fibrous bands which further puts pressure on the fibrous bands and increase blood circulation and further alleviate the mouth opening.(Table 3) This is in accordance to the findings in our previous study on oral physiotherapy using Shekar's appliance in OSMF patients.<sup>4</sup>

In our case-4 trismus was due to pterygomandibular space infection where we achieved significant mouth opening. In most of these cases the trismus is transient and self limited. Early physiotherapy with this appliance can yield satisfactory mouth opening that facilitate further treatment and prevent complications (Table 4).

Treatment of trismus is directed at the inciting etiology and is most commonly treated symptomatically. Symptom-directed interventions, including heat therapy, analgesics such as non-steroidal anti-inflammatory agents, and muscle relaxants, are usually prescribed in the acute phase and have been described as mainstays for treating uncomplicated transient trismus.<sup>5</sup> Stretching exercises are indicated after the acute phase or in patients with post-traumatic and post-operative trismus, particularly when persisting longer than one week. The exercises typically consist of repeated attempts to open the mouth against applied resistance, usually divided into multiple sessions per day.<sup>8</sup>

Shekar's appliance consists of two acrylic plates—maxillary and mandibular.<sup>3</sup> These plates are prepared after taking the measurement of the arches. There are two springs made up of 0.9-1.2 mm stainless steel orthodontic wire depending upon the age of the patient and the type of trismus to be treated. The appliance is activated by opening both the coils uniformly as per the interincisal distance of the patient's mouth.<sup>4</sup> Appliance fabrication is simple, non-invasive technique, less traumatic to the patient and affordable.<sup>4,9</sup> It can be performed anywhere during the

**Table 5:** Improvement in mouth opening

Case No.	Cause of trismus	Pre treatmentMouth opening [A] (in mm)	Post treatmentMouth opening [B] (in mm)	Increase inMouth opening [A-B] (in mm)
1	Post condylar trauma	13	36.4	23.4
2	Sub massetric space infection	12	35	23.0
3	OSMF	20.4	25.0	4.6
4	Pterygomandibular space infection	0.4	31.3	30.9

day by the patient which adds to its benefit as a patient compliance unlike other mouth opening devices. This can be repeated three to four times a day to ensure the steady state of increased blood flow. The duration and frequency required for the exercise can be increased, subject to the patient's normal comfort level. Long term use, fatigue may develop, leading to breakage of stainless-steel wire, to prevent this one must use good quality stainless steel wire.

## 7. Conclusion

Shekar's appliance has proved to be useful oral physiotherapy in trismus patients. In all our four cases oral physiotherapy with this appliance showed excellent result. Thus, this appliance is a reliable and satisfactory physiotherapeutic aid in the treatment of trismus due to diverse and varied etiologies. Further study should be carried out with larger sample size and increasing study criteria to strengthen the results of this case report.

## 8. Source of Funding

None.

## 9. Conflict of Interest

None.


## 10. Acknowledgement


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