

Fabrication of Occlusal Splint for Limited Mouth Opening Patient: A Technical Note

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ABSTRACT

Background: Restricted mouth opening is one of the commonly encountered problems in dental practice. The cause for reduced mouth opening is various reasons. Mostly the causes of inability to open mouth are articular and sometimes the cause may be extra-articular. The case reported in this article the cause of mouth opening is extra-articular, who was prosthetically treated with modification of techniques for impression making and fabrication of occlusal splints by three different methods.

Keywords: Trismus, Occlusal splint, Putty index.

INTRODUCTION

The word Trismus is Latin term derived from the Greek word "Trismos" which means grinding / rasping. Limitation of mouth opening due to reduced mandible mobility means Trismus in lay man terms. Trismus was defined by Kristensen¹ as a prolonged tetanic spasm of the jaw muscles, due to extraarticular causes by which normal mouth opening is restricted (locked jaw). Maxilla and Mandible are the Two bones form the boundaries of oral cavity. Out of these two maxilla is fixed and is not mobile, where as mandible is capable of upwards and downwards mobility with a limited forward and backward mobility too. The cut -off point is at least 35mm of maximal interincisal opening (MIO) to determine trismus.

This particular clinical condition cannot be attributed to any particular disease or condition, as it may be a symptom of number of conditions. The causes can be broadly classified into articular and extra-articular. Luyk and Steinberg² have enumerated the possible causes of trismus as under :

1. Trauma
 - a. Acute
 - b. Chronic
2. Neoplastic
 - a. Benign
 - b. Malignant
3. Neuromuscular disorders
 - eg. Parkinson's disease
4. Reactive
 - a. Acute: masticator space infection
 - b. Chronic: TMJ ankylosis, oralsubmucous fibrosis, MPDS, post radiotherapy and degenerative joint disease
5. Congenital
6. Psychogenic – hysteria, hyperventilation syndrome
7. Drug induced – strychnine poisoning

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This Article describe the technical note in the fabrication of occlusal splint in restricted mouth opening patient by extra-articular cause - oralsubmucous fibrosis (Chronic Reactive) .

OSMF

Oral submucous fibrosis, an insidious chronic disease and a precancerous condition, affecting any part of the oral cavity and sometimes the pharynx is caused by prolonged³ use of tobacco, arecanut, spices ,etc In which the Patients complain of burning sensation while eating spice food. The fibrosis also leads to difficulty in mastication, speech, and swallowing and pain in throat and ears. It also may lead to relative loss of auditory acuity because of stenosis of the opening of the Eustachian tube. In advance cases, there may be severe trismus.

CLASSIFICATION OF OSMF

Khanna⁴ Classification System (1995)

Group I: This is the earliest stage and is not associated with mouth opening limitations. It refers to patients with an interincisal distance of greater than 35mm.

Group II: This refers to patients with an interincisal distance of 26-35 mm.

Group III: These are moderately advanced cases. This stage refers to patients with an interincisal distance of 15-26 mm. Fibrotic bands are visible at the soft palate, and pterygomandibular raphe and anterior pillars of faucets are present.

Group IVA: Trismus is severe, with an interincisal distance of less than 15 mm and extensive fibrosis of all the oral mucosa.

Group IVB: Disease is most advanced, with premalignant and malignant changes throughout the mucosa.

Ranganathan *et al.* Classification (2001):

1. Group I: Only symptoms and no demonstrable reduced mouth opening
2. Group II: Limited mouth opening 20 mm and above
3. Group III: Mouth opening <20 mm

4. Group IV: OSMF advanced with limited mouth opening. Precancerous or cancerous changes seen all through the mucosa.

Treatment Plan by Anila Koneru⁵ et al

Group 1: clinician can perform any dental procedures

Group 2: treatment modalities such as complete denture, RPD and FPD can be performed normally

Group 3: occlusal splints can be successfully used to gain adequate mouth opening for prosthodontic treatment

Group 4: prosthodontic treatment modalities should be considered only after the surgical procedures done for reduced mouth opening.

IMPRESSION TECHNIQUE FOR OSF PATIENT

Luebke⁶ described a sectional impression procedure for dentulous patients by using two plastic sectional impression tray assembled with lego building blocks and autopolymerising resin. Whitsitt and Battle⁷ introduced a procedure for primary impression of dentulous arches using putty silicones as a flexible tray, washed with light body silicone to obtain more detail.

Heasman *et al*⁸ modified a procedure for making final impression of dentulous arches by using 2 sectional acrylic resin impression trays joined together with 2 fins.

Supoj dhanasomboon *et al*⁹ suggested that after making elastomeric impression, complete the first pour using dental stone leaving a portion of the dental arch in the sectional tray uncovered. then retrieve the cast from the impression, wet it and place it in the other portion of the sectional impression and complete the second pour.

CASE HISTORY

A 43-year-old men reported to department of prosthodontics in Tagore dental college presented with a complaint of progressive difficulty in opening his mouth over the past 2 years. He had a longstanding habit of chewing fresh areca nut (4-5 pouches a day for 20-25 years). Examination revealed that his lips were thin and his mouth opening was limited to about 20 mm. There was erosion at the corners of his mouth . The entire oral mucosa was pale, with focal blanched areas . The

tongue was devoid of papillae and extensive fibrosis had occurred on its ventral surface and the floor of the mouth.

Thick fibrotic bands were palpable bilaterally on the buccal mucosa. Intraoral examination was problematic as it was difficult to retract the patient's fibrotic cheeks. When the patient was asked to blow out air with closed lips, the usual puffed cheek appearance was not seen, suggesting loss of cheek elasticity. The teeth were periodontally weak. General examination was normal. A diagnosis of OSF at a moderately advanced stage was made based on the characteristic oral features: generalized blanching of mucosa, extensive fibrosis and limited mouth opening. The patient comes under group III by Khanna⁴ and Ranganathan et al. treatment plan performed for this patient is group 3 by Anila Koneru⁵ plan.

TREATMENT PROCEDURE

TECHNIQUE 1

1) Since mouth opening was limited, the smallest available sectional tray inserted in patients mouth and the impression was made with irreversible hydrocolloid (Neocolloid, Zermack clinical, Italy) as the impression material.

2) The cast (type III stone Kalabhai, Mumbai, India) was poured and both the cast removed from the impression.

3) In cast I the tooth were recorded from 36 - 43 & in cast II 46-34 were recorded.

4) The cast were sectioned with disc exactly in 42 region in cast I, same way cast were sectioned with disc exactly in 43 region in cast II.

5) Both the cast were fused together and occlusal splints were fabricated by conventional technique.

TECHNIQUE II

1) The cast where fabricated same as like technique I

2) The cast where duplicated using putty (Aquasil, Densply)

3) The Final cast (type III stone Kalabhai, Mumbai, India) was poured and the cast removed from the putty index. (Fig -1, 2)

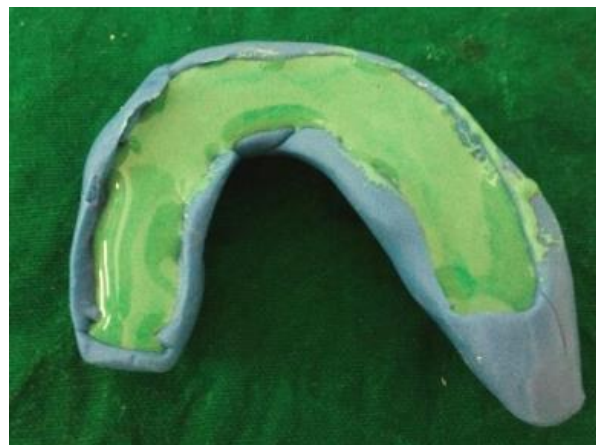


Fig 1: Cast poured in the putty index.



Fig 2: Cast removed from the putty index.

4) Occlusal splint where fabricated over the final cast.

TECHNIQUE III

1) Sectional Impression where made and the cast (type III stone Kalabhai, Mumbai, India) was poured and both the cast removed from the impression. (Fig-3)



Fig 3: Cast prepared from sectional impression

2) In cast I the tooth were recorded from 36 - 43 & in cast II 46-34 were recorded.

3) The cast were sectioned with disc exactly in 42 region in cast I, same way cast were sectioned with disc exactly in 31 region in cast II. (Fig-4)



Fig 4: Sectioning of the cast with a disc.

4) Putty index (Aquasil, Densply) where made in Cast I from 36-43 (Fig -5)



Fig 5: Putty index made in cast I.

5) Then the cast II exactly oriented to the putty index and (type III stone Kalabhai, Mumbai, India) was poured to get the final cast. (Fig -6).



Fig 6: Cast II oriented in putty index.

6) Occlusal splint where fabricated over the final cast. (Fig-7)



Fig 7: Occlusal splint fabricated

DISCUSSION

Adult patients with varying severity of tooth loss can be treated by different types of fixed or removable constructions that are retained by the remaining natural teeth or dental implants. Such prosthetic therapy of patients with OSMF offers a terrifying dispute due to restricted mouth opening and totally inelastic mucosa is forced against the teeth, leading to chronic ulceration and subsequent infection. Several methods of constructing sectional special trays have been discussed in literatures⁶⁻⁹. Use of inter-occlusal forces to achieve sufficient mouth opening forms an essential part of treatment

in OSMF patients. Patients with excellent dentition are agreeable to use of such forces^{10,11} and also occlusal splints helps in prevent the injury to the soft tissues.

Only prosthetic rehabilitation will not suffice in such cases, it should be supported with cessation of arecanut eating, salivary substitutes, nutritional support high in protein and calories and for vitamin B complex and other vitamins and minerals., physiotherapy with heat therapy like hot rinses, lukewarm water, or selective deep heating therapies like short-wave and microwave diathermy

Post-operative physiotherapy will as well be vulnerable in such patients. According to Rai *et al.* post-operative physiotherapy is the key in achieving the adequate mouth opening in OSMF patients. Initially, wooden spatulas and then Heister's jaw opener were used for the purpose of passive and active physiotherapy simultaneously. However, these are useful in the patients who are dentulous with acceptable periodontal status¹².

CONCLUSION

Trismus is a fairly common presenting complaint amongst patients seen by dentist. An accurate diagnosis of these causative factors is necessary for appropriate management of the condition, and provides the patient their best possible chance to overcome their disability. Slight modification in the treatment procedure by the operator helps in treating any clinical situation without any bias. No condition is impossible to treat. In this article we describe the three different technical note in the fabrication of occlusal splint in restricted mouth opening patient with modification in treatment procedure.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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