

# Intricate Role of Trismus Appliance in Dental Perspectives: A Comprehensive Cum Technical Revelation

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## ABSTRACT

Trismus, or lockjaw usually refers to decreased opening of the jaws due to spasm of the masticatory muscles or might usually refer to the etiologies of limited mouth opening. Dorland's Illustrated Medical Dictionary describes trismus (Greek Trimos: 'grating', 'grinding') as a motor disturbance of the fifth cranial nerve (trigeminal nerve) compelled with spasm of the masticatory muscles with obscurity in opening the mouth similar to the early characteristic symptom of tetanus. Trismus is said to have multiple etiological basis which range from the simple and non-progressive to those that are potentially critical. In a day to day clinical practice, it is very obvious to notice patients with a complaint of trismus. This condition possibly will impair eating, hamper oral hygiene, curb access for dental procedures and badly affect speech and facial appearance. Trismus is a common problem with a variety of causes and may interfere with eating, speech, oral hygiene, and could alter facial appearance. The term trismus signify a "motor disturbance of the fifth cranial nerve (trigeminal nerve), particularly spasm of the masticatory muscles, with difficulty in opening the mouth." Trismus appliances perform either externally or internally however the forces they impart may be continuous or intermittent, light or heavy, and elastic or inelastic. The overall success of the executed treatment relies on the accurate identification of the cause and commencement of right management. If possible, trismus appliances are used in combination with physical therapy and are most effectual when the condition is the outcome of muscle fibrosis or scar tissue that has not yet developed.

**KEYWORDS:** Trismus, Trismus appliances, Therabite

## INTRODUCTION

The word 'Trismus' is Latin term resulting from the Greek word "Trimos" that denotes grinding / rasping. However in general terms, Trismus means restraint of mouth opening due to reduced mandible mobility. As we all are aware that two bones usually forms the boundary of oral cavity out of which maxilla is fixed and is not mobile, where as mandible is capable of upwards and downwards mobility with a restricted forward and backward mobility. Literature has well evidenced that the maximal interincisal opening (MIO) of at least 35mm is used as a cutoff point to determine Trismus. Consequently less than 5 mm of MIO signifies complete ankylosis.<sup>1</sup> Roughly put the mouth opening should permit a minimum of three fingers when inserted sideways. The normal range of mouth opening is not constant in every patient and usually falls within a range of 40– 60 mm, even though some researchers place the lower limit at 35 mm. Since the width of the index finger at the nail bed is around 17-19 mm, two fingers' breadth (40 mm) and up to three fingers' breadth (54–57 mm) is commonly used to quantify width of opening. Because the movement of the mandible take places around Temporomandibular joint; Kazanjian and associates classified ankylosis of

Temporomandibular joint into true and false variants.<sup>2</sup> True ankylosis of Temporomandibular joint is typically caused because of pathology concerning the joint while the term false ankylosis is often used to explain restrictions of movement resulting from extra-articular joint deformities. It is none other but the false ankylosis which clinicians normally term as "Trismus".

Etiology of Trismus as shown in literature are infection, trauma, dental treatment, TM joint disorders, drug induced, radiotherapy, chemotherapy, congenital disorders and miscellaneous disorders include Hysteria, Lupus erythematosus. Trismus related to invasive dental procedures involving the oral cavity may lead to limitations in mouth opening.<sup>3</sup> in addition, dental extraction may also lead to trismus because of inflammation involving the muscles of mastication or as a result of direct trauma to Temporomandibular joint. Some of the 'dental' factors are surgical extraction of mandibular molars, inferior alveolar nerve block, posterior superior alveolar nerve block and dental restorative procedures. Pulpitis is nothing but infection and inflammation of the dental pulp commonly caused by dental caries that penetrate through the enamel and dentine of the teeth to reach the pulp. This can also be resulted due to trauma / frequent heat shocks following

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various dental procedures. When Pulp becomes inflamed due to infections it causes excessive pressure build up within the Pulpal cavity causing dental pain. The word periodontium generally denotes hard and soft tissues that enclose and support the teeth. Constant irritation and infections of these supporting tissues might irritate free nerve endings to cause masseteric muscle spasm. Pericoronal infections or pericoronitis usually resulting from the inflammation of soft tissues around the crown of a partially erupted tooth. Any unattended foci of infection can lead to the spreading of infection into different neck spaces causing cervical cellulitis / mediastinitis. Some non odontogenic infections are also known to cause Trismus. These include tetanus, brain abscess, parotid abscess, tonsillitis and meningitis.

In such circumstances trismus usually develops characteristically 2–5 days after the said procedure. Initially these patients respond well to conservative therapies like heat therapy, warm saline rinses, analgesics muscle relaxants to manage the initial stage of muscle spasm physiotherapy. An additional reason of trismus soon after dental procedures is because of incorrect positioning of needle during inferior nerve block causing injury to medial pterygoid muscle. Bleeding that resulted from such injury will possibly cause hematoma and subsequent fibrosis resulting into trismus.<sup>4</sup> Trismus caused due to fibrosis of medial pterygoid muscle is rather difficult to treat.

## MANAGEMENT OF TRISMUS

In the routine oral surgical procedures it is very obvious to develop trismus following the completion of treatment. Furthermore, single tooth extraction can also cause trismus as a result either of inflammation of the muscles of mastication or direct trauma to the TMJ. This is typically accredited to the incorrect positioning of the needle during the inferior alveolar nerve block. Ideally, the needle must be placed in the pterygoid space which is bound by the internal oblique ridge of the mandible on the lateral side and pterygomandibular raphe on the medial side. Any suspicion of TMJ trauma or dislocation ought to be considered in young patients who have dysphagia and trismus but who do not have a severe infectious etiology. Treatment should ideally be directed towards managing the cause of trismus.<sup>5</sup> If trismus is resulted because of muscle fibrosis / formation of undeveloped scar tissue, physical therapy and use of trismus appliance can be used judiciously. Formation of immature scar tissue may be due to reparative process however if this scar tissue becomes dense then physical therapy might not be of much use. Trismus resulted due to intracapsular anomalies involving temporomandibular joint, bony interference from styloid or coronoid processes, formation of dense fibrosis can require surgical interventions. Physiotherapy includes exercises which relaxes the masticatory muscles, improves its strength. Devices are available that keeps the mouths open in a graded manner. Wooden top may also be used to slowly open the mouth. Bunch of ice cream sticks can

be inserted between the upper and lower incisors to gradually increase mouth opening. Physiotherapy comprising exercises which relaxes the masticatory muscles, recovers its strength. Currently there are several commercially available devices are available that keeps the mouth open in a graded manner. In virtually all cases of trismus that are managed as outlined above, patients report improvement within 48 hours. Therapy must be continued until the patient is free of symptoms. The chances of infection must be considered if pain and dysfunction continue unabated beyond 48 hours. Antibiotics have been shown to improve the overall situation when added to the treatment regimen and continued for 7 days. As and when trismus is suspected to be allied with infection, suitable antibiotics should be prescribed. In the case of severe pain or dysfunction, if no improvement is noted within 2–3 days without antibiotics or 5–7 days with antibiotics, or if the ability to open has become very limited, the patient should be referred to an oral and maxillofacial surgeon for evaluation.

**Trismus appliances:** Literature has well evidenced the traditional use of trismus appliances to treat trismus in combination with physical therapy.<sup>2,5</sup> These devices can perform externally by forcibly stretching the elevator muscles by depression of mandible. An internally activated device applies stretch to trismus affected elevator muscles or other tissue that limits mandibular opening. Externally applied appliances impart forces that could be continuous / intermittent, light / heavy, elastic / inelastic. Dynamic Bite opener is one of the widely used externally applied appliances.

**Threaded tapered screw:** This appliance resembles the toy Top. It is made of acrylic resin. This can be placed inside the mouth of the patient between the posterior teeth, with gradual turns the maxillary and mandibular teeth are spread apart.<sup>6-10</sup> This appliance provides force that can be controlled by the patient. The force imparted is of course not elastic in nature. Author prefers to use the age old toy The Top in place of threaded tapered screw. This is inexpensive and easily available and does the same job. To use this type of device teeth must be present. This method is not useful in edentulous patients. Since enormous amount of force is generated by using tapered screw, in some patients anterior teeth could get loosened on prolonged use.<sup>11-12</sup>

**Fingers:** Beekhtjis was one of the pioneers to introduce the use the fingers by the patient to depress the mandible, stretch the musculature to the maximum, and then maintain the position for a slow count of ten. This exercise must be repeated by the patient throughout the day. Even if this approach allows complete control of the stretching schedule, the amount of opening depends on the patient's subjective perceptions.<sup>13</sup>

**Procedure:** It included measurement of the initial amount of inter-incisal opening with the help of Vernier caliper followed by fabrication of a threaded tapered screw resembling toy top (Figure 1). This threaded tapered screw can be placed inside the mouth of the



Figure 1: Use of a trismus appliance



Figure 2: Measurement of inter-incisal opening with the help of Vernier caliper

patient between the posterior teeth, with gradual turns the maxillary and mandibular teeth are spread apart. If continually used an increase in inter-incisal opening is appreciable in few weeks. It is always better to apply moist heat to the muscles of mastication for about 10 minutes before using a threaded tapered screw. Analgesic and anti-inflammatory drugs may be of use in these patients (Figure 2). A threaded tapered screw should be kept in closed position (zero position).<sup>14-15</sup> The mouth of the patient is opened as much as possible and the mouth piece of the threaded tapered screw should be inserted in such a way that the teeth and gums rest comfortably against the threaded tapered screw. For achieving the

good treatment outcome, the handle of the threaded tapered screw must be turned gradually until the sensation of gentle stretch of mouth opening is felt. The increase in mouth opening must be done only in a step by step fashion. This exercise should not be used for more than 5 mins per sitting. Then it is increased by 2 mins per sitting gradually till the maximum limit of 30 mins is reached. After accomplishment of every session ice packs need to be applied to the muscles of mastication. Furthermore, the intricate role of surgery in the managing trismus is appeared to be very limited. If trismus is resulted due to submucous fibrotic band, these bands can be excised using laser therapy. Masseter muscle myotomy can be helpful in selected cases wherein spasm of this muscle causes trismus.

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