ABSTRACT

One of the most common problems encountered by dental practitioners is restricted mouth opening, otherwise called trismus. The word trismus is derived from the Greek word “Trismos” meaning grinding/rasping. Trismus means a limitation of mouth opening due to reduced mobility of the mandible. A number of potential factors may cause trismus and its treatment will depend on the cause. The causes of this problem are usually of infectious, traumatic, pathological origin, or a combination of these. Trismus is not considered as a disease or injury; it is, in fact, a result or can also be said as concluding sequelae which follows the active healing stages. A thorough knowledge of this decreased mobility is very much essential to deliver proper treatment and also post-operative care to the patients to avoid permanent disability in function. The primary causes of this condition and the various possible treatments available have been discussed in this review.

KEYWORDS: Dynamic bite appliance, Mouth opening, Phenothiazines, Physiotherapy, Succinylcholine, Temperomandibular joint, Trismus

INTRODUCTION

Trismus is defined as the motor disturbance of the trigeminal nerve, especially the spasm of the muscles of mastication with difficulty in opening the mouth (lockjaw), a characteristic early symptom of tetanus. The restriction in mouth opening can have serious health implications, which can dramatically affect the quality of life. Impaired mastication can lead to reduced nutrition, speech difficulties, diminished vocal quality, and compromised oral hygiene. An increased risk of aspiration is also observed. The causes of trismus range from simple to non-progressive to those that are potentially life-threatening. The treatment of this condition may be relatively simple or complicated depending on the etiological factors.

MOUTH OPENING

The normal range of mouth opening is usually 40–60 mm. Two-fingers to three-fingers breadth is the usual width of opening. The vertical mandibular opening is said to be influenced by the gender factor, with males having a larger mouth opening.

ETIOLOGY

Causes of trismus can be classified as follows:

1. Infections
   • Pulpal
   • Periodontal
   • Pericoronal
   • Cellulitis/mediastinitis
   • Tetany
   • Tetanus.

2. Trauma
   • Surgical extraction of mandibular third molars
   • Post-anesthetic injections
   • Inferior alveolar nerve block
   • Posterior superior alveolar block
   • Fractures.

3. Temperomandibular joint disorders
   • Extracapsular
   • Intracapsular.

4. Tumors and oral malignancies

5. Drug therapy

6. Psychogenic causes

INFECTION/INFLAMMATION

Trismus is the most common symptom of masticatory space infection. The infections could be of odontogenic or non-odontogenic in nature.
Odontogenic Infections Causing Trismus Include
Pulpal infections - Pulpitis is commonly caused by dental caries that affect the enamel and dentine of the teeth to reach the pulp. Trauma/repeated thermal injuries during dental treatment are also responsible in causing pulpitis. In these conditions, excessive pressure build up occurs within the pulpal cavity causing dental pain. Pain can also be caused due to increased pressure affecting adjacent tissues and this, in turn, leads to irritation of the trigeminal nerve, which causes masseteric muscle spasm causing trismus.[9]

Periodontal infections: The tissues that surround and support the teeth are termed as the periodontium. Irritation of the free nerve endings due to periodontal infections causes spasm of the masseter. This causes irritation of the trigeminal nerve which contributes to trismus.

Pericoronal infections - pericoronitis involves inflammation of soft tissues surrounding the crown of a partially erupted tooth. These infections also cause reflex irritation of trigeminal nerve throwing masseter muscle into a spasm causing trismus.[10]

Cellulitis: Untreated dental infections can cause spread into various neck spaces causing cervical cellulitis/mediastinitis.

Non-odontogenic Infections Causing Trismus Include
These include tonsillitis, tetanus, meningitis, parotid abscess, and brain abscesses.[11]

TRAUMA
Fractures involving the mandible, zygomatic arch, and zygoma may cause restriction of mouth opening. These cause disturbances in the movement of the temporomandibular joint causing trismus. The type of injury and the direction of force of trauma also contribute to the mobility of the jaws. The accidental incorporation of foreign bodies due to external trauma also causes trismus.[12]

TRISMUS DUE TO DENTAL TREATMENT
Surgical, dental procedures may lead to limitations in mouth opening.[13] The inflammation involving the muscles of mastication during dental extractions and also direct trauma to the temporomandibular joint can cause trismus.[11] Another cause of trismus is the limited mouth opening that occurs 2–5 days after the administration of local anesthesia. This is due to the wrong positioning of the needle while giving a nerve block.[14]

TEMPEROMANDIBULAR JOINT DISORDERS
They can be classified as:
Extra-articular:
- Infection/inflammation, e.g., pericoronitis, sialadenitis
- Hematoma
- Trauma (post-operative edema, facial trauma)
- Myofascial pain dysfunction syndrome
- Tetany
- Tetanus
- Systemic sclerosis and oral submucous fibrosis
- Neoplasm
- Fibrosis due to burns and radiation.
Intra-articular:
- Infective arthritis
- Osteoarthritis
- Rheumatoid arthritis
- Ankylosis of TMJ
- Dislocation
- Intracapsular condylar fractures and injections.[15]

TUMORS AND ORAL MALIGNANCIES
The patients with a primary or metastatic neoplasm, in the epipharynx, parotid gland, jaws, or TMJ can cause trismus. A thorough clinical and radiographic examination must be performed to rule out any malignancy.[16] Oral submucous fibrosis, a precancerous condition, commonly seen in Indians is a juxta-epithelial inflammatory reaction causing progressive fibrosis of the submucosal tissue in the oral cavity. This causes blanching of the mucosa and affects mouth opening causing trismus.[17]

DRUGS
Some drugs such as succinylcholine, phenothiazines, and tricyclic antidepressants can cause trismus as an extrapyramidal side effect.[18]

MISCELLANEOUS CAUSES
Psychogenic.

Lupus erythematosus.[19]

MANAGEMENT OF TRISMUS
Treatment of trismus depends on the factor causing it. If trismus results due to fibrosis of tissue or immature scar formation, physiotherapy and appliances can be of help. If trismus results due to intracapsular pathologies, causing dense fibrous tissue formation, it may require surgical management.[20]
Conservative medical management for acute trismus:
1. Heat - Placement of moist hot towels on the affected area for 10–20 min/h.
2. Analgesic therapy - Aspirin is the most common. When discomfort is extensive, narcotic analgesic may be indicated.
4. Muscle relaxants - In extensive masticatory muscle spasm, benzodiazepines 2.5–5 mg 3 times a day may be indicated.\[8\]

Physiotherapy can be started after cessation of the acute phase.

Physiotherapy: Exercises which relax the masticatory muscles and strengthen them. Mouth opening can be achieved in a gradual manner by devices such as the wooden top or bunch of ice cream sticks inserted between the teeth to keep the mouth open.

The steps in physiotherapy include:
1. Heat - This is used as an alternative to exercises involving the masticatory muscles. The increase in collagen tissue extensibility decreased stiffness of joint and the science of pain and muscle spasm is achieved by heat. It also increases the flow of blood, thereby reducing the edema of the muscles of mastication.
2. Massage - This causes an increase of blood flow and aids in relaxing of the masticatory muscles.
3. Exercise - This causes breakage of the fibrosis of the muscles of mastication.

The goals of physiotherapy include:
1. Edema reduction.
2. Softening and stretching of scar tissue.
3. Increase in the range of joint movement.
4. Increase in the strength of masticatory muscles.\[21\]

Under general anesthesia, forced opening of the jaw can be indicated when all other modalities of treatment are exhausted.\[22\] Manipulation under anesthesia can cause instability of temporomandibular joint.

TRISMUS APPLIANCES

They are used in combination with physical therapy. These devices cause forcible stretching of the elevator muscles, externally. This is usually achieved by depression of mandible. Devices that are internally activated stretches the affected elevator muscles and also other tissue that limits mandibular opening.

**External Appliances**

**Dynamic bite opener**
Drane was the first person to describe this appliance. Elastic force is provided in a continuous manner by this device which causes depression of the mandible. The amount and direction of the force provided can be regulated. It is always advisable to apply moist heat to the masticatory muscles for about 10 min before using the bite opener. Analgesic and anti-inflammatory drugs may be of use in these patients.

The bite opener should be kept in closed position (zero position). The patients’ mouth is opened as much as possible and the mouthpiece of the bite opener should be inserted in such a way that the teeth and gums rest comfortably against the bite opener. The handle of the bite opener is turned slowly till the sensation of gentle stretch of mouth opening is felt. The increase in mouth opening should be performed only in a stepwise pattern. This system should not be used for more than 5 min per sitting to start with. This is then increased by 2 min per sitting gradually till the maximum limit of 30 min is reached. After each session, ice packs need to be applied to the muscles of mastication.\[22\]

**Threaded tapered screw**
This appliance made of acrylic resin resembles the toy top. This device should be placed between the posterior teeth of the patient and should be gradually turned such that the maxillary and mandibular teeth spread apart.\[13\] The force provided is not elastic in nature and can be controlled by the patient. This device can be used only in dentulous patients. Prolonged usage of the device results in mobility of anterior teeth due to the extensive force generated.\[23\]

**Screw type mouth gag**
Nakajima was the first person to describe this device. Unilateral continuous and inelastic force are provided by the screw component of this device. The dental practitioner can adjust the force generated. This appliance cannot be used in edentulous patients.\[24\]

**Fingers**
Rouse was the first person to describe this method. The patient depresses the mandible with his fingers. This exercise should be repeated by the patient many times a day. The most important aspect of this method is the compliance of the patient.\[25\]

**Use of tongue blades**
Tongue blade can also be useful in mouth opening. Stack of wooden tongue blades can be used to keep the mouth open.

**Surgical management**
Surgical management in the case of trismus is rare. If trismus is caused due to fibrotic band formation in the submucosa, lysis of these bands is done using laser. Myotomy of the masseteric muscle helps in certain cases.

CONCLUSION

Trismus is a condition of rich clinical importance and helps in the provision of accurate diagnosis. The success
in treating this condition depends on prompt identification of the underlying cause and proper management of the patient to avoid its recurrence and also in prevention of causing permanent damage of function. Despite reviews and research in literature, the knowledge of this medical problem remains inadequate. Hence, more research into the insight of trismus is needed in the near future.

REFERENCES