

Trismus: Aetiology, Differential Diagnosis and Treatment

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Abstract: Trismus is a problem commonly encountered by the dental practitioner. It has a number of potential causes, and its treatment will depend on the cause. This article discusses the primary causes of this condition and the various treatments available.

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Clinical Relevance: Dental professionals should realize that trismus can be a common problem. Treatment of trismus may be relatively easy or complicated. It is important to remember that multiple potential causes exist.

Trismus is an inability to open the mouth. According to *Dorland's Illustrated Medical Dictionary*¹ trismus (Greek *Trimos*: 'grating', 'grinding') is

a motor disturbance of the trigeminal nerve, especially spasm of the masticatory muscles, with difficulty in opening the mouth, a characteristic early symptom of tetanus.

Trismus has a number of potential causes, which range from the simple and non-progressive to those that are potentially life-threatening.^{2–6} Kazanjian⁷ divided ankylosis of the temporomandibular joint into true and false. The true type of ankylosis was attributed to pathological conditions of the joint, and false ankylosis was

applied to restrictions of movement resulting from extra-articular joint abnormalities. This latter type of ankylosis is what most clinicians know as trismus.⁸

In a busy practice, it is not unusual to see several patients each month with a complaint of trismus. This condition may impair eating, impede oral hygiene, restrict access for dental procedures and adversely affect speech and facial appearance.

What is Normal Opening of the Mouth?

The normal range of mouth opening varies from patient to patient, within a range of 40–60 mm, although some authors place the lower limit at 35 mm.^{9,10} The width of the index finger at the nail bed is between 17 and 19 mm. Thus, two fingers' breadth (40 mm) up to three fingers' breadth (54–57 mm) is the usual width of opening.^{11,12} Evidence suggests that gender may be a factor in vertical mandibular opening. In general, males display greater mouth opening.¹³ Lateral

movement is 8–12 mm.

It is very important that dentists are familiar with the differential diagnosis of limited jaw opening,¹⁴ as some of the conditions attributed to it can be life threatening.¹⁵ Good perception of its causes can help the dentist to refer the patient early for specialist care.

CAUSES OF TRISMUS

Several conditions may cause or predispose an individual to develop trismus. The aetiology of trismus may be classified as follows:

- infection;
- trauma;
- dental treatment;
- temporomandibular joint disorders;
- tumours and oral care;
- drugs;
- radiotherapy and chemotherapy;
- congenital problems;
- miscellaneous disorders.

These are summarized in Figure 1 and will be described below.

Infections

The hallmark of a masticatory space infection is limited jaw opening. Trismus may be related to dental infections and must be systematically evaluated so that a potential life-threatening situation is discovered as early as possible.

Infections causing trismus may be of an odontogenic or non-odontogenic nature. Odontogenic infections have three major origins: pulpal, periodontal and pericoronal. The presence of an oral infection, particularly around an

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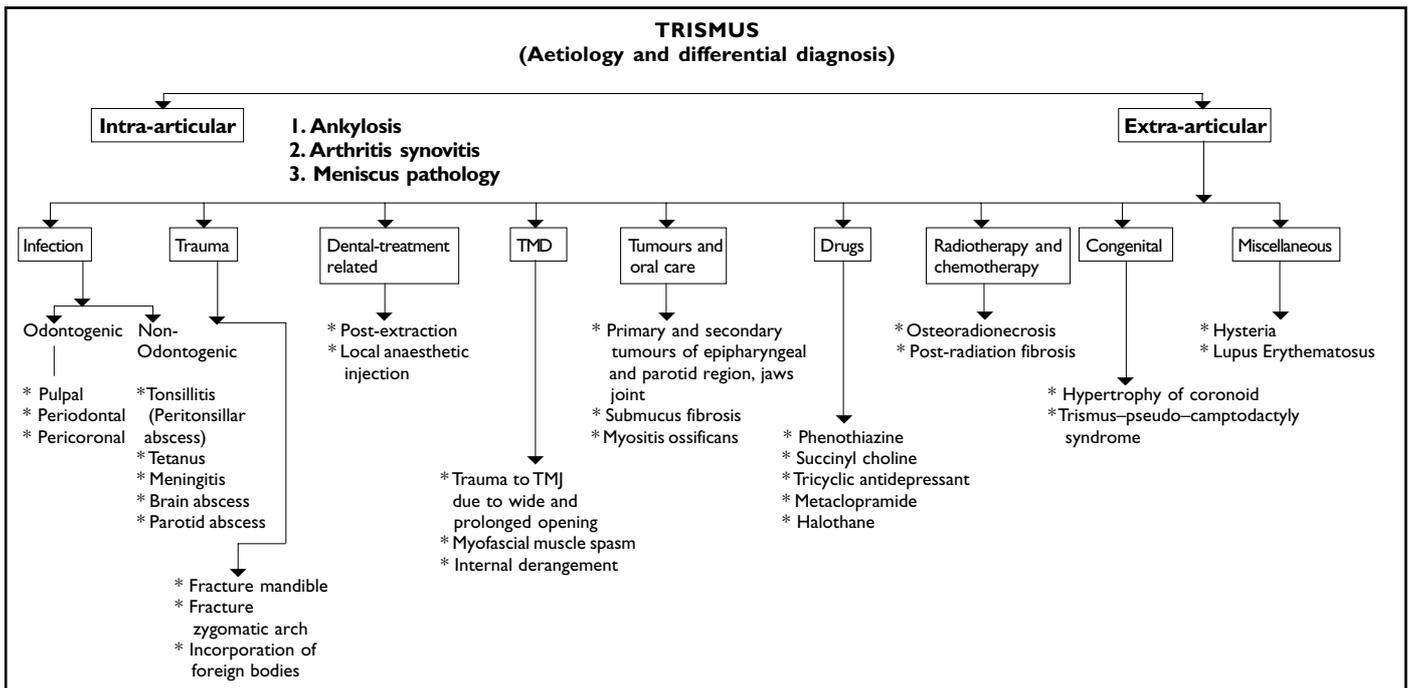


Figure 1. Aetiology of trismus.

erupting mandibular third molar, is the most common cause.¹⁵ Severe odontogenic infections involving the muscles of mastication are often accompanied by trismus at initial presentation. This infection, if unchecked, can spread to various facial spaces of the head and neck and lead to serious complications such as cervical cellulitis or mediastinitis.¹⁶

Non-odontogenic infections such as tonsillitis, tetanus, meningitis, parotid abscess and brain abscess may also cause trismus.^{17,18}

Trauma

Fractures, particularly those of the mandible, may cause limited jaw opening. Depending upon the type of injury and the direction of the traumatic force, fractures of the mandible may occur in different locations, producing mandibular hypomobility.

Backland *et al.*¹⁷ defined trauma as a devastating event (e.g. sports injury), administration of general anaesthesia and performance of a dental procedure such as difficult extractions or other treatment requiring lengthy appointments. The purpose of this study was to investigate the onset of

temporomandibular joint (TMJ) symptoms in which trismus was a specific traumatic event. The records of 779 patients were reviewed and 33.4% of cases had trismus within one week of the event.

Trismus has also been reported due to the accidental incorporation of foreign bodies because of external traumatic injury.¹⁹ Another relatively rare cause of trismus seen in general practice is trauma of the zygomatic arch and zygomaticomaxillary complex (ZMC), which interferes with the movement of the coronoid process.²⁰

Trismus Related to Dental Procedures

Oral surgical procedures may result in limited jaw opening. The extraction of teeth may also cause trismus as a result either of inflammation involving the muscles of mastication or direct trauma to the TMJ.²¹

Another common cause of trismus often seen in general practice is the limited mouth opening that occurs 2–5 days after a mandibular block has been administered. This is usually attributed to inaccurate positioning of the needle when giving the inferior nerve block.

Ideally, the needle should 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. Occasionally, the medial pterygoid muscle is accidentally penetrated or a vessel is punctured and a small bleed follows: a haematoma can occur in the muscle bed and subsequently organize, causing a fibrosis. Trismus due to this cause can be protracted and quite severe.²²

Hot packs, stretching exercises using wooden spatulas and reassurance are usually sufficient for this condition, although sometimes the haematoma becomes infected and requires surgical evacuation.

Temporomandibular Joint Disorders

There are numerous subcategories of TMD, a number of which may be associated with trismus. TMDs may be divided into extracapsular (mainly myofascial) and intracapsular problems (including disc displacement, arthritis, fibrosis, etc.). Intracapsular problems are often caused by trauma. Pain upon palpation, lateral to the joint capsule, is

<p>1 Trauma:</p> <ul style="list-style-type: none"> ● Surgical extraction of mandibular molars ● Post-anaesthetic injections: Inferior alveolar nerve block²⁴ Post-superior alveolar nerve block²⁴ ● Direct trauma: Fractured mandible Other facial fractures ● Facial laceration ● Recent dental restorative procedures ● Radiation therapy <p>2 Infection: In cases where there are associated signs and symptoms:</p> <ul style="list-style-type: none"> ● tachycardia ● tachypnoea ● high temperature ● increased white blood cell count ● decreased oral uptake ● dehydration <p>These may lead to the suspicion of more common facial spaces involvement. In the presence of neck rigidity, tetanus should be ruled out. These conditions should be considered life threatening if early treatment is not intervened.</p> <p>3 TMD: Chronic complaints usually seen in young females. They do not need any urgent attention.</p> <p>4 Conditions that affect the central nervous system such as meningitis/encephalitis, brain tumour/abscess and epilepsy should be ruled out.</p> <p>5 Drug history is very important in cases of trismus.</p> <p>6 Tumours/oral cancers: These conditions can be very obvious to diagnose clinically, except some metastatic tumours in oropharynx. One should not forget oral submucous fibrosis in differential diagnosis.</p> <p>7 Psychogenic causes, such as hysterical trismus.</p>

Table 1. Differential diagnosis of trismus.

a significant finding. Clicking may indicate anterior disc displacement. Painless clicking alone does not require treatment. Conditions such as fibrosis or unilateral condylar hyperplasia require surgical consultation and treatment.

Suspicion of TMJ trauma or dislocation should be considered in young patients who have dysphagia and trismus but who do not have a serious infectious aetiology.

Acute closed-lock conditions may occur when the meniscus becomes displaced anteromedial to the condyle. In such instances, the patient usually has a history of paroxysmal clicking and some discomfort. In closed-lock conditions of a mechanical nature, the patient can often open his or her jaw 20–25 mm. If the opening is significantly less than this the practitioner should suspect a closed lock of muscular origin.

Tumours and Oral Malignancies

A potential problem in treating patients with trismus is the risk of misdiagnosing the patient who has a neoplastic disease, either primary or metastatic, in the epipharyngeal region, parotid gland, jaws or TMJ.²³ Thorough clinical and radiographic examination must be performed to rule out neoplastic possibilities.^{24,25} Rarely, trismus is a symptom of nasopharyngeal or infratemporal tumours or fibrosis of the insertion of temporalis tendon, resulting in limited jaw movement.

Oral submucous fibrosis is a precancerous condition, commonly seen in people from the Indian subcontinent. Asian migrants in European countries also present with trismus due to fibrosis of the submucosal tissue in the oral cavity. This causes blanching of the mucosa

and can affect speech by restricting tongue and soft palate movements. The exact aetiology is unknown but it is most commonly attributed to betel nut chewing.

Drug Therapy

Some drugs are capable of causing trismus as a secondary effect, succinyl choline, phenothiazines and tricyclic antidepressants being among the most common.²⁶

Trismus can be seen as an extrapyramidal side-effect of metaclopramide, phenothiazines and other medications.

Radiotherapy/Chemotherapy

Dentists are on occasion asked to provide treatment for patients undergoing radiotherapy and chemotherapy.^{27,28} Oral mucosal cells have a high growth rate and are susceptible to the toxic effects of chemotherapy, which can lead to stomatitis. The severity of the stomatitis is dose related. Although the damage is reversible, this condition may cause severe discomfort, pain, trismus and difficulty in swallowing.

Radiotherapy is commonly used to treat squamous cell carcinoma of the head and neck and regional lymphomas. The primary advantage of using radiotherapy to treat oral cancer is the preservation of normal tissue and function; however, complications may develop, depending upon which healthy tissues are in the path of the radiation beam, the amount of radiation given and the course of treatment. Osteoradionecrosis may occur, resulting in pain, trismus, suppuration and occasionally a foul-smelling wound. When the muscles of mastication are within the field of radiation, fibrosis may result and lead to trismus, reducing the range of movement. Fibrosis and trismus have been attributed to the ischaemia caused by endarteritis obliterans. Trismus complicates post-radiation dental care. The recommendation to minimize the effects of radiation on the facial and masticatory muscles include

the use of protective stents, jaw exercises and hyperbaric oxygen to increase neovascularization.

Congenital/Developmental Causes

There has been a report of trismus as a result of hypertrophy of the coronoid process causing interference of the coronoids against the anteromedial margin of the zygomatic arch.²⁹ Trismus-pseudo-camptodactyly syndrome³⁰ is a rare combination of hand, foot and mouth abnormalities and trismus.

Miscellaneous Causes

Other rare causes of trismus are:

- hysteria (psychogenic);
- lupus erythematosus, etc.³¹

Hysteria, or more accurately where a single symptom is concerned conversion hysteria, is the physical manifestation of suppressed emotional conflicts and ideas.³² The presentations are varied and include paralysis, blindness, anaesthesia, anorexia and vomiting – in fact, this condition may mimic practically any disease.³³ Through the mechanism of conversion, the emotional conflict is converted into a physical symptom, thus releasing the patient from emotional conflict. The onset of hysteria is usually before the age of 35, and occurs mainly in women and in those with a suggestible and parent-dependent personality.³⁴

DIFFERENTIAL DIAGNOSIS

A systematic approach using a disciplined and organized thought process is more likely to yield an accurate diagnosis. For the clinician to diagnose trismus properly, he or she must be able to determine the cause from a variety of possibilities. It is important to obtain a complete history and to perform a thorough clinical examination. Radiographs should be ordered as deemed appropriate. The possible causes that should be considered are listed in Table 1.

TREATMENT/ MANAGEMENT OF TRISMUS

Treatment of trismus varies depending on the aetiological factor. Some difficulty in opening the jaw on the day following dental treatment in which a superior alveolar or inferior alveolar nerve block was administered is frequently encountered. The degree of discomfort and dysfunction varies, but is usually mild.

When a patient reports mild pain and dysfunction, an appointment for examination should be arranged. In the interim, the practitioner should prescribe the following:

- heat therapy;
- analgesics;
- a soft diet; and (if necessary)
- muscle relaxants

to manage the initial phase of muscle spasm. Heat therapy consists of placing moist hot towels on the affected area for 15–20 minutes every hour. Aspirin is usually adequate in managing the pain associated with trismus; its anti-inflammatory properties are also beneficial. A narcotic analgesic may be required if the discomfort is more intense. If necessary, diazepam (2.5–5 mg three times daily) or other benzodiazepine may be prescribed for muscle relaxation.³

When the acute phase is over the patient should be advised to initiate physiotherapy for opening and closing the jaws and to perform lateral excursions of the mandible for 5 minutes every 3–4 hours.³⁵ Sugarless chewing gum is another means of providing lateral movement of the TMJ. Any trauma or event that may be suspected of having triggered the TMD should be recorded in the patient's dental record, as should the findings and the treatment. Further dental treatment in the involved region should be avoided until symptoms resolve and the patient is more comfortable.^{3,5}

If further dental care is needed, as with a painful infected tooth, access for local anaesthesia may be difficult when trismus is present. The (closed mouth) nerve block usually provides relief of

the motor dysfunction, permitting the patient to open and allowing the practitioner to provide the appropriate treatment.

In virtually all cases of trismus that are managed as outlined above, patients report improvement within 48 hours. Therapy should be continued until the patient is free of symptoms. If pain and dysfunction continue unabated beyond 48 hours, the possibility of infection should be considered. Antibiotics should be added to the treatment regimen and continued for 7 days.

If trismus is suspected to be associated with infection, appropriate 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.

Treatment for trismus should be directed at eliminating its cause. Diagnostic assessment should be made before any type of therapy is applied.

CONCLUSION

Trismus is a common complication of dental treatment. In many ways, it is mostly harmless, but it could give rise to many constraints for the patient, including social injunctions that can cause anxiety and danger. In a few instances, lawsuits have been instigated. Therefore, it is important for clinicians to be aware of this significant condition, its primary causes, and its treatments.

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BOOK REVIEW

Concise Textbook of Physiology for Dental Students. By H. Pispati. Oxford University Press, Oxford, 2001 (432pp., £12.95 h/b). ISBN 0-19-565209-6.

This textbook of physiology covers the basic systems in physiology. These systems are covered in 12 chapters and they are dealt with in a very concise manner. The textbook is aimed at dental students but the level at which most areas are addressed and the brevity and paucity of detail makes it inadequate for students of dentistry in the UK. Thus, for example, Body Fluids are covered in just a few paragraphs and Nutrition in only six (small) pages. The digestion and absorption of all nutrients is covered in approximately five pages. Subjects where one might expect more detail in a dental course, such as the functions of the mouth and pain, are not exempt from this approach. In

many of the basic areas the material covered is not even sufficient for A level students. The author suggests that this book might be suitable for postgraduate dental students and further that even postgraduate medical students might find it useful. I think this is unlikely to apply to such students in the UK.

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ABSTRACT

THE RISKS OF POST SPACE PREPARATION

The Unpredictability of Seal after Post Space Preparation: A Fluid Transport Study. I. Abramovitz, R. Lev, Z. Fuss and Z. Metzger. *Journal of Endodontics* 2001; **27**: 292–295.

It is always assumed that the root filling remaining after post space preparation will still effectively seal

the root canal. Indeed, the authors quote references that an apical 5 mm seal will be effective. However, in criticizing the results of previous research, these workers developed a novel fluid transport assay technique. They found that removal of the coronal part of a root filling had a significant effect on the resistance of the remaining seal to microleakage, although they found no significant difference between a remaining seal of 3 mm or 6 mm.

The significance of this report to general practice is two-fold. First, dentists should be aware of this increased potential for failure of their endodontic treatment if temporary crowns leak whilst the permanent restoration is being constructed. Second, if a post crown has been lost from a canal for any period of time, there is potential for the root canal seal to be compromised. It may be wise to consider this before recementation or construction of a new crown.

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