



## **Comprehensive Review on Complications of Local Anesthesia in Oral Procedures: Focus on Trismus**

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### **ABSTRACT :**

Trismus is characterized by limited mouth opening due to muscle spasms, is a potential complication following oral procedures, particularly after surgeries like wisdom teeth extraction involving local anesthesia. Etiologically, trismus arises from various factors, including trauma, infection, surgery, radiation therapy, and neurological disorders. Understanding anatomical considerations during dental anesthesia. Clinical presentation involves assessing symptoms such as restricted mouth opening, jaw deviation, facial swelling, and fever. Treatment approaches include preoperative evaluations, consideration of alternative anesthetic methods, and postoperative instructions. Both pharmacological and non-pharmacological interventions are tailored to individual cases.

**KEY WORDS:** Trismus , Anesthesia, Complication

### **INTRODUCTION:**

Trismus, characterized by restricted mouth opening due to muscle spasms, can result from factors such as local anesthetic administration, oral surgeries like wisdom teeth extraction, trauma, infections, and neurological conditions. The discussion delves into anatomical considerations during dental anesthesia, the pathophysiological mechanisms of trismus, and various contributing factors. It also provides insights into clinical presentation and diagnosis, detailing symptoms and assessment methods. The management and treatment section covers both pharmaceutical and non-pharmaceutical interventions, recognizing diverse effectiveness and emphasizing the need for further research.

### **INCIDENCE AND PREVALENCE OF TRISMUS :**

Persistent pain at the injection site represents the most prevalent complication associated with local anesthesia in the oral cavity. Typically, this symptom tends to resolve spontaneously without the need for specific therapeutic interventions.<sup>[1]</sup> Conversely, trismus, while less frequent, has the potential to lead to enduring restrictions in movement if not managed appropriately. The focus of this article is to conduct a comprehensive review encompassing the anatomy, pathophysiology, and effective management of trismus, supplemented by illustrative case examples.<sup>[2]</sup>

Trismus may manifest following oral surgery, especially in the context of lower wisdom teeth extraction, resulting from inflammation or excessive jaw extension during the procedure<sup>[3]</sup>. The symptoms of trismus encompass restricted mouth opening, jaw deviation toward the affected side, noticeable facial swelling and fever, a sense of muscle stiffness, and intense pain during acute episodes.<sup>[4]</sup>

### **ETIOLOGY AND PATHOPHYSIOLOGY:**

When an IANB or posterior maxillary infiltration is performed, it involves accessing the infratemporal fossa—an anatomical region with specific boundaries. The front is defined by the maxilla and zygomatic buttress; the back by the mandibular condyle and articular tubercle of the temporal bone; the inner side by the temporal bone and greater wing of the sphenoid; and the outer side by the mandible's ramus. This fossa is open at the bottom, extending along the front edge of the mandibular ramus to the alveolar ridge. Internally, it connects with the orbit through the pterygomaxillary and inferior orbital fissures.<sup>[5]</sup>

Within this space, you find the temporalis, lateral and medial pterygoid muscles, along with the inferior alveolar, lingual, and maxillary nerves. Additionally, the internal maxillary artery and its branches, as well as the pterygoid plexus of veins, are present. Understanding the relationship of these structures to the inferior alveolar nerve, mandible, and maxilla is crucial for grasping the reasons behind trismus after dental anesthesia procedures

Trismus may develop following the application of local anesthesia, particularly in the context of inferior alveolar blocks. This condition may be attributed to factors such as hematoma, infection, multiple injections, excessive use of local anesthetics, and the use of sterilizing solutions, all of which have the potential to induce trismus. The typical approach to managing trismus involves the application of moist heat, anti-inflammatory medications, and engaging in range of motion exercises. In the majority of instances, resolution occurs within a period of 6 weeks, with a timeframe ranging from 4 to 20 weeks.<sup>[6]</sup>

Several factors can contribute to the development of trismus, including;

**Trauma:** Facial or jaw trauma, such as fractures or dislocations, may induce muscle spasm or inflammation leading to trismus. **Infection:** Infections affecting the teeth, gums, or jaw can cause inflammation and swelling, contributing to the development of trismus.

**Surgery:** Procedures like the extraction of third molars can trigger trismus due to postoperative inflammation and muscle spasm.

**Radiation therapy:** Head and neck radiation therapy can result in fibrosis of the masticatory muscles, leading to trismus.

**Neurological disorders:** Certain neurological conditions like tetanus or Parkinson's disease can cause muscle spasms and consequently lead to trismus.<sup>[7]</sup>

The pathophysiology of trismus involves the contraction or fibrosis of the masticatory muscles, responsible for jaw movement. Inflammation, trauma, or other factors can initiate muscle spasms or fibrotic changes, resulting in limited mouth opening.

The severity of trismus varies based on the underlying cause and the extent of muscle involvement.

Trismus resulting from local anesthesia can occur when an excessive amount of anesthetic solution is deposited in a confined area, leading to tissue expansion. During the acute phase, pain arising from hemorrhage triggers muscle contraction, restricting movement. To mitigate the risk of trismus associated with local anesthesia, it is essential to have a thorough understanding of anatomical landmarks and muscles. Techniques such as palpating the bony anterior ramus for the temporalis muscle, identifying the pterygomandibular fold for the pterygoid muscle, and ensuring proper needle angulation with bone contact before injection are effective preventive measures.<sup>[8]</sup> It is a rare but possible side effect of local anesthesia. It is characterized by limited opening of the mouth due to muscle spasms in the jaw. Trismus caused by local anesthesia is usually mild and temporary, lasting only a few hours.<sup>[9]</sup>

#### ***Clinical Presentation and Diagnosis:***

The typical symptoms of trismus include difficulty in opening the mouth, pain, and stiffness in the jaw muscles. The severity of trismus can vary from mild to severe, and it can be unilateral or bilateral. To diagnose trismus, clinicians typically measure the distance between the upper and lower incisors at maximum mouth opening. This can be done using a metric ruler or tape, or by using a face bow with vertical plates.<sup>[10]</sup> The distance is then compared to the preoperative distance to determine the degree of trismus. Other diagnostic criteria include the presence or absence of trismus, taking into account a difference of 5 mm, or using ordinal variables such as "none", "mild", "moderate", and "severe". In addition to these methods, patients can also self-assess their mouth opening using a cardboard scale, which has been shown to be reliable and valid. Ultrasound and a portable scanner have also been used to measure trismus in clinical settings.<sup>[11]</sup>

#### ***Management and Treatment:***

To reduce the likelihood of trismus after local anesthesia, various preventive strategies can be considered;

**Preoperative Measures:** Before administering anesthesia, it's essential to evaluate the patient's medical history and identify risk factors for trismus, such as pre-existing temporomandibular disorders (TMDs). Additionally, avoiding the use of anesthetics known to cause trismus is a prudent approach.

**Alternative Anesthetic Approaches:** Opting for alternative anesthetic methods that carry a lower risk of inducing trismus can be beneficial. This may involve using intraosseous anesthesia or nerve blocks as alternatives to traditional approaches.

**Postoperative Interventions:** Providing clear postoperative instructions is crucial. Patients should be advised to refrain from activities like chewing gum or consuming hard foods. Encouraging jaw exercises and utilizing warm compresses can help alleviate muscle tension.<sup>[12]</sup>

Pharmacological approaches encompass the utilization of non-steroidal anti-inflammatory drugs (NSAIDs), opioids, local anesthetics, corticosteroids, curcumin, hyaluronic acid, antibiotics, antiseptics, and topical gels. On the other hand, non-pharmacological methods involve platelet-rich fibrin, low-level laser therapy, acupuncture, cold therapy, socket irrigation with tap water, as well as considerations related to suture type and suturing techniques<sup>[13]</sup>.

#### ***Muscle Relaxant :***

Muscle relaxants play a role in the management of trismus by helping to alleviate muscle spasm and promote relaxation of the masticatory muscles. They can aid in reducing the discomfort and dysfunction associated with trismus, allowing for improved jaw movement and function. Muscle relaxants

such as diazepam or other benzodiazepines may be prescribed by healthcare professionals to assist in the treatment of trismus . It's important for patients to follow the prescribed dosage and to be aware of potential side effects or interactions with other medications.<sup>[14]</sup>

For pain relief, aspirin is typically effective. If a muscle relaxant is required, it is recommended to use a benzodiazepine like diazepam, with a dosage of 2.5 to 5 mg three times a day.

It's crucial to highlight that the effectiveness of these interventions can vary, and further research is necessary to assess both their efficacy and potential side effects. Moreover, the choice of management and treatment options for trismus after local anesthesia may be influenced by individual patient factors and the specific nature of the dental procedure undertaken.

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## CONCLUSION:

In conclusion, dealing with trismus, marked by restricted mouth opening from various causes, mainly after the local anesthesia . This comprehensive exploration delves into the anatomical considerations during anesthesia, the underlying pathophysiological mechanisms of trismus, and the diverse contributing factors at play. The focus is on emphasizing precise clinical assessment methods, elucidating tailored pharmaceutical and non-pharmaceutical management strategies, and recognizing the pressing need for further research.

A broad spectrum of etiological factors, ranging from trauma and post local anesthesia administration , infection to surgery, radiation therapy, and neurological disorders, contributes to a comprehensive understanding of trismus development Postoperative interventions and a diverse array of treatments are explored, emphasizing their varied effectiveness. Diazepam is highlighted as a potential muscle relaxant for trismus management, offering relief and inducing relaxation. In summary, achieving optimal trismus management after local anesthesia calls for a nuanced and multidimensional approach.

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