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Use of Botulinum Toxin (Botox) in Patients with Trismus

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Abstract

Objective: To evaluate the therapeutic effectiveness of botulinum toxin type A (Botox) in the management of trismus associated with muscular hyperactivity, temporomandibular disorders (TMD), oral cancer therapy, and neurologic conditions, efficacy analysis of splint combined with platelet-rich plasma in the treatment of temporomandibular joint osteoarthritis

Methods: This narrative was conducted focusing on clinical indications, injection techniques, dosage protocols, outcomes, and complications related to botulinum toxin use in trismus patients.

Results: Botulinum toxin has demonstrated significant efficacy in reducing muscle hyperactivity and improving mouth opening in patients with trismus caused by muscular spasm or fibrosis. Clinical studies show improved maximal interincisal opening (MIO), reduced pain, and enhanced quality of life. Adverse effects are generally mild and transient when administered properly.

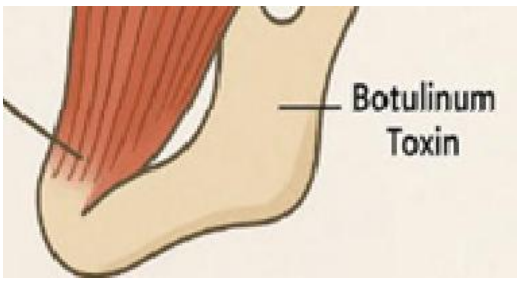
Conclusion: Botulinum toxin represents a minimally invasive, effective adjunctive therapy for trismus management, particularly when conservative therapies fail. Careful patient selection, anatomical knowledge, and proper dosing are essential for optimal outcomes.

I. Introduction

Trismus is defined as a restriction in mouth opening resulting from muscular spasm, fibrosis, trauma, temporomandibular joint disorders, or iatrogenic causes such as radiation therapy for head and neck cancer. Normal maximal interincisal opening typically ranges from 35–55 mm; trismus is often diagnosed when opening is less than 35 mm.

This condition significantly impacts oral hygiene, nutrition, speech, dental treatment, and quality of life. Conventional treatments include physiotherapy, pharmacologic muscle relaxants, occlusal splints, and surgical interventions. However, in many patients, particularly those with muscular hyperactivity or fibrosis, these therapies provide limited improvement.

Botulinum toxin type A has emerged as a therapeutic option due to its ability to induce temporary muscle relaxation by blocking acetylcholine release at the neuromuscular junction. Its use in dentistry has expanded to include management of bruxism, TMD, masseter hypertrophy, and trismus.



Etiology of Trismus

Trismus may result from multiple etiologies:

- **Muscular causes:** myospasm, myositis, bruxism-related hyperactivit

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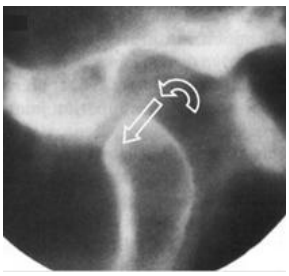
- **Temporomandibular joint disorders:** internal derangement, arthritis



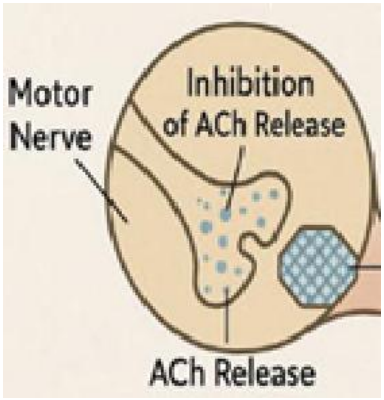
- **Post-radiation fibrosis:** head and neck cancer therapy
- **Infections:** pericoronitis, abscess

- **Trauma or surgery:** fractures, third molar extraction
- **Neurologic conditions:** dystonia, cerebral palsy

Botox therapy is most effective in cases involving muscular hyperactivity or spasm rather than fibrotic or joint-related mechanical limitations.

Mechanism of Action of Botulinum Toxin

Botulinum toxin type A inhibits acetylcholine release at presynaptic neuromuscular junctions. This results in:



- Temporary chemodenervation
- Reduced muscle contraction
- Decreased pain from hyperactivity
- Improved range of mandibular motion

Effects typically begin within 3–7 days, peak at 2–4 weeks, and last approximately 3–6 months.

Materials and Methods (Aproach)

A review of peer-reviewed dental and medical publications was conducted using databases such as PubMed, Scopus, and dental journals. Keywords included:

- Botulinum toxin
- Botox
- Trismus
- Temporomandibular disorders
- Masseter spasm
- Oral cancer rehabilitation

Studies included clinical trials, case series, and systematic reviews focusing on therapeutic outcomes in trismus patients treated with botulinum toxin.

Injection Sites and Clinical Protocols

Common Muscles Targeted

- Masseter

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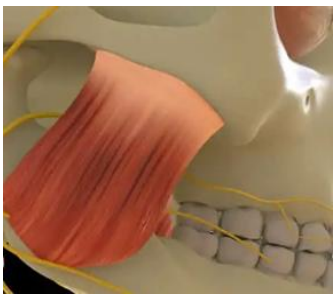
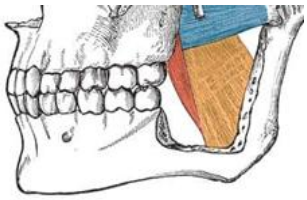
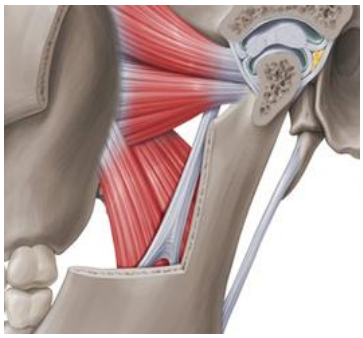


- Temporalis

- Medial pterygoid



- Lateral pterygoid (advanced cases)



Dosage (Typical Ranges)

- Masseter: 20–40 units per side
- Temporalis: 10–25 units per side
- Medial pterygoid: 10–20 units per side

Dosage varies depending on severity, muscle size, and patient response. Electromyography (EMG) guidance may improve accuracy in deep muscle injections.

Clinical Indications

1. Temporomandibular Disorder–Related Trismus

Botox reduces muscle hyperactivity and pain in patients with myofascial TMD, improving mouth opening and function.

2. Post-Radiation Trismus

Patients undergoing radiation therapy often develop fibrosis and muscle spasm. Botox may improve mandibular mobility when muscular hyperactivity contributes to restriction.

3. Neurologic and Dystonic Conditions

Patients with oromandibular dystonia or cerebral palsy may benefit from targeted injections to reduce involuntary contractions.

4. Post-Surgical or Traumatic Trismus

Botox can assist in cases involving persistent muscular spasm following trauma or oral surgery.

Results from Clinical Studies

Reported outcomes in the literature include:

- Increase in mouth opening by 5–15 mm in many patients
- Significant pain reduction
- Improved mastication and speech
- Enhanced ability to perform dental treatment

Most studies report improvement within 2 weeks after injection.

Advantages of Botox in Trismus Management

- Minimally invasive
- Reversible and adjustable
- Reduces need for systemic medications
- Can be repeated safely
- Improves patient comfort and function

Hyaluronic acid (HA) is a natural substance found in the body, particularly in the synovial fluid of joints, where it plays a vital role in maintaining joint health.TMJ disorders, which include conditions such as osteoarthritis and internal derangement of the joint, often lead to pain, inflammation, and impaired mobility of the jaw. The use of HA injections aims to replenish the natural synovial fluid in the TMJ, providing better lubrication and

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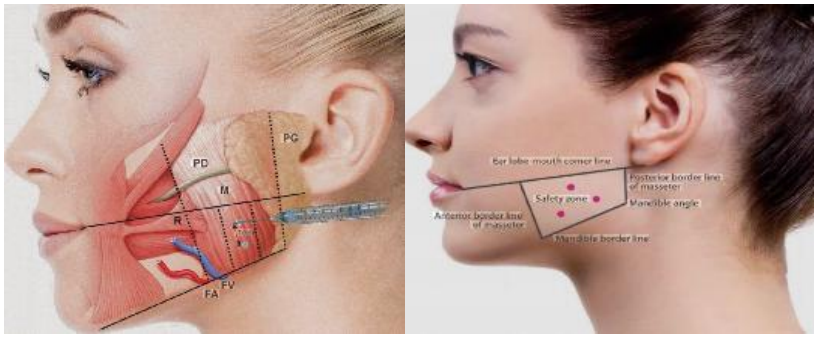
reducing friction between the articular surfaces, thus helping to alleviate symptoms and restore normal joint function



Botulinum toxin (BoNT), commonly known for its cosmetic applications, has proven to be a valuable treatment option for temporomandibular joint (TMJ) disorders, particularly in managing muscular pain, spasms, and dysfunction.

Limitations and Potential Complications

- Temporary muscle weakness
- Mild chewing fatigue
- Asymmetry if improperly injected
- Rare dysphagia when medial pterygoid affected
- Requires repeat injections every 3–6 months

Contraindications include pregnancy, neuromuscular disorders (e.g., myasthenia gravis), and allergy to botulinum toxin components.

II. Discussion

Botulinum toxin represents a significant advancement in the management of trismus, particularly for cases involving muscular hyperactivity. While it is not a replacement for physiotherapy or treatment of underlying pathology, it serves as an effective adjunct therapy.

In dental practice, Botox facilitates improved mouth opening, allowing restorative, surgical, and hygiene procedures to be performed more comfortably. For oncology patients, it may improve quality of life and nutritional intake.

Future randomized controlled trials with standardized dosing protocols are needed to establish long-term efficacy and treatment guidelines.

III. Conclusion

Botulinum toxin is a safe and effective adjunctive treatment for trismus of muscular origin. Its ability to reduce muscle hyperactivity and improve mandibular function makes it a valuable tool in modern dental and oral medicine practice. Proper diagnosis, technique, and patient selection are essential for successful outcomes.

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