

REVIEW ARTICLE

Botox: A New Therapeutic Arena in Dentistry

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ABSTRACT

In this modern era of one's desire to look beautiful, various new techniques are evolving to enhance and improve the physical appearance of people. Botox is emerging as one such popular and accepted treatment to improve various facial abnormalities. There are many medical and dental conditions which do not have complete treatment procedure in traditional ways. The Botox is a minimal invasive technique and may prove that it is an attractive alternative treatment to surgery in some dental problems. This article will review the basic of botulinum toxin and its therapeutic aspect in dentistry.

Keywords: Botox, Esthetics, Minimal invasive, Toxin.

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INTRODUCTION

As a human being, we all want to look young and beautiful less than our age. Moreover, Botox is one such cosmetic treatment that will help us look younger by evading lines and wrinkles. Today, Botox became a focus point in the field of cosmetic and esthetic industry.^[1] Botox has been used as a cosmetic treatment for lines and wrinkles on the face, but the botulinum toxin (BTX), that Botox is obtained from, has a prolonged history of medically therapeutic uses in blepharospasm, cervical dystonia, hyperhidrosis, and strabismus. The use of Botox has now been growing in the field of dentistry and in the treatment of certain oral conditions due to its therapeutic uses. On July 26, 2013, the dental quality assurance commission of Washington has released a statement and certified the ability of general dentists to use Botox and dermal fillers which are to treat functional or esthetic dental conditions and their consequences and the treating dentist has suitable, confirmable training

and experience. Moreover, New Jersey state board and Michigan board of dentistry also approve the use of dermal fillers and Botox by general dentists.^[2]

MECHANISM OF ACTION

At the neuromuscular junction, BTX A works by inhibiting the release of acetylcholine. The toxin binds to cholinergic nerve terminals, where it is released and internalized into the cytoplasm of the neuron. Then, it causes the proteolysis of SNAP-25 - a synaptosomal-associated protein utilized in synaptic vesicle fusion with the nerve terminal membrane and forms a complex with neuronal proteins. Subsequently, frequency of acetylcholine released at the synaptic cleft is decreased, which leads to the inhibition of its exocytosis. Consequentially, acetylcholine receptors are lost at the motor end plate, resulting muscular denervation and loss of neuronal activity in the target organ.^[3] Recent data suggest that the neurotoxin also plays a role in reducing the release of inflammatory mediators such as calcitonin gene-related peptide, substance P, and glutamate that cause pain. Therefore, this neurotoxin causes temporary muscle paralysis and interrupts a vital step in the contraction process of a skeletal muscle. However, the muscle initiates the formation of new acetylcholine receptors. There is a gradual return to full muscle function, usually with minimal side effects as the axon terminal begins to sprout with the growth of branches to form new synaptic contacts.^[4]

BOTOX IN DENTISTRY

Today is an era of minimal invasive dentistry, and Botox is one such minimal invasive option for a number of dental treatment.^[1] The essential components of a comprehensive therapeutic approach to all patients with masticatory parafunctional conditions are patient education and counseling. Dentists and physicians who are administering Botox must have a good knowledge regarding the anatomy of affected muscles and the resultant movement disorder. Botox can be used as adjunct to oral medications or as a sole therapy.^[5]

BTX type A can be used in following dental conditions:

BRUXISM

Bruxism refers to the grinding or clenching of the teeth. The treatment for bruxism includes intraoral appliances,

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behavioral modification techniques to reduce stress.^[6] Marchau and Van Zandijcke described the effective treatment of a brain-injured patient with severe bruxism with 100 U of a BTX type A injections to the temporalis and masseter muscles.^[7] Treatment involves injection of Botox bilaterally, solely into the masseter immediately superior to the angle of the mandible and bilateral injection into the masseter and temporalis muscles.^[8]

MASSETERIC HYPERTROPHY

Masseteric hypertrophy is the enlargement of the masseter muscles. Treatments include surgical removal of the medial bulk of the muscle by an extraoral or intraoral approach. Drawbacks of this treatment include risks associated with general anesthesia, hemorrhage, edema, post-operative, infection, hematoma, scarring, and facial nerve damage.^[9] Botox is injected subcutaneously into the masseter muscles and it denervated the muscles which results in atrophy. Although repeat injections may be required, as the effects may last from 3 to 18 months.^[10]

TEMPOROMANDIBULAR DISORDER (TMD)

TMD refers to pain related to the jaw and masticatory muscles. Anti-inflammatory agents, muscle relaxants narcotics, antidepressants drugs, orthotic devices, physiotherapy exercises, massage, acupuncture, and surgical intervention such as arthrocentesis, intra-articular steroid injection, arthroscopy, and open arthrotomy have been used for pain management. Botox is injected to the muscles of mastication: The temporalis, masseter, and medial and lateral pterygoid muscles.^[11]

TEMPOROMANDIBULAR JOINT (TMJ) DISLOCATION

TMJ dislocation is defined as a mandibular dislocation in which the condyle protrudes too far forward into the articular eminence. It causes the jaw to lock in an open position. Botox is injected into the muscles that cause dislocation of the TMJ, results in the atrophy, and weakening of these muscles. Lateral pterygoid muscles are commonly injected and lasts for minimum of 3 months.^[10]

HEMIFACIAL SPASM

Hemifacial spasm is involuntary, irregular, or chronic contractions of the muscles innervated by the facial nerve on the ipsilateral side of the face. Botox is used for the treatment of patients suffering from hemifacial spasms as it provides relief for some extent. The muscles typically injected for relief are the orbicularis oculi,

corrugator, frontalis, zygomaticus major, buccinator, and depressor anguli oris. Over a number of years, treatment seems to be effective with temporary side effects that include dry eyes, facial muscle weakness, erythema, and ecchymosis.^[12]

GUMMY SMILE

Gummy smile refers to the display of excessive gingival tissue in the maxilla on smiling. It is both cosmetic and oral hygiene issue with no simple remedy. Excessive gum exposure is due to the overcontraction of the upper lip muscles, particularly the levator labii superioris alaeque nasi.^[2] Hwang *et al.* proposed an injection point for BTX at Yonsei University College of Dentistry, Seoul, Korea, and named it as Yonsei point.^[13] Yonsei point is located at the center of triangle formed by levator labii superioris, levator labii superioris alaeque nasi, and zygomaticus minor. These muscles can be proportionately weakened with Botox if it is applied in small carefully titrated doses, which will ultimately reduce exposure of the upper gums when smiling. A dose of 3 Unit is recommended at each injection site.^[2]

SIALORRHEA

Sialorrhea is the excessive saliva production or the inability to hold saliva within the mouth or swallow. It is commonly known as drooling. Botox can be used to treat sialorrhea by injecting into the parotid and submaxillary salivary glands, which inhibits the stimulation of the cholinergic receptor. This results in a reduction of saliva produced and secreted.^[14]

SALIVARY FISTULA

Salivary fistula is a common complication following the surgical removal of parotid tumors (parotidectomy). Botox is injected in the proximity of the parotid glands result in blockage of the parotid secretion and causes a decrease in salivary flow, allowing the salivary fistula to heal.^[13]

OROMANDIBULAR DYSTONIA

Oromandibular dystonia is a type of muscle dysfunction which involves the masticatory, labial, lingual, and lower facial muscles and causes unintentional jaw opening or closing, protrusion, and lateral deviation. This muscle dysfunction causes involuntary biting of the tongue, cheek, or lips and also interferes with speaking and chewing. Botox is injected into the masseter or medial or lateral pterygoid and has been reported resolve muscle dysfunctions in an average of 16 weeks.

Botox has now become the treatment of choice for oromandibular dystonia because of its effectiveness.^[15]

BLEPHAROSPASM

Blepharospasm is focal cranial dystonia and caused by spasms of the orbicularis oculi. It is characterized by excessive involuntary closure of the eyelids. The dystonia may spread to other areas of the face including the lower face and masticatory muscles in most of the cases. Botox treatment of these spasms has now become the therapy of choice. Botox is injected superficial to the orbicularis oculi in four locations in the periphery of each eye and injected intramuscularly in the corrugator and procerus muscles. It provides relief for 12–16 weeks.^[16]

SIDE EFFECTS OF BOTOX THERAPY

The side effects that associate with the use of Botox are local edema, flu-like symptoms, erythema, development of tolerance, mild nausea, muscle weakness at sight of injection, post-injection bruising, transient headache, local spread, causing unwanted paralysis of nearby muscles, mild pain with injection, transient numbness, and production of neutralizing (IgG) antibodies against BTX A (in injections over 200 Unit given at once or repeated injections within 1 month of treatment session). If there is an accidental overdose, an antitoxin is available. It will neutralize the toxin, if given within a few hours of the overdose.^[11]

CONTRAINDICATIONS^[17]

- Botox is contraindicated for people with diseases that affect neuromuscular transmission such as myasthenia gravis and Eaton-lambert syndrome.
- Dependent on intact facial movements and expressions their livelihood.
- Psychologically unstable or who have questionable motives and unrealistic expectations.
- Pregnant women or lactating mother.
- Taking certain medications that can interfere with neuromuscular impulse transmission and potentiate the effects of BTX (e.g., aminoglycosides, penicillamine, quinine, and calcium blockers).
- Allergic to any of the components of BTX-A or BTX-B (i.e., BTX, human albumin, saline, lactose, and sodium succinate).

CONCLUSION

Botox therapy is minimally invasive and becoming an alternative therapeutic option to surgical treatment for various dental conditions. However, there are much more to be discovered for its routine use in the field

of dentistry. Moreover, food and drug administration approval is still required for many dental problems to be treated with BTX. It is obvious that the potential use of BTX in dentistry can be of great value and will undoubtedly bring one step ahead in the field of advancement.

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