

REVIEW ARTICLE

Therapeutic application of Botox in dentistry

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ABSTRACT:

The use of Botox is a minimally invasive technique of treatment in medical as well as in dental field. The Botox has been administered usually by dermatologists and neurologists, although the administration of Botox lies within the dentistry field as Dentistry covers all knowledge of head and neck. The general concept of using Botox is limited to esthetic and cosmetic enhancements. Nowadays, many dentists worldwide are providing botulinum toxin (Botox) to patients. The present article is highlighting the usefulness of Botox in dentistry.

Key words: Botox, Dermatologists, Dentistry.

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INTRODUCTION

The Botulinum toxin can be considered as a neurotoxin present in nature. It is produced by the Clostridium botulinum Bacteria. Botox is the most commonly known commercial name for the Botulinum toxin. It is a strong toxin because as little as 30–100 mg can be theoretically fatal. Ingesting of a few milligrams of such toxin in contaminated food can cause severe illness or even death to humans, animals, and birds. By the 2002, the FDA accepted the Allergan's Botox cosmetic for the resolution of momentarily deleting the facial lines. For several years, many physicians also have used Botox "off-label" (without FDA approval) in treating some other medical problems.¹

The idea for a possible therapeutic use for botulinum toxin was first developed by the German physician Justinus Kerner (1786-1862). He deduced that the toxin acted by interrupting signal transmission within the peripheral sympathetic nervous system, leaving sensory transmission

intact. He called the toxin a "sausage poison," because it was observed that illness followed ingestion of spoiled sausage. In 1870, John Muller, another German physician, coined the name "botulism" (from the Latin root *botulus*, which means "sausage").² In 1949, Burgen was the first to discover that the toxin was able to block neuromuscular transmission. This strain was approved by the US Food and Drug Administration (FDA) in 1989 under the trade name Botox (Allergan, Inc, Irvine, Calif) for treating strabismus, blepharospasm, and hemifacial spasm in patients younger than 12-year-old. In the year 2000, Botox was approved for use in treating cervical dystonia (wry neck) and 2 years later for the temporary improvement of moderate to severe frown lines between the eyebrows (glabellar lines). Serotype B has been FDA approved for treating cervical dystonia, and serotype F is under investigation in patients who are resistant to serotypes A and B.³

Mechanism of action

Botulinum toxin inhibits the release of acetylcholine at neuromuscular junction leading to the paralysis of muscles. The three steps in the action of botox are after binding the toxin to the nerve it is internalized in the nerve. The normal process of vesicle fusion to the plasma membrane is interfered by the degradation byproducts of the toxin which is cleaned by internal proteolytic enzymes. This leads to the inhibition of exocytosis of acetylcholine and finally causing the neuromuscular blocking effect. The effect of the paralysis depends on dose administered. Large doses cause complete paralysis while as partial activity results from therapeutic activity hence decreasing the appearance of hyper functional wrinkles.⁴

Applications of Botox in dentistry

Botox is used in number of medical and dental conditions like headache, migraine, gummy smile and angular chelitis, Dental implants and surgery, Bruxism and clenching cases. Myofacial pain and neck pain, temporomandibular disorders, depressed orthodontic appearance and orthodontic relapse, masseteric muscle hypertrophy, mandibular spasm, trigeminal neuralgia finally for retention of removable prosthesis to reduce muscle hyperactivity.⁵

Bruxism

The injection of the Botox into both masseter as well as temporalis muscles bilaterally had been effective in treating Bruxism. In 1990, nitty gritty checked diminishing in bruxism after implantation of BoNT/A into the masseter and temporalis muscles in a patient recuperating from a state of insensibility. Muscle shortcoming is a known unpredictability for the treatment in this district as a result of the dissemination of arrangement over the facial planes. This new Botox treatment gives assistance for four - a half year or now and again, may prompt aggregate goals of bruxism.⁶ Botox side impacts incorporate soreness at the infusion site and gentle dribbling. Botulinum neurotoxin has shown ensure in decreasing the signs of bruxism. A long haul, open-name primer examination with a previous history of serious bruxism who were recalcitrant to restorative and dental strategies, to them BoNT/A mixtures were surrendered to the masseters (mean measurement: 61.7 U/side; go 25 U to 100 U), which results in an aggregate span of helpful reaction of 19 weeks.⁷

Mandibular Spasm

This type of muscular spasm results from spasm of all muscles of mastication and associated mandibular muscles. This disorder places limitations on completing the basic oral hygiene necessary to prevent oral disease. Other impairments can include: Restrictions on dental treatment, difficulty with eating and diminished oral utility. Botulinum toxin treatment to the masticatory musculature

diminishes the effects of hyperfunctional or spastic muscles.⁸

Trigeminal Neuralgia

It is a unilateral neurological disorder affecting orofacial muscles leading to acute severe pain. Botox can be used as an adjunctive treatment modality in these patients which acts on nerve endings, thereby reducing the severity of the pain.⁹

Enhancing Facial Esthetics

The facial wrinkles can be treated with Botox. But, the pathogenesis of wrinkles should be known first. The use of fillers in the lower face and the use of Botox for the upper face are advised. When the rhytid is primarily caused by muscular action deforming the overlying skin, Botox can be extremely effective treatment in the lower face.¹⁰

Gummy smile

The excessive display of gingival tissue in maxilla while smiling is termed as Gummy smile Botox can be used as an alternative treatment in use of gummy smile, other treatment options are cosmetic surgical procedures, dermal fillers, orthodontic and orthognathic procedures and dental bleaching.¹¹

Salivary fistula

Salivary fistula is a typical entanglement following the careful evacuation of parotid tumors (parotidectomy). Most fistulae may close suddenly, persistent fistulae are difficult to be dealt with. An infusion of Botox in the nearness of the parotid organs causes blockage of the parotid emission. This causes a decline in the salivary stream, trailed by glandular decay, enabling the salivary fistula to recuperate.¹²

Oromandibular dystonia

Oromandibular dystonia is muscle brokenness in the face. This brokenness meddles with talking and biting and it might prompt accidental jaw opening or shutting, horizontal deviation and projection. Development of the masticatory muscles frequently results in automatic staying quiet, cheek or lips. Oromandibular dystonia has reacted well to Botox treatment by infusing Botox into the masseter, medial or lateral pterygoids.¹³

Temporomandibular disorder (TMD)

The disorder can be subdivided into two groups pain caused by the muscles of mastication and pain attributed to the temporomandibular joint (TMJ). The common treatments are the uses of anti inflammatory agents, muscle relaxants and narcotics. There are other treatments like orthotic devices, physiotherapy exercises, drug treatments (antidepressants), massage and acupuncture and intra-articular steroid injection.¹⁴ The Botox injection into the muscles of mastication (the temporalis, masseter, and

medial and lateral pterygoid muscles) shows great results in improving the condition. Muscular relaxation with Botulinum toxin A is a viable alternative. When a muscle relaxant is used with the muscles of mastication, this clenching reflex can be reduced or eliminated. Because a very small percentage of available force is required to masticate food, a slight relaxation of muscle function reduces bruxism and is usually insufficient to affect chewing and swallowing.¹⁵

Side effects

The side effects of Botulinum toxins are mild and transient, usually seen at the site of injection. These include nausea, headache, urticaria, dry mouth, dysphagia, dysphoria, transient muscle paralysis.¹⁶

Safety measure

As a safety measure the commercially available butulinum toxin A should have a "Boxed warning "on its product including the adverse reaction as prescribed by both health Canada and FDA. The effect of the symptoms can range from one day to several weeks.¹⁷

CONCLUSION

Botox is a successful treatment for many facial and oral musculature dysfunctions because it provides an overall conservative, quick and painless approach. Botox can be a valuable addition to the dentistry. A dentist now can provide Botox injections to treat various conditions. Since dentists' training and knowledge covers everything about the head and neck, dentists can use Botox Injection to treat such problems of the face and oral cavity with the proper training specifically related to Botox. Botox also provides reversible temporary approach that can be stopped at any time. The isolation of newer strains of Cl. Botulinum is needed and more researches should be done to discover and improve the medical and dental benefits of Botox.

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