

Non Invasive Treatment For Gummy Smile-Botox

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Introduction

One of the common reasons of patient seeking treatment in orthodontics is the excessive gingival display or appearance of gummy smile. Relationships between three components of teeth, lip framework, and the gingival scaffold determine the esthetic appearance of smile.¹

A beautiful smile would be ideally a perfect set of teeth along with pleasing peri-oral facial esthetics. The objective of lip repositioning is to minimize the excessive gingival display by limiting the retraction of the elevator smile (Levatorlabii superioris, Levatoranguli, Orbicularis oris, Zygomaticus minor).²

The treatment options depends on etiology and may range from invasive (surgery-gingivectomy, muscle resection, orthognathic surgery) to a non invasive (orthodontic intrusion, diminish the activity of hyperfunctional lip elevator muscle) approach. The surgical procedures may lead to frequent relapse and undesirable side effects such as scar contraction. Hence, a minimally invasive treatment modality that can serve as a substitute for the surgical procedure, i.e., the use of botulinum toxin (BTX) has been suggested. This toxin acts by cleaving the synaptosomal-associated protein (SNAP-25) and inhibiting the release of acetylcholine, thus preventing muscle contraction. Among the seven serologically distinct types of botulinum neurotoxin, type A (BTX-A) appears to be the most potent and is most often used clinically.³ Botulinum toxin type A (BTX-A) (Botox; Allergan, Irvine, Calif) has been studied since the late 1970s for the treatment of several conditions associated with excessive muscle contraction. Botulinum toxins or Botox® is available in a freeze-dried powder that clumps at the bottom of the vial. The action of Botox is selective muscle denervation. Woo-Sang Hwang⁴ proposed a safe and

Abstract

Gummy smile has been one of the prime concerns in facial esthetics as well as the patients undergoing dental treatment. There are several etiologic factors that include skeletal, gingival and muscular that works in combination to contribute to this condition. The current article is a case report of a patient with gummy smile treated with a non invasive intervention using Botulinum toxin type A.

Keywords: Botulinum toxin, Lip elevator muscles, Gummy smile, Non-invasive, Neurotoxin

reproducible injection point (Yonsei point) for botulinum toxin-A (BTX-A) as a supplementary method for the treatment of gummy smile, as determined by assessment of the morphologic characteristics of three lip elevator muscles.

Yonsei point (Figure 1a, b) is located at the centre of the triangle formed by:

1. Levatorlabii superioris [LLS],
2. Levatorlabii superioris alaeque nasi [LLSAN], and
3. Zygomaticus minor [Zmi]. Effect of Botox is seen within 5-10 days and lasts about 6 months, with a range of 4 to 8 months, at which time the patient can return to repeat the process.

Case Report

A 26 year old female patient with a chief complaint of irregular upper and lower front teeth and excessive gingival display on smiling reported to the department. She wanted to minimize her gingival display on smile but was reluctant to get any surgical intervention and hence chose for a non-invasive treatment.

After completion of leveling and aligning stage of fixed orthodontic treatment, correction of excessive gingival display was planned. No relevant medical history was reported. On clinical examination, patient revealed no lip competency or muscle strain. She showed adequate upper incisor exposure at rest. On rest 0 mm and on smiling, 6 mm of gingival display was seen (Figure 2a,b).

Hence, the gummy smile was due to hyperactive lip elevator muscles. An informed consent was obtained after discussion with the patient & possible complications and benefits of treatment with Botulinum toxin were told.

100 U of freeze-dried powder of BTX-A (Botox; Allergan Inc, Westport, Ireland) was reconstituted with 2 ml normal saline (0.9%) solution to make a 5.0 U/0.1 ml dose according to the manufacturer's instructions. The patient was instructed not to rub on the injected area and recalled after 10 days.

After 10 days, the gingival display was reduced to 2 mm with symmetric elevation of the upper lip as seen clinically. No side effect was reported. The patient was recalled after 2 months and gingival display was reduced along with symmetric elevation of the upper lip

observed clinically (Figure 3a,b). Patient was satisfied with her present facial esthetics.

DISCUSSION

Esthetics of the smile are influenced by 3 components:

1. Teeth
2. Gums,
3. Lips.

An attractive smile depends on the proper proportion of the above 3 elements. The upper lip should symmetrically expose up to 3 mm of the gum. The exposure of more than 3 mm of the gum during the smile is known as gummy smile. Hulsey⁵ noted that the most attractive smiles were those in which the upper lip rested at the height of the gingival margin of the maxillary incisor. Tjanet al⁶ reported gender differences in the smile line. In men, the authors report that the low smile line is predominant (2.5:1), whereas high smile lines are predominant in women (2:1).

Polo⁷ conducted a study on five subjects with excessive gingival display to evaluate the effect of BTX-A injections; all the subjects had hyper functional upper lip elevator muscles. 1.25 U of BTX-A was injected into bilateral levatorlabii superior in muscles and levatorlabii superior alaeque nasi muscles; 1.25 U was injected at the overlap areas of levatorlabii superioris and zygomaticus minor muscles bilaterally. The study was a photographic study and from the study it was concluded that maximum reduction in gingival display was found within 14 days. The improvement lasted for 3 to 6 months.

According to Hexsel⁸ injections should be given at one point on each side of nasolabial groove into the levatorlabii superioris alaeque nasi muscle, about 5 mm from the nasal alar rim.

Polo conducted study on 30 patients to determine the effectiveness of BTX-A on excessive gingival display. The patients were followed up for a period of 6 months. Patients were recalled at 2, 4, 8, 12, 16, 20, and 24 weeks postinjection. Preinjection gingival display averaged 5.2 (+/-1.4) mm in the 30 patients. At 2 weeks postinjection, mean gingival display declined to 0.09 (+/-1.06) mm. Gingival display gradually increased from 2 weeks postinjection through 24 weeks, but, at 24 weeks, average

gingival display had not returned to baseline values.⁷ Near similar results were seen in our treated cases where a 6 mm preinjection gingival display reduced to 2 mm at 2 weeks postinjection.

Contraindications¹⁰

- Patients who are psychologically unstable or who have questionable motives and unrealistic expectations.
 - Individuals dependent on intact facial movements and expressions for their livelihood (e.g. actors, singers, musicians and other media personalities).
 - Those afflicted with a neuromuscular disorder (e.g. myasthenia gravis, Eaton-Lambert syndrome).
 - Patients allergic to any of the components of BTX-A or BTX-B (i.e. BTX, human albumin, saline, lactose and sodium succinate).
 - Those taking certain medications that can interfere with neuromuscular impulse transmission and potentiate the effects of BTX (e.g. aminoglycosides, penicillamine, quinine, and calcium blockers).
- Pregnant or lactating women (BTXs are classified as pregnancy category C drugs).

Side Effects¹¹

- Mild stinging, burning or pain with injection
- Edema around injection site
- Erythema around injection site
- Mild headache, localized and transient
- Technique dependent
- Ecchymosis lasting 3 to 10 days
- Asymmetry
- Oral incompetence and asymmetric smile

- Lack of intended cosmetic effect Rare and idiosyncratic
- Numbness and paresthesias(localized and transient)
- Focal tonic movements (twitching)
- Mild nausea and occasional vomiting
- Mild malaise and myalgias (localized and generalized)
- Rare adverse effects of longer duration that can be serious and are not technique dependent:
- Immediate hypersensitivity reactions
- Urticaria XX Dyspnea
- Soft tissue edema
- Anaphylaxis

Conclusion

Botulinum toxins are a boon to our dental field. This therapy is not only conservative, but also a minimally invasive treatment approach that can expand our therapeutic and treatment options for the benefit of our patients. Hands-on training from a renowned academy is absolutely essential in learning the correct technique and protocol of how to use this versatile toxin for the maximum benefit to our patients and dental fraternity. With proper training, dentists are usually more proficient than any of these other healthcare professions in providing these treatments to patients, both for dental and cosmetic needs. It is time to broaden our horizons as a profession and use all of the tools available to us.

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References

1. Garber DA, Salama MA. The aesthetic smile: diagnosis and treatment. *Periodontol* 2000. 1996;11:18-28.
2. Hu KS, Yang SJ, Kwak HH, Park HD, Youn KH, Jung HS, Kim HJ. Location of the modiolous and the morphologic variations of the risorius and zygomaticus major muscle related to the facial expression in Koreans. *Korean J Phys Anthropol*. 2005;18:1-11.
3. Polo M. Botulinum toxin type A in the treatment of excessive gingival display. *Am J Orthod Dentofacial Orthop*. 2005;127: 214-218; quiz 261.
4. Woo-Sang Hwang: Surface Anatomy of the Lip Elevator Muscles for the Treatment of Gummy Smile Using Botulinum Toxin. *Angle Orthod*. 2009; 79:70-77.
5. Mackley RJ. An Evaluation of smiles before and after orthodontic treatment. *Angle Orthod*. 1993; 63(3): 183-189.
6. Tjan AH, Miller GD, The JG. Some esthetic factors in a smile. *J Prosthet Dent*. 1984; 51(1):24-28.
7. Polo M. Botulinum toxin type A in the treatment of excessive gingival display. *Am J Orthod Dentofacial Orthop* 2005;127:214-8
8. Hexesel C, Hexsel D, Porto MD, Schilling J, Siega C. Botulinum toxin type A for aging face and aesthetic uses. *J Dermatol Ther* 2011;24:54-61
9. Daniel Troung, Dirk Dressler, Mark Hallett: Manual of botulinum toxin therapy; first print 2009.
10. Kate Coleman moriarty: Botulinum Toxin in Facial Rejuvenation; revised; 2006.
11. Kromminga, A. & Schellekens, H. (2005). Antibodies against erythropoietin and other protein-based therapeutics: an overview. *Ann N Y Acad Sci*, 1050, 257-65. Hunt, T. J. (2007). Botulinum Toxin Composition, US Patent application 2007/0025019.

Figure Legends:

Figure 1- a, b- Locating Yonsei Triangle
 Figure 2- a-On rest 0 mm; b- on smiling, more than 5-6 mm of gingival display
 Figure 3- a- After 10 days, the gingival display was reduced to 2 mm; b- After 2 months to gingival display was completely reduced



Figure 1 a, b. Locating Yonsei point



Figure 2. a-On rest 0 mm and b- on smiling, more than 5-6 mm of gingival display



Figure 3a- After 10 days, the gingival display was reduced to 2 mm. b- After 2 months to gingival display was completely reduced

