Botulinum Toxin Type-A as an alternative treatment for gummy smile: a case report.

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Abstract

In some cases of dentofacial deformities such as vertical maxillary excess, administration of *botulinum* toxin has been used as an effective minimally invasive technique to improve the aesthetic disorder of gummy smile. This article presents a case of a woman with excessive gingival exhibition during the smile related to vertical maxillary excess and hyperactive upper lip elevator muscles. This patient was treated using *botulinum* toxin type A (BT) to camouflage the deformity and improve her facial aesthetic. This therapeutic option proved to be effective and should be a good alternative for patients.

Keywords: botulinum toxins, type a cosmetic techniques, gingiva

Introduction

Of all facial expressions, the smile is possibly the most attractive and complex in terms of meaning. From its anatomic and physiologic perspective, the smile is a result of the exposure of the teeth and gums during the contraction of the muscle groups in the middle and lower thirds of the face [1]. Gummy smile (GS) is a term used to describe disproportionate exhibition (more than 3mm) of gingival tissue of the maxilla upon smiling [1,2]. *Botulinum* toxin type A (BT) can be used as a treatment or as an alternative for surgical procedures and represents a simple therapy for GS [3].

Case Synopsis

A 41-year-old woman presented with the chief complaint of excessive gingival exhibition. During the examination, the patient presented a straight profile with competent lips and excessive gingival display during the smile **(Figure 1).** In addition, the maxillary vertical excess such as the contraction of the levator labii superioris were seen as the cause. Close-up photographs clearly highlighted this discrepancy and the GS was classified as mixed according to Mazzuco et al. [1]. The patient was advised about the necessity of orthognathic surgery but she refused this option. Therefore, as an alternative treatment approach, injection of BT was suggested. The patient had no medical history that might contraindicate the procedure. *Botulinum* toxin

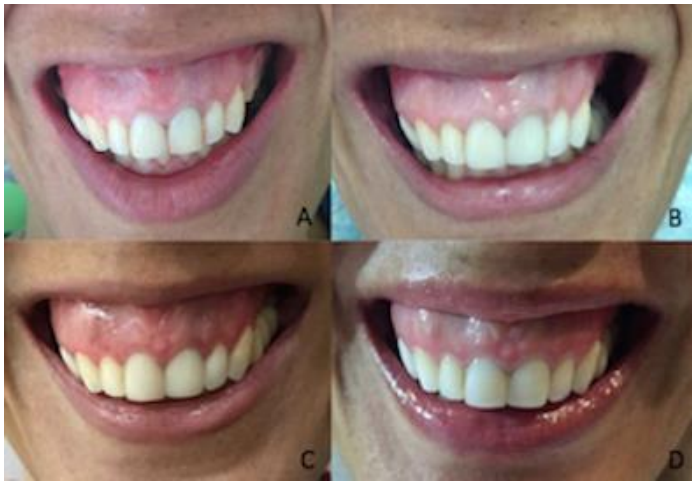

Figure 1. ***A-D)*** *Gingival display before the applications of BT with an interval of 5 months between each photograph.*

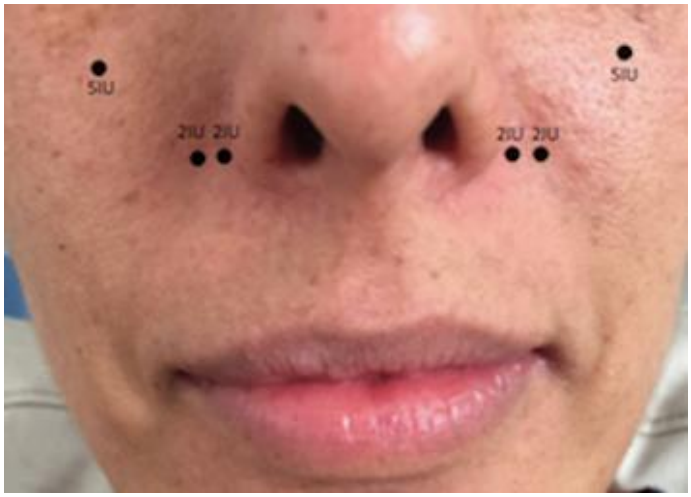

Figure 2. *Points of injections and respective dosage used.*

was diluted according to the manufacturer's recommendations by adding 2ml of saline solution to 100 international units (IU) of the toxin to provide 10 IU per 0.1ml. Under sterile conditions, 2 IU were injected into 2 points of the levator labii superioris and 5 IU into the minor zygomaticus bilaterally **(Figure 2).**

No local anesthesia was administered and a 0.30×4mm needle was used. After two weeks, an improvement was observed with a decrease of gum exhibition **(Figure 3).** The patient had a total of four sessions with an interval of 5 months between them and was very pleased with the results.

Case Discussion

Before any treatment with BT, patient and physician should discuss treatment options [3]. The use of BT for improvement of facial aesthetic problems has been widely disseminated [1]. Benefits of this therapy are: easy and safe applications, utilization of reasonable dosages, fast onset of action, low risk, and reversible effect. Also, BT offers a fast aesthetic result when compared to more invasive procedures [1,4]. Furthermore, BT has been shown to be less invasive and efficient alternative to correct GS [5].

The etiology of the GS can be attributed to alterations of hard and/or soft tissue and also to dentoalveolar morphology. The lip dimension, excessive levator labii superioris contraction, clinical crown length, and vertical maxillary excess are described in association with GS [6]. A normal maxillary length dimension represents an indication for treatment with BT, as the problem is related to a hyperfunction of the levator labii superioris [7].

Regarding dosage, some authors prefer to inject an initial dose of one IU, and if necessary, a reapplication in two-three weeks [8]. The reason for the use of this protocol is to prevent adverse side effects related to excessive dosage or potency of the designated dosage [1].

The technique of BT application depends on professional experience and GS classification. When BT is applied using the conservative method, a dosage of 2.5 or 5 IU in levator labii superioris is sufficient to correct anterior gummy smile (between canines). In cases of posterior or mixed GS (anterior and posterior), an additional injection of 2.5 IU in two points of zygomatic muscles are recommended and have proven to be effective [1]. In this case, the later technique was performed due to a mixed GS classification and excessive gingival exposure.

In the present case, the authors observed a significant decrease of gingival exposure (4mm) after the period of four injection sessions in an overall interval of 20 months **(Figure 4).** This fact reinforces the report described by Polo, that demonstrated reduction of GS initially and progressively from two weeks post injection through 6 months; the full muscle force does not return to normal. A hypothesis is that the decrease in muscle force tends to occur after several injection sessions associated with a long

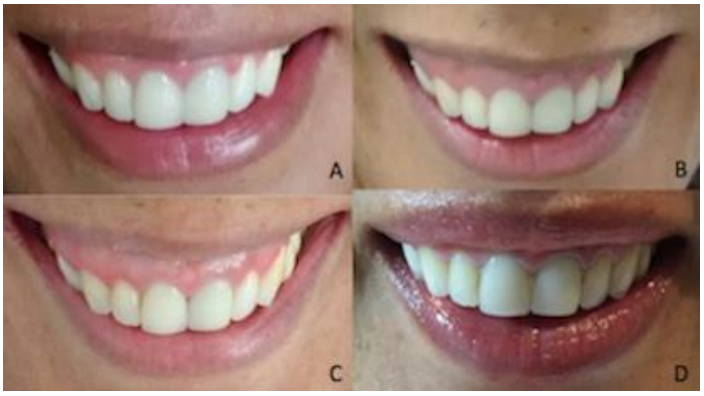

Figure 3. ***A-D****) After two weeks of each application, a decrease of gum exhibition was observed.*

muscle period relaxation [4]. In contrast, Dinker et al., indicated that this relaxation period progressively reverses and retreatment will be needed after around 6 months [2].

Owing to those circumstances, BT treatment is considered to be safe, predictable, and very effective, being legalized in many countries by the respective supervisory agencies. Knowledge of anatomy, physiology, technique, dosage, and potential complications are the basis of successful use of BT [9].

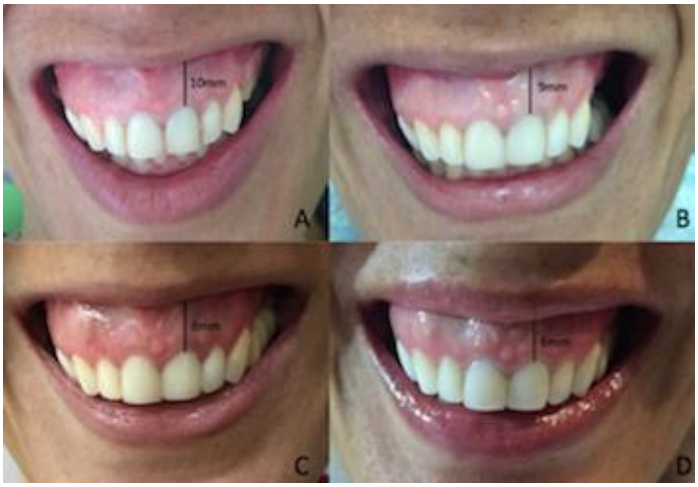

Figure 4. *A significant decrease in muscle force and gingival exposure over 20 months before the reapplications.*

Conclusion

Botulinum toxin type-A injection was seen to be an effective alternative to treat GS caused by vertical maxillary excess. Studies with appropriate methodologies and statistical analyzes are needed to confirm the apparent clinical efficacy of this drug in patients with GS.

References

1. Mazzuco R, Hexsel D. Gummy smile and botulinum toxin: a new approach based on the gingival exposure area. *J Am Acad Dermatol*. 2010;63(6):1042-51. [PMID: 21093661].
2. Dinker S, Anitha A, Sorake A, Kumar K. Management of gummy smile with Botulinum Toxin Type-A: A case report. *J Int Oral Health*. 2014;6(1):111-5. [PMID: 24653614].
3. Jaspers GW, Pijpe J, Jansma J. The use of botulinum toxin type A in cosmetic facial procedures. *Int J Oral Maxillofac Surg*. 2011;40(2):127-33. [PMID: 20965695].
4. Polo M. Botulinum toxin type A (Botox) for the neuromuscular correction of excessive gingival display on smiling (gummy smile). *Am J Orthod Dentofacial Orthop.* 2008;133(2):195-203. [PMID: 18249285].
5. Indra AS, Biswas PP, Vineet VT, Yeshaswini T. Botox as an adjunct to orthognathic surgery for a case of severe vertical maxillary excess. *J Maxillofac Oral Surg*. 2011;10(3):266-70. [PMID: 22942600].
6. Garber DA, Salama MA. The aesthetic smile: diagnosis and treatment. *Periodontol.* 2000;11:18-28. [PMID: 9567953].
7. Hwang WS, Hur MS, Hu KS, Song WC, Koh KS, Baik HS, et al. Surface anatomy of the lip elevator muscles for the treatment of gummy smile using botulinum toxin. *Angle Orthod.* 2009;79(1):70-7. [PMID: 19123705].
8. Kane MA. The effect of botulinum toxin injections on the nasolabial fold. *Plast Reconstr Surg.* 2003;112(5 Suppl):66S-72S; discussion 3S-4S. [PMID: 14504487].
9. Hexsel C, Hexsel D, Porto MD, Schilling J, Siega C. Botulinum toxin type A for aging face and aesthetic uses. *Dermatol Ther.* 2011;24(1):54-61. [PMID: 21276158].