

# THE USE OF BOTULINUM TOXIN TYPE A IN THE CORRECTION OF THE GINGIVAL SMILE

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## ABSTRACT

In the case of Smile Analysis, it is indisputable that excessive gingival exposure is considered one of the main reasons for the pursuit of aesthetic correction by patients. A full evaluation of all the factors involved is needed in the labial resting position and smiling, so that the complete diagnosis is made. Botulinum toxin has been described with an important ally in the gummy smile correction. Objective: The aim of this study is to report the use of botulinum toxin type A in the gummy smile correction, in 10 patients randomly selected, of both genders aged 18-35 years. Methods: The application was done at the Faculty Inga / Uningá, in two stages, an initial and another 15 days after the first application. The patients were selected and photographed in frontal facial analysis in these two stages, and subsequently compared. The sample consisted of patients with greater than 3 mm gummy smile and the sample selection criteria were: no patient could present subcutaneous graft as hyaluronic acid or have performed toxin application within 120 days. Botulinum toxin type A was applied on the nose wing levator muscle at a dose of 2 units per side. Results: After application, there was significant reduction in the elevation of the upper lip while smiling, greatly improving the aesthetics late patients smile in all cases. Conclusion: At the end of this study, it is concluded that botulinum toxin type A, is an excellent alternative for reducing the gummy smile.

**KEYWORDS:** Gingival smile, botulinum toxin type A, Botox

## 1. INTRODUCTION

The use of botulinum toxin is a main used alternatives to the aesthetic treatment in the medical field and are not widely used in the dental aesthetic treatment. However, this reality is changing, after the liberation of Federal Council of Dentistry (CFO), for the use of botulinum toxin for therapeutic purposes. Among the many

approaches to this treatment are related: the treatment of temporomandibular disorders, orofacial dystonia, bruxism, masseter hypertrophy, facial asymmetries muscular origin and gummy smile<sup>2,3,5</sup>.

Considered to be acceptable to smile, a gingival display up to 2mm and above that, the aesthetics would be compromised especially for females; exposure above 4 mm considered very unpleasant<sup>1,4</sup>.

One of the etiological factors of gummy smile is lip of mobility caused by hypertonicity of the muscles involved in smiling that would be the muscles: Orbicular the mouth, upper lip lift, nose wing elevator, corner of the mouth lift, zygomatic major, minor zygomatic, depressor of the nasal septum<sup>6</sup>.

According to Peck et al., Patients with gummy smile have 20% more capacity of the facial muscles to raise the upper lip while smiling when compared to other patients<sup>7</sup>. Several correction methods for gummy smile have been proposed, such as gingivoplasty, orthodontic treatment indicates tion of intrusion of upper incisors; orthognathic surgery to impaction of the maxilla; and bone resection<sup>8</sup>. These procedures are of varying complexity, high cost and generally have long treatment time. Thus, a minimally invasive treatment modality that can serve as a substitute for the surgical procedure, namely the use of botulinum toxin (BTX) has been suggested<sup>11</sup>. Use of botulinum toxin type A could become an option, to be a simple, rapid, reversible and effective for aesthetic correction of excessive gingival exposure when smiling<sup>10</sup>.

## 2. MATERIAL AND METHODS

The cases presented in this study are patients with more than 3 mm gingival display during smiling posed, of both genders, different ages. Treatment elected to minimizing the gummy smile was the application of BTX-A in the upper lip elevator muscles and nasal wing,

bilaterally and in the depressor muscle of the nasal septum. The precise location of the application site was determined by animation muscle (during the smile) and palpation of twitch before injection. 10

To assistance of diagnosis were made extraoral pictures with the camera rebel XT Canon brand before application and after 15 days. Insulin syringe was used 30 units needed.

The botulinum toxin used was the trademark Dysport<sup>R</sup>, (300 U, Lab. IPSEN) reconstituted in sterile saline 1 ml per vial. We selected the lateral point the nose of the wing, and two units applied bilaterally.

### 3. RESULTS

After 15 days after the application of botulinum toxin type A in the levator muscle of the upper lip, with 2 units on each side, it was found extremely satisfactory result, considerably reducing the contraction of this muscle, and improving the appearance of gummy smile in 10 patients sample, without exception (Figures 1 up to 10). This result remained stable for four months on average and, after this period, patients reported a recovery of the initial configuration of the smile, given that the toxin is not a permanent substance.

The following illustrate the extraoral smiling frontal photographs of patients who received treatment with toxin at two times: before and 15 days after.



**Figure 1.** PATIENT 1. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 2.** PATIENT 2. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



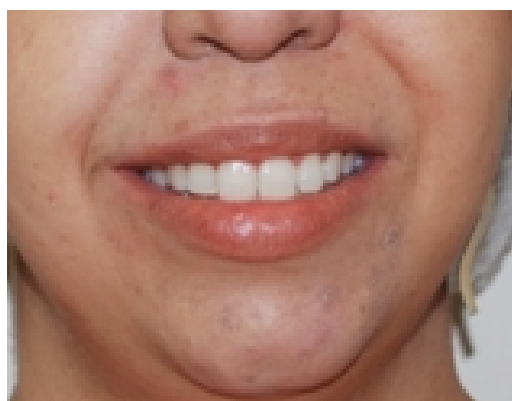
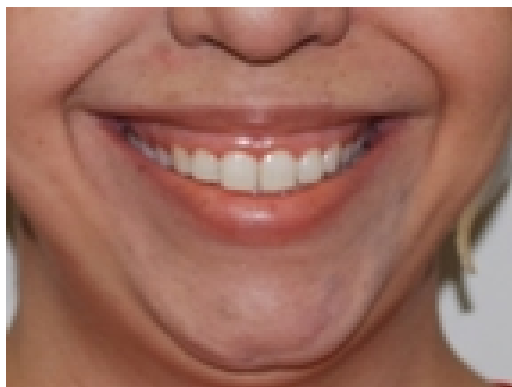
**Figure 3.** PATIENT 3. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



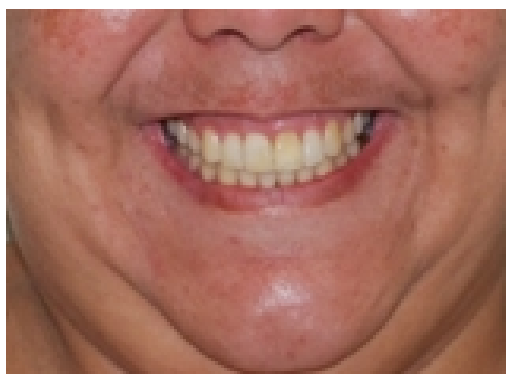
**Figure 4.** PATIENT 4. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 6.** PATIENT 6. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 4.** PATIENT 4. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 7.** PATIENT 7. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 8.** PATIENT 8. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 10.** PATIENT 10. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).



**Figure 9.** PATIENT 9. Photography before the application of the toxin (above) and 15 days after application of the toxin (below).

#### 4. DISCUSSION

Botulinum toxin is produced by *Clostridium botulinum* bacteria. There are seven distinct forms neurotoxin ranging from Type A to G, with type A (BTX-A) being most commonly used for therapeutic reasons. "Botox" (Allergan, Inc., USA) is the trade name of botulinum toxin type A first approved for cosmetic and therapeutic use, which is why this is the most remembered product.

Botulinum toxin (BTX) is a protease that causes temporary chemical denervation of skeletal muscles by blocking the release of acetylcholine-mediated  $Ca^{+2}$  the nerve endings of alpha motor neurons and gamma (myoneural junction), producing a dose-dependent weakening, temporary muscle activity becoming non-functional muscles without systemic effects. However, it is believed that the muscle begins the formation of new acetylcholine receptors. When the terminal axon begins to form new synaptic contacts, there is a reestablishment of neuromuscular transmission and gradual return to full muscle function, usually with minimal side effects<sup>3</sup>.

The CFO, permitted the use of botulinum toxin in 2011 according to CFO-112 Resolution of 02/09/2011 that subscribe below:

Article 1°. The article 2°, CFO-112 resolution of

09/02/2011, published in the Federal Official, Section 1, page 233, on 09/05/2011, as amended by CFO-145 resolution of 27/03/2014, published in the Federal Official, Section 1, page 174, on 14/04/2014, becomes effective with the following wording: "Article 2º. The use of botulinum toxin is allowed to dental procedures and sealed for non-dental purposes".

Article 2º: This Resolution became effective on the date of its publication in the Official Imprensa, all provisions to the contrary (CFO, 2011)<sup>12</sup>. In the dental office, as Couto (2014)<sup>12</sup>, the most common application is in the treatment of bruxism, gummy smile and dysfunction that affects about 30% of Brazilians. When applying the toxin, the involved muscles undergoes a "relaxation" improving the condition of muscular hypertonicity in the region<sup>12</sup>.

The gummy smile is conceptualized by exposure of more than 3 mm of gum tissue for smile and its etiology is multiple and may be involved: vertical excess of maxilla late passive eruption, hyperfunction of the muscles involved in smiling and reduced length of the clinical crown of the tooth<sup>8,9,11</sup>.

The gummy smile caused by muscle hyperfunction was nominated for botulinum toxin, being the treatment of choice for ease and security of applications, rapid effect, as well as being a more conservative method compared to surgical procedures<sup>4,8</sup>.

Each muscle involved in raising the upper lip has a function during Smile activity. The sites for the injections are determined by the contraction of specific muscle groups and is the main muscle involved, and upper lip lift. Applications are usually made laterally to bridge of the nose with low-dose toxin type A (two units/ side).

## 5. CONCLUSION

According to findings and research presented here, we conclude that botulinum toxin type A, is an important ally in the treatment of patients with gummy smile of muscular origin, significantly reducing the contraction of the upper lip levator muscle, and improving the facial aesthetics patient.

## REFERENCES

- [1] Escóssia NBM, Nunes LKF, Capelli Júnior J. Utilização de toxina botulínica do tipo A para minimizar o sorriso gengival: relato de três casos clínicos. *Rev Clín Ortod Dental Press*. 2014;13(4):68-73.
- [2] Marciano A, Aguiar U, Vieira PGM, Magalhães SR. Toxina botulínica e sua aplicação na odontologia. *Revista de Iniciação Científica da Universidade Vale do Rio Verde, Três Corações*. 2014; 4(1):65-75.
- [3] Majid OW. Clinical use of botulinum toxins in oral and maxillofacial surgery. *Int J Oral Maxillofac Surg*. 2010; 39(3):197-207.
- [4] Ishida LH. Estudos das alterações do sorriso em pacientes submetidas a alongamento do lábio superior miotomia do

músculo levantador do lábio superior [tese]. Universidade de São Paulo, Faculdade de Medicina. 2012; 114p.

- [5] Pedro IG. Utilização da toxina botulínica tipo A associada à cirurgia gengival ressectiva: relato de caso. *Braz J Periodontol*. 2014; 24(03):24(3):35-3.
- [6] Seixas MR, Costa-Pinto RA, Araújo TM. Checklist dos aspectos estéticos a serem considerados no diagnóstico e tratamento do sorriso gengival. *Dental Press J Orthod*, 2011; 16(2):131-57.
- [7] Peck S, Peck L, Kataja M. The gingival smile line. *AngleOrthod*. 1992; 62(2):91-100.
- [8] Jaspers GWC, Pijpe J, Jasma J. The use of botulinum toxin type A in cosmetic facial procedures. *Int J Oral Maxillofac Surg*. 2011; 40(2):127-33.
- [9] 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.
- [10] Hwang *et al.* Surface Anatomy of the Lip Elevator Muscles for the Treatment of Gummy. Accepted: February 2008. Submitted: September 2007. 2009 by The EH Angle Education and Research Foundation, Inc.