



Smile Harmony after Dental Implant Rehabilitation Optimized by Application of Botulinum Toxin

Rosimari Mariano de Campos¹, Jorge Peña Dias Junior², Fernanda Colella de Barros², Marcelo do Lago Pimentel Maia³, Caleb Shitsuka⁴ and Irineu Gregnanin Pedron^{5*}

¹Dentist and Nurse, São Paulo, Brazil

²Dentist, Prescriber of Botulinum Toxin in Dentistry, Private Practice, São Paulo, Brazil

³Professor and Speaker, Department of Implantology, Derig Co., São Paulo, Brazil

⁴Professor, Department of Cariology and Pediatric Dentistry, Universidade Brasil, São Paulo, Brazil

⁵Professor, Department of Periodontology and Implantology, Universidade Brasil and Professor, Course of Botulinum Toxin in Dentistry, Botoxindent Institute, São Paulo, Brazil

***Corresponding Author:** Irineu Gregnanin Pedron, Professor, Department of Periodontology and Implantology, Universidade Brasil and Professor, Course of Botulinum Toxin in Dentistry, Botoxindent Institute, São Paulo, Brazil, **Email-id:** igpedron@alumni.usp.br.

Received: February 04, 2020; **Published:** March 02, 2020

Abstract

Widely used in Medicine, botulinum toxin type A presents your cosmetic or therapeutic use, has been increasing its indications. In Dentistry, it is indicated in temporomandibular disorders, orofacial dystonia, bruxism, dental clenching, masseteric hypertrophy, sialorrhoea, facial asymmetry of muscular origin, gummy smile and lip asymmetries that can cause severe gum exposure. Recently, it has been shown the prophylactic application of botulinum toxin in patients after rehabilitation on dental implants, reducing masticatory forces and protecting the prostheses and implants. The purpose of this article is to present the case of a patient with excessive gingival exposure and aesthetic disharmony after dental implant rehabilitation in the anterior region, whose tooth loss occurred due to a previous traffic accident. After the conclusion of the rehabilitation treatment, the patient has received the botulinum toxin application to reduce gingival display and to minimize the exposure of cervical area of the prostheses implants.

Keywords: Botulinum Toxins; Dental Aesthetics; Dental Implants; Smiling

Introduction

Botulinum toxin was firstly studied in the treatment of strabismus, in the 70s. However, considering its approval by the US Food and Drug Administration (FDA) in 2002, its increasing use has been helping the treatment of various diseases and conditions [1,2].

Botulinum toxin is a protein which causes temporary chemical denervation of skeletal muscle fibers mediated by blocking the acetylcholine from the nerve endings of alpha and gamma motor neurons (neuromuscular junction) by calcium ions release. The effect is dose-dependent temporary weakening of muscular activity, making it non-functional, without systemic effects. However, over

time, the muscle function gradually returns by the beginning of formation of new acetylcholine receptors and reestablishment of neuromuscular transmission, with minimal side effects [1,2].

It is produced by *Clostridium botulinum* bacteria, anaerobic bacilli, which may cause food poisoning. There are seven serotypes of botulinum toxin (A, B, C₁, D, E, F and G), with different periods of action, specific toxicity and action potentials. However, the most used is the serotype A [1,2].

Botulinum toxin has become an excellent aid in the treatment of various dental disorders. Despite being known for cosmetic use in the reduction of hyperkinetic facial lines, it can also be used for therapeutic purposes. In Dentistry, it is indicated for temporoman-

dibular disorders, orofacial dystonia, bruxism, clenching, masseteric hypertrophy, sialorrhea, facial asymmetry of muscular origin, gummy smile and lip asymmetries that can cause severe exposure of the gum. Has been recently shown the prophylactic application of botulinum toxin in cases after dental implant restorations, reducing masticatory forces and protecting the prosthesis and implants [1-11].

Clinically, the excessive gingival exposure larger than 3 mm during the smile is called gummy smile [1,4,6,10] and is more frequently observed in women [10].

Purpose of the Study

The purpose of this article is to present the case of a patient with excessive gingival exposure and aesthetic disharmony after dental implant rehabilitation in the anterior region, whose tooth loss occurred due to a previous traffic accident. After the conclusion of the rehabilitation treatment, the patient has received the botulinum toxin application to reduce gingival display and to minimize the exposure of cervical area of the prostheses implants.

Case Report

Caucasian male patient, 35 years-old, attended the particular clinic complaining of tooth and bone loss caused by traffic accident.

Clinically, the absence of teeth 11, 12, 21 and 22 and the presence of provisional fixed partial prosthesis (in acrylic resin) cemented on teeth 13 and 23 were observed (Figure 1). Radiographically, advanced bone loss was observed, being proposed rehabilitation by the prosthesis installation on implants after undergoing block bone graft.

No systemic abnormalities were observed.

Under local anesthesia was performed bone graft derived from a bone bank (cortico-medullary of knee: 20 X 10 X 6 mm) after incision and divulsion of mucoperiosteal total flap, being fixed by titanium screws (Figure 2). After 6 months, the screws were removed and in the same query, 4 HE implants were installed in the teeth 11 and 21 (15 x 4 mm) and 12 and 22 (3.5 X 15 mm) (Conus®, INP, Sao Paulo, Brazil). After 10 months of implant placement, the confection of prosthesis on the implant 11, 12, 21 and 22 and on the teeth 13 and 23 has been completed (Figure 3 and 4). However, in view of the small height of the upper lip and its unsatisfactory anatomy, excessive gingival exposure and of the cervical end of the prosthesis on implants were observed (Figure 4). The application of botulinum toxin was suggested to the patient with the purpose of blocking the contraction of the levator muscle of the upper lip and reduce gingival exposure. However, the patient was instructed as the recurrence of gummy smile after 4 to 6 months after the application in average.

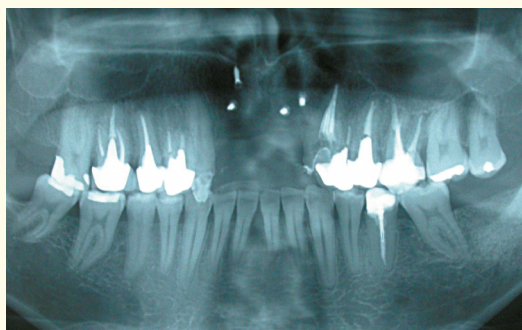


Figure 2: Radiographic aspect showing bone graft derived from bone bank, fixed by titanium screws.



Figure 1: Initial clinical aspect. Dental absences and provisional fixed partial prosthesis can be observed.

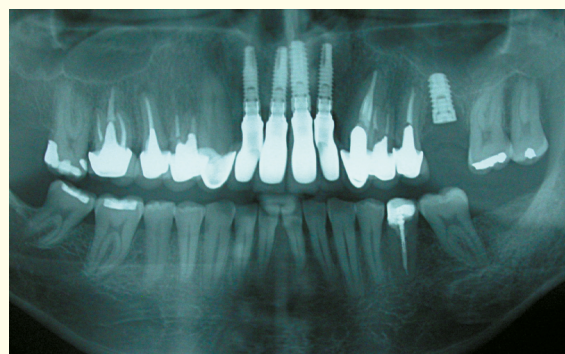


Figure 3: Final radiographic aspect, after rehabilitation with prosthesis on installed implants.



Figure 4: Final clinical aspect, after rehabilitation with prosthesis on implants and presenting excessive gingival exposure.

Previously, local anesthetic was applied (Emla®, Astra, São Paulo, Brazil) in order to promote comfort during the procedure. Botulinum toxin type A (Botox® 200 units, Allergan Pharmaceuticals, Westport, Ireland) was diluted in sterile saline according to the manufacturer's instructions, and injected 2 units in the recommended site, laterally to each nostril.

The patient was instructed about the post-application guidelines. After 15 days, the reduction of excessive gingival exposure and cervical end of the prosthesis on implants were observed (Figure 5). The patient reported no post-application changes and he was oriented on the transient duration of botulinum toxin in the muscle (an average of 4 to 6 months), reapplication being necessary after the recurrence of the gingival exposure.



Figure 5: Final aesthetic result after botulinum toxin application, harmonizing lip aesthetic and reducing exposure of the end of the prosthesis on implants. Note that the patient is performing the perioral movement. However, there is the block of the upper lip elevator muscle, caused by botulinum toxin application.

Discussion

Gummy smile presents several etiologies, such as reduced length of the clinical crown of teeth [1,6,12,13], delayed passive eruption [1,5-7,9], hyperfunction of the muscles involved in smiling [1,5,6,9] and vertical maxillary excess [5-9]. They can occur singly or associated and determine the type of treatment to be applied [4-11]. In the present case, the hyperfunction of the muscles involved in lifting the upper lip can be found, as well as the unsatisfactory lip anatomy itself, where the botulinum toxin application presented a satisfactory result.

The action of the muscles upper lip elevator, upper lip and wing of nose elevator, zygomatic minor and major determines the amount of lip elevation [1,4,5,7-10]. It is a consensus that the application of botulinum toxin at a single point is capable of causing the desired effect: this point is located next to each nostril [1,4,7-10], called the Yonsei point [7]. When injected, the botulinum toxin spreads an average of 20 mm [1,4,7], decreases the contraction of the responsible muscles for lifting the upper lip, reducing gingival display [1,2,4-11].

In this report, the result was satisfactory to the harmony of the smile of the patient by application of botulinum toxin type A, given that, despite the aesthetic and functional rehabilitation by prosthesis on implants have been properly carried out, the unsatisfactory labial architecture did not culminate in excellence of the result. Subsequently, the application of botulinum toxin type A softened the gummy smile by the uniform dehiscence of the upper lip itself, still promoting smoothness to facial smile lines, as can be seen in the nasolabial folds, adjacent to the nostrils, comparing figure 1, 4 and 5.

Botulinum toxin type A is a hydrophilic powder, stored under vacuum, sterile and stable [1,5,8] and your reconstitution occurs from the injection of the sodium chloride 0.9% (diluent) within the bottle. It should be stored at 2 to 8°C and used within 4 to 8 hours, in order to ensure its effectiveness [1,9]. The clinical effects present in average in 14 days after injection, with your maximum effect [1,5,7] and persist lasting about 3 to 6 months [1,4,5,9].

Contraindications to the use of botulinum toxin are: pregnancy, lactation, diseases with neuromuscular transmission deficiencies (such as myasthenia gravis, Charcot disease, Lambert-Eaton syndrome and amyotrophic lateral sclerosis) and concurrent use of aminoglycoside antibiotic, which may potentiate the action of the toxin [1,9].

Despite being a simple and safe procedure, the injection of botulinum toxin may be associated with some adverse events, such as: swelling, erythema, pain at the injection site, infection, ptosis or lengthening of the upper lip and asymmetry of the smile. The dental surgeon must be aware in relation to the accuracy of the technique, dosage, and the location of the puncture [1,4,5,9,11]. In the present report, complaints or changes arising from the application were not reported.

Conclusion

Despite temporary effect, the application of botulinum toxin is an alternative fast, safe, and effective. It produces harmonic and pleasing results, as long as respecting the appropriate dose and indications. The application of botulinum toxin becomes a useful complement in the aesthetic improvement of the smile, particularly in the completion of our cases.

Bibliography

- Pedron IG. Botulinum Toxin - Applications in Dentistry. Florianópolis: Ed. Ponto, 2016:195.
- Côrte-Real de Carvalho R, Shimaoka AM, Andrade AP. The use of botulinum toxin in Dentistry, 2019.
- Rocha AC, Utumi ER, Pedron IG. Sialorrhea. In: Caldas Neto S, Mello Jr JF, Martins RHG, Costa SS. Tratado de Otorrinolaringologia. São Paulo: Roca, 2011:149-153.
- Mazzuco R, Hexasel D. Gummy smile and botulinum toxin: A new approach based on the gingival exposure area. J Am Acad Dermatol. 2010;63(6):1042-1051.
- Polo M. Botulinum toxin type A in the treatment of excessive gingival display. Am J Orthod Dentofacial Orthop. 2005;127(2):214-218.
- Mangano A, Mangano A. Current strategies in the treatment of gummy smile using botulinum toxin type A. Plast Reconstr Surg. 2012;129(6):1015e.
- Hwang WS, Hur MS, Hu KS, Song WC, Koh KS, Baik HS, Kim ST, Kim HJ, Lee KJ. Surface anatomy of the lip elevator muscles for the treatment of gummy smile using botulinum toxin. Angle Orthod. 2009;79(1):70-77.
- 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):266-270.
- Jaspers GWC, Pijpe J, Jansma J. The use of botulinum toxin type A in cosmetic facial procedures. Int J Oral Maxillofac Surg. 2011;40(2):127-133.
- Sucupira E, Abramovitz A. A simplified method for smile enhancement: botulinum toxin injection for gummy smile. Plast Reconstr Surg. 2012;130(3):726-728.
- Niamtu J 3rd. Botox injections for gummy smiles. Am J Orthod Dentofacial Orthop. 2008;133(6):782-783.
- Pedron IG, Utumi ER, Tancredi ARC, Perrella A, Perez FEG. Gingival smile: resective surgery coadjuvant to the dental aesthetic. Rev Odonto. 2010;18(1):87-95.
- Pedron IG, Utumi ER, Silva LPN, Moretto EML, Lima TCF, Ribeiro MA. Gingival resective surgery to the treatment of disharmony of smile. Rev Odontol Bras Central. 2010;18(1):87-91.

Volume 3 Issue 4 April 2020

© All rights are reserved by Irineu Gregnanin Pedron, et al.