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Case Report

Botulinum Toxin Application Improves Frontal Headache, Facial Aesthetics and Quality of Life: Case Report

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Abstract

Botulinum toxin type A is a drug with therapeutic purpose, initially used by Ophthalmology, indicated in cases of blepharospasms. However, botulinum toxin has achieved fame and success in aesthetic applications. In Dentistry, the toxin has been indicated for gummy smile; parafunctional habits such as bruxism and brychism; masseteric hypertrophy; trismus; temporomandibular dysfunctions; adjuvant in surgical procedures such as arthrocentesis or in Implant Dentistry, favoring the osseointegration period by reducing masticatory forces, avoiding the fracture of prostheses and implants; orofacial and oromandibular dystonia; facial paralysis; sialorrhea. Also indicated in orofacial pain, it presents the same protocol for aesthetic applications, taking care to avoid applications that cause asymmetric, non-esthetic, and artificial results. The purpose of this article is to present the case of a patient who presented headache, with painful symptoms in the glabellar and frontal regions. The patient received botulinum toxin applications for painful symptomatology, without, however, altering her facial aesthetics, achieving improvement in pain, self-esteem and quality of life.

Keywords: *Botulinum Toxins Type A; Orofacial Pain; Esthetics; Dentistry*

Introduction

Nowadays, the search for aesthetic and cosmetic procedures has been growing exponentially, both in Medicine and Dentistry, particularly in relation to facial aesthetics. Besides aiming at the principle of health promotion, they seek facial aesthetics, favoring communication and socialization [1-7].

Among the aesthetic procedures that most contributed to this growth is the application of botulinum toxin type A. The predictability, safety, and minimal morbidity of botulinum toxin have contributed to its popularity, in addition clearly to all the aesthetic or therapeutic clinical effects on human health. Additionally, reports of patient satisfaction, both for therapeutic and aesthetic purposes, are not uncommon. In this last perspective, there are also reports of patients mentioning the improvement of self-esteem [1-12].

Botulinum toxin type A is a drug with therapeutic purpose, initially used by Ophthalmology, indicated in cases of blepharospasms, since 1976. The approval in the USA by the Food and Drug Administration for aesthetic indications only occurred in 2002. However, the applications of botulinum toxin have been increasing, not only in aesthetics, but also in various pathologies and condi-

tions [1,11,13]. In Brazil, the authorization of aesthetic procedures performed by dental surgeons occurred in 2019, through Resolution 198, by the Federal Council of Dentistry, authorizing dental surgeons to practice the application of botulinum toxin at the facial level, with the aesthetic purpose of facial harmonization [14].

In Dentistry, the toxin has been indicated for gummy smile; parafunctional habits such as bruxism and clenching; masseteric hypertrophy; trismus; temporomandibular dysfunctions; coadjuvant in surgical procedures such as arthrocentesis or in Implant Dentistry, favoring the osseointegration period by reducing masticatory forces, avoiding the fracture of prostheses and implants; orofacial and oromandibular dystonia; facial paralysis; sialorrhea. In cases of orofacial pain, the application protocol is the same as for aesthetics. Care should be taken to avoid applications that cause asymmetric, non-aesthetic and artificial results [1-10,13,14].

Considering that the World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity", aesthetics can also be contemplated by this broad concept [15].

Purpose of the Study

The purpose of this article is to present the case of a patient who presented headache, with painful symptoms in the glabellar and frontal region. The patient received applications of botulinum toxin for painful symptomatology, without, however, altering her facial aesthetics, gaining improvement in pain, self-esteem and quality of life.

Case Report

A Caucasian female patient, 59-years-old, presented to the clinic complaining of frontal region headache.

The patient reported attempts at pharmacological treatment with a neurologist, without much long-term success, 3 years ago. Regarding the systemic condition, no alteration was found, although the patient reported stress and anxiety, coinciding with the time of evolution of the symptomatology.

The application of botulinum toxin was recommended to the patient, who reported fear regarding the change in the aesthetic result. The patient was oriented and informed about the possible aesthetic and therapeutic results, suggesting that a minimalist and conservative protocol be performed, with few points of application that actually coincided with the painful symptomatology. The patient agreed to the application and signed the consent form.

The patient reported mild pain in the medial region of the frontalis muscle bilaterally and more intense pain in the glabella region. The patient also indicated a desire to raise her eyebrow, discreetly favoring facial rejuvenation. It is important to emphasize that the neurologist, along with the otorhinolaryngologist, had already eliminated the possibility of painful symptoms due to sinusitis in the glabellar region (frontal and ethmoidal sinuses).

Pre-application photographs were taken to plan the application points. Muscle dynamics was recorded from photographs of the muscles of the mimic at rest (Figure 1), in the frontal (Figure 2) and glabellar (Figure 3) regions. Four points were determined in the glabellar region, one in each corrugator muscle and two points in a vertical line on the procerus muscle, as well as two symmetric points on the frontalis muscle. The patient agreed to the planning. The dermatological anesthetic (Dermomax™, Aché, São Paulo, Brazil) was applied over the points, and remained for 15 minutes (Figure 4). Each point received 2 units of botulinum toxin type A (Botox™, Allergan Pharmaceuticals, Westport, Ireland). The botulinum toxin was diluted according to the guidelines suggested by the manufacturer (1ml of sterile, cooled saline for 100 units).

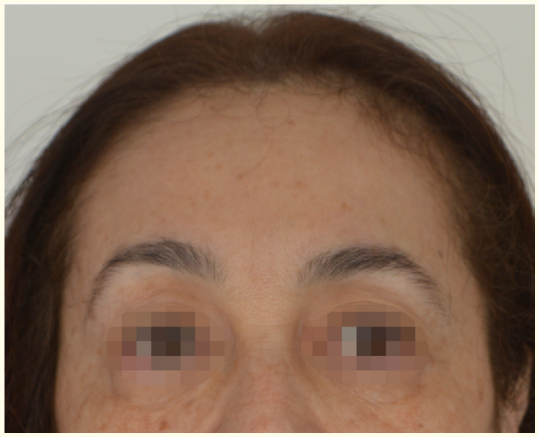

Figure 1: Initial clinical aspects: resting patient.

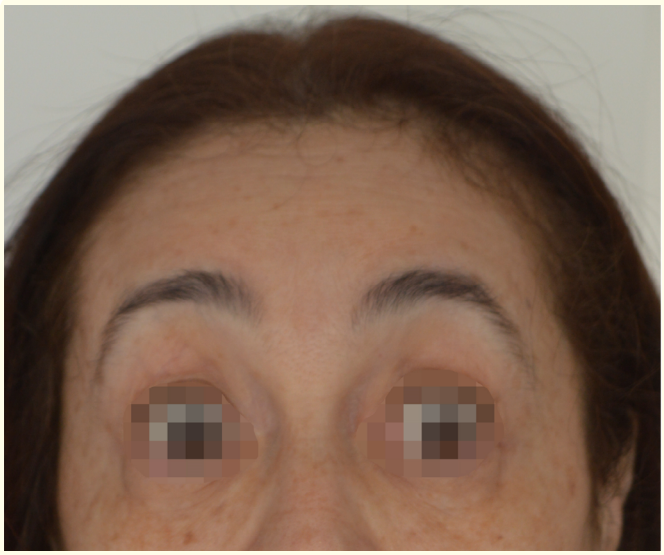

Figure 2: Initial clinical aspects: contraction of the frontalis muscle.

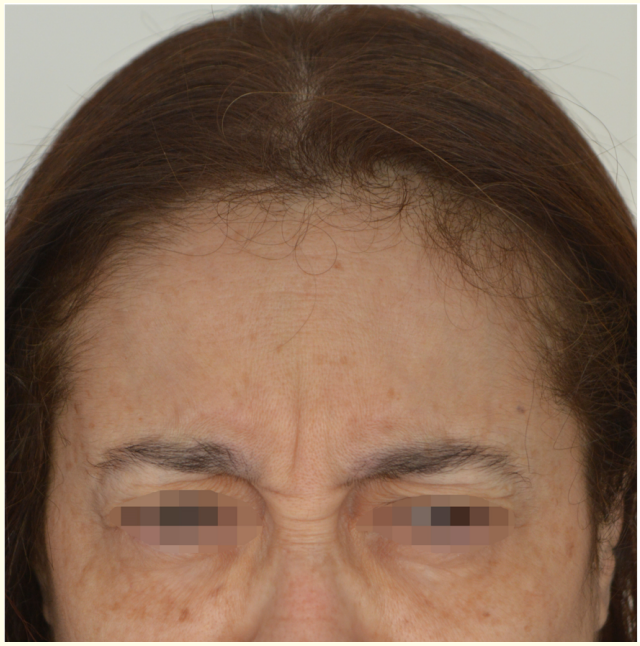

Figure 3 Initial clinical aspects: contraction of the glabellar region (procerus and corrugators muscles).

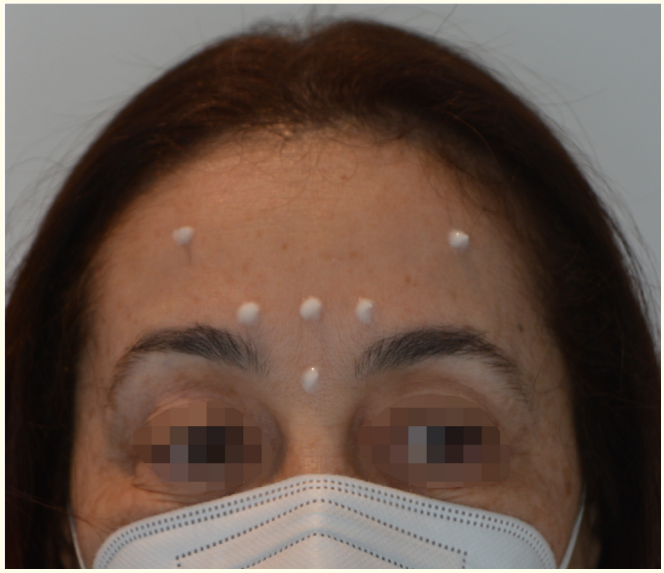

Figure 4: Demarcated points and application of topical dermatological anesthetic.

After 15 days of application, the patient was evaluated. No complaints and/or complications were reported. The patient reported improvement of the painful symptomatology and of the aesthetic condition. Post-application photos were taken, comparing them to the initial ones, at rest (Figure 5), by contraction in the frontal (Figure 6) and glabellar (Figure 7) regions.

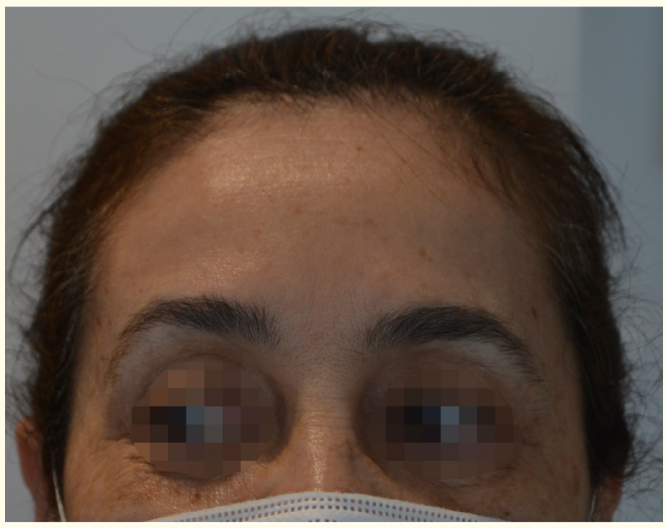

Figure 5: Clinical aspects after application of botulinum toxin: resting patient.

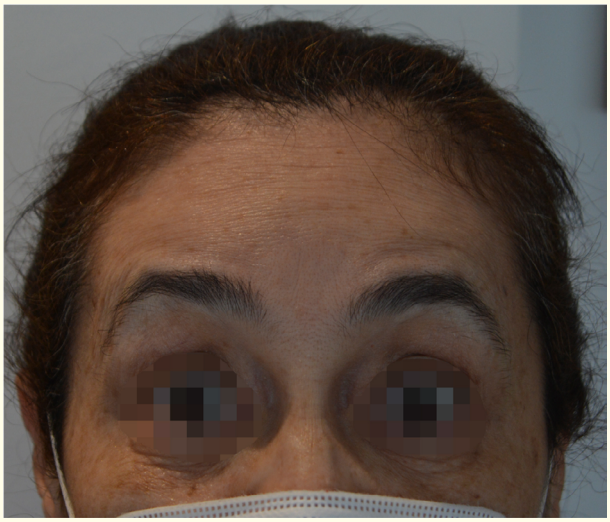

Figure 6: Clinical aspects after application of botulinum toxin: frontalis muscle contraction.

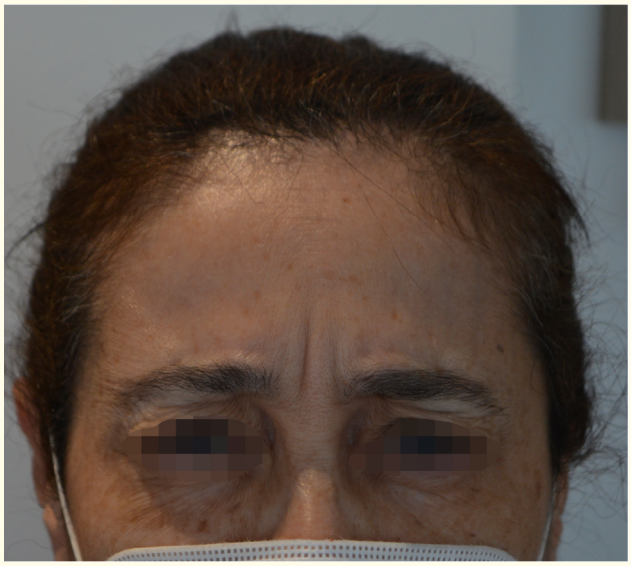

Figure 7: Clinical aspects after the application of botulinum toxin: contraction of the glabellar region (procerus and corrugators muscles).

The patient was oriented as to the duration of the therapeutic and aesthetic effects of botulinum toxin (4 to 6 months), requiring future applications for the containment of the painful symptomatology.

Discussion

Botulinum toxin is a protease synthesized by the Gram-positive anaerobic bacterium *Clostridium botulinum*. Seven distinct serotypes are produced, designated by the letters A, B, C, D, E, F and G. Subtypes A, B and E have therapeutic characteristics, but type A is the most potent and frequently used in the clinic [1,6]. It causes temporary chemical denervation of the musculoskeletal fibers by blocking the release of acetylcholine at the neuromuscular junction between the nerve endings of the alpha and gamma motor neurons, preventing muscle contraction. This muscle weakening is temporary and dose-dependent, with no systemic effects [1].

The maximum visible effect occurs after 14 days of injection, lasting approximately 3 to 6 months, depending on the commercial brand [1-10,13].

Some adverse events such as pain at the injection site, hematomas, infection, edema, eyelid ptosis, and asymmetry may occur. It is important to emphasize that adverse events and complications are technique-dependent and, although the procedure is simple and safe, the dental surgeon should be aware of the dosage, precision of the technique and location of the puncture [1-10,13]. In the present report, no complaints or alterations resulting from the application were reported.

Pregnancy; lactation; hypersensitivity to botulinum toxin, lactose and albumin; muscular and neurodegenerative diseases (myasthenia gravis, Eaton-Lambert syndrome, Charcot disease, and Amyotrophic Lateral Sclerosis); and simultaneous use of aminoglycoside antibiotics are contraindications to the use of botulinum toxin [1-10,13].

It is worth emphasizing the importance of the evaluation of aesthetic medicine based on validated objective experiences, and not only on subjective measures, preferably quantifiable, reproducible, and standardized [11]. In the present report, however, the evaluation of the clinical improvements observed were only visualized by comparing figure 1 and 5 (at rest), 2 and 6 (frontalis muscle), and 3 and 7 (glabellar region), as well as on the subjective response of improvement in pain symptomatology reported by the patient.

Botulinum neuromodulators maintain a strong popularity among practitioners and consumers. Affordability and predictable results may, in part, explain their acceptance [11]. Dayan., *et al*. (2010) [11], using the Facial Line Outcome Questionnaire in the treatment of multiple upper facial rhytids with botulinum toxin type A, observed that patients looked younger and felt better. Significant improvements were observed in social (personal relationships) and household activities, overall life satisfaction, body appearance satisfaction, self-awareness, perceived self-intelligence, self-esteem, appearance, comprehension, weight satisfaction, attractiveness, sense of well-being, appearance-related self-esteem, self-social esteem, and performance-related self-esteem. Additionally, the authors concluded that improving self-esteem can contribute to improved quality of life. Consistently, Jandhyala (2013) [12] reported the significant improvement in quality of life by the application of botulinum toxin type A to frontal rhytids, glabellar and orbicular muscles of the eyes ("crow's feet") in 53 patients (87% female and mean age 39.5 years), employing the Program for individual quality of life assessment (direct scoring tool). Finzi and Wasserman (2006) [16] reported a case series of the treatment of symptoms of depression with the application of botulinum toxin in glabellar rhytids. Recently, involution of oral lichen planus lesions has been demonstrated after application of botulinum toxin to facial aesthetics, improving self-esteem and quality of life [9].

Therefore, it seems plausible that self-impression results in better treatment, which in turn may trigger a biofeedback mechanism, resulting in patients feeling better about themselves. Furthermore, it is possible that higher self-esteem improves self-confidence, resulting in better quality of life. Alternatively, it has been postulated that botulinum toxin acts on a biochemical level, affecting neurotransmitters that are important for mood, although it is unlikely that botulinum toxin crosses the blood-brain barrier [11].

Botulinum toxin has been an excellent constituent of the dental arsenal for the dental surgeon, in the most diverse therapeutic and consequently aesthetic indications - within the professional scope - as can be observed in this report. The applications performed on the frontalis, procerus and corrugator muscles (the latter two constituting the glabella), indicated for orofacial pain were equally and evenly distributed, with the purpose of not promoting facial asymmetries [1]. Besides the aesthetic result secondary to the therapeutic applications to orofacial pain, as can be seen in figure 5 to 7, botulinum toxin applied by the dental surgeon can help in the valorization of dental work, promoting the increase of self-esteem and psychological and social well-being.

Conclusion

The indication of botulinum toxin application in cases of orofacial pain coincides with facial aesthetic results. These indications have been carried out by the dental surgeon and may improve the self-esteem and quality of life of patients, in addition to the expected therapeutic benefits. The change of the aesthetic and functional paradigm can also help in the motivation for dental care. Botulinum toxin has become an excellent therapeutic and aesthetic tool in several dental indications.

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