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The use of botulinum toxin in the treatment of gummy smile: a literature review

The use of botulinum toxin in the treatment of gum smile: a literature review

The use of botulinum toxin in the treatment of the smile of the eyes: a review of the literature

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SUMMARY

This study performs an Integrative Literature Review (ILR). Botulinum toxin type A (TBX-A) is widely used to treat gummy smiles, characterized by excessive gum exposure during smiling. This literature review analyzed the main advantages, disadvantages, and effectiveness of this treatment. TBX-A works by blocking the release of acetylcholine, temporarily inhibiting the contraction of the upper lip elevator muscles, thus reducing gingival exposure. The study reviews articles published between 2015 and 2024, using databases such as PUBMED and GOOGLE SCHOLAR. The methodology included the selection and analysis of 12 articles that met the established criteria. Studies indicate that this technique is minimally invasive, safe, and has a rapid recovery, offering satisfactory aesthetic results for patients seeking a conservative and less painful solution compared to corrective surgeries such as gingivectomies or osteotomies. However, its effects are temporary, lasting three to six months, requiring periodic reapplications to maintain results. Furthermore, it is essential that the practitioner has a thorough understanding of facial anatomy and muscle dynamics to avoid complications and asymmetries. The conclusion is that, although TBX-A is a promising alternative, further studies are needed to assess its limitations, long-term safety, and impact on patients' quality of life.

Keywords: Gummy smile; Gummy smile treatment; Botulinum toxin; Aesthetics.

ABSTRACT

This work presents an Integrative Literature Review (ILR). Botulinum toxin type A (BTX-A) is widely used in the treatment of gummy smile, characterized by excessive gum exposure when smiling. This literature review analyzed the main advantages, disadvantages, and efficacy of this treatment. BTX-A works by blocking the release of acetylcholine, temporarily inhibiting the contraction of the upper lip elevator muscles, thereby reducing gum exposure. The study reviewed articles published between 2015 and 2024, using databases such as PUBMED and GOOGLE SCHOLAR. The methodology included the selection and analysis of 12 articles that met the established criteria. Studies indicate that this technique is minimally invasive, safe, and offers rapid recovery, providing satisfactory aesthetic results for patients seeking a conservative and less painful solution compared to corrective surgeries, such as gingivectomies or osteotomies. However, its effects are temporary, lasting three to six months, requiring periodic reapplications to maintain results. Additionally, it is essential for the professional to have a deep

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understanding of facial anatomy and muscle dynamics to avoid complications and asymmetries.
In conclusion, although BTX-A is a promising alternative, further studies are needed to assess its limitations, long-term safety, and impact on patients' quality of life.
Keywords: Gummy smile; Gummy smile treatment; Botulinum toxin; Aesthetics.

SUMMARY

This work presents an Integrative Literature Review (RIL). Botulinum toxin type A (TBX-A) is widely used in the treatment of gingival sore throat, characterized by excessive exposure of sore spots. This review of the literature analyzed the main advantages, disadvantages and effectiveness of this treatment. TBX-A acts by blocking the release of acetylcholine, temporarily inhibiting the contraction of the upper lip elevator muscles, thus reducing the exposure of them. The study reviewed articles published between 2015 and 2024, using databases such as PUBMED and GOOGLE ACADÉMICO. The methodology included the selection and analysis of 12 articles that met the established criteria. Studies indicate that this technique is minimally invasive, safe and offers rapid recovery, providing satisfactory aesthetic results for patients seeking a conservative and less painful solution compared to corrective surgeries, such as gingivectomies or osteotomies. However, its effects are temporary, lasting three to six months, which requires periodic reapplications to maintain results.

Furthermore, it is essential that the professional has a deep understanding of facial anatomy and muscular dynamics to avoid complications and asymmetries. In conclusion, although TBX-A is a promising alternative, more studies are needed to evaluate its limitations, long-term safety and impact on the quality of life of patients.
Keywords: Gingival smile; Gingival smile treatment; Botulinum toxin; Aesthetics.

1. Introduction

Beauty is understood as subjective, that is, it varies according to each person's perception. person. A beautiful smile is especially important, as it can boost self-esteem, transmitting confidence and personality to those around. In recent years, the search for dental aesthetic treatments have grown significantly, not only by ensuring health adequate oral hygiene, but also by providing full satisfaction and well-being to the patient (Santos, 2016).

Smiling is considered one of the most pleasant and, at the same time, most complex in terms of meaning, being the subject of artistic and philosophical debates throughout time. Anatomically and physiologically, it occurs due to the exposure of teeth and gums during the contraction of muscles located in the middle and lower thirds of the face (Mazzuco; Hexsel, 2010).

According to Câmara (2010), the visibility of the gums during the smiling process depends on the position of the smile line, which is determined by the relationship between the incisors upper lips and the upper lip. In current aesthetic standards, there is a distinction according to the sex: for women, a high smile with up to 3 mm of gingival display is considered acceptable, while for men, the ideal is a medium smile, with the upper lip aligned with the

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gingival margin. With aging, loss of muscle tone reduces the height of the gum line. smile, reducing the exposure of the upper teeth and increasing that of the lower teeth, characterizing the so-called “low smile”.

When the gum is exposed by more than 4 mm in both sexes, the so-called “gummy smile”. The origin of this “problem” is associated with several factors, such as vertical excess of the maxilla, upper dentoalveolar protrusion, extrusion or passive eruption altered anterior upper teeth, and hyperactivity of the lip elevator muscles superior. In most cases, it is a combination of two or more of these factors (Insfran, 2016).

In the studies by Sposito (2009), among non-surgical and minimally invasive treatments, invasive for the gummy smile, the application of botulinum toxin type A stands out, which neutralizes muscle hyperactivity. This substance is a purified protein complex, biological origin, derived from the anaerobic bacterium *Clostridium botulinum.* Under conditions suitable for reproduction, this bacterium produces seven different serotypes of toxin (A, B, C1, D, E, F and G), with serotype A being the most potent and having the longest lasting therapeutic effect.

In this sense, the choice of the theme, the use of botulinum toxin in the treatment of smiles gingival: a literature review, is justified by the interest in understanding how the procedure, what doses are necessary, advantages, disadvantages and duration of effects, through a literature review carried out in academic works.

1.1 General Objective

To report, through a literature review, the use of botulinum toxin in gummy smile treatment.

1.2 Specific Objectives

• Conduct a critical evaluation of existing research on the effects of botulinum toxin in the treatment of gummy smiles, highlighting how the procedures are carried out;
• Highlight the main advantages and disadvantages associated with the use of botulinum toxin in this treatment;
• Describe the number of doses administered during the procedure;
• Report the duration of the effects of botulinum toxin in the cases studied.

2. Methodology

This study is a literature review research with a narrative approach, qualitative, exploratory and integrative. The aim is to deepen the understanding of the topic proposed through the analysis of a set of studies and results, selected with criteria of inclusion and exclusion.

Exploratory research, according to Gil (2002), aims to offer a greater understanding of the problem, with the aim of making it clearer or developing hypotheses. These studies have with the main focus being the improvement of concepts or the discovery of new perceptions.

Qualitative research, according to Medeiros (2012), is characterized by generating discoveries that are not based on methods or forms of quantification. This type of research allows you to explore the symbolic and unique universe of experiences, behaviors, emotions and feelings, in addition to providing an understanding of organizational functioning.

The integrative literature review, according to Soares (2014), involves the elaboration of a comprehensive analysis of existing sources, which favors debates on methods and results of research, in addition to fostering reflections for future investigations. The main objective of this approach is to obtain a detailed understanding of a specific phenomenon, based on if in studies carried out previously.

The methodology of this study will follow a structured process divided into two stages main ones. In the first stage, a comprehensive survey was conducted on online platforms, including PubMED, Google Scholar. The descriptors used for the search were: “Gummy smile,” “gummy smile treatment,” “botulinum toxin,” and “aesthetics.” The choice PubMed's ranking is justified by its specialization in peer-reviewed articles in the health field and biomedical sciences. Google Scholar was selected for its comprehensiveness multidisciplinary and access to diverse academic sources.

Data collection began in February 2025 with access to PUBMED, first using the descriptors mentioned above where they were found 371 articles published in different, however considering the time frame and the object of study 63. When searching in the GOOGLE SCHOLAR database, 784 results were found in different years and languages using the same descriptors.

In the second stage, articles were selected based on specific criteria: studies should be case studies, published between 2015 and 2024, and include the use of botulinum toxin in the treatment. After applying these inclusion criteria to each database, the works

were initially pre-selected based on reading titles and abstracts, systematizing the most recent literature on the subject.

Below are systematized, in table form, the 12 selected articles that will be object of analysis.

Table 1: Summaries of articles selected for this review, 2025.

Title	Authors Year Canevassi, P,	Database
Use of botulinum toxin: case report	M, B, T. et 2019 al., (2019)	Pubmed
Treatment of gummy smile with botulinum toxin type A: case report	Magro, A, K, D, al., (2015) 2015	Google Scholar
Correction of a gummy smile with botulinum toxin type A: Case report	Sousa, R. V, et al., (2024) 2024	Google Scholar
Multidisciplinary treatment of severe gummy smile, through Use of botulinum toxin – clinical case	Bernardes, M. J (2018) 2018	Google Scholar
"Yonsei point" technique for treating gummy smile with botulinum toxin: case report	Netto SCB et al., (2022). 2022	Google Scholar
Treatment of gummy smile with the use of botulinum toxin	Oliveira, S, S, G (2021) 2021	Google Scholar
Treatment of gummy smile of combined etiology: case report	Smaniotto, L, A., et al (2023) 2023	Google Scholar
Multidisciplinary approach to treating node gummy smile: clinical case report	Oliveira, L, S. (2023) 2023	Pubmed
Etiologies of gummy smile: a clinical case report	Oliveira, D, F., et al (2020) 2020	Pubmed
Gummy smile correction with application of botulinum toxin type a: clinical case report.	Rossi, F, A, D., et al (2023) 2023	Pubmed
Application of botulinum toxin type A in gummy smile: case report	Moreira, David Costa (2019). 2019	Google Scholar
Successful treatment of severe gummy smile using gingivectomy and botulinum toxin injection: case report case	Mostafa, D. (2018) 2018	Pubmed

Source: prepared by the authors (2025)

3. Results and Discussions

The articles were gathered and analyzed according to their main characteristics, in Table 2.

Table 2. Individual variations of the articles selected for this review (2025).

Author/Year	Title	Dose	Location	Age 20	Sex	Duration
Canevassi, P, M, B, T. et al., (2019)	Use of botulinum toxin: case report	3U were used to obtain uniform dehiscence of the upper lip	The toxin was injected bilaterally into the muscles of the ala of the nose and the muscles	years	Female 6 months	

		.	lip depressors			
Magro, A, K, D, al., (2015)	Gummy smile toxin treatment with botulinum type A: case report	10U bilateral (total of 20U)	Nasolabial fold, next to the nostril	20 years	Female 6 months	
Sousa, R. V, et al., (2024)	Correction of a gummy smile with botulinum toxin type A: Case report	4 Units International (UI)	Elevator labii superioris muscles	25 years	Male 6 months	
Bernardes, M. J (2018)	Multidisciplinary treatment of severe gummy smile, through Use of botulinum toxin – clinical case	TB-A of 7.5 U Muscle levator labii	superioris and alae nasi, m. levator labii superioris) and 5U in the region of the nasal spine (m. depressor septum nasi	19 years	Female 4 months	
Netto SCB et al., (2022).	"Yonsei" technique point" for the treatment of gummy smile with botulinum toxin: case with report	10U of toxin in 0.10 ml.	Edge from the wing of the nose, with a horizontal line, above the corner of the mouth.	32 years	Female 6 months	
Oliveira, S, S, G (2021)	Treatment of gummy smile with the use of botulinum toxin	300 U was reconstituted in 2 ml of sterile 0.9% saline solution	Next to the wing of the nose and on the nasal septum	54 years	Female 6 months	
Smaniotto, L, A., et al (2023)	Treatment of gummy smile of combined etiology: case report	1U of botulinum toxin type A in each demarcated point	Nasolabial fold	23 years	Male 4 months	
Oliveira, L, S. (2023)	Multidisciplinary approach to treatment gummy smile: clinical case report	2 international units (IU) of botulinum toxin	Nasolabial fold region, aiming to reduce the activity of the levator labii superioris muscle	19 years	Not specified of	10 months
Oliveira, D, F., et al (2022)	Etiologies of gummy smile: a clinical case report	7.5 U TB-A Upper lip		26 years	Female 4 months	
Rossi, F, A, D., et al (2023)	Gummy smile correction with application of botulinum toxin type a: clinical case report.	Botulinum toxin 100U	Elevator labii superioris muscle on the right side of the face and the another in the levator labii superioris muscle on the left side of the face	26 years	Female 3 to 6	months.

Moreira, David Costa (2019).	Application of botulinum toxin type A in gummy smile: case report	2.5 units of botulinum toxin type A.	Levator labii superioris alae nasi muscle, near each nostril	22 years	Female 4 months.	
Mostafa, D. (2018)	Successful treatment of gummy smile using gingivectomy and severe botulinum toxin injection: a case report	20 units of botulinum toxin.	Upper lip	24 years	Female 6 months.	

The case report presented by Magro et al, (2015) deals with the treatment of smile gingival with botulinum toxin type A, addressing its etiology, diagnosis and intervention minimally invasive. Based on Pascotto and Moreira (2005), it defines the gummy smile such as excessive gum exposure when smiling. The theoretical review considers dental factors, gingival, bone, and muscle as causes. Botulinum toxin acts by inhibiting the contraction of lip elevator muscles, reducing gingival exposure (Hwang et al., 2009). The report case study demonstrates the effectiveness of the procedure, providing a more harmonious smile.

Meanwhile, the work of Smaniotto, et al (2023) refers to the aesthetics of the smile influences self-esteem and socialization, making excessive gingival exposure a common aesthetic concern. Gummy smile is defined as the exposure of more than three mm of the gum when smiling, its causes can be isolated or combined, requiring approaches specific. This report presents a case of mixed etiology, involving vertical excess of maxilla, lip hypermobility, and altered passive eruption. Treatment combined toxin botulinum type A and clinical crown lengthening, ensuring a less invasive and effective result. An accurate diagnosis guides the best therapeutic choice, restoring harmony to your smile.

Excessive gingival display, or gummy smile, is an aesthetic challenge treated according to its etiology. This study by Oliveira, et al (2002) reports the case of a patient with 23-year-old patient with dissatisfaction due to short clinical crowns and gingival exposure. The diagnosis indicated altered passive eruption, type IB and lip hypermobility, being indicated gingivectomy with osteotomy. The immediate postoperative period showed significant improvement, and after six months, the patient had a more harmonious smile. This study confirms the results of other studies that prove the efficiency and safety of using Botulinum Toxin (Mangano, Mangano, 2012; Matos et al., 2017; Mostafa, 2018). The study

reinforces the importance of an accurate diagnosis for effective treatment, highlighting the need for further research on the relationship between etiological factors and gingival exposure.

There is an emphasis on innovative approaches, as highlighted in the work of Sousa et al., (2024), a gummy smile can have multiple causes, such as altered passive eruption, excess vertical jaw and hyperactivity of the upper lip muscles. The study reinforces that several therapeutic approaches can be used for its correction, including surgeries and techniques minimally invasive. Botulinum toxin type A (TBX-A) emerges as an alternative innovative, safe and conservative for cases such as the one presented in this study. This investigation reports two clinical cases treated with 4 IU of TBX-A bilaterally, with reevaluation after 15 days, one male patient and one female patient. The results have been shown to be effective involves relatively simple procedures in compared to other techniques. Its results are satisfactory and safe.

Despite the psychological and aesthetic impact, Rossi et al., (2023) presents elements important as facial and smile aesthetics are closely related to well-being physical and emotional, the study that reports the case of a 26-year-old female patient, complaining of excessive gingival exposure when smiling treated with this approach, resulting in a more harmonious smile and improved self-esteem. The technique presents advantages such as less complexity, low cost and quick recovery, however, a accurate diagnosis and adequate planning are essential for successful treatment, when the origin is muscular, which is the case of the patient, botulinum toxin type A appears as an effective and minimally invasive option given that the smile plays a relevant role in the patient's facial harmony, consequently, directly impacts self-esteem and quality of life (Araújo et al., 2018).

There is an advance in the discussion on modern techniques, for Netto et al., (2022) problematizes a current technique and Yonsei Point was used to treat a smile case gingival in a patient with 6 mm of gingival exposure when smiling. Botulinum toxin type The (TBA) was applied to a single point on each side of the face, located at the convergence of the levator labii superioris muscles. Garber and Salama (1996) suggested that the relationships among the three primary components that determine the aesthetic appearance of a smile: teeth, lip structure, and gingival structure. Monitoring included records photographs and measurements before and after 15 days of application. A reduction in gingival exposure to 3 mm, providing a more harmonious smile, the method has been shown to be safe, minimally invasive, effective and easy to replicate, ensuring a satisfactory and reversible aesthetic treatment.

Studies are progressing on conservative and personalized solutions, in which Moreira (2019) mentions that a gummy smile affects patients' self-esteem and may have causes multifactorial, such as vertical growth of the maxilla and excessive lip contraction. The toxin Botulinum type A appears as an effective therapeutic alternative and can be used alone or in conjunction with other treatments. This study presents the case of a 22-year-old patient who opted for the application of the toxin to reduce gingival exposure excessive, the procedure has proven to be safe, quick and minimally invasive, offering a conservative solution compared to surgery. In addition to improving the aesthetics of the smile, treatment contributed to the patient's well-being and self-esteem.

It is also possible to perceive the analysis of multifactorial factors brought by Bernardes (2018) highlights in his research that the smile plays a central role in facial aesthetics, requiring harmony between teeth, gums and lips. Excessive gum exposure affects negatively impacts this aesthetic and is related to the anatomy and function of the labial muscles. This clinical case describes a 19-year-old patient with a gummy smile caused by growth excessive maxillary bone, delayed passive eruption, and lip hypermobility. Treatment included partially reduced gingival exposure, for fine adjustment, botulinum toxin was applied type A (TB-A) at strategic points, such as the levator labii superioris and alaecusis muscles. nose, m. levator labii superioris and 5U in the region of the nasal spine, in the depressor muscle of the nasal septum, resulting in a more harmonious smile, TB-A proved to be an alternative safe, effective and well accepted by patients for aesthetic correction of gummy smiles.

Furthermore, the long-term results in Oliveira's studies are problematized. (2023), mentions that the gummy smile, characterized by excessive exposure of gums during smiling, affects approximately 7% of men and 14% of women, being a common complaint in dental offices, causes include vertical growth of the maxilla, short upper lips, and excess gingival tissue. This case report describes the treatment multidisciplinary approach of a 19-year-old patient with 4mm of gum exposure. It was performed application of botulinum toxin to reduce the activity of the levator muscle during exercises superior. After 15 days, external gingival exposure was reduced to 1 mm, resulting in high satisfaction of the patient. After 10 months, the result was maintained, requiring only reapplication of the toxin, combination of procedures demonstrated to be effective and aesthetically satisfactory.

The clinical applications and practical considerations, which are addressed by Oliveira (2021) reports the treatment of a 54-year-old patient with 4 mm of gingival exposure, who underwent the application of botulinum toxin type A. This treatment is considered an option less invasive, quick and well tolerated, resulting in an aesthetically pleasing smile. In

However, the correction is temporary, requiring reapplications. Botulinum toxin offers a safe and painless alternative to improve the aesthetics of the smile, promoting customer satisfaction patient with harmonious results. The treatment of gummy smile with the application of Botulinum toxin type A has the advantage of a good cost-benefit ratio, with visible results in just a few days, with minimal tissue invasion, simplicity of technique and reversibility (Canduro Neto, 2015).

And the relationship of facial harmony brought by Mostafa (2018) presents the case report presents a 24-year-old patient with severe SG of 11-12 mm, treated with gingivectomy and Botox injections. The treatment was effective in significantly improving aesthetics, avoiding surgery. For extensive lesions, botulinum toxin is a minimally invasive, fast, and affordable option for correcting SG, increasing patient satisfaction. The experience and knowledge of facial anatomy when administering the toxin. The safe approach involves low initial doses, with subsequent touch-ups as needed, the predominance of the gummy smile in females is explained by the fact that male individuals have a lower smile line in comparison to females (Pedron, 2018).

And finally, Canevassi (2019) illustrates the use of botulinum toxin in facial harmonization, focusing on the nasal wrinkles and platysma. The toxin acts by blocking the release of acetylcholine, causing muscle relaxation and reducing dynamic wrinkles. The results showed high patient satisfaction and average durability of 180 days, however, static wrinkles require prior treatment, facial analysis is essential before application to avoid complications, the study reinforces botulinum toxin as an effective and minimally invasive aesthetic solution. As to the facial contour, relaxing it can improve the definition of the jaw, enhancing facial aesthetics. The toxin also relieves muscle tension, promoting a feeling of lightness in the neck, and the resulting aesthetic gain and well-being can increase self-esteem and satisfaction with the image itself (Gouveia, 2021).

Final considerations

From the review carried out, it is concluded that botulinum toxin type A (TBX-A) is stands out as an effective, safe and minimally invasive alternative for the treatment of gummy smile. Its application acts directly on inhibiting muscle contraction upper lip lifts, reducing gingival exposure and promoting facial aesthetics more harmonious. This procedure is especially advantageous for patients seeking fast results, with low invasiveness and accelerated recovery. TBX-A is widely

used to treat cases of upper lip muscle hyperactivity, one of the main causes of a gummy smile, being able to provide visible results in just a few days.

Several studies analyzed in this review demonstrate that the technique offers benefits significant, such as less complexity of the procedure, quick recovery and cost reduced compared to more invasive surgical interventions such as gingivectomy or maxillary osteotomy. Furthermore, the reversibility of the toxin's effects is seen as a advantage for patients seeking an aesthetic solution without compromising functionality long-term muscle gain. However, the duration of the effects is temporary, ranging from three to six months, which may require reapplications to maintain the desired result.

Another important point highlighted in the literature is the need for a diagnosis precise and detailed, which considers not only muscular aspects, but also factors anatomical and skeletal factors that may influence gingival display. In some cases, the association with other procedures, such as surgical correction or the use of laminates ceramics, may be necessary to achieve more permanent and aesthetically pleasing results. satisfactory.

Furthermore, the technique requires specific knowledge of facial anatomy and muscle dynamics to ensure precision in application and avoid possible complications, such as asymmetries and changes in lip mobility. Professionals who perform this procedure must be well trained to correctly assess the etiology of the smile gingival and define the ideal amount of toxin to be administered, considering the individual characteristics of each patient.

Finally, the review highlights the importance of further studies that explore the variables that influence the duration of results and patient satisfaction, promoting a more comprehensive understanding of the benefits and limitations of TBX-A in the context of facial harmonization. Furthermore, future research should investigate the psychological impact of this treatment, considering the crucial role that smile aesthetics plays in self-esteem and quality of life of patients.

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