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# Conservative treatment approach with botulinum toxin for cases of asymptomatic hypertrophy of the masseter muscle

# Abordagem de tratamento conservador com toxina botulínica para casos de hipertrofia assintomática do músculo masseter

# Enfoque de tratamiento conservador con toxina botulínica para casos de hipertrofia asintomática del músculo masetero

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**Abstract**

Commonly related to parafunctional habits, Masseteric Hypertrophy represents an asymptomatic increase of the lower third of the face. Without gender preference, it has been shown to be prevalent in the second and third decades of life. As an alternative to surgical treatment, the use of Botulinum Toxin A has been increasingly effective in desired clinical results, such as reduced muscle thickness. This study aims to report the case of application of Botulinum Toxin A in an asymptomatic patient who presented bilateral hypertrophy of the masseter muscle, with 120 days follow-up of application where we observed improvement in facial aesthetics due to the reduction in volume of the muscles.

**Keywords:** Botulinum toxins, Type A; Hypertrophy; Masseter muscle.

**Resumo**

Comumente relacionada a hábitos parafuncionais, a Hipertrofia Massetérica representa um aumento assintomático do terço inferior da face. Sem preferência por gênero, tem se mostrado prevalente na segunda e terceira décadas de vida. Como alternativa ao tratamento cirúrgico, o uso da Toxina Botulínica A tem se mostrado cada vez mais eficaz nos resultados clínicos desejados, como a redução da espessura muscular. Este estudo tem como objetivo relatar o caso de aplicação de Toxina Botulínica A em paciente assintomático que apresentava hipertrofia bilateral do músculo masseter, com seguimento de 120 dias de aplicação onde observamos melhora da estética facial devido à redução do volume do músculo masseter.

**Palavras-chave:** Toxinas botulínicas Tipo A; Hipertrofia; Músculo masséter.

**Resumen**

Comúnmente relacionada con los hábitos parafuncionales, la hipertrofia maseterica representa un agrandamiento asintomático del tercio inferior de la cara. Sin preferencia de género, se ha demostrado que prevalece en la segunda y tercera décadas de la vida. Como alternativa al tratamiento quirúrgico, el uso de la toxina botulínica A ha sido cada vez más eficaz en los resultados clínicos deseados, como la reducción del grosor muscular. Este estudio tiene como objetivo reportar el caso de aplicación de Toxina Botulínica A en un paciente asintomático que presentó hipertrofia bilateral del músculo masetero, con 120 días de seguimiento de la aplicación donde se observó mejoría en la estética facial por reducción de volumen del músculo masetero.

**Palabras clave:** Toxinas botulínicas, Tipo A; Hipertrofia; Músculo masetero.

## 1. Introduction

Masseteric Hypertrophy (MH) is recognized as asymptomatic enlargement of the lower portion of the face (Mandel & Tharakan, 1999; Pereira Junior, et al., 2009; Shetty, et al., 2012). The highest incidence for this condition is in the second and third decades of life, affecting the masseter muscle bilaterally more often (Mandel & Tharakan, 1999; Shetty, et al., 2012), with no sex preference (Shetty, et al., 2012), commonly related with parafunctional habits (Kim, et al, 2003). As a result of this volumetric increase, a greater prominence of the mandibular angle is observed, becoming an undesirable aesthetic complaint by the patient (Shetty, et al., 2012).

Although MH is an uncommon condition of uncertain etiology (Fedorowicz, et al., 2013) some factors such as malocclusion, bruxism, and temporomandibular dysfunction have been cited as congenital or functional causal factors (Kim, et al, 2003; Shetty, et al., 2012;). Besides the importance of the masseter muscle in a facial aesthetics, its hypertrophy alters facial lines, causing discomfort and a negative cosmetic impact in most patients due to the prominence of the mandibular angle (Shetty, et al., 2012; Vasileva, 2018). The MH diagnosis can be made through clinical examination, imaging exams and muscle palpation, where its prominence is observed when the patient performs contraction during oral closure (Shetty, et al., 2012). The differential diagnosis includes parotid tumor, lipoma, benign or malignant muscle tumors, and vascular tumors (Baş, et al., 2010; Shetty, et al., 2012).

Surgical interventions or conservative therapies may be performed to MH treatment. Complications from surgical partial excision of the masseter muscle associated or not with mandibular angle osteotomy under general anesthesia such as hematoma formation, facial nerve paralysis, infection e mouth opening limitation (Baş, et al., 2010; Ham, 2009; Shetty, et al., 2012) raised the need to search for less invasive modalities. The benefits of injection into the masseter muscle with Botulinum Toxin type A (BTA) consists in his capacity to binds in the presynaptic cholinergic nerve terminals and inhibits acetylcholine release, causing paralysis and subsequent functional muscle atrophy (Al-Muharraqi, et al., 2009; Know, et al., 2009). The aim of this work is to report the treatment of asymptomatic masseteric hypertrophy with the use of the neurotoxin BTA with clinical follow-up of one year, where a reduction in muscle volume was observed.

## 2. Methodology

This is a described, retrospective and qualitative study done by direct observation, with special interest due to the few reports in the literature on the application of botulinum toxin for the treatment of muscle hyperfunction of the masseter muscle (Pereira et al., 2018). The data were collected through access to the medical record, through the consent signed by the patient by a free and informed consent term for scientific dissemination.

## 3. Case report

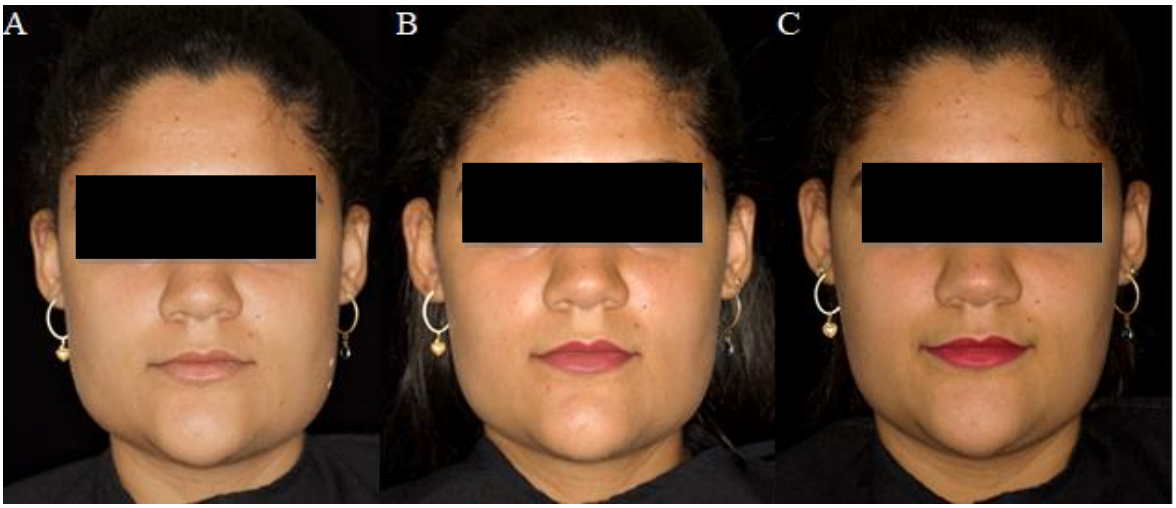
A 25-year-old female patient sought dental care in a private clinic complaining of asymptomatic volumetric increase in both sides of the mandible, associated with aesthetic damage. No pain or other symptoms of temporomandibular disorder were related.

On clinical examination, hypertrophy of the masseter and temporal muscles was observed bilaterally (Figure 1A), without intraoral and radiographic changes. The diagnosis of Masseteric Hypertrophy was then established.

It was elaborated as a treatment plan the application of 40 units of Botulinum Toxin type A (BTA) in each masseter muscle (right and left), and 5 units in the main belly of the temporal muscle, bilaterally. After application, a seven-day follow-up was performed where the patient evolved without complaints related to the procedure, and no signs of infection.

Reassessment after 30 (Figure 1B) and 120 (Figure 1C) days was realized. The clinical findings demonstrated satisfactory masseter muscle atrophy bilaterally after application of BTA, with report of improvement of facial aesthetics by the patient.

**Figura 1.** (A) Initial front photo of patient with Masseteric Hypertrophy. Follow up of 30 (B) and 120 (C) days after application of Botulinum Toxin type A in masseteric and temporalis muscles bilaterally.




Source: Authors.

## 4. Discussion

Masseter muscle hypertrophy is defined as the overgrowth of the muscle mass medially to laterally (Ahn & Kim, 2007; Pereira Junior, et al., 2009). Although physical examination and clinical history are sufficient for the diagnosis of muscle hypertrophy, complementary imaging exams, as x-ray and computed tomography, are used in the differential diagnosis with other pathologies and in establishing the best clinical management (Pereira Junior, et al., 2009).

The Botulinum Toxin Type A (BTA) is composed of a heavy chain that irreversibly binds to pre-synaptic neurons at the neuromuscular junction, thereby inhibiting neurotransmitter release and causing paralysis in the target muscle (Al-Muharraqi, et al., 2009). The clinics effects are visualized after seven days of administration, where its application induces significant changes in muscle fibre composition reducing muscle strength, generating atrophy as a consequence (Vasileva, 2018; Gart & Gutowski, 2016; Gedrange, et al., 2013). It should be diluted in preservative-free saline, and injected immediately into the visually located portions of the largest muscle volume, previously detected by palpation when the patient is in dental maximal intercuspation (Pereira Junior et al., 2009). Applications have shown a good clinical response, where muscle changes (atrophy and weakening) began between two and eight weeks (Kim, et al., 2003) and maximum effect observed at three

months, with product stability up to one year after injection (Pereira Junior, et al., 2009) due to twinning of new axon shoots and neuromuscular joints (To, et al., 2001).

The BTA disadvantage is its short-lived, being reported from 2 to 6 months by Vasileva (2018) to 18 months by To et al. (2001). This variation depends on several factors such as dose, concentration, technique employed, patient's immune response, among others (Gart & Gutowski, 2016). The toxin is also used extensively to address cosmetic concerns, primarily for the rejuvenation of the upper and lower face. Adverse clinical effects such as decreased chewing strength, dysgeusia and change in lower facial contour are also reported (Kim, et al., 2003).

In the follow up of 30 days of application, we observed a reduction of both masseter muscles, with similar results found in same period of time in the Jae-Hong Kim et al. (2007) study. At 8 cases study of MH reduction with BTA injection, Lee et al. (2016) after 25 weeks of ultrasound aid application observed reduction in chewing strength and at rest, with peak effectiveness at 11 weeks. At comparative tomographic analysis before and after BTA application, Kim et al. (2003) observed in a sample group of 11 patients a decrease in masseter volume after 12 weeks. In addition to these benefits, after 120 days we noticed an important improvement in the aesthetic complaint reported at the beginning of the treatment by the patient, achieving at the end of the treatment the achievement of all primary objectives and elimination of previous complaints.

Despite the low risk of the procedure and predictability, the effect of this toxin is transient, leading to the possible need for new application for long-term maintenance of muscle atrophy (Baş, et al., 2010). The possible complications of this procedure are damage to the mandibular branch of the facial nerve, change in bite force, speech disturbance, muscle pain, facial asymmetry (Baş, et al., 2010). However, the benefits such as easy application without the need for hospitalization outweigh the risks and disadvantages, making this modality of treatment for Masseter Hypertrophy very advantageous for the patient.

## 5. Final considerations

The use of botulinum toxin type A proved to be efficient in the treatment of masseteric hypertrophy, where it was visualized after 120 days the volumetric reduction of the muscles bilaterally and improvement of the facial aesthetics of the lower third of the face. We emphasize the need for multicenter studies with a longer follow-up time for long-term evaluation of the benefits of this technique.

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