Unilateral masseter muscle hypertrophy: A case report

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Masseteric hypertrophy is a benign increase in the size of the masseter muscle, secondary to muscle hypertrophy. It produces facial asymmetry and is important in the differential diagnosis of other entities. The aim of this article is to report a case of unilateral masseteric muscle hypertrophy. The characteristics and diagnostic features of such alterations and options for treatment will be presented. (Quintessence Int 2002;33:776-779)

Key words: asymmetry, hypertrophy, masseter muscle

Masseteric hypertrophy is a benign increase in the size of the masseter muscle that may affect one or both sides of the face. This relatively rare alteration often affects young people. Although the etiology is controversial, it has been associated with genetic predisposition, bruxism, clenching, temporomandibular disorders (TMD), and psychological reactions. Zachariades et al1 speculated that a vascular lesion may gradually subside to a residual muscular hypertrophy. They reported two cases in which this occurred.

Sensitivity has been reported, but the change in appearance is the most frequent complaint of patients with masseteric hypertrophy. The panoramic radiograph is the most practical examination to complement the clinical diagnosis. When the physical examination suggests masseteric hypertrophy, an increased angle of the jaw region may be observed.2,3 The secondary enlargement of the mandibular angle is a result of the functional remodeling that occurs at the muscle insertion sites.4

Computed tomography (CT), magnetic resonance imaging (MRI), and sonography also have been used to evaluate masses in the buccomasseteric region.5,6 Because of their high resolution and good delineation, CT and MRI are useful in demonstrating the extent and location of buccomasseteric masses. Yonetsu et al7 reviewed the diagnostic images of pathologic conditions in this area. In their series of 66 cases, there were 60 benign lesions; of these 28 were myopathies. The most common pathologic changes of the buccomasseteric region were masseteric hypertrophy (22), which was followed by atrophy of the masseter muscle (6). Although the images obtained from those examination modalities are important to establish the diagnosis, clinical correlation is essential.

The treatment of masseteric hypertrophy ranges from conservative to invasive therapies. Occlusal adjustment, relation therapy, spasmolytics, tranquilizers, and antidepressant therapy are some examples of conservative treatment. In some cases, mainly when stress is involved, psychological followup may be required in association with other treatment.

However, conservative therapy is often not effective. Smyth7 and Moore and Wood8 suggested an alternative therapy using the intramuscular injection of botulinum toxin type A. When applied in small doses, the toxin will decrease muscle activity. These injections produce localized paralysis by blocking the release of acetylcholine at the neuromuscular junction without producing undesirable systemic effects.

Capra et al9 evaluated the effects of intramuscular injections of botulinum toxin type A on the ultrastructural changes in the masseter muscle in monkeys to provide a better understanding of the morphologic response of this tissue to such treatment. Despite the major changes in masseter muscle fibers after botulinum injections, the
neuromuscular junctions seemed to maintain their structural integrity. Moreover, the effect in the masseter muscle may ultimately be completely reversible.

Studying five patients, To et al used ultrasound and electromyography to prospectively evaluate the effect of botulinum toxin A on masseteric muscle hypertrophy. All five patients (nine hypertrophied muscles) showed a good response; the maximal effect of a 31% reduction in muscle bulk was observed 3 months after treatment. One year after injection, the effect remained stable for six of the hypertrophied muscles. Three muscles required a second injection to maintain the reduction.

A more radical approach to treating masseter hypertrophy consists of partial muscle resection, usually in the lower portion. The surgical access can take either an intraoral or an extraoral approach. Some authors have recommended the concomitant resection or reduction of the mandibular angle when it is prominent. Nishida and Iizuka described an intraoral method for removal of the enlarged mandibular angle associated with masseteric hypertrophy. The disadvantages of surgical reduction include the risks of general anesthesia, postoperative hemorrhage, edema, hematoma, infection, scarring, and facial nerve damage.

Microscopic examination of the removed muscle tissue usually shows normal muscle fibers without changes in length, thickness, or nuclear structure. Zachariades et al reported two cases in which phleboliths were associated with masseteric hypertrophy. Despite the benign aspect of masseteric hypertrophy, attention must be paid to other conditions that can produce facial swelling. Parotid inflammation, cysts, benign neoplasms such as hemangioma or lipoma, and malignant diseases must be considered in the differential diagnosis.

**CASE REPORT**

A 16-year-old white boy was referred to the Oral Diagnosis Clinic of Sacred Heart University with a chief complaint of progressive swelling of the right lower side of the face (Figs 1a and 1b). His grandmother reported that this swelling had become increasingly prominent since his infancy (Figs 2a to 2c). The patient revealed that the region was intermittently painful to the touch, i.e., occurring some days but absent for as long as 3 to 4 months. The familial medical history included the existence of allergy (grandmother) and diabetes (grandfather).

Clinical examination did not reveal any abnormality of the lips, tongue, floor of the mouth, soft palate, hard palate, throat, alveolar mucosa, gingiva, occlusion, or temporomandibular joint. The patient had no history of trauma, paresthesia, xerostomia, trismus, dysphagia, or any difficulty in mastication. There was no pain on palpation, and no thrills or bruits were noted. Bimanual palpation during the muscle contraction revealed a relationship between the volumetric increase in the lower right side and the masseteric muscle. There was no restriction of mouth opening and no associated lymph node enlargement. The differential diagnosis included alteration of the parotid gland. However, glandular salivation appeared normal, and no masses were detected on palpation.

In the panoramic and posteroanterior radiographs, no significant alteration was observed. The CT examination did not reveal any abnormality either (Fig 3).
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**DISCUSSION**

Masseteric hypertrophy is an uncommon muscular alteration in which the chief complaint is related to esthetics. Some authors suggest that the use of the term *hypertrophy* in this condition may be misleading, because the enlargement of the muscle is caused by an
Meaningful emphasis must be given to the differential diagnosis, because several malignancies can produce similar clinical features. In masseteric hypertrophy, a uniform mass that is characteristically of long duration is noted. Additionally, further inspection demonstrates that, when the patient forcibly bites, local muscle contraction is felt in the area of the swelling. Another characteristic of masseteric muscle alteration is that visual examination and palpation reveal a more uniform swelling that is different from the irregular and nodular growth that characterizes other benign and malignant neoplasms. Yonetsu et al. discussed the characteristic images of many pathologic conditions of the buccomasseteric region, emphasizing the differential diagnosis. The final diagnosis should be based on the clinical features, medical history, and findings of imaging modalities.

After diagnosis of masseter muscle hypertrophy, patients are encouraged to diminish their excitability levels, thereby decreasing muscle tension. Although the patient in this case complained of swelling, the chief concern of his grandmother was that the swelling could be a malignant tumor. The esthetic factor was not as important to them. Therefore, conservative therapy was chosen because of the small enlargement of the masseter muscle. Moreover, it was also desirable to allow the continuation of facial growth, through which the asymmetry can be naturally minimized.

Another conservative treatment is the use of local injections of neurotoxin made of anaerobic organisms (Clostridium botulinum), but more clinical and scientific evaluation of this method is needed. In addition, the action of this therapy may be temporary. The possible reasons for this temporary response are that new neuromuscular synapses can be resynthesized over a period of a few months and antibodies may develop because of the repeated injections.

Early diagnosis of masseteric hypertrophy is important so that the patient and parents can be informed about the likely development of facial asymmetry. Careful followup is required because this condition can be recurrent.

CONCLUSION

The professional must be prepared to recognize masseteric muscle hypertrophy, which is the most frequent condition that occurs in the buccomasseteric region. The main features are facial swelling, muscle contraction when the patient occludes, normal glandular function, and absence of pain. The condition should be confirmed with imaging modalities. The correct treatment is still debatable, but the first choice should be conservative therapy. Diagnostic mistakes could lead to more aggressive and unwarranted therapy.

REFERENCES