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# Benign Unilateral Masseteric Hypertrophy: A Rare Case Report

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**Abstract**
Masseter muscle hypertrophy also known as Benign Masseteric hypertrophy (BMH) or Idiopathic Masseteric Muscle Hypertrophy (IMMH) is a rare condition of unknown cause and can occur unilaterally or bilaterally. Pain may be a symptom, but most frequently patient approaches to the clinician for cosmetic reasons. In majority of the cases the etiological factor is unknown therefore it is considered to be idiopathic. It is most commonly bilateral and rarely unilateral in occurrence. The purpose of this article is to report a case of acquired idiopathic unilateral masseter hypertrophy in a 23 year old female, diagnosed using a detailed history, intra oral, extra oral examination and imaging modalities and was surgically treated by debulking of masseter muscle and mandible ramus osteotomy.

**Keywords:** masseter hypertrophy, unilateral, idiopathic, imaging, debulking

## Introduction
The masseter hypertrophy has been attributed to muscle hyperactivity and parafunctions originated from stressful lifestyle that causes bruxism or clenching. The term idiopathic masseter hypertrophy (IMMH) is used whenever a specific etiology is not evident. Idiopathic masseter muscle hypertrophy (IMMH) was first described by Legg in 1880, reporting on the case of a 10-year-old girl with concurrent idiopathic temporalis muscle hypertrophy [1, 2]. The highest incidence for this condition is in the second and third decades of life with no gender predilection [2, 3]. Pain may be a symptom, but most frequently a clinician is consulted for cosmetic reasons. In some cases, prominent exostosis at the angle of the mandible is noted.

Masseter is a thick quadrate essential muscle for mastication which arises from the zygomatic arch and inserts into the inferior lateral aspect and angle area of the mandibular ramus, and plays an important role in facial esthetics. A hypertrophied masseter will alter facial lines, generate discomfort and produce negative cosmetic impacts for many patients [4, 5, 6].

Responsible features for acquired masseteric hypertrophy [7]:

- Increased muscle function
- Bruxism
- Habitual overuse of masseter during mastication
- Anabolic steroids.

A congenital variety also exists, but acquired masseter hypertrophy is more common. It can occur as either unilateral or bilateral. Unilateral occurrence is very rare and can be seen when patients chew or clench primarily on one side.

In older age groups with dental deterioration, there is an inability to fully activate the masseters and any pre-existing masseter hypertrophy tends to recede. Anatomically most of the masseteric thickness is along the inferior portion of the mandibular ramus, where the facial contour normally tapers. With Masseter hypertrophy, the patient's face takes on a characteristic rectangular configuration. The accurate diagnosis is more difficult in unilateral cases.

Differential diagnosis requires clinical history and physical examination and may even include imaging resources to exclude other lesions. Differential diagnosis must include muscle tumors, salivary gland diseases, and intrinsic masseter muscle myopathy. Treatment can be conservative (using tranquilizers, mouthguards to minimize teeth clenching, psychological counseling etc.) or surgical (intraoral and extraoral approaches) [7]. This paper describes a case of unilateral idiopathic masseter muscle hypertrophy with prominent bony exostosis of angle of mandible bilaterally, diagnosed by clinical examination and imaging modality.

## Case Report
A 23 year old female patient came with a chief complaint of swelling over the left lower one third of face since one year. It was initially small in size and gradually increased over one year leading to facial asymmetry. It was associated with dull pain on chewing food from same side. Medical history was non- contributory. The patient had no history of systemic diseases and no signs of xerostomia, xerophthalmia, or symptoms such as fever, etc.

Extraoral examination showed an obvious unilateral swelling centered over the left mandibular angle (Figure 1 & 2) roughly measuring 2.5 x 2cm and with a prominent mandibular angle at the lower border bilaterally. The overlying skin was normal in color with no secondary changes.

The ipsilateral ear lobe was not raised and no regional lymphadenopathy was detected. The swelling was moderately tender and firm in consistency with no rise in temperature. On clenching the teeth, left masseter became more prominent and the definitive borders were palpable. Functional assessment of other muscles of mastication were normal. Mouth opening was normal. There was no significant findings intra orally

(Figure. 3 A, B, C). The dental occlusion was class I molar relation on both sides with spacing in the maxillary anteriors.
The **OPG** showed mild prominency in mandibular angles on both right and left side (Figure 4)
**Anteroposterior view of skull radiograph** (Figure 5) showed prominence of the mandibular angle and bone spur development on the left side. These finding suggests compensatory hypertrophy in the area of muscle insertion due to the increase in the muscle tension.
**USG** (Figure 6) performed on bilateral masseter muscle with high frequency (5 –12MHZ) linear transducer showed marked increase in muscle size in left side (13mm) appearing larger than (10.3mm) in right side.
**MRI** (Figure 7 & 8) Axial and coronal T2-weighted image showed nonenhancing hypertrophy of the left masseter compared to the right side, and no increase in other muscles of mastication.
Based on the history, clinical examination and imaging, a final diagnosis of Benign Idiopathic Unilateral Left Masseteric Hypertrophy was made. As the patient was of esthetic concern, surgical management was made. Under General anesthesia, by extra oral approach, left superficial masseteric muscle fibres removal, repositioning of the masseter muscle and contouring of the angle of the mandible was done and the patient was reviewed after a week (Figure 9). Patient is currently under regular follow up.

**Discussion**
Idiopathic masseter muscle hypertrophy (IMMH) was first described by Legg in 1880, reporting on the case of a 10-year-old girl with concurrent idiopathic temporalis muscle hypertrophy [8]. IMMH is considered to be a rare condition with unknown etiology. Seen more frequently in Asian population [9]. Some authors have correlated idiopathic masseter muscle hypertrophy to a variety of conditions, such as defective teeth, dysfunctional mastication, gum chewing, TMJ disorders, teeth grinding, bruxism, and clenching teeth during sleep [10]. Therefore, anyone with the above mentioned conditions may develop unilateral or bilateral masseter muscle hypertrophy. People with psychological disorders or emotional disturbances that impact proprioception and the ability to keep the tone of the masseter muscle are at a higher risk of evolving to IMMH. According to Teixeira, there are two types of masseter muscle hypertrophy: Congenital or Familial and Acquired due to functional hypertrophy [10].
Idiopathic masseter muscle hypertrophy must be accurately diagnosed, as it may be mistaken for other diseases. Among them are unilateral compensatory hypertrophy (due to hypotrophy or hypoplasia in the contralateral side), masseter tumor, salivary gland disease and masseter muscle intrinsic myopathy [11].
The diagnosis of Masseter hypertrophy can be made from clinical examination, history and muscle palpation. Muscle palpation test is associated with palpation of the muscle with fingers while the patient clenches his/her teeth so that the muscle is more prominent during contraction. With the muscle relaxed and the patient's mouth slightly open, extra-oral palpation using both hands will pinpoint the intramuscular location of the hypertrophy. Imaging modalities such as ultrasound, CT and MRI may be helpful in showing homogeneous enlargement of the muscles. According to Seltzer and Wang (1987), CT and MRI scans produce excellent images for the diagnosis of various masseter muscle conditions [12]. MRI is a preferred technique for evaluating soft tissue while CT shows bony abnormalities better. Presenting complaints of the patients are usually of cosmetic concerns due to the obvious facial asymmetry as in the present case and rarely they present with pain and discomfort due to tension on the hypertrophied muscle and limitation of mouth opening. Most patients only complain of cosmetic problems, as an increased masseter introduces facial asymmetry, also called 'square' face. Some individuals complain of pain, headache, muscle stress, trismus, and intermittent masticatory claudication [11, 13].
There are various treatment modalities for the management of masseter hypertrophy. This can be categorized into nonsurgical and surgical. Management is based on psychological counseling, use of mouth guards, muscle relaxant, and anxiolytic drugs, analgesics, physical therapy, dental restorations, and occlusal adjustments to correct premature contacts. A good result can be achieved in the patients with mild hypertrophy but there is no reliable report on the literature on the success rates of isolated clinical therapy. Injection of botulinum toxin into the masseter muscle is generally considered a less invasive modality and has been advocated for cosmetic sculpting of the lower face, first introduced by Smyth, Moore, and Wood in 1994 and considered a less invasive modality for the treatment of muscle hypertrophy [11, 14]. Local injection of very small doses of the toxin into a muscle produces local paralysis and therefore, individual muscles can be selectively weakened and atrophy of the muscle occurs.
Perhaps the biggest disadvantage of botulinum toxin therapy is that the treatment effect wears away and reverts to the original condition in 6 months [15]. Ham JW *et al.* (2009) used radiofrequency coagulation by which an electric current is used as an alternative energy source which causes ionic agitation, leading to tissue coagulation and denatures the proteins. This ultimately produces a focal necrosis of the hypertrophied masseter muscle without any side effects [16].
The traditional method of treatment for masseter hypertrophy is the surgical partial excision of masseter muscle under general anesthesia.
The surgical treatment is based on intra and extraoral approaches. Both techniques revolve around the removal of excessive mscle fibers from the inner third of the masseter vertical muscle fibers. Reduction osteoplasty may be performed in cases of bony hyperplasia of the mandibular angle [9, 11,17]. The remaining external bundle of the masseter should be attached to the mandibular periosteum to allow for adequate functional recovery. The choice between intra- and extraoral approaches is not related to cosmetic or functional outcomes or to the risk of introducing vascular and nerve injury. It depends on the skill and experience of the surgeon in performing surgery using either of the approaches. The extraoral approach was widely indicated, because it offered better visualization. Surgical treatment was proposed for the first time by Gurney in 1947 [18]. This procedure is carried out through a Risdon submandibular incision and consisted the the removal of three fourth to two third of all muscle tissue available from the muscle upper aponeurosis to the lower mandibular border. Beckers in 1977 surgically treated 17 patients using the intraoral approach in which internal muscle bands were removed from the hypertrophied masseter from

the upper insertion in the zygomatic arch to the lower insertion in the mandibular angle, thus avoiding the production of a visible scar on the patient's face and reducing the possibility of injuring branches of the facial nerve [19].

## Conclusion

Masseter muscle hypertrophy is a benign enlargement of masseter muscle due to multifactorial etiology. Its diagnosis is mainly based on clinical and radiographic examination. It mimics the malignant skeletal muscle lesions and malignant parotid gland lesions. The striking clinical features of a masseteric hypertrophy that clues the diagnosis are slow growing asymptomatic swelling in mandibular angle region which is non-tender, non-pulsatile, soft-fibrous growth with normal overlying skin and swelling becomes prominent on clenching the teeth. Misdiagnosed cases due to lack of familiarity with this entity may lead to unnecessary biopsies and explorative surgeries.

**Fig 1:** Patient Profile

**Fig 2:** Lateral Profile

**Fig 3A:** Occlusion –labial view

**Fig 3B:** Occlusion-right side

**Fig 3C:** Occlusion- left side

**Fig 4:** Orthopantomogram revealed prominent mandibular angles in right and left side


**Fig 5:** Anteroposterior View: Prominence of the mandible angle and bone spur development was evident on the left side

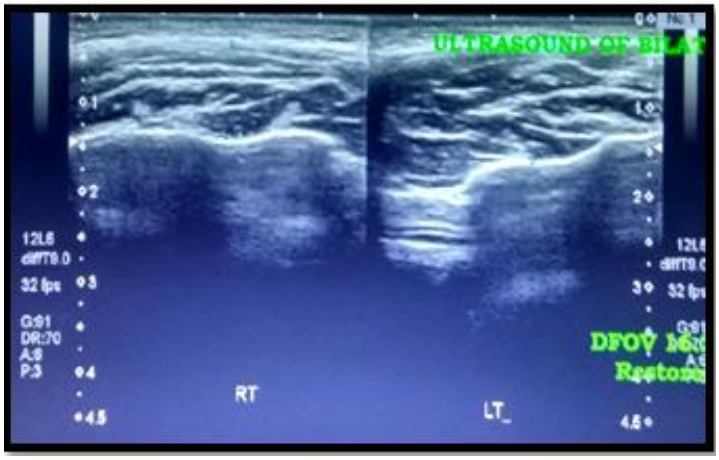


**Fig 6:** USG performed on bilateral masseter muscle showing marked increase in muscle size in left side (13mm ) appearing larger than (10.3mm) in right side.

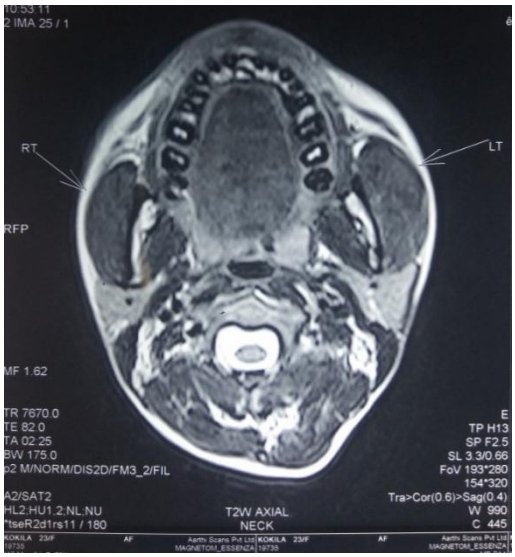


**Fig 7 & 8:** Axial and coronal T2-weighted magnetic resonance image showed nonenhancing hypertrophy of the left masseter compared to the right side.

**Fig 9:** one week postoperative image

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