ABSTRACT:
Introduction: Myositis ossificans traumatica (MOT) is known mostly in the orthopedic literature as non-neoplastic, heterotopic bone formation within muscle or fascia, presumably due to acute trauma or repeated injury. Myositis ossificans traumatica of the masseter muscle is uncommon disease producing limitation of opening of the jaws.
Purpose: To present a case of MOT of the masseter muscle in patient with history of facial trauma.
Material and methods: The medical history of a 53 years patient with complaint of decreasing ability to open his mouth over the past 10 years after a blow to face. CT revealed enlarged calcification in the left masseter muscle.
Conclusion: Treatment of MOT of the masseter muscle is surgical- total extirpation of the ossified muscle but also surgical techniques including osteotomy that involve the muscle attachment region should be considered and after that appropriate physical therapy.
Key words: MOT; masseter muscle;

INTRODUCTION:
Myositis ossificans traumatica (eponyms: myositis ossificans circumscripta, ossifying hematoma, calcified hematoma, parosteal bone formation) was initially described by Thorma [9] in 1958 as a condition generally caused by calcification and progressive ossification of an intramuscular hematoma after trauma. [7, 8] Very few cases have been reported in the head and neck region. Arima et al. [2] reviewed the literature and discovered 26 cases involving the head and neck. The muscles most commonly affected, in decreasing order of involvement, are the masseter (75%), temporalis, genioglossus, buccinator, and medial pterygoid. [2, 5] Only few cases have been reported with bilateral involvement. [7] Myositis ossificans traumatica (MOT) should be differentiated from its related counterpart myositis ossificans progressiva (MOP). MOP is a rare hereditary connective tissue disorder of unknown origin occurring primarily in children. [4, 6, 10] The condition is autosomal dominant, with variable expressivity. MOP is characterized by progressive ossification of any and all skeletal muscles of the body unrelated to trauma. Ossification of skeletal muscle, fascia, tendons, and ligaments occurs with seemingly no definitive pattern. [1, 11]
Many theories have been proposed. Carey’l [3] summarized these as 1) displacement of bony fragments into the soft tissue and hematoma with subsequent proliferation, 2) detachment of periosteal fragments into the surrounding tissue with proliferation of osteoprogenitor cells, 3) “leakage” of subperiosteal osteoprogenitor cell into surrounding soft tissue through periosteal perforations suffered via trauma, and 4) differentiation of extrasosseous cells exposed to bone morphogenetic protein (BMP). Most clinicians adhere to the last theory. According to this theory, bone fragmentation during trauma may result in autolysis and release of BMP into the soft tissue mass; BMP induction of cellular differentiation with progressive ossification then occurs. [2, 5]
Potential diagnoses to be considered are:
1. Fibrous ankylosis, left temporomandibular joint; 2. Scarring or calcification of the left masseter muscle (myositis ossificans); 3. Left anterior disc displacement without reduction or “anchored disc phenomenon”; 4. Right coronoid impingement; 5. Tumor

CASE REPORT
We present a 55 years-old man complained of a decreasing ability to open his mouth over the past 10 years (fig. 1). After soft tissue blunt trauma (intramuscular hematoma of left masseter) he reveal progressive limitation of motion of the mandible (fig. 2). The patient was treated initially with nonsteroidal anti-inflammatory medications (NSAIDs), cold and hot compresses, and range of motion exercises. Nonsurgical therapy was unsuccessful and the patient was referred to our department for evaluation in February 2013. Clinical examination showed limited mouth opening- incisal opening to 3 mm and no lateral movements. Painless swelling palpated in this region. Palpation and auscultation of temporomandibular joints (TMJs) were unremarkable. Differential diagnosis should be considered: 1) benign or malignant tumors; 2) degenerative condylar irregularities, or 3) a pathologic fracture.

The two most likely diagnoses were fibrous ankylosis and myositis ossificans. Scarring or myositis ossificans (MO) of the masseter muscle seem like rare possibilities at first, but achieving an accurate diagnosis should not be difficult with the addition of the medical history, physical, and imaging
findings. CT finding showed of impressive extensive calcifications of the masseter muscle attached to the adjacent bone by a broad, calcified stalk. CT revealed no obvious TMJ pathology. The images could not rule out intraarticular adhesion or a fibrous ankylosis. (Fig. 3, Fig. 4)

The patient was scheduled for operation with extraoral approach and release (osteotomia) the bony attachment of the involved left masseter muscle to the mandible, arthrotomy and release of fibrous ankylosis / coronoidectomy if indicated.

**DISCUSSION**

Myositis ossificans traumatica (eponyms: myositis ossificans circumscripsta, ossifying hematoma, calcified hematoma, parosteal bone formation) was initially described by Thoma [9] in 1958 as a condition generally caused by calcification and progressive ossification of an intramuscular hematoma after trauma. Very few cases have been reported in the head and neck region. Arima et al. [2] reviewed the literature and discovered 26 cases involving the head and neck. Primarily single muscle involvement was reported. The muscles most commonly affected, in decreasing order of involvement, are the masseter, temporalis, genioglossus, buccinator, and medial pterygoid. The case presented here is MOT that involve the masseter muscle unilaterally. There is a prominent male:female ratio of 24:4. Myositis ossiciana traumatica (MOT) should be differentiated from its related counterpart myositis ossificans progressiva (MOP). MOP is a rare hereditary connective tissue disorder of unknown origin occurring primarily in children. [9] Histologic findings of MOT typically include newly formed lamellar bone within fibrous strands of muscle tissue where previous trauma is suspected. There is a mixture of fibrous tissue, bone, and occasionally cartilage. Careful histologic examination should be performed to rule out extrasosseous osteosarcoma. Elevated alkaline phosphatase levels seem to occur during evolution of MOT as a result of progress of the disease. Signs and symptoms within the head and neck region can oftentimes be minimal until severe trismus is evident. [1, 2] A history of trauma to the affected area is commonly elicited. Typically, there is limited posttraumatic evidence of ossification until trismus occurs. In the case presented, trauma caused by buffet may have produced the hemorrhage/autolysis to stimulate the sequence of events. Plain films are rarely helpful in diagnosing early ossification, and the introduction of CT scanning and MR imaging has aided in more timely recognition of the condition. It is not clear why some muscles are prone to ossification and others are not. No clinical or laboratory studies have been linked to the diagnosis. [7] The case presented raises a question about the degree of trauma necessary to initiate ossification, as well as the theory behind its inception. In addition, it substantiates the belief that optimum postoperative results are achieved through complete excision of the affected muscles and appropriate physical therapy.

**CONCLUSION:**

It is not clear why some muscles are prone to ossification and others are not. No clinical or laboratory studies have been linked to the diagnosis. There are no treatment protocols, as the literature is unclear as to the need for surgical intervention, surgical timing, recurrence rates, and effectiveness of nonsurgical therapies. Good postoperative results are achieved through complete excision of the affected muscles and appropriate physical therapy after surgery.
Fig. 3. CT revealed enlarged calcification in the left masseter muscle.

Fig. 4. Calcification of the left masseter muscle (myositis ossificans);

REFERENCES:
4. Bar Oz B, Boneh A. Myositis


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