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Case Report

Myositis ossificans traumatica of the medial pterygoid muscle: a case report

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Abstract: In this report, we present a case of myositis ossificans traumatica (MOT) of the medial pterygoid muscle that had developed after mandibular block anesthesia administered for endodontic treatment of the lower right second molar, demonstrating typical features of this condition. MOT should be considered as a differential diagnosis when there is severe limitation of jaw opening and an associated trauma. Panoramic radiographs and axial and coronal computed tomography (CT) scans can effectively delineate the calcified mass. Other imaging studies that may be helpful include magnetic resonance imaging (MRI), bone scans, and ultrasound. As shown in our case, calcified masses were found in the right mandibular angle, which severely limited jaw opening. Some earlier reported cases of MOT were treated by extraoral surgical approaches with complete removal of the evolving muscle. The aim of this case report is to present only the diagnostic imaging aspects of myositis ossificans traumatica. (J Oral Sci 52, 485-489, 2010)

Keywords: myositis ossificans traumatica; medial pterygoid muscle; computed tomography.

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Introduction

Myositis ossificans (MO) is a rare disease in which ossification develops in the muscle or soft tissue. MO is divided broadly into myositis ossificans progressive (MOP) and myositis ossificans traumatica (MOT) (1,2).

Myositis ossificans progressive (MOP), also known as fibrodysplasia ossificans progressive, is an autosomal dominant disease in which multiple, heterotopic ossifications develop in the systemic muscle, fascia, tendons, and ligaments. (1-3) It is characterized by symmetric congenital malformation of the hands and feet and a progressive heterotopic ossification of the soft connective tissues. In many cases, MOP occurs in childhood, and the movement of the joints gradually becomes restricted, leading to ankylosis (2,3). In some cases the patient may die of pulmonary complications due to restricted movement of the respiratory muscles (2). The prognosis is generally poor. MO can also be associated with paraplegia (1,2).

Myositis ossificans traumatica (MOT) also called traumatic myositis ossificans, myositis ossificans circumscripta (1,3), localized myositis ossificans, or fibrodysplasia ossificans circumscripta, is characterized by heterotopic bone formation within a muscle due to a single or repetitive injury (1,2,4-6). The lesions are localized predominantly in the high-risk sites of injury (4). It is difficult to diagnose and usually appears in adolescents or young adult men. MOT is frequently reported in the orthopedic literature

(2,5,6) and is rarely found in the head or neck, including the masticatory muscle (6,7).

Here, we report a case of MOT involving the medial pterygoid muscle which had developed as a postoperative complication of endodontic treatment.

Case Report

A 33-year-old male patient was referred to the surgeon with restricted mouth opening for 60 days, following mandibular block anesthesia administered for endodontic treatment of the lower right second molar.

The clinical examination showed an interincisal mouth opening of 5 mm, with tenderness on palpation in the right mandibular angle, a traumatic lesion in the right cheek and swelling in the retromolar area of the lower right second molar.

The provisional diagnosis was pericoronitis of the lower right second molar and the patient was prescribed Cefalexin 2 g/day and a muscular relaxant for 7 days. However, no clinical improvement was observed. Neurological evaluation and gingival crevice culture for *Clostridium tetani* proved negative. Temporomandibular joint magnetic resonance was also performed, which ruled out temporomandibular joint ankylosis.

Bilateral mandibular coronoidectomy was performed and postoperative mandibular physiotherapy was conducted due to elongation of the mandibular coronoid process in panoramic radiography. Two weeks after the surgical procedure, the mouth opening increased to 15 mm, which progressively decreased to 8 mm after 30 days.

After eighteen months of the initial surgery, a multislice computed tomography (CT) of the mandible was performed, which revealed complete calcification of the medial pterygoid muscle, confirming the diagnosis of

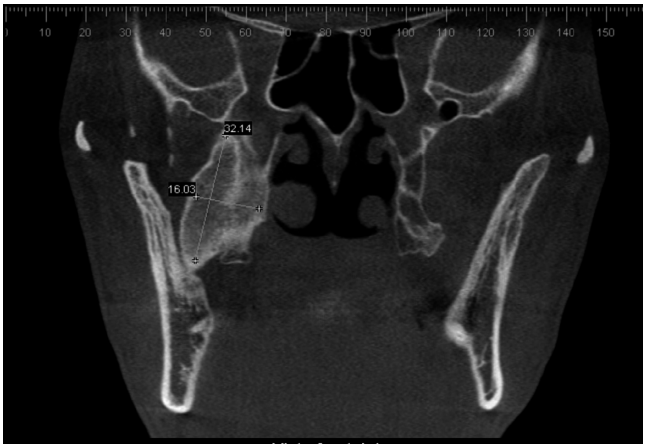

Fig. 1 Coronal Cross section CBCT.

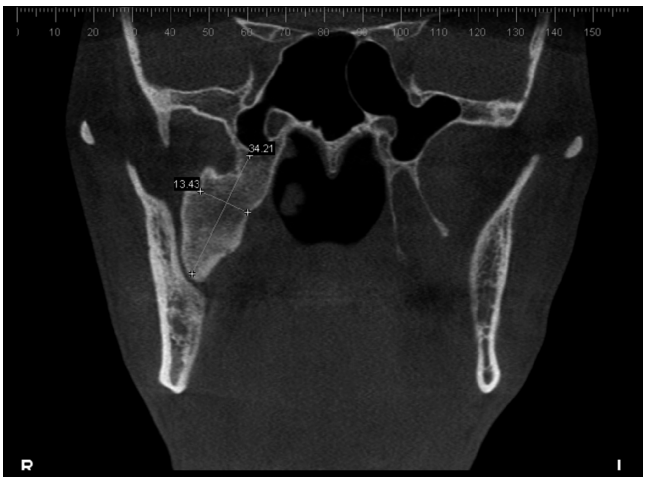

Fig. 2 Coronal Cross section CBCT.

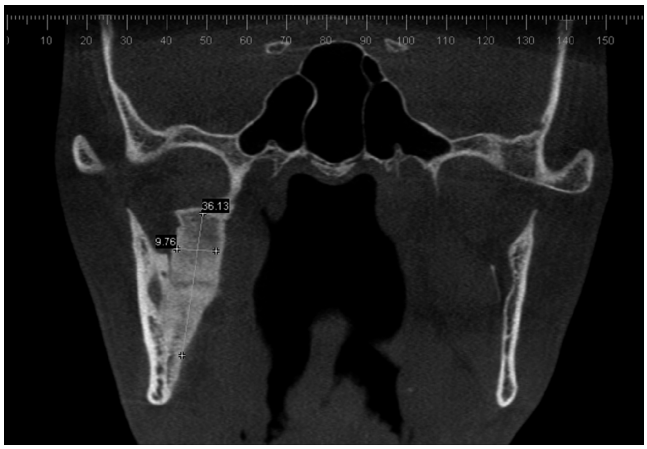

Fig. 3 Coronal Cross section CBCT.

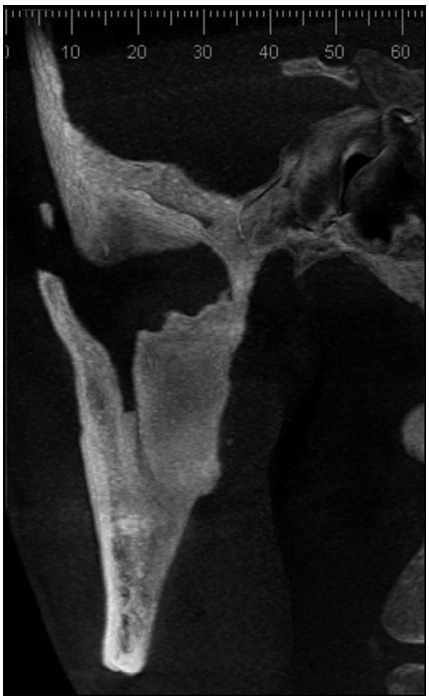

Fig. 4 Coronal Cross section CBCT.

myositis ossificans traumatica (MOT).

After a follow-up of 2 years, the mouth opening decreased to 6 mm. A vestibular injury in the region of the upper left lateral incisor had occurred due to interposition of a wood object between the teeth by the patient, in an attempt to open his mouth.

Three months after the surgery, partial resection of the calcified medial pterygoid muscle was performed with total relapse.

Three years later, the patient returned with limitation of mouth opening again and was referred to the Radiology Department to perform a volumetric CT. The tomographic incidence was performed in Cone Beam CT (CBCT) (I-CAT, Imaging Sciences Int., Hatfield, PA, USA) using a field of view (FOV) 13 cm, 0.25 × 0.25 voxels, and 40 s. Multiplanar reconstructions (panoramic, lateral, axial, and three-dimensional reconstructions) were made to evaluate upper and lateral extension, length and continuity of the lesion. In all reconstructions, a uniform hyperdense image with well-defined cortical limits, compatible with medullary space obliteration was observed. In coronal, transversal, cross-sectional and axial views, an extending hyperdense region in the interior of the right mandible connecting the pterygoid blade and promoting an increased volume of its lateral-medial portion was noted (Figs. 1-7). There was uniform calcification throughout the muscle path in the 3D-

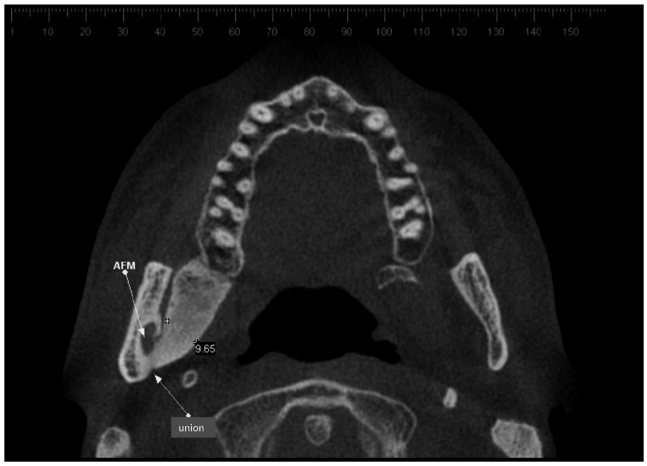

Fig. 5 Axial cross section CBCT.

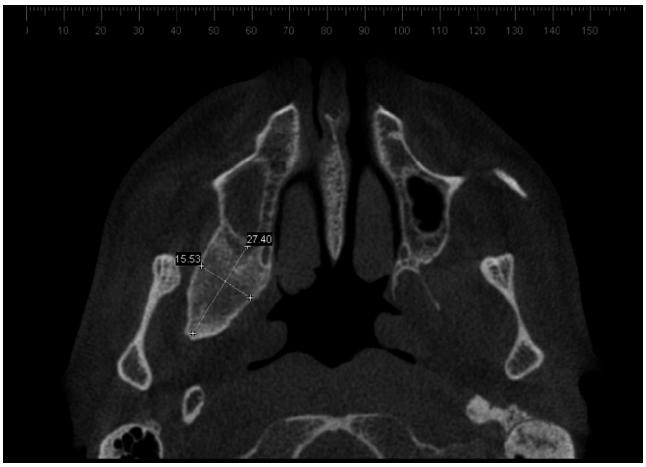

Fig. 6 Axial cross section CBCT.

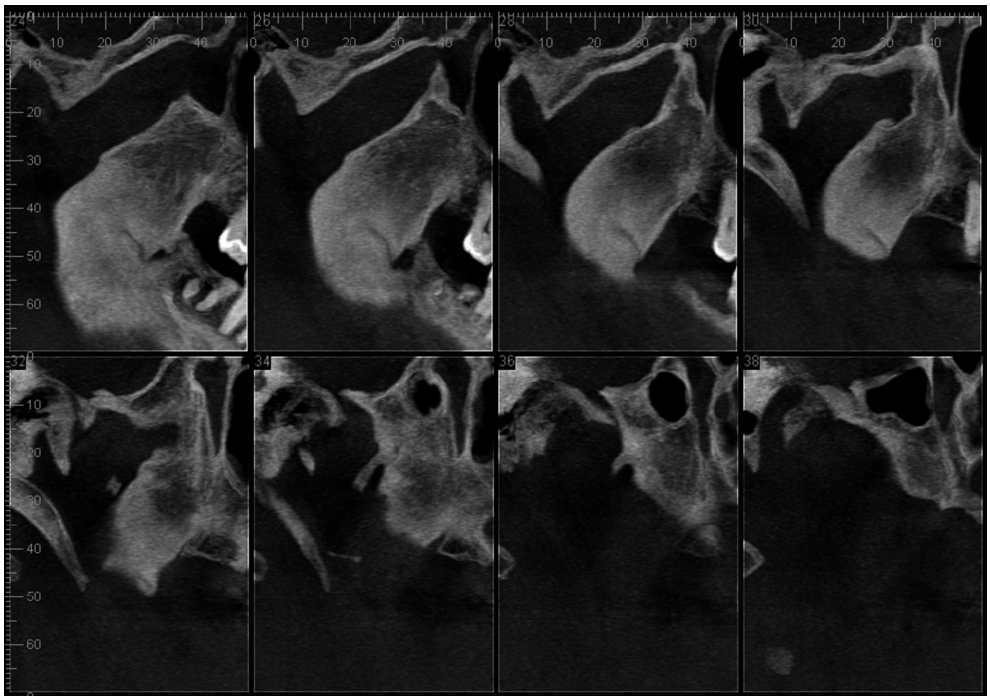
Fig. 7 Transversal cross section CBCT.

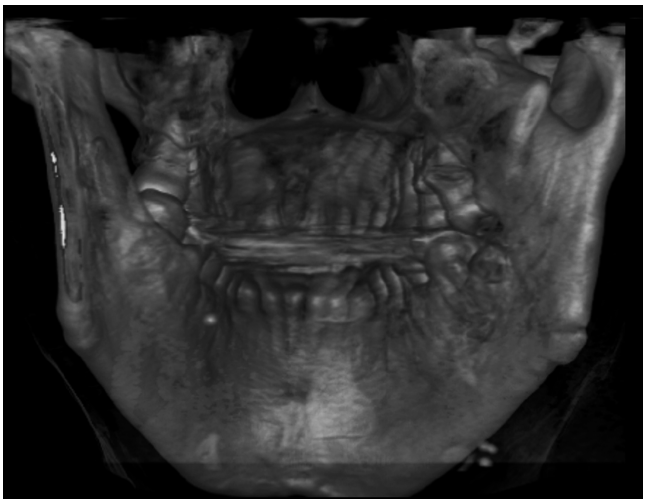

Fig. 8 3D Reconstruction.

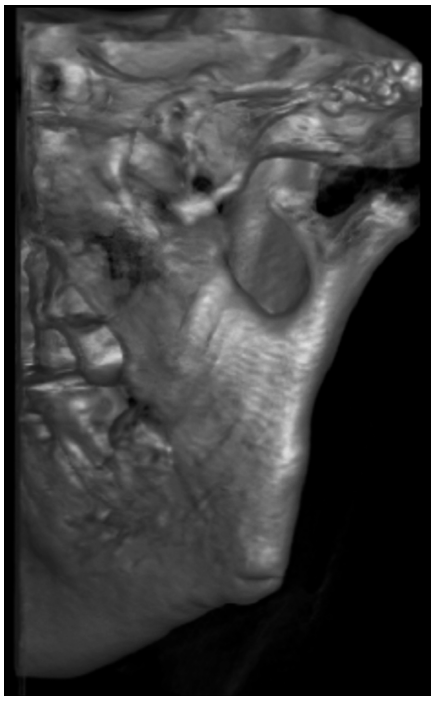

Fig. 9 3D Reconstruction.

CT volume-rendered images in the posterior-anterior view (Figs. 8, 9).

Discussion

Myositis ossificans traumatica (MOT) is a rare clinical entity in the maxillofacial region and few cases have been reported in the literature (2,5-7)

MOT was described initially by Thoma in 1958 as a condition generally caused by calcification and progressive ossification of an intramuscular hematoma after trauma (2,5,6). MOT is a benign, self-limiting and localized lesion characterized by ossification of fibrous connective tissue within and between skeletal muscle bundles after multiple traumatic episodes with muscle bleeding (1,5,8).

MOT rarely affects the head and neck muscles. Not more than 30 cases have been reported in the maxillofacial region (5). Acute trauma, including tooth extraction and injection of local anesthetic, has been cited as the cause in some cases of MOT in the masticatory muscles (8). Other factors include chronic infection such as pericoronitis, and surgery involving muscles. The highest incidence of MOT involving the masticatory muscles was in the masseter, but case reports have described occurrence in temporal, medial and lateral pterygoid muscles (1,8).

Only three cases affecting the unilateral medial pterygoid muscle have been reported in the English literature (5). When affecting the masticatory muscles, MOT can be asymptomatic and often produces severe trismus (8). It has also been reported that MOT can affect other muscles of the head and neck region, including the soft tissues associated with the chin and buccinator, genioglossus, platysma and sternocleidomastoid muscles (2,5,6).

It typically presents with pain, tenderness, and limited movement of the affected muscle, with a soft swelling of the skeletal muscle after injury. Subsequently, the swelling subsides, and a hard and tender mass develops within 1 to 2 months (3).

The exact mechanism of development remains unclear (5,6). According to Rattan, the pathogenesis of MOT remains uncertain although many authors consider it as an aberrant physiological healing (5).

The pathogenesis of MOT might begin with intramuscular hemorrhage, which is followed by the exuberant formation of vascular granulation tissue (3,5,8). Maturation of granulation tissue results in fibroblastic proliferation with progression to the synthesis of osteoid and chondroid, usually within 1-3 weeks, although radiographic evidence of calcification may not appear until 3-6 weeks (3,5,8).

The radiographic appearance over time generally reflects the maturation sequence of MOT from the time of trauma (3). The lesion initially presents as an undefined mass with faint, flocculent, and irregular opacities. Typically, calcifications in MOC appear 2 to 3 weeks after the trauma, and a well-developed MOC with a characteristic zonal calcification pattern becomes evident only after 4-6 weeks.

In plain radiographs, mature MOT appears as a well-demarcated, calcified mass, with accentuated calcification at the periphery and a central nidus of radiolucency. CT and magnetic resonance imaging are useful for mapping the zonal architecture and mineralization patterns, which are diagnostic for MOT (4).

CT can define the extraskeletal location, extent of the lesion, and confirm absence of invasion into the surrounding

normal tissues. CT generally is the imaging method of choice in difficult cases or planning of surgical resection.

The present case demonstrates the adequacy of cone-beam CT to demonstrate accurately the radiographic patterns of mineralization in MOC.

Unlike MOP, MOT is often removed by surgical treatment, including excision of the ossification, but some patients presented recurrence and were refractory to treatment (2,5,6).

The treatment normally consists of excision of the mass or of the entire affected muscle. Plezia et al. reported the treatment of 14 cases in the literature and found that the prognosis is generally good, although some lesions presented recurrence. A period of follow-up before the treatment is recommended, but some authors believe that early intervention is preferable (9). Also, non-surgical therapy must be attempted.

The literature suggests various treatments for these lesions. It is believed that many of the lesions will regress over time (5). Regardless, many suggest that simple excision is curative and that recurrence is rare (9). Some authors insist that early surgical intervention (within 3 to 6 weeks post-injury) is ideal for curative excision (10). However, others have stated that recurrence of the lesion is common if removed at an early stage (9). Another author recommends that surgery should not be contemplated unless the lesion does not regress or it becomes a functional handicap because 35% of cases have been reported to spontaneously resolve over a period of several months (11,12).

Various adjunctive modalities like bisphosphonates, nonsteroidal anti-inflammatory agents, and radiation therapy have been used to prevent relapse of heterotopic bone formation after surgical removal (5).

Nonsurgical treatment of MO has been proposed by some authors but this procedure remains controversial.

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