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Clinical Case

Pathological fracture of the jaw due to osteomyelitis after a third molar extraction

Fratura patológica da mandíbula devido a osteomielite após extração do terceiro molar
Fractura patológica de la mandíbula debido a osteomielitis después de la extracción del tercer molar

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Abstract
The osteomyelitis is an inflammatory process in bone tissue caused by an infection, commonly related to anaerobic pathogens, frequently *Staphylococcus aureus* and *Streptococcus sp*. Several causes have been related such as dentoalveolar infection, trauma, radiation and genetic condition, but it is not common after surgery for third molar extractions, especially in healthy patients. The symptoms of chronic osteomyelitis usually include signs and symptoms such as pain, edema, suppuration, areas of bone sequestration, and limited mouth opening. Among the complications associated with this condition, pathological fracture may occur due to local bone fragility. This paper aimed to report a rare case of pathological mandible fracture due to osteomyelitis after third molar extraction in a healthy male patient treated by a surgical procedure. The procedure consisted of decortication and resection of the sclerotic bone followed by reduce and fixation of mandibular fracture with one 2.4 reconstructive plate and one 2.0 plate with standard screws.
Descriptors: Chronic Disease; Osteomyelitis; Mandible.

Resumo
A osteomielite é um processo inflamatório no tecido ósseo causado por uma infecção, comumente relacionada a patógenos anaeróbicos, freqüentemente *Staphylococcus aureus* e *Streptococcus sp*. Várias causas têm sido relacionadas, como infecção dentoalveolar, trauma, radiação e condição genética, não sendo comum após cirurgia para extrações de terceiros molares, principalmente em pacientes saudáveis. Os sintomas da osteomielite crônica geralmente incluem sinais e sintomas como dor, edema, supuração, áreas de sequestro ósseo e abertura limitada da boca. Entre as complicações associadas a essa condição, pode ocorrer fratura patológica devido à fragilidade óssea local. Esse artigo objetivou relatar um caso raro de fratura patológica de mandíbula devido a osteomielite após extração de terceiros molares em um paciente do sexo masculino saudável e discutir o tratamento proposto. O procedimento consistiu em decorticação e ressecção do osso esclerótico, seguido de redução e fixação da fratura da mandíbula com uma placa 2.4 de reconstrução e uma placa 2.0 com parafusos padrão.
Descritores: Doença Crônica; Osteomielite; Mandíbula.

Resumen
La osteomielitis es un proceso inflamatorio en el tejido óseo causado por una infección, comúnmente relacionada con patógenos anaerobios, a menudo *Staphylococcus aureus* y *Streptococcus sp*. Se han relacionado varias causas, como infección dentoalveolar, trauma, radiación y afección genética; No es común después de la cirugía para la extracción de terceros molares, especialmente en pacientes sanos. Los síntomas de la osteomielitis crónica generalmente incluyen signos y síntomas como dolor, edema, supuración, áreas de secuestro óseo y apertura bucal limitada. Entre las complicaciones asociadas con esta afección, puede ocurrir fractura patológica debido a la fragilidad ósea local. Este estudio tuvo como objetivo informar un caso raro de fractura patológica de la mandíbula debido a osteomielitis después de la extracción de terceros molares en un paciente masculino sano tratado con un procedimiento quirúrgico. El procedimiento consistió en decorticación y resección del hueso esclerótico, seguido de reducción y fijación de la fractura mandibular con una placa de reconstrucción 2.4 y una placa 2.0 con tornillos estándar.
Descriptores: Enfermedad Crónica; Osteomielitis; Mandíbula.

INTRODUCTION

The extraction of impacted third molars is one of the most common procedure performed in oral and maxillofacial surgery. The reasons for extracting these teeth include pericoronitis, cysts, periodontal problems, carious lesion on third or second molar[1]. Osteomyelitis of the jaw after the extraction of a tooth are a rare complication, with few reports in the literature[2].

Osteomyelitis is an inflammation, usually of infectious origin that invades the bone and its medullary spaces. Several causes have been related, such as dentoalveolar infection, trauma, radiation and genetic condition. Rare in healthy patients, it is usually associated with alcohol consumption, smoking, uncontrolled diabetes and immunosuppressive diseases[3].

The symptoms of chronic osteomyelitis usually include signs and symptoms such as pain, edema, suppuration, areas of bone sequestration, and limited mouth opening, which can often be masked by self-medicating patients[4]. In most cases the causative pathogens are anaerobic and the most frequently found microorganism are *Staphylococcus aureus* (over 60%), *Peptostreptococcus species*, and *Pseudomonas aeruginosa*, among others[5].

The removal of bone sequestrations, lesion debridement, bone decorticalization, associated with the systemic use of antimicrobials, usually of broad spectrum of action, are the main points addressed for the treatment of these infectious conditions[6]. Thus, this this paper aimed to report an unfortunate development of osteomyelitis in a healthy man after removal of an impacted third molar.

CLINICAL CASE

A 55 years old male patient, healthy patient presented to the office with a primary complaining of pain, swelling and unpleasant smell and taste in the mouth for the last month (Figure 1a, b, c). His medical history revealed he was not using any regular medication, had no known allergies and had never smoked.

On intraoral examination, signs of chronic inflammation and carious lesion were seen associated with the left lower second and third molar that was in infra occlusion. On radiographic examination an intimate relationship between the teeth and the inferior alveolar and a very narrow mandible below them was verified (Figure 1d).

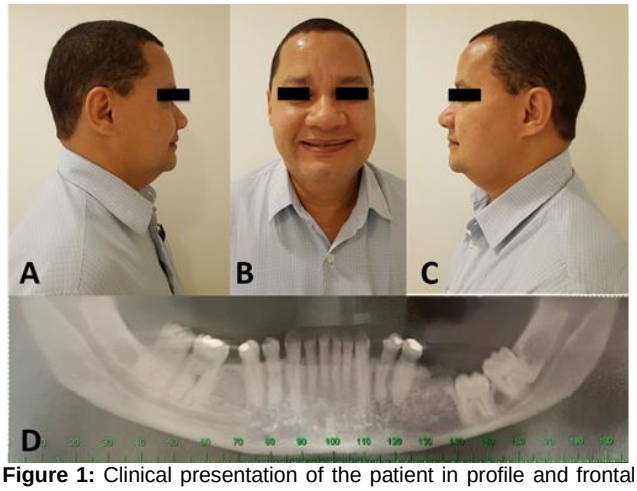

Figure 1: Clinical presentation of the patient in profile and frontal view (A, B and C), and panoramic section from CT scan.

Due to the narrow basilar mandible and the chance of hemorrhage, dental extraction was performed under general anesthesia with rigid internal fixation material available to be used in case of mandible fracture. The procedure occurred as a regular extraction with the detachment performed antero-posteriorly, avoiding extension beyond the external oblique line. Osteotomy was performed in a minimally invasive manner to avoid mandible fracture, followed by tooth section with surgical drills, both accompanied by copious irrigation with saline solution. After the extraction the socket was filled with Bio-Oss and primary closure was achieved using Vycril thread 3.0 suture. Antibiotics and painkillers were prescribed after surgery: Amoxicillin and clavulanic acid 875mg every 12 hours for 7 days, 400 mg of Ibuprofen every 6 hours and 750 mg of acetaminophen every 6 hours both for 5 days after surgery. The patients return for follow-up without any complain and healing was progressing as usual. A posteoperative CT scan was performed (Figures 2 and 3).

Three months postoperatively the patient returned for a follow up and reported severe pain and trismus with a maximum interincisal opening of 20mm. During clinical examination it was seen that the socket was exposed without any kind of exudate and left mandible angle had a slight motility. Radiographic examination included a new CT scan and revealed an extensive osteolytic mandibular lesion and a pathological fracture of mandible angle, which suggested chronic osteomyelitis (Figure 4).

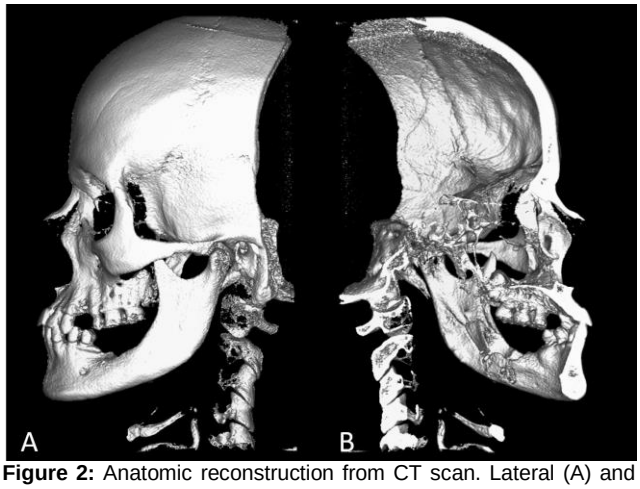

Figure 2: Anatomic reconstruction from CT scan. Lateral (A) and Medial (B) view.

Figure 3: Panoramic section from CT scan in immediate postoperative

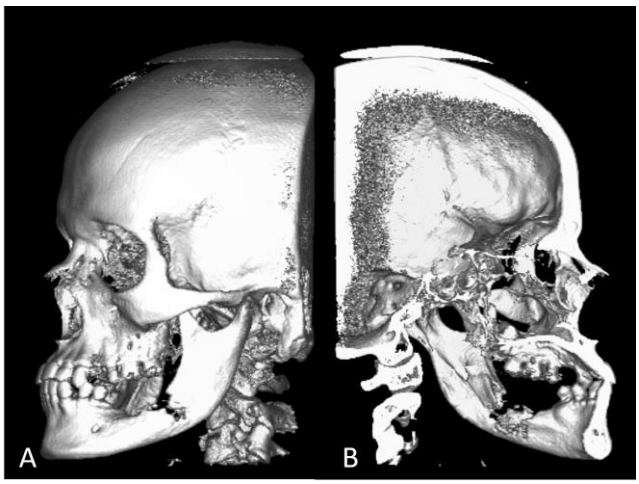

Figure 4: Panoramic section from CT scan in 3-month follow-up highlighting an osteolytic mandibular lesion with pathological fracture in the mandible angle.

Based on the clinical history, the patient was hospitalized to start venous antibiotic therapy and undergo to a surgical procedure to reduce and fix the mandibular fracture. Before starting venous antibiotic therapy, material was collected from the surgical site for microbiological and histopathological analysis. The surgical procedure consisted of decortication and resection of the sclerotic bone followed by reduce and fixation of mandibular fracture with one 2.4 reconstructive plate and one 2.0 plate with standard screws. The patient would not to tolerate a scar in his face, so the reconstructive plate was placed intraorally (Figures 5a and 6a).

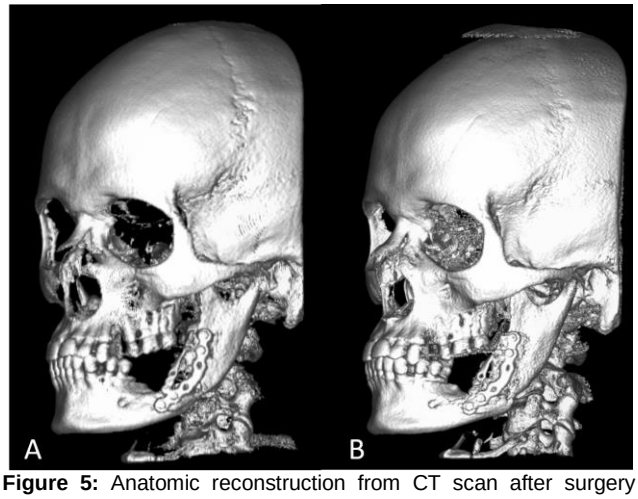

Figure 5: Anatomic reconstruction from CT scan after surgery from reconstruction. Immediate postoperative (A) and 8-month follow-up (B).

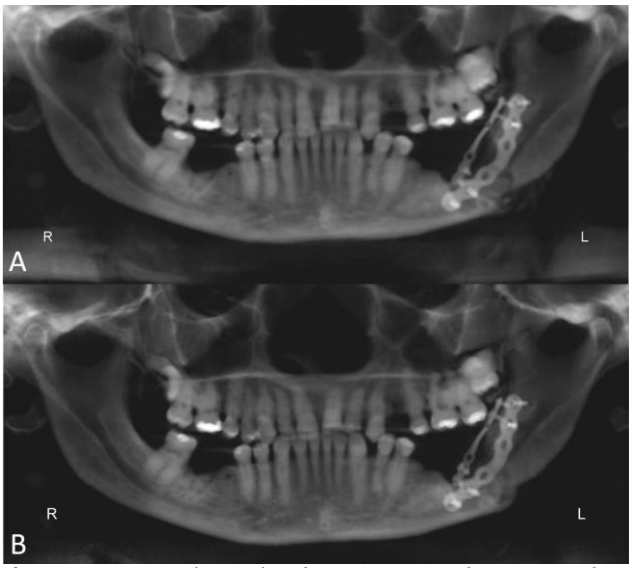

Figure 6: Panoramic section from CT scan after surgery from reconstruction. Immediate postoperative (A) and 8-month follow-up (B).

The results from the sample showed evidence of bone trabeculae without osteocytes permeated by mixed inflammatory infiltrate and colonies of *enterobacter cloacae* and *streptococcus oralis*. After surgery ciprofloxacin 500mg every 12 hours and clindamycin 300mg every 6 hour both for a period of 3 month was prescribed. Eight months after surgery patient is still under regular follow-up reported no further symptoms of pain or bad taste in mouth and in CT scan is possible to see new bone formation on the fractured line (Figures 5b and 6b).

DISCUSSION

Chronic osteomyelitis is a term used to describe an infectious inflammatory disease of the bone marrow. The remodeling bone is compromised because the osseous blood supply is diminished by an inflammatory exudate. Several local and systemic factors have been suggested to the development of osteomyelitis, but it is a rare condition in healthy patient, such as the patient in this report[3].

Common complications after third molar surgeries are alveolar osteitis, infection, neurological injuries and hemorrhage. Osteomyelitis of the jaw after the extraction of a tooth are a complication, with few reports in the literature[7]. A previously paper published evaluated the complications after third molar surgery and between 101 complications in 1,199 wisdom teeth extraction, none of them were for osteomyelitis[8]. Another one, evaluated 55 third molar complications who required hospitalization and only one of them was caused by osteomyelitis[9].

There are some case reports[10,11] of pathologic fractures of the mandible caused by osteomyelitis most of the fractures are caused by lesions, which are characterized by an aggressive osteolysis. In this case, there was an extensive and fast osteolysis that could be may have been caused by a fissured fracture at the time of the surgery that created an infected in the surrounding area or an asymptomatic infection with microorganisms that do not respond to regular prescribed antibiotic treatment after third molar extraction.

The microbiota associated with osteomyelitis may be variable, since in addition to the local microorganisms, it will present the dissemination of microorganisms associated with its etiology, such as odontogenic, endodontic infections, gingivitis, periodontitis, periimplantitis and pericoronitis. The microbiological and histopathological analysis of the associated pathogens becomes even more important in these cases, being responsible for defining the type of antibiotic that should be used, as well as the conduct performed in the reported case[12].

Different opinions regarding the most appropriate treatment can be found in the literature, although hyperbaric oxygen therapy and antibiotics may be effective, but they are an

adjuvant therapy, elimination of the infectious cause is mandatory. In this case the main treatment was the decortication and resection of the sclerotic bone with intern rigid fixation of the segments[13].

Mandibular fractures and osteomyelitis are considered rare complications during third molar removal surgery[14]. However, it is necessary to consider that late fractures may cause osteomyelitis, and that early and appropriate treatment is important to prevent pathological fractures[15-17].

CONCLUSION

Although jaw fractures due to osteomyelitis are rare, it is important to prevent them. In this case, the 2.4 plate reconstruction stabilized the fracture and the correct prescription of antibiotics after the culture result helped the patient's health recovery.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

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