

Case Report

A case of mandible osteonecrosis after a severe periimplant infection

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ABSTRACT

The term osteonecrosis has been applied to describe the presence of a persistent inflammation of the mouth, osteomyelitis, delayed healing of extraction sockets, development of sequestra or presence of fistulae from the mouth to the lower skin. Here, we document a case of mandible osteonecrosis that developed in a patient after a severe periimplant infection. Osteonecrosis, severe inflammatory osteolysis, and heavy bacterial colonization were found. Surgical toilette and hyperbaric oxygen therapy permitted complete healing of the case. No complication was recorded in the post-operative period and no further surgery was performed. The clinical follow up and the imaging after one year showed a complete '*restitution ad integrum*' of the mandible. Although the risk of developing osteonecrosis of the jaw for oral implants is low, the devastating complications still require caution.

Key Words: Hyperbaric oxygen therapy, jaw osteonecrosis, periimplant infection, surgical toilette

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INTRODUCTION

Osteonecrosis is still not completely understood at present. Probably the disease should be considered a consequence of a metabolic decrease and a tissue homeostatic disturbance.^[1] From the pathological point of view, the term "necrosis" refers to a retrograde change, meaning the death of a tissue. It is induced because of injury factors, which (either directly or indirectly) inhibit blood supply to the tissues.^[2] Necrosis can affect different tissues and when it affects osseous tissues, it is called 'osteonecrosis'. Osteonecrosis frequently affects bones in the stomatognathic system, mainly the lower or the upper jaw (ONJ).^[3] It usually comprises of three stages:^[4]

1. Oral mucosa defect with bone exposure; in this case the lesion does not give any symptom and no infection is observed,
2. The lesion is painful with clinical features of infection, and
3. The lesion is similar to that of stage 2 but, additionally pathological bone fraction or fistula or extensive osteolysis occurs.

Many causes can be associated with this kind of disease but the most important are:

1. Radiation of the head and neck
2. Osteomyelitis
3. Bisphosphonates

However, other risk factors must be considered: Smoking and dental disease such as periodontitis, caries, poor oral hygiene and poorly fixed dentures. Infection is a constant component of ONJ (*Actinomyces* is typically identified). Periodontitis and above all, peri-implantitis are also observed in most patients with ONJ,^[5-7] while ONJ-associated delayed wound healing, as mentioned in the definition of this medical condition, encourages bacterial penetration into bone. The histological studies all show pronounced

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inflammatory changes, represented by a mixed cellular infiltration (neutrophils, lymphocytes, plasma cells), infection with bacterial debris, congested venules and bacterial infiltrate within the deep trabeculae, scarce quantity of osteoblasts and vascularization, and fibrosis of marrow spaces.^[8]

There is no universally accepted treatment for osteonecrosis of the jaws. The management of ONJ remains controversial; both radical and conservative treatment have been reported.^[9] Radical surgery is indicated in cases where conservative approaches are not successful and in symptomatic and rapidly progressive lesions.^[10]

Here, we document a case of mandible osteonecrosis that developed in a patient after a severe periimplant infection. Osteonecrosis, severe inflammatory osteolysis, and heavy bacterial colonization were found. Its treatment and the pertinent literature are discussed.

CASE REPORT

A 54-year old man presented to Maxillofacial Surgery, Galeazzi Hospital, Milan, Italy, in September 2009 for evaluation. He complained of pain, and the presence of a lesion about the submental region was observed. The anamnesis showed that the patient had undergone placement of two oral implants into the mandible a few months ago. The following month, the two implants were infected and were explanted by a dentist. However, the patient developed osteonecrosis at the chin symphysis and the wound had never healed, persisting for more than two months.

In the first clinical examination, the presence of two cutaneous fistulae at the submental region was noted [Figure 1]. The chin was extremely reddened and edematous, with areas of necrosis, especially in the medial part. In a computed tomography (CT) study, the chin symphysis presented a global osteolysis with a composed fracture along the sagittal plane [Figure 2].

It was decided to submit the patient to a surgical toilette, in order to remove all necrotic areas. So, sequestra were removed, a primary closure was sutured, and proper antibiotic therapy was administered. The wound was finally under control. The hyperbaric oxygen therapy further permitted complete healing of the case.

No complication was recorded in the post-operative period and no further surgery was performed. The

clinical follow up and the imaging [Figure 3] after one year showed a complete '*restitution ad integrum*' of the mandible.



Figure 1: The reddened and edematous chin with two cutaneous fistulae



Figure 2: Pre-surgical 3D computed tomography reconstruction



Figure 3: Post-surgical 3D computed tomography reconstruction

DISCUSSION

The term osteonecrosis has been applied to describe the presence of a persistent inflammation of the mouth, osteomyelitis, delayed healing of extraction sockets, development of sequestra or presence of fistulae from the mouth to the lower skin. Several authors during the years focused on the importance of different characteristics of dental implants and their influence on survival of the same.^[11-17]

The initial approach to manage this disease should be conservative: Oral hygiene is essential, including use of 0.02% aqueous clorexidine mouthwash after meals,^[18] analgesics and anti-inflammatory drugs should be prescribed when judged necessary. Galler, *et al.*^[19] proposed even hyperbaric oxygen in the management of this disease.

The therapeutic value of hyperbaric oxygen (HBO) was originally observed in controlled *in vivo* experiments on burns, in which daily increases in the oxygen tension in hypoxic tissues were found to encourage capillary angiogenesis, proliferation of fibroblasts, and synthesis of collagen.^[20] Furthermore, HBO can also be bactericidal or bacteriostatic to many pathogens.^[21] Mainous, *et al.*^[22] was probably the first to suggest the use of HBO for the management of osteonecrosis of the jaw. However, the widespread use of HBO for the treatment of mandible osteonecrosis may be considered largely theoretical or anecdotal because of the paucity of controlled trials and the lack of any unified assessment of the improvement of symptoms.^[23]

The greatest advances in the surgical management of ONJ have been made in reconstructive surgery through the replacement of the necrotic bone with bone grafts and creation of a regional vascularized flap or insertion of free grafts capable of restoring mandible continuity with adequate bone volume and quality, sufficient crest height and integrity of the soft tissues.^[23]

CONCLUSION

Although the treatment of ONJ is complex, widely accepted criteria should be established to reduce the devastating complications of osteonecrosis and improve the quality of life of these patients.^[24]

Here, a case of mandible osteonecrosis after insertion of dental implants is reported. Although the risk of developing osteonecrosis of the jaw for

oral implants is low, the devastating complications still require caution.

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