

DOXYCYCLINE BONE LABELING – IMPACT ON MRONJ TREATMENT

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Abstract

Background: Medication-related osteonecrosis of the jaws (MRONJ) represent a growing incidence pathology. Switching from bisphosphonate to denosumab treatment did not reduced the cases numbers, instead it increased the MRONJ incidence [1, 2]. Complete removal of necrotic bone is essential for wound healing [3]. Necrotic bone identification represent a challenge for a successful outcome. Main clinical criteria are the aspect of the bone and bleeding; imaging investigation commonly used are RMN and CT [4-7]. The aim of this study is to underline the value of doxycycline bone labeling in necrotic bone resection in MRONJ.

Case report: We present a 57 year-old female oncologic patient with MRONJ treated using fluoroscopic guided bone resection.

Discussion: Doxycycline bone labeling is a valuable tool for increased necrotic bone visualization and resection in MRONJ.

Keywords: MRONJ, osteonecrosis, fluoroscopic, doxycycline, guided resection.

1. Introduction

Medication-related osteonecrosis of the jaws is a serious disease with a lengthy, disabling evolution, especially in neoplasia patients [8].

From the first published cases, described by Marx RE in 2003, the definition of the disease, its staging, presented several successive changes (2007, 2009, and 2014) due to the progress acquired in understanding the onset and evolution of this disease. The therapeutic options, related to the stage of the disease, have also registered successive changes, both as a way of treatment and as a stage in which to be used.

Main options are medication for early stages and associated medication and surgery for advanced stages. Adjuvant therapy include by hyperbaric oxygenoterapy, shock wave therapy, hormonal therapy, pentoxifin with E vitamin etc.

Surgical treatment represented a therapeutic option only for advanced disease until now, but some authors consider that it is indicated even in incipient forms of MRONJ. There is no general consensus for specific

procedures at this time [9-14]. Choosing the right moment and limits between healthy bone and necrotic one represent a challenge even for surgeons with experience in MRONJ treatment. Maxillary bones has natural auto-fluorescence due to collagen type 1 fibers and osteocytes. Some studies result suggest that auto-fluorescence are suitable for bone labeling [15-17], but that depends on UV light sources used. To enhance the contrast between healthy bone and necrotic one we can use tetracycline class antibiotics.

2. Case report

A 57 year-old female patient is admitted in OMF Surgery Department for alveolar bone pain, in mandibular frontal area. Clinical exam reveal an unhealed post-extraction socket (41) three months after dental procedure.

The patient have a history of mammary neoplasm surgery, followed by radiotherapy and chemotherapy, with bone metastasis. She received Zometa (zoledronic acid) 4mg each

month for 41 months, without drug holiday before dental extraction.

Preoperative the patient receive Doxycycline, 100 mg twice a day for 10 days without notable side-effects.

Intraoperative, after mucoperiosteal flap elevation a post-extraction bone defect was visualised in frontal mandibular alveolar bone.

Using neutral artificial light the bone has normal colour and bleeding, without necrotic bone optically visible (fig. 1).

Using UV light (450 nm, 1 W) and scialytic lamp light only minor changes are seen without a clear necrosis bone area identification (fig. 2).

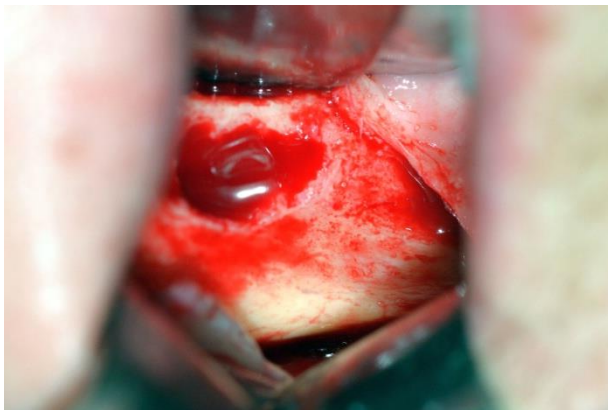


Fig. 1 – Scialytic lamp light

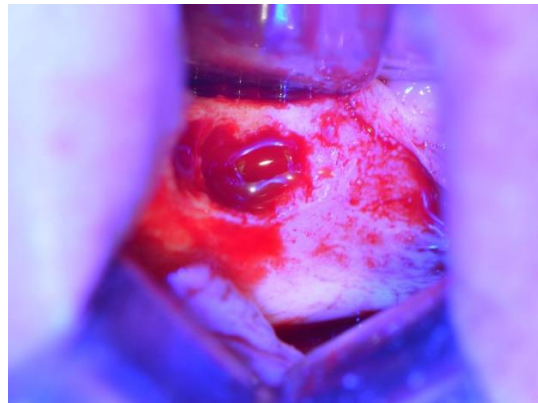


Fig. 2 –UV and scialytic lamp light

Under strict UV light, after the removal of all neutral light sources, the necrotic bone areas (black spots) are clear visible over the healthy bone surface (fig. 3 & 4).

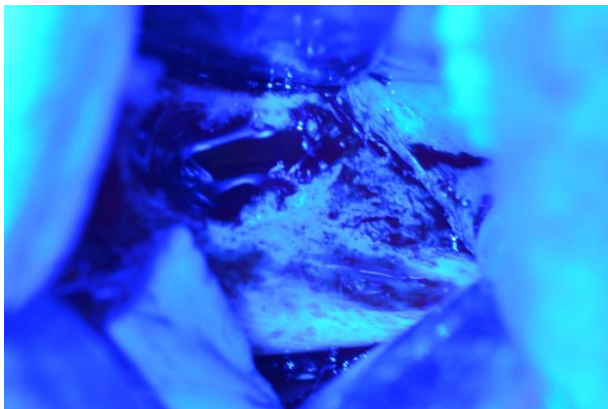


Fig. 3 – UV light



Fig. 4 – UV light

After clear identification, the necrotic bone are removed, after each osteotomy an UV light check was performed until fluorescence cover all the maxillary bone. Remaining bone was protected with A-PRF (1300rpm-14 min), using Choukroun centrifuge.

Postoperative the recovery was uneventful, suture removed at 10 days and *per prima* healing. At follow-up visit, 4 weeks after surgery ,the wound was closed, without dehiscence or infection signs.

3. Discussion.

Maxillary bones exhibit natural auto-fluorescence, but the contrast between healthy bone and necrotic one can be enhanced using tetracycline class antibiotics [15-17]. Augmented fluorescence using doxycycline is indicated for some types of UV light lamps.

The tetracycline's administration, a well-studied antibiotic class, with a long track record, is a sure option, without semnificative risks for the patient [18].

In our opinion, doxycycline is a good choice for bone labeling [19] even if

fluorescence is common in tetracycline class and other tetracycline can be used [18,20, 21].

Surgeon's experience is a key factor for resection limits decision but bone labeling using doxycycline fluorescence provide valuable supplementary data.

4. Conclusion. Bone labeling using doxycycline fluorescence is a safe and useful procedure for necrotic bone resection in MRONJ. Is easy to use and without expensive equipment requirement guided bone resection can be performed in any OMF surgery department.

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