



Extensive hyperdense zone in the mandible. A case report.

Magdalena Molina,¹ Valeria Romero,¹ Darío Domínguez,¹ José Aguilar¹ & Arturo Fuentes.²

Abstract: Hyperdense zones are considered a generic term to define an area of increased density regardless of its cause. Idiopathic hyperdense zones are referred in literature as enostosis, focal osteosclerosis, periapical osteopetrosis or bone scar and are found as imaging finding during a routine radiograph. They have greater predilection for long bones, but can also appear in the maxillary bones in certain occasions, often located in the jaw, especially in the molar region, with an informed incidence rate that varies from 2,3 to 9,7% depending on the population in which the study is being applied. In 40% of the cases, in spite of being of idiopathic origin, they seem to be associated with patients with occlusal trauma or can be a result of a predominant development of isolated bone during bone growth. The case of a 36-year-old female patient is described, who presents hyperdensity that differs in form, location and imaging features from the commonly documented in this type of anatomical variations. It was diagnosed as idiopathic osteosclerosis, periodic imaging controls were established. The purpose of this case report is to emphasize the importance of performing an appropriate differential diagnosis among hyperdense lesions at maxillofacial level.

Keywords: idiopathic osteosclerosis; mandible hyperdensity; cone-beam computed tomography; panoramic radiograph.

INTRODUCTION

Hyperdense zones are considered a generic term to define an area of increased density regardless of its cause; they were initially described by Stieda in 1905 (*Sisman et al., 2011; Kawai et al., 1998*). Hyperdense areas are defined as a focal area of compact bone and can be found in many parts of the skeleton, such as maxilla bones (*Marques-Silva et al., 2017*); but mainly in the pelvis and long bones (*Bsoul et al., 2004; Kaka, 2011*). The prevalence described in the literature is 2.3% up to 8%, in ages between 20 and 40, starting in adolescence without gender predilection (*Kaka, 2011; Misirlioglu et al., 2013; Mariani et al., 2008*).

These areas of well-defined homogenous hyperdensity do not present apparent etiological cause and are not correlated with the presence or absence of teeth in maxilla bones (*Marques-Silva et al., 2017; Bsoul et al., 2004; Misirlioglu et al., 2013*). They are more common in the lower molar and premolar regions and sometimes are observed next to the mandible's lower edge. These lesions can have round, ovoid or irregular form (*Urzúa, 2003; Kawai et al., 1998*). Clinically, they are asymptomatic, although certain symptoms have been associated to this type of anatomical variations (*Misirlioglu et al., 2013; Miloglu et al., 2009; Li et al., 2013*). Several terms have been found in the literature and this confusion in the terminology is attributed to the result of past studies, which did not distinguish idiopathic injuries from those of

Affiliation: ¹Universidad Católica de Cuenca sede Azogues, ² Universidad Andrés Bello, Concepción, Chile.

Corresponding: Magdalena Molina Barahona. Autopista Concepción-Talcahuano 7100. Phone: +56412662070. E-mail: dramolinabarahona@gmail.com.

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inflammatory, dysplastic or neoplastic origin.

The clinical procedure established for idiopathic hyperdense zones is radiograph control (*Misirlioglu et al., 2013; Bsoul et al., 2004*). The time of radiograph control and the intervals between examinations are well established in the literature and vary according to the growth of the lesion over time (*Kaka, 2011*).

The diagnosis of maxilla hyperdensities is important. Inadequate diagnosis can lead to the lack of treatment of a disease (*Marques-Silva et al., 2017*). The studies on idiopathic hyperdense areas published in dental literature consider the same parameters with reduced criteria and terminology on this entity, whereas the studies in medical literature are categorical in affirming the importance of the correct diagnosis of this type of lesions, since they can be associated to systemic diseases such as metastasis, intestine adenocarcinoma, adenomatosis coli, hyperparathyroidism, and others (*Bsoul et al., 2004; Kaka, 2011; Kawai et al., 1998*).

The objective of this investigation was to establish a differential diagnosis with complementary examinations of an extensive hyperdense zone at mandible level, compatible with solitary central osteoma or idiopathic osteosclerosis, being these pathological entities of similar clinical, imaging and histopathological features.

CASE REPORT

A 36-year-old patient, female, mestizo ethnicity and professional accountant, without harmful habits, comes to the clinic of the Universidad Andrés Bello School of Dentistry, Concepción. On anamnesis refers uterine cancer treated 5 years before, and left-sided breast cancer. In addition, presents old untreated mandibular fracture and mild paresthesia in mental zone. On extraoral clinical examination presents face asymmetry and on intraoral clinical examination did not show relevant alterations for this case (*fig. 1*).



Figure 1: Intraoral and extraoral examination.

Presence of caries and multiple apical lesions were diagnosed in radiograph examinations. In panoramic radiograph, an extensive apical and interradicular hyperdense zone is observed at the level of teeth 4.2 and 4.3. Sharp edges respect tooth integrity (*fig. 2*).



Figure 2: Panoramic radiograph. Note apical and interradicular hyperdense zone at the level of teeth 4.2 and 4.3.

Due to the patient's characteristics, medical history and intermittent painful symptomatology, CBCT and incisional biopsy are indicated to discard pathologies. CBCT reveals a lesion of 21 mm x 6 mm, without modification of bone plate, i.e., swellings and erosions. A slight invasion of the incisive duct appears, which would explain the patient's intermittent paresthesia (*fig. 3*). Differential diagnoses among central osteoma of the mandible, idiopathic osteosclerosis and condensing osteitis. Incisional biopsy is performed (*fig. 4 and 5*) and the microscopic examination reports the presence of calcified bone tissue of compact aspect with presence of normal lamella organization, typical of an osteone, and presence of normal-looking osteocytes in its lagoons (*fig. 6*).

The diagnosis, considering the histologic and radiographic examination of the lesion, was idiopathic osteosclerosis, also known as "dense bone island". It was, thus, decided to schedule periodic imaging controls every three months and, after a year, no increase in size of the idiopathic osteosclerosis was observed (*fig. 7*).

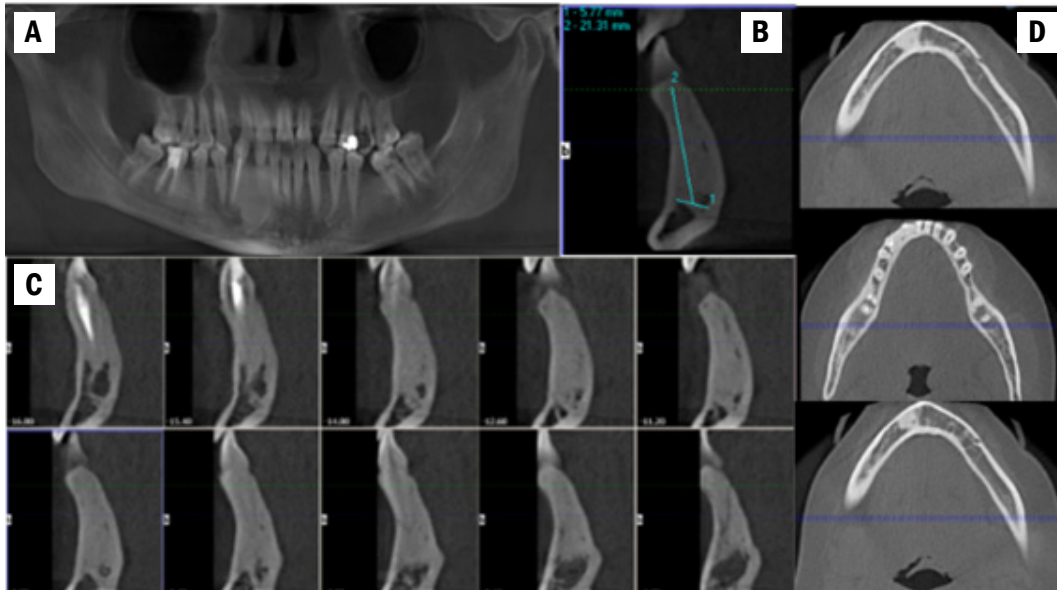


Figure 3: CBCT of the affected zone: 3a Coronal plane; 3b Parasagittal plane - length of the lesion; 3c Sagittal planes- Invasion in lower dental duct; 3d Axial Planes.



Figure 4: Incisional biopsy procedure.

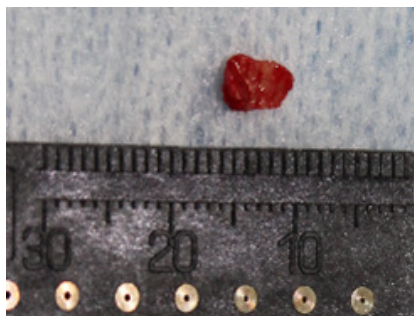


Figure 5: Specimen.

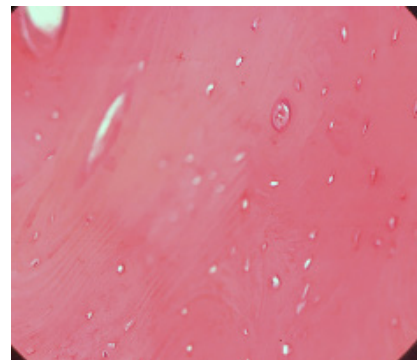


Figure 6: Microscopic aspect of the specimen.

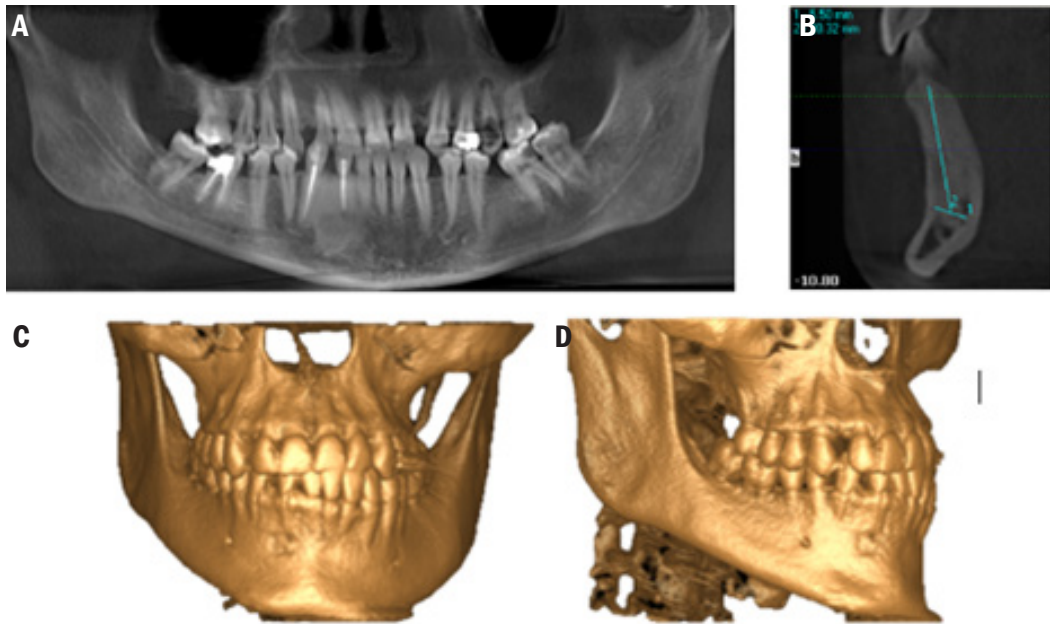


Figure 7: CBCT annual imaging control: 7a Panoramic Image; 7b Parasagittal plane; 7c and 7d 3D Images.

DISCUSSION

The zones of idiopathic osteosclerosis are generally anatomical variations of small and stable size. They are not zones of active growth, which is why there are characteristics to differentiate between this type of anatomical variations and aggressive or malignant lesions. One of the following criteria must be met: absence of a primitive tumor, slow growth, a clearly demarcated margin with spinous radiation of the sclerotic lesion and the absence of pain to differentiate malign from benign lesions (Sisman et al., 2011; Kaka, 2011; Seung-Youp et al., 2010). According to the mentioned criteria, when analyzing the case of the patient it did not fulfill two criteria, which is why incisional biopsy is performed.

One study establishes that the prevalence in Chileans is 8.11%, being the jaw the most preferred zone, without specifying the quadrant. In addition, the study establishes a size between 5 and 10mm (Misirlioglu et al., 2013), which was not in agreement with the present case, since the size of the hyperdense zone was 21 mm x 6 mm and it also involves the whole thickness of the mandible, being this another of the factors by which it is decided to intervene the lesion.

In most of the studies, these hyperdense zones are considered radiographic findings and, therefore,

asymptomatic; nevertheless, other studies suggest that this type of anatomical variations could be related to certain symptoms like pain (Kawai et al., 1998), exorizalis (Bsoul et al., 2004) or changes in dental position (Marques-Silva et al., 2017; Consolaro & Consolaro, 2012; Li et al., 2013), but this will depend on its evolution time. In the present case, the patient presented intermittent paresthesia and in CBCT a slight invasion of the incisive duct was diagnosed, being one of the main reasons by which an extension of the studies to the patient is required, since these alterations did not agree with the valid criteria to completely discard another pathological entity.

In terms of imaging, this type of variations will present a round, ovoid or irregular form, generally with a size of up to 15mm. However, some variations have reached a diameter of even 70mm, which have been named “dense bone islands”. These islands have defined limits and, in certain occasions, are intermingled with the trabeculae of surrounding bone with spicules that irradiate from its margins (Nakano et al., 2009; Miloglu et al., 2009; Seung-Youp et al., 2010). They usually present a hyperdense zone within lesion, revealing the beginning or the area of stimulus for the growth of the lesion, which is called Pearl Shell Structure (PSS) (Mariani et al., 2008). They can be located next to a healthy tooth,

in the root apices, between the roots or separated and far from the teeth. The idiopathic osteosclerosis appears within the thickness of the medullary bone, it can spread from the top of the crest of the dentoalveolar process to the base of the mandible, but it does not displace nor deforms anatomical cortical areas (*Marques-Silva et al., 2017; Kaka, 2011*). The space of periodontal ligament might be obliterated by the mass or present normal or widened thickness, a feature that has not been explained suitably (*Uriza, 2009*), which is why the features of this case are in agreement with the established parameters for this type of anatomical variations.

Certain authors claim that the histopathological features of idiopathic osteosclerosis is the obliteration of medullary spaces by dense compact bone and a little amount of fibrous and fatty connective tissue. Presenting a minimum or non-existent inflammatory infiltrate, which is the main and differential feature between this variation and condensing osteitis, but there are no histological differences with central osteoma of the mandible, which is why the differentiation with idiopathic osteosclerosis becomes complex (*Urzúa, 2003; Consolaro & Consolaro, 2012; Mariani et al., 2008*). According to the studies obtained after the histopathological examination, total agreement with the pre-established parameters in this type of anatomical variations was found.

Certain authors claim that idiopathic osteosclerosis and central osteoma of the mandible have equal imaging and histopathological features, being the clinical difference of size increase over time the only difference that could appear (*Marques-Silva et al., 2017; Kawai et al., 1998; Bsoul et al., 2004*). This is why in the present case, given the size, location and presence of unusual symptomatology for this type of anatomical variations, it is recommended to maintain a progressive radiographic examination observing if this lesion does not evolve over time, discarding thus a pathological entity.

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