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RESEARCH ARTICLE

RADIOGRAPHIC EVOLUTION OF RADIOPAQUE AND RADIOLUCENT LESIONS COMPATIBLE WITH CEMENTO-OSSEOUS DYSPLASIAS

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ABSTRACT

Bone dysplasias are radiographic findings showing radiopaque and radiolucent images, which are generally asymptomatic. It is essential to monitor these patients through periodic controls that include collection of radiographic exams, conventional x-ray and CBCT Scan, in addition to the face-to-face clinical examination. The dentist must be familiar with the diagnosis of these radiopaque and radiolucent lesions found on the radiographs that he performs daily, for a correct therapeutic approach. The objective of this work is to verify whether these images, seen in routine radiographs, evolve over time to a different type of image than the one initially found.

Key words: Bone Dysplasia, Periapical Cemento-Osseous Dysplasia, Focal Cemento-Osseous Dysplasia, florid Cemento-Osseous Dysplasia.

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INTRODUCTION

Bone dysplasias are idiopathic processes located in the apical region of dental support areas characterized by the replacement of normal bone with fibrous tissue. (1) In 1992 the World Health Organization adopted the concept of cemento-osseous dysplasia and in 2005 described three clinical presentations : periapical cemento-osseous dysplasia, focal cemento-osseous dysplasia and florid cemento-osseous dysplasia. (2-5) This classification is based on age, gender, histopathology, radiographic and clinical characteristics. (6, 7) Radiopaque/radiolucent images cells that appear in dental support areas (3), can be simple radiographic findings, if they do not show clinical signs and symptoms (2, 3, 8) These present replacement of bone by fibroconjunctive tissue and mineralized materials (bone tissue, lamellar bone, cement-like cells). (2-4, 9) As cement-bone dysplasia appears close to the periodontal ligament, some investigators argue that these injuries have origin in the ligament, others believe that it consists of a defect in extraligamentous bone remodeling that can be caused by local factors and hormonal imbalance. (10)
Periapical cemento-osseous dysplasia is associated with the apex of the tooth (11), has a preference for the anterior zone of the mandible (2, 4) and covers only a few adjacent teeth (3). It can be unitary, but multiple foci often appear. (10) It usually appears in patients over 30 years of age and with a female predilection. (2, 4)

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This lesion has a higher incidence in the black race. (8) This dysplasia can be in three phases: first or osteolytic phase where circular or elliptical reabsorption zones are visible (in this phase it is not possible to distinguish it from periapical granuloma or periapical cyst) (10); in the second or cementoblastic phase, a mixture of radiolucent and radiopaque zones with small calcifications is visible; in the final or mature phase, only a completely radiopaque zone is visible. (2, 4, 8) Single lesions almost never exceed 1 cm in diameter. (10) Treatment is not necessary, unless there are symptoms or if the image increases, as its development and maturation are self-limited, and it is only advisable to watch with frequent radiographic exams. (8) Progressive growth rarely occurs and does not normally expand the cortex. (10) However, this destruction of the cortical plates has already been reported (12), and its location and expansion is easily identified with axial images of the CBCT scan. (8). Focal cemento-osseous dysplasia occurs in a single location, is the most frequent and appears in the posterior sectors of the mandible. (2, 3, 7, 10) The predilection for the third to sixth decade and for the caucasian race (in contrast to the periapical and florid) as well as by the female gender. (7, 10) Usually, the lesion is asymptomatic and smaller than 1.5 cm in diameter. (5, 7, 10) This lesion has 3 maturation phases: early (well-defined radiolucency); intermediate (radiolucent-radiopaque with well-defined radiolucent halo) and late (radiopaque with poorly defined periphery). (2, 7) Lesions in a later stage have diffuse radiopacity with ill-defined edges and a higher proportion of anastomosed, curvilinear and slightly bony trabeculae (the so-called "ginger root" pattern) (7)

Although its etiology is unknown, some triggering factors have been identified, such as trauma, caries, periodontal disease (probable origin), infection, systemic diseases and hormonal imbalance. (2) Dysplasia before the final sclerotic state is based on fragmented and granular tissue that is easily cured, but that hardly separates from the adjacent bone. (10). Florid cemento-osseous dysplasia is broader and appears bilaterally in the mandible or maxilla and mandible (multifocal). (3) It is more frequent in middle-aged black women. (6, 7, 11, 13) Symptoms (persistent low-intensity pain and alveolar fistula with yellowish avascular bone sequestration exposure) (10, 11)they are related to the exposure of sclerotic masses (bone sequestrations) which, due to the decrease in vascularization, necrosis as a result of minor trauma. These may be associated with progressive alveolar atrophy resulting from pressure caused by a prosthesis or after extractions. (6, 13) Expansion may occur in one or more of the affected areas. (10) Dense and lobulated masses are visible radiographically, often symmetrically located in several regions of the jaws. (13) Depending on the radiographic aspect, flowering dysplasia can be found in three phases: osteolytic phase - well-defined radiolucent zone with destruction of the hard lamina and periodontal ligament; cementoblastic phase - small radiopacities in the radiolucent zone due to the accumulation of cement particles in the fibers; last stage - lobular radiopacity surrounded by radiolucent area (cysts type). (2) The appearance is not related to the presence or absence of teeth. (10) Biopsy is not recommended as it increases the risk of infection. For these reasons, surgical removal of these lesions is not advocated (6, 13). While the patient has no symptoms, it is recommended to consult with prophylaxis and increase hygiene to prevent periodontal diseases and reduce the loss of insertion. (10) Symptoms appear when the sclerotic masses are exposed in the oral cavity, and biopsy is not recommended. nor perform elective tooth extractions. (10) When symptoms begin after exposure of sclerotic masses arising from growing alveolar atrophy under full dentures, treatment is more complex, since at this stage there is inflammation and the process is background, a chronic osteomyelitis surrounding dysplastic bone and cementum. (10) Antibiotics can be prescribed but usually without improvement. (10) The trapping of sclerotic masses is slow and soon begins the repair process, which can be accelerated by removing the bone. (10) When simple bone cysts appear in dysplasia, it is important to perform surgical exploration to define r the diagnosis.(10)

MATERIAL AND METHODS

Of the 7364 clinical files analyzed from patients at the Clinic of the Faculty of Dental Medicine of the University of Porto, 254 radiographic exams (periapical radiographs and computed tomography or scans) were selected that presented radiopaque or radiolucent lesions compatible with cement-bone dysplasias. Of these patients, 18 underwent radiographic control (orthopantomography and CBCT Scan) to assess whether these lesions showed changes over time. Format, radiopacity and initial size were evaluated. These controls were performed with distance from the initial x-ray of less than one year to 4 years, in patients of both genders, between 24 and 71 years old.

RESULTS

Of the 18 radiographic controls performed on patients of both genders and aged between 24 and 71 years old, 10 controls had one year or less between the control and the initial x-ray, 4 were performed 2 years after the initial, 3 with 3 years of difference and 1 control had 4 years of separation from the initial radiography. The initial radiograph of these lesions was an orthopantomography and the control was an orthopantomography and / or CBCT Scan. None of these lesions reached the cortical bone. (table1). Of these 18 injuries, we observed that 3 of them, which we classified as periapical cement-bone dysplasias, after 1, 2 and 3 years between radiographs, were absent. These lesions were radiolucent with ill-defined edges, which initially measured between 2.3mm and 4mm. They were present in patients between 49 and 65 years of both genders. (Images 1 and 2)

We observed that 12 lesions, on the control radiography, showed a more radiopaque image compared to the initial image (images 3 and 4), probably focal cemento-osseous dysplasias and 3 lesions exhibited a less radiopaque aspect compared to the previous radiography. Regarding the edges of the lesions, on the radiographs of the lesions that were compatible with focal cemento-osseous dysplasias, we analyzed that 9 of the lesions suffered changes in the edges, becoming more defined and 3 lesions had more irregular edges compared to the initial radiography. In the images compatible with flowering cemento-osseous dysplasias, in the two lesions, the edges were more defined in the control. (Images 5 and 6). The majority of lesions compatible with focal cemento-osseous dysplasias suffer an increase in size, between 1 and 6 mm, which occurred in 8 lesions, in patients between 24 and 71 years of age. Only one lesion maintained the same size (florid cemento-osseous dysplasia) and the 6 lesions with size reduction decreased between 3.3mm and 0.2mm compared to the previous image, in patients between 38 and 52 years old, with images compatible with periapical cemento-osseous dysplasias.

DISCUSSION

There are some doubts in the clinic if the images seen on routine radiographs, with radiolucent and / or radiopaque pattern, and that do not cause swelling in the bone cortices, both internal and external, observable on palpation, nor present symptoms detectable by the patient, should be considered findings routine radiographic and left to its free course, being able to be controlled periodically. Or if these injuries, they evolve over time to more severe and invasive pathologies and should be treated early. As we can see from the results obtained in this study, most injuries controlled after less than one year and up to 4 years have increased in size, in patients of both genders and in a wide range of age groups (between 24 and 71 years old)).

However, these lesions suffered only a maximum increase of 6mm, as mentioned in the literature (8), their growth is self-limited, so radiographic controls of these lesions should be made and progress to more invasive treatments only in the case of a large increase in size. or presence of symptomatology. We also proved that three lesions were absent on the control radiography, and that previous invasive treatment could have been performed unnecessarily. (8). As for the image obtained in the control, we verified a majority of lesions with a more radiopaque aspect compared to the initial radiography, possibly due to the evolution of the lesion, as referred to in the literature (2, 4, 8), cement-osseousdysplasias in more advanced stageshave a more radiopaque image.

Table 1. Classification and evolution of observed injuries.

Classification of the initial injury	Injurynumber	Age	Gender	Format	TeethAssociation	Evolution
Radiopaque Focal Cemento-osseousdysplasia	12	24-71	Female (+freq.)	Irregular (+freq.)	No association with teeth (+freq.) In cases of association with teeth, it occurred in the posterior mandibular zone	Greater radiopacity More defined edges Increase in size
Radiolucent Periapical Cemento-osseousDysplasia	4	49-65	Female = Male	Regular edges (+freq.)	Anterior zone of the mandible	Most disappeared Less radiolucency More irregular edges Sizereduction
Radiopaque / Radiolucent Cemento-osseousdysplasiaFlorid	2	40-45	Female	Regularedges	Posterior zone of the 4th quadrant	More defined edges No radioactivity change No sizechange

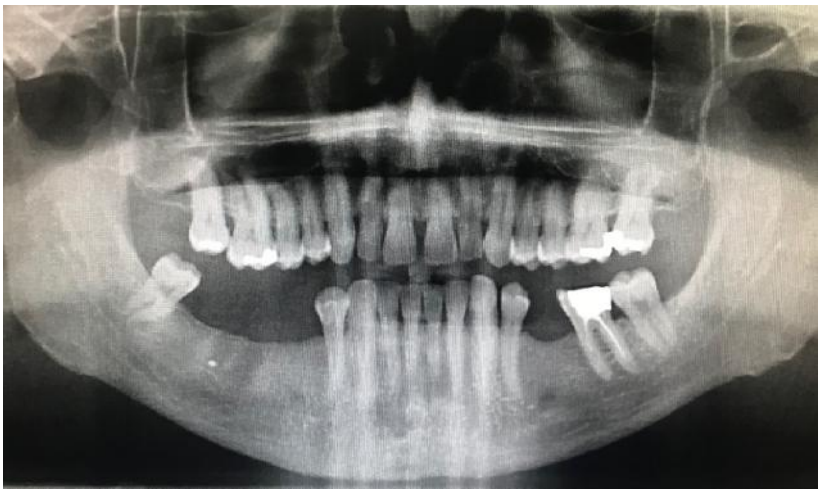

Image 1. Orthopantomography performed in April 2018 where a radiolucent image is visible in the anterior area of the mandible

Image 2. Orthopantomography performed in July 2019 where the radiolucent image is no longer visible in the anterior area of the mandible

Image 3: Orthopantomography performed in July 2018, where a radiopaque image is visible near tooth 46.

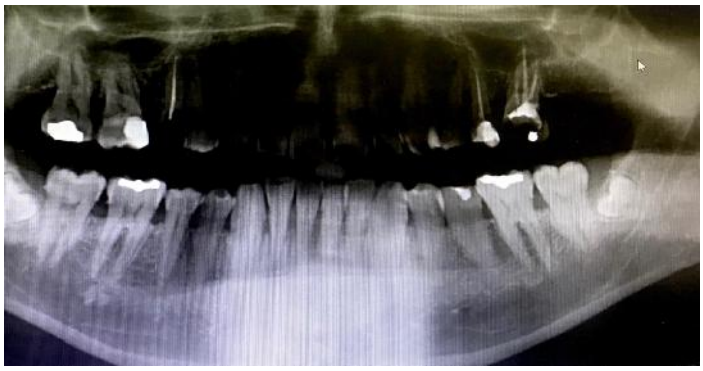

Image 4. Orthopantomography performed in July 2019, where a radiopaque image close to tooth 46, which is more radiopaque and larger, is visible

Image 5. Orthopantomography performed in 2017 where a radiopaque / radiolucent image is visible next to tooth 46

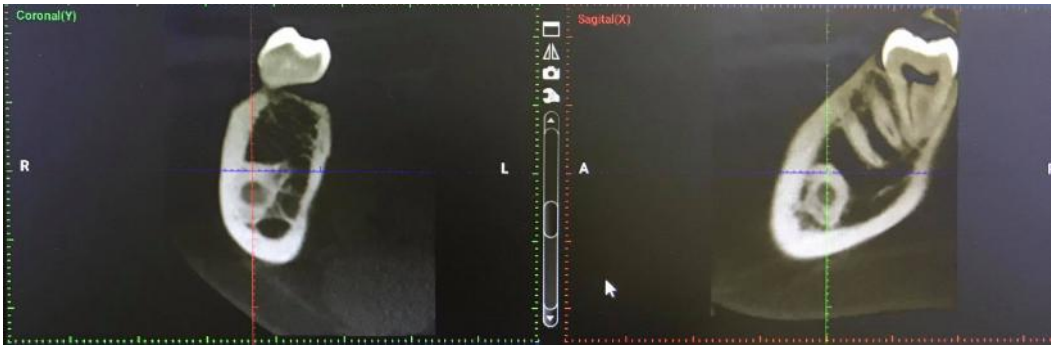

Image 6. Scan performed in 2019 where an image with well-defined edges is visible

The edges of the lesions, only 4 lesions (focal and periapical cemento-osseous dysplasias) showed more irregular margins on the control x-ray, which alert us to a rigorous differential diagnosis due to the possibility of more invasive pathologies. We included in the differential diagnosis idiopathic sclerosis and focal sclerosing osteomyelitis, however we excluded the possibility of focal sclerosing osteomyelitis since we did not observe any image with the appearance of snowflakes or cotton or an infectious sign, but we kept the possibility of idiopathic sclerosis since radiographically and clinically it is not possible to make this distinction.

Conclusion

Most cemento-osseous lesions are radiographic findings observed as radiopaque and radiolucent images, usually asymptomatic. These reflect a constant doubt for the dentist in his diagnosis, due to the similar characteristics with several other pathologies.

Studying the evolution of the lesions observed between the initial radiography and the control, as well as the literature, we can conclude that we must periodically control the lesions observed in routine radiographs, with radiolucent and or radiopaque pattern, and that do not cause swelling in the cortical bones, either internal or external, nor present symptoms, in order to avoid unnecessary invasive treatments.

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