



RADIOLOGIC PROGNOSIS OF AN IDIOPATHIC BONE CAVITY OF THE MANDIBLE IN 1-YEAR PERIOD

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ABSTRACT

An idiopathic bone cavity (IBC) tends to rise as an abnormality in osseous growth, a degenerating tumoral process, or triggered by hemorrhagic trauma. This paper describes the interpretation of an IBC and its progression over one year. The patient's initial radiographic images showed well-defined multilocular radiolucency located at the right mandibular molar region, extending between the teeth and the mandibular basis. No clinical symptoms were present, and the course of the mandibular canal was not altered. The lesion was not initially biopsied due to the patient's dental anxiety. Over one year, the radiolucent area extended anteriorly and thinned the lingual and buccal cortices. Prior radiolucent areas changed to granular-appearing bone. The diagnosis was based on a fine-needle aspiration biopsy. The appearance of an IBC is not unique; its benign nature should be differentiated from multilocular or fibro-osseous lesions by a careful interpretation of clinical and radiological perspectives.

Keywords: Nonodontogenic cysts, idiopathic bone cavity, cone-beam computed tomography, oral pathology

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INTRODUCTION

Idiopathic bone cavities (IBC) are included together with giant cell granulomas, cherubism, and aneurysmal bone cysts in the recent classification of the World Health Organization.¹ IBCs, also called simple bone, traumatic, solitary hemorrhagic cysts, are intraosseous cavities that lack an epithelial lining, therefore, are not considered true cysts. The bone cavity can be either empty or filled with fluid.² IBCs of the jaws are not widespread; they are observed in approximately 1% of all jaw cysts. Most IBCs (90%) are found in the long bones

of the body.³ The etiology of the IBC is unclear to date, although several theories have been proposed: an abnormality in osseous growth, a degenerating tumoral process, or a result of hemorrhagic trauma, which explains why the lesions tend to be more common in younger individuals when trauma often occurs.³⁻⁶ Mandibular IBCs are usually observed around the second decade of life in the posterior region with a female predominance.^{2,5,7,8} Clinical symptoms are generally not present, although rare pathological fractures may be observed due to the insidious course of

the thinning cortex.⁴ The lesion involves no true septa; however, it tends to scallop into the interradiolar and interdental alveolar bone and the endosteal surface of cortical plates, which mimics a multilocular appearance on 2-dimensional (2D) images.^{2,7} The lesions may show spontaneous healing where healing bone may appear radiographically granular.⁷ Additionally, surgical exploration and curettage are advised to stimulate bleeding and promote bone regeneration.^{5,7,8}

In this paper, both the prognosis of an IBC over 1 year and a

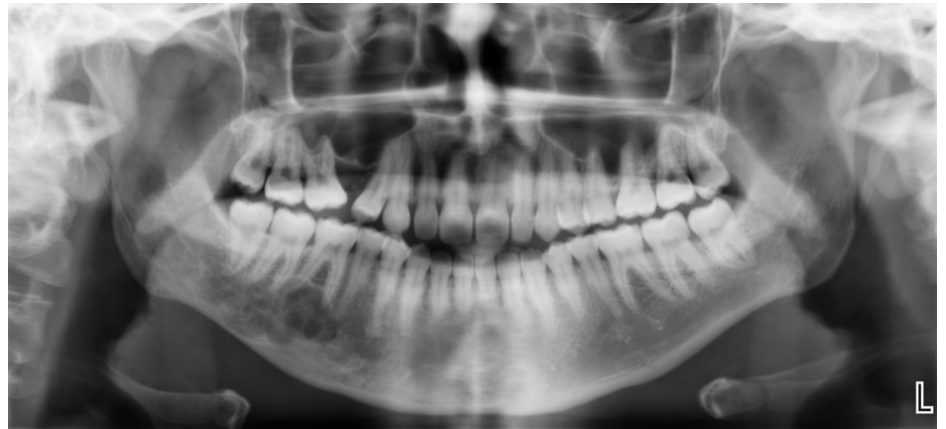
differential diagnosis approach to multilocular radiolucency were presented based on clinical, panoramic, and cone-beam computed tomography (CBCT) findings.

CASE REPORT

A healthy 24-year-old female patient was referred to Dentomaxillofacial Radiology clinic for a routine check-up. She had a traumatic tooth extraction performed by her prior dentist, and since that incident, she had been avoiding her dental visits. Multiple caries in all quadrants of the jaw were detected, and panoramic radiography was prescribed. The patient has given written consent for using the information from the patient's dental records for research purposes.

Panoramic radiography (Planmeca ProMax, Helsinki, Finland) showed a multilocular lesion at the right posterior mandible, involving anteriorly from the second premolar posterior to the third molar and inferior to the basis mandible (**Fig.1**). The patient did not have any trauma history or paresthesia, anesthesia, or tingling sensation on the lower right side of her face. Pain or swelling was not present. The vestibular and lingual areas were palpated for the presence of any expansion or crepitation or

Figure 1. The patient's initial panoramic radiograph reveals a multilocular lesion located at the right posterior mandible.



tenderness on palpation. Along with a lack of lymphadenopathy, no symptoms were present. The vitality of the teeth (#45,#46,#47,#48) was tested using an electric pulp tester and compared with the left mandibular teeth (#35,#36,#37,#38). All teeth were found to be vital.

A CBCT (Planmeca ProMax 3D Mid, Helsinki, Finland) examination was performed to evaluate the nature and the extent of the lesion before the biopsy. The periphery of the radiolucent lesion was well defined, and the shape and the border of the lesion were scalloped. Thin, loose septa were detected in the internal structure. The radiolucency extended from the

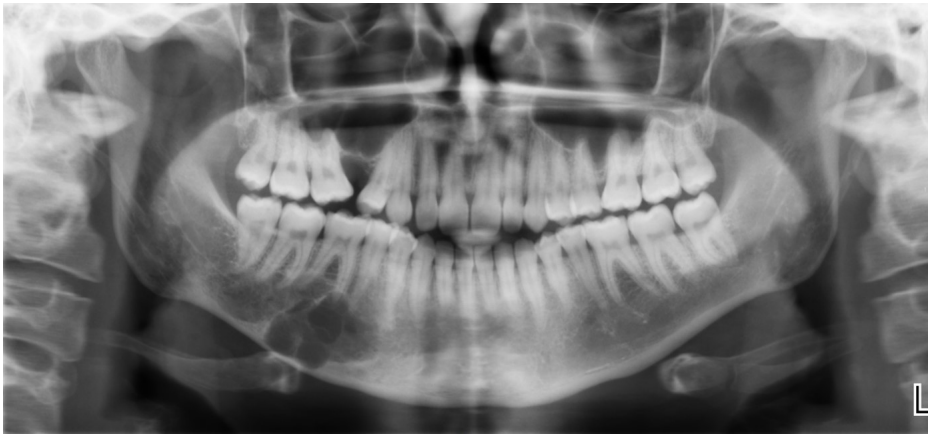
to the third molar apex, and the lesion showed minimal extension to the alveolar bone both between the roots of the teeth and the interdental area. The lesion occupied both the buccal and lingual sides of the mandibular canal. The lesion did not alter the course of the mandibular canal. However, thinning of the buccal and lingual cortices was observed. The roots of the affected teeth were intact, and no resorption was present, although the partial lamina dura was disrupted. In the coronal slices, minimal expansion was detected (**Fig.2**).

The initial diagnosis of IBC was made. The patient was referred to the Oral and Maxillofacial Surgery Department for biopsy to rule out other differential diagnoses. However, due to the patient's previously developed dental anxiety, she rejected the proposed procedure. Almost a year later, she was again referred to Dentomaxillofacial Radiology clinic and gave her consent for the biopsy. The clinical and radiological features were detected, and again, panoramic and CBCT images were taken. Clinical symptoms were almost the same, with no tenderness to palpation and without any evidence of expansion.



Figure 2. Patient's initial CBCT images. **a)** At the axial slice, the radiolucent lesion which thins the buccal and lingual cortical plates, **b)** At the sagittal slice, the radiolucent lesion minimally extends to the interdental and interradicular alveolar bone, **c)** At the coronal slice, a granular-appearing bone shows an inferior border with well-defined radiolucencies at the superior portion of the lesion.

Figure 3. The patient's second panoramic radiography demonstrates that the lesion was grown along the axis of the mandible anteriorly with increased radiolucency.



The teeth were still vital. The radiographic features, however, revealed a progression of the lesion towards the anterior and inferior, with increased radiolucency of the scalloped lesion (**Fig.3**).

In comparison with the initial CBCT images, the area of radiolucency was increased, extending through the granular-appearing bone, although the radiolucent area buccal to the mandibular molars had changed to granular bone from total radiolucency. The course of the mandibular canal was not significantly displaced. The buccal and lingual cortical borders became gradually thinner; however, the cortices stayed intact. No perforation was observed. No displacement of the involved teeth or root resorption was present (**Fig.4**).

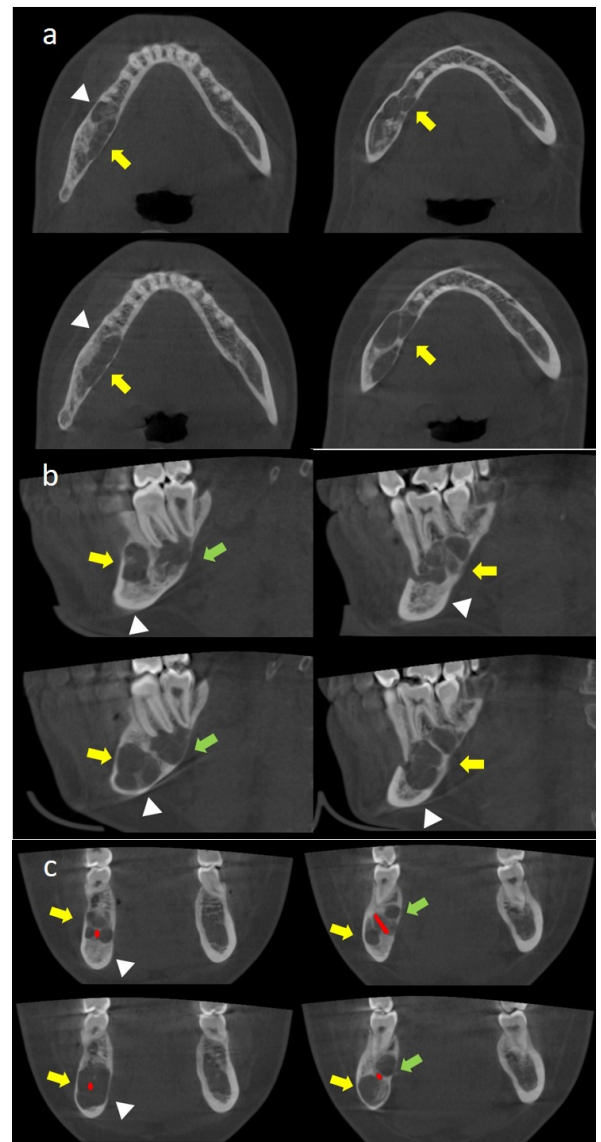
Because the initial diagnosis of the lesion was not changed based on the new radiological features, the patient was again referred to the Oral and Maxillofacial Surgery Department for aspiration biopsy. Aspiration biopsy revealed that the cavity presented no soft tissue content and was filled with air. The IBC was accessed through a vestibular incision and elevation of a mucoperiosteal flap, and a bony vestibular window was created using a round bur. Then, the lesion was fully explored. No epithelial lining of the cystic cavity was present, confirming the initial diagnosis.

Finally, the bone cavity walls were curetted to promote healing.

DISCUSSION

IBCs are well-defined radiolucencies that are usually asymptomatic and are detected during routine dental radiographic examinations. An IBC is observed mostly in the mandibular molar region and mimics multilocular radiolucency on 2D images due to its scalloping nature.² Some multilocular lesions that may be considered in the differential diagnosis are keratocystic odontogenic tumor (KOT), ameloblastoma, central giant cell granuloma (CGCG), aneurysmal bone cyst (ABC), and odontogenic myxoma (OM). CGCG, ABC, and OM are multilocular radiolucencies that tend to occur in the same age group as IBCs; however, all present true septa in CBCT images.

Figure 4. For each quadruple image, the upper images represent the initial CBCT images, and the lower images represent the second CBCT images, 1 year later. The yellow arrows show the increased radiolucencies, and the green arrows show gradual thinning of the cortices after 1 year. **a)** At the axial slices, the white arrowhead demonstrates that the radiolucency had changed into granular-appearing bone. **b)** At the sagittal slices, the white arrowhead indicates that the granular-appearing bone had changed into total radiolucency in contrast with the axial slices. **c)** The course of the mandibular canal is marked in red. The white arrowheads show again that the granular-appearing bone had developed increased radiolucency.



Furthermore, the key features of ABC are pain and severe expansion producing facial deformity, whereas expansile CGCG usually arises anterior to the first mandibular molars and presents tooth displacement.^{2,7} A similar radiologic feature between OM and IBC is that the lesions tend to extend into the interradiolar bone without causing root resorption; however, OM lesions are less expansile than ameloblastomas and CGCG.⁷ In the presented case, even though the patient's age was in accordance with the aforementioned differential lesions, they were ruled out based on clinical and radiologic symptoms. The age and gender of the case were compatible with the previous reports.^{2,5,8}

Besides the clinical features of IBC, its radiologic features may have a similar appearance as KOT with a tendency to grow along the long axis of the bone resulting in minimal expansion, scalloped borders, and extending between the roots of the teeth. However, KOTs usually cause root resorption and displacement of the teeth. Unicystic ameloblastoma is reported in a younger population with symptoms like painless swelling, displacement of anatomic structures, and root resorption.⁷ KOT and ameloblastoma were ruled out as initial diagnoses because the lesion did not cause any swelling or alter the course of the mandibular canal, and the roots that were in proximity to the lesion stayed intact.

Studies report that the etiology of IBCs is still vague and might have three possible theories such as abnormal osseous growth, a degenerating tumoral process, and a traumatic origin; some IBC lesions are associated with florid osseous dysplasia, fibrous dysplasia, or CGCG.^{3,6,7,9} The degenerating tumoral process is based on the idea of liquefaction in the middle part of fibrous dysplasia or CGCG inducing cyst formation, which is associated

with a healing process.^{3,9} The abnormal osseous growth may present abnormally produced trabeculae, which may block lymphatic drainage and induce the formation of IBCs.⁶ The presented case displayed a granular-appearing bone, abnormal trabeculae without a history of trauma, progressing into complete radiolucency after 1 year. In addition, the healing parts of the IBC resembled fibro-osseous lesions. IBCs may be solitary or multiple and generally do not have clinical symptoms. It is reported that they tend to heal spontaneously; however, curettage of an IBC favors progressive bone regeneration, improving its prognosis.^{5,8} In the presented case, after performing the biopsy, surgical exploration and curettage were carried out to stimulate bleeding and healing.

In conclusion, although IBC is not frequently observed, it should be interpreted carefully. Each clinical and radiological feature should be interpreted and organized thoroughly before informing the patient and initiating any procedure.

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