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Cemento-ossifying fibroma in the anterior region of the mandible: a case report emphasizing a conservative surgical management

Abstract:

Cemento-ossifying fibroma (COF) is a slow-growing, well-defined unilocular benign mesenchymal odontogenic tumor, that can have sclerotic edges and mixed areas. This case report details a conservative surgical treatment approach for COF that preserved both the cortical basal bone and the tooth segment. A thirty-three-year-old female presented with an asymptomatic extensive lesion in the anterior mandible, manifesting mild facial asymmetry, with one year of evolution. Imaging revealed a mixed dense lesion with sclerotic edges, with extension to the periapex of the teeth 33-44, expanding and thinning the cortical bone. Histopathology confirmed COF, showing fibrous stroma with spherical cementoid calcifications, overlaid with intact bone tissue. Conservative surgery was performed combining enucleation and curettage, with peripheral ostectomy, maintaining the cortical basal bone from the mandibulae, and tooth by apicoectomies. Three- and ten-months postoperative imaging displayed peripheral bone neoformation at the site, indicating effectiveness in the short-term follow-up, with no evidence of residual disease or recurrence.

Keywords: Diagnosis; Oral surgery; Bone diseases; Oral surgical procedures; Case reports.

INTRODUCTION

Fibro-osseous lesions comprise a group of lesions that primarily affect the gnathic bones and the craniofacial region¹. They are characterized by the replacement of bone tissue with a connective tissue matrix with varying levels of mineralization¹⁻³. In the latest classification of the World Health Organization (WHO), fibro-osseous tumors and dysplasia includes cemento-osseous dysplasia, segmental odontomaxillary dysplasia, fibrous dysplasia, ossifying fibroma divided in psammomatoid and juvenile trabecular, and familial gigantiform cementoma⁴.

Statement of Clinical Significance

This case report highlights the clinical, radiographic, and histopathological features of a large cemento-ossifying fibroma in the anterior region of the mandible. The lesion was managed with a conservative surgical approach, emphasizing the importance of accurate diagnosis and treatment planning in preserving functional and esthetic outcomes. This report emphasizes the need for long-term follow-up to monitor for recurrence and provides valuable insights for clinicians in managing similar cases.

Meanwhile, the group of benign mesenchymal odontogenic tumors includes odontogenic fibroma, cemento-blastoma, cemento-ossifying fibroma, and odontogenic myxoma, and is a group of lesions derived from mesenchymal components of the dental forming structures^{5,6}. The cemento-ossifying fibroma (COF) is characterized by cemento-like calcifications and bone production in a fibrous stroma⁴. It is mostly diagnosed in the third to fourth decades of life, with a predilection for females in a ratio of 5:1⁴.

Clinically, COF presents as a painless bone expansion, slow-growing, mostly presented as a solitary lesion,

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and occasionally can achieve a large size⁷⁻⁹. Radiographically, it appears as a well-defined lesion with sclerotic borders with variable extents of radiolucent and radiopaque areas, depending on the amount of mineralized material present and the duration of lesion evolution^{6,7}. Histologically, the connective tissue that forms the lesion contains varying amounts of mineralized and fibrous tissue, with a thin capsule or well demarcated margin surrounding normal bone^{4,6,8}. The definitive diagnosis is made through clinical, radiographic, and histological correlation¹⁰.

The treatment of choice typically involves surgical excision for large lesions, while conservative treatment with enucleation and curettage and/or peripheral osteotomy may also be indicated for mild lesions¹⁰⁻¹². The objective of this case report is to describe the clinical, radiographic, and histological characteristics, emphasizing the surgical conservative management of a case of COF.

CASE REPORT

A 33-year-old female patient was referred for evaluation of an intraosseous lesion in the mandible,

which had been evolving for approximately one year. The patient denied any comorbidities, use of medication, tobacco, and alcohol consumption. On extraoral physical examination, there was a slight facial asymmetry in the left mental region, particularly in the lower canine area. In the intraoral physical examination, bone expansion was observed in the vestibular region of tooth 33 (Figure 1A-B). Radiographic examination shows a mixed radiolucent image with radiopaque areas, with sclerotic borders, extending into the anterior mandibular region, involving the periapex of teeth 33-44, measuring approximately 5 cm, without root resorption (Figure 1C). Cone beam computed tomography (CBCT), revealed hypodensity with hyperdense areas inside, with expansion and thinning of the buccal and lingual cortical bone, without bone fenestration or root resorption (Figure 1D-F).

Subsequently, an incisional biopsy was performed using a trephine, followed by curettage of fragments from the interior of the lesion (Figure 2A). Based on the clinical and imaging characteristics, the diagnostic clinical hypotheses included: cemento-ossifying fibroma, expansive periapical cemento-osseous dysplasia, Pindborg's tumor,

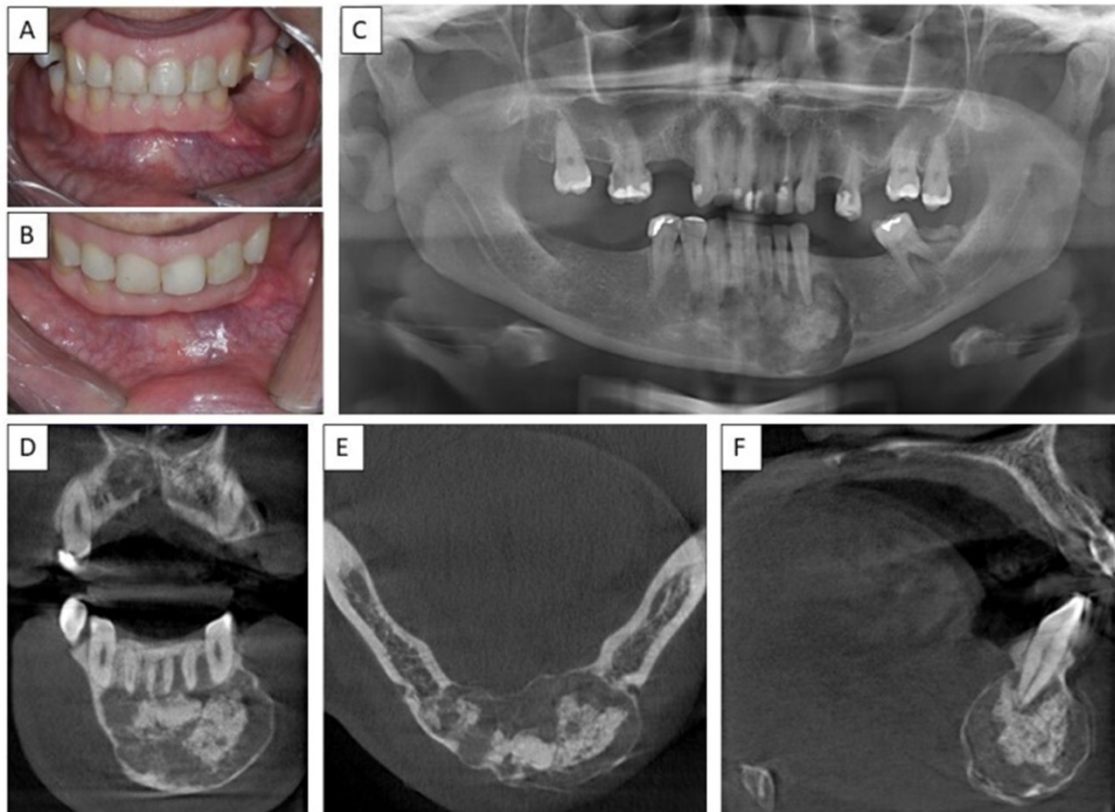


Figure 1. A and B) Intraoral aspect with mild bone expansion; C) Panoramic radiography showing mixed radiolucent image with radiopaque areas, sclerotic borders, extending into the anterior mandibular region, involving the periapex of teeth 33-44, expansion of the buccal and lingual cortical bone, without root resorption; D) Coronal section; E) Axial section; F) Sagittal section: well-defined hypodense image with hyperdense areas inside, showing expansion of the cortical bone without rupture.

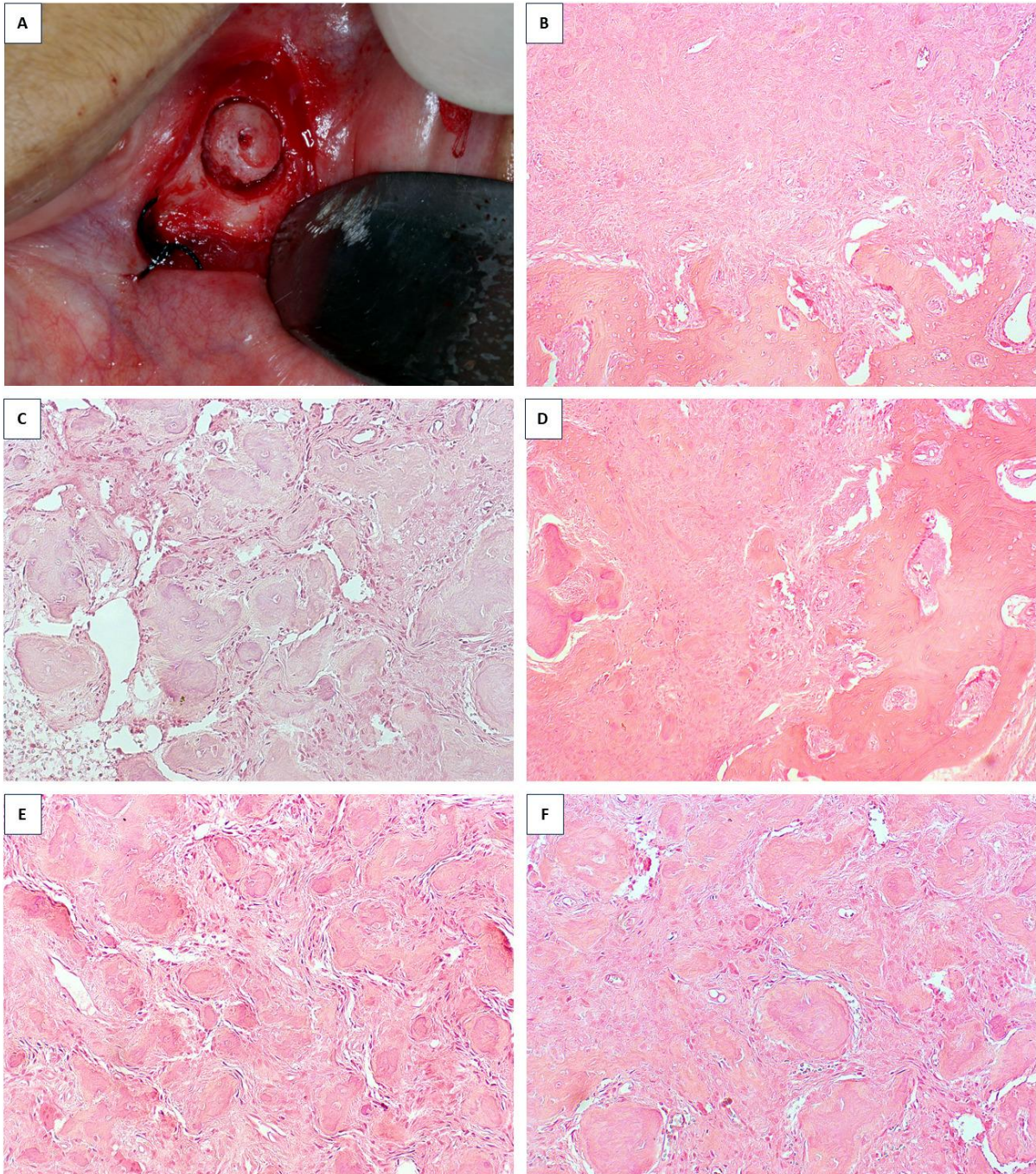


Figure 2. A) incisional biopsy using a trephine; B and C) HE stained slides, at 100x and 200x magnification, showing a fibrous stroma with spherical cementoid calcifications, overlaid with an intact bone tissue; D, E and F) HE stained slides, at 100x and 200x magnification, of the excised material, presenting cementoid calcifications and intact bone tissue, confirming the diagnosis of COF.

calcifying odontogenic cyst, and fibrous dysplasia, due to the distinctive radiographic pattern and the lesions predilection for the anterior region, presenting clinically as a painless swelling of the bone. On histopathological examination, fibrous stroma with spherical cementoid calcifications, overlaid with an intact bone tissue, leading to a diagnosis of COF (Figure 2 B-C).

The patient was referred to a maxillofacial surgeon for case evaluation and management. Conservative surgical excision of the lesion was performed under general anesthesia. An intrasulcular approach with a lateral relaxing incision was performed, exposing the entire anterior mandibular region to facilitate an osteotomy for lesion access. The remaining buccal cortical

bone was removed to fully expose the lesion's margins. Lesion excision was carried out, carefully identifying and following cleavage planes between the lesion and the surrounding bone. Endodontic treatment of teeth 33 to 44 was completed in advance to facilitate the planned conservative surgical approach, which required apicoectomy of the anterior teeth. The apicoectomy allowed access to the lesion, with biocompatible obturation material placed to seal the apices, ensuring proper closure and minimizing the risk of postoperative complications. Curettage and peripheral ostectomy were performed to ensure complete removal of any residual lesion. The flap was sutured using an interpapillary technique, without the need for grafts or fixation plates (Figure 3). The excised material was histopathological analyzed, confirming the diagnosis of COF (Figure 2 D-F).

The patient returned for follow-up after seven days, presenting signs of excellent healing in the operated area and radiographic and CBCT imaging showed excision of the lesion, together with apicoectomies of teeth 33-44, with a small volume of remaining bone (Figure 4), but the patient reported paresthesia in the left lower lip and chin region. Photobiomodulation was performed in a single session to alleviate paresthesia symptoms (Therapy Ec, DMC®), using infrared light at $808 \text{ nm} \pm 10 \text{ nm}$ on points on the skin of the left chin and lower lip for 40 seconds each. After 70 days, both extraoral and intraoral examinations showed no significant alterations, and imaging exams showed initial bone neoformation on the surgical area (Figure 5). The patient reported complete resolution of the paresthesia symptoms in the lower lip and left chin. Ten-months postoperative follow-up imaging showed bone neoformation with a bone defect (Figure 6), and extraoral and intraoral examinations showed no significant alterations.

The patient continues to undergo semiannual clinical and imaging follow-up to evaluate local bone formation and for ongoing monitoring, with excellent treatment outcomes so far.

DISCUSSION

Most of COF occur in the mandible, with predilection of premolar and molar region^{4,7,8}. Here, we present a case of a COF in the anterior mandible region, that despite the large size was treated with a conservative surgery over surgical excision. COF is primarily diagnosed between the third and fourth decades of life, with a female predilection, being in accordance with this case. The clinical appearance of COF is usually bony swelling, usually no symptoms are reported but pain is possible⁴. The current case also presented as a mild swelling of the area affected, and the patient denied symptomatology. The minimal or even complete lack of symptoms can cause a delay in diagnosis, identified by accident on routine radiographs.

Radiographically it exhibits as a well-defined unilocular mixed lesion with variable opacification, depending on the stage of the lesion, being mainly radiolucent in initial stages, and later developing opacification and calcifications in the center¹³. It may present with displacement of adjacent teeth and perforation or thinning of the cortical bone^{4,6,7,9}. The present case exhibited mixed radiolucent image with radiopaque areas, and sclerotic borders, extending into the anterior mandibular region, involving teeth 33-44, measuring approximately 5 cm, with expansion of the buccal and lingual cortical bone, without root resorption.

Considering the lesion's size, location, and clinical aspects, the incisional biopsy technique with a trephine

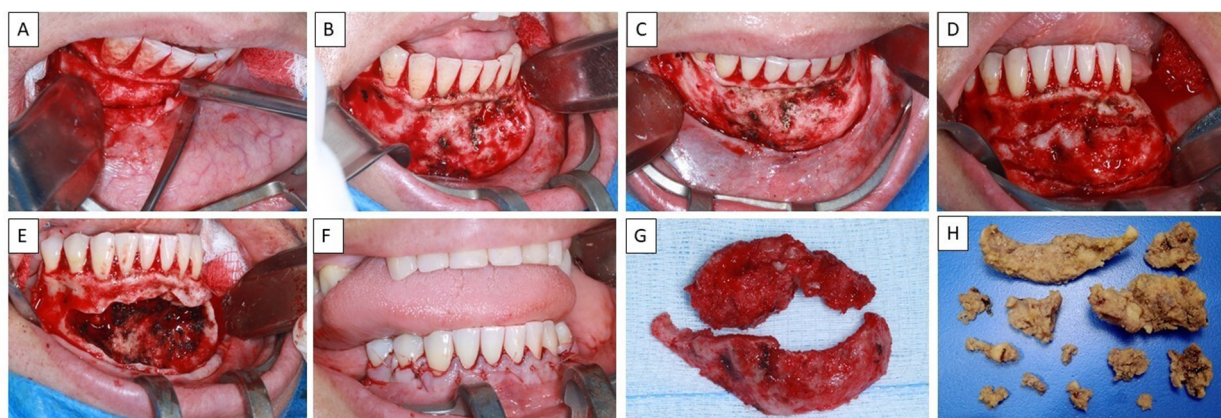


Figure 3. A) Intrasulcular incision; B) and C) Exposure of the anterior mandibular region; D) Osteotomy of the buccal cortical bone for lesion access; E) Exposure of the lesion; F) Interpapillary sutures; G) Surgical specimen; H) Decalcified material.

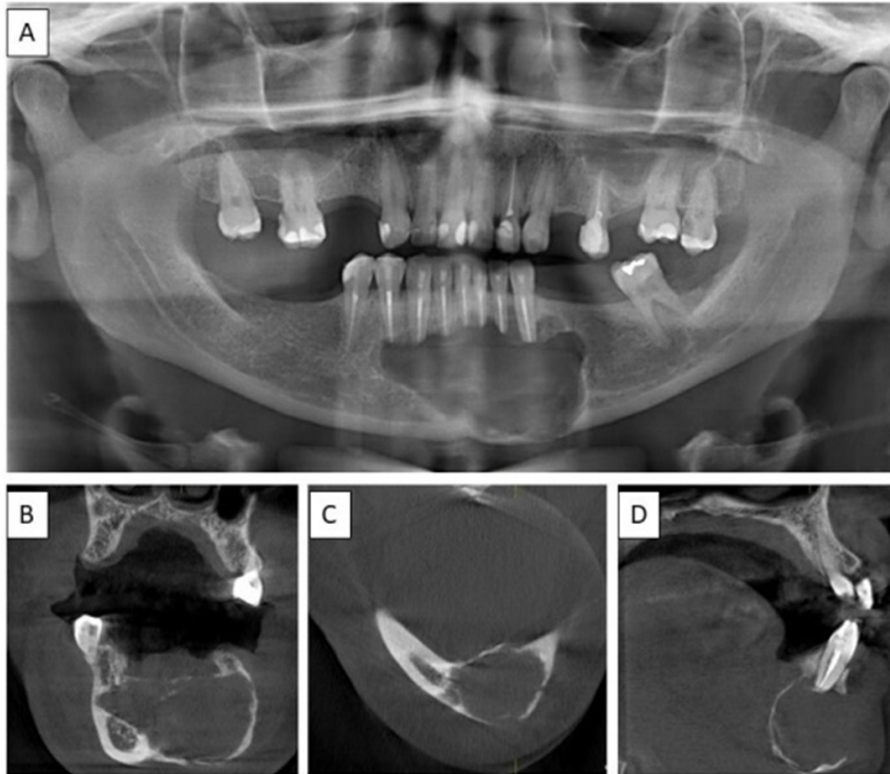


Figure 4. A) Immediate postoperative panoramic radiograph showing removal of the lesion and apicoectomies of teeth 33-44, with a small volume of remaining bone; immediate postoperative cone beam CT: B) Coronal section; C) Axial section; D) Sagittal section, showing lesion removal, apicoectomies of teeth 33-44, and thin cortical bone.

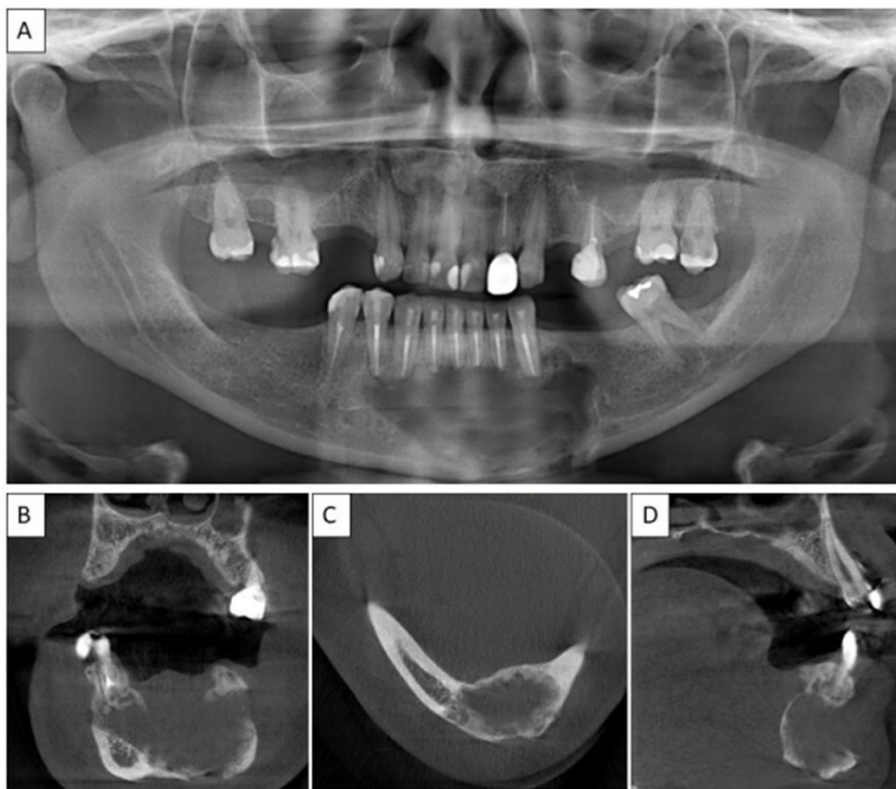


Figure 5. A) Three-months postoperative panoramic radiograph, with bone neoformation; three-months postoperative cone beam CT: B) Coronal section; C) Axial section; D) Sagittal section, bone neoformation.

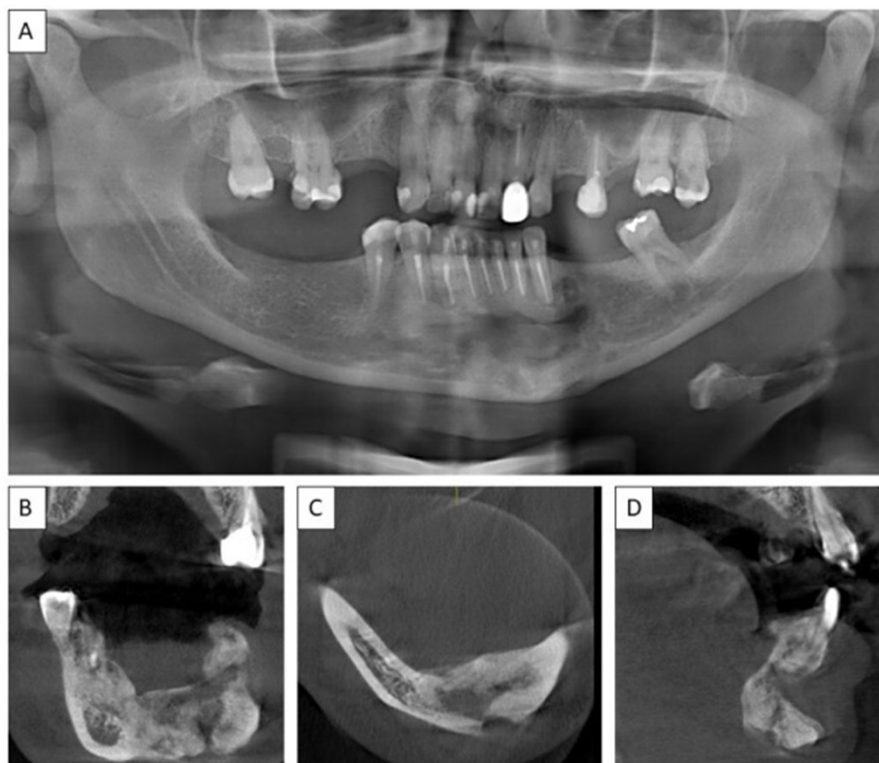


Figure 6. A) Ten-months postoperative panoramic radiograph, with bone neof ormation; ten-months postoperative cone beam CT; B) Coronal section; C) Axial section; D) Sagittal section, bone neof ormation.

was chosen to minimize trauma and preserve healthy structures, allowing patients better recovery. The trephine offers efficacy and precision, minimizing the tissue damage compared to other surgical approaches, preserving the microscopic view of the interface between the healthy bone tissue and the lesion, including the cortical bone. This interface bone/lesion represents a critical diagnostic area for pathologists and contributes significantly to diagnostic accuracy¹⁴.

Recurrence rates after tumor removal is rarely detected, being higher in cases of maxilla than mandibulae, due to the difficulty of surgical removal and larger size^{15,16}. Long-term follow up of patients with COF is mandatory due to recurrences that can occur up to 10 years after treatment. In our case, we present a short follow-up time, that may not be sufficient to draw definitive conclusions regarding the long-term recurrence risk of this lesion; the patient continues vigilant monitoring for recurrence detection every 6 months.

The recommended treatment for large lesions is typically surgical resection followed by reconstruction with a bone graft^{10,11}. The present case was treated with combined conservative surgery with enucleation, curettage and peripheral ostectomy to prevent the typical disfigurement and dysfunction associated with surgical resection.

Despite the low recurrence of COF⁴, regular examinations and consultations should be conducted. Any changes must be promptly investigated, as early diagnosis can enable less aggressive treatment options for the patient.

CONCLUSION

In conclusion, the conservative surgical approach demonstrated effectiveness in completely removing the COF, preserving mandibular function, and minimizing complications in the short term. However, it is essential to recognize that the follow-up period in this case is relatively short, which may be insufficient to fully assess the potential for recurrence. As such, we emphasize the importance of long-term, periodic evaluations to detect potential recurrences and ensure sustained treatment success. The positive outcomes observed underscore the feasibility of conservative surgical management in selected cases, while also highlighting the necessity of vigilant post-treatment monitoring.

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AUTHORS' CONTRIBUTIONS

HMC: data curation, investigation, writing – original draft. RAE: data curation. ACPR: supervision, writing – review & editing. PAV: writing – review & editing. MAL: writing – review & editing. ARSS: supervision, writing – review & editing. ACR: writing – review & editing.

CONFLICT OF INTEREST STATEMENT

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