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SUCCESSFUL SURGICAL MANAGEMENT OF THE LARGE RADICUALAR CYST WITH THE COMPRESION OF MENTAL NERVE AND RISK OF THE MANDIBLE FRACTURE

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ABSTRACT
Radicular cysts are the most common inflammatory odontogenic cysts, typically associated with non-vital teeth and often resulting from untreated or inadequately managed endodontic infections. Although they are usually small and asymptomatic, larger lesions may cause significant bone destruction and involve adjacent anatomical structures.
We report a case of a large radicular cyst in the mandible associated with a previously inadequately treated tooth. The lesion exhibited extensive bone resorption, resulting in cortical thinning and increased risk of pathological mandibular fracture.
Notably, the cyst was associated with compression of the mental nerve, leading to sensory disturbances.
The patient was managed surgically by complete enucleation of the cyst with careful preservation of the mental nerve. Postoperative recovery was uneventful, with resolution of symptoms and satisfactory bone healing observed during follow-up.
This case highlights the importance of early diagnosis and adequate endodontic treatment in preventing the progression of radicular cysts to advanced stages.
It also emphasizes the need for careful surgical planning when managing large lesions associated with nerve involvement and structural weakening of the mandible.

INTRODUCTION
Radicular cysts are the most common inflammatory odontogenic cysts of the jaws, originating from epithelial rests of Malassez secondary to pulpal necrosis. They are typically associated with non-vital teeth and are often detected incidentally on routine radiographic examination. In many cases, these lesions develop as a consequence of untreated or inadequately treated endodontic infections.
While most radicular cysts remain small and asymptomatic, some lesions may undergo progressive enlargement due to osmotic pressure changes and continued epithelial proliferation, resulting in significant bone resorption. In advanced cases, large radicular cysts may lead to expansion and thinning of the cortical plates, increasing the risk of pathological mandibular fracture.
Involvement of adjacent anatomical structures, such as the mental nerve, is uncommon but clinically significant, potentially resulting in sensory disturbances including paresthesia or hypoesthesia. These complications are more likely in long-standing lesions, particularly when associated with delayed diagnosis or insufficient prior dental treatment.
The management of large radicular cysts remains a clinical challenge, especially when complicated by nerve compression and compromised bone integrity. Surgical enucleation is the treatment of choice in most cases; however, careful planning is essential to minimize the risk of nerve injury and mandibular fracture.
In this report, we present a case of a large radicular cyst associated with inadequate prior treatment, mental nerve compression, and significant mandibular weakening, successfully managed through surgical intervention.

Procedures
The radiographic assessment (OPG) revealed a large radiolucent lesion in the mandibular left premolar region associated with teeth 34 and 35, both of which had undergone previous inadequately performed endodontic treatments.
Orthopantomographic examination demonstrated a well-defined radiolucent lesion in the mandibular left premolar region involving teeth 34 and 35. Both teeth had a history of previously performed but inadequate endodontic treatment, which was considered the most likely etiological factor contributing to the development of the radicular cyst.

Photo 1 a,b ; OPG and planification , Pre- op

A full-thickness mucoperiosteal flap was elevated to provide adequate access to the underlying pathology. Controlled osteotomy was performed to expose the cystic cavity. Intraoperatively, a large cystic lesion was identified and enucleated in toto together with the associated infected root remnants and periapical inflammatory tissue.

Photo 2: Osteotomy

Meticulous dissection was carried out in proximity to the mental nerve, which was identified to be compressed but anatomically intact and was carefully preserved throughout the procedure. Given the marked thinning of the mandibular cortices and the presence of infected root-associated pathology contributing to bone destruction, prophylactic rigid internal fixation was performed to restore mandibular stability and reduce the risk of pathological fracture.
The surgical site was thoroughly irrigated with sterile saline, and primary closure was achieved using layered suturing techniques. The excised specimen, including cystic tissue and associated infected root material, was submitted for histopathological examination to confirm the definitive diagnosis.

Photo 4 : Intraoperative clinical photograph demonstrating surgical enucleation of the radicular cyst

Photo 5 : Intraoperative clinical photograph demonstrating surgical enucleation of the radicular cyst in toto

The mental nerve remained intact and functionally preserved at the conclusion of the procedure. A titanium miniplate was adapted along the inferior border of the mandible and secured with three monocortical screws to provide rigid internal fixation and reinforce structural integrity of the weakened cortical bone.
The patient tolerated the procedure well without intraoperative complications. Postoperative instructions were given, including analgesia, antibiotic therapy, and advice on maintaining oral hygiene. The patient was scheduled for regular follow-up to monitor wound healing, neurosensory status of the mental nerve, and stability of the fixation hardware.

Photo 6 a,b: Excised cyst specimen shown after complete removal, sent for histopathological examination.

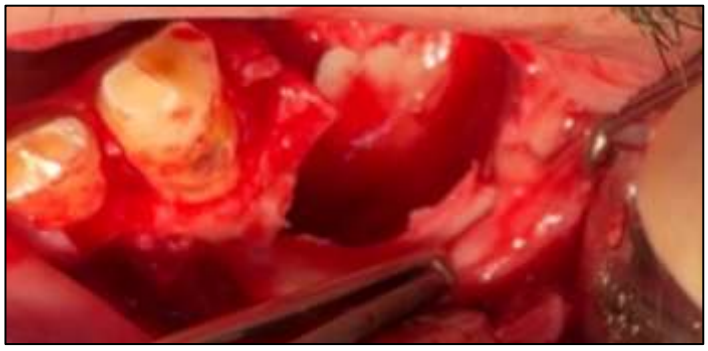

Photo 7 : Localization of the mental nerve

Intraoperative localization of the mental nerve at the mental foramen region was performed with meticulous dissection under direct visualization. The neurovascular bundle was carefully identified and isolated, with extreme caution taken to avoid traction or compression injury. The nerve was gently protected and retracted throughout the procedure to ensure its functional integrity was fully preserved.

Rigid internal fixation was achieved using a miniplate secured with three screws to stabilize the weakened mandibular bone.
The mini plate was carefully adapted to the contour of the mandible and positioned along the inferior border to reinforce structural integrity and prevent pathological fracture.
The fixation was confirmed to be stable with adequate screw purchase and proper alignment of the bone segments..

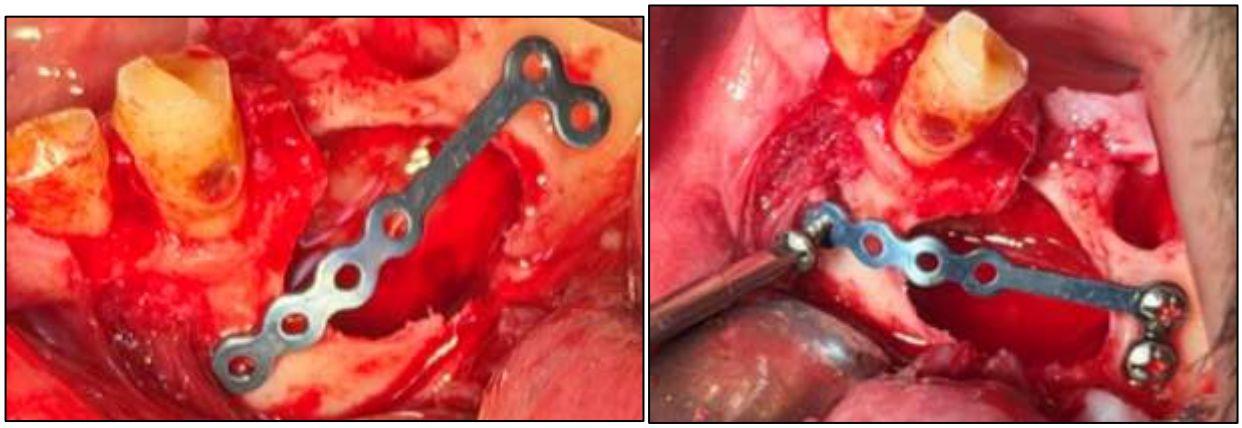

Photo 8 : Bone plate fixation

The Bone plate was carefully adapted to the contour of the mandible and positioned along the inferior border to reinforce structural integrity and prevent pathological fracture.

The fixation was confirmed to be stable with adequate screw purchase and proper alignment of the bone segments..

Photo 9 a, b:

a. Suturation
Intraoral view showing primary wound closure,with precise approximation of soft tissue margins and satisfactory adaptation for healing

b. Radiographic
Postoperative radiograph demonstrating stable placement of a miniplate with three screws along the mandibular cortex, confirming adequate fixation and proper alignment.

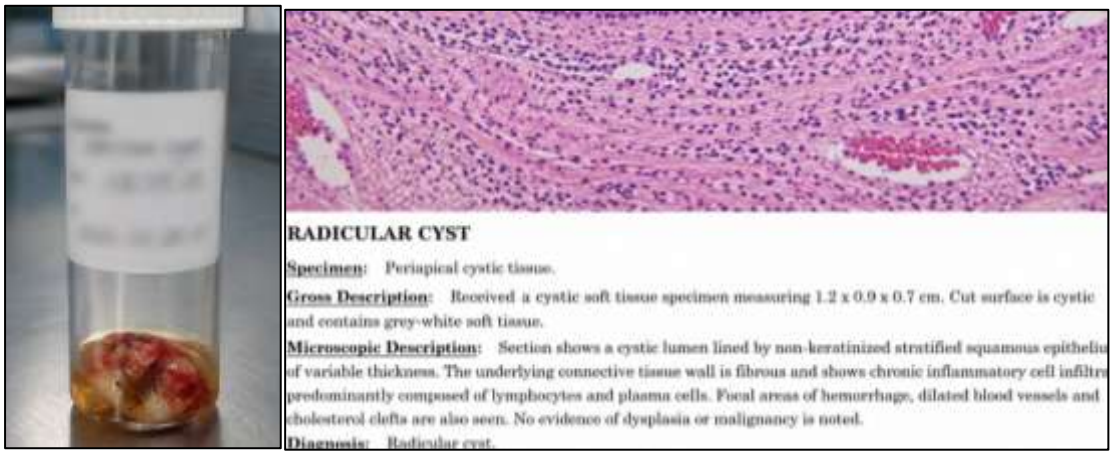

Photo 10 : Histopathology

RESULTS
The cystic lesion was completely enucleated without intraoperative complications. The mental nerve was successfully identified, carefully preserved, and postoperative neurosensory function remained intact. Rigid internal fixation using a miniplate with three screws provided satisfactory stabilization of the mandibular cortex.

Postoperative healing was uneventful, with no signs of infection, wound dehiscence, or pathological fracture. The patient demonstrated good recovery, and soft tissue closure healed satisfactorily. Histopathological examination confirmed the diagnosis of the excised lesion. Follow-up evaluations showed stable fixation and preserved neurosensory function.

DISCUSSION

Enucleation is the preferred management for most odontogenic cysts, allowing complete removal of the lesion while preserving adjacent vital structures. In this case, careful dissection was required due to proximity to the mental nerve and marked thinning of the mandibular cortices secondary to chronic inflammatory expansion and bone resorption.

Odontogenic cysts typically originate from epithelial remnants and enlarge through osmotic fluid accumulation and inflammatory mediators, leading to progressive osteoclastic bone resorption. Histologically, they are characterized by a fibrous cyst wall lined by stratified squamous epithelium, often showing chronic inflammatory infiltrate in infected cases, which correlates with accelerated bone destruction.

Histopathological examination of the excised specimen was performed, confirming the definitive diagnosis and correlating with the clinical and radiographic features.

The overall prognosis following complete enucleation of odontogenic cysts is generally favorable, particularly when complete removal of the cystic lining is achieved without residual epithelial remnants.

In cases involving significant preoperative bone thinning, there remains a transient risk of pathological fracture; however, the use of rigid internal fixation in this case significantly improves postoperative mechanical stability and supports uneventful functional recovery. With respect to neurosensory structures, proximity to the mental nerve may result in temporary paresthesia; nevertheless, spontaneous recovery is commonly observed over weeks to months provided there is no transection injury. Recurrence is considered uncommon for most non-aggressive odontogenic cysts following meticulous enucleation, although long-term radiographic follow-up is recommended to monitor for delayed recurrence or incomplete bone remodeling. Overall functional and structural prognosis in this case is expected to be good, contingent on adherence to postoperative monitoring and maintenance of oral health.

CONCLUSIONS

Complete enucleation of the cyst with preservation of the mental nerve and prophylactic rigid internal fixation provided a predictable and stable outcome in a structurally compromised mandible. The use of a miniplate with three screws effectively reduced the risk of pathological fracture and supported postoperative healing. Histopathological examination confirmed the definitive diagnosis, emphasizing its essential role in the management of odontogenic cystic lesions.

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