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Management of a Radicular Cyst in Anterior Maxilla With Use of Mineral Trioxide Aggregate (MTA) and Bone Graft: A Case Report

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Abstract

Introduction: Root cysts are asymptomatic lesions that occur in the periapical area of the tooth due to caries, pulp necrosis, or trauma. Various surgical approaches of enucleation and marsupialization can be performed to remove radicular cysts. The combination of enucleation and apicoectomy is an alternative treatment that can be used to remove radicular cysts without extracting the causative tooth. Case Report: A 37 years old female patient came with chief complaints of a lump on the upper front gum. The patient had a history of trauma to her front teeth approximately three years ago. Endodontic treatment was performed before surgery. The patient underwent enucleation of the radicular cyst followed by apicoectomy. Retrograde obturation is performed using Mineral Trioxide Aggregate (MTA), and a bone graft is administered to help regenerate bone defects. The patient was followed up one week and three months after surgery, there were no complaints or recurrence in this case. Conclusion: The combination of enucleation and apicoectomy is an alternative treatment to eliminating periapical abnormalities that can be performed to preserve existing teeth. 1 year follow-up; he was found to be asymptomatic, and periapical healing was observed in the radiograph with bone formation.

Keywords: Cyst , Enucleation, Apicoectomy.

Tratamento de cisto radicular em maxila anterior com uso de agregado trióxido mineral (MTA) e enxerto ósseo: relato de caso

Resumo

Introdução: Cistos radiculares são lesões assintomáticas que ocorrem na área periapical do dente devido a cáries, necrose pulpar ou trauma. Várias abordagens cirúrgicas de enucleação e marsupialização podem ser realizadas para remover cistos radiculares. A combinação de enucleação e apicectomia é um tratamento alternativo que pode ser usado para remover cistos radiculares sem extrair o dente causador. Relato de caso: Uma paciente do sexo feminino de 37 anos veio com queixas principais de um caroço na gengiva frontal superior. A paciente tinha histórico de trauma nos dentes da frente há aproximadamente três anos. O tratamento endodôntico foi realizado antes da cirurgia. A paciente foi submetida à enucleação do cisto radicular seguida de apicectomia. A obturação retrógrada é realizada usando Agregado Trióxido Mineral (MTA), e um enxerto ósseo é administrado para ajudar a regenerar defeitos ósseos. A paciente foi acompanhada uma semana e três meses após a cirurgia, não houve queixas ou recorrência neste caso. Conclusão: A combinação de enucleação e apicectomia é um tratamento alternativo para eliminar anormalidades periapicais que pode ser realizado para preservar os dentes existentes. Acompanhamento de 1 ano; ele foi encontrado assintomático, e a cura periapical foi observada na radiografia com formação óssea.

Palavras-chave: Cisto, Enucleação, Apicectomia.

INTRODUCTION

Radicular cysts are the most common cystic lesions that affect the jaws, which, though mostly asymptomatic, can be seen radiographically as an oval or pear-shaped unilocular radiolucency in the periapical region. Nonsurgical root canal procedures and periapical surgery followed by placement of bone substitute and bioceramic root-end filling material is generally the treatment of choice (Das et al. 2023).

Combination treatment with endodontics can be an alternative to removing cysts in the oral cavity without removing the causative tooth. Combination treatment in the form of apicoectomy aims to remove the area of infection in the apical part and prevent recurrent infections in the tooth. (Balaji,, Laskin, 2018 This combination treatment can be carried out with 80-90% success in maintaining tooth structure. (Avinash et al. 2019). In this case, the procedure for removing the cyst using a combination of apicoectomy is reported with enucleation surgery in the apical area.

Accurate diagnosis and management of these lesions are crucial for successful treatment outcomes (Scully, 2013). Histopathological examination remains the gold standard for definitive diagnosis, providing detailed information about tissue composition, cellular characteristics, and any atypical features. This microscopic analysis allows for the accurate identification of cystic lesions and aids in differentiating them from other pathologies, such as odontogenic tumors, which may have similar radiographic appearances but vastly different treatment protocols and prognoses (Gurcan et al 2009).

This case report presents a large radicular cyst involving three maxillary anterior teeth, i.e., teeth #21, #22, and #23 with tooth #22 having an open apex. Advanced radiological methods and histopathological investigation like biopsy, along with bone grafts, contributed to successful endosurgical management of the case.

CASE REPORT

A 37 years old female patient came with a chief complaint of a lump on the upper front gum. The patient had a history of trauma to her front tooth from a fall about three years ago. Then, the patient underwent endodontic treatment. On clinical examination, a lump was found in the apical area of tooth 21, which was the same color as the surrounding tissue and did not feel painful on palpation. Periapical radiological examination of tooth 21 showed a radiolucent image with clear radiopaque boundaries, and tooth 21 looked airtight after endodontic treatment. The results of the radiological examination showed that there was a cyst in the periapical area of tooth 21. Currently, the patient has no complaints of pain and wants to remove the lump without extracting the tooth. The patient was planned to perform a combination of enucleation and apicoectomy in this case (Figure 1 and 2).

Figure 1- Presence of fistula between teeth 22 and 23

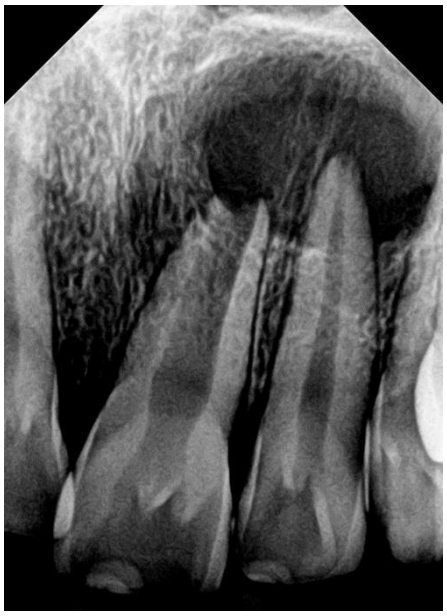

Figure 2 - Digital X-ray before treatment - Periapical radiograph showing a significant periapical radiolucency associated with teeth #21, #22, And: Tooth #21 with an open Apex

Endodontic treatment of teeth 21 and 22 was performed in the same session, using the condensation technique associated with bio-c selare. There was leakage of the bioceramic cement (figure 3).

Figure 3 – Filling of teeth 21 and 22

The patient has performed supra periosteal infiltration anesthesia of the anterior superior alveolar nerve in the labial area and a nasopalatine nerve block in the palatal area. A full thickness mucoperiosteal was made on the labial teeth 12-22. Then, the flap was dissected. with a rasparatorium. After the periapical cyst was visible on the distal surface of tooth 22, enucleation was performed using a curette until the entire cyst was removed (Figure 4). The removed cyst tissue was kept in 10% formalin for examination in the anatomical pathology department. The labial bone of tooth 21 was reduced using a bone drill until it reached the apex of tooth 21 (Figure 5).

Figure 4 - Visualization of the periapical cyst on the distal surface of tooth 22

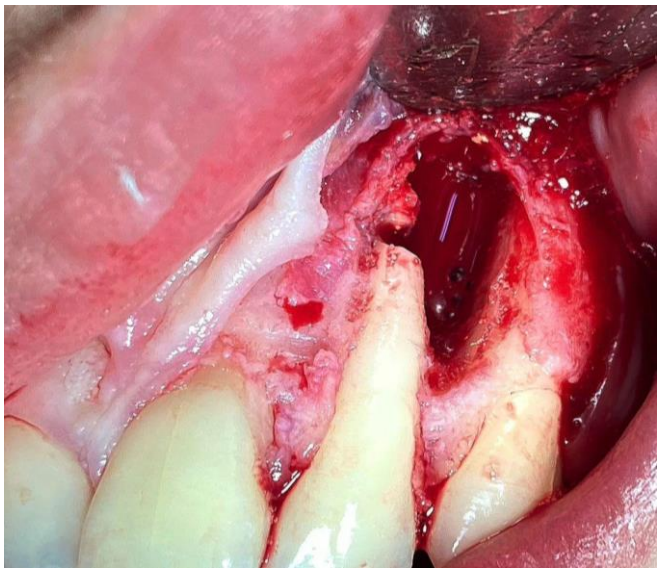

Figure 5 - Enucleation of the periapical cyst

Next, apicoectomy was performed, followed by retro-obturation with a large bank (figure 6).

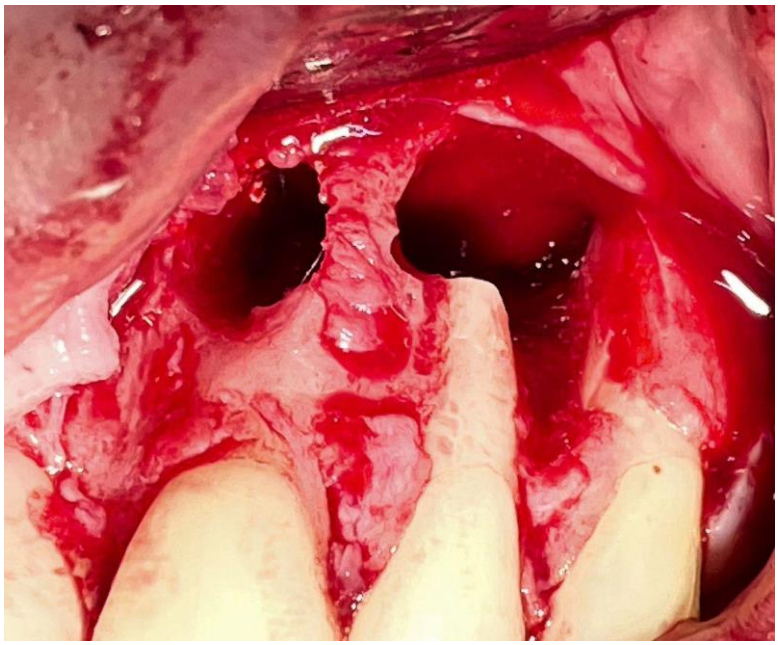

Figure 6 - Apicoectomy of teeth 21 and 22

This case report illustrates the successful management of a complex radicular cyst involving multiple maxillary anterior teeth. It emphasizes the critical role of a multidisciplinary approach, advanced diagnostics, precise surgical and non-surgical interventions, and the strategic

use of hydroxyapatite bone graft. This case highlights the challenges in treating such cysts and stresses the importance of collaborative efforts among dental specialists

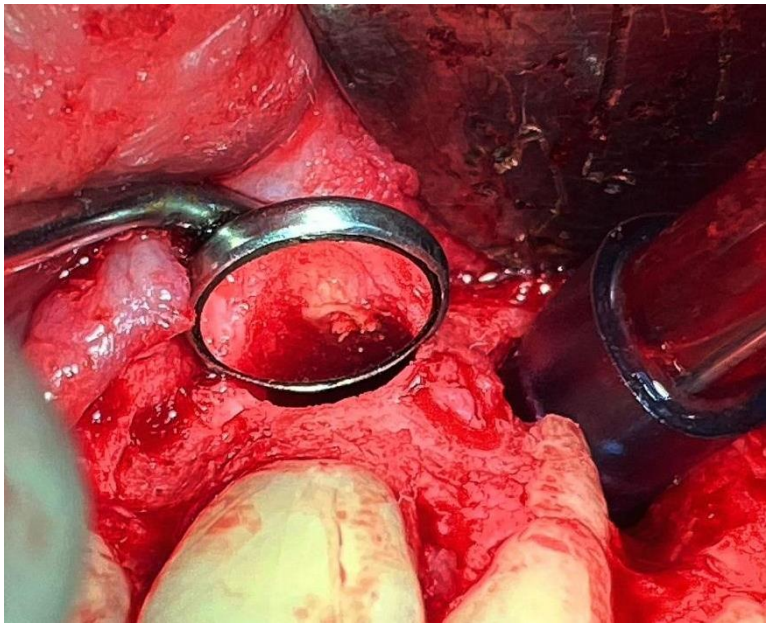

Figure 7 - hydroxyapatite bone graft filling the bone cavities

Long-term follow-up confirms treatment effectiveness, highlighting the need for ongoing monitoring to assess healing and stability over time, determined periapical osseous neoformation.

Figure 8 - 1-year follow-up after periodontal surgery

DISCUSSION

Apical surgery is now considered a predictable treatment option to save a tooth with apical pathology that cannot be managed by conventional, non-surgical endodontics. Appropriate treatment modality should be applied to the patients, which in turn improves the patients' quality of life (Saha, Saha, 2023). Apicoectomy was performed by resecting ± 3 mm from the apical at an angle of 45o. Cavity preparation was continued using a micro round bur with a depth of ± 3 mm. Then, obturation is retrograded by applying Mineral Trioxide Aggregate (MTA). After retrograde obturation, the bone defect caused by a cyst is carried out with a 0.5 g bone graft to speed up the bone regeneration process in the periapical area. After the entire process had been carried out, the surgical area was debridement, and the flap was repositioned and sutured. Patients were followed up for one week and three months after apicoectomy. The patient had no complaints, and no recurrence occurred after the procedure

Endodontic surgery is an alternative option to avoid tooth loss, especially anterior teeth accompanied by lesions in the periapical tissue. The success of endodontic surgical treatment is quite high, in the range of 70-90% of all endodontic cases. (Krastev, Filipov, 2020). Generally, apicoectomy is performed on teeth with a single root. Several alternative flap designs that can be used for apicoectomy include envelope, triangular, trapezoid, and semilunar. The selection of flaps is carried out with various considerations, considering the need for access to lesions in the periapical area. After achieving periapical access, curettage and enucleation are performed to remove the cystic lesion in the area. Enucleation can remove inflammatory tissue in the periapical area, which hinders the healing process due to insufficient blood supply. The enucleation action aims to remove inflammatory tissue, which increases blood. The combination of enucleation and apicoectomy is an alternative treatment to eliminating periapical abnormalities that can be performed to preserve existing teeth. Retrograde filling using MTA can prevent recurrence due to reducing the canal gap and apical seal, which is a good prognosis. (Setoaji ,Anastasia, 2024).

CONCLUSION

To conclude, this case report has demonstrated how management of a radicular cyst with enucleation and using bone graft substitute filled the defect area can be successful.

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