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Manejo cirúrgico de incisivo central superior com retentor intrarradicular e periodontite apical crônica: 12 meses de acompanhamento

| Surgical management of maxillary central incisor with intraradicular retainer and chronic periapical lesion: a 12-month follow-up

RESUMO | Introdução:

A cirurgia periapical é uma das opções de tratamento utilizadas em casos de falha da terapia endodôntica, principalmente nos casos associados a bactérias localizadas em áreas inacessíveis ao sistema imunológico.

Objetivo: *Este relato de caso apresenta o manejo cirúrgico de um paciente do sexo masculino, 17 anos, com uma lesão periapical envolvendo os ápices radiculares dos elementos 21 e 22, com histórico de trauma.*

Métodos: *O elemento 21 apresentava tratamento endodôntico e restauração com retentor intrarradicular, enquanto o elemento 22 respondeu positivamente ao teste de sensibilidade pulpar. Exames clínico, radiográfico e tomográfico foram utilizados para a elaboração do plano de tratamento.*

O tratamento cirúrgico foi realizado no elemento 21, com apicectomia, realização do retropreparo e retrobturação com Agregado Trióxido Mineral (MTA). Resultados:

Os exames histopatológicos indicaram cisto periodontal apical. As avaliações radiográficas e tomográficas pós-operatórias demonstraram reparo tecidual na área acometida, enquanto o exame clínico não mostrou sinais e sintomas de insucesso. Além disso, os testes evidenciaram a preservação da sensibilidade pulpar do dente 22. Conclusão: O estabelecimento de diagnóstico e planejamento adequados são fatores importantes para o sucesso do tratamento cirúrgico.

Palavras-chave | Diagnóstico:

Endodontia; Cirurgia Oral; Cisto radicular; Apice radicular

ABSTRACT | Introduction: Periapical surgery is one of the options used to treat root canal therapy failure cases mostly associated with residual bacteria located in areas inaccessible to the immune system. **Objective:** This case report presents the surgical management of a 17-year-old male patient with periapical lesion involving root apices of teeth #9 and #10, with history of trauma. **Methods:** Tooth #9 was subjected to endodontic treatment and restoration with intraradicular retainer, whereas tooth #10 has positively responded to pulp sensitivity test. Clinical, radiographic and tomographic exams were used to determine treatment plan. **Results:** Thus, surgical management applied to the lesion was associated with apicoectomy, retro-end cavity and retro-end filling, as well as with Mineral Trioxide Aggregate (MTA) of tooth #9. Histopathological examinations have shown apical periodontal cyst. Postoperative radiographic and tomographic evaluations have shown tissue repair in the injured area, whereas clinical examination did not show any signs and symptoms of failure, although it showed pulp vitality preservation in tooth #10. **Conclusion:** Therefore, it is possible concluding that establishing proper diagnosis and planning are major factors enabling successful surgical therapy.

Keywords | Diagnosis; Endodontics; Oral Surgery; Radicular Cyst; Tooth Apex.

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INTRODUCTION |

Periapical surgery comprises a set of procedures aimed at overcoming complications resulting from root canal treatments or from their failure¹. Intra- and extraradicular biofilm associated with anatomical complexities and morphological changes caused by inflammatory dental resorption, as well as by iatrogenic and dental traumas, can lead to root canal therapy failure²⁻⁴. Among the reasons for periapical surgery prescriptions, one finds: persistent symptomatology, conventional retreatment contraindication, anatomical complications, iatrogenic issues, failure in previous treatments and referral to biopsy¹.

Apical cyst is a pathological cavity fully surrounded by non-keratinized stratified squamous epithelium of different thickness in a 3-dimensional structure in apical periodontitis lesion⁵. According to the World Health Organization, apical cysts (true or pocket) are classified as inflammatory and non-neoplastic lesions⁶. They are mostly asymptomatic; thus, they are often discovered through routine radiographic examinations. They present slow growth rate and, once they reach larger dimensions, they expand the external cortical bone and lead to hard and painless swelling, except at palpation time^{4,5}. The prevalence of cysts, abscesses and granulomas reaches 15%, 35% and 50%, respectively⁷. Sixty-one percent (61%) of cysts are true apical cysts, whereas 39% of them are apical pocket cysts⁷. Some authors have suggested that pocket cysts may heal after root channel therapy; however, true cyst healing is less likely to happen^{4,7}.

On the other hand, histopathological examination is the only way the diagnosis process can be concluded, since these pathologies have similar radiographic features, although larger lesions tend to present increased incidence of cysts⁸. Cone beam computed tomography (CBCT) presents significantly higher diagnostic accuracy in periapicopathy cases than periapical radiography⁹. CBCT images enable better periapical lesion evaluation and healing than periapical radiographs; therefore, CBCT using is recommended as valuable tool for endodontic microsurgeries¹⁰.

The present case report describes a surgical therapy applied to Apical Periodontal Cyst associated with root apices of teeth #9 and #10, with the aid of imaging and histological exams.

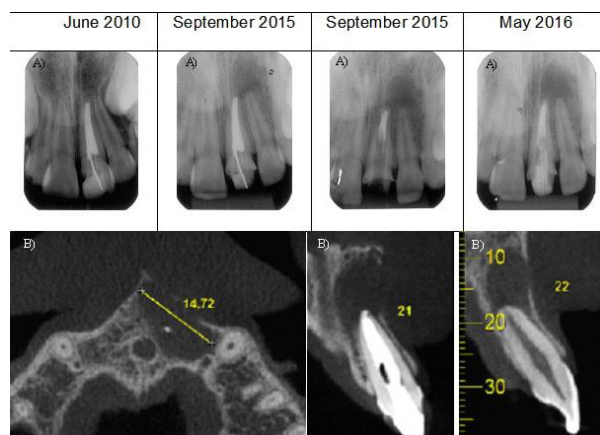
CASE REPORT |

This case report was approved by the Ethics Committee of Federal University of Espírito Santo (UFES) (protocol number 61901916.8.0000.5060). A 17-year-old male patient sought the Endodontics Department at UFES, Espírito Santo State, Brazil, after he was referred by his dentist for CBCT evaluation; CBCT image suggested Apical Periodontal Cyst extending between the roots of teeth #9 and #10. The patient reported traumatic accident at the age of 9, when he fractured the incisal portion of tooth #8 and half the crown of tooth #9 (involving buccal, mesial, palatal and incisal surfaces), although there was no bleeding, pain or any other symptom type. Tooth #9 was subjected to endodontic treatment and restored with composite resin (Figure 1A).

Clinical examinations did not show changes. Pulp sensitivity test was performed and tooth #10 has positively responded to it; similar response was observed for the other teeth. Tomographic report has described well-delimited hypodense image depicting rounded and expansive shape and causing cortical bone discontinuity. Such a shape was associated with the roots of teeth #9 and #10, which compromised the apical region of tooth #10, and suggested large cyst-like periapical lesion and / odontogenic tumor (Figure 1B).

Based on clinical, radiographic and tomographic findings, treatment plan included surgical management of tooth #9

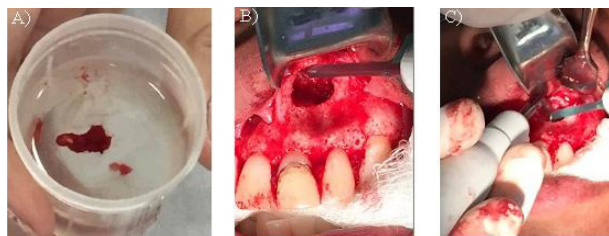
Figure 1 - A) radiographic images of tooth #9, which was subjected to endodontic treatment due to dental trauma; B) CBCT images showing hypodense area surrounding root apices of teeth #9 and #10 with discontinuity of buccal cortical bone



and evaluation of tooth #10, *in-situ*. Patient's legal guardian has signed an informed consent form before treatment.

Surgery was performed based on the anterior superior alveolar (both sides) and nasopalatine anesthetic techniques; triangular incision was performed from tooth #8 to #11. Tissue divulsion was performed and the periradicular region was accessed through bone window. A 1016 diamond spherical bur (KG Sorensen, Cotia, São Paulo, Brazil) was used under high rotation and constant jet of sterile serum. The lesion was removed with the aid of Serrated Lucas #86 Bone Curette (Quinelato, Rio Claro, São Paulo, Brazil). After specimen enucleation was complete, it was placed in 10% formalin solution and sent to pathology laboratory for histopathological diagnosis (Figure 2A).

Figure 2 - A) Inflammatory tissue removed from the surgical area; B) Apicoectomized element 9; and in C) Root-end preparation



Apicoectomy was performed with 28-mm Zekrya drill (Dentsply Maillefer Ballaigues, Switzerland) at high rotation speed under abundant irrigation - 3mm of root apex was cut at angle of approximately 45° in relation to its long axis (Figure 2B). Root-end cavity was performed by using diamond-coated ultrasonic tip (Gnatus, Ribeirão Preto, São Paulo, Brazil) at approximately 3mm (in depth); the cavity was filled with Mineral Trioxide Aggregate - MTA (Angelus) (Figure 2C). Flap was repositioned and sutured

with nylon 5.0 (Ethicon, Johnson & Johnson, Somerville, New Jersey, USA). The surgery was performed by an experienced endodontist.

Histopathological examination was performed at the Oral Diagnosis Center – (ODC / Federal University of Espírito Santo) and it showed connective capsular tissue presenting deep inflammatory mononuclear and polymorphonuclear infiltrate, which was sometimes focal subepithelial, epithelial or diffuse. Hyperplastic stratified epithelium, disorganized in some places, was observed on the surface of some fragments. The patient was diagnosed with chronic inflammatory process compatible to Apical Periodontal Cyst.

The follow-up period lasted 6 to 12 months (Figure 3). Clinical and radiographic examinations were performed at 6 months. Results have shown signs of repair, as well as pulp vitality preservation in tooth #10. One year after surgery, the patient returned for reevaluation. New exams were requested, including CBCT (i - CAT, Cone Beam 3D imaging, KaVo, USA). Intraoral examinations did not show changes, tooth mobility was normal and there was no sensitivity to palpation and percussion. Tooth #10 presented preserved pulp vitality. Based on CBCT evaluation, it was possible seeing that the area previously damaged by bone neoformation was repaired, which suggested lack of infectious process (Figure 3).

DISCUSSION |

According to the World Health Organization, apical periodontal cyst is an inflammatory lesion⁶, whose main etiology lies on bacterial infection in the root canal

Figure 3 - Radiographic and tomographic examinations showing recovery in the area previously injured by bone neoformation. This image suggests infectious process remission, 12 months after surgical procedures



system, which is inaccessible to the immune system^{4,5,8}. Consequently, the conventional treatment applied to teeth with pulp necrosis and chronic periapical infections remains a challenge to dental surgeons. The present case report describes the surgical therapy applied to Apical Periodontal Cyst in tooth with intraradicular retainer.

Bacterial leakage is the main etiopathogenic factor, since bacteria can reach the entire root canal system, either in planktonic form or organized in biofilms, as well as colonize resorption areas on the external root surface³. These resorption areas on the apical root surface are often seen in approximately 72.5% of teeth with chronic periapical lesions². These findings support the technical limitation in solving certain cases through conventional endodontic therapy.

CBCT plays a key role in diagnosis and clinical-surgical planning processes; however, it is worth emphasizing that it is a complementary tool and, therefore, an aid in diagnosis. Subjective and objective semiology are mandatory, despite all technological advances. In this particular case, pulp sensibility test was essential to help preserving pulp vitality in tooth #10, although tomographic images have strongly suggested that the tooth was compromised. According to a previous study, CBCT has shown larger number of images than panoramic radiographs indicating intraosseous lesions¹¹. However, CBCT images present low diagnostic accuracy in comparison to histopathological examinations^{9,12}.

Surgical treatment is an option in cases where conventional endodontic treatment has failed and endodontic retreatment is impracticable¹. With respect to surgical technique, it is consensus among researchers that the apex cut should be 3mm in size at 90° angle in order to reduce the exposure of dentinal tubules and, consequently, to prevent bacterial leakage and colonization^{1,13}. According to Pereira *et al.*¹⁴, ultrasonic tips used in root-end filling preparation are a major advance in periapical surgeries, since they produce cavities with centralized parallel walls, with at least 2.5mm (in depth) in comparison to spherical diamond burs.

Periapical surgery procedures have reached significantly successful rates in the last two decades after MTA was introduced as retro-filling material, due to its unquestionable biological properties. Studies have shown high prevalence (92.5%) of successful periapical surgeries based on MTA using¹⁵ in comparison to cases where composite resin was used with retro-filling material¹⁶. New formulations of

tricalcium silicate-based materials with better physical, chemical, and biological properties have been introduced in the market. These material do not require long setting time and have better handling properties than MTA^{17,18}, which makes this treatment option feasible and easier to be performed. A previous study has shown that Endosequence Bioceramic Root Repair Material (92.6%) using in retro-fillings presented better results than MTA (75.0%)¹⁹. This preliminary study has shown perspectives towards bioceramics using as retro-filling material alternative to MTA. Thus, bioceramics may be the material of choice in these cases, although further clinical studies should be conducted to confirm such an assumption.

The follow-up in case of surgical procedures can last from 16 weeks to five years. Despite the short preservation period (1 year) observed in the current study, it was possible seeing evidence of healing in the injured area, according to previously established criteria^{10,20,21}. This outcome enables suggesting that well-indicated periapical surgeries present high predictability rate of success. The period of follow-up is a limitation of the present study and the patient remains under monitoring.

CONCLUSION |

Despite the short preservation period, the current case report suggested that periapical surgery is a feasible alternative to treat teeth affected by persistent inflammatory periapical lesions after conventional endodontic therapy. Therefore, it is essential performing careful diagnosis and adequate planning to enable successful surgical therapy.

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