

Endodontic treatment as non-surgical alternative in managing multiple periapical lesions

Tratamento endodôntico como alternativa não cirúrgica no monitoramento de uma lesão periapical múltipla

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Abstract

This paper presents non-surgical resolution of an extensive periapical lesion-like-cyst of endodontic origin associated with lower central incisors. Endodontic treatment was performed through full crowns, since patient had circular metal-ceramics bridges in lower jaw. This article is a case report of combined endodontic treatment of multiple periapical lesions at 29 years old male, followed by prosthodontic rehabilitation. Intraoral examination revealed a symptomatic, sore bony hard and soft tissue swelling, mainly confined in lower intercanine sector. Trepanation and apical patency obtained 2 ml of bloody serous exudates. After through biomechanical preparation, a calcium hydroxide/CPMC root canal dressing was applied and periodically renewed for 4 months. The exudates were almost eliminated at treatment onset and significant bone formation was observed at the periapical region in the following months. We can report unexpectedly good bone healing of a large periapical lesion-like- cyst in teeth 31 and 41, following non-surgical root canal treatment, as well as smaller lesions on teeth 34 and 43. After complete root canal treatment, patient was prosthetic rehabilitated additionally. Complete radiographic resolution of the periapical lesion was not observed six months after the root canal filling, but the lesion is obviously smaller. Thus, non-surgical treatment of this supposedly cystic, extensive periapical lesion provided favorable clinical and radiographic response.

Descriptors: Root canal therapy; Periapical diseases

Resumo

Este trabalho apresenta uma resolução não cirúrgica de uma extensa lesão periapical como se fosse uma lesão cística, de origem endodôntica, relacionada com os incisivos centrais inferiores. O tratamento endodôntico foi executado através da coroa total em metalocerâmica. O paciente tinha uma ponte de metalocerâmica inferior. É um relato de caso que combina tratamento endodôntico de lesões múltiplas periapicais em um paciente masculino de 29 anos de idade, em sequência de uma reabilitação oral protética. O exame intraoral revelou uma lesão óssea e inflamação do tecido mole, confinada à região do intercanino inferior. Com trepanação e permeabilidade apical foram obtidos 2 ml de sangue e exudato seroso. Depois por meio de preparação biomecânica, o canal foi forrado com hidróxido de cálcio CPMC e foi aplicado CPMC periodicamente e renovado a cada 4 meses. O exudato foi quase todo eliminado no tratamento e uma neoformação óssea foi observada na região periapical nos meses seguintes. Foi observada boa reparação óssea de uma grande lesão de aparência cística nos dentes 31 e 41 e seguido de tratamento de canal radicular não cirúrgico, bem como em pequenas lesões nos dentes 34 e 43. Após completar o tratamento do canal radicular, o paciente teve, além disso, a reabilitação protética. A resolução radiográfica completa da lesão periapical não foi observada 6 meses após a restauração do canal radicular, mas a lesão tornou-se menor. Assim sendo, o tratamento não cirúrgico deste suposto cisto com extensa lesão periapical, proporcionou uma resposta clínica e radiográfica favorável.

Descritores: Tratamento do canal radicular; Doenças periapicais

Introduction

The survival and performance of clinical prostheses with a ceramic component are probabilistic in nature. Only under very rare circumstances will all of the prostheses in a group exhibit either 100% successes or 100% failures over a period of 5 years or more. Prosthesis failure may be defined as any condition that leads to replacement. These conditions include secondary caries, irreversible pulpitis, excessive wear of opposing tooth surfaces, excessive erosion and roughening of the ceramic surface, ditching of the cement margin, unacceptable esthetics, cracking, chipping and fracture¹⁻⁶.

Secondary caries and irreversible pulpitis are reasons in prosthesis failure in significant number of cases, and from this point especially important for endodontics. In numerous cases irreversible pulpitis is related with periapical lesion development.

Apical periodontitis is a sequel to endodontic infection and manifests itself as the host defense response to microbial challenge emanate from the root canal system. It is viewed as a dynamic encounter between microbial factors and host defenses at the interface between infected radicular pulp and periodontal ligament that results in local inflammation, resorption of hard tissues, destruction of other periapical tissues, and eventual formation of various histopathological categories of apical periodontitis, commonly referred to as periapical lesions⁷.

Periapical lesions of endodontic origin may develop asymptotically and become large. Proper biomechanical preparation followed by calcium hydroxide medication renewed periodically represents a nonsurgical approach to resolve extensive inflammatory periapical lesions⁸.

The treatment of apical periodontitis, as a disease of root canal infection, consists of eradicating microbes or substantially reducing the microbial load from the root canal and preventing re-infection by orthograde root filling. The treatment has a remarkably high degree of success. Nevertheless, endodontic treatment can fail. Most failures occur when treatment procedures, mostly of a technical nature, have not reached a satisfactory standard for the control and elimination of infection. Even when the highest standards and the most careful procedures are followed, failures still occur. This is because there are root canal regions that cannot be cleaned and obdurate with existing equipments, materials, and techniques, and thus, infection can persist. In very rare cases, there are also factors located within the inflamed periapical tissue that can interfere with post-treatment healing of the lesion⁷.

Treatment consists in the elimination of the infectious agents by endodontic, root canal treatment. Even when carrying out a correct cleansing and filling of canals, it is possible that periapical perio-

dontitis will persist in the form of an asymptomatic radiographic transparency giving rise to the post-endodontic periapical lesion. The chronic inflammatory periapical lesion is the most common pathology found in relation to alveolar bone of the jaw.

From the histological point of view, it can be classified as chronic periapical periodontitis (periapical granuloma), radicular cyst, and as scar tissue. The most frequent is the periapical granuloma, constituted by a mass of chronic inflammatory tissue, in which isolated nests of epithelium can be found. The radicular cyst is characterized by the presence of a cavity, partially or wholly lined by epithelium. Scar tissue is a reparative response by the body, producing fibrous connective tissue⁹⁻¹⁰.

From therapeutic standpoint, most cases can be managed with a combination of endodontic and periapical surgical treatments¹¹⁻¹³.

This article presents the resolution of an extensive, supposed cystic maxillary lesion exclusively by means of endodontic treatment.

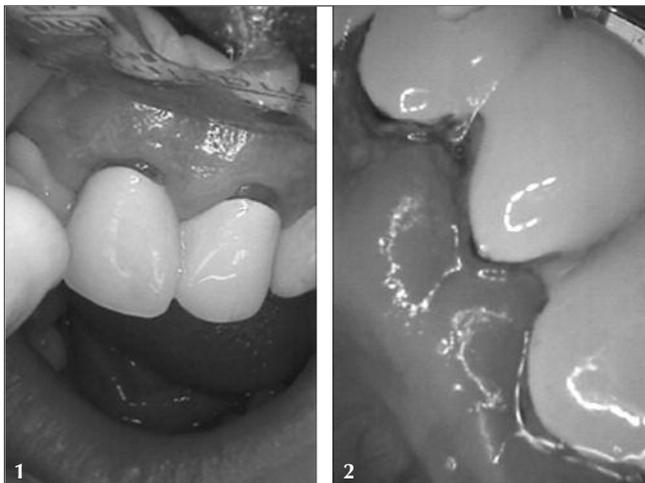


Figure 1. Details of old metal-ceramics prosthesis on upper jaw show poor periodontal state, ditching of the cement margin and unacceptable esthetics

Figure 2. Two central incisors after the trepanation through metal-ceramic crowns, and after apical patency. Obtained exudates was purulent in first moment, and later it became bloody serous

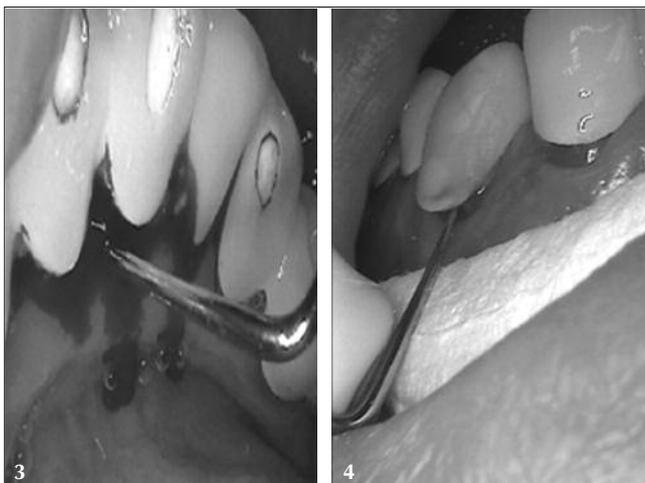


Figure 3. Details of old metal-ceramics prosthesis after the trepanation of teeth 31, 41 and 43. Poor periodontal state, secondary caries, excessive erosion and roughening of the ceramic surface, ditching of the cement margin, unacceptable esthetics, cracking and chipping

Figure 4. Details of old metal-ceramics prosthesis show excessive erosion and roughening of the ceramic surface, ditching of the cement margin, unacceptable esthetics, cracking and chipping

Case report

The patient, 29 years old male, reported at Department of dental pathology and endodontics at Faculty of Dentistry in Sarajevo.

Patient complained on swelling, pains, and general symptoms as temperature, fever and general bad condition.

Intraoral examination revealed a symptomatic, sore bony hard and soft tissue swelling, mainly confined in lower intercanine sector. Gingival tissue was livid, widely apart from teeth's neck, with crevice measuring approximately 5 mm on each central lower incisor. Teeth were covered with metal-ceramic crowns bounded in block which extend on all four lower incisors (Figures 1, 2, 3 and 4).

Each lower incisor showed significant mobility, but it couldn't be particularly specified which tooth show the biggest mobility, since forces were transferred on all four teeth.

All of them were sensitive on vertical as horizontal percussion, but again, for the same reason, it was impossible to determine which one is the most sensitive, as well.

Vitality test couldn't be performed, also.

Radiographic examination revealed quite well defined periapical

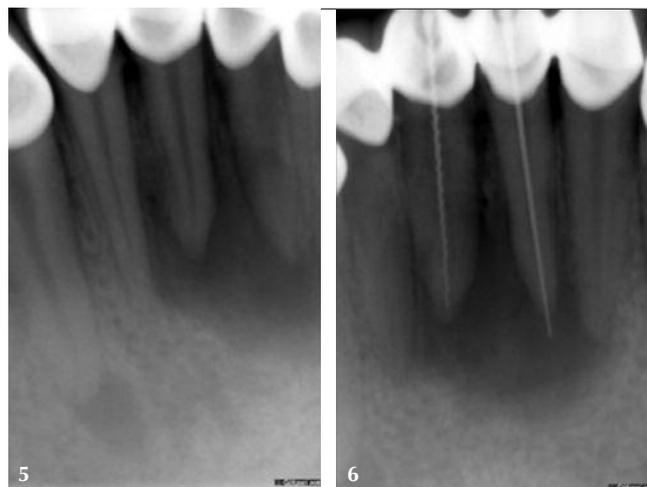


Figure 5. Big periapical, supposedly cystic, formation associated with teeth 31 and 41, and smaller periapical lesion associated with tooth 43

Figure 6. Big periapical supposedly cystic formation associated with teeth 31 and 41, after achieving periapical patency

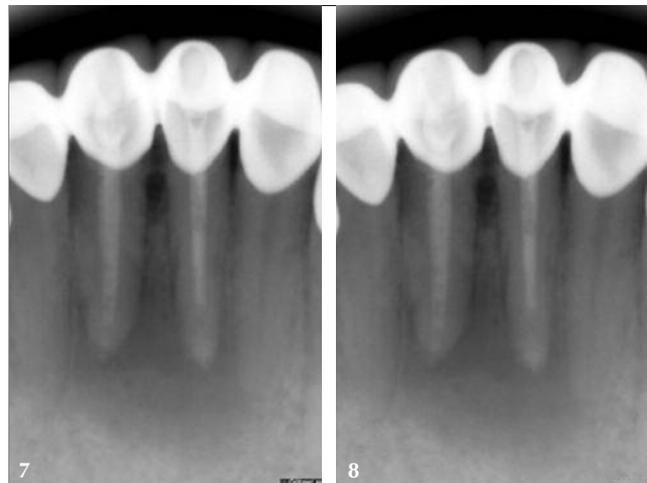


Figure 7. Partially resorbed calcium hydroxide root canal dressing, evident periapical healing after 2 months

Figure 8. Definitely obturated root canal of tooth 34. Control X rays was done 1 month after the treatment

radiolucent area which involved periapical region of teeth 31, 41, 42 and probably 32.

This radiolucent area measured 20 by 15 mm in diameter according to X-Genus digital RVG software (Figures 5 and 6).

The clinical history of prosthodontic treatment performed nine years ago, purely from aesthetic reasons, led to clinical working diagnose of extensive, supposedly cystic chronic periapical pathology of endodontic origin, caused by extensive grinding of dentin during prosthodontic preparation, or maybe caused by traumatic occlusion after crowns were placed.

Extraction of central incisors was the first logic choice, but regarding general bad condition, acute faze of inflammation, and fact that all four teeth were bounded in block, we decided to provide first aid by drainage. Therefore the severity of condition, and potentially serious complication in form of phlegmonouse inflammation of oral cavity base, we tried to provide enough time for any kind of further treatment.

Antibiotics therapy was proscribed (Xiclav-amoxicillin and clavulanic acid combination, two times a day, single dose of 1000 mg).

At the first session, two central incisors were trepanated through ceramic and metal of the crowns, and following apical patency obtained 2 ml of bloody serous exudates (Figures 2 and 6).

Patient reported instantaneous relief. Control X-ray confirmed clinically absence of apical foramen in tooth 41. In purpose of further

spontaneous drainage, tooth was left opened for next 24 hours, and patient was instructed to gargle with mildly warm salty water.

Patient reported almost complete absence of local and general symptoms next day, except mild sensitivity in antagonistic contact.

That was the reason for change in therapy approach. We discarded extraction of those teeth and choose a root canal treatment instead as a therapeutically alternative, as long as patient is symptoms-free.

Root canal treatment was performed with rotary canal files (M-Two, VDW, Germany) under copious irrigation with 2, 5% NaClO. Last irrigation was performed with 20% EDTA (Calcinase, lege artis Pharma GmbH+CO KG, Dettenhausen /Germany) in order to remove a smear layer from root canal dentin.

After drying, a calcium hydroxide paste (Claxyl blue OCO-Präparat, Germany) was placed in root canals and periodically renewed in next 4 months.

Control X-rays showed progressive involution of periapical radiolucency. No root canal exudate was observed after the third change of root canal dressing (Figure 7).

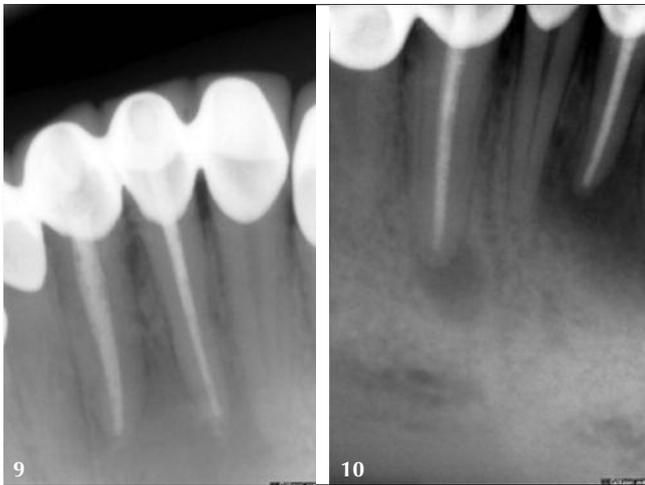


Figure 9. Definitely obturated root canals of teeth 31 and 41. Control X rays was done 4 months after the treatment of large periapical defect. Periapical healing is clearly visible, more than satisfying.

Figure 10. Definitely obturated root canal of tooth 43. Control X rays was done 1 month after the treatment. Freshly renewed calcium hydroxide dressing in root canal of 41 is visible in right side of x-ray.



Figure 11. Details after completion of periodontal treatment and positioning of new prostheses in maxilla

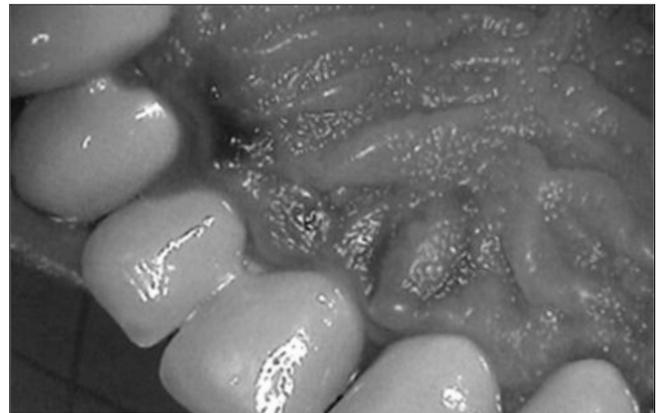


Figure 12. Details after completion of periodontal treatment and positioning of new prostheses in maxilla



Figure 13. Details after completion of periodontal treatment and positioning of new prostheses in mandible



Figure 14. Details after completion of periodontal treatment and positioning of new prostheses

In a meantime, during routine X-ray controls, we noticed smaller, rather well defined lesions on teeth 34 and 43. Their origin was probably the same as bigger one, but they were small and totally asymptomatic (Figures 5, 8 and 10).

As patient was symptom-free, and as we need a quite long time for adequate endodontic treatment, we decided to keep existing metal ceramics prosthodontics appliances, regardless their quite bad ditching of the cement margin and poor periodontal status. Our estimation was based on patients needs for aesthetic and function for a few months. Besides, it was reasonably to believe that classic root canal treatment is not going to be sufficient for total recovery, which means a need for addition periapical surgical treatment. Those treatments are to a certain extent apprehensive on lower central incisors, regarding their rather short and very brittle root. So we could expect a loss of those teeth eventually, which imply a major change in prosthodontic therapy plan.

As root canal treatment came along with more than satisfactory response, we decided to seal root canals definitely with AH- plus sealer and gutta-percha points using lateral condensation technique (Figures 8, 9, 10).

Two months after a completion of endodontic treatment, as a patient was symptom-free, and control X-rays showed more than satisfactory bone healing, we decided to remove old metal ceramics prosthesis, and to make a new one.

After removal of old prosthesis patient was submitted for periodontal treatment procedure, during two weeks. This treatment was sufficient to establish satisfactory periodontal status. Following removal of metal-ceramic crowns, vitality test showed that the teeth 32 and 42 vital. Teeth mobility disappeared completely, and new prostheses could be positioned (Figures 11, 12, 13 and 14).

Discussion

Periapical lesions of endodontic origin may develop asymptotically and become large. Proper biomechanical preparation followed by calcium hydroxide medication renewed periodically represents a nonsurgical approach to resolve extensive inflammatory periapical lesions⁸.

Non surgical approach should be our first step. Other reports confirm that large periapical lesions can respond favourably to non-surgical treatment¹¹.

The conservative treatment success in managing supposedly cystic periapical lesions could be explained based on the following aspects:

- Biomechanical preparation and bacterial control
- Lesion decompression achieved by apical patency
- Complementary antiseptic action of calcium hydroxide due to its alkalinity and its bony repair effect.
- Good immune response due to patients age¹⁰.

In situation like this one the most dentists will advise a surgical approach for therapy of large periapical lesion with multiple teeth involving. This treatment didn't exclude a need for additional periapical surgery in future. At least it delayed surgical treatment until diminishing of pathological process in apical periodontal region. In those circumstances, surgeon can take advantage of quite conservative approach, and maximally preserve local tissues, without weakening those fragile teeth.

Conclusion

Complete radiographic resolution of the periapical lesion was not observed six months after the root canal filling, but the lesion is obviously smaller. During six months after treatment patient did not have any symptoms of pain and there is not recorded signs of acute conditions. Thus, non-surgical treatment of this supposedly cystic, extensive periapical lesion provided favorable clinical and radiographic response with possibilities of good periapical tissue healing process.

References

1. Christensen GJ. When is a full-crown restoration indicated? *J Am Dent Assoc.* 2007;138(1):101-3.
2. Raustia AM, Näpänkangas R, Salonen AM. Complications and primary failures related to fixed metal ceramic bridge prostheses made by dental students. *J Oral Rehabil.* 1998;25(9):677-80.
3. Näpänkangas R, Salonen MA, Raustia AM. A 10-year follow-up study of fixed metal ceramic prosthodontics. *J Oral Rehabil.* 1997;24(10):713-7.
4. Goodacre CJ, Bernal G, Rungcharassaeng K, Kan JY. Clinical complications in fixed prosthodontics. *J Prosthet Dent.* 2003;90(1):31-41.
5. Anusavice KJ, Kakar K, Ferree N. Which mechanical and physical testing methods are relevant for predicting the clinical performance of ceramic-based dental prostheses? *Clin Oral Implants Res.* 2007;18 Suppl 3:218-31.
6. Sailer I, Pjetursson BE, Zwahlen M, Hammerle CH. A systematic review of the survival and complication rates of all-ceramic and metal-ceramic reconstructions after an observation period of at least 3 years. Part II: Fixed dental prostheses. *Clin Oral Implants Res.* 2007;18 Suppl 3:86-96.
7. Nair PN. Pathogenesis of apical periodontitis and the causes of endodontic failures. *Crit Rev Oral Biol Med.* 2004;15(6):348-81.
8. Soares J, Santos S, Silveira F, Nunes E. Nonsurgical treatment of extensive cyst-like periapical lesion of endodontic origin. *Int Endod J.* 2006;39(7):566-75
9. García CC, Sempere FV, Diago MP, Bowen EM. The post-endodontic periapical lesion: histologic and etiopathogenic aspects. *Med Oral Patol Oral Cir Bucal.* 2007;12(8):E585-90.
10. Soares J, Brito-Júnior M, Silveira FF, Nunes E, Santos SM. Favorable response of an extensive periapical lesion to root canal treatment. *J Oral Sci.* 2008;50(1):107-11.
11. Oztan MD. Endodontic treatment of teeth associated with a large periapical lesion. *Int Endod J.* 2002;35(1):73-8.
12. Ricucci D, Langeland K. Incomplete calcium hydroxide removal from the root canal: a case report. *Int Endod J.* 1997;30(6):418-21.
13. Tanomaru Filho M, Leonardo MR, Silva LA. Effect of irrigating solution and calcium hydroxide root canal dressing on the repair of apical and periapical tissues of teeth with periapical lesion. *J Endod.* 2002;28(4):295-9.

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