Van Diş Hekimliği Dergisi
Van Dentistry Journal
Cilt 5 (2024) ~ Sayı 2 Sayfa: 14-21
ISSN(Online): 2757-6868 e-ISSN: 2757-6868

Olgu Sunumu / Case Report

Non-Surgical Endodontic Treatment Approach to Large Periapical Lesion: Two Case Reports

Büyük Periapikal Lezyonlara Cerrahi Olmayan Endodontik Tedavi Yaklaşımı: İki Olgu Sunumu

Hilmi TAŞ[1], Aliye KAMALAK[1], Esra BALKANLIOĞLU[1]

[1]*Kahramanmaraş Sütçü İmam Üniversitesi, Diş Hekimliği Fakültesi, Endodonti AD, Türkiye*

ÖZET: Bu makalede cerrahi yaklaşım olmaksızın endodontik tedavi sonrası iki geniş periapikal lezyonlu vakanın iyileşme süreci radyografik değerlendirmeler ile birlikte verilmiştir. İlk olguda 17 yaşında kadın hastada ekstra oral şişlikle seyreden sol üst lateral dis, kaynaklı genis, bir periapikal lezyon, ikinci olguda ise 15 yaşında kadın hastada sağ alt molar dis, kaynaklı periapikal lezyon görülmektedir. Kök kanallarının preparasyonu yapıldıktan sonra kanallar kalsiyum hidroksit ile dolduruldu. Kök kanal dolgusu, AH Plus ve gütta perkayla bitirildi. Bir sene sonraki klinik ve radyografik muayenede tamamen iyileşme gözlendi. Bu olgu raporunda cerrahi müdahaleye gerek kalmadan başarılı bir şekilde yapılan endodontik tedaviler sonrasında genis, periapikal lezyonların iyileşebileceği anlatılmıştır.

Anahtar Kelimeler: Kalsiyum hidroksit, endodontik tedavi, periapikal iyileşme, periapikal lezyon

ABSTRACT: In this article, the healing process of two cases with large periapical lesions after endodontic treatment without surgical approach is presented to get her with radiographic evaluations. In the first case, a large periapical lesion originating from the upper left lateral tooth with extraoral swelling was observed in a 17-year-old female patient, and in the second case, a periapical lesion originating from the lower right molar tooth was observed in a 15-year-old female patient. After the preparation of the root canals, the canals were filled with calcium hydroxide. The root canal filling was finished with AH Plus and gutta-percha. Complete recovery was observed in the clinical and radiographic examination 1 year later. In this case report, it is explained that large periapical lesions can heal after successful endodontic treatments without the need for surgical intervention.

Keywords: Calcium hydroxide, endodontic treatment, periapical healing, periapical lesion

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

INTRODUCTION

Pulp tissue can become infected due to caries, dental procedures or trauma (1). Infection of the pulp tissue leads to the loss of pulp vitality and results in pulp necrosis. Untreated pulp necrosis may lead to the development of a periapical lesion due to infectious agents.

In the presence of a large periapical lesion, treatment options include non-surgical root canal treatment, apical surgery or extraction of the affected tooth (2). In recent years, apical surgery has become a less preferred treatment option. Apical surgery is the treatment of choice when retreatment fails or orthograde treatment is not possible. It has been reported that the chance of success decreases when the apical surgery option is preferred primarily (3).

The aim of root canal treatment is to completely eliminate bacteria from the root canal. Nowadays, successful results can be obtained with the application of non-surgical root canal treatment in teeth with extensive periapical lesions (2). Most periapical lesions are classified as dental granulomas, radicular cysts or abscesses. It is not possible to diagnose a periapical lesion as a cyst or apical granuloma by radiographic evaluation alone (4).

In the conservative treatment of periapical lesions, different canal irrigations and temporary root canal paste are used. The objective of endodontic treatment is not solely to ensure apical sealing, but to achieve disinfection of the access root canal system. Upon examination of the conducted studies, it has been observed that sodium hypochlorite is preferred as an irrigation solution in concentrations ranging from 0.5% to 5.25% (5, 6).

In general, calcium hydroxide (Ca(OH)2) therapy is used for the treatment of infected root canals and periapical lesions (7). Ca(OH)2 is a preferred agent in lesion treatments due to its stimulating hard tissue formation and antibacterial tissue dissolving effects (8). Calcium hydroxide exhibits a positive stability on the healing of periradicular lesions by increasing the pH of the periapical environment and providing calcium ions for the repair process. Additionally, it possesses a denaturing effect on proinflammatory mediators such as IL1 and TNF (9).

The aim of these case reports is to follow the healing of teeth with large apical lesions in the periapical areas with correct endodontic treatments without surgical intervention.

CASE REPORT 1

A 17-year-old female patient presented to Kahramanmaraş Sütçü İmam University, Faculty of Dentistry, Endodontics Clinic with complaints of pain and swelling in her tooth. On examination, the patient's tooth number 22 was found to be devitalized and a large radiolucent lesion was detected on radiography (Figure 1). Electrical vitality test was negative. Root canal treatment was indicated for the related tooth. The informed consent form was read to the patient and the parents and consent was obtained. Local anesthesia was performed and intraoral drainage was provided and IV antibiotics (Klindan 600 mg) were prescribed. One week later, the acute

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

condition was controlled and root canal treatment was started (Figure 2a/b).

Working length was determined with an electronic apex locator (Woodpecker, Woodpex-3 Gold Plus, New Generation Apex Locator). The root canal was prepared used to protaper next file system (Dentsplay Sirona) and crown down shaping prosedure to an apical diameter of file #40 with using 2.5% sodium hypochlorite (NaOCI) (Coltene Canalpro) between each file change. After drying the root canal with sterile paper cones, calcium hydroxide (Kalsin) was placed in the root canal and the access cavity was closed with temporary filling material. One week later the patient was called for a third appointment. Calcium hydroxide was removed from the root canal and since the tooth was asymptomatic, the root canal was irrigated with 2 ml of 17% EDTA (Cerkamed Endo Solution, Pawlowski, Poland) and then washed with 5 ml of distilled water. Finally, irrigation was completed with 2 ml of 2% chlorhexidine (Ceraxidin-C). The root canal was dried with sterile paper cones and root canal filling was performed with canal paste (AH plus, Dentsplay Sirona) and guta percha using cold lateral compaction technique (Figure 3). The access cavity was restored with composite resin. A follow-up examination and radiographs taken after one year showed that the lesion had largely healed and the tooth was asymptomatic (Figure 4).

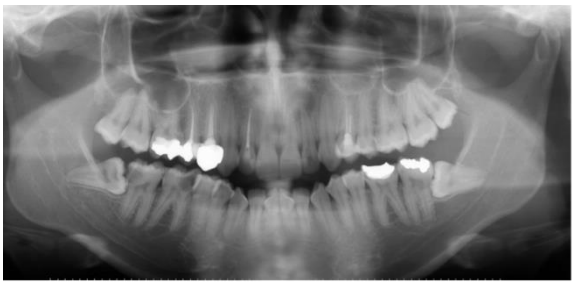

Figure 1. Large periapical lesion in tooth number 22.

Figure 2a/b. Image of the patient at the clinic, Image of the patient one week later.

Figure 3. Radiographic image of the tooth after root canal treatment.

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

Figure 4. 3, 6, 9 and 12 months follow-up from the beginning to the end, respectively, and the healing process of the large periapical lesion in the relevant tooth.

CASE REPORT 2

The patient was admitted to the same clinic with the complaint of intraoral fistula in the lower jaw. Radiographic examination revealed the presence of a large radiolucent lesion surrounding the roots of tooth 46 (Figure 5). The vitality test was negative. Informed consent form was read to the patient and consent was obtained. After opening the access cavity without local anesthesia, working lengths were determined with an electronic apex locator (Woodpecker, Woodpex-3 Gold Plus, New Generation Apex Locator).Root canal shaping was performed with the Protaper Next (DentsplyMaillefer, Switzerland) nickel titanium rotary file system up to X3 file size with a speed and torque controlled endomotor (X-Smart; DentsplyMaillefer, Switzerland) according to the manufacturer's instructions and the root canals were flushed with 2.5% NaOCl (Coltene Canalpro) solution between each file used. Following the preparation, the canals were dried with sterile paper cones and calcium hydroxide (Kalsin) was placed in the canals. The patient was called for a second appointment one week later. On examination, the fistula disappeared completely and it was decided to fill the root canals. Calcium hydroxide was removed from the root canals and final irrigation was performed using 2 ml of 17% EDTA (Endo-Solution) and 2 ml of distilled water in each root canal. The root canal was dried with sterile paper cones and root canal filling was performed with AH plus canal paste and guta percha using cold lateral compaction technique. The access cavity was restored with composite filling (Figure 6). One-year clinical and radiologic follow-up examination showed that the tooth was asymptomatic and the lesion had shrunk to a great extent (Figure 7).

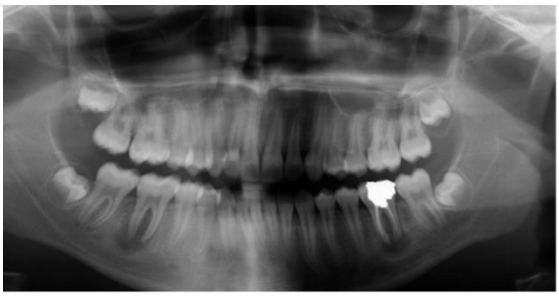

Figure 5. The patient had a large periapical lesion on tooth number 46 before treatment.

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

Figure 6. Radiographic image of the tooth after root canal treatment.

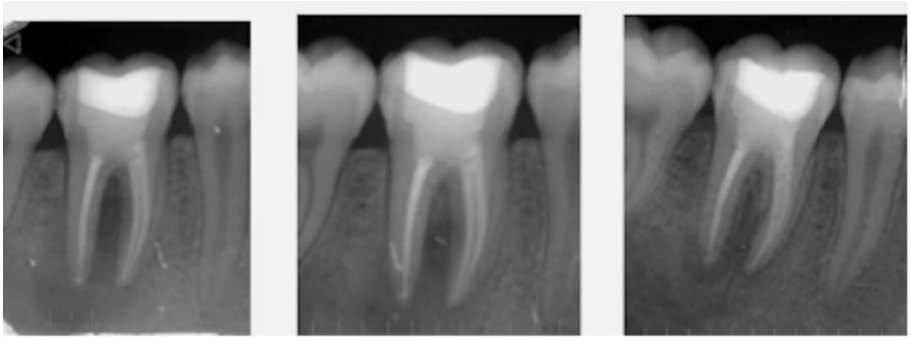

Figure 7. 3, 6 and 12 month controls of tooth number 46 respectively, visible reduction in the lesion.

DISCUSSION

Periapical tissues are rich in blood supply, lymphatic drainage and undifferentiated cells. All these structures are associated with inflammation and the healing process. Since periapical tissues have the potential to heal, the first treatment option for periapical lesions should be aimed at eliminating the causative agents. For this purpose, root canal treatment was performed in both cases to control the causative agent of the periapical infection.

Root canal treatment is primarily based on the removal of microbial infection from the root canal system (10). During root canal treatment, it is known that sodium hypochlorite irrigation together with mechanical preparation is an important step in reducing the number of bacteria in the canal (11). However, only with the application of this method, it is not possible to completely eliminate the bacteria in the canal permanently (12). For this purpose, the use of calcium hydroxide (Ca(OH2)) as an intracanal medication is recommended, especially in teeth with extensive periapical lesions (13). In our clinic, Ca(OH)2 was applied to the canals in both cases. Calcium hydroxide used for one week in properly and completely shaped and irrigated root canals is known to effectively eliminate bacteria (14). Other studies have also reported that treatment with Ca(OH)2 results in high healing rates in teeth with extensive periapical lesions (15). Some lesions have even been reported to diminish or disappear completely after only one to three months of treatment, especially in young patients. In the light of all this information; according to the results of clinical and radiographic examinations at regular intervals, the change in bone density in the lesion, the reformation of the trabecular structure, the formation of lamina dura in the apical region, the symptom-free and functional teeth and the healthy appearance of the soft tissues show us that the treatment has been successful (10).

In the first case, only soft tissue drainage was performed on the patient during the initial session. The reasons for this include the patient's high degree of agitation, severe limitation in mouth opening, and challenges encountered in patient cooperation. Due to the presence of soft tissue drainage, fever, affected lymph

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

nodes, and general fatigue in the patient, root canal treatment was initiated in the second session after the patient was alleviated following antibiotic administration. However, in such cases, if there is an opportunity to drain the tooth, intracanal drainage should be performed in conjunction with soft tissue drainage during the initial session.

Due to the acute condition present in the first patient, we opted to utilize chlorhexidine in addition to the routine irrigation procedure to achieve more rapid control of microorganisms. Endodontic antibiotic and analgesic utilization, in conjunction with intraoral and extraoral drainage, may be considered in specific circumstances. In cases of symptomatic irreversible pulpitis or symptomatic apical periodontitis, a combination of ibuprofen and acetaminophen or dexamethasone has been recommended for pain management (16). Incision, drainage, and antibiotics have been recommended as the primary treatment modality exclusively in cases of acute apical abscess. In cases of acute apical abscess, the concurrent administration of penicillin or clindamycin as antibiotics, along with ibuprofen and acetaminophen as analgesics, has been recommended (17).

CHX gluconate possesses broad antimicrobial efficacy against gram-positive and gram-negative bacteria, fungi, and lipid-enveloped viruses. Additionally, it is preferable for irrigation due to its lack of unpleasant taste and odor, unlike NaOCl, as well as its non-irritating effect on periapical tissues and absence of bleaching properties. CHX, due to its cationic properties, binds to the hydroxyapatite present in the dentin layer and is gradually released over time (18). Thus, it possesses a long-lasting antimicrobial effect not observed in any other irrigation solutions. However, the use of CHX solution alone is not preferred due to several limitations, including its lack of tissue-dissolving effect, loss of efficacy in the presence of organic matter, inability to neutralize lipopolysaccharides, ineffectiveness against microbial spores, and inability to remove the smear layer (19, 20).

In our initial case, considering the presence of extra-oral swelling in the patient and the persistent microbial flora associated with the periapical lesion, CHX was incorporated into the irrigation protocol. Root canal treatment is an integral part of shaping and disinfection processes. Neither the shaping process alone nor irrigation by itself will be sufficient to achieve the desired outcome. Different methods and solutions can be used in irrigation protocols. We achieved successful outcomes by implementing two distinct irrigation protocols in two separate cases.

In cases with large periapical lesions, conventional root canal treatment performed with adequate disinfection, appropriate therapy, and regular follow-ups can yield successful outcomes in the majority of instances without necessitating surgical intervention. For this purpose, conventional root canal therapy should be the primary choice prior to surgical intervention. In cases where root canal treatment does not yield favorable outcomes, surgical treatment options may be considered. The results obtained in our

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

case study corroborate this hypothesis. Furthermore, the periodic evaluations conducted are of significant importance.

In both case reports, symptom-free teeth and healing of the periapical lesion are important indicators of successful treatment. In cases with large cyst-like periapical lesions, traditional root canal treatment with adequate disinfection, appropriate treatment and regular follow-up with the level of endodontic knowledge and advanced technological facilities that have been reached today, gives mostly successful results and there is no need for surgical treatment. Therefore, conventional root canal treatment should always be our first choice before surgery. The results of our report and periodic follow-up findings support this idea.

CONCLUSION

With proper treatment planning under ideal conditions, no matter how large the periapical lesion is, the tooth can be healed without the need for surgical intervention. Although the treatment of these teeth can be complicated and laborious, the result can be satisfactory. Especially in pediatric patients, trying treatment with a preventive approach before the use of advanced surgical treatments results in the right treatments in the right indications.

Conflict of Interest: There is no conflict of interest between the authors.

REFERENCES

1. Çırakoğlu NY. Mandibulada Kist Benzeri Geniş Periapikal Lezyonun Cerrahi Olmayan Endodontik Tedavisi. Unika Sağlık Bilimleri Dergisi. 2022;2(2):289-95.

2. Sağlam BC, Karatekin C, Erol F. Geniş Periapikal Lezyonlu Dişlerin Cerrahi Olmayan Endodontik Tedavisi: Olgu Sunumu Serisi. J Int Dent Sci. 2019;5(3):66-70.

3. Harty F, Parkins B, Wengraf A. The success rate of apicectomy: A retrospective study of 1, 016 cases. Br Dent J. 1970;129(9):407-13.

4. Çalışkan M. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. Int Endod J. 2004;37(6):408-16.

5. Vier-Pelisser FV, Pelisser A, Recuero LC, Só MVR, Borba MG, Figueiredo JAPd. Use of cone beam computed tomography in the diagnosis, planning and follow up of a type III dens invaginatus case. Int Endod J. 2012;45(2):198-208.

6. Fregnani E, Spinola L, Sônego J, Bueno C, De Martin A. Complex endodontic treatment of an immature type III dens invaginatus. A case report. Int Endod J. 2008;41(10):913-9.

7. Bayram E, Eren H. Endodontik Tedavisi yapilmiş geniş periapikal lezyonlu dişlerin uzun dönem radyografik takibi: 2 olgu sunumu. Atatürk Üniversitesi Diş Hekimliği Fakültesi Dergisi. 2015;25:39-43.

8. Çelenk S, Ayna Be, Bolgül Bs, Atakul F. Geniş Çapli Periapikal Lezyonun Tedavisi (3 Yıllık Takip Çalışması): Olgu Sunumu. J Dent Sci. 2005;11(3):69-72.

9. Shadmehr E, Farhad AR. Clinical management of dens invaginatus type 3: a case report. Iran Endod J. 2011;6(3):129.

10. Saatchi M. Healing of large periapical lesion: A non-surgical endodontic treatment approach. Aust Endod J. 2007;33(3):136-40.

11. Riccitiello F, Stabile P, Amato M, Rengo S, D'Ambrosio C. The treatment of the large periradicular endodontic injury. Minerva Stomatologica. 2011;60(9):417-26.

12. GB S. Reduction of intracanal bacteria using nickel-titanium rotary instrumentation and various medications. J Endod. 2000;26:751-5.

13. Öztan M. Endodontic treatment of teeth associated with a large periapical lesion. Int Endod J. 2002;35(1):73-8.

14. Çalışkan MK, Türkün M. Periapical repair and apical closure of a pulpless tooth using

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024

calcium hydroxide. Oral Surg, Oral Med, Oral Pathol, Oral Radiol, and Endodontol. 1997;84(6):683-7.

15. Çelik K, Belli S. Periapical Cysts and Relationships with Root Canal Therapy. Turkiye Klinikleri Dishekimligi Bilimleri Dergisi. 2012;18(1):64.

16. Smith EA, Marshall JG, Selph SS, Barker DR, Sedgley CM. Nonsteroidal anti-inflammatory drugs for managing postoperative endodontic pain in patients who present with preoperative pain: a systematic review and meta-analysis. J Endod. 2017;43(1):7-15.

17. Ather A, Patel B, Ruparel NB, Diogenes A, Hargreaves KM. Coronavirus disease 19 (COVID-19): implications for clinical dental care. J Endod. 2020;46(5):584-95.

18. Mohammadi Z, Jafarzadeh H, Shalavi S. Antimicrobial efficacy of chlorhexidine as a root canal irrigant: a literature review. J Oral Sci. 2014;56(2):99-103.

19. Gomes BP, Vianna ME, Zaia AA, Almeida JFA, Souza-Filho FJ, Ferraz CC. Chlorhexidine in endodontics. Brazil Dent J. 2013;24(2):89-102.

20. Bernardi A, Teixeira CS. The properties of chlorhexidine and undesired effects of its use in endodontics. Quintessence Int. 2015;46(7).

Taş H, Kamalak A, Balkanlıoğlu E. Non-Surgical Endodontic Treatment Approach to Large Periapical Lesion: Two Case Reports. *Van Diş Hekimliği Dergisi.* 2024;5(2):14-21.

Sorumlu Yazar: Dr. Öğr. Üyesi Esra Balkanlıoğlu, e mail: dt.esrabalkanlioglu@gmail.com

Gönderim Tarihi: 24 Eylül 2024; Kabul Tarihi: 7 Aralık 2024