

Case Report

Clinical Approach in Trauma-Induced Large Periapical Lesions: 2 Case Reports With 3-Year Follow-Up

Menekşe Alim¹, Mehmet Bani²

¹ Res. Assist., Gazi University, School of Dentistry, Department of Pediatric Dentistry, Ankara, Türkiye. ² Prof. Dr., Gazi University, School of Dentistry, Department of Pediatric Dentistry, Ankara, Türkiye.

ABSTRACT

Introduction: This case report aims to present the treatment and long-term follow-up of teeth with extensive periapical lesions using two different approaches.

Case Reports: In the first case, a 14-year-old girl had a large periapical lesion on the upper right lateral tooth and in the second case, a 10-year-old girl had a large periapical lesion on the upper left lateral tooth with extraoral swelling and pain. Both cases were irrigated with sodium hypochlorite during the treatment, and calcium hydroxide was applied as an intracanal medicament. In the first case, when the tooth was asymptomatic, the root canal was filled with gutta-percha and epoxy resin paste. In the second case, since pus drainage could not be prevented, apical resection was performed after root canal filling. At the end of the 12-month follow-up period, it was observed that the lesion healed completely, and bone formation occurred in the cavity in both cases.

Conclusion: Clinical and radiographic evaluations revealed that there were no pathologic findings in the teeth at the 3rd year follow-up.

Keywords: Apical resection, calcium hydroxide, endodontic treatment

Citation: Alim M., Bani M. Clinical Approach In Trauma-Induced Large Periapical Lesions: 2 Case Reports With 3-Year Follow-Up ADO Klinik Bilimler Dergisi 2025;14(3):233-239

Editor: Sinem Akgül, Gazi University, Ankara, Türkiye

Copyright: ©2025 Alim & Bani This work is licensed under a [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/). Unrestricted use, distribution and reproduction in any medium is permitted provided the original author and source are credited.

INTRODUCTION

All types of traumatic forces on the teeth outside the biological limits affect the pulp and periapical tissues. These forces may be excessive occlusal forces resulting from premature contact with the teeth or exogenous forces such as falls, bumps and sports injuries. Clinical, radiographic and histologic changes occur in the teeth, periodontal tissues and temporomandibular joint as a result of trauma.¹ Histologically, increased vascularization and permeability, necrosis of the periodontal ligament, hemorrhage, thrombosis, bone resorption and in some cases root resorption may occur with the pressure on the traumatized tooth.² As a result, loss of vitality, inflammation and periapical lesions are observed.

Most periapical lesions can be classified as granulomas, radicular cysts, or abscesses. Periapical lesions cannot be differentiated as cysts or granulomas by radiographic examination alone.³ The definitive diagnosis of lesion type can be made by histologic examination.⁴

There has been a long-standing debate about the treatment of large cystic lesions, with some arguing that surgery may be the only way to treat true cysts successfully.^{5,6} However, endodontists argue that the vast majority of cysts will heal after nonsurgical root canal treatment.^{7,8}

Treatment options for large periapical lesions range from non-surgical root canal treatment to apical resection and extraction. In this case report, we describe the treatment of a periapical lesion caused by previous trauma and occlusal trauma with two different methods and the recovery achieved as a result.

Received: 17.10.2024; Accepted: 16.04.2025

Corresponder author: Dr. Menekşe Alim
Gazi University, Faculty of Dentistry, Bişkek St. 1.St. Number:8
Postcode: 06490 Emek, Ankara, Türkiye
E-mail: dt.alimmenekse@gmail.com

Case 1: A 14-year-old girl patient presented to Gazi University Department of Pediatric Dentistry because of crowding in her teeth. Radiographs revealed a lesion in the root of the upper anterior tooth. Clinical examination revealed premature contact between the upper right lateral tooth and the lower right lateral tooth (Figure 1a, 1b). No anomaly was detected on the buccal and palatal mucosal surface of tooth 12 and the tooth was asymptomatic. Panoramic and periapical radiographs obtained from the patient showed a radiolucent lesion associated with the root of tooth 12 (Figure 1c, 1d). The tooth responded negatively to the electrical vitality test. The decision was to perform root canal treatment of the tooth. Root canal treatment was started in the first session under rubber dam isolation (Figure 2a). After opening the access cavity without local anesthesia, the working length was determined with an electronic apex locator (Root ZX, Morita, Tokyo, Japan). Apical trepanation was achieved with

a #15 K-type file (Dentsply Maillefer, Ballaigues, Switzerland) 1 mm beyond the radiologic apex and serous exudate drainage was started. Drainage was repeated twice weekly until discontinued. The root canal was then treated with calcium hydroxide for 1 month. The root canal was enlarged with the step back technique up to the apical diameter of file #80. Sodium hypochlorite (NaOCl) 2.5% was used between each file change and saline was used as the final wash solution. After drying the root canal with sterile paper cones, root canal filling was performed with resin-containing root canal paste (Adseal, Meta Biomed, Korea) and gutta-percha using cold lateral compaction technique (Figure 2b). The tooth was restored with composite resin. The control examination and radiographs taken in the first year showed that the lesion healed completely, and the tooth was asymptomatic (Figure 3a). In the 2nd and 3rd year follow-ups, the tooth was asymptomatic (Figure 3b,3c).



Figure 1.

- a: Preoperative intraoral photograph,
- b: Premature contact between the upper right lateral tooth and the lower right lateral tooth,
- c: Preoperative radiograph of tooth 12,
- d: Panoramic radiograph.

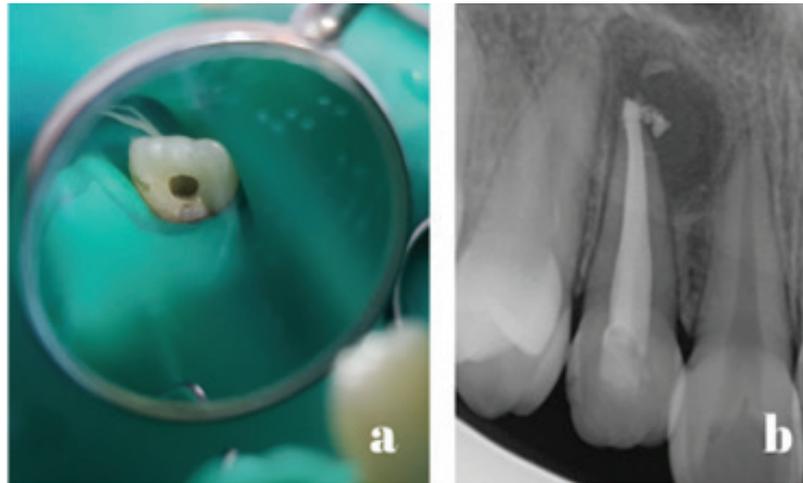


Figure 2.
a: Rubber dam isolation,
b: Postoperative radiograph.

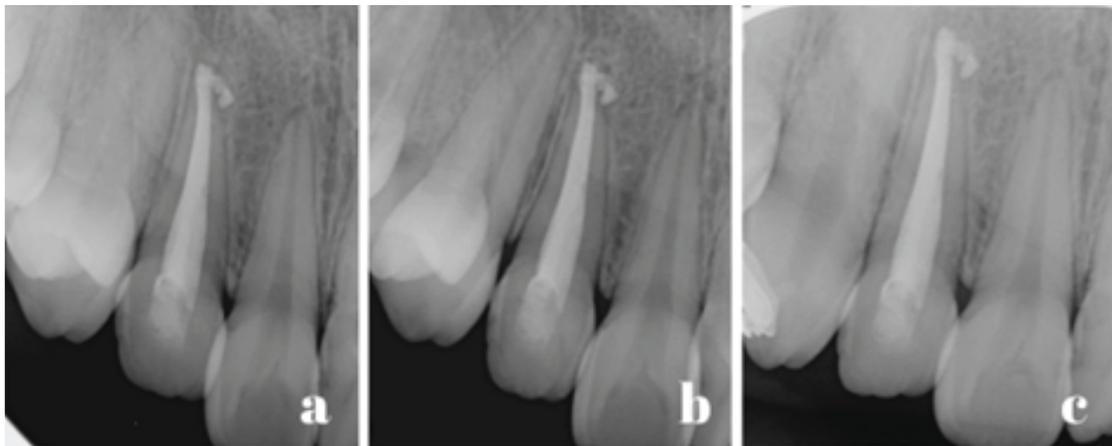


Figure 3.
a-b-c: 12-, 24- and 36-months follow-up.

Case 2: A 10-year-old girl presented to our clinic with swelling and pain in the upper jaw. Extraoral examination revealed swelling in the upper left region extending from the edge of the nose to the corner of the mouth. The swelling caused obliteration of the nasolabial fold, and the area was painful on palpation (Figure 4a). Intraoral examination revealed swelling and hyperemia of the mucosa apical to tooth 22 (Figure 4b). The tooth responded painfully to percussion. Radiographic examination revealed a large radiolucent lesion associated with the root of tooth 22 (Figure 4c). There was no caries in the tooth and the patient's family was asked about any history of trauma. The patient had fallen on his face in the past and it was thought that the lesion in the tooth might be caused by trauma. In the first session, the abscess was drained by incision through both

the canal and buccal mucosa (Figure 5a). Antibiotics (amoxicillin+clavulanic acid) and analgesics (ibuprofen) were prescribed. In the second session, drainage was performed once a week for 4 weeks as the flow of pus through the canal still continued. Then, the canals were washed with 2.5% sodium hypochlorite and saline, dried with sterile paper cones and calcium hydroxide was placed. For 3 months, calcium hydroxide was replaced once a month. The tooth was asymptomatic, but the lesion was thought to be a cystic structure since the paste did not come out of the root canal clean and dry at the end of 3 months and was consulted by the Department of Oral, Dental and Maxillofacial Surgery. A computed tomography scan of the patient showed a lesion approximately 16 mm in diameter and covering an area of 288 mm³ in size. After

orthograde filling of the root canal, apical surgery was planned. The root canal was expanded with the step back technique up to the apical diameter of file #80. Sodium hypochlorite (NaOCl) 2.5% was used between each file change and saline was used as the final wash solution. After drying the root canal with sterile paper cones, root canal filling was performed with resin-containing canal paste (Adseal) and gutta-percha using cold lateral compaction technique. The entrance cavity was restored with composite resin. Immediately afterwards, the flap was opened, and a window was made in the bone at the level of the root of tooth 22. After the cystic tissue was completely

removed from the cavity, the apical 2-3 mm of the tooth was resected, and the cavity was prepared (Figure 5b). The cavity was filled with mineral trioxide aggregate (MTA) (Bio-MTA-Cerkamed-Poland) and the flap was re-sutured and the operation area was closed. After the operation, there was no mobility in the tooth that required splinting. The pathology of the tissue removed during the operation was diagnosed as radicular cyst. The patient was followed up at 6, 12, 24 and 36 months (Figure 6). At the end of 3 years, the lesion was completely healed, and the bone structure was healthy.



Figure 4.
 a: Preoperative photo showing swelling in the upper left region,
 b: Intraoral photo showing swelling and hyperemia of the mucosa,
 c: Pre-operative radiograph showing large periapical lesion.



Figure 5.
 a: Drainage of abscess through the canal,
 b: Complete removal of the cystic tissue from the cavity and resection of the apical 2-3 mm of the tooth.

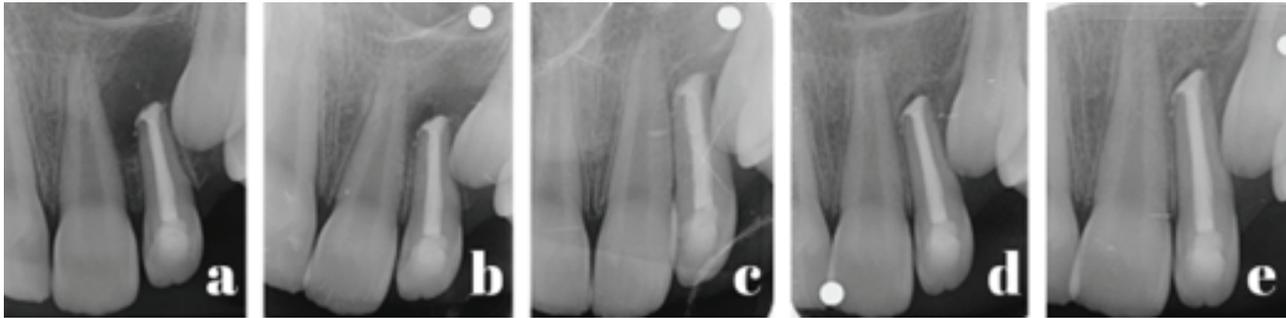


Figure 6.
a: Postoperative radiograph,
b-c-d-e: 6,12,24 and 36 months follow-up.

DISCUSSION

Any excessive force applied to the teeth may cause the tooth to lose its vitality, resulting in inflammation and periapical lesions. Although the mechanism of the formation of periapical lesions has not been fully explained, it is generally accepted that periapical lesions occur as a result of pulp necrosis, which creates an environment suitable for the proliferation of microorganisms, followed by an immunological reaction.⁹ In both of the cases presented, radiographic examination revealed extensive periapical lesions. One of the cases had a history of previous trauma, while the other had a traumatic condition caused by premature contact. Indeed, it has been reported that pulp necrosis can occur as a result of a sudden interruption of circulation with a traumatic injury.^{10,11}

When endodontic treatment and apical resection options are evaluated in the treatment of large periapical lesions, endodontic treatment is preferred primarily due to the possibility of damage to nearby vital teeth and anatomical structures and postoperative pain associated with surgical procedures. However, it has been reported that surgical treatment may also be needed in cases where the lesion does not heal.¹² Although the possibility of healing with conventional root canal treatment is low due to the intra-tissue dynamics of the cysts, a more conservative method should be preferred first since it is not possible to diagnose true cysts clinically and radiographically.^{4,5,13} In one of the cases presented, apical resection was planned because endodontic treatment was not successful. In the other case, the lesion healed completely with endodontic treatment.

Successful root canal treatment is based on the elimination of bacteria by instrumentation and irrigation of the root canal system. Instrumentation can be performed manually or using rotary file systems. Studies have shown that there is no significant difference between the two methods in terms of cleaning capacity.^{14,15} Irrigation solutions are preferred because of their ability to remove debris from apical non-instrumented areas, remove necrotic tissue and biofilms, and have antibacterial effect in root canals.¹⁶⁻¹⁸ In the cases presented, instrumentation was performed with the manual method and sodium hypochlorite was used as irrigation solution due to its organic tissue dissolving effect and antimicrobial effect.

Calcium hydroxide is the most preferred material as an intra-canal medicament due to its anti-inflammatory and antibacterial effects.¹⁹ Calcium hydroxide increases pH by releasing OH⁻ ions and shows antibacterial effect.²⁰ In addition, its advantages are that it induces bone formation and helps periradicular healing.²¹ Calcium hydroxide was preferred as an intra-canal medicament in the cases presented to take advantage of the mentioned advantages. In the first case, when the tooth was asymptomatic, the root canal was filled with a paste containing gutta-percha and epoxy resin. In the second case, since pus drainage could not be prevented, apical resection was planned after root canal filling. Apical resection is the treatment of choice when the root canal does not heal after root canal treatment or when other factors such as complex canal anatomy, extraradicular infection and procedural errors responsible for the failure

of endodontic treatment cannot be eliminated. The apical resection procedure includes surgical removal of the periapical lesion, root apex resection, preparation of the root apex cavity, and root apex filling.²² Root apex filling placement aims to completely seal the root canal system and prevent bacterial entry into the periradicular tissues.²³ In the present case, MTA was used as root apex filling material due to its sealing ability, material stability, and biocompatibility. The apical barrier created with MTA is thought to be effective in the prognosis and success of the treatment.

Radiographically, density change, trabecular formation and lamina dura formation within the lesion and clinically, asymptomatic tooth and healthy soft tissues indicate healing.²⁴ In the follow-up radiographs of the presented cases, the trabecular structure and lamina dura had regenerated, and the soft tissues were healthy.

CONCLUSION

This case report presents two instances where root canals of teeth with extensive periapical lesions were effectively treated through thorough disinfection and sealed fillings. In scenarios where intracanal drainage could not be controlled, the use of retrograde plugging with mineral trioxide aggregate (MTA) in conjunction with apical resection demonstrated a favorable impact on the healing of lesions.

Travma Kaynaklı Geniş Periapikal Lezyonlarda Klinik Yaklaşım: 3 Yıllık Takipli 2 Olgu Raporu

ÖZET

Giriş: Bu olgu bildiriminin amacı geniş periapikal lezyona sahip dişlerin iki farklı yaklaşımla tedavisi ve uzun dönem takibini sunmaktır.

Vaka Raporları: İlk olguda 14 yaşındaki kız hastanın üst sağ lateral dişinde geniş periapikal lezyon, ikinci olguda 10 yaşındaki kız hastada ekstraoral şişlik ve ağrıyla seyreden sol üst lateral diş kaynaklı geniş periapikal lezyon görülmüştür. Tedavi boyunca her iki olguda da sodyum hipoklorit ile irrigasyon yapıp, kanal içi medikament olarak kalsiyum hidroksit uygulanmıştır. İlk olguda diş asemptomatik olduğunda kök kanalı ortograd olarak guta perka ve epoksi rezin içerikli pat ile doldurulmuştur. İkinci olguda ise

pü drenajı engellenemediğinden kök kanalının doldurulmasının ardından apikal rezeksiyon yapılmıştır. 12 aylık takip sürecinin sonunda iki olguda da lezyonun tamamen iyileştiği ve kavitede kemik formasyonunun gerçekleştiği görüldü.

Sonuç: Hastaların 3. yıl takiplerinde söz konusu dişlerde herhangi bir patolojik bulgu olmadığı klinik ve radyografik değerlendirmelerle tespit edildi.

Anahtar Kelimeler: Apikal rezeksiyon, endodontik tedavi, kalsiyum hidroksit

REFERENCES

- Öncü E, Alaaddinoğlu EE. Travmatik Oklüzyon ve Adaptasyon. Türkiye Klinikleri J Dental Sci-Special Topics. 2014;5:62-8.
- Fan J, Caton JG. Occlusal trauma and excessive occlusal forces: Narrative review, case definitions, and diagnostic considerations. J Periodontol 2018;89:214-22.
- Bhaskar SN. Oral surgery-oral pathology conference no. 17, Walter Reed Army Medical Center: periapical lesions-types, incidence, and clinical features. Oral Surg, Oral Med, Oral Pathol 1966;21:657-71.
- Çalışkan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. Int Endod J, 2004;37:408-16.
- Nair PNR, Sjögren U, Schumacher E, Sundqvist G. Radicular cyst affecting a root-filled human tooth: a long-term post-treatment follow-up. Int Endod J, 1993;26:225-33.
- Natkin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence, and treatment of periapical cysts and granulomas. Oral Surg, Oral Med, Oral Pathol 1984;57:82-94.
- Bhaskar SN. Nonsurgical resolution of radicular cysts. Oral Surg, Oral Med, Oral Pathol 1972;34:458-68.
- Morse DR, Wolfson E, Schacterle GR. Nonsurgical repair of electrophoretically diagnosed radicular cysts. J Endod, 1975;1:158-63.
- Yanagisawa S. Pathologic study of periapical lesions 1. Periapical granulomas: clinical, histopathologic and immunohistopathologic studies. J Oral Pathol 1980;9:288-300.
- Alaşam T. Endodonti. Ankara: Barış Yayınları, 2000. s.45-72.
- McTigue DJ. Erken daimi dişlenme döneminde travmatik yaralanmaların tedavisi: Pinkham JR, Casamassimo PS, Fields HW, Mc Tigue DJ, Nowak AJ. Infancy through adolescence. Türkçe Çeviri. Ankara: Atlas Yayınları, 2009. s.593-607.
- Hoen MM, LaBounty GL, Strittmatter EJ. Conservative treatment of persistent periradicular lesions using aspiration and irrigation. J Endod 1990;16:182-6.
- Wood NK. Periapical lesions. Dent Clin North Am 1984;28:725-66.
- Silva LA, Nelson-Filho P, Leonardo MR, Tanomaru JM. Comparison of rotary and manual instrumentation techniques on

cleaning capacity and instrumentation time in deciduous molars. *J Dent Child* 2004;71:45-7.

15. Barr ES, Kleier DJ, Barr NV. Use of nickel-titanium rotary files for root canal preparation in primary teeth. *Pediatr dent* 2000;22:77-8.

16. Sedgley C, Nagel A, Hall D, Applegate B. Influence of irrigant needle depth in removing bioluminescent bacteria inoculated into instrumented root canals using real-time imaging in vitro. *Int Endod J* 2005;38:97-104.

17. Boutsoukias C, Lambrianidis T, Kastrinakis E. Irrigant flow within a prepared root canal using various flow rates: a computational fluid dynamics study. *Int Endod J* 2009;42:144-55.

18. Tay FR, Gu L-s, Schoeffel GJ, Wimmer C, Susin L, Zhang K, et al. Effect of vapor lock on root canal debridement by using a side-vented needle for positive-pressure irrigant delivery. *J Endod* 2010;36:745-50.

19. Manfredi M, Figini L, Gagliani M, Lodi G. Single versus multiple visits for endodontic treatment of permanent teeth. *Cochrane Database Syst Rev* 2016;12:CD005296.

20. Uslu O, Dikmen G, Orhan EO. Intrinsic physicochemical interactions of calcium hydroxide-based medications. *Microsc Res Tech* 2021;84:432-40.

21. Tanomaru Filho M, Leonardo MR, da Silva LAB. 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;28:295-9.

22. von Arx T, Walker WA, 3rd. Microsurgical instruments for root-end cavity preparation following apicoectomy: a literature review. *Endod Dent Traumatol* 2000;16:47-62.

23. Akbulut MB, Selen İnce Yusufoglu, Menziletoğlu D. Use of root-end filling materials after root-end resections among oral surgeons: A national survey. *Meandros Med Dent J* 2020;21:196-203.

24. Saatchi, M. Healing of large periapical lesion: A non-surgical endodontic treatment approach. *Aust Endod J* 2007;33:136-40.