CASE REPORT

sciendo

DOI: 10.2478/asmj-2022-0005

The impact of covid-19 on a patient with a severely compromised permanent maxillary central incisor.

Zsuzsanna Bardocz-Veres[1], Mircea Suciu[1]

[1] George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Târgu-Mureș, Romania

Abstract

The SARS-CoV-2 pandemic situation led to public health measures that forced patients to remain isolated and take steps to prevent the dissemination of the virus. Many of these patients were unable to attend to the dental services or delayed seeking dental care due to a lack of private services and concerns about the SARS-CoV-2 outbreak, which in many cases complicated their situation.

This case report describes the long-term clinical outcome of an endo-periodontal periapical lesion with associated bone defect of a maxillary central incisor in an esthetically demanding, systemically healthy patient, who neglected dental treatment during the pandemic outbreak. Treatment procedures included primary endodontic treatment of the periapical lesion and cause-related therapy aimed to control the infection in the rest of the mouth. Clinical examination at the 1-year recall revealed clinical attachment gain with shallow residual probing pocket depths and a slight increase in gingival recession. The esthetic appearance of the treated tooth was improved via a zirconia-ceramic crown. The present case report suggests that successful periodontal and esthetic results can be accomplished and maintained for at least 2 years after treatment of an apparently hopeless tooth with extremely compromised endo-periodontal conditions.

Keywords: endo-periodontal lesion, oral rehabilitation, COVID-19 pandemic, zircon-ceramic crown.

Introduction

The SARS-CoV-2 outbreak began at end of 2019 in China and quickly spread around the world, officially COVID-19 pandemic was announced in March 2020. Therefore, at the beginning of the COVID-19 pandemic in Romania, most of the private dental practices suspended their activities, which led to a reduction in the delivery of dental care [1, 2].

The outbreak disrupted the delivery of non-essential services on a global scale, leading to more serious and complex problems at a later date. Despite the consequences, private dental practices were obligated to close, to prevent the development of the pandemic, and only in public care were dental emergencies treated. Where the dental procedures were classified according to the risk of infection for the staff and the patients, the key factors influencing the possibility of SARS-CoV-2 infection during a dental visit are aerosol-generating procedures [3-5].

Reduced service availability had a negatively impact on both the acceptability of the service (patients waiting with pain and infection) and long-term oral health of affected patients (the inability to provide continuous care). The pandemic situation forced healthcare decision makers to end all routine, private practices and only urgent dental care was available. In most cases, following triage, the dentists offered self-care advice, or prescribed analgesics or antibiotics, only the most severe acute dental problems were offered emergency dental care [6].

The effects of reduced access to dental care on population will fully show only in the future, and will shed light on the role of dentistry in healthcare. However, dental conditions must not be neglected given the fact that their prevalence has increased and influences general health, the psychological state of the individual, therefore the quality of life and well-being of the patient. [7-10].

Case presentation

A 46-year-old woman presented to our care. Dental history revealed that three months prior the patient presented to the emergency care, where pulp necrosis with acute apical

periodontitis was established in the upper right central incisor. After extraoral access cavity preparation and pulp extirpation, in the root canal devitalizing paste was placed and closed with provisional filling. Due to the COVID-19 pandemic, the patient did not feel comfortable seeking dental care. The patient came to our dental department in May 2020, asking for further evaluation of the possibility of saving the maxillary right incisor and management of the esthetic problems. Since the neighboring teeth showed no defects, the request of the patient was to treat the tooth with a single-tooth supported restoration. Her medical history was noncontributory.

The periapical X-ray revealed evidence of external root resorption with periapical radiolucency and an apparent periodontal ligament space (figure 1A). Intraoral clinical examination showed discoloration on the tooth surface, and excessive mobility of the tooth (fiure. 1B).

A B

Figure 1. A-Radiography shows extensive periapical and lateral translucency; B-Discoloration of central incisor is clearly visible

The tooth was diagnosed as a primary endodontic lesion with secondary periodontal involvement. The patient was informed that the tooth had poor to reserved prognosis due to severe periodontal attachment loss. Following a discussion of the benefits, risks, and alternative treatment options, she decided to keep her tooth. She approved of the dental treatment through written informed consent.

On the same day access was reopened, the working length was determined with an electronic apex locator (Dentsply International Inc., Philadelphia, Pennsylvania) and then confirmed radiographically. Root canals were shaped with the crown-down technique using rotary nickel-titanium instruments (Dentsply International Inc., Philadelphia, Pennsylvania) Solutions of 3% sodium hypochlorite (NaOCl; Sainsbury plc, London, UK) and 17% EDTA (Prevest Denpro Ltd, Jammu, India) were used as root canal irrigants. Root canals were dried with paper points (Dentsply International Inc., Philadelphia, Pennsylvania) and were then filled with calcium hydroxide paste (Ivoclar Vivadent AG, Schaan, Principality of Liechtenstein). Intermediate restorative material (Dentsply Ltd., Weybridge, UK) was used for a temporary filling.

The patient was recalled to finish the final root canal treatment after approximately 3 months. The paste was removed with drills (DENTSPLY Maillefer, Tulsa, Oklahoma), and 3% sodium hypochlorite and 17% EDTA were used as root canal irrigants. Root canals were dried with paper points and were obturated with gutta-percha (Dentsply

International Inc., Philadelphia, Pennsylvania) and Endomethasone (Septodont, France) using lateral condensation technique and the correct and complete root-canal filling was confirmed on a radiograph.

The patient was recalled after 1 week. A temporary splint was made to control tooth mobility and improve the patient's comfort and function, as the occlusal forces were directed away from the teeth to other areas of the oro-facial system (figure 2).

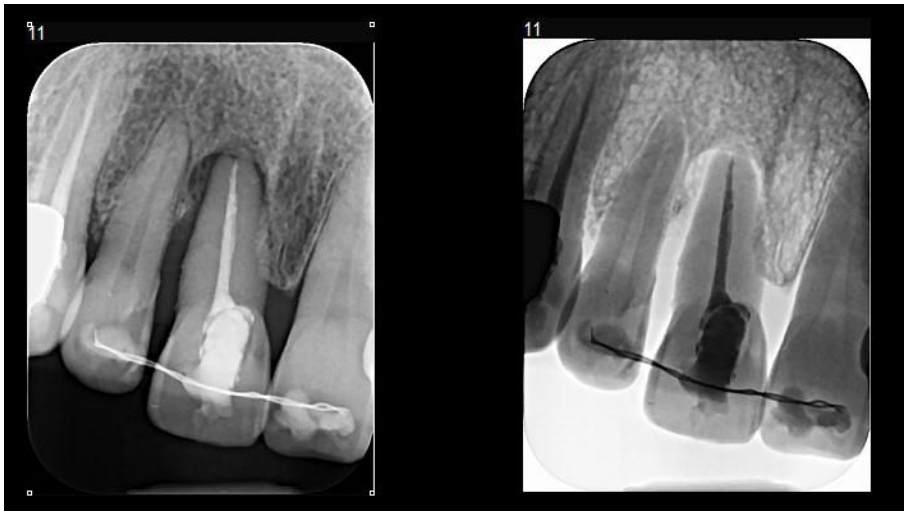

Figure 2. 1 week follow-up radiography, with the complete root-canal filling and the temporary splint

After the 1 month follow-up radiograph, the tooth was prepared for a crown and a conventional impression was taken and a zirconia single crown-frame was fabricated using CAD/CAM technology (DCS Dental) and veneered with a veneering ceramic (Vitadur D, Vita), Finally, the single all ceramic crown was cemented using a glass-ionomer cement (Ketac Cem,3M/ESPE) (figure 3).

Figure 3. Cemented crown in situ

After setting of the cement, remnants were removed and the patient was instructed in proper soft tissue and tooth cleaning. The patient was very satisfied with the esthetic appearance of the treated area.

The 18-month follow-up radiograph showed resolution of most of the periradicular lesions (figure 4). Clinically, the buccal defect healed after one year and the pocket probing depth was normal, except for the distal aspect of 11. The endodontic treatment alone did not

influence the complete healing of the defect, a periodontal treatment is necessary for the further healing of the periradicular area.

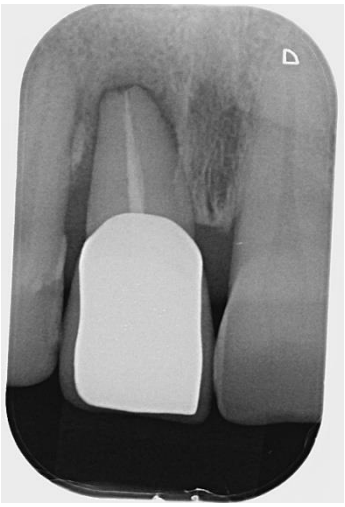

Figure 4. Follow-up radiograph, 18 months after root canal therapy, the resolution of the periradicular bone lesions is evident

Discussions

The COVID-19 pandemic lasted for more than one year and discontinuing dental services for such a long period of time in some cases is threatening for patient's oral health, as such behavior is associated with the appearance of further dental problems or exacerbation of the complications. The ignorance of a continuous treatment can also result in more acute oral problems, which in turn require more expensive, complicated and extended treatment. A study showed that the change in patient behavior was statistically significant during the lockdown period, there was a significant increase in the number of cancelled visits and in the number of patients discontinuing treatment as compared to the year preceding the pandemic. The presumably reason for patients' lack to continue dental care is the fact that during the COVID-19 pandemic, and in line with the guidelines introduced, patients only had the emergency services available. In the emergency care the most important was to reduce pain and protect the patient, and this in turn influenced the attitude towards dental services. The most important in this period was to encourage the public to reduce social contacts and avoid leaving home for unnecessary reasons [8].

Endo-periodontal lesions have been characterized as bacterial infectious diseases that lead to considerable periodontal tissue damage and pulp necrosis. These lesions exist simultaneously in the periodontal and endodontic tissues of the same tooth and can occur because the periodontium and the pulp communicate through different pathways. The primary endodontic lesion with secondary periodontal involvement must first be treated with a root canal therapy to eliminate the ethio-patological factors and to allow the healing of the periapical tissues. This combined endo-periodontal situation becomes a challenge for the clinicians and requires extra considerations. Managing this lesions involves treating both endodontic and periodontal components. Some cases require surgical interventions or even extraction because of poor prognosis. Clinically, when a tooth is diagnosed as having endo-periodontal lesion, the correct assessment of the prognosis of the involved tooth is in adopting a reasonable treatment plan, but, currently, clinicians usually base their diagnostic and treatment plan on their own practical experience [11].

In our case, the endodontic treatment results were evaluated after 2 years, and only then, was the need to apply periodontal treatment considered. Sufficient evidence in the literature reports that this treatment sequence allows enough time for initial tissue healing and better assessment of the periodontal condition. A retrospective study concluded that the endodontic infection stimulates periodontal pocket formation and is a risk in the evolution of periodontitis, thus, a primary endodontic lesion draining through the attachment apparatus should be immediately treated, since an aggressive removal of the periodontal ligament unfavorable affects periodontal healing [12].

Correct root canal treatment controls intrapulpal bacteria and stops the resorption process. In endo-periodontal lesions, infection originates also from the periodontal sulcus and stimulates the pathological process. As proper infection control in the sulcus is unlikely, removal of granulation tissue and sealing are necessary for repair. [13].

The pathogens present affect the integrity of the periodontium, they have to be removed during root canal treatment, so it is critical to control the pulpal bacteria, and calcium hydroxide (CH) appears to be a good choice for treatment when used for several months as medicine. The antibacterial and anti-inflammatory properties and low solubility create a long-term effect in the root canal, and remove the stimulation factor from the main canal, at the same time prohibiting the resorption and the periodontal contamination. [14-16]

Endo-perio lesions may seriously compromise the longevity of a tooth to such an extent that it may result in its early loss. It is, therefore, important to diagnose and remove the intracanal infection that occurs in the initial phase. As first step, the removal of the infected tissues should be initiated prior to any periodontal therapy. This order avoids several complications and helps to create a more advantageous environment for the periodontal recondition. In the combined lesions a periodontal treatment is also important to influence the secondary periodontal disease, because of the communication between the endodontic and periodontal processes, the use of therapeutic drugs is essential to kill any bacteria and to stimulate tissue repair. [17-22].

In this case, the patient requested treatment for esthetic reasons. The esthetic appearance of the treated tooth was improved via the zirconia-ceramic crown. Two years post-treatment both the esthetics and the periodontal health were improved. The present case report suggests that successful periodontal and esthetic results can be achieved and maintained for at least 2 years after regenerative treatment of a tooth with extremely severe periodontal conditions [23, 24].

Conclusions

This case report illustrates how a severely compromised tooth can be successfully treated, with proper diagnosis followed by applying the correct treatment sequence.

Proper and early diagnosis of EPL is critically important and will dictate the appropriate course of treatment, so decision on patient management and treatment should be made by the clinician to provide what is in the patient's best interest, and not the COVID-19 forced healthcare policies.

The presented treatment method would offer an optimal solution for normal and stable occlusion, an adequate width of attached gingiva and good esthetic results of a severely affected tooth. Although first experimental data are encouraging, long-term clinical data are necessary for this treatment solution to be recommended for daily practice.

Conflict of interest: None to declare.

References

1. Spagnuolo G, De Vito D, Rengo S, Tatullo M. COVID-19 Outbreak: An Overview on Dentistry. Int. J. Environ. Res. Public Health. 2020; 17:2094.
2. Ali K, Raja M. Coronavirus Disease 2019 (COVID-19): Challenges and Management of Aerosol-

Generating Procedures in Dentistry. Evid. Based Dent. 2020; 21:44–45.
3. Klemmedson D. Is there an upside to COVID-19 for dentistry? J. Am. Dent. Assoc. 2020; 151:713–715.
4. Dacic SD, Miljkovic MN, Jovanovic MC. Dental Care during the Covid-19 Pandemic—To Treat or Not to Treat? J. Infect. Dev. Ctries. 2020; 14:1111–1116.
5. Passarelli PC, Rella E, Manicone PF, Garcia-Godoy F, D'Addona A. The Impact of the COVID-19 Infection in Dentistry. Exp. Biol. Med. 2020; 245:940–944.
6. Bizzoca ME, Campisi G, Muzio LL. Covid-19 Pandemic: What Changes for Dentists and Oral Medicine Experts? A Narrative Review and Novel Approaches to Infection Containment. Int. J. Environ. Res. Public Health. 2020; 17:3793.
7. Bhumireddy J, Mallineni SK, Nuvvula S. Challenges and Possible Solutions in Dental Practice during and Post COVID-19. Environ. Sci. Pollut. Res. Int. 2021; 28:1275–1277.
8. Migas K, Marczak M, Kozłowski R, Kot A, Wysocka A, Sierocka A. Impact of the COVID-19 Pandemic on the Dental Preferences of Patients in the Private Sector. Int J Environ Res Public Health. 2022 Feb 15; 19(4):2183.
9. Spagnuolo G, De Vito D, Rengo S, Tatullo M. COVID-19 outbreak: An overview on dentistry. Int. J. Environ. Res. Public Health. 2020; 17:2094.
10. Kramer KJ. The COVID-19 pandemic and its impact on dentistry. Anesth. Prog. 2020; 67:65–66.
11. Rotstein I, Simon JH. Diagnosis, prognosis, and decision-making in the treatment of combined periodontal-endodontic lesions. Periodontology. 2000; 34:165–203.
12. Torabinejad M, Walton RE. Endodontics principles and practice. 4th Edition. Saunders, Elsevier; 2009; 94–107.
13. Zehender M, Hasselgren G. Pathologic interactions in pulpal and periodontal tissues. J Clin Periodontol. 2002; 29:663–671.
14. Tronstad L, Andreasen JO, Hasselgren G, Kristerson L, Riis I. pH changes in dental tissues after root canal filling with calcium hydroxide. J Endod 1981; 7: 17– 21.
15. Fuss Z, Szajkis S, Tagger M. Tubular permeability to calcium hydroxide and to bleaching agents. J Endod 1989; 15: 362– 4.
16. Fuss Z, Rafaeloff R, Tagger M, Szajkis S. Intracanal pH changes of calcium hydroxide pastes exposed to carbon dioxide in vitro. J Endod 1996; 22: 362–4.
17. Bansal S, Tewari S, Tewari S, Sangwan P. The effect of endodontic treatment using different intracanal medicaments on periodontal attachment level in concurrent endodontic-periodontal lesions: A randomized controlled trial. J Conserv Dent. 2018 Jul-Aug; 21 (4):413-418.
18. Zucchelli G. Long-term maintenance of an apparently hopeless tooth: a case report. Eur J Esthet Dent. 2007 Winter; 2(4):390-404.
19. Pereira R, Arboleda S. A Multidisciplinary Approach of an Endo-Perio Lesion in a Severely Compromised Tooth: An 18-Year Follow-up Case Report. J Med Life. 2020 Oct-Dec;13 (4):629-634.
20. Alshawwa H, Wang JF, Liu M, Sun SF. Successful management of a tooth with endodontic-periodontal lesion: A case report. World J Clin Cases. 2020 Oct 26;8(20):5049-5056.
21. Fan X, Xu X, Yu S, Liu P, Chen C, Pan Y, Lin L, Li C. Prognostic Factors of Grade 2-3 Endo-Periodontal Lesions Treated Nonsurgically in Patients with Periodontitis: A Retrospective Case-Control Study. Biomed Res Int. 2020 Feb;
22. Makeeva MK, Daurova FY, Byakova SF, Turkina AY. Treatment of an Endo-Perio Lesion with Ozone Gas in a Patient with Aggressive Periodontitis: A Clinical Case Report and Literature Review. Clin Cosmet Investig Dent. 2020 Oct 28; 12:447-464.
23. Ahmad I. Restitution of maxillary anterior aesthetics with all-ceramic components. Int Dent J. 2002 Feb; 52(1):47-56.
24. Spitznagel FA, Boldt J, Gierthmuehlen PC. CAD/CAM Ceramic Restorative Materials for Natural Teeth. J Dent Res. 2018 Sep; 97(10):1082-1091.

Corresponding author:
Mircea Suciu
George Emil Palade University of Medicine, Pharmacy, Science and Technology of Târgu -Mureș, 38 Gheorghe Marinescu Street, Târgu -Mureș, 540139, Romania
Email: mircea.suciu@umfst.ro

Received: April 29, 2022 / Accepted: May 26, 2022