

ENDODONTSKI TRETMAN MAKSILARNOG PRVOG PREMOLARA SA TRI KANALA – PRIKAZ SLUČAJA

ENDODONTIC TREATMENT OF A MAXILLARY FIRST PREMOLAR WITH THREE CANALS – CASE REPORT

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Kratak sadržaj

Cilj ovog rada je bio da se prikaže mogućnost uspešnog endodontskog tretmana u kompleksnom slučaju kod prvog maksilarног premolara sa tri korena i tri kanala. Pristupilo se sistematičnoj analizi preoperativnih rentgen snimaka, kao i adekvatnoj preparaciji pristupnog kavita. Za instrumentaciju je odabrana krunično apeksna tehnika uz primenu Ni-Ti rotirajućih instrumenata, a opturacija je ostvarena uz primenu cementa na bazi smole kao i gutaperka kočića veće koničnosti, monokonom tehnikom. Ova metodologija je pomogla da se izvede kako efikasna preparacija tako i zadovoljavajuća definitivna opturacija kanala korena zuba.

Ključne reči: preparacija kanala korena, anatomske karakteristike premolara, opturacija kanala korena

Uvod

Neuspех kanalne terapije je nekada prouzrokován nepotpunom dijagnostikom koja se odnosi na anatomske karakteristike zuba, što znači da pojedini kanali ostaju neprimećeni ("zaboravljeni").

Da bi se izbegle ovakve greške, neophodno je sistematski pristupiti i to: precizno interpretirati rendgenološki snimak, ispreparisati odgovarajući pristupni kavitet i uraditi pažljivu inspe-

Abstract

The purpose of this paper was to report on the possibility for successful endodontic treatment of the complex case of maxillary first premolar with three roots and three canals. Systematic examination of preoperative X-rays and correct access cavity preparation were performed. Crown-down Ni-Ti rotary instrumentation technique was chosen for root canal preparation, and obturation was accomplished using resin cement and greater taper gutta-percha cones (monocone technique). This methodology contributed to efficient preparation and suitable definitive root canals obturation.

Key words: root canal treatment, premolars anatomy characteristics, root canal obturation

Introduction

Failure of root canal treatment is sometimes caused by the incorrect diagnosis of the anatomical characteristics of the tooth, which means that root canals could go unnoticed.

To avoid such mistakes, a systematic approach is advocated: accurate interpretation of the radiographs, preparation of an appropriate access, and meticulous inspection (using

kciju i sondiranje poda pulpne komore, koristeći lupu ili operativni endo mikroskop.

Maksilarни prvi premolar je uglavnom dvokoren zub sa dva kanala. Ali učestalost ovakvih anatomskih karakteristika je u 73% do 95% slučajeva. Objavljeno je da u 4% do 26% slučajeva maksilarni prvi premolar može imati jedan koren,¹ dok se u nekim studijama ističe da u 6% slučajeva ovaj zub ima tri korena.² Vertucci je ispitivanjem pronašao da je od 400 maksilarnih prvih premolara 5% sa tri kanala, u 0,5% oni postoje kao tri kanala u jednom korenju, u 0,5% su to dva kanala u jednom korenju i jedan kanal u drugom korenju, a u 4% slučajeva svaki kanal se nalazi u svakom od tri jasno odvojena korena.³ Tipovi kanalne konfiguracije koji se susreću u ovom zubu su vrlo raznoliki, a pojava lateralnih kanala naročito u apikalnoj regiji može biti u više od 49% slučajeva.⁴

Cilj ovog prikaza iz kliničke prakse je bio da se pokaže način identifikacije kao i metodologija endodontske terapije prvog maksilarnog premolara sa tri kanala.

Materijal i metod

Pacijent muškog pola star 25 godina upućen je na Kliniku za bolesti zuba Stomatološkog fakulteta u Beogradu, radi endodontske terapije prvog levog maksilarnog premolara. Pacijent je bio dobrog opšteg zdravlja i bez znakova prethodnog ili trenutnog oboljenja. Kliničkim ispitivanjem je utvrđeno da postoji velika karijesna lezija druge klase, a rendgenološki snimak je pokazao postojanje duboke lezije koja je u komunikaciji sa eksponiranim pulpnim kavumom.

Pacijent je opisivao postojanje blage bolne osetljivosti u toku mastikacije, usled povećanog pritiska nagomilane hrane u karijesnoj šupljini. Test vitalita na elektro stimulaciju je pokazao da je potrebna veća količina struje u odnosu na prag da bi se izazvala bolna senzacija. Nije postojala bolna osetljivost obolelog zuba ni na palpaciju ni na perkusiju. Na osnovu pregleda postavljena je dijagnoza hroničnog otvorenog ulceroznog pulpitisa. Preoperativni rendgenografski snimak pod uglom pokazao je neobičnu anatomiju ovog zuba sa tri korena i tri kanala bez znakova periapikalnih promena.

Pacijent je lokalno anesteziran aplikovanjem 2% lidokaina sa adrenalinom 1:100 000. Zub

magnifying glass or a operative endomicroscope) and careful probing of the pulp chamber floor.

Maxillary first premolar teeth is generally considered to be two-rooted with two canals. But the frequency of this anatomy ranges from 73% to 95%. It has been reported that 4% to 26.5% of maxillary first premolars are single-rooted,¹ and in some studies, 6% were reported to have three roots.² Vertucci found 5% of 400 maxillary first premolars to have three canals, 0.5% existed as three canals in a single root, 0.5% existed as two canals in one root and one canal in a second root, and 4% existed as one canal in each of three separate roots.³ Many types of canal configuration are to be found in this tooth, and the presence of lateral canals, particularly in the apical region can be as high as 49%.⁴

The aim of presentation of this clinical case was to show the guideline for identification and methodology for endodontic treatment of a maxillary first premolar with three canals.

Material and method

A 25-year old man was referred to the Conservative Dentistry and Endodontics Department at The Faculty of Stomatology in Belgrade for endodontic treatment of his first left maxillary premolar. The patient was in good health with no significant past or present illness. Clinical examination revealed that there was an extensive class 2 caries lesion and radiographic examination showed deep cavity in communication with exposed pulp.

Patient noticed only some slight pain during mastication when pressure of the food bolus packed food fragments into the cavity lesion. The electric pulp test showed that more current than normal was required to elicit a response. There was no tenderness to palpation and percussion. Diagnosis of chronic ulcerative pulpitis was established. Angulated preoperative radiograph showed an unusual anatomy with three roots and three clear canals, with no periapical changes.

Anesthesia was obtained with local infiltration of 2% Lidocaine with 1:100 000

kao i okolno operativno polje su izolovani, dezinfikovani a zatim se pristupilo uklanjanju karijesnih masa. Nakon preparacije pristupnog kaviteta, usledila je trepanacija kruničnog kavuma i ulaz u palatalni kanal je lako uočen. Bilo je potrebno izvesti detaljno i pažljivo ispitivanje dna komore pulpe u bukalnom pravcu, i uz korišćenje helatora-EDTA prvo je uočen ulaz u mezio-bukalni kanal, a dodatnim ekstendiranjem pristupnog kaviteta put distalno lociran je značajno sužen otvor disto-bukalnog kanala. Determinisanje radne dužine sva tri kanala određeno je na rendgenološkom snimku. (Slika 1) Instrumentacija kanala korena zuba izvedena je upotrebom K3 Endo nikl-titanijumskim rotirajućim instrumentima (Sybron Endo), i krulično-apeksnom tehnikom preparacije, irrigacija je obavljena sa 1% rastvrom natrijum-hipohlorita, a za lubrikaciju je korišćen File-Eze (Ultradent). Opturacija kana- la je ostvarena primenom nikl-titanijumske dvostruko usmeravajuće spirale i EZ-Fil (Essential Dental Systems) silera na bazi smole, sa gutaperka poenima veće koničnosti (G.T.) od 4% i monokonom tehnikom punjenja. (Slika 2, Slika 3)

Rezultati i diskusija

Endodontski tretman prvog maksilarног premolara sa tri korena i tri kanala uspešno je izведен.

adrenaline. The tooth and operating field were isolated and disinfected and decay was removed. The access opening to the pulp chamber was established, and the principal palatal canal was found easily. After the precise examination of the buccal part of the pulp chamber floor, and using the chelating agent-EDTA mesio-buccal canal was located at first, and finally after extending the outline for towards distally very narrow orifice of disto-buccal canal was found.

The working length of all three canals was checked radiographically. (Fig. 1) Canal were instrumented using K3 Endo nickel-titanium rotary instruments (Sybron Endo), and Crown Down Technique, irrigated with 1% sodium hypochlorite solution and lubricated with File-Eze (Ultradent). Obturation was performed using nickel-titanium bi-directional spiral and EZ-Fil (Essential Dental Systems) resin based sealer with G.T. (4%) gutta-percha monocone technique. Postoperative x-rays were taken from different angles for evaluation of three dimensional root canal obturation. (Fig. 2, Fig. 3)

Results and discussion

Successful endodontic treatment of a maxillary first premolar with three roots and three canals was performed.



Slika 1. Zub 24. Determinisanje radne dužine sva tri kanala upotrebom K-Flexo turpija

Figure 1. Tooth 24. Working length determination using K-Flexo files of the three canals



Slika 2. Zub 24. Definitivna opturacija kanala korena zuba. Standardna buko-lingvalna radiografska projekcija

Figure 2. Tooth 24. Definitive obturation of root canals. Standard buco-lingual radiographic projection



Slika 3. Zub 24. Definitivna opturacija kanala korena zuba. Radiografski snimak pod uglom (mezio-distalni pravac)

Figure 3. Tooth 24. Definitive obturation of root canal. Angulated (mesiodistal) radiographic view



Izuzetno je značajno postaviti pravilnu dijagnozu pre početka tretmana ovakvog tipa zuba. Osnova svega je precizno ispitivanje pretretmanskih radiografskih snimaka u cilju analize multiplikovanih kanala korena zuba da bi se izbegla pojava neuočenih ("zaboravljenih") kanala.⁵ Rendgenografsko snimanje pod različitim uglovima će poboljšati uočavanje više kanala maksilarнnog prvog premolara koji se preklapaju na snimku iz buko-lingvalnog pravca. Pažljivo pregledanje preoperativnog rendgenološkog snimka bez izobličenja dozvoljava procenu oblika i broja kanala korena kao i dimenziju pulpne komore.

Opšta smernica za pravilnu identifikaciju trokorenog maksilarнnog prvog premolara na

A correct diagnosis before treatment is fundamental in teeth of this type. Precise examination of root canal multiplicity on radiographs before treatment is essential to avoid missing canals.⁵ Varying the angle of the x-ray projection will improve the visualization of superimposed canals in maxillary first premolars. Careful examination of an undistorted preoperative radiograph will allow some evaluation of the shape and number of root canals and a size of pulp chamber.

A general guideline for the identification of three-rooted maxillary first premolars on preoperative radiograph is if the mesial-distal width of the mid-root image appears equal or greater than the mesio-distal width of the crown

pretretmanskom rendgengramu, se odnosi na analizu mezio-distalnog promera sredine korena, koji u ovakovom slučaju ima isti ili čak veći promer od mezio-distalnog promera krunice zuba, što se u ovom kliničkom slučaju uočilo. Ako se ovo identificuje onda najverovatnije Zub ima tri korena.

U ovom kompleksnom slučaju trokanalnog maksilarnog prvog premolara neophodno je bilo modifikovati formu pristupnog kaviteta u oblik slova "T", i to dodatnim ekstendiranjem bukalnog dela u mezio-distalnom pravcu. Ovakva modifikacija trepanacionog otvora obezbeđuje pravilan pristup u oba bukalna kanala. Eliminacija suženja i prepreka u kruničnom delu radiksnog kanala, koje mogu da blokiraju pravilnu i potpunu apikalnu preparaciju, ostvaruje primena krunično apeksne tehnike preparacije koja omogućava direktni put ka apikalnom segmentu kanala kao i odgovarajuće oblikovanje i čišćenje kanalskog prostora zbog efikasnog plasiranja irriganta kao i lubrikanta u kanalski prostor.⁶ Biomehanička preparacija sa K3 nikl-titanijumskim rotirajućim instrumentima pruža mogućnost za predvidljiv endodontski tretman uz korišćenje manjeg broja instrumenata povećane koničnosti koja obezbeđuje pravilno oblikovanje kanala naglašenjem konusa.

Zaključak

Može da se zaključi da je ključ uspeha endodontske terapije ovog složenog slučaja upravo u pretretmankoj radiografskoj identifikaciji složenosti kanalne konfiguracije. Neuobičajen spoljašnji obris pristupnog kaviteta, uz korišćenje EDTA, ostvarilo je mogućnost da se lokalizuju ulazi u kanale. Krunično-apeksna tehnika preparacije sa nikl-titanijumskim instrumentima uspešno je oblikovala i proširila naročito sužene bukalne kanale u ovom kliničkom slučaju.

image, as it happen in this clinical case. Then the tooth most likely has three roots.

Independent of the anatomy of the tooth, thorough cleaning and hermetic obturation of the canals are necessary for root canal treatment to be successful. This complex case of the three canal maxillary first premolar requires an access cavity modification into "T shape", mesiodistally extending the buccal aspect of the usual outline form.

The modification allows good access to each of the two buccal canals. The elimination of coronal root canal restriction that would otherwise inhibit apical preparation using crown-down preparation technique provides straight-line access to the apical part of the canal, and allows suitable cleaning and shaping due to efficaciously introduced irrigant and lubricant into the root canal space.⁶ Biomechanical preparation with K3 nickel-titanium rotary instrument gives the opportunity to perform the predictable endodontic treatment, because the taper of the instruments is increased to provide good shaping with consisted taper using fewer instruments.

Conclusion

It can be concluded that the key for performing the successful endodontic treatment in this complex case was the preoperative radiographic identification of the variation in root canal configuration. Unusual outline form of the access cavity, and the treatment with EDTA was useful for localization of the root canals orifices. Crown-down technique with nickel-titanium instruments successfully shaped and enlarged, particularly these narrow buccal canals in this clinical case.

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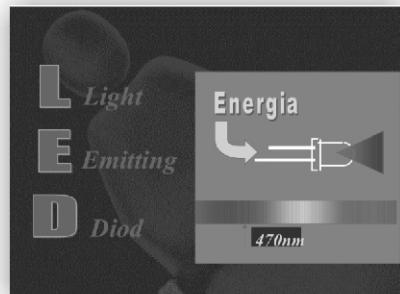
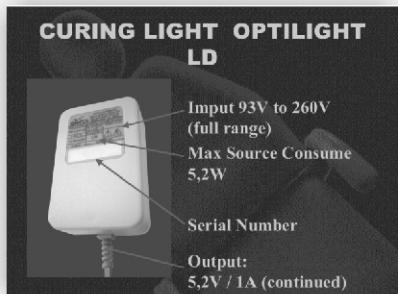
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Radovi u časopisima

1. Standardni članak u časopisu (lista svih autora, ali ako je broj veći od šest citirati tri i dodati et al): Glass DA, Mellon JT, Towle HJ. Histologic evaluation of bone inductive proteins complexed with coralline hydroxyapatite in an extraskeletal site of the rat. J Periodontol 1989; 60:121-125.

2. Organizacija kao autor: Federation Dentaire Internationale. Technical Report No. 28. Guidelines for antibiotic prophylaxis of infective endocarditis for dental patients with cardiovascular disease. Int Dent J 1987;37:235.

3. Nije dat autor: Coffee drinking and cancer of the pancreas (editorial).BMJ 1981;283:628

4. Volumen sa suplementom: Magni R, Rossini G, Berti R. BN52021 protect guinea pig from heart anaohylaxis. Pharmacol Res Commun 1988; 20 Suppl 5:75-8.

Knjige ili druge monografije

5. Lični autor (i): Tullman JJ, Redding SW. Systemic Disease in Dental Treatment. St.Louis: The CV Mosby Company;1983:1-5.

6. Poglavlje u knjizi: Rees TD. Dental management of the medically compromised patient. In: McDonald RE, Hurt WC,Gilmore HW, Middleton RA, eds.Current Therapy in Dentistry, vol.7. St. Louis: The CV Mosby Company; 1980:3-7.

7. Disertacije i teze: Teerakpong A. Langerhans Cells in human periodontally healthy and diseased gingiva. (Thesis). Houston, TX: University of Texas; 1987.92.p.

Ostali publikovani materijal

8. Novinski članak: Shaffer RA.Advances in chemistry are starting to unlock mysteries of the brain. The Washington Post 1989 Ang 7; Sect. A:2 (col. 5).

Reference-elektronski citati

9. On line časopisi bez podataka o volumenu i strani. Berlin JA , Antman EM. Advantages and limitations of metaanalytic regressions of clinical trials data. Online J Curr Clin Trials (serial online). June 4;doc 134. Accessed July 20, 2000.

10. Online časopisi sa podacima o volumenu i strani. Fowler EB, Breault LG. Ridge augmentation with a folded acellular dermal matrix allograft: A case Report. J Contemp Dent Pract (serial online). 2001;2(3):31-40. Available from: Procter&Gamble Company, Cincinnati, OH. Accessed December 15, 2001.

11. World Wide Web.Centers for Disease Control and Prevention. Preventing emerging infectious diseases: Addressing the problem of antimicrobial resistance. Available at: <http://www.cdc.gov/ncidod/emergplan/antiresist/>. Accessed November 5, 2001.

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ACKNOWLEDGMENTS

Acknowledgements are positioned before the reference list specifying general support by department chairman, acknowledgements of technical as well as financial and material support.

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5. Personal author(s): Tullman JJ, Redding SW. *Systemic Disease in Dental Treatment*. St. Louis: The CV Mosby Company; 1983:1-5.

6. Chapter in a book: Rees TD. Dental management of the medically compromised patient. In: McDonald RE, Hurt WC, Gilmore HW, Middleton RA, eds. *Current Therapy in Dentistry*, vol. 7. St. Louis: The CV Mosby Company; 1980:3-7.

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References - electronic quotations:

9. Online journals without volume and page information. Berlin JA , Antman EM. Advantages and limitations of metaanalytic regressions of clinical trials data. *Online J Curr Clin Trials* (serial online). June 4; doc 134. Accessed July 20, 2000.

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