

TERAPIJA PACIJENTA SA TRAUMATSKOM EKSTRAKCIJOM STALNOG GORNJEG CENTRALNOG SEKUTIĆA

THERAPY OF THE PATIENT HAVING TRAUMATIC EXTRACTION OF PERMANENT UPPER CENTRAL INCISORS

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SAŽETAK

Traumatska ekstrakcija stalnih zuba (*avulsio completa*) predstavlja tešku povredu zuba sa neizvesnim ishodom i zahteva brzu i adekvatnu reakciju ordinirajućeg stomatologa. U ovom radu prikazan je kompletni plan terapije pacijentkinje stare jedanaest godina koja se javlja na Kliniku zbog avulziranog zuba 11 i frakture treće klase zuba 12 i frakture druge klase zuba 21. Nakon obavljenog kliničkog pregleda i napravljenog ciljanog rendgen snimka gornje frontalne regije, pristupilo se replantaciji zuba 11 kao i postavljanju odgovarajućeg žičano-kompozitnog splinta. Nakon uspešne replantacije i endodontskog tretmana povređenih zuba, izvršena je i protetska sanacija pacijenta. U radu se prikazuje i kliničko stanje pacijenta jednu godinu nakon povrede.

Ključne reči: avulsija, replantacija, splint

Uvod

Traumatska ekstrakcija zuba ili traumatsko izbijanje zuba (*avulsio completa*, *extrusio completa*, *exarticulatio*, *luxatio completa dentis*) predstavlja retku povredu mlečnih i stalnih zuba, pri čemu se ona češće događa kod mlečnih zuba. Osnovni uzrok traumatske ekstrakcije kod mlečnih zuba je pad, dok je kod stalnih zuba osnovni etiološki faktor direktni (frontalni) udarac u zub. Najčešće su izbijeni centralni incizivi u gornjoj vilici. Učestalost ove povrede u odnosu na druge je veoma mala i kreće se oko 0,9% od svih povreda zuba¹.

Klinički traumatska ekstrakcija zuba se uočava odsustvom zuba iz zubnog niza. Diferencijalno dijagnostički istu ili slučajnu kliničku

Abstract

Traumatic extraction of permanent teeth (*avulsion completa*) is a serious teeth injury with uncertain outcome and it requires dentist's on duty fast and adequate reaction. In this study a complete therapy plan for eleven year old girl, who came to the Clinic because of avulsed teeth 11, third class fracture of tooth 12 and second class fracture of tooth 21, was showed. After clinical examination and upper frontal region X-ray, we started with replantation of the tooth 11, as well as with wire-composite splint placement. After successfully done replantation and injured teeth endodontic treatment, prosthetic sanitation of the patient was done. In this study, clinical picture of the patient one year after the injury was also showed.

Key words: avulsion, replantation, splint

Introduction

Traumatic tooth extraction or traumatic teething (*avulsion completa*, *extrusion completa*, *exarticulatio*, *luxatio completa dentis*) is a rare injury of both milk and permanent teeth, but more often seen in milk teeth. The most common traumatic extraction in milk teeth occurs as a result of falls, but in permanent teeth the main etiological factor is direct (frontal) hitting. The most often disrupted teeth are central incisors in upper jaw. Frequency of this injury, compared to others, is very small, rating about 0,9% of all teeth injuries¹.

Traumatic tooth extraction can clinically be seen as teeth missing from the teeth line. Differentially diagnostically same or similar clini-

sliku daju u intruzija zuba kao i fraktura korena zuba sa gubitkom kruničnog dela zuba, pa je za konačnu dijagnozu neophodan rendgen snimak².

Uspešnost replantacije zuba zavisi od brojnih faktora: vremena koje je proteklo od traumatske ekstrakcije do replantacije, načina čuvanja zuba od trenutka izbijanja do replantacije, stepena razbitka korena izbijenog zuba, stanja alveolarne kosti, predhodnog stanja krunice zuba i pulpe i parodontijuma, postojanja eventualne ortodontske nepravilnosti kao i veoma važnog, postupka pri samoj replantaciji^{2,3}.

Prikaz slučaja

Pacijentkinja M. K. Rođena 1995, godine javlja se sa ocem na Kliniku za stomatologiju u Nišu dana 10.07.2006.godine zbog višestruke povrede zuba nastale padom sa bicikla – udarcem u gubernalu bicikla. Otac je u platnenoj maramici doneo izbijenu zub 11. Od trenutka povrede do prijema na kliniku prošla su nepuna 2 sata. Nakon uzete anamneze, obavljenog kliničkog pregleda i napravljenog randgen snimka (slika 1), postavljena je sledeća dijagnoza: 11 avulsio completa dentis traumatica; 12 fractura III kl. dentis traumatica; 21 fractura II kl. dentis traumatica; 22 contusio dentis. Zub 11 je takođe ima i frakturu druge klase.

Zub 11 je odmah nakon prijema pacijenta stavljen u fiziološki rastvor. Izvršeno je obezbojavanje gornje frontalne regije sa 2 ml anestetika *Lidokain*[®]. Zatim se pristupilo postavljanju žičano kompozitnog splinta na zubima 15,14,21,22,24 (slika 2).

Nakon postavljanja splinta alveola je isprana fiziološkim rastvorom od koaguluma i izvršena je manuelna replantacija traumatski izbijenog zuba 11, nakon čega je i zub 11 bio povezan u već postavljeni žičano kompozitni splint (15,14,11,21,22,24)(slika 3). Napominjem da je od momenta nastaka povrede do završetka replantacije prolo **2 sata i 7 minuta**. Nakon postavljanja splinta napravljen je i kontrolni rendgen snimak (slika 4). Prilikom ove prve posete izvršena je i vitalna ekstirpacija pulpe zuba 12 i zub je endodontski tretiran pastom na bazi kalcijum hidroksida - *Calcipulpe*[®] *Septodont, Cedex, France*, kao i postavljanje kompozitnog zavoja na zub 21. Gingivalni sulkus zuba 11 ispiran je rastvorom *Orvagil*[®] (*metronidazol*), *Galenika A.D. Beograd*. Pacijentu je ordinirana i antibiotska terapija.

Nakon 24 časa od povrede izvršena je ekstirpacija pulpe zuba 11 pri čemu je kanal

cal picture can be seen in teeth intrusion and tooth root fracture with tooth crown loss as well, so for the final diagnosis it is obligatory to do X-ray².

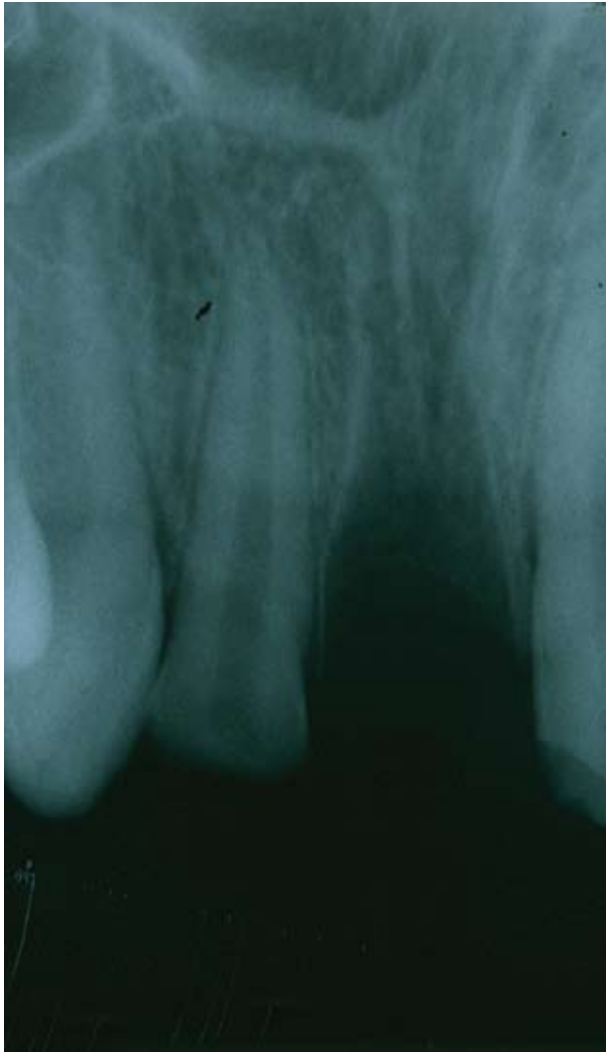
The success of tooth replantation depends on numerous factors: time between traumatic extraction to replantation, the way of storing the tooth from avulsion until replantation, the level of avulsed tooth root fracture, alveolar bone condition, prior condition of tooth crown, pulp and periodontium, possible orthodontic irregularities, and, as a very important factor, procedure during the replantation^{2,3}.

Case report

Patient M.K. born in 1995, came with her father to the Dentistry Clinic on 10th of July 2006 for multiple injury of a tooth due to bicycle fall – hitting the bicycle handlebar. The girl's father brought the avulsed tooth 11 in a cotton handkerchief. Almost 2 hours passed between the time of injury to admission to the Clinic. After taking patient's history, clinical examination and X-ray (picture 1), the following diagnosis was made: 11 avulsio completa dentis traumatica; 12 fracture III cl.dentis traumatica; fracture II class dentis traumatica; 22 contusio dentis. Tooth 11 also had II class fracture.

Immediately after the admission, tooth 11 was put into physiological solution. Decolorisation of upper frontal region with 2 ml of Lidokain anesthetic was done. After that we started wire-composite splint placement on teeth 15,14,21,22,24 (picture 2).

After splint placement, alveoli were rinsed in coagulum physiological solution and manual replantation of traumatically avulsed tooth 11 was done. After that, tooth 11 was bonded to already placed wire-composite splint (15, 14, 11, 21,22,24) (picture 3). The emphasis is on the fact that **2 hours and 7 minutes** passed from the moment of injury until replantation. After splint placement, a control X-ray imaging was done (picture 4). During this first visit, vital extirpation of tooth 12 pulp was done and the tooth endodontic treatment was done with calcium hydroxide paste – *Calcipupe Septodont, Cedex, France*, composite bandage was put on tooth 21. Gingival tooth 11 sulcus was rinsed with the solution *Orvagil (metronidazol)*, *Galenika A.D. Belgrade*. The patient was given antibiotic therapy as well.



Slika 1. Rendgenski snimak regije 12 i 11 neposredno nakon povrede
Picture 1.



Slika 2. Postavljanje žičano kompozitnog splinta – trenutak pre replantacije zuba 11
Picture 2.



Slika 3. Replantirani zub 11 je fiksiran u žičano kompozitni splint
Picture 3.

zuba endodontski bio tretiran pastom kalcijum hidroksida *Calcipulpe[®]Septodont, Cedex, France*. Vitalitet zuba 21 se povratio četvrtog dana nakon povrede. Dalje kontrole su bile na 7 dana, kada su bile izvršene i revizije punjenja zuba 11 i 12 sa predhodno pomenutom pastom.

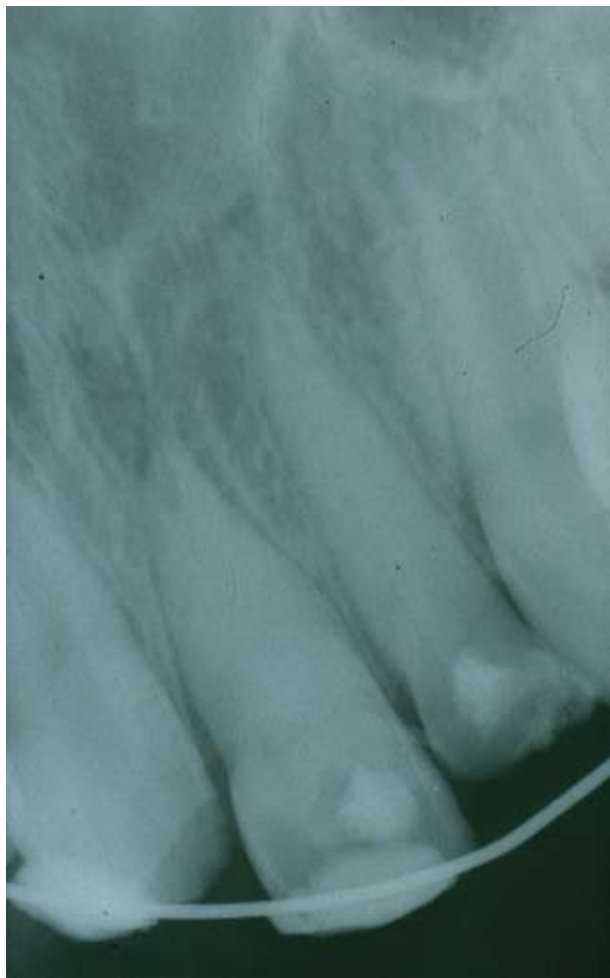
Pre uklanjanja splinta, dvadeset i prvog dana od povrede, izvršeno je definitivno punjenje zuba 11 (*Endométhasone[®] Septodont, Cedex, France*), a dvadeset i trećeg dana definitivno punjenje zuba 12 (*Endométhasone[®] Septodont, Cedex, France*),. Nakon oba definitivna punjenja urađen je i kontrolni rendgen snimak (slika 5). Dvadeset i osmog dana od postavljanja izvršeno je i uklanjanje žičano-kompozitnog splinta (slika 6).

Nakon uklanjanja splinta zubi koji su bili u splintu tretirani su *Fluorogal[®]Forte Gelom, Galenika A.D. Beograd*, po protokolu za osobe sa visokim rizikom za nastanak karijesa.

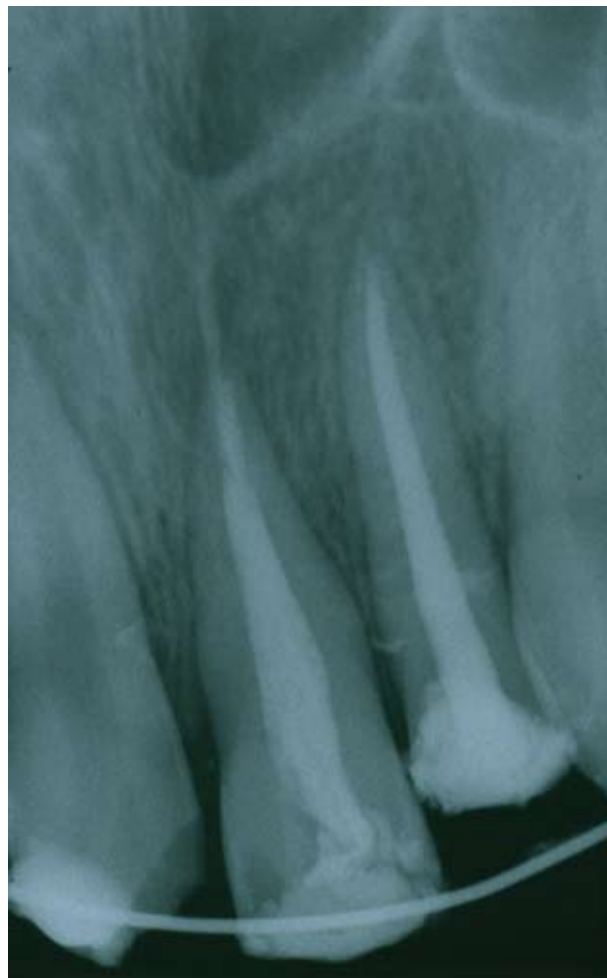
Twenty four hours after the injury, tooth 11 pulp extirpation was done, performing endodontic treatment of tooth root canal with calcium hydroxide paste *Calcipupe Septodont, Cedex, France*. Vitality of tooth 21 was regained on the fourth day after the injury. Further controls were every 7th day, when revisions of fillings in teeth 11 and 12 were done with previously mentioned paste.

Before splint removal, on the 21st day after the injury, final filling of tooth 11 was done (*Endomethasone Septodont, Cedex, France*). After both final fillings, a control X-ray image was made (picture 5). Removal of wire-composite splint was done on the 28th day after the placement (picture 6).

After splint removal, the teeth which were bonded in the splint were treated with *Fluorogal Forte Gel, galenika A.D. Belgrade*, according



Slika 4. Rendgenski snimak
nakon replantacije 11
Picture 4.



Slika 5. Rendgenski snimak 11 i 12 nakon
definitivnog punjenja 23. dan od povrede
Picture 5.

Takođe je izvršena i definitivna kompozitna restauracija zuba 11 i 21 sa restaurativnim materijalom *Te-Econom*[®] *Ivoclar-vivadent*. Tri meseca nakon povrede urađen je još jedan kontrolni snimak (slika 7), uz uredan klinički nalaz i sa anamnestičkim podacima koji ne ukazuju na bilo kakve subjektivne i objektivne tegobe pacijentkinje.

Nakon tri meseca pristupilo se i protetskoj nadoknadi krunice zuba 12, postavljanjem keramičke krune. Klinički nalaz nakon godinu dana od povrede je uredan, bez ikakvih patoloških promena, uz obavezno dalje praćenje pacijentkinje i redovne tromesečne kontrole (slike 8 i 9).

Diskusija

Klinička praksa pokazuje da je uspeh replantacije avulziranih zuba izvestan u 4% do 50% slučajeva. Osnovni razlozi za relativno ve-

the protocol for persons with high risk of caries. A final composite restoration of teeth 11 and 21 was done with restorative materials *Te-Econom Ivoclar-vivadent*. Three months after the injury one more control imaging was done (picture 7), showing regular clinical finding with anamnesis data not showing any subjective or objective discomfort in patient.

After three months, a prosthetic dental ceramic crown portion for tooth 12 was placed. After a year from the injury, clinical finding was neat, with no pathological changes. The follow-up of the patient is obligatory and the control examinations are every three months (pictures 8 and 9).

Discussion

Clinical practice shows that success of replantation of avulsed teeth is certain in 4% to 50% of cases. The main reasons for relatively



*Slika 6. Stanje nakon uklanjanja
žičano kompozitnog splinta – 28. dan
Picture 6.*



*Slika 7. Rendgenski snimak tri meseca nakon povrede
Picture 7.*

liki neuspeh replantacije leže u tretmanu samog zuba do trenutka replantacije kao i u vremenu prošlom do replantacije zuba⁴. U prilog ovoj tvrdnji ide i činjenica da je uspešnost replantacije kod ekstrahiranih i odmah replantiranih zuba u laboratorijskim uslovima 100%⁵. Cvek



*Slika 8. Rendgenski snimak jednu godinu od povređivanja
Picture 8.*



*Slika 9. Izgled pacijenta jednu godinu nakon povređivanja
Picture 9.*

great number of unsuccessful replantations are in the way of treatment of the teeth until the replantation itself, as well as in period of time prior to replantation⁴. A contribution to this statement is a fact that success in replanting extracted and immediately replanted teeth in laboratory conditions is 100%. Cvek et al emphasize that avulsed teeth being out of alveoli between 15 and 60 minutes, have considerably lower degree of postreplanted resorption if they were in physiological solution about 30 minutes before

i saradnici ističu da avulzirani zubi koji su van alveole između 15 i 60 minuta imaju izrazito manji stepen postreplantacione resorpcije ukoliko provedu u fiziološkom rastvoru oko 30 minuta pre replantacije⁶. Prilikom replantacije važno je da ćelije korena zuba trpe što manji pritisak da ne bi došlo do njihovog oštećenja o zid alveole. U tom smislu neophodno je istaći relativno nepovoljni uticaj splinta zbog permanentnog pritiska jedne strane zuba na alveolu⁷.

Prilikom tretmana prikazanog pacijenta primenjeno je pravilo da je važno replantirati zub bilo kada se on donese, pa čak i više od dva sata nakon povređivanja jer i tada postoje šanse, premda minimalne, da se zub sačuva i one su veće, nego da se uopšte sa replantacijom i ne pokuša⁵.

Literaturni podaci ukazuju da ne treba žuriti sa endodontskim tretmanom kanala korena zuba i punjenja kalcijum hidroksidom zbog povećane incidence apikalne ankiloze kao posledice prodora citotoksičnih supstanci tokom obrade kanala u prostor periodontalnog ligamenta (PDL). Tako je uspostavljen kompromisni period od 7 do 10 dana nakon povrede za endodontski tretman u cilju prevencije necrose pulpe avulziranog zuba. Svako dalje odlaganje izuzetno povećava rizik od postreplantacione nekroze i gubitka zuba^{8,9,10}.

U prikazanom slučaju odlučeno je da se pristupi rešenju koje je posledica konkretnog stanja – činjenice da je replantacija izvršena nakon više od dva sata od povrede, što takođe povećava opasnost od brzog razvoja nekrotičnih procesa, kao i činjenice da se radi o mladom pacijentu, sa izuzetno voluminoznom komorom pulpe, što, sa svoje strane, takođe ubrzava širenje inflamatornog procesa na regiju preiodoncijuma (PDL)¹¹. Takođe treba istaći da čuvanje avulziranih zuba u vodi ili pljuvački treba izbeći, jer u ovim medijima dolazi do oštećenja ćelija PDL-a, čime se povećava resorpcija korena. Mleko se pokazalo kao relativno dobar medijum za kratkotrajno čuvanje avulziranih zuba u intervalu 15 do 20 minuta. Mleko samo kratkotrajno sprečava smrt ćelija, ali ih i ne revitalizira^{12,13}.

Posebno treba istaći značaj perioda u kome pacijent nosi splint. Autori se slažu da zbog složenih reparativnih procesa kod replantacije kompletno deartikulisiranog zuba ovo vreme ne sme biti manje od 3 nedelje^{1,8}, do maksimalni 6 nedelja, sa posebnim rizikom zbog mogućih post replantacionih komplikacija u vidu ankiloze zuba ili eksterne resorpcije^{2,3,9}.

Prikazani pacijent je nosio splint četiri nedelje, što predstavlja optimalni interval za regeneraciju periodontalnog tkiva^{8,9}.

replantation⁶. During the replantation itself, it is of great importance that the cells of the tooth root suffer as little pressure as possible, so as not to be damaged against the alveoli wall. In that sense, it is inevitable to say that splint has relatively bad influence due to permanent pressure of one side of the tooth to alveoli⁷.

During the treatment of the reported patient, we applied the rule that it is important to replant a tooth, regardless the time when it was brought, even if it was more than 2 hours after the injury, because, even then, there are chances, although minimal, to keep the tooth, and they are greater than in case of no replantation at all⁵.

Literature data show that there is no need to rush with endodontic treatment of tooth root canal and filling with calcium hydroxide, because of increased incidence of apical ankylosis as a consequence of cytotoxic substances intrusion during canal treatment into periodontal ligament area (PDL). A compromised period of 7 to 10 days after an injury was established for endodontic treatment, as to prevent avulsed tooth pulp necrosis. All further delays extremely increase risk of postreplantation necrosis and tooth loss^{8,9,10}.

In the reported case we decided to do treatment according to concrete situation – the fact that replantation was done more than 2 hours after the injury, what also increased the risk of fast developed necrosis processes, the fact that the patient was young with extremely volumized pulp chamber, what also speeds up spreading of the inflammatory process to periodontal area (PDL)¹¹. It is also worth mentioning that storing avulsed teeth in water or saliva should be avoided, because in these mediums PDL cells are damaged, increasing the root resorption. Milk is a suitable media for storing an avulsed tooth for only 15 to 20 minutes. It only prevents cell deaths in short term, but it does not have the ability to replenish them^{12,13}.

The period of wearing splint is of extreme importance. The authors agree that due to complex reparative processes in replantation of completely disarticulated tooth, this period of time must not be less than 3 weeks^{1,8}, and the maximum is 6 weeks, bearing the risk of possible post replantation complications, such as tooth ankylose or external resorption^{2,3,9}.

The patient reported was wearing splint for 4 weeks, what is an optimal interval for regeneration of periodontal tissue^{8,9}.

Zaključak

Replantaciju zuba je obavezno sprovesti bez obzira kada se pacijent javi. Time se uliva i poverenje pacijenta da je stomatolog učinio sve da terapija uspe. Posebno treba istaći tri ključna momenta tokom kompletnog tretmana replantacije avulziranog zuba za uspeh terapije:

1. Vreme proteklo od izbijanja do replantacije: replantaciju uvek uraditi, s tim što mogućnost komplikacija raste sa dužim vremenom od avulzije do terapije.

2. Trenutak kada pristupiti endodontskom tretmanu kanala korena zuba: prikazani slučaj u ovom radu ukazuje da su dobijeni pozitivni rezultati sa ekstirpacijom pulpe 24 h. nakon avulzije, a ovi rezultati se odnose na period od jedne godine nakon avulzije. Pacijent će biti opserviran još tri godine.

3. Dužina nošenja splinta: pozitivni rezultati u prikazanom slučaju ukazuju da je optimalno vreme nošenja splinta kod avulzije zuba, četiri nedelje.

Conclusion

It is obligatory to perform tooth replantation, regardless the time of patient's arrival. This is also a way for a patient to gain confidence in dentist who did his/her best for success of the treatment. There are 3 key moments during the complete treatment of an avulsed tooth important for the success of the therapy:

1. The time from avulsion to replantation: always do replantation, considering that possibilities of complications increase with longer period of time from avulsion to therapy.

2. The moment when to start endodontic treatment of the tooth root canal: The case reported in this study shows that positive results were obtained with pulp extirpation 24 hours after avulsion, and they are related to period of one year after avulsion. The patient will be observed during the next three years.

3. Prolonged time of wearing splint: positive results in the reported case show that optimal time for wearing splint in tooth avulsion is 4 weeks.

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