Management of dentoalveolar fracture with multiple avulsions: A case report with three years follow-up

**Sangeetha K.M., Poornima Surendra, Roshan N.M., V.V. Subba Reddy,
Rashmi G. Chaur, Sagar B. Srinivasa**

ABSTRACT

Introduction: Traumatic dental injuries are common in children and adolescents and may cause dramatic episodes. Avulsion management associated with dentoalveolar fracture may pose significant difficulty to the clinician. Acute dental treatment is an important requisite after such injuries. Immediate management and continuous follow-up is necessary especially with ever long-term changing treatment protocols.

Case Report: Herein we describe a 10 year-old-boy, referred to our hospital for multiple teeth avulsions, extrusions including molar which is very rare and dentoalveolar fracture as he met with an accident while playing. Timely treatment was done with cap splint appliance. Patient is doing well with three years of follow-up.

Conclusion: We highlight the significance of storage media for carrying the avulsed teeth, and cap splint for stabilization of complicated dentoalveolar fracture which resulted in excellent treatment and a long-time prognosis

International Journal of Case Reports and Images (IJCRI)

International Journal of Case Reports and Images (IJCRI) is an international, peer reviewed, monthly, open access, online journal, publishing high-quality, articles in all areas of basic medical sciences and clinical specialties.

Aim of IJCRI is to encourage the publication of new information by providing a platform for reporting of unique, unusual and rare cases which enhance understanding of disease process, its diagnosis, management and clinico-pathologic correlations.

IJCRI publishes Review Articles, Case Series, Case Reports, Case in Images, Clinical Images and Letters to Editor.

Website: www.ijcasereportsandimages.com

CASE REPORT

OPEN ACCESS

Management of dentoalveolar fracture with multiple avulsions: A case report with three years follow-up

Sangeetha K.M., Poornima Surendra, Roshan N.M., V.V. Subba Reddy, Rashmi G. Chaur, Sagar B. Srinivasa

ABSTRACT

Introduction: Traumatic dental injuries are common in children and adolescents and may cause dramatic episodes. Avulsion management associated with dentoalveolar fracture may pose significant difficulty to the clinician. Acute dental treatment is an important requisite after such injuries. Immediate management and continuous follow-up is necessary especially with ever long-term changing treatment protocols. **Case Report:** Herein we describe a 10 year-old-boy, referred to our hospital for multiple teeth avulsions, extrusions including molar which is very rare and dentoalveolar fracture as he met with an accident while playing. Timely treatment was done with cap splint appliance. Patient is doing well with three years of follow-up. **Conclusion:** We highlight the

significance of storage media for carrying the avulsed teeth, and cap splint for stabilization of complicated dentoalveolar fracture which resulted in excellent treatment and a long-time prognosis

Keywords: Avulsion, Reimplantation, Dentoalveolar, Fracture

How to cite this article

Sangeetha KM, Surendra P, Roshan NM, Subba Reddy VV, Chaur RG, Srinivasa SB. Management of dentoalveolar fracture with multiple avulsions: A case report with three years followup. Int J Case Rep Images 2014;5(12):835–838.

doi:10.5348/ijcri-2014144-CR-10455

Sangeetha K.M.¹, Poornima Surendra², Roshan N.M.³, V.V. Subba Reddy⁴, Rashmi G. Chaur⁵, Sagar B. Srinivasa⁶

Affiliations: ¹MDS, Assistant Professor, Pediatric and Preventive Dentistry, College of Dental Sciences, Davangere, Karnataka, India; ²MDS, Professor and Head of Department, Pediatric and Preventive Dentistry College of Dental Sciences, Davangere, Karnataka, India; ³MDS, Reader, Pediatric and Preventive Dentistry College of Dental Sciences, Davangere, Karnataka, India; ⁴MDS, Professor, Pediatric and Preventive Dentistry College of Dental Sciences, Davangere, Karnataka, India; ⁵MDS, Assistant Professor, Pediatric and Preventive Dentistry PMNM Dental College and Hospital, Bagalkot, Karnataka, India; ⁶MD, Assistant Professor, Koppal Institute of Medical Science, Koppal, Karnataka, India.

Corresponding Author: Sangeetha KM, Assistant Professor, Department of Pedodontics & Preventive Dentistry, College of Dental Science, Davangere 577004, Karnataka, India; Mob: 7259310010; Email: drsangeetakm@gmail.com

Received: 02 August 2014
Accepted: 03 September 2014
Published: 01 December 2014

INTRODUCTION

Dynamic state of the alveolar and dental development pose a challenge to the practitioner for the management of dentoalveolar injuries in an adolescent. Traumatic dental injuries comprises 5% of all the injuries in preschool, school and young adults for which people seek treatment [1]. Of all dental injuries, avulsion of permanent teeth comprise 0.5–3% [2]. Numerous studies have shown that after the avulsion, prognosis is very much dependent on the actions which are taken at the place of accident [1–4]. Also replantation is not indicated in all the situations like severe caries or periodontal diseases, severe cardiac conditions, non-cooperative patient and severe medical conditions. Even though replantation can save tooth, it is important to realize that there are lower chances of long-term survival and even may be lost at a later stage, total extra oral time and storage media/transport media used for carrying avulsed permanent tooth helps treatment planning [3].

CASE REPORT

A 10-year-old boy reported to the Department of Pedodontics and Preventive Dentistry with a traumatic injury to oral and perioral region because of fall when the child was playing cricket in the school. History suggests that the trauma resulted in avulsion of several teeth. By the advice of local dentist, parents of the injured child had carried the avulsed tooth in milk as it is a good storage media and also readily available. Two hours were elapsed by the time the patient reported to the Department of Pedodontics.

On examination child had bruises and swelling of upper lip. Intraoral examination revealed dentoalveolar fracture involving premaxilla and upper right posterior segment with palatal displacement of posterior teeth. There was severe palatal gingival laceration with bleeding. There was an avulsion of 21 and 24 which were carried in milk, 22 was palatally displaced and there was an extrusion of 25, 26, 31, 32 and 41 (Figure 1). The premolar and molar were completely out of their sockets but hanging with little tissue attachment and remained intraorally. Radiographic examination revealed fracture of interdental bone between 25 and 26 (Figure 1). Premolars were immature with only two-third of root formation. Occlusion was deranged because of palatal displacement of left maxillary posterior segment.

Treatment

There was no history suggestive of head injury, child had received first aid medical treatment for minor bodily injuries by school medical officer who had administered tetanus toxoid injection.

Emergency management of dental traumatic injury was planned after thorough history, radiographic (orthopantomograph) and hematological (bleeding time and clotting time) investigations. Under local anesthesia the palatal gingiva was sutured and bleeding was arrested. The avulsed teeth (21 and 24) were reimplanted successfully, after rinsing with saline. Widened dental socket and dentoalveolar fracture in the region of 25 and 26 were reduced with a blunt instrument and digital pressure. Premolars were repositioned and stabilized with interdental sutures. Since it was dentoalveolar fracture, for immobilizing displaced maxillary segment cap splint was planned. Alginate dental impression was made and cast were poured. Displaced maxillary segment was cut, rearranged on the cast and checked with occlusion of the lower jaw and modified cap splint (covering occlusal surface) was fabricated.

Under local anesthesia the displaced palatal segment was reduced and modified cap splint was cemented using zinc phosphate cement (Figure 2). Extruded mandibular anterior teeth were stabilized with flexible wire splint. Amoxicillin 250 mg 8 hourly and analgesics were

prescribed and patient was advised to take soft diet for 10 days.

The child was followed-up the next day for checking the stability of the splint. Although the child was comfortable, showed slight inflammatory swelling of the left side of the face. After ensuring the stability of splint, the child was advised to continue medication and soft diet. Patient was followed-up after one week and found that facial swelling has subsided and child coping up with treatment procedure.

Two weeks later, the modified cap splint was removed carefully and occlusion was ascertained. Occlusion was found to be satisfactory. Radiographic evaluation was done to evaluate present status of avulsed teeth. Flexible wire splint was placed for dentoalveolar stabilization. Root canal treatment was initiated for all the affected teeth. Intermediate calcium hydroxide dressing (ApexCal) was given for premolars as there was beginning of external inflammatory root resorption (Figure 3).

Two months later, radiographs revealed continued external inflammatory resorption with 24 and 25 so decision was made to obturate with mineral trioxide aggregate (Figure 4).

Three years follow-up revealed that the child was asymptomatic with normal function. On examination clinically, the child was asymptomatic showing

Figure 1: Orthopantomograph revealing empty sockets with 21, 24. Extrusion of 25, 26, 31, 32 and 42 with interdental bone fracture between 25 and 26.

Figure 2: Modified cap splint cemented.

infraocclusion with 21 but normal occlusion posteriorly. Radiographically, 21 and 24 revealed complete root replacement resorption even though clinically asymptomatic. However, 22, 26, 31, 32 and 42 were asymptomatic clinically as well radiographically revealed intact lamina dura (Figures 4 and 5).

DISCUSSION

Fractured alveolar process requires reduction, immobilization followed by stabilization for 2–4 weeks for its treatment. Arch bars are not suitable in children due to the size of teeth in mixed dentition and newly erupted permanent teeth have immature roots. Since in our case all the posteriors and central incisor were avulsed, modified acrylic splint was considered in order to stabilize both dentoalveolar fragment and the avulsed teeth. Although the avulsed teeth should not be splinted for more than 7–10 days, since there was associated dentoalveolar fracture, the cap splint was extended for two weeks [4].

The present case showed successful replantation as inflammatory resorption was arrested, although the avulsed teeth were carried in milk few minutes after the trauma, replacement resorption was continuous. But the lower incisors and the upper molar were replaced successfully.

Inflammatory process and cell resorption activity should be eliminated for treatment of root resorption. calcium hydroxide (CaOH) known to be bactericidal and osteogenic potential which is widely used in endodontics [5]. Inhibition of osteoclastic activity results in formation of hard tissue as it creates an alkaline environment in and around the tissue. The reason being CaOH used in the present case. The diffusion of calcium and hydroxide ions through dentinal tubules to the root surface [6]. A change in the concentration of hydroxide ions disturbs the pH gradient at the cell membrane of bacteria thus disrupts the energy supply of the organism. Also its high pH causes dematuration of the cell membrane proteins and intracellular toxins [7].

Mineral trioxide aggregate consisting of calcium and phosphorus, calcium hydroxide is formed when it reacts with tissue fluids. Tavolet et al. have suggested that after the material release calcium, mineralization gets stimulated, which forms calcium carbonate by reacting with tissue carbonic gas [8]. But Ozdemis et al. showed mineral trioxide aggregate did not produce an alkaline shift in the immersion media and by virtue of its high pH mineral trioxide aggregate should not be expected to heal the lesion [9]. Ginger Koshy George has shown that, calcium release by apexcal is greater than Mineral trioxide aggregate, with significant increase with time and advocated CaOH may be potentially used in cases of root resorption [10]. Hence in this, case we used CaOH in the beginning to stop the resorptive process and later Mineral trioxide aggregate obturation was done for the premolars.

Figure 3: External root resorption with 24 and 25.

Figure 4: After three years follow-up showing intact lamina dura with 22,26, 31,32 and 42 and replacement resorption with 21,24 and 25.

Figure 5: Orthopantamograph after three years.

Even though there was a replacement resorption, we could achieve the retention of teeth for three years and still functioning clinically also maintenance of bone height and width for future implant procedures.

The three-year period of retention of permanent traumatized teeth reveals successful clinical techniques utilized to treat this child both in terms of esthetics as well function. Although there was a resorption, the decision to retain the premolars with mineral trioxide aggregate obturation was shown to be satisfactory. Hence in the present case we used CaOH in the beginning to stop the resorptive process and later mineral trioxide aggregate obturation was done. However, the first molar and the incisors showed no resorption with intact periodontal ligament space.

CONCLUSION

Awareness about storage media for avulsed teeth among common people help in better prognosis of replanted teeth. Modified cap splint can be used successfully for stabilization of complicated dentoalveolar fracture along with multiple teeth avulsions and extrusions.

Author Contributions

Sangeetha K.M. – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Final approval of the version to be published, guarantor and

Poornima Surendra – Substantial contributions to conception and design, Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Roshan N.M. – Acquisition of data, Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

V.V. Subba Reddy – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Rashmi G. Chaur – Analysis and interpretation of data, Drafting the article, Final approval of the version to be published

Sagar B. Srinivasa – Analysis and interpretation of data, Drafting the article, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

Copyright

© 2014 Sangeetha K.M. et al. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited.

Please see the copyright policy on the journal website for more information.

REFERENCES

1. Andreassen JO, Andreassen FM, Andersson L. Textbook and color Atlas of Traumatic injuries to the teeth, 4th Blackwell 2007.
2. Glendor U, Halling A, Andersson L, Eilert-Peterson E. Incidence of traumatic tooth injuries in children and adolescents in the country of Vastmanland, Sweden. Swed Dent J 1996;20(1-2):15–28.
3. Trope M. Avulsion of permanent teeth: Theory to practice. Dental Traumatol 2011;27(4):281–94.
4. Fonseca RJ, Walker RV. Oral and Maxillofacial Trauma. 2nd edition Vol 2. Philadelphia, Pa: WB Saunders 1997:1003–41.
5. Foreman PC, Barnes IE. Review on calcium hydroxide. Int Endod J 1990 Nov;23(6):283–97.
6. Holland R, Souza V, Nery MJ, Otoboni Filho JA, Bernabé PFE, Dezan Junior E. Reaction of rat connective tissue to implanted dentin tubes filled with mineral trioxide aggregate or calcium hydroxide. J Endodon 1999;25:161–6.
7. Sbicego S. Scientific documentation-APEXCAL, Research and development service, Ivoclar Vivadent AG, Liechtenstein 2005:1–10.
8. Javelet J, Torabinejad M, Bakland LK. Comparison of two pH levels for the induction of apical barriers in immature teeth of monkeys. J Endod 1985 Sep;11(9):375–8.
9. Beer R, Baumann AM, Keelbasa MA. Pocket atlas of endodontics. Stuttgart, Germany, Thieme 2006:160 pp.
10. George GK, Rajkumar K, Sanjeev K, Mahalaxmi S. Calcium ion diffusion levels from MTA and ApexCal in simulated external root resorption at middle third of the root. Dental Traumatology 2009 Oct;25(5):480–3.

Access full text article on
other devices

Access PDF of article on
other devices

Edorium Journals: An introduction

Edorium Journals Team

About Edorium Journals

Edorium Journals is a publisher of high-quality, open access, international scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

Invitation for article submission

We sincerely invite you to submit your valuable research for publication to Edorium Journals.

But why should you publish with Edorium Journals?

In less than 10 words - we give you what no one does.

Vision of being the best

We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day of every week of every month of every year.

Exceptional services

We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

Editorial Review

All manuscripts submitted to Edorium Journals undergo pre-processing review, first editorial review, peer review, second editorial review and finally third editorial review.

Peer Review

All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

Early View version

Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

Manuscript status

From submission to publication of your article you will get regular updates (minimum six times) about status of your manuscripts directly in your email.

Our Commitment

Six weeks

You will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this by even one day, we will publish your manuscript free of charge.

Four weeks

After we receive page proofs, your manuscript will be published in the journal within four weeks (31 days). If we fail to honor this by even one day, we will publish your manuscript free of charge and refund you the full article publication charges you paid for your manuscript.

Mentored Review Articles (MRA)

Our academic program "Mentored Review Article" (MRA) gives you a unique opportunity to publish papers under mentorship of international faculty. These articles are published free of charges.

Favored Author program

One email is all it takes to become our favored author. You will not only get fee waivers but also get information and insights about scholarly publishing.

Institutional Membership program

Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in fees make their research accessible to all.

Our presence

We have some of the best designed publication formats. Our websites are very user friendly and enable you to do your work very easily with no hassle.

Something more...

We request you to have a look at our website to know more about us and our services.

We welcome you to interact with us, share with us, join us and of course publish with us.

Edorium Journals: On Web

Browse Journals

CONNECT WITH US