DENTAL CARE FOR CHILDREN AFTER REPLANTATION OF AVULSED PERMANENT INCISORS

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SUMMARY:
The diagnosis avulsion of permanent tooth/teeth is an emergency situation which has special requirements in respect of proper storage of the avulsed tooth, the need of urgent medical/dental care, time past till replantation and splinting, the need for endodontic treatment and long term follow up period. Those clinical actions depend on three groups: parents/people who are with the child in the moment when trauma happens and give the first aid; dental specialist- surgeon who replants the tooth/tooth; dental specialist- endodontist who takes care of the endodontic treatment and the long period after treatment for follow up and observation of the replanted teeth.

The aim of the paper is to present the dental post-operative care in a couple of cases of children with trauma and replanted avulsed permanent incisors.

Material and methods: We present four clinical cases of children who get 6 permanent upper incisors replanted. Replantation is made by the oral surgeon. Treatment and observation after replantation are made by dental specialists of pediatric dentistry and conservative dentistry. All 4 cases get 3 years follow up period.

Results: After replantation of 2 central incisors with complete root development (first clinical case) the left one has developed a resorption of the root but the right one is in a stable condition. Replantation of 3 teeth with incomplete root development (second and third clinical cases) where the patients refer to specialized surgical care less than 60 minutes after injury and store the teeth in different ways lead to different clinical results. In the case of avulsed upper right incisor (second case), it is stored in milk and we observe revascularization followed by partial root canal obliteration. The tooth is scheduled for endodontic treatment. In the case of upper central incisors, both kept dry till replantation in the alveolus filled up with substitute bone, we observe fast root resorption which going to lead to early tooth loss. After replantation of the first upper incisor with open apex, stored in physiological solution for 5 hours and with delayed endodontic treatment (forth case) healing process is stable and the prognosis is good. Follow up period for all the replanted teeth has continued.

Conclusion: The presented clinical cases show that there is a lack of dental teams for complex treatment of children with avulsed teeth in Bulgaria. Dental specialists have no good information about recommended by IADT protocols (www.iadt-dentaltrauma.org), for the treatment of teeth undergoes avulsion during childhood. Parents of these children have no proper information about how to store the teeth which are avulsed and found immediately after trauma.

Keywords: dental trauma, dental avulsion, replantation, permanent teeth,

Avulsion is one of the most serious dental injuries [1-6]. Prognosis for the replanted permanent teeth in children is hard and the extraoral storage of the avulsed tooth [7], time past from the moment of trauma till that of replantation of the avulsed tooth [8], the stage of root development [9, 10] and protocol for replantation [2, 3] are important for it. The aim of replantation is to restore the aesthetics, function and to maintain the alveolar bone contour [1, 2, 11-13]. Prognosis for replantation of permanent teeth which stay out of the mouth less than 60 minutes after an accident is good and expected ankylosis lead to slow root resorption after a couple of years [2, 3, 14, 15]. Revascularization of the replanted teeth with immature root development is a remarkable outcome [9, 16]. Replantation after more than 60 minutes after the accident (delayed replantation) has a poor long-term prognosis. The periodontal ligament will be necrotic and not expected to heal. The goal in delayed replantation is, in addition, to restoring the tooth for esthetic, functional and psychological reasons and to maintain alveolar bone contour [2, 3, 17, 18]. However, the expected outcome is ankylosis, root resorption, and eventual tooth loss [2, 3, 19, 20]. In the last few years, dental practitioners report for coronal removal of replanted teeth and successful
preservation of the alveolar contour [21, 22, 23]. All efforts about the long term complicated treatment are made for the preservation of the alveolar bone [1, 2, 3].

There are three important aspects in a discussion about traumatic injuries like avulsion: information for first aid and proper storage of the avulsed tooth [24 - 30], modernization of the replantation protocol [12, 31-34] and the professional medical and dental care for the replanted tooth[12, 35- 40].

The aim of the article is to present dental postoperative care for children with replanted avulsed permanent incisors.

MATERIAL AND METHODS:

We present four clinical cases of children with replanted six permanent upper incisors. Protocols for replantation are performed by oral surgeons. Pediatric dentists and endodontists take the postoperative dental care and control the follow up period. Presented clinical cases are followed up for 3 years. The method of case’s presentation is descriptive, illustrated with pictures and X-rays, which give a short information about the treatment in the emergency situation and later in the period of postoperative care.

**First clinical case**

A. I., 11 years old girl. She had syncope and hit her face on the floor and as a result avulsed her upper incisors. She was taken to the hospital and after EEG and detailed medical check - up she was scheduled for replantation of the avulsed teeth under general anesthesia. The teeth stayed out of the mouth for about 1 hour and were stored dry. The injured teeth were with completed root development. There was no information about the protocol of replantation of the incisors in the hospital. The teeth were immobilized by a rigid metal splint (fig. 1-A, B). Tooth 11 was replanted in infra occlusion compared to tooth 21 according to an old radiograph (fig. 1-C). Antibiotics were prescribed to the patients.

**Fig. 1.** A.I.,11 years old girl. A) OPG after replantation and splinting of teeth 11, 21. B) there is a disparity in the level of incisor’s cut edges between replanted teeth. C) OPG before the injury.
Fig. 3. A) Extirpation of the pulp at the stage of necrobiosis of teeth 11, 21. B) X-ray of teeth 11, 21 – root canals were filled up with Metapex. C) X-ray 1 month later – root resorption of tooth 21 was progressing and reached part of the root canal filling. D) 3D radiograph showed the area of osteolysis.

Despite the progressing resorption after consultation with a radiologist and endodontist the endodontic treatment was continued. The root canals were filled with bioceramic sealer Root SP (Innovative BioCeramix, Canada) and Gutta-percha (fig. 4-A). The permanent filling was made with Filtek™ Supreme Ultra, 3M ESPE Dental. Control check-up and radiograph 12 months after endodontic treatment and 17 months after replantation registered: the patient had no clinical symptoms, tooth 11 had no any radiographic pathology, there was no progression of the root resorption of tooth 21 (fig. 4-B).

Next control check-up and radiograph were made 23 months after replantation. There was no tenderness to percussion and palpation. It was observed inner root resorption in the cervical region of tooth 21. Root resorption in the apical region was stable and there was no progression. There were no any radiographic pathological changes seen on tooth 11. Follow up period was continued.

Fig. 4. A) The root canals were filled with iRoot SP® and Gutta-percha. B) Control radiograph 1 year after endodontic treatment. There were no newly formed resorption lesions. C) Control radiograph 1 year and a half after the endodontic treatment. Apical region of tooth 21 was stable but new inner resorption was observed in the cervical area.

Second clinical case
M. A. 8 years old boy, who during trampoline game hit himself and avulsed tooth 11. The tooth was found and the father called the clinic to get instructions in that emergency situation. The tooth was washed carefully and transported in milk. The period from the accident till replantation of the tooth was less than 60 minutes. The tooth had incomplete root development (open apex).

The child was taken to the clinic of maxillofacial surgery where the tooth was replanted. The wound was irrigated with blood coagulum. The surgeon replaced the tooth with light pressure in the alveolus. Radiographs had not been taken before or after the replantation. The tooth had not been splinted. The patient was immediately sent to a pediatric dentist and the instructions were to keep the tooth in the alveolus by biting gauze between teeth.

In the pediatric dental office, the injured tooth was splinted to the neighbor healthy teeth by a flexible splint (Kevlar fiber) and composite for 2 weeks (fig. 5-A). A radiograph has been taken and it showed intrusion of the tooth 12 (fig. 5-B). The systemic antibiotic has been prescribed (Augmentin 250mg) and control visit was scheduled. Instructions to the patient included not to bite with the injured tooth, soft by consistence food, adequate oral hygiene with tooth paste and soft tooth brush after every meal and under parents control, 2 times a day for 1 week the patient should rinse the mouth with chlorhexidine (0.1 % mouth wash); the child should be taken to the clinic if any symptoms occur.
Fig. 5. M.A. 8 years old boy. A) Tooth 11 right after replantation and splinting. Lateral right incisor couldn’t be seen in the mouth. The gingiva was bleeding and there was edema. There were no lacerations. B) X-ray right after the replantation and splinting of tooth 11. It was registered full intrusion of the upper right lateral incisor.

Chance for revascularization of the pulp of the injured tooth was included in the treatment plan. If revascularization hasn’t become evident an endodontic treatment would be done. The prognosis for the intruded tooth was that it will reerupt again and will take its place in the dental arch.

Follow up - visual and radiographic criteria:
Two weeks after marginal gingiva was healthy, pink and did not bleed. The replanted tooth was with no discolorations and symmetrical compared to tooth 21 (fig.6-A). One month later the marginal gingiva was healthy. The replanted tooth had no discolorations. The splint would be taken down (fig.6-B). Replanted tooth showed signs of ankylosis and no resorption (fig.6-C). Three months after the accident the marginal gingiva and the interdental papilla were healthy and embedded the tooth tightly. Tooth 11 had no discolorations and hadn’t changed its location (fig.6-D).

Fig. 6. M.A. 8 years old boy. A) Clinical appearance 2 weeks after the accident. Marginal gingiva looked healthy and did not bleed. Replanted tooth hadn’t been discolored and was symmetrical compared to tooth 21. Tooth 12 reerupted. B) Clinical appearance 1 month after the replantation. The marginal gingiva was pink and healthy. The replanted tooth had no discoloration and tooth 12 fully reerupted. C) X-ray - replanted tooth showed signs of ankylosis and no root resorption. D) Clinical appearance 3 months after the accident. Marginal gingiva and interdental papilla were healthy and embedded the tooth tightly. Tooth 11 had no discolorations and had no change in its location.

Seven months later the marginal gingiva was healthy, the replanted tooth had no pathological changes (fig.7-A). The injured tooth was asymptomatic. There was a tendency for the obliteration of the root canal and slight root resorption in the apical region (fig. 7-B). One year after the accident the replanted tooth was completely symmetrical to tooth 21 (fig. 7-C). Tooth 11 was asymptomatic but the root canal obliteration and resorption had a progression (fig. 7-D). 2 years after the treatment the replanted tooth had no discolorations. A slight rotation of its mesial edge could be observed (fig. 7-E). The tooth 11 was asymptomatic, with obliteration of the root canal and evident apical resorption (fig.7-F). Three years after the accident the replanted tooth was with no discolorations and was asymptomatic (fig. 7-G). The tooth was asymptomatic, with evident root canal obliteration and apical resorption (fig.7-H).

Fig. 7. A) Clinical appearance seven months after the accident. B) X-ray - the tooth was asymptomatic. The tendency to the obliteration of the root canal and slight signs of apical resorption. C) M.A. 9 years old – clinical appearance 12 months later. Replanted tooth was fully symmetrical compared to tooth 11 D) X-ray showed a tendency to the obliteration of the root canal and advanced apical resorption. E) M.A. 10 years old. Clinical appearance 2 years later. Replanted tooth had no discolorations. There was a slight rotation of the mesial edge. F) X-ray showed obliteration of the root canal and apical root resorption G) M.A. 11 years old. Clinical appearance 3 years after the replantation. Replanted tooth was with no discolorations and was asymptomatic. H) X-ray showed root canal obliteration and developed apical resorption.
Mobility test: Tooth is stable after taking down the splint (4 weeks after the accident). The mobility was controlled after 3 months, seven months after the treatment and once a year every year till the third year after the accident. The tooth was absolutely stable.

Percussion test: Replanted tooth didn’t show any tenderness to percussion 1 week, one month, three months, seven months, one year, 2 years and 3 years after treatment. The percussion tone was “deaf”.

Electric pulp test (EPT): One week, one month, 3 months, seven months, one year, two years and 3 years after replantation test showed referent rates.

Test of pulse oximetry: Pulse oximetry is a noninvasive method to determine and monitor oxygen saturation of the pulp. The method shows the percentage of saturated with oxygen hemoglobin in the blood. Rates between 95%-100% are the referent. Rates under 92% show hypoxia or lower level of oxygen in the blood. The method is a part of the complex assessment of the tooth condition same when it is stable and during the period of exacerbation (fig.8).

Patient results: 10 years old - tooth 11 = 76 % O₂ saturation, tooth 21 = 78% O₂ saturation
11 years old – tooth 11 = 80% O₂ saturation, tooth 21 = 95% O₂ saturation

Fig. 8. A) Pulse oximetry appliance. B) M.A. 10 years old boy – pulse oximetry testing on teeth 11 and 21.

Third clinical case

M.V. 8 years old boy who had fallen on training and avulsed his upper right and left central incisors. Teeth were found and the child was taken to an oral surgeon who decided that there were conditions for replantation of the teeth. The diagnosis was Expulsio dentis of teeth 11, 21 with incomplete root development. Teeth stayed out of the mouth less than 60 minutes and were transported dry, in a box. The aim of replantation was revascularization of the dental pulp. Root canal treatment would be conducted if there are evidence for pulp necrosis, clinical and radiographic.

Protocol for replantation included cleaning the teeth and alveolus with physiological solution, filling up the alveolus with Bio-Oss® spongiosa 0,25-1mm (Geistlich Biomaterials) and the teeth were replanted with light pressure and no splinting. OPG was taken for control of replantation (fig. 9-A). Systematic antibiotics were prescribed. The patient was not consulted for tetanus prophylaxis. It was given an instruction for home care in the postoperative period. During next two months, replanted teeth were controlled by the oral surgeon. Visually tooth 11 was in infra position compared to tooth 21 but over the marginal gingiva, it was observed sinus tract (fig. 9-B). On a control radiograph an advanced root resorption on tooth 11 was registered (fig.9-C). The tooth was movable. The patient had no any complaints but has noticed the inflamed gingiva. The patient was referred to a pediatric dentist for subsequent treatment.
**Fig. 9.** M.V. 8 years old boy. **A)** OPG after the replantation of teeth 11 and 21. **B)** Intraoral appearance 2 months after replantation. The gingival margin on the vestibular side of tooth 11 was way above the enamel-cementum junction, there was sinus tract and the tooth was with pathological mobility. The cut edge of tooth 11 was in infra position compared to that of tooth 21. Slight discoloration of tooth 21 was observed. **C)** X-ray two months after replantation showed resorption ankylosis on tooth 21 (diagnosed by Assoc. Prof. P. Stanimirov). Tooth 21 had no pathological changes up to radiograph criteria.

**Treatment and follow up made by pediatric dentist**

The pathological mobility of tooth 11 was a reason for the decision to apply a flexible splint (Kevlar fiber), which was fixed to the neighbor teeth with composite resin (fig. 10-A). EPT revealed pulp necrosis on tooth 21 (>200 µA). Root canal treatment was immediately scheduled for tooth 21 which included irrigation with NaOCl and application of calcium hydroxide paste (Metapex/META BIOMED, Calcium hydroxide with iodoform) (fig.10-B). Tooth 11 was put under observation because of a minimal chance for adequate endodontic treatment.

Control check-ups: six months after treatment patients had no complaints. After splinting the sinus tract above the gingival margin of tooth 11 healed with no other treatment. Tooth 21 was asymptomatic. The eruption of tooth 22 made the repair of the splint necessary (fig.10-C). Control radiograph showed that the calcium hydroxide paste Metapex has been resorbed to the middle of the root canal of tooth 21 (fig.10-D). Nine months later sinus tract appeared again on the gingiva above tooth 11(fig.10-E). The radiograph showed that letapex in the root canal of tooth 21 has been resorbed again partially (fig.10-F). Root canal treatment of tooth 11 had started. The root canal was filled up with Metapex in order to treat local inflammation. Parents refused control radiograph on tooth 11 after the beginning of endodontic treatment. Twelve months later patient didn’t show up for control check-up and the contacts were discontinued. Two and a half years after the accident patient came again for control visit. Replanted teeth were asymptomatic. Part of the splint was still on the teeth (fig.10-G). The splint was removed (fig.10-H). There was supra gingival calculus on the lower front teeth. Professional dental hygiene was made. A radiograph revealed advanced root resorption to both teeth (fig.10-I).

**Decision for subsequent regular check-ups and observation has been taken**

**Fig. 10.** **A)** Teeth were splinted two months after replantation to improve the stability of tooth 11. **B)** The root canal treatment was performed according to the protocol for treatment of periodontitis of teeth with incomplete root development. The root canal of tooth 21 was obturated temporary with Metapex. **C)** Six months later sinus tract hadn’t been observed on tooth 11; tooth 21 was asymptomatic; the splint was repaired because of the eruption of tooth 22. **D)** The radiograph showed that Metapex paste was resorbed to the middle of the root canal. **E)** Nine months later sinus tract appeared again in the same location above tooth 11. **F)** The radiograph showed partial resorption of letapex paste in the root canal of tooth 21. **G)** M.V., ten and a half years old. Two and a half years after the accident part of the splint was still bonded on the vestibular surfaces of the front upper teeth. Teeth were relatively stable. The presence of supra gingival calculus pointed the fact that the child hasn’t bite. **H)** Replanted teeth after removal of the splint parts. **I)** A radiograph revealed advanced root resorption of both teeth and residual calcium hydroxide paste.
Forth clinical case

N.R., 9 years old girl who was referred to us for consultation and treatment of upper left central incisor. The patient underwent trauma, avulsion of the tooth, 11 months ago. The tooth was replanted after 5 hours being out of the mouth by a surgeon in an emergency room. The tooth was splinted to the neighbor teeth for 10 days. No plan for follow-up treatment and control was made. During that period, no EOD or control radiograph was made to observe the condition of the tooth. The tooth stayed intact for 10 months. The acute periapical abscess was the reason for opening the pulp chamber and evacuating the purulent exudate. Antibiotics (Ospamox) were prescribed and the patient was referred to a specialist for further endodontic treatment. On a control radiograph, which the patient brought to the endodontist it was observed an opened pulp chamber and diffuse periapical lesion (fig. 11-A). Ten days after the acute period the tooth had slight tenderness to palpation and pain from vertical percussion was registered. There still has been observed purulent exudate in the canal. Endodontic treatment had been done by following the protocol for treatment of exacerbated periodontitis of tooth with incomplete root development. After mechanical and chemical root canal treatment, a calcium hydroxide paste was applied for 10 days (fig.11-B). There were some difficulties to determine the actual root canal length and a control radiograph with gutta point No 80 had been made (fig.11-C). After the root canal working length was determinate it was obturate permanently with bioceramic sealer (TotalFill, FKG, Switzerland) and gutta-percha (fig.11-D).

Fig. 11. A) X-ray 11 months after replantation of tooth 21 with which the child came to the specialist. The diffuse periapical lesion was observed. B) Tooth 21 with calcium hydroxide paste applied in the canal. C) X-ray of tooth 21 for determination of working length of the root canal, gutta-percha point was used. D) Control X-ray after the permanent restoration of the root canal of tooth 21. E) Control X-ray 18 months after endodontic treatment. The periodontal gap is normal through the whole root length. There were no signs of resorption.
Regular control check-ups were scheduled. The tooth had no tenderness to palpation and percussion after the permanent restoration of the root canal. Control X-ray 18 months after endodontic treatment (and 27 months after re-plantation) revealed satisfactory results, the normal condition of the periodontal tissues and periodontal gap (fig.11-E). There were no signs of resorption ankylosis.

**DISCUSSION**

According to contemporary classifications and guidelines [2, 3, 4] for the treatment of dental traumas, our first clinical case is about avulsion and replantation of permanent teeth with complete root development which stayed out of the mouth for more than 60 minutes. That means that neuro-vascular trunk and periodontal fibers are torn and the root surfaces of the avulsed teeth are exposed. The protocol for treatment of replanted permanent teeth with complete root development according to IADT [3] requires: storage of the avulsed tooth should be in a physiological solution till the moment of replantation, root surface should be cleaned and the tooth should be placed in a 2% sodium fluoride solution; aseptic treatment of the wound, replantation of the tooth/teeth with light pressure and splinting with flexible splint. In the first clinical case, the teeth were stored wrong, dry, in a paper napkin. The rigid splinting that has been made leads to resorption ankylosis. This means that the rigid splinting in this clinical case is a wrong clinical decision. We haven't obtained any information about the replantation protocol and why the rigid splint was put in the treatment plan. The actual clinical protocol requires endodontic treatment 7 to 10 days after splinting and removal of the splint 2 to 4 weeks after that because the short splinting period favors the healing processes in the periodontal ligamentum. In that case, the splint is taken down 2 weeks after the treatment but the endodontic treatment has not been made on time which questions the success results of the healing process. Endodontic treatment has been started 4 and a half months after the accident and has been scheduled after evident resorption in the apical region of tooth 21. Both replanted teeth are treated by following the protocol for treatment of chronic periodontitis and the aim is to reduce the root resorption of tooth 21. In the next 17 months, the resorption at the apical third of the root is reduced but cervical resorption is registered. There are no complaints or pathological changes of tooth 11 during the whole follow up period of two years. The clinical case has a good prognosis about the level of front alveolar bone. The monitoring of the clinical case continues.

We support the opinion of the most researchers who state that avulsed teeth should better be replanted. The long-term prognosis is that they will be lost because of progressive resorption. The good result of replantation any way is that it will preserve the level of alveolar bone. In the mix dentition, replanted teeth preserve from vertical and horizontal loss of a bone and favor future orthodontic treatment or placement of a tooth implant.

The second clinical case presents replantation of avulsed tooth with incomplete root development, which stayed out of the mouth less than 60 minutes and has been stored properly. The goal for replanting still-developing (immature) teeth in children is to allow for possible revascularization of the pulp space [2, 3]. The protocol for replanting permanent teeth with incomplete root development according to IADT [3] requires the tooth to be placed in a solution of 1mg. Clindamycin in 20 ml. the physiological solution which gives greater chances for revascularization of the pulp. After that, the tooth should be placed in the alveolus with light pressure and should be splinted to the neighbor teeth with a flexible splint for 2 weeks.

Replantation of tooth 11 with incomplete root development was made up to 60 minutes after the accident. It was stored in physiological solution and transported properly. Replantation was not strictly made by instructions given by IADT [3]. The root surface has not been treated with Clindamycin before replantation and the tooth has not been splinted immediately after that. One hour after that the child was referred to a pediatric dentist, flexible splint has been put and antibiotics have been prescribed. Control radiograph has been taken and instructions for home care have been given to the patient and parents. In this case, the goal is to stimulate revascularization of the pulp and to complete the root development under regular professional control.

Replanted tooth was observed regularly 3 years after treatment. Clinical and radiograph criteria to assess tooth condition are compared to those of the neighbor
healthy tooth through the whole follow up period. The patient has no complaints. Tooth function and aesthetics are saved. The tooth is stable. All tests (visual criteria, mobility test, test for tenderness to percussion, EPT confirm possible revascularization of the pulp and completion of the root development. Only the pulse oximetry test shows that the oxygen saturation is inadequate. This is probably the reason for the fast obliteration of the root canal as a result of pulp irritation. The slight apical root resorption is probably a result of the resorption processes in the periodontium. Three years after replantation EPT and the pulse oximetry test show that the pulp is still alive. Advanced obliteration of the root canal requires endodontic treatment just to save the root canal and to slow down the root resorption. Follow up period continues.

The prognosis for the replanted tooth is good thanks to adequate parent’s and medical help and because of incomplete root development which gives good chances for revascularization of the pulp. Advanced obliteration of the root canal requires endodontic treatment. The case is one of the successful cases of replantation.

Presented third case is about replantation of an avulsed permanent tooth with incomplete root development, which stayed out of the mouth no more than 60 min. The goal for replanting still-developing (immature) teeth in children is to allow for possible revascularization of the pulp space [2, 3, 4]. The risk of infection-related root resorption should be weighed up against the chances of revascularization. Such resorption is very rapid in child’s teeth. If revascularization does not occur, root canal treatment may be recommended. Endodontic treatment should provide a chance for apexification by regular application of calcium hydroxide till it is necessary. After building up of an apical barrier root canal should be filled up with permanent filling and the tooth should be finished with aesthetic restoration [3].

In the presented case there were some mistakes made: teeth were stored dry, they were cleaned with physiological solution, the alveolus were irrigated with physiological solution as well (according to IADT [3], replantation protocol requires the avulsed teeth to be soaked in a solution of 1 mg. Clindamycin in 20 ml physiological solution for 5 min) then they were filled up with Bio-Oss® spongiosa 0,25-1mm/Geistlich Biomaterials, the teeth were replanted with light pressure but not splinted (the instructions are flexible splint to be put for 2 weeks); the patient was not sent for future observation and treatment by pediatric dentist; endodontic treatment has been made too late (11 months later) after pulp necrosis and periapical abscess. Antibiotics and contemporary endodontic treatment stopped the progress of pathological processes. The inflammation has been limited and now 27 months after the accident the tooth is preserved in the alveolus, there is no complaints and resorption. Visually the tooth looks in a good condition, the patient is still under regular observation and the long-term prognosis is good.

The presented clinical case of replanted upper permanent central incisor with developed root and the open apex is one of the best cases for long term survival of an avulsed tooth. Delayed replantation and short term splinting do not favor the chance for possible revascularization of the pulp. Instead of that delayed replantation has a poor long-term prognosis. The periodontal ligament will be necrotic and will not expect to heal. The goal in doing delayed replantation of immature teeth in children is to maintain alveolar ridge contour. The eventual outcome is expected to be ankylosis and resorption of the root. It is important to recognize that if delayed replantation is done in a child, future treatment planning must take into account the occurrence of tooth ankylosis and the effect of ankylosis on the alveolar ridge development. When ankylosis occurs, and when the infra position of the tooth crown is more than 1 mm, it is recommended to perform decoronation to preserve the contour of the alveolar ridge. If pulp necrosis occurs endodontic treatment should be made to provide conditions for apexification by regular applications of calcium hydroxide for a period of time. After building up of an apical barrier root canal should be filled up with permanent filling and the tooth should be finished with aesthetic restoration [3].

CONCLUSION

The presented clinical cases show that in Bulgaria there is a lack of dental teams for complex treatment of children with avulsed teeth. There is no good information about recommended by IADT protocols for treating teeth which undergo avulsed trauma in childhood [3]. There is a lack of information about how to store avulsed and found teeth before replantation. This motivates us to work on a creation of an interactive guideline “Teeth traumas in childhood”, which is going to be sponsored by Console of medi-
cal sciences by Medical University – Sofia, Bulgaria. Fast and easy internet access will give a chance to promote that necessary information about adequate steps that parents and dentist should take in an emergency situation like avulsion of permanent teeth during childhood.

Acknowledgement:
The article is a part of a project No 321/15. 01. 2015, sponsored by MC- Medical University- Sofia, Bulgaria to whom we evince our acknowledgements.

The authors deny any conflicts of interest related to this study.

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Received: 03/09/2016; Published online: 20/12/2016

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