Avulsion in Paediatric Dentistry: Management of a Double Dental Emergency in a Child

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Introduction
General dental practitioners and paediatric dentists face real dental emergencies that effect children, especially dental trauma. Avulsion is considered, in terms of severity, the worst of all dental-alveolar injuries. This is when the tooth is completely displaced out of its socket and the socket is found empty or filled with a blood coagulum. We report a case that describes the management of an avulsed maxillary central incisor (21) in a fit and healthy 8-year-old boy, accompanied by a lower lip laceration. The management of 21 took place over a period of 12 months.

Case Report
An 8-year-old child presented to the department of paediatric dentistry at the Hamdan Bin Mohammed Col- lege of Dental Medicine (HBMCMD) at the Mohammed Bin Rashid Uni- versity (MBRU) in Dubai Healthcare City. He allegedly fell off a climbing wall, and knocked out his upper left maxillary incisor (tooth # 21) and cut his lower lip (Figures 1 and 2). This occurred at 14:15 hours at school, and his mother asked the nurse to find the tooth and put it in milk. The tooth’s “dry time” was around 60 minutes.

Upon history taking, the child had fallen on a gravelled playground, with no loss of consciousness (LOC), nausea, vomiting or disorientation. He was responsive, alert, and other- wise fit and well with no known al- lergies. There were no safeguarding concerns. His dental history revealed that he was an irregular attender, with no history of dental treatment under local anesthesia (LA) but he had a history of avulsed primary teeth when he was two years old and had multiple primary teeth extractions under general anesthesia (GA) four years ago.

Extra oral examination
• No TMJ, alveolar or facial bone frac- tures detected.
• Lower lip through- and through laceration of the lower lip (Figure 3).
• Class 2 skeletal profile.

Intraoral Examination
• 21 empty socket with coagulum.
• Laceration of the buccal gingiva near 21.
• Injuries relationship Class 2 Division 1 (50%)-syrnum.

Initial assessment, we ad- duced a week, and the patient was referred for a reassessment. To our sur- prise, the patient showed up in our clinic (at 18:20 hours) with renewed bleeding from his mouth (Figure 10 a & b).

After obtaining a new history and carrying out an assessment, the wound was debried. The splint and sutures were examined and we found to be intact. Although the splint was slightly mobile (Grade 2), it was securely bonded to the teeth. No new radiographs were indicated. The patient and family were reassured and the above advice was re-iterated.

They went back to the GMP for the booster injection straight after the appointment. To attend his general medical prac- titioner (GMP) to obtain a Tetanus booster injection straight after the appointment.

A second trauma within two hours
Within two hours of leaving our clinic, the patient suffered another trau- ma affecting the injured area. This happened at the GMP receptionist’s office. As the receptionist was ask- ing the patient’s mother where her son was, she pointed to him (he was standing behind her) and accidentally hit her son in the mouth. There was no LOC, nausea, vomiting or disoorientation. This caused the GMP conc- ern so she sent the patient back to us for a reassessment. To our sur- prise, the patient showed up in our clinic (at 18:20 hours) with renewed bleeding from his mouth (Figure 10 a & b).

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Figure 1: Initial presentation. 21 was avulsed and its socket appeared empty. There was a lac- eration of the lower lip

Figure 2: Palatal view of 21 socket. Notice the coagulum filled socket

Figure 3: Storage medium of 21 was milk. The "wet time" was 50 minutes

Figure 4 (a & b). Empy socket of 21 due to its avulsion. Notice the immature alveolus of 21 and 22. In addition there was a supernumerary tooth/mesiodens

Figure 10 (a & b). The clinical appearance following a second trauma incident that happened within two hours of fitting the dental splint.
Figure 11: A periapical radiograph taken one week post-op showed the correct positioning of the replanted tooth. Note the open apex.

Figure 12: Healing of the lip one month post-op. Some oedema and scarring were noted.

Figure 13: One-month post-op after removal of the splint. The tooth was responsive to EC & EPT.

Figure 14: One year follow up. The patient and parent were pleased with the aesthetic result. 21 was vital and positively responsive to EC & EPT. The tooth was non-mobile and produced a metallic sound indicative of ankylosis.

Trauma follow-up appointment (one-week post op)
The aim of the visit was to review 12, 13, 21, and 22 and to assess soft tissue healing. The patient had no complaint whatsoever. Observations revealed a slight mobility of 21 and good healing lower lip and buccal gingiva of 21 with good oral hygiene but some visible plaque on 22. The splint was intact. We obtained a periapical radiograph of 21, which showed it to be in a favourable position (see Figure 10) with a large wide-open apex.

At this appointment, and in the subsequent appointments (3, 6, 9 and 12 months post-op) we completed a “Dental Trauma Stamp” (see Table 1 for an example) which included assessment for mobility, tooth colour (direct and transillumination), tenderness to percussion (TTP), sinus presence, swelling presence, percussion sound, electric pulp tester (EPT), ethyl chloride (EC) and radiographic assessment. The latter was essential to assess for apical pathology, root resorption (internal and external), arrested/continued root development, pulp obliteration and replacement resorption/ankylosis. The dental trauma stamp was repeated at every visit. It helps in assessing periodontal ligament (PDL) and pulpal healing.

Trauma follow-up appointment (one-month post op)
The healing of the lip appeared satisfactory (Figure 12). We gently removed the dental splint (Figure 13) and a new dental trauma stamp was completed. Tooth 21 was +ve to EC & EPT suggesting possible revascularization, although this was not absolute.

Subsequent appointments (at 3, 6, 9 and 12 months post-op)
Healing of the lip and periodontal soft tissues continued satisfactorily and the patient and mother were happy with the aesthetically pleasing result (one year follow up; see Figures 14, 15 & 16). A mouth guard was made to prevent further dental injuries to the same area. Dental caries was treated appropriately.

However, the dental trauma stamp revealed that tooth 21, despite remaining vital (+ve to EC and EPT), non-discoloured and asymptomatic, became ankylosed. At 3 months, a decision whether to initiate root canal treatment or not was debated, but no intervention was decided upon, as the tests suggested its vitality. The tooth was non-mobile and was producing a “crack plate metallic” sound on percussion. At 6 months, radiographically, there was evidence of replacement resorption (Figure 17 a, b & c). This worsened at 12 months. This tooth will inevitably be lost.

Discussion
Traumatic dental injuries are common, with between 6-34% of children aged 8-15 experiencing damage to their permanent teeth. Over ¾ of all traumatic oral injuries occur in childhood, and in the United Kingdom, the proportion of 12 and 15 year olds with any traumatic damage was recently found to be 12% and 10% respectively. Traumatised teeth can have a significant clinical, aesthetic and social impact on an individual. Treatment of traumatised teeth usually requires extensive management, carrying a burden for the patient as well carers and health authorities in the long term. Avulsion is the complete displacement of tooth out of its socket and the socket is found empty or filled with a blood coagulum. Avulsion accounts for between 0.5 to 3% of dento-alveolar trauma to permanent teeth. About 90% of replanted avulsed teeth will undergo ankylosis.
According to British Society of Paediatric Dentistry (BSPD) guidelines, factors to take into account in avulsed teeth are dry time (DT) and total extra alveolar time (EAT). In cases with less than 30 minutes DT and less than 90 minutes EAT, when stored in appropriate storage medium, reimplantation with no further treatment was recommended. However, we must not forget that the tooth was traumatised for 30 seconds to one minute, and the lips were cut, so the wound was deep. The tooth was replaced, splinted and the lip was sutured. The tooth suffered another trauma after two hours Radiographic findings showed signs of replacement resorption from 6 months post trauma. Clinically, it responded positively to EPT and EC tests, no other signs of inflammation. Deornation (removal of the crown and retention of the root with surgical coverage) will be implemented. The lip healed favourably. The patient and his parents were warned about the poor long term prognosis of 21 and alternative long treatment options were discussed.

Table 1. Example of the “dental trauma stamp”. This was taken at one week post op.

<table>
<thead>
<tr>
<th>Tooth No</th>
<th>DTI</th>
<th>EMRI</th>
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<th>22</th>
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<td>+ve</td>
</tr>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Swelling</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-ve</td>
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</table>

Figure 15: Palatal view of 21 one year on. Notice the excellent gingival healing.

Figure 16: Lip healing one year on showed excellent soft tissue healing and an aesthetically good outcome following the suturing of the lip.

Figure 17 (a, b and c): Post op radiographs taken at 3, 6 and 12 months. They show lack of PDL some pulpal obliteration and replacement resorption.

**EFP societies celebrate biggest-ever European Day of Periodontology**

By DTI

**MADRID, Spain:** For the third time, the European Federation of Periodontology (EFP) celebrated the European Day of Periodontology on 12 May. The event has grown immensely since its launch in 2014, with 20 national societies of periodontology across Europe taking part this year. The EFP-affiliated bodies organised a wide range of activities, including television and radio interviews, awareness actions in public spaces, and presentations at dental congresses.

With this year’s slogan, “Healthy gums for a better life”, the EFP and its affiliated societies aimed to raise awareness of gingival disease and its links to other diseases, such as diabetes and cardiovascular disease. In order to support this goal, the EFP launched a media campaign, including posters, press releases, images and a new visual identity, also providing its members with information material for the event.

According to the EFP, at least 20 national societies joined yesterday’s celebration by organising various events across Europe. The countries that took part were Austria, Australia, Belgium, Croatia, Denmark, France, Germany, Greece, Ireland, Israel, Italy, Lithuania, the Netherlands, Portugal, Romania, Spain, Switzerland, Turkey, Ukraine and the UK.

The Belgian Society of Periodontology invited all dentists in the country to dedicate 12 May to periodontal screening. Moreover, it created a mini-site in French and Dutch with useful information on gingival health for dentists and patients, and a list of all 200 dental practitioners taking part in the massive free screening across the country.

The Société Française de Pédodontologie et d’Implantologie Orale, the French society of periodontology and oral implantology, organised a multidisciplinary event together with endodontists, cardiologists and gynaecologists with the aim of educating and raising awareness about the link between periodontal and systemic health.

The Ukrainian Society of Periodontists organised a day of periodontal check-ups at the Shupyk National Medical Academy of Postgraduate Education in Kiev. Patients had the opportunity to learn about different periodontal treatment options, as well as strategies to improve their gingival health, including dental hygiene and lifestyle recommendations, particularly for young patients.

Our association has been encouraging dentists and medical doctors to play their part in the treatment and diagnosis of periodontitis and to raise public awareness of periodontitis and its link to systemic health and general wellbeing,” said Daiva Gelazienė, EFP delegate of the Drusgija Periodontology Lietuvos, the Lithuanian periodontal association. Among other activities, the society conducted events related to gingival health at schools in Vilnius, with about 200 children participating in a game of comparing their knowledge about and skills in keeping their mouths and bodies healthy. “The EFP’s communication tools have been very helpful,” noted Gelazienė. “We are very happy to be a part of this excellent initiative.”

**References**

1. Daiva Gelažienė, RIG (Drusgija), Lithuanian Society of Periodontology. “Healthy gums for a better life”, and the EFP’s communication tools have been very helpful,” noted Gelazienė. “We are very happy to be a part of this excellent initiative.”

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