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Poster Session P11 – Dental Trauma

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INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

Poster Session P11/Dental Trauma

P11–146

Mineral trioxide aggregate in the treatment of internal root resorption: case report

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Introduction: Hard tissues of the permanent teeth may undergo inflammatory internal root resorption as a consequence of trauma. Once detected, treatment must aim the complete removal of the resorptive tissue from the root canal system with attempt to prevent further loss of hard tissue. Mineral trioxide aggregate (MTA) has satisfactory properties for solving many endodontic problems, including: biocompatibility, favourable sealing ability, mechanical strength and a capacity to promote periradicular tissue healing. The aim of this case report is to describe the treatment and 3-year follow-up of an inflammatory internal root resorption case due to trauma managed by the combination of root canal treatment and internal MTA repair.
Clinical management: A 9-year-old female patient with traumatic internal root resorption affecting tooth 11 (FDI) was presented. Late referral of patient caused substantial loss of tooth structure, including cementum and chronic apical inflammation. Root canal therapy was initiated with massive irrigation of 5% NaOCl and calcium hydroxide paste for 10 months. Then, the resorption defects were repaired with MTA and the canal treatment completed with AH 26 and gutta-percha point. The final restorations were finished with glass-ionomer cement covered with light-cured resin composite. Follow-up radiographs over 36 months demonstrated the maintenance of functional teeth. No complications were observed during this follow-up period.
Conclusion: Internal root resorption following trauma is a common complication violating the viability of the permanent teeth. MTA serves as an adequate treatment option in the treatment of these cases afterwards massive debridement and calcium hydroxide paste dressing for the infection eradication.

P11–147

Basketball players' experience of dental injury and awareness about mouthguard in China

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Introduction: The objective of the present study was to describe the occurrence of orofacial, particularly dental injuries in basketball, and to survey the athletes awareness concerning the use of mouthguards during basketball training and competition.
Patients and methods: A pilot questionnaire was designed and tested with basketball players. Two hundred and thirty-six male athletes were surveyed. Seventy-seven players were professional players. The others were semiprofessionals. The questionnaire contained the time of basketball training, the knowledge and attitude toward mouthguards, the evaluation of the dental injury risk in basketball, and the awareness of dental injury prevention. All data were entered into the SPSS 10.0 database. Descriptives and crosstabs were used for the data while the chi-square statistic was employed to test the significance of association between variables.
Results: 80.6% professionals and 37.7% semiprofessional athletes had an experience of oral soft tissue laceration and dental injuries in basketball practice. The difference between the two groups is significant ($P < 0.05$). The incidence of dental and oral injuries was related to the length of training time ($P < 0.01$). About 59% of athletes ranked the risk of orofacial and dental injury in basketball as medium. Although the awareness of mouthguards among the basketball players was very high (80.1%), only one of them had used the custom-made mouthguard. Most of the athletes gained the knowledge about mouthguards from foreign players (33.5%), media (24.8%) and teammates/classmates.
Conclusion: Athletes should be informed about the high risk of oral injuries when participating in contact sports. Dentists should play a more significant role in the program of promoting mouthguard use to prevent oral injury occurring in sport participation.

P11–148

Anastrophic impacted maxillary permanent incisor: a case report

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Introduction: Traumas occurring in primary dentition can lead to developmental disturbances of the underlying permanent tooth germs, including eruption abnormalities. Anastrophy, which corresponds to a 180° rotation of the developing tooth germ, remains however rare.
Clinical management: A 6-year-old girl was referred to the Department of Paediatric Dentistry of Strasbourg for asymmetric eruption of permanent central incisors. History of dento-alveolar trauma affecting the primary incisors during early childhood was reported by the parents. Previous extraction of a mesiodens was performed at the age of 5. Oral examination revealed presence of the left permanent central incisor with persistence of the contralateral primary tooth. Panoramic radiograph and computed-tomography showed anastrophic impaction of the right permanent central incisor, which was located just below the nasal cavity floor. A second supernumerary tooth in a median location was also identified. Removal of the mesiodens and the right central primary incisor followed by surgical exposure and bonding of an orthodontic attachment on the vestibular face of the anastrophic impacted tooth were performed under general anaesthesia. The orthodontic traction with upper fixed appliance and elastomeric chain allowed to move the right permanent central incisor into its physiological position in about 20 months.
Conclusion: This case report underlies the importance of a close clinical and radiological follow-up after traumatic injuries in primary dentition in order to allow an early management of the sequelae of permanent germs.

P11–149

Restoration using the avulsed crown following loss of an upper permanent incisor

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Introduction: An 8-year-old male attended after 16 h, having sustained an avulsion injury to the upper left central incisor (UL1) the previous evening during a fall at Laser Quest. At the initial visit the child believed the avulsed tooth was swallowed, as it had not been found. On examination, the patient was in the mixed dentition, with an upper partially erupted left lateral incisor. The UL1 socket was beginning to heal. A periapical radiograph confirmed the avulsion of the UL1. However, the patient returned the next day with the UL1 stored in milk, having found the avulsed incisor at the Laser Quest Arena. The accident and emergency referral for a chest x-ray was now unnecessary.
Clinical management: At the initial visit, impressions were taken to provide the patient with an upper removable appliance to replace the UL1. Upon retrieval of the avulsed UL1, the patient and parent were eager to proceed with using the avulsed crown as a composite and wire retained bridge pontic. The case will be reviewed regularly on the department's trauma clinic to ensure continued aesthetic and functional success. The eruption of the upper lateral incisors will be closely monitored.
Conclusion: Avulsion of permanent teeth constitutes 0.5–3% of reported dental injuries. The best aesthetic results are achieved by re-implantation of the avulsed tooth. This is not always possible. An alternative restorative method using the natural crown as a resin-retained bridge pontic also allows for a good aesthetic result.

P11–150

From intrusive luxation to acute relapsing glomerular nephritis

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Introduction: Serious periodontal soft tissue injuries can result from intrusive luxation during deciduous dentition. The trauma intrudes the deciduous tooth into the dental alveolus. Children aged 1–3 years are most often affected.
Materials and methods: During 6 months, a 12-month-old child's intruded tooth spontaneously re-emerged. The parents neglected to bring their child for subsequent examinations of the reerupted tooth. At age 4, the child suffered 4 serious renal infections in 6 months. A stomatological examination discovered necrosis and periapical enlargement of the tooth that was traumatized 3 years earlier. Given the diagnosis and the patient's age (5 years), the tooth was extracted. A comparison of bacteriological tests of the patient's urine and extracted tooth confirmed identical discovery of the infection. Twelve months passed after the extraction without a reccurrence of renal infection. The permanent tooth has yet to emerge. During the past 5 years (2004–2008) we have diagnosed 11 intruded deciduous teeth in 11 children.
Results: Based on identical bacteriological test results of urine and the extracted tooth, and considering that there was no reccurence of renal infection for a year after extraction, we believe that the source of the urinary tract infections was the endodontic untreated deciduous tooth. Of 11 other cases of intruded teeth, only two resulted in dental necrosis. These, however, received proper treatment in time.
Conclusion: The purpose of this presentation is to highlight the importance of following the teeth after trauma and performing early endodontic treatment by their necrosis, in order to avoid infections elsewhere in the body.

P11–151

Esthetic management of complicated crown fracture in an immature permanent incisor

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Introduction: Dental trauma is common in the pediatric population with dental injuries occurring with a prevalence of 6–19% for all children and adolescents. Crown fractures are fractures involving enamel and dentin and it can be complicated with the involvement of pulp or uncomplicated without the involvement of pulp. Use of the fractured fragment in the restoration of a fractured tooth is always advantageous when compared to other treatment options like ceramic/composite restorations or prosthetic rehabilitation.
Clinical management: An 8-year-old boy accompanied by his parents, reported to Pedo Planet Pediatric Dental Center, Chennai, India with the complaint of fractured upper front teeth during play approximately 8 h before. Intraoral examination revealed that the patient had horizontal complicated crown fracture in 21, the entire coronal pulp exposed and the fracture line was at the cervical third of the crown. An oblique complicated crown fracture was also seen in 11 with a pinpoint exposure of the mesial pulp horn. Direct pulp capping was done in 11 and composite build up was done. Apex was closed in 21 with MTA (apical barrier technique) intracanal composite post was placed and fragment reattachment was done. Follow up of the tooth after 3 and 8 months showed a good outcome.
Conclusion: This case discusses management of complicated crown fracture with fragment reattachment aided with apical barrier technique and placement of intracanal bonded composites.

P11–152

Unraveling permanent incisor – a case report

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Introduction: An 8-year-old girl reported with an unaesthetic smile due to unerupted permanent central incisors in the maxillary anterior region. Clinical and Radiographic examination revealed intruded tooth # 51, facial and distal migration of # 11 and 21 which were impacted. History revealed that the child fell down at 9 months of age, losing tooth # 61 and missing # 51 which was in fact intruded. The intrusion of # 51 due to trauma clearly caused disturbance in tooth mineralization of # 11 and 21 and also affected teeth # 12 and 22.
Clinical management: On Surgical exposure # 12, 51, 11 and 21 were visible, teeth # 21 and 12 were in line of eruption, tooth # 51 was intruded, and tooth # 11 was displaced labially and distally. Evident enamel hypoplastic changes were seen in teeth # 21, 11 and 12. Extraction of # 51 was done. Enough windows were created for eruption of # 12 and 21 and composite built up for teeth # 11 and 21 was planned after complete eruption.
Conclusion: The enamel hypoplastic changes in permanent teeth vary depending on the intensity of trauma to primary teeth, timing of the injury and stage of permanent tooth formation at the time of trauma. The child needs regular follow up till the teeth #11 and 21 are completely erupted. Alignment & aesthetics will be needed in future.

P11–153

Multidisciplinary treatment to a subgingival complicated crown-root fracture

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Introduction: A 12-year-old boy fractured his right maxillary central incisor following a bicycle accident. The fracture line was located 1 mm supra-gingivally on the labial aspect, and extended to the mesio-palatal area subgingivally, minimally invading the biological width. The fragment was still connected with the tooth by some dentin and cemetum on the palatal aspect. Pulpal exposure was observed. The root was fully developed and there was no apparent periapical pathosis.
Clinical management: The fragment was stabilized to the tooth remnant in its original place using temporary wire composite splint. The fracture line was sealed with glass-ionomer cement temporally. 2 weeks after root canal therapy, the restoration of the tooth was performed using fragment reattachment with fiber post. The root canal was shaped for matching post according to manufacturer's instruction, then the splint and the glass-ionomer cement sealer were removed, the fragment was reattached using flowable composite and RelyX™ Fiber Post(3M) was cemented. Finally, a circumferential bevel along the fracture line was prepared. The bevel and the cavity of the pulp chamber entrance were filled with resin (Z250, 3M). Clinical examination was conducted at 1-, 6-, 12- and 18-month for follow-up, and it was observed that both endodontic and restorative treatments remained clinically acceptable for the entire time.
Conclusion: With the aid of temporary splint and fiber post, it may be an alternative procedure to stabilize the fragment in it's original position in stead of extracting in cases of subgingival complicated crown-root fracture that minimally invades the biological width.

P11–154

The clinical and radiographic changes of fractured immature teeth after pulpotomy

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Introduction: To observe the radiographic representation of immature anterior fractured permanent teeth after pulpotomy, this was followed by radiographic measurements. Thereafter, it may be used as a reference for deciding whether root canal treatment should be done after the roots have completely formed.
Materials and methods: Information on 31 immature anterior fractured permanent teeth after pulpotomy (25 cases) was analyzed retrospectively. Radiographic measurements were separately taken of 100 healthy maxillary central incisors (50 cases) and the maxillary central incisors of 12 cases after pulpotomy in which roots had completely formed. We had obtained permission from the institutional ethical committee (IRB00001052-06016).
Results: Roots could continue developing after pulpotomy, root length and periapical configuration were both similar in healthy teeth, but some root canals could become narrow, even almost obturated in the apical direction of the root. The measurements showed there was no significant difference of root canal width between healthy right and left maxillary central incisors at the site of 1/4, 1/2, 3/4 of the root, but in the pulpotomy group, the root canal width at the same site of the teeth differed significantly from the contralateral healthy incisor.
Conclusions: There was a tendency of root canals of fractured teeth to narrow and become obturated after pulpotomy from radiograph. It should not be followed up for too long a time when the roots have completely formed; finally, root canal treatment should be performed on the teeth.

P11–155

Prevalence of traumatic dental injuries in pre-school children in Brazil

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Introduction: Traumatic dental injuries (TDI) constitute an important public health problem due to its high prevalence and negative impact on children's quality of life. Epidemiological studies suggest that TDI at this age varies from 10 to 38%. The aim of this study was to verify the prevalence of TDI in pre-school children and its associated factors.
Patients and methods: The study was approved by Local Ethical Committee and written consent was obtained from children's guardian. A cross-sectional survey was performed through clinical examination of 359 pre-school children (aged 1–3 years) enrolled in 12 public nursery schools in Itatiba, Brazil. Socioeconomic factors were assessed by questionnaire to parents (Jarman index). Clinical exams were performed by two examiners previously trained and calibrated (kappa = 0.65 to 1.00) regarding TDI (Andreasen criteria) and malocclusion (Moyers criteria). Poisson regression was performed to evaluate the association of TDI and explanatory variables and then, prevalence ratio (PR) and 95% confidence interval (95%CI) were calculated.
Results: The results showed that TDI were identified in 52.9% of children. Poisson regression after adjusting showed higher prevalence of TDI in children with 3 years old compared to younger (PR = 1,55; 95% CI = (1.09–2.19). Prevalence for children living with more than 5 people at the same house was lower than for children living with 3 people or less (PR = 0.69; 95% CI = 0.50–0.97). Prevalence for children with overjet (PR = 1.23; 95% CI = 1.01–1.49) was higher than for those with crossbite (PR = 0.58; 95% CI = 0.35–0.96).
Conclusion: There was a high prevalence of dental trauma in pre-school children. Prevalence increased with age and it was related to malocclusion.

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Traumatic injuries of permanent teeth in schoolchildren in Kadıköy region of İstanbul

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Introduction: The purpose of this study was to assess the incidence of dental traumatic injuries to the anterior teeth of public schoolchildren, living in Kadıköy region of İstanbul, Turkey.
Materials and methods: In whole 204 teeth of 7- to 15-year-old schoolchildren were examined in Kadıköy Municipality's dental clinics. A total of 256 traumatized were evaluated.
Results: More boys (61%) suffered traumatic injuries than girls (39%). Maxillary central incisors were the most affected teeth (92%) and the most common type of crown injury was the enamel-dentin fracture (57%). Falls were the major cause of the trauma (65%). 24.5% of injuries involved more than one tooth. Great

proportions of the traumatized teeth were not treated after the injury (92%).
Conclusion: Educational programs about the dental injuries for parents and teachers are very important in the management of dental trauma. Dentists should be more knowledgeable and careful about the consequences of a delay.

P11–157

Epidemiological survey of dentofacial trauma occurrence on children at county emergency unit

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Introduction: This study reveals the occurrence of trauma on children from 0 to 12 years old, producing an epidemiological map through identification of the most frequent trauma type, predominant cause, time passed until professional treatment, the most susceptible gender and age, furthermore to establish the relation between age and type of trauma.
Materials and methods: 152 children from 0 to 12 years old were registered without distinction of race or gender in a period of six months in the Emergency Unit of Ananindeua country – Pará-Brasil.
Results: On the survey 176 types of trauma were registered, 5 (3%) on dental tissue, 50 (28%) on periodontal tissue, 14 (8%) on bone support and 107 (61%) on the gum or oral mucosa. The main trauma causes were: 73 (47%) falling down, 48 (32%) practicing sports, 4 (3%) physical aggression, and 27 (18%) other causes. Only 148 had information concerning the time passed until they started receiving treatment, where 76 (52%) looked for treatment in 30 min, 28 (19%) between 30 min and 60 min, 11 (7%) between 1 h and 2 h and 33 (22%) more than 2 h after the trauma occurred. 94 (62%) were males and 58 (38%) were females.
Conclusion: The conclusion reached is that the gum and oral mucosa lesions are the most frequent types of trauma, featuring at all ages, and falling down is the most related cause. The patients arrive at the Emergency Unit in 30 min, most frequently seen on males, and the trauma frequency decreases as the children grow up.

P11–158

How many avulsions are preventable?

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Introduction: To identify the number of avulsions during sporting activity that may prevented by mouthguards.
Materials and methods: A retrospective audit of cases notes of avulsion cases caused by sport between 2001 and 2007. Data was extracted for gender, age at trauma, cause of avulsion, and number of teeth avulsed.
Results: 68 teeth from 44 patients were included. 27 patients (61.36%) were male. Mean age at time of avulsion was 10 years for males (SD 32 months), and 9 years 4 months for females (SD 33 months). Numbers of avulsion patients by each sport were: cycling 16 (36.4%); trampoline 5 (11.4%); golf 5 (11.4%); soccer 4 (9.1%); swimming 3 (6.8%); skateboard 3 (6.8%); scooter 2 (4.6%); motorsport 2 (4.6%); horse riding 2 (4.6%); hockey 1 (2.3%); and cricket 1 (2.3%). Number of teeth avulsed by each sport were: cycling 20 (29.4%); horse riding 10 (14.7%); trampoline 9 (13.2%); golf 6 (8.8%); soccer 5 (7.4%); motorsport 5 (7.4%); skateboard 4 (5.9%); swimming 3 (4.4%); scooter 3 (4.4%); hockey 2 (2.9%); cricket 1 (1.5%).
Conclusion: If soccer, hockey and cricket are the sports where a mouthguard would normally be recommended then only five patients (11.36%) might have benefited. Contact sports commonly a cause of avulsions did not occur in this audit, i.e., rugby. This may have been because mouthguards were worn in these sports. The causes of avulsions in this audit suggest that preventing all sports avulsions would require a mouthguard for even the most casual of sporting activity. This would be impractical.

P11–159

Traumatic dental injuries in children with attention deficit/hyperactivity disorder

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Introduction: The aim of this study was to assess the frequency and distribution of traumatic injuries in 247 children with attention deficit/hyperactivity disorder who were 7–16 years old and attended the Ondokuz Mayıs University, Medical Faculty, Department of Child Psychiatry at Samsun, Turkey.
Patients and methods: This study was approved by the Ethical Committee of Ondokuz Mayıs University. Written informed consent was obtained from the parents. Each psychiatric diagnosis was based on criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Traumatic dental injuries were recorded using the classification of the Andreasen & Andreasen. All of the data were analyzed using a Chi-square test.
Results: Thirty-two per cent of the ADHD children presented 103 traumatized teeth. The frequency of dental injuries peaked in children who were 10–12 years of age, and showed no significant difference between subtypes of ADHD or gender. The maxillary central incisors were the most vulnerable to injury, and there were no differences between the right and the left sides in terms of susceptibility. Uncomplicated crown fracture (52.4%) and complicated crown fracture (16.6%) were the most commonly encountered types of injury. The main causes of dental injury were falls, collisions with objects, violence, and traffic accidents, and there was no difference in the frequencies of these causes between subtypes of ADHD, age, or gender. Only 5.1% of the ADHD children sought treatment within the first 24 h of the injury.
Conclusions: Children with ADHD were at an increased risk of traumatic dental injuries.

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The profile of dental trauma presenting to a specialist centre recorded on a computer database

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Introduction: The computer database for dento-alveolar trauma (CDDT) was introduced to prospectively record paediatric trauma cases presenting to Leeds Dental Institute. We present a profile of trauma seen at this specialist centre compiled using this database.
Patients and methods: Trauma details from patients presenting in the first 16 months (April 2007–August 2008) of the CDDT were analysed. This included the frequency of different diagnoses, gender, day and month of presentation.
Results: 171 children presented with trauma of which 78% involved permanent teeth, 20% involved primary teeth and 2% were injuries to the mixed dentition. The mean number of teeth injured in both dentitions was 2. Almost 60% of the trauma cases involved boys. The mean age of trauma presentation was 2.9 years old for primary and 11 years old for permanent teeth. The peak days of presentation were on Mondays and Wednesdays and the peak months were June and August 2007. 77% of the primary teeth

injured presented with injuries to the PDL alone, with 21% of the injuries involving both hard tissue and the PDL. In the permanent dentition 43% teeth had only PDL injuries, 23% had hard tissue fractures only and 34% had hard tissue fractures and PDL injuries.
Conclusion: The CDDT provides a systematic method of recording and analysing dental trauma data such as the results presented in this study. The CDDT can compile a detailed profile of any clinical unit or clinician's trauma workload in Britain. CDDT is available via the secure N3 NHS network.

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Retrospective analysis of dentofacial trauma patients attending the Royal Children's Hospital, Melbourne

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Introduction: The aim of this study was to examine age, gender, type of injury, aetiology of injury, time to presentation, complexity of injury and outcome at one-year post-dentofacial trauma.
Patients and methods: Retrospective case note analysis of all patients attending the Royal Children's Hospital, Melbourne with a dentofacial injury between April 2006 and March 2007.
Results: The departmental database identified 253 children who had experienced a dentofacial injury. Of these, 160 sets of records were preliminarily available for data collection. In total 324 injured teeth were noted: 245 primary and 79 permanent teeth. The peak age for trauma was seen in the 0–3-year-old age range (52%), with males representing 59% of the study population. The mean time from injury to presentation was 8.6 h with 69% of injuries occurring indoors. The maxillary central incisors were the most commonly affected tooth in both the primary and permanent dentition (65% and 65%, respectively). The majority of primary and permanent tooth injuries were periodontal/luxation injuries only (86% and 48%, respectively). Complex injuries affecting both periodontal and dental hard tissue occurred in 4% of primary injuries and 15% of permanent injuries. Outcome at one-year post-trauma was dependent upon the pulp/periodontal status of the patient with 'no long-term follow-up required' or 'patient discharged' occurring in 38% and 43%, respectively.
Conclusion: The results of this study emphasise the complexity of the management of dental trauma and the numerous factors involved. To aid in the development of management protocols data for dentofacial trauma should be recorded consistently.

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Factors that influence children's psychosocial adjustment to dentoalveolar trauma

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Introduction: Dentoalveolar trauma occurs commonly in childhood and may necessitate demanding courses of treatment. However, there has been little research investigating the psychosocial impact of such dental injuries. The aim of this study was to explore the psychosocial factors which influence childhood adjustment to dental trauma, sequelae and related treatment.
Patients and methods: 244 children who attended the paediatric dental clinic, Charles Clifford Hospital, Sheffield, for management of their traumatised permanent incisors were invited to take part in the study. Coping strategies, social support, oral health related and general health related quality of life (OHRQoL) (HRQoL) were assessed using postal questionnaires. Clinical information regarding the child's dental injury was obtained from patient records. Written informed consent was obtained from parents and ethical approval was obtained from Sheffield National Research Ethics Service. Two multiple linear regressions were conducted for OHRQoL and HRQoL.
Results: 108 children completed and returned the questionnaires (44% response rate). Participants had a mean age of 12 years (range = 7–16) and 62% were males. No relationship existed between clinical variables and impact. Predictors of OHRQoL were gender, use of behavioural avoidance coping strategies and time since injury. These variables explained 31% of the variance within OHRQoL. Predictors of HRQoL in children were OHRQoL, the use of behavioural avoidance strategies and peer social support. These variables explained 59% of the variance within HRQoL.
Conclusion: This study demonstrates that there are important psychosocial factors which predict childhood adjustment to dental trauma. The clinical and theoretical implications of these findings are discussed.

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Predictors for pulp necrosis in permanent incisors following crown fractures with concurrent luxation

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Introduction: The purpose of the study was to identify and weight predictors for pulp necrosis (PN) following *crown fractures* with or without a concurrent luxation injury.
Materials and methods: The study material includes 803 permanent teeth with crown fractures (infractions, enamel fractures, enamel-dentin fractures and complicated fractures) of which 573 have a concurrent luxation injury (concussion, subluxation, extrusion, lateral luxation or intrusion). The teeth were compared to a group of 565 luxated teeth without crown fracture. All teeth were examined according to standardized protocol including clinical, photographic, and radiographic registration. Initial treatment was provided at the Copenhagen University Hospital from 1972 to 1985 with a follow-up period ranging from 10 month to 22 years. Logistic regression analysis was performed to identify and weigh predictors.
Results: Following predictors were significantly related to PN: type of luxation, type of crown fracture, pulp test at time of injury, and root development. The results indicate that especially enamel-dentin fractures and infractions contribute to the risk of PN, which is probably due to the possible access of bacteria in to the pulp via dentinal tubules.
Conclusion: The model showed that crown fractures increase the risk of PN significantly for all types of luxation. Type of luxation, pulp test at time of injury and root development was however equally strong or stronger predictors and have to be taken in to consideration when making a risk assessment.