

Incidence of Primary Dental Injuries in a Pediatric Emergency Department

Shaker Saleh M Alosman¹, Abdullah salehalsamani², Mahmoud Jawad H. Alawa³, Saleh Salem Saleh Alshehri⁴, Abdullah salehalsamani⁵, Jabril Mohammed Yahya Otudi⁶, Abdulaziz Alharthi⁷, Afnan Abdulrahman Aldosari⁸

¹Dentistry ,Medical service in ministry of interior

²Pediatric dentistry, Regional Dental Center in Alqassim

³General dentist , Ahsaa cluster , Dentistry department of Primary health care centers
Ministry of health

⁴Resident dentist , Almadah primary healthcare

⁵Pediatric dentistry, Regional Dental Center in Alqassim

⁶General dentist , Ministry of Health- Jazan health cluster

⁷Dentist , Ministry Of Health, Aseer Health Cluster

⁸General Dentist , Riyadh First Cluster

Received: 17.08.2024

Revised: 18.09.2024

Accepted: 05.10.2024

ABSTRACT

Background: Traumatic dental injuries (TDIs) are a significant public health concern for children, as they can lead to functional, aesthetic, and emotional consequences. These injuries are commonly observed in young children due to their developing motor skills and high activity levels. While TDIs affect both primary and permanent teeth, there is limited research focusing specifically on primary dental injuries. The importance of early intervention in these cases is emphasized, as untreated trauma to primary teeth can affect the development of permanent teeth. This study aims to investigate the prevalence, causes, and outcomes of primary dental injuries in pediatric patients presenting to the emergency department (ED).

Methods: A retrospective study was conducted at [Location] Children's Hospital, where 541 pediatric patients with dental trauma were treated in the ED over a defined time period. The study included children aged 18 years or younger, and data were collected from their emergency dental consultations, including patient demographics, injury causes, treatment outcomes, and follow-up care. Descriptive statistics and χ^2 tests were used for data analysis. Ethical approval was obtained from the Human Subjects Research Committee.

Results: Among 1,459 pediatric patients treated for dental emergencies, 37% (541 cases) involved dental trauma. The majority of cases were male (59%), and dental trauma peaked during the summer months, especially between 4 PM and 12 PM. Falls were the most common cause of injury (63%), particularly among children under seven. Soft tissue injuries were documented in 91% of cases, with lacerations occurring in 32% of patients, especially in younger children. Hard tissue injuries were primarily fractures (33%) and luxations (18%). Tooth fractures were more common in male patients, particularly in those over 12 years. A significant portion of patients received pulp therapy (19%), and 16% required tooth extractions, particularly in children under seven. Follow-up care was recommended for 61% of patients.

Conclusion: TDIs are prevalent in pediatric emergency settings, with falls being the leading cause of injury. Early intervention and accurate management are critical for preventing long-term consequences, particularly concerning the development of permanent teeth. Pediatric emergency departments should be equipped to handle dental trauma, and timely referrals to specialized dental care are essential to ensure optimal outcomes. Future studies should explore the impact of early treatment and preventive strategies to reduce the incidence of dental injuries in young children.

Keywords: children, extractions, particularly, therapy.

INTRODUCTION

Traumatic dental injuries (TDIs) are considered a significant public health concern for children because they may consequently have impaired comfortable eating, speaking, and socializing. Traumatic dental injuries can pose emotional and financial burdens on the child's parents. Management of TDIs is very important; these injuries occur in both primary and permanent teeth. However, most clinical attention is given to permanent teeth since primary teeth would eventually exfoliate and get replaced. In the case of primary teeth, though, these

injuries, if left unmanaged, set permanent teeth back in their development. Hence, much more care must be undertaken whenever TDIs occur for young children (Flores & Onetto, 2019).

Early childhood is quite a susceptible period for dental trauma, as children are learning to move, crawl, play, and explore their surroundings, which automatically raises their chances of falls and other accidents. Indeed, various professional guidelines have identified the need for timely and efficacious management of dental trauma among children, regarding the prevention of complications and protection of children's oral health to lay proper grounds for dental development (Andersson & Andreasen, 2019).

TDI is so common among young children, but there is less literature and research on specified injuries to primary teeth. Part of this may relate to the fact that children suffering from dental injuries often seek their initial care at general healthcare facilities or through pediatricians rather than visiting directly to a dental professional. These cases also present in many emergency departments where specialized dental treatment may not be available. Most emergency physicians receive basic training in the management of dental traumas; however, incomplete or delayed treatment can easily occur when access to pediatric or general dentists is limited in some settings (Odersjo et al., 2018).

This gap in specialized care has enormous implications, given that early and correct intervention forms the basis for preventing the long-term effects of TDIs. Without proper dental follow-up, primary teeth injuries may go undiagnosed and have an influence on the development of permanent teeth. Discussing management in emergency settings might provide better outcomes to ensure comprehensive care is availed for children (Cully et al., 2019).

Children are specifically vulnerable to dental trauma because of their developing bodies, which include much movement and, hence, a susceptibility to sustaining an injury. Additionally, various other influences may put them at an even higher risk for TDIs, such as alignment of teeth and competency of lips. Some studies indicate the incidence of dental trauma among children is higher in specific environments, like the home environment, and could be related to physical characteristics or activities. These findings show recognition of specific risk factors associated with dental trauma to the primary teeth (Lauridsen et al., 2017).

This present study will try to fill this gap in existing knowledge by studying the prevalence and characteristics of primary dental injuries in children attending the pediatric emergency department. A detailed analysis of the cases for the purpose of the research will be used to guide better practices for both emergency and dental professionals so that TDIs in primary teeth are managed effectively and support good long-term outcomes in children's oral health (Trivedy et al., 2012).

METHODS

The residency programme in pediatric dentistry jointly operated by [Location]'s Children's Hospital and one of its affiliated universities and is a specialized training program centered in the hospital. The program has six residents and three supervising dentists who manage dental trauma and related conditions within the Department of Dentistry. At the time this study was conducted, the residency was a two-year program with three residents enrolled per year. A dental consultant is available for all dental emergencies in the ED 24/7.

We included children aged 18 years or younger who presented to the ED for a dental injury. Stable patients presenting after triage and registration with isolated oral trauma were assessed and treated by a pediatric dental resident. Patients whose treatment required attention to other head or body injuries were first assessed by a pediatric emergency physician, following which dental and other treatments were performed according to clinical priority.

An emergency trauma data sheet was completed on each patient seen for dental trauma from [Date Range]. Emergency dental consultations determined to be due to nontraumatic dental emergencies presenting in children were excluded. Data recorded included demographics, date and time of injury, etiology of injury, pertinent medical history, behavior during the examination and treatment, types of soft and hard tissue injury, radiograph use, teeth involved, extractions or pulp therapy supplied, antibiotic and splint use, and need for medical consultation.

The treating dental consultant categorized each patient's medical history into either significant or non-significant. A positive history was noted in cases where this had affected the dental care delivery, such as in the cases of heart murmurs, implants, or shunts that require antibiotic prophylaxis, or allergies to local anesthetics. A no significant history indicated that the child was healthy and did not need any special consideration in dental care.

Data analyses were performed using SPSS/PC software, and χ^2 test was used for statistical testing. This study was approved by the Human Subjects Research Committee.

RESULTS

A total of 1,459 children received treatment for dental emergencies in the ED, with 541 of these cases (37%) involving dental trauma and included in this study. Patient ages ranged from five months to 18 years. For analysis purposes and alignment with primary, mixed, and permanent dentition stages, patients were categorized

into three age groups: under seven years, seven to twelve years, and over twelve years. The majority (59%) of dental trauma cases involved male patients, with no significant difference in sex distribution across age groups. The racial demographics mirrored that of the ED's overall patient population, comprising 67% Caucasian, 31% African-American, and 2% from other racial backgrounds. Dental trauma incidents peaked during the summer months, particularly in July and August, and were most frequent between 4 and 12 PM, representing 60% of all cases across ages.

Information on injury causes was available for 98% of patients, with falls accounting for 63% of injuries, direct blows for 17%, motor vehicle accidents for 2%, and other mechanisms, such as electrical burns and foreign bodies, for 18%. A significant age-related difference was observed in injury mechanisms, with younger children (under seven years) more frequently sustaining injuries from falls.

Among patients evaluated, 91% had documentation on soft tissue injuries. Of these, 32% had lacerations, 8% exhibited oral or gingival swelling, 7% presented with abrasions, 6% with contusions, and 5% with other types of soft tissue injuries. Notably, 42% of patients did not have any soft tissue injuries. Among those with lacerations, 72% were younger than seven years, which was statistically significant.

In terms of hard dental structure injuries, 33% of patients experienced tooth fractures, categorized using the Ellis I, II, and III fracture classification. Additional types of fractures included root fractures and fractures of the mandible or maxilla without tooth fractures. Luxations accounted for 18% of cases, concussions for 12%, avulsions for 8%, and jaw fractures for 1%. Younger children (under seven) were more likely to experience luxations (22% of this age group), while older age groups most commonly had crown fractures with dentin exposure (Ellis class II). Age differences in injury types were statistically significant.

Regarding tooth fractures specifically, enamel fractures accounted for 7% of hard tissue injuries, enamel and dentin fractures for 16%, fractures involving enamel, dentin, and pulp for 9%, and root fractures for 1%. Notably, tooth fractures were more prevalent in male patients, particularly in the over-12 age group (73%) compared to 52% in seven-to-twelve-year-olds and 46% in children under seven. Abnormal tooth mobility was observed in 28% of patients, and 8% had abnormal occlusion.

Behavioral responses of patients during evaluation were noted, influencing the feasibility of obtaining diagnostic intraoral films. Of the 353 children with documented behavior, 67% were rated as cooperative, 14% cried only, and 19% cried and struggled. Radiographs were taken in about two-thirds of patients, with 57% undergoing posterior-anterior or occlusal views, and 0.4% having Panorex films.

Tooth extractions were performed in 16% of cases, predominantly among children under seven years. Trauma most often affected anterior teeth across primary and permanent dentition, with the upper right central incisor being the most frequently injured. In both dentitions, central incisors were the most common combination of teeth affected. Although splinting was required for only a small subset of patients, it was exclusively used for permanent teeth in children six years or older.

Pulp treatment was provided in 19% of cases, and antibiotics were prescribed for 12% of patients. Medical consultation was requested in 5% of cases. Follow-up recommendations were recorded for 88% of patients, with 61% advised to have follow-up care. Among these, 8% were recommended to return within one week, 20% in two to four weeks, 15% in one to six months, and 18% at another specified interval.

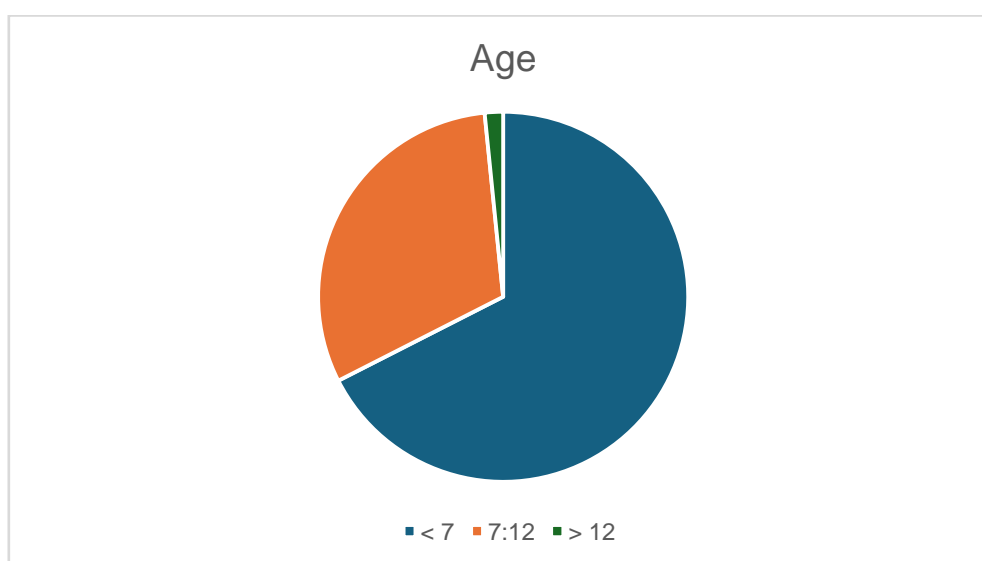


Figure 1: Age Distribution

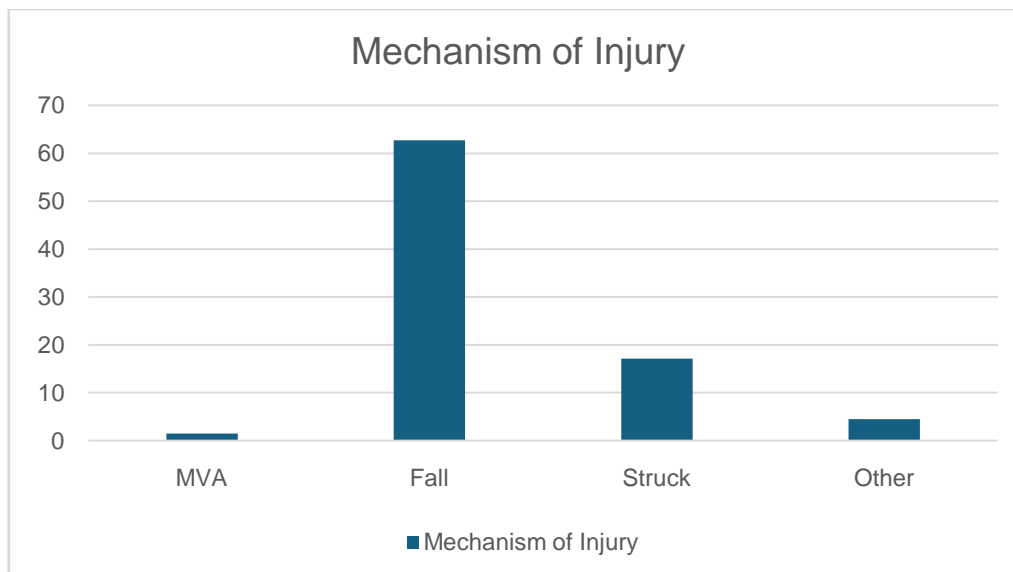


Figure 2: Mechanism of Injury

DISCUSSION

In this study, we explored the characteristics and outcomes of traumatic dental injuries (TDIs) to primary teeth among children presenting to the emergency department (ED) of a large urban pediatric hospital. This research provides essential insights into the epidemiology, nature of injuries, and treatment response for TDIs in young children, contributing valuable data to a field where research is limited.

Our findings align with previous studies, highlighting the demographics, types of injuries, and common causes of TDIs in primary teeth. Similar to other reports, we observed a male predominance in dental trauma cases, with boys showing higher rates of injury due to more risk-taking behavior (Sae-Lim et al.; Borum et al.). The tendency of males to suffer more TDIs is well-documented, and our data supports the notion that boys are more likely to engage in activities that heighten the risk of such injuries. Additionally, in agreement with the studies by Borum et al. and Hall et al., maxillary central incisors were the most frequently affected teeth, particularly in younger children. This predilection for maxillary incisors is often attributed to the positioning of these teeth, which leaves them more exposed to impact.

The most common type of injury among younger children was luxation, which is consistent with findings by various authors (Sae-Lim et al., Lauridsen et al.). In our study, luxation injuries accounted for a significant portion of periodontal injuries, especially among children under seven years old. This finding aligns with existing literature, which suggests that the softer, more pliable alveolar bone in younger children allows for luxation rather than fracture upon impact (Lauridsen et al., Andreasen et al.). As children age and their bone density increases, we observed a shift towards tooth fractures rather than displacement, mirroring similar age-related injury patterns in previous research. For example, Andreasen et al. noted that as the bone surrounding the teeth becomes denser, fractures become more common in older children, and our data similarly shows a higher rate of tooth fractures among children older than seven.

In terms of the causes of TDIs, falls were the leading cause in children younger than seven years, a result consistent with the studies by Sae-Lim et al. and Rocha et al. We found that approximately 63% of TDIs in this age group resulted from falls, a statistically significant finding that highlights the vulnerability of younger children due to their still-developing motor coordination. This high rate of fall-induced injuries underscores the importance of preventative strategies, such as close supervision and home safety measures, to reduce the risk of dental trauma in young children.

While most previous studies reported a seasonal pattern with higher rates of TDIs in summer months due to increased outdoor activity, our data showed that trauma incidents peaked during the summer, particularly in July and August, and were most frequent between 4 and 12 PM, representing 60% of all cases across ages. Studies like those by Borum et al. have often linked higher TDI rates to sports activities and outdoor play, primarily among older children. However, this pattern may also reflect increased recreational activities during school vacations.

Regarding treatment-seeking behavior, most patients in our study (90.1%) received care at the dental clinic during regular hours, with fewer presentations to the ED. This outcome contrasts with findings from Sae-Lim et al., who documented higher ED visit rates for TDIs. In our setting, the availability of a pediatric dental clinic and on-call dental staff likely reduced the necessity for emergency visits. This trend suggests a need for further research on parental attitudes toward primary tooth injuries, as many may not perceive such injuries as requiring

immediate attention. Understanding these attitudes is essential, as early intervention can significantly impact the prognosis of dental trauma cases, especially those involving soft tissue injuries.

Our study also confirmed that early presentation to care is associated with more severe trauma cases, particularly those involving soft tissue injuries. Among patients evaluated, 91% had documentation on soft tissue injuries, with 32% presenting with lacerations, 8% exhibiting swelling, and 7% abrasions. This pattern aligns with studies by Borum et al., who noted similar tendencies, with more complex trauma cases often prompting faster care-seeking. However, nearly half of our sample experienced delays in seeking care, with a notable portion presenting more than 24 hours post-injury. This delay could be attributed to factors such as parental underestimation of injury severity and logistical challenges. Similar findings were documented by Rocha et al., who noted that parents often misjudge the severity of primary tooth trauma, leading to delayed presentation.

Our study provides a comprehensive look at primary tooth trauma among children, though it is not without limitations. Unlike some broader epidemiological studies, our focus on children presenting to a single ED may limit the generalizability of our findings to other settings. Additionally, data collection relied on ED records, which may omit cases where dental triage staff dismissed patients with minor injuries. Further research, particularly multi-center studies, is necessary to refine our understanding of TDIs and to develop evidence-based guidelines for managing these common pediatric injuries. Our findings underscore the need for increased awareness, prompt treatment, and preventive strategies to minimize the incidence and impact of dental trauma in young children.

Limitations

This study offers valuable insights into the characteristics, causes, and outcomes of traumatic dental injuries (TDIs) among pediatric patients visiting the ED. However, several limitations should be noted. First, this study was conducted in a single urban pediatric hospital, which may limit the generalizability of findings to other settings, particularly rural or non-specialized hospitals. The retrospective design also presents challenges, as data relied on available ED records, which may omit certain details or vary in completeness based on clinician documentation practices. Additionally, while radiographs were taken in approximately two-thirds of patients, variability in imaging protocols may have influenced the assessment and categorization of specific injuries. Behavioral responses of patients also impacted the feasibility of obtaining diagnostic films, potentially leading to underrepresentation of certain injury types or severities. Finally, the study's patient population demographic characteristics could reflect the local population served by the hospital and may not accurately represent other racial or socioeconomic groups.

CONCLUSION

This study underscores the prevalence and nature of TDIs in young children, with falls being the primary cause, particularly among children under seven years old. Luxation injuries were most common in younger children, whereas older age groups more frequently presented with tooth fractures, illustrating an age-dependent injury pattern. Our findings highlight the critical role of preventative measures, such as home safety protocols, in minimizing fall-induced injuries in younger children. Moreover, the study emphasizes the importance of prompt and appropriate management of dental trauma to improve outcomes, as early presentation was associated with more severe injuries, particularly those involving soft tissue.

To improve pediatric dental trauma management, further research involving multi-center studies across diverse healthcare settings is essential. These findings point to the need for increased awareness among parents and caregivers about the importance of early intervention in dental trauma cases. Tailored educational initiatives and accessible pediatric dental services could be instrumental in enhancing care outcomes and minimizing the long-term impacts of TDIs on pediatric patients.

REFERENCES

1. Flores, M.T., Holan, G., Andreasen, J.O., & Lauridsen, E. (2019). Injuries to the primary dentition. In J.O. Andreasen, F.M. Andreasen, & L. Andersson (Eds.), *Textbook and color atlas of traumatic injuries to the teeth* (5th ed., pp. 556–584). Oxford: Wiley Blackwell.
2. Wilson, S., Smith, G.A., Preisch, J., & Casamassimo, P.S. (1997). Epidemiology of dental trauma treated in an urban pediatric emergency department. *Pediatric Emergency Care*, 13(1), 12–15.
3. Rocha, M.J., & Cardoso, M. (2007). Survival analysis of endodontically treated traumatized primary teeth. *Dental Traumatology*, 23(6), 340–347.
4. Feldens, C.A., Kramer, P.F., & Feldens, E.G. (2013). Exploring the profile of articles on traumatic dental injuries in pediatric dental journals. *Dental Traumatology*, 29(2), 172–177.
5. Kramer, P.F., Onetto, J., Flores, M.T., Borges, T.S., & Feldens, C.A. (2016). Traumatic dental injuries in the primary dentition: A 15-year bibliometric analysis of dental traumatology. *Dental Traumatology*, 32(4), 341–346.

6. de Amorim, L.F., Estrela, C., & da Costa, L.R. (2011). Effects of traumatic dental injuries to primary teeth on permanent teeth—A clinical follow-up study. *Dental Traumatology*, 27(2), 117–121.
7. Lenzi, M.M., Alexandria, A.K., Ferreira, D.M., & Maia, L.C. (2015). Does trauma in the primary dentition cause sequelae in permanent successors? A systematic review. *Dental Traumatology*, 31(2), 79–87.
8. Flores, M.T., & Onetto, J.E. (2019). How does orofacial trauma in children affect the developing dentition? Long-term treatment and associated complications. *Dental Traumatology*, 35(5), 312–323.
9. Day, P., Flores, M.T., O'Connell, A., Abbott, P.V., Tsilingaridis, G., Fouad, A.F., et al. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dental Traumatology*, 36(4), 343–359.
10. Andersson, L., & Andreasen, J.O. (2019). Soft tissue injuries. In J.O. Andreasen, F.M. Andreasen, & L. Andersson (Eds.), *Textbook and color atlas of traumatic injuries to the teeth* (5th ed., pp. 626–647). Oxford: Wiley Blackwell.
11. Andreasen, J.O., & Ravn, J.J. (1972). Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. *International Journal of Oral Surgery*, 1(5), 235–239.
12. Shayegan, A., De Maertelaer, V., & Vanden, A.A. (2007). The prevalence of traumatic dental injuries: A 24-month survey. *Journal of Dentistry for Children*, 74(3), 194–199.
13. Tello, G., Bonini, G.C., Murakami, C., Abanto, J., Oliveira, L.B., & Bonecker, M. (2016). Trends in the prevalence of traumatic crown injuries and associated factors in Brazilian preschool children: 10-year observational data. *Dental Traumatology*, 32(4), 274–280.
14. Flores, M.T. (2002). Traumatic injuries in the primary dentition. *Dental Traumatology*, 18(6), 287–298.
15. Glendor, U., Halling, A., Andersson, L., & Eilert-Petersson, E. (1996). Incidence of traumatic tooth injuries in children and adolescents in the county of Västmanland, Sweden. *Swedish Dental Journal*, 20(1), 15–28.
16. Mitchell, J., Sheller, B., Velan, E., Caglar, D., & Scott, J. (2014). Managing pediatric dental trauma in a hospital emergency department. *Pediatric Dentistry*, 36(3), 205–210.
17. Hall, E., Hickey, P., Nguyen-Tran, T., & Louie, J. (2016). Dental trauma in a pediatric emergency department referral center. *Pediatric Emergency Care*, 32(12), 823–826.
18. Odersjö, M.L., Robertson, A., & Koch, G. (2018). Incidence of dental traumatic injuries in children 0–4 years of age: A prospective study based on parental reporting. *European Archives of Paediatric Dentistry*, 19(2), 107–111.
19. Cully, J.L., Zeeb, K., Sahay, R.D., Gosnell, E., Morris, H., & Thikkurissy, S. (2019). Prevalence of primary teeth injuries presenting to a pediatric emergency department. *Pediatric Dentistry*, 41(2), 136–139.
20. Lombardi, S., Sheller, B., & Williams, B.J. (1998). Diagnosis and treatment of dental trauma in a children's hospital. *Pediatric Dentistry*, 20(2), 112–120.
21. Andreasen, J.O. (1970). Etiology and pathogenesis of traumatic dental injuries. A clinical study of 1,298 cases. *Scandinavian Journal of Dental Research*, 78(4), 329–342.
22. Fried, I., Erickson, P., Schwartz, S., & Keenan, K. (1996). Subluxation injuries of maxillary primary anterior teeth: Epidemiology and prognosis of 207 traumatized teeth. *Pediatric Dentistry*, 18(2), 145–151.
23. Perez, R., Berkowitz, R., McIlveen, L., & Forrester, D. (1991). Dental trauma in children: A survey. *Endodontics & Dental Traumatology*, 7(5), 212–213.
24. Luz, J.G., & Di Mase, F. (1994). Incidence of dentoalveolar injuries in hospital emergency room patients. *Endodontics & Dental Traumatology*, 10(4), 188–190.
25. Choi, S.C., Park, J.H., Pae, A., & Kim, J.R. (2010). Retrospective study on traumatic dental injuries in preschool children at Kyung Hee Dental Hospital, Seoul, South Korea. *Dental Traumatology*, 26(1), 70–75.
26. Lewis, C., Lynch, H., & Johnston, B. (2003). Dental complaints in emergency departments: A national perspective. *Annals of Emergency Medicine*, 42(1), 93–99.
27. Andreasen, J.O., Lauridsen, E., & Dugaard-Jensen, J. (2009). Dental traumatology: An orphan in pediatric dentistry? *Pediatric Dentistry*, 31(2), 153–156.
28. Zaitoun, H., North, S., Lee, S., Albadri, S., & McDonnell, S.T. (2010). Initial management of paediatric dento-alveolar trauma in the permanent dentition: A multi-centre evaluation. *British Dental Journal*, 208(5), 254–255.
29. Sae-Lim, V., Hon, T.H., & Wing, Y.K. (1995). Traumatic dental injuries at the Accident and Emergency Department of Singapore General Hospital. *Endodontics & Dental Traumatology*, 11(1), 32–36.
30. Lauridsen, E., Blanche, P., Amaloo, C., & Andreasen, J.O. (2017). The risk of healing complications in primary teeth with concussion or subluxation injury: A retrospective cohort study. *Dental Traumatology*, 33(5), 337–344.
31. Kaban, L.B. (1993). Diagnosis and treatment of fractures of the facial bones in children 1943–1993. *Journal of Oral and Maxillofacial Surgery*, 51(7), 722–729.
32. Smartt, J.M., Jr., Low, D.W., & Bartlett, S.P. (2005). The pediatric mandible: II. Management of traumatic injury or fracture. *Plastic and Reconstructive Surgery*, 116(1), 28e–41e.

33. Trivedy, C., Kodate, N., Ross, A., Al-Rawi, H., Jaiganesh, T., Harris, T., et al. (2012). The attitudes and awareness of emergency department (ED) physicians towards the management of common dentofacial emergencies. *Dental Traumatology*, 28(2), 121–126.
34. Spinis, E., Melis, A., & Savasta, A. (2006). Therapeutic approach to intrusive luxation injuries in primary and young permanent teeth. *European Journal of Paediatric Dentistry*, 7(4), 175–180.
35. Colak I, Markovic D, Petrovic B, Peric T, Milenkovic A. A retrospective study of intrusive injuries in primary dentition. *Dent Traumatol*. 2009; 25: 605– 10.
36. Cho WC, Nam OH, Kim MS, Lee HS, Choi SC. A retrospective study of traumatic dental injuries in primary dentition: treatment outcomes of splinting. *Acta Odontol Scand*. 2018; 76: 253– 6.
37. Gustafson D, McTigue D, Thikkurissy S, Casamassimo P, Nusstein J. Continued care of children seen in an emergency department for dental trauma. *Pediatr Dent*. 2011; 33: 426– 30.
38. Bourguignon C, Cohenca N, Lauridsen E, Therese Flores M, O'Connell A, Day P, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. *Dent Traumatol*. 2020; 36: 314– 30.