

# Luxation Injuries in Primary teeth - A University based Retrospective study

**Amina mehrinbano**

Saveetha Dental College, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai.  
Email: 151501085.sdc@saveetha.com

**Deepa Gurunathan\***

Professor and admin head, Department Of Pediatric And Preventive Dentistry, Saveetha Dental College And Hospital, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai. Email: deepag@saveetha.com

**SriRengalakshmi**

Senior lecturer, Department Of Orthodontics, Saveetha Dental College And Hospital, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai

## **Article Info**

**Volume 83**

**Page Number: 2700 - 2709**

**Publication Issue:**

**July-August 2020**

## **Article History**

**Article Received:** 06 June 2020

**Revised:** 29 June 2020

**Accepted:** 14 July 2020

**Publication:** 25 July 2020

## **Abstract:**

Traumatic dental injuries (TDIs) are one of the most serious dental public health problems among children who seek emergency dental treatment. These injuries may influence further tooth growth, resulting in irreversible damage if they occur during the initial stages of development. The aim of the study was to find the prevalence of luxation injury in primary teeth in a university dental clinic in South India, Chennai. The data regarding pediatric patients treated for trauma who have visited the hospital during the study periods from June 2019 to March 2020 was retrieved from the university database. The search resulted with 15 in total of patients who underwent treatments for dental trauma to primary teeth. The age range of the patients included in this study was 3-10 years of age. Data tabulation was carried out in Excel. The data is imported and transcribed in Statistical Package for Social sciences version 16 (SPSS, IBM corporation). Descriptive analysis was based on quantitative variables and frequencies for categorical variables. P less than or equal to 0.005 was considered statistically significant with a confidence interval of 95%. A higher prevalence in male (58.3%) children reporting with luxation injuries was compared to female (41.7%) children was observed. The highest prevalence of luxation injuries was subluxation 41.7%, followed by extrusive luxation 25%. It was also observed that female children took less time to report to the clinic when compared to the male children. The increased health awareness and the importance of prevention methods have essentially contributed to the decrease in the prevalence of TDIs, with an increase of subluxation injuries and a male gender prevalence.

**Keywords:** Subluxation; Luxation injuries; prevalence; primary teeth.

## Introduction

Dental trauma is a serious problem among children with most injuries constituting dental emergencies that require immediate assessment and management. Luxation injuries that affect the primary dentition are commonly reported and associated with resilience of the alveolar bone and supporting structures in young children (Gupta, 2011). It is the responsibility of parents to pursue health-related necessities of their children. In this regard, the lack of parent's or guardian's attention will have a negative influence on the child's oral status. (Gurunathan and Shanmugaavel, 2016) Primary dentition plays an important role in the functional and psychological aspects of child development, which may contribute to new studies focused on trauma in the primary dentition (King, Anthonappa and Itthagaran, 2007). Additionally, researchers unanimously agree the dental trauma to primary teeth can lead to alterations in succedaneous dentition, especially in cases of intrusive luxation and avulsion. (Da Silva Assuncao *et al.*, 2009)

One of the topics that is most controversial is the diagnosis and management of traumatic dental injuries in children. Although the majority of injury to the primary anterior dentition comprises luxation, particularly intrusive luxation and lateral luxation. Luxation injuries are categorised as; intrusions, extrusions, lateral luxation and avulsion (Skaare, Aas and Wang, 2015). Dental trauma shows a higher prevalence upto three years of age in both genders was reported in Spain. (Da Silva Assuncao *et al.*, 2009) In South Korea one of the main causes for trauma in primary teeth was falling at home. The one main treatment option suggested by the study was splinting of the offended teeth which showed a success rate of 58.9% (Choi *et al.*, 2010).

Most of the dental trauma data available in literature is collected retrospectively from cross sectional or longitudinal studies of patient records with no standardized trauma records or adequate trauma history at time of injury was found to be available.

The purpose of a study was to analyse the prevalence of luxation injuries in primary teeth in a University dental clinic in Chennai India . As different treatment protocols are followed in different hospitals, the analysis of treatment done, duration taken to report to dentist post injury, age, gender, etiological factors, the type of injury in patients etc will help in better understanding and providing effective treatment. There is a lack of consistency in the knowledge among general dentist regarding traumatic dental injuries of primary teeth. There is a need to create awareness and education regarding traumatic injuries of primary teeth. (Ravikumar and Jeevanandan, 2017) .

Previous studies involving various treatment modalities (Govindaraju and Gurunathan, 2017; Packiri, Gurunathan and Selvarasu, 2017; Subramanyam *et al.*, 2018), prevalence of frenal attachment (Christabel and Gurunathan, 2015) , post operative pain perception (Nair, Jeevanandan and Vignesh, 2018), fluoride levels (Mahesh R, 2018; 10(4) : 109- 114; Somasundaram *et al.*, 2015) , rotary files for pediatric treatment , KAP studies (Govindaraju and Jeevanandan, 2017; Govindaraju, Jeevanandan and Subramanian, 2017a, 2017b) , efficiency of rotary files (Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018; Panchal *et al.*, 2019) have been conducted in our institution letting us focus on the prevalence of traumatic injuries in pediatric patients in this study . Treatment of trauma to primary teeth has recently found place in literature, conducting the study in a different socio economic and geographic locations should be a novel addition. The aim of the study was to find the prevalence of luxation injury in primary teeth in a university dental clinic in South India , Chennai .

## Materials and methods

This is a retrospective clinical study that is performed to assess the prevalence of luxation injury in primary teeth in a university dental hospital . After obtaining

approval from the ethical review board of Saveetha institute of medical and technical sciences(SDS/SIHEC/2020/DIASDATA/0619-032020).

### Selection of subjects :

The study population consists of a predominantly South Indian population. The list of pediatric patients treated for trauma were retrieved by reviewing 86000 patient records who have visited the hospital during the study periods from June 2019 to March 2020 from the university database, based on the following criteria .

### Inclusion criteria :

1. Patients below the age of 10
2. Patients with primary dentition who underwent treatment for dental trauma between the June 2019 and March 2020
3. Records with complete data and photographs during treatment .

### Exclusion criteria :

1. Records with incomplete data of clinical examination and blood reports.

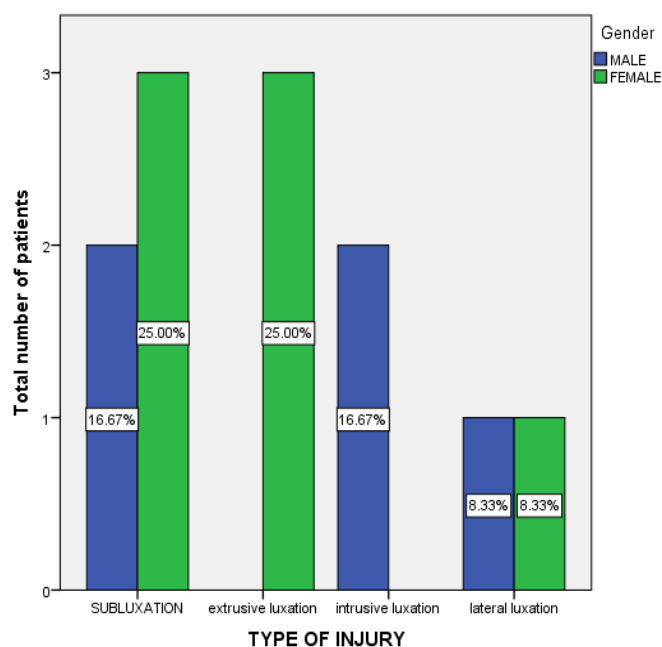
### Statistical analysis:

The search resulted with 15 in total of patients who underwent treatments for dental trauma to primary teeth. The age range of the patients included in this study was 3-10 years of age. Internal validity of the study was maximised with cross verification by patient and department along with the photographic evidence. The results of the study can be applied to the South Indian population for epidemiological inferences and is therefore externally valid. The incomplete data was verified by the department and or the patient which if couldn't be verified as a possibility of bias was excluded from the study. Data tabulation was carried out in Excel. The data is imported and transcribed in Statistical Package for

Social sciences version 16(SPSS, IBM corporation). Descriptive analysis was based on quantitative variables and frequencies for categorical variables. P less than or equal to 0.005 was considered statistically significant with a confidence interval of 95%.

### Results and Discussion

The mean age of the patients included in the study ranged from 3 to 10 years. A higher prevalence in male (58.3%) children reporting with luxation injuries was compared to female (41.7%) children was observed. The highest prevalence of luxation injuries was subluxation 41.7%, followed by extrusive luxation 25%. Subluxation was the most prevalent type of injury among both the genders (Graph1).



**Graph 1:** Bar Graph depicts the gender distribution of different types of luxation injury . The X-axis represents the luxation injuries and the Y-axis the number of the patients . Higher prevalence of subluxation among male ( blue ) and female (green ) patients seen which is statistically significant .(Chi-square test , p value - 0.002 {<0.05, hence statistically significant }). Also , 25% of the female population (green ) has extrusive luxation and 16.67% of males (blue ) show intrusive luxation . Lateral luxation

seems to be equal in incidence in both male(blue) and female(green) patients 8.3%.

Our data also suggests that the most frequently occurring tooth displacement during a traumatic injury is labial displacement 25%. It was also observed that female children took less time to report to the clinic when compared to the male children. The most commonly affected tooth was the maxillary incisor.

Injuries to the primary dentition occur frequently.(Soporowski, Allred and Needleman, 1994) Luxation injuries comprise a large portion of traumatic dental injuries in the primary tooth due to resilience of alveolar bone. Various types of luxation injuries are possible depending upon the force and direction of impact.(Malmgren *et al.*, 2012) For a considerable period, clinical studies emphasised that the main factors predisposing children to TDIs were gender and age (de Fátima Guedes de Amorim, Estrela and da Costa, 2011); in later studies, however, other factors, such as falls, driving accidents, sports, violence, inadequate lip protection and protrusion, received more attention.(Malmgren *et al.*, 2012; Norton and O'Connell, 2012)

The increase in the prevalence of dental trauma in recent years is confirmed by many studies in the literature. .Lexomboon *et al.*(Lexomboon *et al.*, 2016) reported an increase of TDIs in Brazilian preschool children in the last 10 years and in children living in the county of Värmland, Sweden in the past 20 years, respectively.The predominant age group in our study was 3 to 5 years. This was in agreement with studies that found an increase in incidence of TDIs in children between the age of 3 to 5 years(Jorge *et al.*, 2009; Viegas *et al.*, 2010) . However this finding disagreed with another study reporting that the peak age of TDI incidence in children is 2 to 4 years(Bhayya and Shyagali, 2013). Male children have seen an incidence of injury than girls (58.33%), which was

consistent with other studies(Rajab, 2003) and may reflect the observation that boys are more energetic and more likely to take part in outdoor activities than girls are. The predominant age of boys in the series was 4 to 5 years, while that of girls was 2 to 3 years. This was in agreement with the study that found the predominant age of boys was older than that of girls(Ritwik, Massey and Hagan, 2015). These changes between the previous studies and current data are attributed to: elasticity of alveolar bone in the younger studied age groups and increased attention of parents about the importance of mouthguards not only for certain sports activities but also with active children

In our study most of the luxation injuries were subluxation (41.7%), followed by extrusive luxation (25%). contradicting these findings (Soporowski, Allred and Needleman, 1994) reported lateral luxation (57%), followed by intrusions (15.3%) extrusion (8.5%), since their sample was almost five times larger the findings may be more representatives of the types of luxation injuries occurring in paediatric population. Another study reported 32.6% of injuries to be subluxation with the highest prevalence (Da Silva Assuncao *et al.*, 2009) , thus supporting our findings. In the limits of our study the most commonly affected tooth was a primary central incisor, supporting this finding (Soporowski, Allred and Needleman, 1994) reported 80.8% of the injury was sustained by the central incisors, where as they found no significance between injuries occurring right (52.1%) and left dental arch (47.9%) 4, which was also supported the findings of our study. The prominent and most vulnerable position of the maxillary incisors makes these teeth more susceptible to injuries compared to the lower teeth(Lacerda *et al.*, 2004). A large variability in the reported prevalence of TDIs can be found in the literature. Differences in sample composition as well as in the definitions and

classifications of trauma make the comparison between various data on uniform basis difficult.

## Conclusion

The most frequent type of injury that occurred among children was subluxation. Male children suffered from dental trauma significantly more often than female children and the most commonly affected teeth were the central incisors. This study also shows that in the absence of acute symptoms parents tend to not apply to a dental clinic for children's injuries. We should further highlight the importance of informing the public about primary tooth injuries and the consequences.

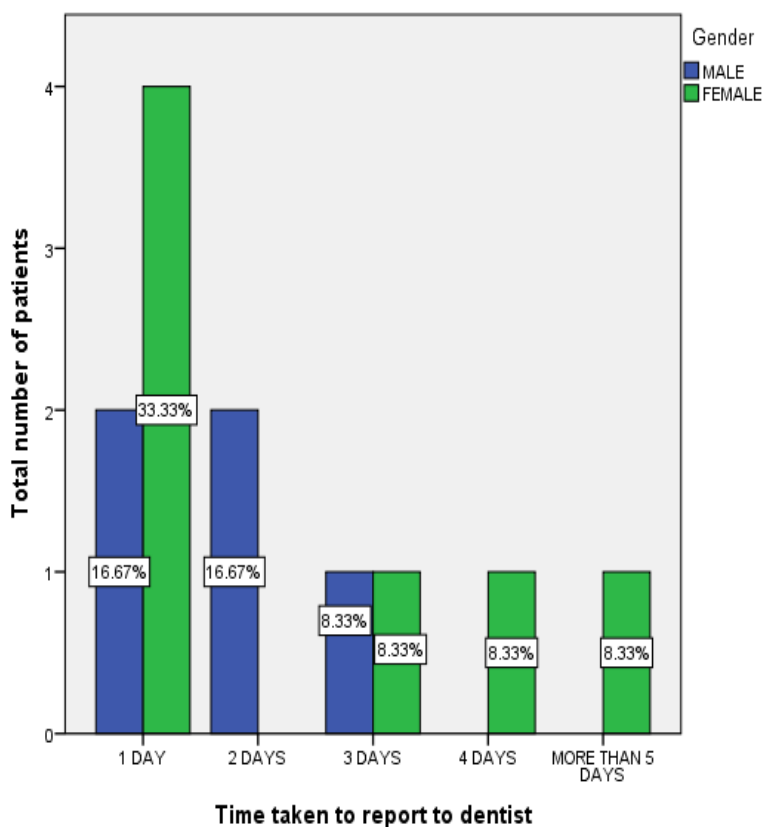
## Reference

1. Bhayya, D. P. and Shyagali, T. R. (2013) 'Traumatic injuries in the primary teeth of 4- to 6-year-old school children in gulbarga city, India. A prevalence study', *Oral health and dental management*. researchgate.net, 12(1), pp. 17–23.
2. Choi, S. C. *et al.* (2010) 'Retrospective study on traumatic dental injuries in preschool children at Kyung Hee Dental Hospital, Seoul, South Korea', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 26(1), pp. 70–75.
3. Christabel, S. L. and Gurunathan, D. (2015) 'Prevalence of type of frenal attachment and morphology of frenum in children, Chennai, Tamil Nadu', *World J Dent*, 6(4), pp. 203–207.
4. Da Silva Assuncao, L. R. *et al.* (2009) 'Effects on permanent teeth after luxation injuries to the primary predecessors: a study in children assisted at an emergency service', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 25(2), pp. 165–170.
5. de Fátima Guedes de Amorim, L., Estrela, C. and da Costa, L. R. R. S. (2011) 'Effects of traumatic dental injuries to primary teeth on permanent teeth--a clinical follow-up study', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 27(2), pp. 117–121.
6. Govindaraju, L. and Gurunathan, D. (2017) 'Effectiveness of Chewable Tooth Brush in Children-A Prospective Clinical Study', *Journal of clinical and diagnostic research: JCDR*. ncbi.nlm.nih.gov, 11(3), pp. ZC31–ZC34.
7. Govindaraju, L. and Jeevanandan, G. (2017) 'Clinical evaluation of quality of obturation and instrumentation time using two modified rotary file systems with manual instrumentation in primary teeth', *Journal of clinical and*. ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5713856/>.
8. Govindaraju, L., Jeevanandan, G. and Subramanian, E. M. G. (2017a) 'Comparison of quality of obturation and instrumentation time using hand files and two rotary file systems in primary molars: A single-blinded randomized controlled trial', *European journal of dentistry*. Thieme Medical and Scientific Publishers Private Ltd., 11(03), pp. 376–379.
9. Govindaraju, L., Jeevanandan, G. and Subramanian, E. M. G. (2017b) 'Knowledge and practice of rotary instrumentation in primary teeth among indian dentists: A questionnaire survey', *Journal of International Oral Health*. Medknow Publications and Media Pvt. Ltd., 9(2), p. 45.
10. Gupta, M. (2011) 'Intrusive luxation in primary teeth--Review of literature and report of a case', *The Saudi dental journal*. Elsevier,



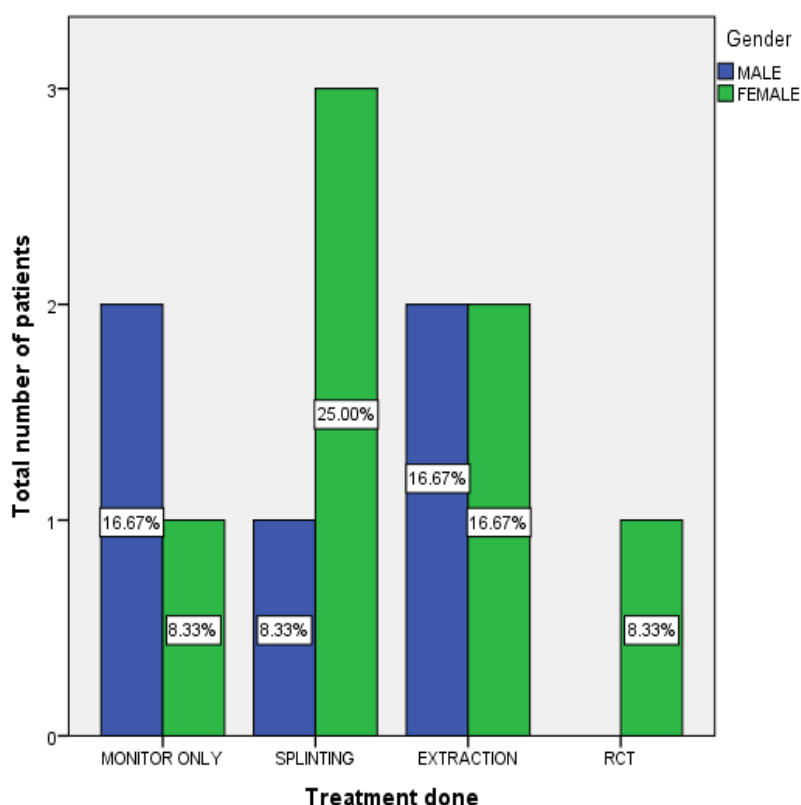
- 23(4), pp. 167–176.
11. Gurunathan, D. and Shanmugaavel, A. K. (2016) 'Dental neglect among children in Chennai', *Journal of the Indian Society of Pedodontics and Preventive Dentistry*. jisppd.com, 34(4), pp. 364–369.
  12. Jeevanandan, G. (2017) 'Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth - Case Report', *Journal of clinical and diagnostic research: JCDR*. ncbi.nlm.nih.gov, 11(3), pp. ZR03–ZR05.
  13. Jeevanandan, G. and Govindaraju, L. (2018) 'Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial', *European archives of paediatric dentistry: official journal of the European Academy of Paediatric Dentistry*. Springer, 19(4), pp. 273–278.
  14. Jorge, K. O. *et al.* (2009) 'Prevalence and factors associated to dental trauma in infants 1-3 years of age', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 25(2), pp. 185–189.
  15. King, N. M., Anthonappa, R. P. and Itthagaran, A. (2007) 'The importance of the primary dentition to children-Part 1: consequences of not treating carious teeth', *Hong Kong Practitioner*. Hong Kong College of Family Physicians, 29(2), p. 52.
  16. Lacerda, J. T. de *et al.* (2004) 'Dental pain as the reason for visiting a dentist in a Brazilian adult population', *Revista de saude publica*. SciELO Public Health, 38, pp. 453–458.
  17. Lexomboon, D. *et al.* (2016) 'Incidence and causes of dental trauma in children living in the county of Värmland, Sweden', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 32(1), pp. 58–64.
  18. Mahesh R, M. M. (2018; 10(4) : 109- 114) *FLUORIDE, FLUORIDATED TOOTHPASTE EFFICACY AND ITS SAFETY IN CHILDREN - REVIEW*. Available at: <http://www.ijpronline.com/ViewArticleDetail.aspx?ID=7041> (Accessed: 28 June 2020).
  19. Malmgren, B. *et al.* (2012) 'International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 28(3), pp. 174–182.
  20. Nair, M., Jeevanandan, G. and Vignesh, R. (2018) 'Comparative evaluation of post-operative pain after pulpectomy with k-files, kedo-s files and mtwo files in deciduous molars-a randomized clinical trial', *Brazilian dental journal*. bds.ict.unesp.br. Available at: <http://bds.ict.unesp.br/index.php/cob/article/view/1617>.
  21. Norton, E. and O'Connell, A. C. (2012) 'Traumatic dental injuries and their association with malocclusion in the primary dentition of Irish children', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 28(1), pp. 81–86.
  22. Packiri, S., Gurunathan, D. and Selvarasu, K. (2017) 'Management of Paediatric Oral Ranula: A Systematic Review', *Journal of clinical and diagnostic research: JCDR*. ncbi.nlm.nih.gov, 11(9), pp. ZE06–ZE09.
  23. Panchal, V. *et al.* (2019) 'Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial', *Journal of the*

- Indian Society of Pedodontics and Preventive Dentistry*. Medknow Publications, 37(1), p. 75.
24. Rajab, L. D. (2003) 'Traumatic dental injuries in children presenting for treatment at the Department of Pediatric Dentistry, Faculty of Dentistry, University of Jordan, 1997--2000', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 19(1), pp. 6--11.
  25. Ravikumar, D. and Jeevanandan, G. (2017) 'Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study', *European Journal of*. thieme-connect.com. Available at: [https://www.thieme-connect.com/products/ejournals/html/10.4103/ejd.ejd\\_357\\_16](https://www.thieme-connect.com/products/ejournals/html/10.4103/ejd.ejd_357_16).
  26. Ritwik, P., Massey, C. and Hagan, J. (2015) 'Epidemiology and outcomes of dental trauma cases from an urban pediatric emergency department', *Dental traumatology: official publication of International Association for Dental Traumatology*. Wiley Online Library, 31(2), pp. 97--102.
  27. Skaare, A. B., Aas, A.-L. M. and Wang, N. J. (2015) 'Enamel defects on permanent successors following luxation injuries to primary teeth and carers' experiences', *International journal of paediatric dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children*. Wiley Online Library, 25(3), pp. 221--228.
  28. Somasundaram, S. *et al.* (2015) 'Fluoride Content of Bottled Drinking Water in Chennai, Tamilnadu', *Journal of clinical and diagnostic research: JCDR*. ncbi.nlm.nih.gov, 9(10), pp. ZC32--4.
  29. Soporowski, N. J., Allred, E. N. and Needleman, H. L. (1994) 'Luxation injuries of primary anterior teeth--prognosis and related correlates', *Pediatric dentistry*. aapd.org, 16(2), pp. 96--101.
  30. Subramanyam, D. *et al.* (2018) 'Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries', *European journal of dentistry*. thieme-connect.com, 12(1), pp. 67--70.
  31. Viegas, C. M. *et al.* (2010) 'Predisposing factors for traumatic dental injuries in Brazilian preschool children', *European journal of paediatric dentistry: official journal of European Academy of Paediatric Dentistry*. admin.ejpd.eu, 11(2), pp. 59--65.



**Graph 2:** Graphs representing time taken to report to the dentist from the time of injury .X-axis represents the time taken to report to the dentist post trauma and Y-axis represents the number of patients A higher prevalence among female(green) children is seen. Among the study population , 33.3% of the female(green) children happened to report to the dentist within one day of injury .About 16.6% of the male(blue) children reported on the same day as the trauma . On the second day 16.6% of the male population reported to the dentist. On the subsequent days , 8.3% of the male (blue ) and 8.3% female(green) patients reported to the dentist .





**Graph 3:** Graph depicts the various treatments carried out for patients with luxation injuries. X-axis represents treatment modalities and Y-axis represents the number of patients. The most prevalent treatment appears to be splinting 25%, carried out among the female (green) patients, followed by extraction 16.6% in both male (blue) and female (female) patients. Around 16.6% of the male (blue) patients were put on observation. Only 8.3% of the female (green) patients were advised an RCT.

Direction of displacement of tooth	Number of patients (occurrence)	Percentage of patients
Nil	7	58.3%
Palatally	2	16.7%
Labial	3	25%
Total	12	100%

**Table 1:** Table representing the frequency of the different direction of displacement in pediatric patients with luxation injuries. A total of 12 patients reported during the study duration. Approximately 58.3% of the study population did not have any displacement in the direction of the injured tooth. Higher incidence of labially displaced teeth is seen in 25% of the pediatric patients.

Type of injury	Number of patients	Percentage
Subluxation	5	41.7%

Extrusive luxation	3	25%
Intrusive luxation	2	16.7%
Lateral luxation	2	16.7%
Total	12	100%

**Table 2:** Table showing the number of pediatric patients who reported to the university hospital with luxation injuries. A total of 12 pediatric patients reported during the retrospective study duration. Subluxation is the most prevalent type of dental trauma 41.7% seen , followed by extrusive luxation 25%, intrusive luxation 16.7% and lateral luxation 16.7%.