# Frequency of Radiographic Signs of Dental Trauma in Patients Ages 5 and Younger

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## Introduction

During routine radiographic examinations, it is a common finding that us pediatric dentists come across a patient who may have had a traumatic dental injury (TDI) to their primary dentition. It has been studied that the prevalence of primary incisor trauma in other countries can range from 11-47%.[5] Most injuries affecting children below the age of four are caused by falls and they are put at higher risk for facial and oral trauma.[2] Traumatic dental injuries in primary dentition frequently go unnoticed by parents and has the potential to affect the developing permanent tooth. Unless there is a severe tooth displacement, traumatic dental injuries to primary incisors are not always diagnosed at the time of the injury and parents are unaware of the possible consequences to their permanent dentition.[2] Current literature shows some conflicting opinions whether or not female or males are more likely to have a traumatic dental injury to the primary dentition.[1,4] In addition, there are little studies that address a patient's medical history and if there are any correlations with primary tooth trauma.

**The purpose of this study is to identify the radiographic frequency of traumatic dental injuries in the primary dentition occurring in patients five and younger, as well as any correlation with dental trauma to gender or medical history. In addition, a secondary outcome is to analyze parental awareness of dental trauma in the primary dentition, by recording if the radiograph was taken at an emergency, or initial or recall dental visit.**

## Materials & Methods

A retrospective study (UCLA IRB # 21-001644) was conducted by analyzing digital maxillary peri-apical (PA) radiographs of patients ages 5 years 11 months and below at time of radiograph between January 2012-February 2020. Electronic health records were reviewed to collect information regarding age, gender, and medical history. Traumatic dental injuries to primary incisors were noted with radiographic signs such as: External Inflammatory Root Resorption, Root Fracture, Arrested Dentin Deposition, Tube-like Mineralization, Pulp canal obliteration, Internal Root Resorption, Peri-apical radiolucency not associated with carious lesions. In addition to radiographic signs, traumatic dental injuries to primary incisors were also noted with clinical signs based off of clinical note/radiographs such as avulsions, subluxations, crown fractures or tooth discolorations. If radiographic signs of a TDI were found, the type of visit for when it was diagnosed was recorded. The types of visits that were recorded were a New Patient, Emergency, Recall, or IV General Anesthesia appointment. Patient's with radiographic signs of deep dentine caries, previous restorations, and/or pulp treatment teeth were excluded from this study.

Statistical data analysis was performed using Fisher's exact test with significance level set at a P-value < .05. Correlation analysis were performed to identify primary tooth trauma with patient gender and medical history.

## Results

Out of the 2703 subject charts screened for having a maxillary PA or occlusal radiograph below the age of 5 years 11 months, 1664 subjects fit the inclusion criteria. Out of the 1664 subjects, 154 (9.25%) subjects showed radiographic signs of dental trauma with no signs of caries or decay. Statistically significant data was found between age of patient and radiographic signs of dental trauma found on radiographic examination (p = 0.022).

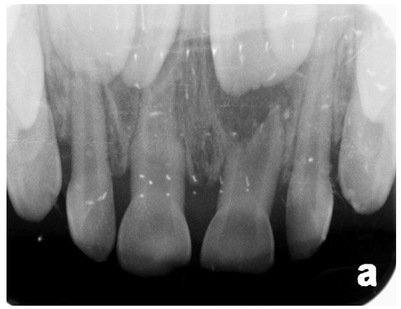


**Figure 1:** Occlusal radiographic image showing primary central incisors with a history of TDI that present with external inflammatory root resorption on tooth E and periapical radiolucency on tooth F.

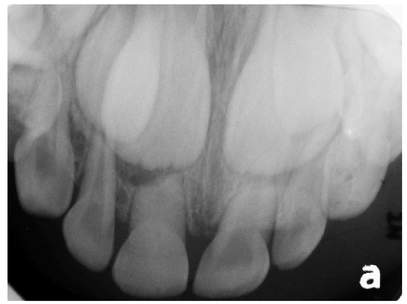


**Figure 2:** Occlusal radiographic image showing primary central incisor #E with a radiographic finding of pulp canal obliteration indicating a history of a traumatic dental injury.

| | Radiographic Signs of Dental Trauma Present | Radiographic Signs of Dental Trauma Not Present | P value |
|---|---|---|---|
| **Age** | | | 0.022 |
| 1 | 11 (7.1%) | 38 (2.5%) | |
| 2 | 13 (8.4%) | 196 (13.0%) | |
| 3 | 32 (20.8%) | 394 (26.0%) | |
| 4 | 52 (33.8%) | 490 (32.5%) | |
| 5 | 46 (29.9%) | 392 (26.0%) | |
| Total (n) | 154 (9.25%) | 1,510 (90.75%) | 1,664 |
| | | | |
| **Gender** | | | 0.061 |
| Female | 57 (37.0%) | 694 (46.0%) | |
| Male | 97 (63.0%) | 816 (54.0%) | |
| Total (n) | 154 (9.25%) | 1,510 (90.75%) | 1,664 |

**Table 1:** Frequency of patients presenting with radiographic signs of TDI related to age and gender.

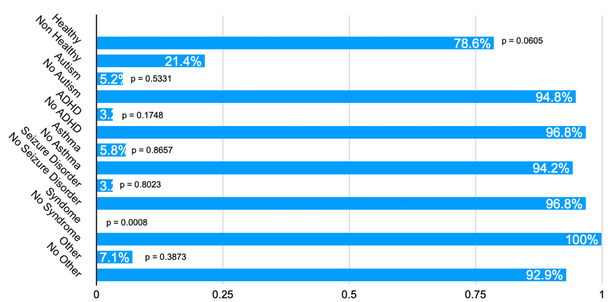


**Figure 3**: Prevalence of traumatic dental injuries amongst various systemic conditions with corresponding p-values.

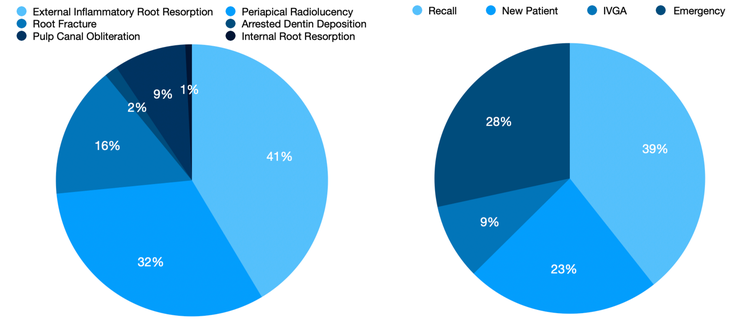


**Figure 4:** Percentages of most common radiographic signs indicating a history of dental trauma and percentages of type of appointment visit present at diagnosing dental trauma.

## Conclusions

- 9.25 % of patient subjects from UCLA Pediatric Dentistry Clinic from Jan 2012- Feb 2020 showed radiographic signs of traumatic dental injuries to their primary incisors
- Correlation found between age and when radiographic signs of dental trauma were examined, with a p-value of 0.022 ($p<0.05$).
- Patient's who do not have an associated syndrome are more likely to show signs of radiographic trauma (p = 0.008).
- The most common radiographic sign of a traumatic dental injury was external inflammatory root resorption, followed by periapical radiolucencies.
- No statistically significant data was found between gender, although there was a higher number of males compared to females. (P value = 0.061)
- Recall visits were the most common dental visit where radiographic signs of trauma were diagnosed, suggesting parents may be less aware of their child's traumatic dental injury, unless otherwise noted on their chart

Future Research: Discovering an alternate measure for analyzing parental knowledge of management of dental trauma to primary incisors, follow up study on subject's permanent incisors and any developmental defects that might be detected.

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