Permanent Maxillary Incisor Trauma in Children with Special Needs

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Introduction

- Traumatic dental injuries (TDI) present a significant public health concern that affect 1 to 3% of the population, disproportionately affecting children and people with special health care needs.
- Maxillary incisors are at the highest risk for TDI due to their anterior position and protrusion.
- There have been few epidemiological studies that analyzed the prevalence, types, and long-term sequelae associated with TDI in children with special health care needs (CSHCN)

We conducted a 10-year retrospective chart review of TDI to a permanent maxillary incisor in CSHCN to assess the trauma profile and clinical outcomes of treatment provided at Boston Children's Hospital.

Methods

Figure 1. Study design

COHORT SELECTION

Inclusion Criteria:
- Ages 6 years and above
- Presented at BCH between September 2009-2018
- History of permanent maxillary incisor trauma (#7, #8, #9, #10)
- Diagnosis of a special health care need recorded in the patient chart or notes, including: developmental delay, Autism Spectrum Disorder, cardiac conditions, Down Syndrome, Attention-Deficit/Hyperactivity Disorder (ADHD), cerebral palsy, and epilepsy

Exclusion Criteria:
- Resides outside of the United States
- Tooth with pre-existing fractures treated prior to baseline visit at BCH

RETROSPECTIVE CHART REVIEW

Data collected:
- **Patient information:**
  - Demographic: gender, age at initial presentation at BCH, special health care need
- **Trauma information:**
  - Tooth number
  - Whether there is repeat trauma, whether multiple teeth were involved in the trauma
  - Reason for injury: fall, sports, collision, motor vehicle accident (MVA), medical
  - Whether tooth is still present on the last day of follow up
  - Tooth injury: fracture, avulsion, subluxation, intrusion, extrusion, lateral luxation
  - Fracture information: pulpal involvement, Ellis Classification (Class I, II, III)
  - Type of hospital visit: ED, urgent, recall/regular
- **Treatment**
  - Dates of initial exam (baseline), restorative failure, last date of follow up
  - CDT codes recording treatment performed
- **Any teeth that required extraction due to restorative failure were accounted**

STATISTICAL ANALYSIS

- The data from Excel was transferred to SPSS.
- Chi Square tests for significance were used for data analysis.

Results

Table 1. A Summary of Baseline Patient Characteristics

Variable	Categories	n (%)	*p*-Value†
Patients	Total number	152 (100)	-
Follow-up Duration	Years (mean ± SD)	3.3 ± 3.3	-
Age	Years (mean ± SD)	12.8 ± 4.4	-
Sex	Male	103 (67.8)	<0.001*
	Female	49 (32.2)	
Reason for Trauma	Fall	75 (49.3)	<0.001*
	Non-fall collision	25 (16.4)	
	Unknown	24 (15.8)	
	Medical Condition	16 (10.5)	
	Sports	11 (7.2)	
	MVA	1 (0.7)	
Repeat Trauma	No	117 (77.0)	<0.001*
	Yes	35 (23.0)	
Special Health Care Need	Dev Delay	50 (32.9)	<0.001*
	ADHD	49 (32.2)	
	Epilepsy	38 (25.0)	
	Autism	36 (23.7)	
	Heart Disease	13 (8.6)	
	Cerebral Palsy	12 (7.9)	
	Down Syndrome	6 (3.9)	

† *p*-values were obtained from chi-square tests.
* Denotes statistical significance.

Figure 2. Prevalence of injuries among different SHCN

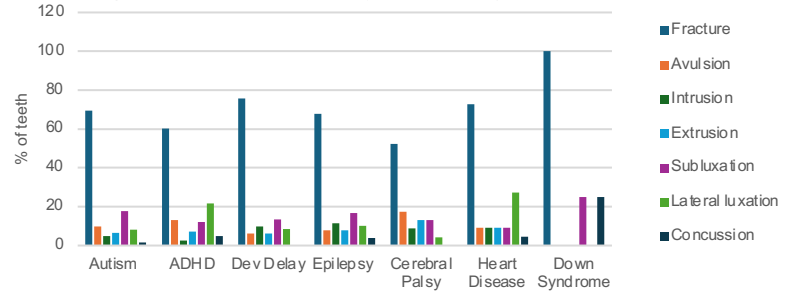
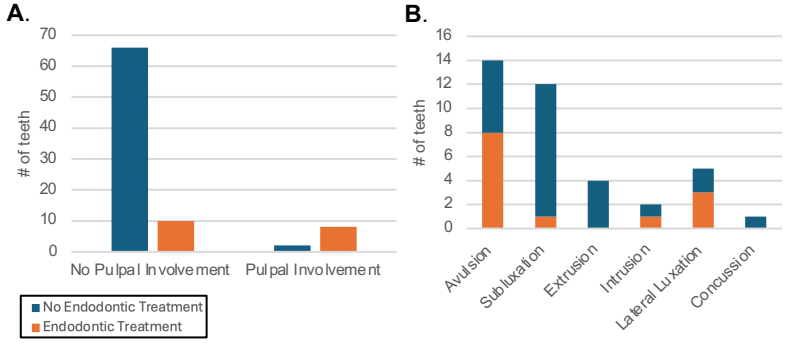


Figure 3. A. Endodontic Therapy for Fractured Teeth
B. Endodontic Therapy for Specific Trauma Types



Discussion

- Among 152 patients included, the majority were male (68%) and an average age of 12.8 years old.
- The majority of trauma was due to fall (49%), then non-fall collision (16%).
- Of 262 teeth analyzed for trauma to a maxillary incisor, 214 (81.7%) were maxillary central incisors and 175 (66.8%) had fractures, of which 115 (66%) were Ellis II and 28 (16%) Ellis III fractures.
- Fracture was the most prevalent injury, accounting for over 50% of injuries for each SHCN.
- Among 107 fracture cases followed longer than 6 months, 95 (89%) survived and 93 (95%) of 98 fracture cases without intrusion survived. There were no fracture-avulsion cases that were followed longer than 6 months.
- Among 25 total avulsed teeth, 10 (40%) were re-implanted, of which 8 (80%) survived greater than 6 months and 8 (80%) received endodontic treatment.
- Pulpally involved fractured teeth had a higher rate of endodontic therapy (80%) compared to non-pulpally involved teeth (13%).
- Avulsion (57%), intrusion (50%), and lateral luxation (60%) injuries had higher rates of endodontic therapy than subluxation (8%), extrusion (0%) and concussion (0%).