TRAUMATIC DENTAL INJURIES IN ONTARIO CHILDREN AGED 12 AND 14 YEARS:

Prevalence, causes and quality of life outcomes

Preliminary report

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BACKGROUND

Although a significant decrease in dental caries has been observed over the past three decades, the opposite has been found in regard to traumatic dental injury. In 2002-3**,** a preliminary project was conducted by the Community Dental Health Services Research Unit for the Ontario Ministry of Health, to provide information on the prevalence and severity of dental trauma in Grade 8 children in six Ontario communities. A history of traumatic injury was reported by 16.8% of the 3010 children examined and clinical evidence of trauma was found in 18.5%. Injury severe enough to warrant treatment, that is fracture involving dentine or worse, was found in 6% of children.

The aims of the study reported here is to provide data to facilitate the development of health promotion strategies and preventive interventions to reduce the prevalence of traumatic dental injuries by providing additional data on their prevalence among Ontario children aged 12 and 14 years, identifying their and their consequences in terms of the quality of life of children so affected.

PURPOSE AND OBJECTIVES

> ***OBJECTIVE 1:*** To provide further data on the prevalence of traumatic dental injuries AMONG Ontario children.
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> ***OBJECTIVE 1:*** To provide data on the circumstances and places in which children suffer traumatic dental injuries.
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> ***OBJECTIVE 2:*** To compare the oral health-related quality of life of children with dental trauma (both treated and untreated) and children without such injuries.

METHODS

The study was conducted in two phases: a clinical examination phase of a large sample of children and a follow-up phase in which selected children and their parents were asked to complete questionnaires concerning oral health and its psychosocial impacts.

Clinical examination phase

The target population for the clinical examination phase was all grade 6 (aged 11/12 years) and grade 8 (aged 13/14 years) children attending schools in York Region and all grade 8 children attending schools in Brant County. A stratified random sample of 15 schools was drawn in each location; 5 designated low caries risk, five medium risk and 5 high risk. These caries risk designations are made by the Public Health Departments using data on caries prevalence collected during their annual school dental screening programs. All grade 6 and 8 students in sampled schools were included in the study if they were present on the day of screening and had not been excluded from the screening process at parental request.

Clinical data were collected during the dental screening program conducted by the two participating Public Health Departments between October 2004 and May 2005. The screening examinations were undertaken by experienced dental hygienists who were trained and calibrated in the use of a common screening protocol and diagnostic criteria. Each child's caries experience was recorded using the DMFT index with the D, M and F components scored separately. Caries was scored at the D3 level. Each child was also

assessed for the following treatment needs – urgent restorative need, non-urgent restorative need, need for sealants, need for topical fluoride, and need for scaling.

The appearance of the anterior teeth of each child was scored by the examining hygienist using the Aesthetic Component of the Index of Orthodontic Treatment Need (AC-IOTN). This is a ten-point scale based on photographs that are ranked according to the arrangement of the anterior dentition, where 1 is the most and 10 the least attractive.

The Dental Trauma Index (DTI) was used to record evidence of injury to the upper and lower incisors. Prior to the examination each child was asked if they had had an injury to the teeth at the front of the mouth. A score of 0 indicates a tooth that is present and sound, while a score of 1 indicates unrestored enamel fractures, and scores of 2 to 5 indicates more severe levels of trauma, such as a fracture involving dentine, pulp involvement or tooth loss, either treated or untreated.

The upper incisors and canines were examined for fluorosis using the Tooth Surface Index of Fluorosis. Based on the examination each child was assigned to one of the following fluorosis categories; none, very mild, mild, moderate and severe.

Questionnaire phase

The target population for this phase of the study was all children reporting a history of traumatic dental injury and showing clinical evidence of injury, along with a comparison group consisting of the next two non-injured children of the same gender to be clinically examined. The parents of these children were sent a letter informing them of the study and asking them to complete a short questionnaire concerning the child's dental history and family characteristics. Also included was a questionnaire to be

completed by the child. Two mailings were used along with telephone follow-ups of non-responders to these mailings.

The child questionnaire asked whether or not the child had experienced a traumatic dental injury and, if so, where this happened and the circumstances that resulted in the injury. Questions were also asked regarding the use of mouth guards while playing sports at school and their use while playing sports when not at school. Those who reported not using mouth guards when playing sports were asked a series of questions concerning why they were not worn.

In order to assess the quality of life outcomes of dental injuries, the questionnaire contained a 10-item short form of the Child Perceptions Questionnaire11-14 (CPQ11-14) which forms one component of the Child Oral Health Quality of Life Questionnaires. Each item asked about the frequency of functional and psychosocial problems experienced over the previous three months as a result of the condition of the teeth and mouth. The response format was Likert-type with the following categories and codes: Never=1, Once or twice=2, Sometimes=3, Often=4, Everyday or almost everyday=5. The validity of this short form was previously demonstrated in a study of 141 children with malocclusions just starting orthodontic treatment.

RESULTS

The clinical examination phase of the study was completed by 1847 children in York Region (891 in grade 6 and 956 in grade 8) and 573 children in Brant County (all grade 8). A total of 808 children were selected to take part in the questionnaire phase of the study. Completed parental and child questionnaires were obtained from 370. Because

the response rate was low, data from this phase of the study were adjusted to account for non-response.

Prevalence of traumatic dental injury

Table 1 shows the prevalence of traumatic dental injury (Dental Trauma Index codes of 1 though 5) and severe injury (Dental trauma Index codes of 2 though 5). Prevalence rates were similar in York Region and Brant County.

Rates of injury were higher in boys than in girls. Among boys 15.8% had one or more injured incisors with 4.7% having one or more teeth with severe injury. For girls, the rates were 11.1% and 3.7% respectively.

Table 1: Prevalence of traumatic dental injury

	Percent with one or more incisors with injury	**Percent with one or more incisors with severe injury**
All	13.5	4.2
York Region	13.1	3.7
Brant County	14.6	5.7

Table 2 shows data for York Region separately for Grade 6 and Grade 8 children. As expected, rates are marginally higher in the older children. The table also shows data for Grade 8 children who took part in the 2002-3 survey. There was a small increase in the overall prevalence of injury between the two surveys but a small decline in the prevalence of severe injury.

Table 2: Prevalence of traumatic dental injury: York Region

	Percent with one or more incisors with injury	Percent with one or more incisors with severe injury
Grade 6: 2004-5	12.3	3.4
Grade 8: 2004-5	13.8	4.1
Grade 8: 2002-3	10.7	3.3

Association with dental caries

As in the 2002-3 study, there was a significant association between traumatic dental injury and dental caries experience. The mean DMFT for those without injury was 0.67 compared to 0.91 for those with injury ($p<0.05$). The highest rate was observed among those with severe injury were the mean DMFT was 1.41.

Location and causes of traumatic dental injury

Table 3 shows that most of the dental injuries reported occurred at home (34.8%) or at school (23.6%). Just over one tenth occurred at a swimming poor or other sports facility and 16% occurred in public spaces such as parks or shopping malls. Table 4 lists the causes and/or events that resulted in the injury. The most common was falls, accounting for a third of the injuries. Almost as many injuries occurred as a result of 'fooling around'. Only 15% occurred while playing sports and few were the outcome of violence.

Table 3: Location in which the injury occurred

Location:	**Percent**
At home	34.8
At school	23.6
Swimming pool	8.1
Other sports facility	4.2
Park	7.1
Shopping mall	2.1
In the street	7.5
Other place	12.7

Table 4: Causes of/events leading to injury

Cause/event:	**Percent**
Bicycle accident	4.7
Rollerblading accident	6.0
Playing sports	15.1
Fights/violence	3.1
Fall	33.8
Collision with person or object	9.0
Biting hard food	1.6
Fooling around	26.8

Impact on quality of life

Table 5 shows the mean oral health-related quality of life scores for those with and without injuries to the anterior dentition. Scores were significantly higher among children who had two or more teeth with severe injury.

The association between severe injury and the quality of life scores remained after controlling for the number of decayed teeth, fluorosis score and the arrangement of the anterior dentition as measured by the AC-IOTN.

Table 5: Mean quality of life scores by number of teeth injured

Number of teeth injured:	**With any injury**	**With severe injury**
None	12.7	12.7
One	13.4	13.6
Two	13.7	16.4
P-value	ns	<0.001

Table 6 shows that children with two or more teeth with severe injury were more likely to report experiencing seven of the ten psychosocial impacts comprising the measure of quality of life outcomes. The most common were being concerned about what others think, feeling shy or embarrassed, avoiding laughing or smiling and difficulty biting or chewing foods.

Table 6: Percent reporting experiencing psychosocial impacts

	Number of teeth with severe injury		
	None	One	Two or more
Pain in teeth or mouth	15.1	25.0	20.0
Trouble sleeping	4.0	0.0	0.0
Difficulty biting or chewing foods*	11.6	16.7	28.0
Feeling shy or embarrassed**	10.1	17.3	28.0
Concerned what others think**	13.5	21.2	36.0
Hard time paying attention in class**	4.0	5.6	20.0
Avoiding smiling or laughing***	6.9	11.3	28.0
Not wanted to talk to other children**	2.6	0.0	12.0
Not wanted to spend time with other children*	2.7	3.7	12.0
Been teased or called names	5.5	3.7	12.0

*p<0.05; **p<0.01;***p<0.001

Use of mouth guards while playing sports

The majority of children (92%) reported playing sports both at school and also when not at school. Few wore mouth guards while playing sports at school (Table 7), although approximately 10% reported always wearing a mouth guard when playing sports at clubs or with friends. Table 8 show the percentage giving various reasons for not

using mouth guards. The most common reason cited was that no-one had told them to wear one.

Table 7: Percent of children reporting wearing a mouth guard while playing sports

	Always	**Sometimes**	**Never**
While playing sports at school	2.3	3.2	94.5
While playing sports elsewhere	8.7	16.4	74.9

Table 8: Reasons for not wearing a mouth guard when playing sports (%)

Reason:	**Percent giving reason:**
No-one has told me to wear one	49.3
I don't think I need to	38.6
Too expensive	4.2
I don't know where to get one	4.9
I don't look good wearing one	6.2
Too uncomfortable	9.3
Makes it difficult to breathe or talk	8.9

CONCLUSIONS

The main conclusions derived from the analyses of the data conducted to date are as follows:

- 13.5% of the children examined had injured one or more of their upper or lower incisors with 4.2% having severe injuries; that is injuries other than simple enamel fractures.
- Most injuries occurred at home or at school, locations where preventive strategies could be implemented.
- Most injuries were the result of falls or ‘fooling around’. More needs to be known about these causes in order to determine if strategies to reduce the number of injuries that occur as a consequence of these events are feasible.
- Children with severe injuries were more likely to report experiencing various psychosocial impacts as a result of the condition of the teeth and mouth than children with no injury.
- Although most children played sports, few wore a mouth guard to protect their teeth. Use of mouth guards was more frequent when playing sports outside school than at school.
- The most common reason the children gave for not wearing a mouth guard was that no-one had told them to wear one.