Prevalence and Causes of Oral Injuries in a Population of Canadian Adults Aged 18 to 50 Years – A Brief Communication

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Abstract

Objective: *To determine the prevalence and causes of injuries to the mouth and teeth among adults aged 18 to 50 years in Ontario, Canada.* ***Methods:*** *2001 individuals in the target age range participated in a telephone interview survey based on random digit dialling.* ***Results:*** *Overall, 15.5% of subjects reported a history of injury with 5.4% having multiple episodes of injury. One third of the injuries occurred in adulthood. The majority (85.0%) with a history of trauma reported damage to the teeth and of these, 26.0% broke one or more teeth, 25.4% reported one or more teeth being knocked out and 6.5% reported displacement of teeth. The most common cause of injury was playing sports, followed by collisions and falls. Violence accounted for 10.0% of the injuries reported. The causes of injury varied according to gender, education and the age at which the injury occurred.* ***Conclusion:*** *Oral and dental injuries occur throughout the lifespan, although the causes appear to vary according to the age at which they happen.*

Key Words: Oral injuries; adults; prevalence; causes

Introduction

It is generally accepted that injuries to the teeth at the front of the mouth fit the criteria for a public health problem (1). That is, they are prevalent, entail significant psychosocial and economic costs and are, for the most part, preventable. For example, in children aged 12 to 14 years rates of 11% (2) to 59% (3) have been reported. A Canadian study of Grade 8 students found a prevalence of 18.5% (4), with 6.0% having injuries that have been deemed to be severe, that is, involving dentine, pulp death or the displacement or loss of teeth (5). Repeated cross-sectional surveys in the same communities have suggested an increase in the prevalence of dental trauma in adolescent populations (6).

The prevention of dental trauma requires information on the specific causes of injuries to the teeth, the locations in which they occur and the social and personal factors that place individuals at risk. Numerous studies have indicated that the majority of dental injuries in children and adolescents occur at school or in the home, with the principal causes being sports, violence, falls, and collisions (7). However, the proportion of injuries attributed to specific causes varies across studies (5,8,9). Risk factors for dental injuries include incisal protrusion, social deprivation, overcrowding (1) and suggest further opportunities for prevention.

No data are available on the prevalence and causes of oral injuries in Canadian adults. The Canadian Community Health Survey (CCHS) of 2003, a national self-report survey of a random sample of Canadians aged 12 years and above (10), included a substantial section on injuries and their causes but no questions were asked about injuries to the teeth and mouth.

Consequently, the aim of the study reported here was to: 1) obtain estimates of the prevalence of oral injuries in adults aged 18 to 50 years living in the province of Ontario, Canada, and 2) to identify the main causes of such injuries. Consistent with the CCHS 2003, a self-report approach rather than a clinical examination survey was used to collect data.

Methods

Since there is no accessible listing of the adult population living in Ontario, data were collected using a telephone interview survey based on random digit dialling. A sample of telephone numbers was drawn from each of three strata; the Census Metropolitan Areas of Toronto and Ottawa, and the rest of Ontario. The telephone numbers were used to identify households. In households with more than one individual in the target age range, one was randomly selected to be the respondent to the survey. The aim was to obtain 800 completed interviews in Toronto CMA and 600 in the two other strata, for a total sample size of 2000.

All sampling and data collection procedures were undertaken by a professional survey research organization (SOM, Montreal). Interviews were conducted between January and July 2005. The questionnaire contained two initial questions concerning a history of injury to the mouth and/or teeth and the number of such injuries experienced. Subsequent questions concerned the nature of the worst injury that had been experienced and where and how it occurred. If only one injury was reported it was by definition the worst.

Prior to analysis, data from the Canadian census of 2001 were used to calculate weights. These adjusted for

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disproportionate sampling within strata and for differences in the gender and age distributions of respondents and the target population. Data were analyzed using the survey estimation procedures available in STATA 7. These allowed standard errors to be adjusted to take account of the stratified sample design. Chi-square tests were used to assess the significance of differences in proportions and t-tests to assess the significance of differences in means.

TABLE 1
Prevalence of oral and dental injury

	Prevalence %	Mean episodes of injury
Gender:		
Males	20.0*	2.3**
Females	11.0	1.5
Age at time of interview:		
18-24	18.5	2.3
25-29	16.0	1.8
30-34	12.0	1.7
35-39	15.0	1.5
40-44	15.1	2.4
45-50	15.7	2.1

* $p<0.01$; Chi-square test.
** $p<0.05$; t-test.

Results

In all, 15,026 telephone numbers were randomly generated and called. Of these, 6127 identified commercial organizations, were non-existent or not working; 2159 were ineligible and 3524 were numbers whose eligibility status could not be determined. Of the 3216 numbers that identified households with one or more persons aged 18 to 50 years, interviews were completed with 2001 or 62% of the randomly selected respondents. Following weighting, the gender, age and educational characteristics of subjects matched that of the provincial population quite closely. For example, the proportions of females in the unweighted and weighted samples were 56.1% and 50.6%. The proportion in the target population was 50.7%.

One or more episodes of oral trauma was reported by 15.5% and two or more episodes by 5.4%. Trauma resulting in damage to the teeth was reported by 13.1% and 8.1% experienced severe damage; that is tooth fracture, avulsions, luxations or loss. Loss of one or more teeth as a result of trauma was reported by 3.1%.

Males were more likely to report injury than females and reported more episodes of injury, but there was no association with age (Table 1). The age at which the worst injury occurred was as follows: 1 to 12 years – 41.3%; 13 to 17 years – 23.9%; 18 to 30 years – 23.5%; 31 to 50 years – 11.3%.

The main locations in which the injuries occurred were: home (25.0%), public spaces such as the street or park (18.3%); sporting facilities (18.0%) and schools (15.0%). One tenth (7.1%) occurred in work locations or farms. The most common cause of injury was playing sports, accounting for almost a third of all injuries, followed by collisions and falls. Violence accounted for 10% of the injuries reported (Table 2). However, there were variations in the causes of injury according to gender ($p<0.01$), educational attainment ($p<0.05$) and the age at which the injury occurred ($p<0.001$) (Table 2). For example, violence was the cause of almost a quarter of the injuries experienced by those with less than high school education and accounted for one fifth of the injuries occurring at ages 13 to 17 years. Sports was the main cause of injury at ages 18 to 30 years, while car accidents and chewing/biting hard foods were the cause of half of the injuries of those injured after the age of 30 years.

Just over half of the respondents (56.0%) reported currently playing the types of sports commonly associated

TABLE 2
Causes of dental injury by gender, education and age injury occurred

	All (n=303)	Gender*		Education**			Age injury occurred ***			
		Males (n=193)	Females (n=110)	Less than high school (n=43)	High school (n=71)	Post Secondary (n=185)	1-12 (n=122)	13-17 (n=66)	18-30 (n=68)	31-50 (n=34)
Sports	27.4	32.1	19.1	16.3	31.0	28.1	23.8	19.7	50.0	5.9
Falls	13.3	10.4	18.2	18.6	12.7	12.4	23.0	6.1	8.8	5.9
Car accident	5.9	3.1	10.0	9.3	6.9	4.9	2.5	4.5	4.4	20.6
Bicycle accident	6.3	6.8	5.5	9.3	6.9	5.4	9.8	3.0	4.4	2.9
Collision with person or object	18.9	20.3	16.4	7.0	22.5	20.5	18.0	28.8	16.2	11.8
Violence/assault	9.9	9.9	10.0	23.3	9.9	7.0	4.9	18.2	10.3	8.8
Biting/chewing food	5.4	3.1	10.0	2.3	2.8	7.0	2.5	4.5	0	26.5
Other	12.9	14.1	10.9	14.0	8.5	14.6	15.6	15.2	5.9	17.6

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

with injuries to the teeth and mouth. These individuals had twice the risk of injury to the teeth than those who did not play these sports (16.9% vs 8.2%; p<0.001: OR=2.3). They were also more likely to report multiple injuries (7.9% vs 2.6%; p<0.001: OR=3.2). However, in spite of this increased risk, 79.6% never wore any type of mouth guard (data not shown in tables).

Discussion

The data suggest that 15.5% of Ontario adults aged 18 to 50 years have experienced an oral or dental injury, with 13.1% damaging teeth and 8.1% having relatively more severe forms of damage. Approximately two thirds of these injuries occurred in childhood or adolescence and one-third in adulthood. These prevalence rates are lower than those reported by Kaste *et al.* (11) for US adults aged 21 to 50 years, probably because the US estimates were based on clinical examinations rather than self-reports. The data also suggest that sports, falls and collisions are the main causes of dental injuries but that there were differences in causes by socio-demographic characteristics. As in the US (12), a substantial proportion of those engaging in sports often leading to oral injuries, few used mouthguards on a consistent basis.

However, these data should be treated with some caution since telephone interview surveys of this type have a number of disadvantages. First, since the number of eligible units (households containing persons aged 18 and over) identified by the randomly selected telephone numbers is not known, response rates are difficult to calculate, the characteristics of non-responders are not known and the magnitude of non-response bias cannot be estimated. Second, the data are retrospective and may be subject to recall bias. Third, estimates are based on self-reports and no clinical examination was undertaken that could verify respondents' reports of injury.

Finally, time and cost constraints meant that a comprehensive history of injury was not obtained. Rather, in common with other population health surveys that address injury (10), details such as age at time of injury, type and causes of injury were collected for the worst injury that had been experienced. Since one-third of those with injuries reported multiple episodes of injury this may have had an effect on some of the estimates reported here. Consequently, further studies are necessary that are not subject to these methodological limitations in order to confirm that dental injuries happen throughout the life span and that the causes of these injuries vary according to the age at which they occur. Additional research would help identify appropriate prevention and health promotion strategies to reduce oral injuries and their impacts across the lifespan.

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