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Young people's perceptions of photographs of dental trauma

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Abstract – *Background/Aim*: Few studies have investigated how patients feel about traumatic injuries to teeth. Dentists may focus on treating an injury and neglect to address how the patient views the severity, or aesthetics. Addressing these issues may improve trauma management and communication between dentists and patients. The aim of the study was to compare children's, adolescents' and young adults' perceptions of common dental injuries to the maxillary central incisor teeth. *Materials and methods*: A cross-sectional study was conducted with 138 participants selected by convenience sampling and divided into 6- to 10-year, 11- to 17-year and 18- to 24-year age groups. Participants were shown six coloured photographs of traumatic injuries to central incisors and asked four questions. Data were analysed using SPSS. Group differences were evaluated using Mann–Whitney *U* and Kruskal–Wallis *H* tests. *Results and Conclusions*: There were statistically significant differences between the 6- to 10-year and 18- to 24-year age groups as to which traumatic injury would hurt the most ($P < 0.05$). Responses from younger participants appeared to be affected by the presence of blood in photographs, while young adults were more 'tooth-focused.' Younger children selected extrusion as the most painful injury, and the oldest group selected the complicated crown fracture. For the youngest age group, a missing anterior tooth was least concerning aesthetically, while young adults were most likely to choose discolouration ($P < 0.05$). Most in each age group thought crown fractures (particularly complicated ones) would be the most difficult for a dentist to treat. *Conclusions*: Statistically significant differences ($P < 0.05$) were found among the youngest and oldest age groups in their perceptions of which type of injury would hurt most and which injury was the least attractive. This study suggests that children and young adults may perceive the significance of their dental injuries quite differently than dental professionals.

Traumatic injuries to the maxillary central incisor teeth are common, with reported prevalences of up to 30% for the primary dentition and up to 22% in and the young adolescent populations (1, 2). While clinicians are concentrating on treating injuries, they may not always appreciate just how patients, (particularly younger ones) perceive the significance of their injuries. This may have an impact on how patients follow instructions and attend for follow-up care. Greater awareness of the patient's perspective may therefore help to improve communication and treatment outcomes.

Children, adolescents and young adults require different approaches to management because of their age and understanding of dentistry. A recent report (3) identified important consequences of dental trauma: an untreated aesthetic problem may have psychological and social effects, and, as the dental visit for a traumatic injury may be the first dental experience, future cooperation may be compromised if that experience is perceived as unpleasant. This is no different to the introduction of any dental procedures, particularly for children.

It has been postulated that, as there is a tendency for repeated trauma in as many as 50% of patients (4) and considerable time and expense may be involved in long-term management (5), some understanding of the technical complexity of treatment is necessary for both patients and carers. The aim of this study was to determine whether there are differences in perception of dental injuries among children, adolescents and young adults in terms of the associated discomfort, treatment complexity and aesthetics.

Materials and methods

This cross-sectional study, carried out in the South Island of New Zealand, used convenience sampling. Ethical approval was gained from the University of Otago's Research and Ethics Committee. Participants were recruited from local schools and university student residences in Dunedin and Christchurch, and the Orthodontic and Paediatric Dentistry clinic waiting rooms within the School of Dentistry, Dunedin. The sites were

selected to recruit participants to represent a broader population group that would have been obtained from clinic waiting rooms. The university students included those in late adolescence and early adulthood, and this allowed exploration of the differences in perceptions of dental trauma occurring through this age span. Data collection took place between July and September 2009. Participants were approached and told about the study. Those who were interested and aged between 6 and 24 years were invited to participate and provided with an age-appropriate information sheet. All those invited to participate actually did so. Children completed the questionnaire either in School of Dentistry waiting rooms or in their schools. Young adult university students completed it at their residence hall. After written consent was obtained, including from parents for children under the age of 16 years, participants were interviewed using a structured questionnaire. Prior to commencing data collection, the three interviewers underwent calibration by interviewing several young students under observation to confirm they were interviewing consistently.

Demographic data collected included age and gender. A set of six individually numbered coloured clinical photographs of common traumatic injuries or outcomes of injuries to the maxillary central incisors (Fig. 1) was shown to participants, with the only explanation that these were some teeth injuries that young people had suffered. After they had viewed the photographs, the participants were asked whether they had experienced any of the injuries. Those answering affirmatively were asked to identify the photograph/s depicting the type/s of trauma they had experienced. If participants thought they had suffered a different type of injury, they were asked to describe their injury and what their teeth looked like. All were asked to identify which of the injuries they thought would hurt the most and which would be the most difficult for a dentist to restore.

Participants were also asked to rank the injuries from best to worst in relation to their perception of the effects on appearance. Those aged 10 years and under were given a visual smiley faces scale of six faces (6) to rate the injuries, while those over 10 years of age used a numeric scale with a ranking of 1 ('looking the best') to 6 ('being the worst'). The rankings for the numbers and the faces pain scale were in the same direction. Efforts were made to keep interviews consistent. For younger participants, parents were invited to observe the interview, but they were asked to allow the children to make their own responses without help. Responses were recorded on standard data collection forms by the interviewers using numeric codes. Data were entered into Microsoft Excel and analysed using SPSS (version 14.0 SPSS Inc, Chicago, IL, USA). Mean ratings were computed for each photograph. Differences among groups were tested for statistical significance using Mann–Whitney U and Kruskal–Wallis H tests (where appropriate). The level of significance was set at $P < 0.05$.

Results

There were 139 participants, of whom 71 (51.1%) were women. Participants' ages ranged from 6 to 24 years. The mean age was 14.4 (SD, 5.2) years. The median age was 14 years (distribution was bimodal, with modes of 10 and 20). Data on age group and gender are presented in Table 1. There were a higher proportion of women in the youngest age group, but the difference was not statistically significant. The forms were completely answered by all the participants.

Data on participants' self-reported experience of dental trauma are presented in Table 2 by age group and gender. Participants reported the most frequently

Table 1. Demographic characteristics of the sample

	Gender		
	Female *n* (%)	Male *n* (%)	All combined *n* (%)
Age group			
6–10 years	31 (62.0)	19 (38.0)	50 (36.0)
11–17 years	17 (43.6)	22 (56.4)	39 (28.1)
18–24 years	23 (46.0)	27 (54.0)	50 (36.0)
All combined	71 (51.1)	68 (48.9)	138 (100.0)

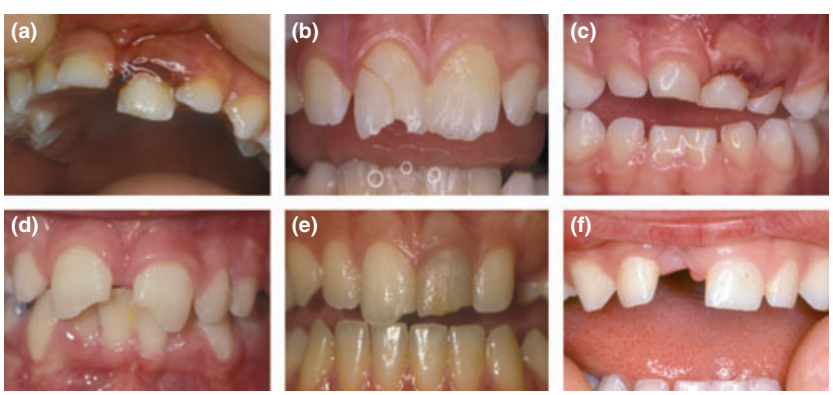

Fig. 1. Dental injuries: (a) extrusion; (b) complicated crown fracture; (c) lateral luxation; (d) uncomplicated crown fracture; (e) discoloration; (f) avulsion.

Table 2. Self-reported experience of dental trauma, by age group and gender

Type of trauma	Gender		Age group			
	Female *n* (%)	Male *n* (%)	6–10 years *n* (%)	11–17 years *n* (%)	18–24 years *n* (%)	All combined *n* (%)
Extrusion	2 (2.8)	2 (2.9)	2 (4.0)	0 (0.0)	2 (4.0)	4 (2.9)
Complicated crown fracture	1 (1.4)	2 (2.9)	0 (0.0)	2 (5.1)	1 (2.0)	3 (2.2)
Lateral luxation	2 (2.8)	2 (2.9)	4 (8.0)	0 (0.0)	0 (0.0)	4 (2.9)
Uncomplicated crown fracture	4 (5.6)	16 (23.5)*	6 (12.0)	4 (10.3)	10 (20.0)	20 (14.4)
Discolouration	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.0)	1 (0.7)
Avulsion	5 (7.0)	7 (10.3)	3 (6.0)	2 (5.1)	7 (14.0)	12 (8.6)
Experience of any trauma[1]	14 (19.7)	25 (36.8)*	13 (26.0)	6 (15.4)	20 (40.0)*	39 (28.1)

*$P < 0.05$; Chi-square test.
[1]Defined as one or more of the types of trauma listed above.

experienced trauma type and outcome were uncomplicated crown fracture (for which the rate was four times greater for men than for women) followed by avulsion. The least frequently reported trauma outcome was discolouration. More than one-quarter of the sample reported ever experiencing any dental trauma, and this was higher among men than women, and lowest among the 11- to 17-year age group.

Data on participants' perceptions of the various dental injury types are presented in Table 3. Sixty-nine (50.7%) of the participants thought tooth extrusion would hurt the most, with 48 (35.5%) recording the complicated crown fracture as hurting the most. There was a significant difference by age group, whereby 66% of the youngest age group selected tooth extrusion, while 56% of the oldest age group selected the complicated crown fracture. The complicated crown fracture was deemed to be the most difficult type of trauma for a dentist to treat by 33.8% of the participants, followed by uncomplicated crown fracture (23.0%) and then avulsion (15.1%). There were no significant differences by gender or age group. There were also no associations between participants' responses and their own experience of previous dental trauma demonstrated in the results.

Participants ranked extrusion as having the greatest aesthetic impact (Table 4); the condition thought to have the least impact was avulsion. While there were no significant differences by gender, there were differences by age group for three of the injury types – complicated crown fracture, lateral luxation, discolouration where there was a consistent gradient across the age groups, whereby the highest ranking (representing the greatest perceived impact) was in the youngest age group, with the lowest ranking being that for the oldest age group. Gradients in the opposite direction across the age groups were noted for the uncomplicated crown fracture and for tooth avulsion.

Discussion

This study investigated young people's perceptions of a number of common dental injuries or the outcomes of injuries that differ in their associated discomfort, treatment complexity and aesthetics. It was found that there were age differences, not only in perceptions of both the pain thought to be associated with the various injuries, but also in their aesthetic impact. While previous studies have investigated the quality of life of children related to

Table 3. Dental injury perceived by participants as (a) hurting the most, and (b) being most difficult for a dentist to treat, by age group and gender

	Gender		Age group			
	Female *n* (%)	Male *n* (%)	6–10 years *n* (%)	11–17 years *n* (%)	18–24 years *n* (%)	All combined *n* (%)
Which type of trauma would hurt the most?[1]						
Extrusion	35 (49.3)	34 (50.0)	33 (66.0)	21 (53.8)	15 (30.0)*	69 (49.6)
Complicated crown fracture	22 (31.0)	27 (39.7)	9 (18.0)	12 (30.8)	28 (56.0)	49 (35.3)
Lateral luxation	3 (4.2)	1 (1.5)	3 (6.0)	0 (0.0)	1 (2.0)	4 (2.9)
Uncomplicated crown fracture	2 (2.8)	0 (0.0)	2 (4.0)	0 (0.0)	0 (0.0)	2 (1.4)
Avulsion	9 (12.7)	6 (8.8)	3 (6.0)	6 (15.4)	6 (12.0)	15 (10.8)
Which type of trauma would be most difficult for a dentist to treat?						
Extrusion	10 (14.1)	9 (13.2)	8 (16.0)	4 (10.3)	7 (14.0)	19 (13.7)
Complicated crown fracture	23 (32.4)	24 (35.3)	19 (38.0)	13 (33.3)	15 (30.0)	47 (33.8)
Lateral luxation	3 (4.2)	0 (0.0)	2 (4.0)	0 (0.0)	1 (2.0)	3 (2.2)
Uncomplicated crown fracture	18 (25.4)	14 (20.6)	10 (20.0)	11 (28.2)	11 (22.0)	32 (23.0)
Discolouration	8 (11.3)	9 (13.2)	4 (8.0)	6 (15.4)	7 (14.0)	17 (12.2)
Avulsion	9 (12.7)	12 (17.6)	3 (6.0)	6 (15.4)	6 (12.0)	21 (15.1)

*$P < 0.05$; Chi-square test.
[1]Discolouration not chosen by any respondent (and not included as a category in the cross-tabulation).

Table 4. Mean ranks for appearance for the different trauma types, by gender and age group (brackets contain standard deviations)

	Gender		Age group			
	Female	Male	6–10 years	11–17 years	18–24 years	All combined
Type of trauma[1]						
Extrusion	5.2 (1.1)	5.4 (0.9)	5.3 (1.0)	5.5 (0.9)	5.1 (1.0)	5.3 (1.0)
Complicated crown fracture	3.6 (1.4)	3.6 (1.5)	4.0 (1.3)	3.6 (1.5)	3.3 (1.5)*	3.6 (1.5)
Lateral luxation	2.8 (1.4)	3.0 (1.3)	3.2 (1.3)	2.9 (1.3)	2.7 (1.3)	2.9 (1.3)
Uncomplicated crown fracture	3.9 (1.5)	3.8 (1.5)	3.4 (1.5)	4.0 (1.5)	4.2 (1.5)*	3.9 (1.5)
Discolouration	3.0 (1.6)	2.8 (1.7)	3.4 (1.6)	2.7 (1.5)	2.5 (1.8)*	2.9 (1.7)
Avulsion	2.5 (1.7)	2.4 (1.6)	1.7 (1.3)	2.4 (1.6)	3.2 (1.6)*	2.5 (1.6)

*$P < 0.05$; Kruskal–Wallis H test.
[1]The higher the score, (maximum six) the greater the perceived aesthetic impact.

dental injuries (3, 7, 8), there do not appear to be any previous studies that have asked children or young people to record their perceptions of the impact of different injuries or injury outcomes.

A potential influence on the results was the photographs used. These varied in terms of dental age, the degree of soft-tissue involvement, and in the presence of blood. It is possible that the presence of blood may have influenced the younger participants' scoring of the extrusion, with surrounding blood as the injury likely to hurt most. This should be noted in future studies when selecting photographs. Older participants were thought to more likely to focus on the injury to the tooth itself, with complicated crown fracture being selected more frequently in terms of discomfort. There was no difference among the ages in regard to which injury they thought would be the hardest for the dentist to treat.

It was noteworthy that, when photographs were ranked from best to worst in terms of appearance, the image of avulsion was more acceptable to the 6- to 10-year-old age group than for older participants. For a university student, a missing front tooth may be socially unacceptable, but, for a 7-year-old in the playground, it is more likely to fit with peers in the mixed dentition phase. By contrast, the image of a discoloured tooth was least acceptable to the younger children, which suggests that they may be more aware of the effect of this on appearance than might have previously been imagined. Uncomplicated crown fracture was less of a problem to the 6- to 10-year-old group, who may be used to the appearance of partly erupted teeth in their contemporaries and therefore did not realize the tooth was actually fractured. The findings of this study clearly indicate that future studies should carefully select photographs that standardized in terms of age, dentition development stage and tooth alignment. It is also important to avoid using photographs that have other aesthetic problems such as diastemata or crowding to defect from the trauma being examined.

This study has some limitations in terms of the sample's size and likely lack of representativeness. Many of the younger respondents were sourced from the Orthodontic and Paediatric Dentistry waiting rooms at the School of Dentistry, and this may account for the high prevalence of dental trauma found in the group. However, it was not possible to demonstrate any association between participants' responses and their own experience of previous dental trauma, and so this is unlikely to have influenced the study's outcome. The numbers did not allow any analyses of the effect of where the study was carried out (Dental School Clinic waiting room or school). Therefore, the findings, while interesting, should be considered to be exploratory at this stage. Nevertheless, important differences were identified in how young people of different ages perceive the seriousness and effects on appearance of various types of dental trauma. There is scope for further study to determine how dental professionals might address patients' concerns more appropriately as a result of improved understanding of the psychosocial impact of dental trauma from young people and also their parents' perspectives. This study has suggested that patients may not comprehend the actual significance of dental injuries and the complexity of treatment in the same way as dental professionals, and this may explain the wide variation in cooperation with long-term management of dental injuries.

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