

Dental injuries and Trauma in Mixed Dentition of Pakistani School Children: A Cross Sectional Study

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ABSTRACT

Objective: This study analyzed the largest cause for the mortality of teeth in Pakistan's school going children.

Study Design: Descriptive / prospective / cross-sectional study.

Place and Duration of Study: This study was conducted at the private school of Karachi from March 2017 to April 2017.

Materials and Methods: Children aged between 7 to 12 years were selected on the basis of non randomized sampling. Questions were asked about accidental injuries like fall, collision, bicycle injuries, sports injuries, fights, injured teeth, fracture and non accidental injury. A descriptive analysis was done; a mean \pm standard deviation (SD) was taken out for continuous variables (age) and categorical variables (distribution of traumatic injuries according to cause, distribution of age related injuries in dentition, distribution of injuries related to number of injured teeth and distribution of traumatic injuries according to type)

Results: Results have shown that the children aged between 8 to 9 years old are most effective (58%). Bicycle falling (64%) appeared as the most common reason of dental trauma. End of the study we found that most of the participants have one tooth involve (64%) while those participants have class II trauma; extensive crown fracture involving most of dentine but not the dental pulp ($\chi^2 = 42.43$, $df = 16$, $p < 0.001$).

Conclusion: On conclusion of this study, bicycle injury appeared as the most common cause of dental trauma in school going children which involves dentine but not the pulp.

Key Words: dental injury, Mix dentition, school children

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INTRODUCTION

Traumatic dental injury (TDI) is a developing and challenging public health problem to oral health professionals, and it has been seriously neglected.^{1,2} The most exposed parts of the body (face and teeth), are more prone to fracture. Traumatized permanent anterior teeth are a common finding.³ the increasing frequency of traumatic injuries have made them the third largest cause of teeth mortality. Since the modes of teaching became more civilized the children are more prone to getting injured, due to involvement of trauma.⁴⁻⁷ School going children participate actively in outdoor play and particularly in organized bodily contact play. Careless activities increase the possibility of injuries.

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Though these activities are markers of growth and development of the child, loss of balance and impaired movements are the result of traumatic injuries. In recent years reports appearing in dental literature have suggested an increase in the occurrence of traumatic injuries to the incisors teeth³. Dental caries and periodontal disease have been replaced by dental trauma as the most common threat to dental health in youngsters.^{8,9} Dental trauma is significant in children and adolescence because the formation of many young, permanent teeth takes place in those ages. These young patients who are exposed to trauma are not only physically but also psychologically affected.¹⁰ Traumatic injuries like falls, auto accidents, and sporting activities are the most common etiological factors of dental trauma.¹¹ According to the standard Ellis classification, the types of tooth fracture are as follows:¹²

Class I: Simple fracture of the crown, involving little or no dentin.

Class II: Extensive fracture of the crown, involving considerable dentin but not the dental pulp.

Class III: Extensive fracture of the crown, involving considerable dentin and exposing the dental pulp.

Class IV: The traumatized tooth that becomes non vital, with or without loss of crown structure.

Class V: Total tooth loss.

Class VI: Fracture of the root, with or without loss of crown structure.

Class VII: Displacement (Intrusion) of the tooth without fracture of crown or root.

Class VIII: Displacement (Extrusion) of the tooth without fracture of crown or root.

Class IX: Fracture of the crown en masse and its replacement.

MATERIALS AND METHODS

A cross sectional study was done at a private school of Karachi, Pakistan from March 2017 till April 2017. This study was performed under supervision of senior teaching faculty members of school located in Gulistan e Johar (Metropolitan Academy, Karachi). School children were selected on the basis of non-probability convenient sampling. Questions were asked about accidental injuries like fall, collision, bicycle injuries, sports injuries, fights, injured teeth, fracture and non accidental injury

Inclusion/Exclusion Criteria: School children aged between 7 to 12 years were included. Uncooperative children and those with any sort of mental abnormality were excluded.

Sample Size: It was done using the W.H.O. software for "Sample Size Calculation" edited by L. Lemeshow and S. K. Lwanga. This sample size calculation is done by the following reference study: Celenk S, Sezgin B, Ayna B, Atakul F. "Causes of dental fractures in the early permanent dentition: a retrospective study." J. Endod. 2002 Mar;28(3):208-10. The authenticity of our result is confirmed by sample size calculation using W.H.O. software for sample size calculation, where $\alpha = 0.05$, $1 - \beta = 90$, $P_o = 0.50$, $P_a = 0.40$, n (sample size) = 300.

Data Management and Analysis: The data was entered and analyzed on Statistical Package for Social Sciences (SPSS) Version 19. A descriptive analysis was done; a mean \pm standard deviation (SD) was taken out for continuous variables (age) and categorical variables (distribution of traumatic injuries according to cause, distribution of age related injuries in dentition, distribution of injuries related to number of injured teeth and distribution of traumatic injuries according to type)

Ethical Considerations: The study protocol was approved by the Department of Research and Ethics of the Liaquat College of Medicine & Dentistry Karachi and written informed consent was provided by each participant.

RESULTS

We examined total 418 students in this study and 300 (71.77%) students fulfilled the requirements of the study. So the study group included 300 School going Students. We examined each student and filled the Traumatic Dental Injury Questionnaire of all students.

According to the study mostly students had a history of fall from bicycle and they were aged between 8 to 9 years old.

Distribution of traumatic injury according to etiological factors: We examine the different causes of dental trauma. According to Traumatic Dental Injury Questionnaire most participants have history of fall from bicycle (64.00%), while the occurrence of non accidental trauma is less in number (0.7). Sports injury (26.00 %) is the second most common cause of dental trauma. (SD= 0.78, SE= 0.04, mean= 1.49, Median= 1.00)(Table 1)

Distribution of traumatic injuries according to ages in mixed dentition: According to Traumatic Dental Injury Questionnaire, 8 to 9 years old children are at a high risk of dental trauma (58.00 %) while 10 to 11 years old children are at second highest risk of dental trauma (30.00%). (SD= 0.67, SE= 0.03, mean= 2.32, Median= 2.00) (Table 2)

Distribution of traumatic injuries according to number of injured teeth: According to my study most of the children have one tooth dental trauma (64.00%) on the other hand 24% children have two teeth involve. We found that 12% participants have more than two teeth involve. (SD= 0.70, SE= 0.04, mean= 1.48, Median= 1.00) (Table 3)

Table No.1: Distribution of traumatic injury according to etiological factors

Falls					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bicycle	192	64.0	64.0	64.0
	sports	78	26.0	26.0	90.0
	fights	24	8.0	8.0	98.0
	non accidental	2	.7	.7	98.7
	unknown	4	1.3	1.3	100.0
Total		300	100.0	100.0	
(SD= 0.78, SE= 0.04, mean= 1.49, Median= 1.00)					

Table No.2: Distribution of traumatic injuries according to ages in mixed dentition

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6-7	22	7.3	7.3	7.3
	8-9	174	58.0	58.0	65.3
	10-11	90	30.0	30.0	95.3
	12	14	4.7	4.7	100.0
	Total	300	100.0	100.0	

(SD= 0.67, SE= 0.03, mean= 2.32, Median= 2.00)

Distribution of traumatic injuries according to type: According to Traumatic Dental Injury Questionnaire, the highest numbers of children have Class II trauma which is extensive fracture of the crown, involving most of dentin but not the dental pulp. Similarly second highest class is class 8 which is Fracture of the crown

en masse and its replacement ($x^2 = 42.42$, $df = 16$, $p < 0.001$) (Table 4).

Table No.3: Distribution of traumatic injuries according to number of injured teeth

number					
		Freq- uency	Percent	Valid Percent	Cumulative Percent
Valid	1	192	64.0	64.0	64.0
	2	72	24.0	24.0	88.0
	more than 2	36	12.0	12.0	100.0
	Total	300	100.0	100.0	

(SD= 0.70, SE= 0.04, mean= 1.48, Median= 1.00)

Table No.4: Distribution of traumatic injuries according to type - class * number Cross-tabulation

Count					
		number			Total
		1	2	more than 2	
class	class 1	7	3	0	10
	class 2	30	12	1	43
	class 3	17	5	3	25
	class 4	26	9	4	39
	Class 5	13	13	11	37
	class 6	20	14	5	39
	class 7	18	9	6	33
	class 8	34	2	6	42
	class 9	27	5	0	32
Total		192	72	36	300

DISCUSSION

This study was conducted by Department of Community Dentistry and Periodontology at Liaquat College of Medicine & Dentistry and Darul Sehat Hospital Karachi. Being a teaching hospital the treatment provided is quite affordable hence it covers a broad spectrum of population from each social class. The results of this study reveal that traumatic dental injuries can be considered a public health problem.

8–9 years is the most commonly affected age group which is in agreement with other studies¹³⁻¹⁵. Life style and general tendency of taking more risks makes the adolescence more vulnerable to dental trauma.

The most frequent cause of trauma in all age groups was fall and this was generally supported by other studies as well²⁻¹⁶⁻¹⁷. Collision in 192 children (64%) which occurred when children were bicycling, playing at home, at school or outside the street during leisure activities appeared to be the second cause. Accidents occurred due to sports injuries accounted for 26% of traumatic injuries in 79 children. In 24 patients (8%) tooth trauma was due to violence. It was found that these cases were related to violence in street and home for example pushing against another child, assaults and physical abuse. Injuries to the teeth resulting from non accidental or unknown activities appeared to be underestimated in our study in 6 children as compared

to other studies¹⁷⁻¹⁸. This finding is explained by the fact that non accidental activities are not commonly available for the poor population in Pakistan.

In this survey most of the trauma cases involved only one tooth (64%), and second most common cases involved two teeth (24%). The last common cases involved more than two teeth (12%). This finding supports the earlier findings of researchers^{19,20}.

The most frequent injuries were (Class II) crown fracture involving enamel and dentin without involving pulp 43 children out of 300 children which are in agreement with few of the previous studies. The second most common injury is complicated Fracture of the crown en masse and its replacement in 42 children^{21,22}.

In order to avoid future injuries identifying the etiologic factors and establishing their preventive measures is important. Parks and play grounds are examples of such locations particularly conducive to dental injuries in Pakistan. Health promotion policies should create an appropriate and safe environment as well as increasing awareness of health hazards at home, school and street and to minimize unsafe activities. An educational programme that underlines the importance of prevention of dental trauma and the benefits of immediate treatment and conservation of avulsed and fractured teeth would minimize the overall rate of traumatic dental injuries and their sequels. Therefore dental emergencies should be dealt with high expertise and providing rapid standard care for such injuries should be the target of dental emergency care providers. Detailed standard documentation of entire dental trauma episodes as well as prospective studies on a national level should be carried out to obtain baseline information of this common but neglected emergency. This is expected to help policy makers in developing preventive and curative strategy.

CONCLUSION

On conclusion of this study, bicycle injury appeared as the most common cause of dental trauma in school going children which involves dentine but not the pulp.

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Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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