

Prevalence Of Traumatic Dental Injuries Among Residential School Children And Day Scholars Of 9-14 Years In South Bangalore.

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Abstract

Aim:- To assess and compare the prevalence of traumatic dental injuries among day scholars and residential school children and their association with predisposing factors, such as lip competence, molar relationship, overjet and variables such as age, gender and cause of trauma.

Methodology:- Cross sectional study was carried out among 250 residential and 250 day school children aged 9-14 years of South Bangalore. All the children were examined for traumatic dental injuries, its related cause, incisal overjet, molar relation and lip competence using mouth mirror and probe under day light.

Results:- Statistical analysis was done using SPSS version 22.0. Prevalence of dental injuries was 18.2% , commonly seen among boys of residential school aged 13-14 years. The increased prevalence of traumatic injuries was found with Class I molar relation and increased overjet in children with potentially competent lips.

Conclusion:- Increased prevalence of dental trauma among school children stresses the need for awareness towards prevention and treatment.

Index terms:- Cross sectional study, Prevalence, School children, Traumatic dental injury

INTRODUCTION:-

Several millions of people are injured by trauma every year that has multitude of consequences for not only the traumatized individual but also the family members and society. Oral region comprises as small as 1% of the total body area but accounts for 5% of all bodily injuries¹. Oral injuries are more common among the children and the adolescent. Studies have shown that 71-92% of all the TDI's sustained in a lifetime occur before 19 years of age and begin to decrease after 24-30 years². Since there is decline in the

prevalence and severity of dental caries among children, attention has been drawn to other aspects of oral health such as traumatic dental injuries³. These injuries range from simple enamel fractures to severe damage involving the displacement or avulsion of teeth⁴.

Prevalence of traumatic dental injuries has markedly increased in the past few decades. Existing data on prevalence of traumatic dental injuries carried out in different countries have shown that the prevalence of incisor trauma ranges from 6%-34%⁵. This difference may be attributed to age of the study participants, gender, sample from which participants were drawn and criteria used⁶⁻⁷.

Oral health is an integral part of general health. Oral cavity has a multitude of function. Decreased food intake due to oral pain and poor dental status can cause low growth in children. The position and appearance of anterior teeth have a psychological and a social impact on children and hence any injury to the anterior teeth will affect the child's quality of life. It also causes difficulty in speaking clearly and feeling embarrassed to smile or to show the teeth⁸⁻¹¹. Studies have shown that traumatic dental injuries of permanent anterior teeth affects the personality and self esteem of the young patient and its management requires experience, judgement and skill⁸.

The causes for traumatic dental injuries are usually related to the age of the patient . In preschool children the most common cause for traumatic injuries are falls. In school age children injuries are most often caused by bullying at school, sports etc. In adolescents and young adults assaults and traffic accident are the most common cause¹. Predisposing factors include inadequate lip closure and increased incisal overjet of teeth¹²⁻¹³.

Several residential schools are there in Bangalore. In these schools there can be increased prevalence of traumatic dental injuries as there is no parental supervision, increased sports activities, collision, bullying, violence etc. Very few studies in the literature have assessed the prevalence of traumatic dental injuries among residential school children.

Hence the aim of the study is to assess and compare the prevalence of traumatic dental injuries among the day scholars and residential school children in South Bangalore and to correlate the prevalence of injury to the cause of trauma with age of the child, incisal overjet, molar relationship and lip competence of the child.

MATERIALS AND METHODS:-

A cross sectional comparative study was conducted among 500, 9-14 years school going children of both genders from South Bangalore. Ethical clearance was obtained from the Institute's ethical committee. List of Day scholars school and Residential schools was obtained from the Department of Public Instructions. Permission was obtained from school authorities and study schedule was prepared. On the scheduled day the school was visited to collect the data.

Healthy children of the age group 9-14 years were included in the study. Children with permanent anterior teeth lost due to caries or causes other than trauma, children with partial or complete anodontia involving permanent anterior teeth and children undergoing orthodontic treatment were excluded from the study. Informed consent was obtained from both the parents and participants included in the study.

The study was undertaken in 2 parts :- Clinical examination and structured interview.

Clinical examination:- Information regarding age, gender and school was noted down. Clinical examination was done using mouth mirror and probe under day light to examine the number of teeth injured, type of injury, lip competence, molar relation and the overjet. The injured teeth were classified using the Andreasen's epidemiological classification of TDI's including codes of the World Health Organization International classification of diseases to dentistry and stomatology (1997). The Community Periodontal Index Probe for Treatment Needs was used to record the overjet. The molar relationship was recorded using Angle's classification (Angle's class I, class II and class III). Lip competency was recorded as competent lips, potentially competent and incompetent lips when the patient was seated upright and in relaxed state. Lips were noted as competent when the lips were in slight contact when the musculature is relaxed. Subjects with morphologically shorter lips not being able to form a lip seal in relaxed state and who required active contraction of perioral and mentalis muscle to form a lip seal were categorized to have incompetent lips. Subjects with normal lips that failed to form a lip seal due to proclined upper incisors were categorized to have potentially competent lips.

Structured interview:- Structured interview was conducted where the children were verbally asked to state the cause of injury that was documented as fall, collision, road traffic accident, violence, cannot recollect and miscellaneous. Miscellaneous category included biting on hard objects like pen, pencil etc, opening of bobby pins, soda bottles. Other information like duration since the injury occurred (<1 year, 1-2 years, > 2 years and cannot recollect) and if any treatment was taken for the injury was also noted down.

STATISTICAL ANALYSIS:-

The data was collected and tabulated and was analyzed using SPSS software V.22, IBM., Corp

Descriptive analysis of all the explanatory and outcome parameters was done using mean and Standard Deviation for quantitative variables, frequency and proportions for categorical variables.

Chi Square test was used to compare the difference in the distribution of responses for estimating the prevalence of dental injury between the Residential & Day Scholar school children.

Independent Student t test was used to compare the mean dental trauma Index scores between Residential & Day Scholar school children.

The level of significance was fixed at $P < 0.05$.

RESULTS:-

A total of 500 children, 250 from day scholars school and 250 from residential school were included in the study.

Difference in the prevalence of dental trauma between the males and females was statistically significant with higher prevalence of trauma seen among males of residential school (26.7%).

Difference in prevalence of dental trauma between day scholars school and residential school was statistically significant with p value less than 0.05 with a higher prevalence of trauma seen among Residential school children (23.6%).

A statistically significant difference in prevalence was observed between the age group 11-12 years of day scholars school and residential school. but difference in prevalence observed in 9-10 years and 13-14 years was not statistically significant.

In this study the most highly affected tooth was 11 (10.6%) followed by 21(10.4%]. Least affected being 22 (3.2%) followed by 31 and 12 (0.8%). Code 2 injuries (enamel fractures) were common followed by Code 3 injuries (enamel and dentin fractures).

In the present study most of the subjects were not able to recollect the cause of injury.

Majority of the study participants had Angle's Class I molar relation followed by Class II and very few Class III.

Among these class I with bimaxillary protrusion has had highest prevalence of trauma followed by subjects with Class I (18.7%) and Class II (14.5%).

High prevalence of trauma was seen among subjects having potentially competent lips (42.9%) followed by subjects with incompetent lips (25%). The prevalence was low among subjects with competent lips (15.9%).

High prevalence of traumatic injuries was seen in subjects having overjet of 5.6-8.5mm in both day scholar school and residential school (42.9% and 31% respectively). Lower prevalence was observed among subjects having overjet of < 3.5 mm (7.6% in day scholar school and 20.9% in residential school).

DISCUSSION:-

Traumatic dental injuries are a challenging problem to the oral health professionals³. Unfortunately public is unaware of the risk and does not have enough information to avoid traumatic injuries to the teeth. Although prevention of TDI is the most desirable action, oral health promotion through well structured oral health education program can create positive change in awareness for special group such as school children.

In this cross sectional study the total prevalence was found to be 18.2%. This result is in accordance with the results obtained by Traebert et al (16.6%) and Cortes et al (16.1%) and in contrast to the results obtained by David et al (6%) and Rai and Munshi (5.29%) . This difference could be due to variation of age of the study subjects, gender, sample from which subjects were drawn, criteria used and geographical and behavioural differences between study locations.⁶⁻⁷

In this study TDI's were more common in children of residential school and more commonly found in boys. The reason for increased prevalence of TDI in residential school could be due to increased participation in sports, recreational and physical activity¹⁴⁻¹⁵. Apart from this there is also increased bullying and violence seen in residential school. The reason for boys being more prone to TDI's could be due to their participation and involvement in more aggressive sports and vigorous outdoor activities than girls. The relatively low prevalence of trauma in girls can be explained by the fact that girls are generally more mature in their behavior than boys¹⁵. This corroborates with the findings of studies conducted by Ravishankar et al, Ahlawat B et al, Patel et al, David et al and Cavalcanti et al. These results are in contrast to Garcia-Godoy, where gender distribution was not significantly different.³

In the present study the highest prevalence of trauma was among 13-14 years age group children. Children at this age are usually more active, have psychomotor underdevelopment and poor motor skills and hence cannot precisely evaluate velocity and danger.¹⁴ This result is in accordance to the study done by Hedge et al where the peak age to sustain TDI's was 13-14 and study done by Govindarajan et al and Prabhu et al where more injuries were found in 10-13 year old children.

In this study most commonly affected teeth were the maxillary central incisors. This could be due to the anatomical position of the maxillary incisors which are often associated with presence of overjet and inadequate lip closure.^{5,7,10} Also these teeth erupt early that put them at risk for a longer period of time¹⁴. This result is in agreement with the results obtained by Mona et al and Nik-Hussein et al. In this study fractures involving the enamel were more common followed by fractures involving enamel and dentin^{8,10,14,15} which is in accordance with the results obtained by Garcia-Godoy et al. TDI's usually affect single tooth but certain events may lead to multiple tooth injury as well.²

Conclusion could not be drawn for the cause of the injury in this study as majority of them (78%) failed to recall the cause of trauma. The most probable cause for this could be due to high prevalence of minor injuries, for which children and parents were not concerned by the traumatic event and forgot its circumstances in a short time¹⁶. Future study by interviewing the parents and teachers about the cause will throw light and provide some clue for the cause of TDI's among children. The 2nd most common cause of injury was fall. These results are in contrast with Govindrajana et al where the most common cause of TDI's was fall and the second most common cause was of unknown origin.

In the present study majority of subjects with TDI did not refer to dentist for professional assistance. Lack of adequate knowledge and proper motivation of both parent and dentist along with the limitations imposed due to socioeconomic constraints and high cost of treatment could explain the reason for untreated injuries⁶. This result is in accordance with the study conducted by Nik-Hussein and Gupta et al. Considering that TDI's can have a psychological and social impact on children, the required treatment should be promptly provided. Studies have shown that prompt treatment provided within 24 hours of injury reduced the chances of pulpal death and further complications¹⁷.

In the present study majority of the subjects had Class I molar relation and subjects with Class I bimaxillary protrusion had high prevalence of TDI followed by class I malocclusion which is in accordance with the results obtained by Govindarajana et al. This is in contrast to the study conducted by Dua et al where high prevalence of TDI was found in patients with Class II div I malocclusion.

High prevalence of TDI was found in patients with potentially competent lips. Lips provide protection to anterior teeth by avoiding excessive exposure of these teeth and thus a lack of lip coverage infers greater risk of TDI^{5,9,16,18}. These results are in agreement with the study conducted by Prabhu et al, Govindarajana et al and Mona H et al.

Significant association was found between the occurrence of anterior tooth injury and increasing overjet. The most probable cause for this could be that the increased overjet would result in more forwardly placed anterior teeth and this more prominent position in turn would make these teeth more vulnerable for trauma^{5,9,16,18}. These results are in accordance with El-Kalla et al, Cortes et al, Borzabadi-Farahani et al and Artunet et al.

CONCLUSION:-

High prevalence of TDI is seen which can be minimized by routinely conducting screening camps in schools to identify children who are at risk for TDI. School teachers should be educated regarding the emergency management of TDI. TDI's have both physical and

psychological impact on the child hence educational programs emphasizing the ways to prevent dental trauma and the benefits of seeking immediate treatment for the conservation of fractured teeth should be instituted.^{14,16}

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Table I:- Comparison of prevalence of dental trauma among different age groups.

Comparison of prevalence of Dental Trauma among different age groups in Day & Residential Schools using Chi square Test									
Age Groups	Dental Trauma	Day School		Res. School		Total		χ^2 Value	P-Value
		n	%	n	%	n	%		
9-10 yrs	Absent	55	96.5%	64	87.7%	119	91.5%	3.215	0.07
	Present	2	3.5%	9	12.3%	11	8.5%		
11-12 yrs	Absent	81	88.0%	46	69.7%	127	80.4%	8.202	0.004*
	Present	11	12.0%	20	30.3%	31	19.6%		
13-14 yrs	Absent	82	81.2%	81	73.0%	163	76.9%	2.008	0.16
	Present	19	18.8%	30	27.0%	49	23.1%		

Table II:- Comparison of cause of injury and treatment undertaken

Comparison of cause of Injury for dental trauma and treatment undertaken in Day & Residential Schools using Chi Square Test							
Variables	Category	Day School [n=32]		Res. School [n=59]		c2 Value	P-Value
		n	%	n	%		
Cause of Injury	Accident	4	12.9%	0	0.0%	24.299	<0.001*
	Collision	1	3.2%	0	0.0%		
	Fall	11	35.5%	13	22.0%		
	Sports	2	6.5%	0	0.0%		
	Violence	2	6.5%	0	0.0%		
	Cannot Recall	11	35.5%	46	78.0%		
Treatment Undertaken	Yes	2	6.3%	0	0.0%	3.770	0.05#
	No	30	93.8%	59	100.0%		

* - Statistically Significant
- Borderline Significance

Table III:- Comparison of dental trauma with prevalence of dental trauma among study participants.

Comparison of Dental Trauma with prevalence of Dental Trauma among study participants in Day & Residential Schools using Chi square Test									
Over/Jet	Dental Trauma	Day School		Res. School		Total		χ^2 Value	P-Value
		n	%	n	%	n	%		
≤ 3.5mm	Absent	170	92.4%	136	79.1%	306	86.0%	13.068	<0.001*
	Present	14	7.6%	36	20.9%	50	14.0%		
3.6-5.5mm	Absent	41	73.2%	33	71.7%	74	72.5%	0.028	0.87
	Present	15	26.8%	13	28.3%	28	27.5%		
5.6-8.5mm	Absent	4	57.1%	20	69.0%	24	66.7%	0.355	0.55
	Present	3	42.9%	9	31.0%	12	33.3%		
8.6-11.5mm	Absent	3	100.0%	1	50.0%	4	80.0%	1.875	0.17

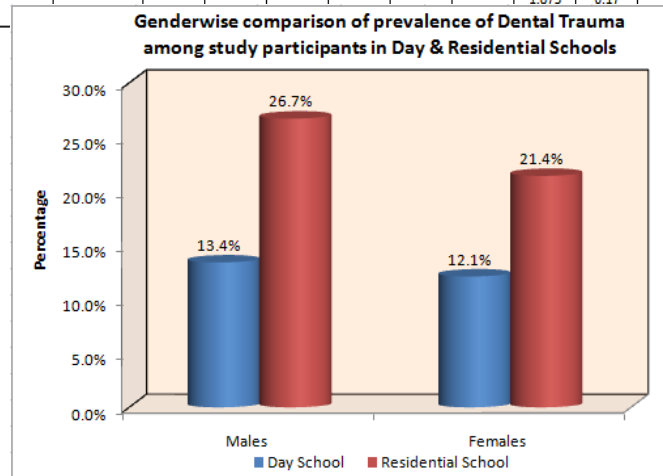


Figure 1: Gender wise comparison of prevalence of dental trauma