



Correlation between Dental Traumatic Injuries and Overjet among 11 to 17 years Indian Girls with Angle's Class I Molar Relation

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ABSTRACT

Aim: The present study was conducted to assess the correlation of traumatic dental injuries and overjet among school going girls of age 11 to 17 years in Pune, India.

Materials and methods: A cross-sectional survey was carried out with 2045 school girls aged 11 to 17 years, attending public elementary schools in Pune, India. The traumatic dental injuries were assessed according to Ellis and Davey's criteria. Occlusion was recorded according to Angle's classification and overjet was measured using a WHO 621 probe. The data obtained was subjected to statistical analysis using Mann-Whitney test.

Results: There was a significant ($Z = -2.785$) association between increase in overjet and occurrence of trauma. Children with increased overjet were 3.09 times more likely to have dental injuries.

Conclusion: It can be concluded from the present study that a significant correlation exists between amount of overjet and prevalence of traumatic injuries among children. The percentage of trauma prevalence increases with the increase of overjet.

Clinical significance: Traumatic dental injury is not a result of disease but a consequence of several factors that will accumulate throughout life if not properly treated. One of the most important factors significantly contributing to traumatic dental injuries is the anterior overjet. Hence, correction of increased anterior overjet may help in prevention of traumatic injuries.

Keywords: Dental injuries, Overjet and trauma, Traumatic dental injuries, Prevalence.

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INTRODUCTION

With the changing trends of decline in dental caries among children especially in developed countries there is increasing interest in studying other oral health conditions, including dental trauma. Traumatic dental injuries are an important public health problem not only because their prevalence is relatively high but also because they have substantial impact on children's daily life. This is because of physical and psychological discomfort, pain and other implications, such as a tendency to avoid laughing or smiling, which can affect social relationships. Also high levels of violence, traffic accidents and a greater participation of children in sports have contributed to transform dental traumatic injuries into a public health problem.¹

There is plethora of research available in the literature on prevalence of traumatic injuries in permanent teeth. The great variation in the prevalence ranging from 6.1 to 58.6% can be attributed to a number of different factors, including types of study, trauma classification, methodology, study size and population, geographical location and differences in cultural behavior.²

Because traumatic dental injuries can be prevented, there needs to be a better understanding about the risk factors associated with trauma, in order to allow the application of adequate preventive actions. Among other factors incisal overjet has been reported as important biological predisposing risk factor to traumatic dental injuries.^{3,4}

Currently, significant research is available on study of traumatic injuries in males and females and also various variables of risk factors. The fact that the boys had suffered more traumatic injuries than girls is basically explained by behavioral or even cultural reasons, in that boys engage in leisure activities or sports of a generally more aggressive

nature or with a greater accident risk than girls do. On the contrary, some studies already indicate an increasing trend of dental trauma among girls, because of their increasing participation in sports or activities formerly practiced by boys only.^{5,6}

However, there is paucity of studies carried out on only one sexual group especially in girls for the risk factors. Hence, the present study was conducted to assess the correlation of traumatic dental injuries and overjet among school going girls of age 11 to 17 years in Pune, India.

MATERIALS AND METHODS

The study was carried out by the research cell of Pediatric Dentistry Department at Sinhgad Dental College and Hospital, Pune, India.

A cross-sectional survey was carried out with 2045 school girls aged 11 to 17 years, attending public elementary schools in Pune, India. In order to obtain the list of all schools, contact was made with the local education authorities, who provided the following information: Name, addresses, phone number and total number of students aged 11 to 17 years at each school. A letter was sent to the parents of the selected children explaining the aim, importance and methods of the study, and requesting their consent to the children's participation. The ethical clearance was obtained from the institutional ethical committee and written permission was obtained from the school authorities.

Inclusion Criteria

- Healthy girls aged between 11 and 17 years
- Children having Angle's class I molar relation

Four pediatric dentists participated in standardization and calibration training sessions which included examination of 200 children in the age group of 11 to 17 years of age in the hospital outpatient section of our pediatric dentistry department, before the baseline field phase began (κ = 0.92). Intraexaminer variability was checked by examining every 10th subject for a second time.

The examinations were performed in the school premises with children sitting on the chair under natural light. Strict cross-infection control measures were adopted. The examiner used disposable gloves, packages with plane mirrors, WHO 621 probes and gauze pads. These were sterilized in sufficient number for a single day's work. The traumatic dental injuries were assessed according to Ellis and Davey's criteria. Occlusion was recorded according to Angle's classification and overjet was measured using a WHO 621 probe. The children were questioned about the cause of traumatic injuries and the place of occurrence, the details were also recorded.

Based on the overjet present, the children were divided into three groups as follows:

- Group 1: Overjet 0 to 3 mm
- Group 2: Overjet 3 to 6 mm
- Group 3: Overjet more than 6 mm

The data obtained was subjected to statistical analysis using Mann-Whitney test.

RESULTS

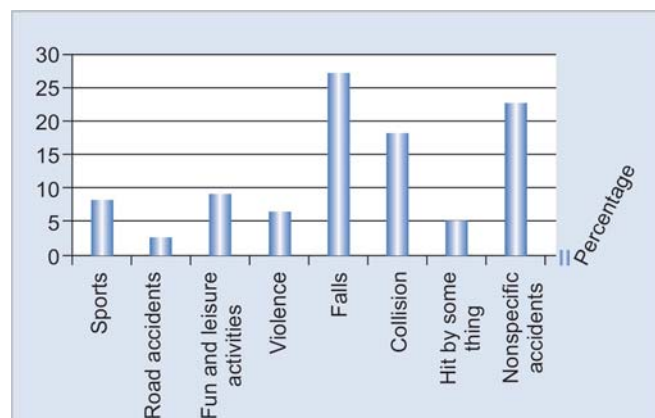
From the total 2045 children examined, 63.52% (1300) children had overjet 0 to 3 mm, 29.09% (595) showed overjet between 3 and 6 mm and 4.35% (89) children had overjet above 6 mm. The overall prevalence of traumatic injuries to permanent anterior teeth was 2.98%. Of 2045 children examined 30 (2.30%) children with overjet 0 to 3 mm, 25 (4.20%) children with 3 to 6 mm and 6 (6.74%) children with above 6 mm had sustained traumatic injuries (Table 1).

Table 1: Cross tabulation of amount of overjet with occurrence of traumatic dental injuries

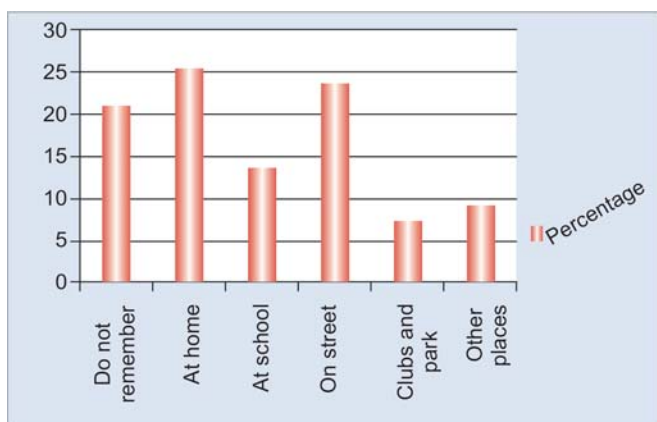
| Overjet | Absence of trauma | Presence of trauma | Total |
|---------|-------------------|--------------------|-------|
| 0-3 mm | 1300 | 30 | 1330 |
| 3-6 mm | 595 | 25 | 620 |
| >6 mm | 89 | 6 | 95 |
| Total | 1984 | 61 | 2045 |

There was also a significant association between the occurrence of traumatic injuries and the presence of overjet higher than 3 mm. Children with increased overjet were 3.09 times more likely to have dental injuries.

The results of cause and the place of occurrence of trauma as answered by the children is shown in a graphical presentation in percentage of occurrence. The main reported causes of traumatic injuries to the permanent incisors were falls, collisions with people or inanimate objects and unspecified accidents respectively. The most frequent sites of dental injuries were home and street (Graphs 1 and 2).



Graph 1: Cause of traumatic dental injuries



Graph 2: Place of occurrence of traumatic dental injuries

When the groups were compared with prevalence of occurrence of traumatic injuries using Mann-Whitney test, there was a significant ($Z -2.785$) association between increase in overjet and occurrence of trauma (Table 2).

| Statistical test | Overjet |
|----------------------|-------------|
| Mann-Whitney U | 49949.500 |
| Wilcoxon W | 2019069.500 |
| Z | -2.785 |
| Asymp sig (2-tailed) | 0.005 |

DISCUSSION

Traumatic dental injury is not a result of disease but a consequence of several factors that will accumulate throughout life if not properly treated. One of the most important factors significantly contributing to traumatic dental injuries is the anterior overjet. The relation of overjet and dental trauma has been investigated by several researchers with considerably varying results.⁷⁻⁹ No significant difference in the means of overjet between the injury group and control was observed by Stokes et al.⁵ Petti and Tarsitani reported that individual with overjet more than 3 mm were two and a half times more at risk compared to individuals with normal overjet for traumatic injuries.¹⁰ It is an interesting question as to why the results of these two studies differ so much. According to Ravn, comparison of one dental trauma study with another is a difficult task, as few epidemiological surveys are similar. They may have different diagnostic criteria, different methodologies and different populations.¹¹

The present study was mainly designed to study the relationship of overjet and traumatic dental injuries in girls with Angle’s class I molar relation. The study included girls mainly because in a developing country like India girls are getting equal opportunity for participation in sports or activities formerly practiced by boys only.

The overall prevalence of traumatic injuries to permanent anterior teeth was 2.98% in this study. Although the prevalence was found to be much lower than other studies in the literature, possible reason may be because the present study included only girls. Also children with only Angle’s class I molar relationship were included in this study. However, these results are in accordance with the study of Esa and Razak.¹²

Also, behavior can be very important in the occurrence of traumatic dental injuries among children and adolescents. This factor must always be taken into consideration in developing effective preventive strategies for preserving dental health, as behavioral risk factors frequently involve aggressive or violent attitudes.¹³ As the study population was adolescent girls in the Indian population with less aggressive and violent behavior.

In relation to overjet, different authors have argued over which particular value should be regarded as an increased overjet or not. Thus, some recognize an increased overjet when the value is over 3 mm and others when it is higher than 5 mm.^{14,15} The results of the present study showed a significant association between the presence of dental trauma and overjet, with overjet above 6 mm showing a 6.74% prevalence corroborating the assertion that the frequency of dental trauma increases proportionally in relation to an increased overjet. Several studies have observed that the adolescents who presented an overjet higher than 5 mm had a threefold greater risk of suffering traumatic injuries in permanent anterior teeth than those that presented an overjet of 5 mm or less.^{16,17} In a study carried out in 2001, it was found that schoolchildren with an overjet higher than 5 mm had a 50% greater risk of traumatic injuries than those with an overjet of 5 mm or less.¹⁸ For this reason, overjet is considered as an important risk factor in dental trauma.

The etiology of traumatic dental injuries observed in the present study is in accordance with the results found in several studies in the literature that have demonstrated that falls and collisions are among the main causes of dental trauma.^{19,20} Many accidents had been grouped in the ‘non-specified’ category and, additionally, the percentage of schoolchildren that did not remember the accident was also high, which could result in the under reporting of violent incidents.

Because the schoolchildren examined suffered trauma mostly at home and on the streets, as was also observed in previous studies, the discussion about healthy environments becomes highly relevant, because environment and health are interdependent and nonseparable.²¹ Therefore, every place appraised as alive territory, where there exists a relation

between human and nature, are environments that can and must be favorable to health.²²

Apart from the risk factors discussed hypothetically, the determinants of traumatic dental injuries can vary according to the size of the city. Thus, large cities are more likely to have more overcrowding, urban violence and traffic accidents. In relation to school environments, large cities probably have more students in schools, more children in classrooms, and schools located in peripheral areas where hypothetically the school commitment toward health and safety at school could be lower. The commitment toward health and safety at school is strongly associated with dental trauma.^{1,13}

CONCLUSION

It can be concluded from the present study that a significant correlation exists between amount of overjet and prevalence of traumatic injuries among children. The percentage of trauma prevalence increases with the increase of overjet. However, further studies with larger sample size and more variables are needed in composite demographics of a developing country like India.

CLINICAL SIGNIFICANCE

Traumatic dental injury is not a result of disease but a consequence of several factors that will accumulate throughout life if not properly treated. One of the most important factors significantly contributing to traumatic dental injuries is the anterior overjet. Hence, correction of increased anterior overjet may help in prevention of traumatic injuries.

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