

Assessment of Prevalence of the Traumatic Dental Injuries of the Permanent Anterior Teeth among 7-14 Years Old School Children in Chitradurga Town

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Abstract: Traumatic dental injuries of the permanent anterior teeth among the school children are a tragic but often the ignored problem. The lack of availability of knowledge on its etiology and treatment makes it a potential dental public health problem. The objective of the present study was to assess the prevalence of the traumatic dental injuries of the permanent anterior teeth in relation to different age group, probable causes, and percentage of those seeking the treatment in Chitradurga town. Descriptive cross sectional study was conducted among 3,363, 7-14 years old school children of Chitradurga town. Information regarding the cause of trauma, place of trauma and those seeking the treatment were collected by direct interview. Fifteen Primary and Higher Primary Schools and Five High schools were selected using simple random sampling procedure. Children aged 7-14 years were included in the study. Data was recorded using specially designed proforma. The collected data was subjected to statistical analysis. The 3,363 children examined 1892(56.3%) were boys and 1471(43.7%) were girls in the age group of 7-14 years. Prevalence rate of traumatic dental injuries was 5.5% in boys compared to 4.75% among girls. Prevalence of traumatic dental injuries was more in the age group of 10-12 years (52.5 %), than 13-14 years (29.5%) and 7-9 years (18%). Major cause of traumatic dental injuries to permanent anterior was fall while playing (58 %). Majority of traumatic injuries had occurred in home (52.1 %) than schools (26.8%). Only one child (0.5%) reported of taking the treatment from the dentist. Majority of the injured children (77.4%) were not aware of the duration of trauma to their tooth. Only one child (0.5%) had a history of avulsed tooth, without replacement and did not have knowledge of emergency management for avulsed tooth. Overall the study results showed lower prevalence of traumatic dental injuries of permanent anterior teeth, but there was a considerable negligence in seeking care for these injuries. Educational programs can be conducted for parents and school teachers in particular to create awareness about the importance of immediate management of traumatized teeth, which would help to prevent further damage such as loss of tooth.

Keywords: Traumatic dental injuries, school children, Prevalence, permanent anterior teeth.

INTRODUCTION

Oral health is the integral part of general health and the teeth are the integral part of overall health. Maintaining healthy teeth is important for child's entire life as they are the key factor for the general wellbeing of an individual. In spite of great achievement and dramatic advances in the armamentarium, oral diseases and conditions are more prevalent in the child's teeth. Traumatic dental injuries are one such condition, which can occur at any age, but the trauma to children's teeth occurs quite frequently [1] and is considered to be the most neglected oral condition despite of its relatively high prevalence [2, 3].

In current terminology, the use of the word trauma implies a reasonable severe, non-physiological lesion to any part of the body. Any thermal, chemical or mechanical lesion that affects the dentition should be analyzed as a dental trauma and its effect as a traumatic dental injury [4]. Dental trauma is an injury associated to external factors, such as violence, accident and fall among others. The extension, intensity and gravity of which may reach both the dental element and its supporting structure [5]. Dental trauma is an irreversible pathology and it is a commonly encountered problem in school children due to sports and athletics [6] which after occurrence is characterized by lifelong debilitating effects because of physical, psychological discomfort and pain. Majority of the injuries to the teeth occur in

children are as a result of accidents in home or at schools [3] and leading to implications such as embarrassment or tendency to avoid laughing or smiling, restriction in biting, speaking clearly, and it can affect social relationships and also a source of distress for the children as well as for the parents of those children [3].

Several studies reported that the prevalence of these injuries has increased during the past few decades, ranging from 4% to 19.5% and available epidemiological evidence indicates that traumatic dental injury is a developing and challenging public health problem to oral health professional and it has been seriously neglected [7, 8]. On the other hand, importance of anterior permanent teeth regarding esthetic and functions during mastication cannot be over emphasized. Anterior permanent teeth have significant effect on the individual facial profile. Facial trauma that results in fractured, displaced or lost teeth can have significant negative functional, esthetic and psychological effect on children [9]. There is a consensus that the anterior teeth are the most commonly traumatized [10]. According to literature, the upper and lower centrals are more commonly traumatized because they tend to be the first to receive a direct blow producing fracture. The prevalence of traumatic injuries increases with age due to cumulative effect and it is more during the very active age range of 7-14 years as a result of bicycle, skateboard, playground and sports accidents, and peak for injuries to permanent dentition [11, 12]. From documented data it can be said that traumatic injuries are widespread in the population and can cause a serious dental public health problem. But most importantly they are preventable.

To allow implementation of preventive strategies to reduce the increasing frequency of dental trauma, community effort is very much necessary in educating school children and their parents, sport teachers, teachers and health personnel's regarding awareness towards prevention of traumatic dental injuries. Hence a study is required to assess the prevalence of traumatic dental injuries and associated factors among school children. The reports on the prevalence of traumatic dental injuries in school children are rare, limited in comparison to the amount of information available in relation to dental caries and periodontal diseases.³ The prevalence of traumatic injuries to anterior teeth has been reported in several developed countries, but a relatively small number of studies have so far been reported in developing countries like India. Proportion of children suffering traumatic injuries and also the types of injury, vary greatly from country to country [13]. The available epidemiological evidence indicates that traumatic dental injury is a developing and challenging public health problem and it has been seriously neglected [7, 8]. Conventional preventive and treatment approaches are unlikely to be successful unless a complimentary

public health strategy is adopted. Public health dentist should make an effort to ensure correct diagnosis, monitoring and applying a preventive role in such traumatic dental injuries of school children to alert parents and guardians to the risks of neglecting treatment with its possible future consequences in child life. Hence, an attempt has been made to assess the prevalence of traumatic dental injuries and its associated factors among the school children in Chitradurga.

AIM OF THE STUDY

To assess the prevalence of the traumatic dental injuries of the permanent anterior teeth among 7-14 years old school children in Chitradurga town.

OBJECTIVES OF THE STUDY

- To assess the prevalence of traumatic dental injury in different age group among school children in Chitradurga town.
- To find out the probable causes and the place of occurrence trauma to the permanent anterior teeth among 7-14 year old School children in Chitradurga town
- To ascertain the percentage of those seeking the treatment for trauma to the permanent anterior teeth among 7-14 year old School children in Chitradurga town

MATERIALS AND METHODS

This study was conducted to assess the prevalence of the traumatic dental injuries to the permanent anterior teeth in relation to different age group, probable causes and percentage of seeking the treatment among 7-14 years old school children at Chitradurga town.

ORGANISATION OF THE SURVEY

Approval from the authorities

The ethical clearance was obtained from the Institutional Review Board of Dental College, prior to the start of the study. Permission to examine the school children was obtained from the Education Department (DDPI) of Chitradurga and from the concerned school authorities.

REQUIRED INFORMATION ABOUT THE STUDY AREAS

All the required and relevant information regarding the schools and children population was obtained from Deputy Director of Public Instruction Office / Statistical Department, Chitradurga.

TRAINING AND CALIBRATION OF THE EXAMINER

For the purpose of understanding and application of the examination criteria the investigator was trained and calibrated in the Department of Public Health Dentistry, under the guidance of the Professor in

order to limit the diagnostic variability. A group of 10 subjects in the age group of 7-14 years with the history of traumatic dental injuries were chosen from the school oral health program (from one of higher primary school). These subjects were examined in the Public Health Dentistry and the observations were recorded in the self designed proforma under the supervision of the Professor. The results so obtained were subjected to kappa statistics. The calibration exercise and the kappa value (0.8) showed good agreement for these observations and measurements in terms of intra examiner variability which validated the examination procedure.

TRAINING OF RECORDING ASSISTANT

A recording assistant was trained to assist in recording the investigation results recorded by the examiner

PILOT STUDY

A pilot study was undertaken to check the feasibility and relevance of proforma, to have prior idea regarding the estimation of the time taken to examine each patient and to plan survey accordingly. Modifications were made in the recording proforma to overcome the particular problem.

SAMPLE SIZE

The total target population of 33,630 school children in the age group between 7-14 years belonging to primary; higher primary and high schools of Chitradurga were considered for the study.

Using statistical sample software based on the total population i.e. 33,630 school children with the age group between 7-14 years and keeping 95% confidence interval and 2% marginal error and taking the account of prevalence of traumatic dental injuries in Indian studies as 10%, the sample size was determined to be 3,363.

Sampling procedure

To obtain this desired sample size of 3,363 school children of age group between 7-14 years, the study was conducted on school children of primary, Higher primary, and High schools enrolled in Government, Aided, and Non Aided schools of Chitradurga. Taking the average of population in individually listed school, 15 primary and higher primary schools and 5 high schools were selected by simple random sampling from the list of schools obtained from DDPI office, Chitradurga. Sample size from each of different schools was proportional to the total number of 7-14 year-olds in that school. Children are divided into three age groups according to different schools (primary, higher primary, and high school) they are more commonly available and proportionate sample of 10% was taken according to the population in each age group as follows

Group I = includes 14,230 children aged 7-9 years = 1,423 were selected.

Group II = includes 13,250 children aged 10-12 years = 1,325 were selected.

Group III = includes 6150 children aged 13-14 years = 615 children were selected.

All the children belonging to the age group of 7-14 years, and who are available on the day of examination in the selected schools were examined till the desired sample size of 1,423 children in the age group of 7-9 years, 1,325 children between 10-12 years, and 615 children between 13-14 years respectively. Hence, after the application of the inclusion and exclusion criteria a total sample of 3,363 school children in the age group of 7-14 years were examined.

Inclusion criteria

Children in the age group of 7-14 years from the selected schools were included in the study.

Exclusion criteria

- Primary teeth,
- Special group children
- Supernumerary teeth,
- Teeth with developmental defects and
- Loss of teeth other than traumatic injuries,
- Children with history of orthodontic treatment
- Root fractures are excluded as radiographs were not taken during the clinical recording.

SCHEDULE OF THE STUDY

A survey was systematically scheduled to spread over a period of 6 months. A detailed weekly and monthly schedule was prepared well in advance by informing and obtaining consent from authorities of respective study areas. On an average, 60 subjects were examined each day.

INFORMED CONSENT

Informed consent was obtained from parents of the children participating in the study before the clinical examination. Assent was obtained from the children before participating in the study.

CLINICAL EXAMINATION

Armamentarium

The following materials and instruments are required to conduct examination

- Plane Mouth mirrors
- CPI Probe
- Tweezers
- Kidney trays
- Cheek retractors
- Sterilized Cotton / gauze pieces.
- Disposable Mouth mask
- Disposable gloves
- Torch.

- Korsolex solution for chemical disinfection
- Divider and Measuring ruler to measure the over jet
- 2 Green cloths
- 2 hand towels
- Study Formats—data collecting sheet, pen, pencil

Instrument and Supplies

Instruments and materials are arranged on a table or platform within easy reach of the examiner. Sufficient numbers of instruments / materials are taken to avoid the interruption during examination and instruments are sterilized while others are being used.

SEATING OF RECORDING ASSISTANT

Recording assistant was sitting close enough to the examiner so that instructions and codes could be easily heard and the examiner could see that finding were being recorded correctly.

EXAMINATION OF THE SUBJECTS

The examination of the subjects was carried out in concerned school premises, under natural daylight conditions or using artificial illumination with subjects seated comfortably on ordinary chair with back rest and the examiner sitting in front of the child.

METHOD OF OBTAINING THE DATA

A specially prepared, and pre tested proforma designed for collecting all the required and relevant general information and clinical findings was used for recording the data. The proforma including the demographic data and questions regarding history of injury to detect the cause, place, duration of trauma to anterior teeth as well as those seeking the treatment for concerned problem were recorded.

INFECTION CONTROL

For investigation disposable mouth masks and gloves are used. Instruments are sterilized by Chemical method of disinfection by using Korsolex solution (Glutaraldehyde-7.0 gms: 1,6 Dihydroxy, 2,5 Dioxahexane-8.2 gms: Polymethylol urea derivatives-17.6 gms and rust inhibitors). Korsolex was diluted by adding 1 part to 9 parts of potable water to get 10% solution. After each days survey, all the instruments are sterilized by boiling.

IMMEDIATE CARE AND REFERAL

The cases of traumatic dental injuries observed during examination were informed to the parents and they were advised to seek treatment for the same. Individual requiring immediate care were referred to nearby dentist or Dental College, Chitradurga.

COURTESY REPORTING

Survey findings were reported to the respective school authorities after the completion of the survey in each school.

STATISTICAL ANALYSIS OF THE RESULTS

The data was transformed from pre-coded survey form to computer. A master file was created for the purpose of data analysis. SPSS version 18.0 (SPSS Pty Ltd, Chicago, IL, USA) was used for the statistical analyses. Chi square was used as test of significance. Data was scientifically represented in form of tables.

RESULTS

The survey was carried out on 3,363 school children consisting of 1892(56.3%) boys and 1471(43.7%) girls in the age group of 7-14 years to study the prevalence of traumatic dental injuries to permanent anterior teeth in relation to different age group, probable causes, and the percentage of those seeking the treatment in Chitradurga town.

Distribution of study population (school children) according to age and gender

Among 3,363, 7-14 years old age group, 1423 (42.3%) children belonging to Group I (7-9 Years), out of which 802 (42.4%) were boys and 621(42.3%) were girls. 1325(39%) children belonging to Group II (10-12 Years), out of which 728 (38.4%) were boys, 597(40.5%) were girls. 615 (18%) children belonging to Group III (13-14 years), out of which 362 (19.2%) were boys, 253 (17.2%) were girls respectively Table 1.

Prevalence of traumatic dental injuries according to age

Out of 3,363 children, 186 (5.5%) children had fractured permanent anteriors. Total of 33(2.31%) children had fractures in group I, Total of 98(7.30%) children had fractures among group II and Total of 55(8.94%) children had fracture in group III respectively [Table 2].

Prevalence of traumatic dental injuries according to gender

Among 186 injured, 116 (6.13%) were boys and 70 (4.75 %) were girls. Boys were found to have significantly higher number of fractures than girls [Table 3].

Cause related distribution of affected children

Out of 186 children who had traumatic dental injuries, 107(58%) children had fracture because of fall during playing, 23(12.4%) children had fracture because of fall due to unknown reason, 13 (7%) children because of collision, 9 (4.8%) children during bicycle riding, 07(3.8%) children did not know the cause for their fractured tooth or teeth. 6 (3.3%) children had fracture due to pushing, 5(2.7%) children got fractured tooth due to a hit from bore well handle, 4(2.2%) children during violence, 4 (2.2%) children due to a punch from somebody, 3(1.7%) children had fractured their tooth during eating, 2(1.8%) children due to road traffic accidents and 2(1.8%) children had fracture while swinging, and 1 (0.5%) child had trauma due to fall from the bullock cart. So, most frequent

cause of trauma was falls during playing reported in 58% of cases [Table 4].

Distribution of affected children according to the Place of trauma

Risk of trauma was greater in house [97 cases – 52.1%] followed by in school premises [50cases – 26.8%], playground [22 cases – 11.8%], on stair case [5 cases – 2.68%], on street [4 cases – 2.15%], and in agricultural fields [1 case – 0.5%], and 7 of the cases (3.76%) were not aware of the place, they had trauma [Table 5].

Percentage of those seeking treatment

Total of 186 fractured cases, 177(95.16%) cases did not take any type of treatment from anybody. only 1 (0.5 %) case reported of undergoing root canal treatment by the dentist indicates a very low level of awareness among the parents about the importance of dental treatment. 3(1.6%) children reported of self treatment by keeping cold pack using ice cubes, and cold cloth when injury had occurred. 3(1.6%) children consulted the physician for prescription of pain killer. 2(1.07%) children reported of taking medicine from the nearby pharmacist [Table.6].

DISCUSSION

Traumatic dental injuries may occur throughout the life. But they are particularly common, unresolved problem among the school children throughout the world and the trend in traumatic dental injuries is not as clear and well documented as the trend in dental caries [14, 15]. Literature reviews shows that the prevalence of dental caries is falling more rapidly than traumatic dental injuries. If this trend continues traumatic dental injuries may become more prevalent than dental caries². The epidemiological studies from various countries indicate that there is considerable variation in the prevalence of traumatic dental injuries. This has been attributed to the factors such as the type of study and the dentition studied [14].

As Hindsight explains the injury that foresight would have prevented [15], therefore a study was carried out to know the prevalence of traumatic dental injuries of permanent anterior teeth fracture in school going children of Chitradurga as no other studies were reported previously. The present study was carried on 3,363 school children in the age group of 7-14 years to assess the prevalence of traumatic dental injuries to permanent anterior teeth in relation to different age group, probable causes and percentage of seeking the treatment at Chitradurga town.

Traumatic dental injury is not a result of disease but it is a consequence of several factors that will accumulate to form the third largest cause for the mortality of the teeth. In the present study among 3,363 school children examined, 186 children had fractured teeth, giving the overall prevalence rate of 5.5.

However, it was lower than the findings of other studies done Lin H, Naidoo S (9.3%) [16] in Maseru, Evelyne Pessoa Soriano *et al.* (10.5%) [17] in Brazil, and Pavan Baldava.*et al.* (14.9%) [18], Gupta K *et al.* (13.8%) [19] in South Kanara District, Garcia-Godoy F (18.1%) [20] in Dominican, Malikaew P *et al.* (35.0%) [20] In Thailand. This variation in the prevalence may be attributed to differences in sampling technique, application of different diagnostic criteria, different study setting with different age group.

The result of the present study showed that the peak incidence of injury was 10-12 years (52.5%) followed by 13-14 year (29.5%). These results are comparable to the study done by Marcenes *et al.* [21] observed most of the injuries in 8-11 year old children,

The causes of traumatic injuries to the teeth are many and varied. In the present study, 58 % of the fractures had occurred due to fall during playing, followed by 12.4% children had fracture because of fall due to unknown reason, and is in accordance with the results found in several studies in the literature that have demonstrated that falls are among the main causes of dental trauma as noticed by different authors like Cortes MI *et al.* [9], Rai SB [22], Hamdan MA and Rajab[19], Rajab LD[23], Traebert J *et al.* [24], Lin H, Naidoo S [25].

In the present study it was observed that 52.1 % of fractures of permanent teeth occurred at home followed by 26.8 % in school and 11.8 % in the playground. But the studies did by Gupta K. *et al.* [26], Traebert J. *et al.* [20] have shown equal distribution at home, in school and elsewhere. The great majority of population based studies reviewed showed that most traumatic dental injuries occur at home, followed by at school and in the street or other public places as noticed by Cortes MI *et al.* [21], Rajab LD [23]. This result may be due to the fact that most of the students spend approximately 60% of their time in the house rather than in school or playground (Gupta K)[26].

In the present study total of 186 children had fractured teeth, only one child (0.5%) reported of seeking the treatment from the dentist, where as remaining 185(99.5%) did not receive any type of treatment, indicates a low level of awareness among the parents about the importance of dental treatment. In a study from Tanzania, 21 % of the children had at least one type of untreated Traumatic dental injuries, where the highest percentage (26%) was observed among children with high socio-economic status [27]. However, almost all (94%) of the teeth untreated Traumatic dental injuries were enamel- or enamel-dentine fractures. The low rates of treatment provided observed worldwide may be because Traumatic dental injuries are not perceived as a disease. One reason could be that on suffering any injury, the people usually rush to a nearby medical practitioner or hospital where

dentists are not available or else the fear of the dentist keep them away. Economical and social status of the patients also may be some other factors due to which people do not seek immediate dental treatment. Accordingly, educational programs need to be instituted about the importance of ways of preventing dental trauma and the benefits of immediate seeking of the treatment for conservation of avulsed and fractured teeth. Such programs should be directed at the community level as well as in the schools. Continuing educational programmes about the latest technologies in the management of traumatized teeth should also be arranged for the dental practitioners [2].

Traumatic dental injuries constitute a major public health problem creating not only physical, but also esthetic and psychological effects in children and their parents. Unfortunately, the public is unaware of the risk and does not have enough information to avoid traumatic injuries to the teeth. On the other hand the health professionals, including dentists, underestimate the incidence of dental trauma and concentrate on the treatment rather than prevention of traumatic dental injuries. Although prevention of traumatic dental injuries is the most desirable action, it is essential that the oral health professionals must educate children, parents, teachers and health care professionals in correct emergency care after a traumatic injury has occurred. Since most injuries occur at home or at school, education of key individuals should impact greatly on the prognosis after a traumatic injury.

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CONCLUSIONS

Following conclusions can be drawn from the result of the present study:

- The prevalence of traumatic dental injuries of permanent anterior teeth is 5.5%.
- Prevalence of traumatic dental injuries was more in the age group of 10-12 years followed by 13-14 years and 7-9 years.
- Falls during playing and undefined falls were the major causes for anterior teeth fracture. Risk of trauma was greater in house followed by school premises and playground.
- There was a considerable negligence in seeking care for these injuries and problem has not received any necessary attention by the dental profession. .
- Educational program would be necessary to improve the public awareness regarding the causative factors, prevention, and the immediate management of traumatized teeth to prevent its consequences in child's future.

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