The Prevalence of Anterior Teeth Fracture and its Relation to Malocclusion in 12 and 15 Year Old School Children Belgaum City India

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ABSTRACT

The objectives of this study were to know the prevalence of anterior teeth fracture and malocclusion and their correlation among the school going children aged 12 and 15 years, as well as to analyze the general relative risk factors like age, sex, malocclusion, nature and place of trauma.

Method: an epidemiological cross sectional study was carried out among 3621 school going children (2418 boys and 1203 girls) in Belgaum city aged 12 and 15 years. Interview was conducted for other variables and clinical examination using modified WHO performance was done.

Results: The prevalence of anterior teeth fracture was 4.41%. The prevalence rate for males was 4.96% and females 3.33%. The maxillary left central incisor had more risk for fracture (42.7%). Enamel fractures comprised of 59.54%. The prevalence rate of malocclusion was 27.3%.

Conclusions: the study concludes that there is a strong relationship between malocclusion and fractured anterior teeth ($p < 0.001$).

Key words: Malocclusion, Trauma, Prevalence, Tooth Fracture

Key words: Referral, periodontics, periodontology, periodontitis, consultation, dental college, consumerism.

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Man, throughout his evolutionary advancement, has been subjected constantly to environment. Some changes were beneficial and others detrimental to his well being. Trauma to anterior teeth is undesirable and prevention of this is beneficial to the personality development of the child. Dental injuries may occur throughout life, but they are particularly common in childhood.

The problem of fractured anterior teeth is a perplexing one to the parent, child and especially the dentist. The behavior of child, as well as his progress in school and especially his psychological stability, could be affected by an untreated and unsightly fracture of an anterior tooth.(1)

During childhood, the development of the occlusion both

functionally and esthetically is dependent on the satisfactory presence of the teeth. Hence, a traumatized region if ignored will result in malformed or malpositioned teeth. Dental injuries are infrequent during the first year of life, but can occur, for example due to a fall from a baby carriage. Injuries increase substantially with the child's first effort to move about. The frequency increases as the child begins to walk and run due to lack of experience and coordination. The incidence of dental injuries reaches its peak just before school age and consists mainly of injuries due to falls and collisions. When the child reaches school age, accidents in the playground are very common.(2) A major predisposing factor for dental injuries is increased overjet.(3) The dental injuries are twice more frequent among children with protruding incisors than children with normal occlusion.(4) The dentist is instrumental in

preventing malocclusion and fractures of anterior teeth and hence improves one's personality and self-esteem. Hence a study was carried out with the aim to find out the prevalence of anterior teeth fracture and to correlate with malocclusion among school children of Belgaum city, aged 12 and 15 years. The objectives were to know the prevalence of anterior teeth fracture and to correlate with the general relative risk factors like age, sex, nature and place of trauma.

MATERIALS AND METHODS

The present study was carried out at Belgaum city on 3621 school children (2418 boys and 1203 girls) for a period of two months. Belgaum is one of the oldest towns of Karnataka in India. It is situated in northwest region of Karnataka with area

of 72 square kilometers, with population as per 1991 census being four lakhs. People from different religious, socio – economic background, culture and habits reside in the city.

The consent was obtained from the concerned authorities of education department, schools, parents and approval for the study was obtained from the KLE'S Research and Ethical Committee, Belgaum. Data was collected by an interview and oral examination. The children attending primary/secondary school in Belgaum city and who had entered 12th or 15th year on their last birthday were included in this study. Children who were undergoing or had finished orthodontic treatment were excluded from the study. Out of total 36 secondary schools in the city, 11 were selected by simple random sampling giving equal importance to all the four areas (for study purpose, Belgaum city map was divided into four quadrants). A Type III oral clinical examination was done.(5) One examiner with the help of an alert and co-operative recording clerk carried out the examination and interview. Anterior teeth fracture was assessed according to W.H.O classification; the six maxillary and mandibular teeth were examined.(6) The WHO basic survey method(7) was modified and used for scoring dentofacial anomalies like malocclusion (box 25-33), nature of trauma (box 22), and place of trauma (box 23).

Data obtained was subjected to statistical analysis using Z – Proportionality test and chi-square test (confidence interval – 95%).

The oral health assessment form (modified WHO) used in study

RESULTS

The table I shows the prevalence rate of injury to anterior teeth fracture being 4.41%. The prevalence of fracture in males (4.96) was more than females (3.33) which was significant ($Z= 2.25$, $p<0.05$). The ratio of prevalence between male and female was 1:0.5. It was observed that 12-year group had more fractures 7.14% when compared to 15-year age group 5.03%. Central incisor 83.2% (i.e., maxillary right 42.7% and 40.4% left central incisor) were more commonly fractured and least affected were the canines 1.8% (maxillary left canine 0.5%). Single tooth fracture was more common (62.5%) than two teeth fractures (37.5%). Table II shows that 59.54% were enamel fractures, 32.73% were crown fracture without pulp

K.L.E.'S INSTITUTE OF DENTAL SCIENCES, BELGAUM.
DEPARTMENT OF PREVENTIVE AND COMMUNITY DENTISTRY
ORAL HEALTH ASSESSMENT FORM (ANNEX - II)

Leave blank Year month Day Identification No

1 4 8 9 10 11 14

GENERAL INFORMATION :

NAME : _____ AGE IN YEARS : 15 16

SCHOOL : _____

SEX (M=1, F=2) : 17 GEOGRAPHIC LOCATION : 19 20

ETHNIC GROUP : 18 LOCATION TYPE : 21

1 - URBAN
2 - PERI URBAN
3 - RURAL

NATURE OF THE TRAUMA : 22 PLACE OF THE TRAUMA : 23

INTRA ORAL EXAMINATION :

TOOTH INVOLVEMENT 321 123 TYPE OF FRACTURE : _____ 24

321 123

DENTOFACIAL ANOMALIES

SPACE :

25 26 27

CROWDING IN THE INCISAL SEGMENTS SPACING IN THE INCISAL SEGMENTS DIASTEMA IN mm

28 29

LARGEST ANTERIOR MAXILLARY IRREGULARITY IN mm LARGEST ANTERIOR MANDIBULAR IRREGULARITY IN mm

OCCLUSION :

30 31

ANTERIOR MAXILLARY OVERJET IN mm ANTERIOR MANDIBULAR OVERJET IN mm

32 33

VERTICAL ANTERIOR OPEN BITE IN mm. ANTERO-POSTERIOR MOLAR RELATION

Table 1: Prevalence of anterior teeth fracture

Sex	No. of children examined	No. of children with fractured anterior teeth	% of teeth fractures in age groups		% of children with fractured anterior teeth	Prevalence
MALE	241866.8%	12075%	7.5	6.3	3.31%	4.96
FEMALE	120333.22%	4025%	5.06	4.06	1.10%	3.33
TOTAL	3621	160			4.41%	
						Z score = 2.25P <0.05

Table 2: Fractures classified according to WHO

Type of Fracture		No. of Fractured Teeth	%
Code	Type		
873.60	Enamel fracture	131	59.54
873.61	Crown fracture without pulp involvement	72	32.73
873.62	Crown fracture with pulp involvement	17	7.73
Total		220	100

involvement and 7.73% were crown fracture with pulp involvement. Table III shows that the over jet of more than 3 mm have an increased risk of sustaining traumatic injury to teeth (64.4%). The common cause of fracture being sports related injury followed by falls, pushing, fighting, road accidents and unknown. Males 45 (37.5%) had more fractures than females 8 (20%) due to sports related injuries as depicted in Table IV. The risk of trauma was greater in outdoors than indoor in both the age groups. The graph I shows that the anterior teeth fracture were significantly more in full cusp antero posterior molar relation than in normal occlusion and half cusp molar relation (chi square value = 15.51). Graph II depicts the prevalence of malocclusion in the fractured individuals (prevalence – 27.3%, $p < 0.001$). Graph III, shows

Table 3: Relation of anterior tooth fractures with anterior maxillary over jet

	No (and %) with injury n=160	No (and %) without injury injury. n=3461	
Normal over jet	57 (35.6%)	3119 (90.1%)	3176
Increased incisor over jet (>3mm)	103 (64.4%)	342 (9.9%)	445

the spacing, crowding were more common in one segment, diastema was seen more in 12 yrs (14.39%) age group as compared to 15 yrs (10.33%), largest anterior maxillary irregularity were common in 12 yrs (9.09%) were as largest anterior mandibular irregularity were more common in 15 yrs (15.09%). Anterior maxillary and mandibular over jet were more common in 12 yrs age group.

DISCUSSION

In the final decade of this century, dental diseases and traumatic injuries remains an unresolved problem affecting the school going children throughout the world. As we know *Hindsight explains the injury that foresight would have prevented*, therefore a study was carried out to know the prevalence of anterior tooth fracture in school going children of Belgaum city as no other studies were reported previously.

The data on the prevalence of anterior teeth fracture from previous studies vary from 1.76% (8) to 46%.(2) Many studies

Table 4: Relation of fractures to cause and place of trauma

	CAUSE OF TRAUMA					PLACE OF TRAUMA		
	Falls	Pushing and fighting	Sports	Road accidents	Unknown	Outdoor	Indoor	Unknown
No. Of teeth fractured	35	28	53	23	23	77	60	23
% Of teeth fractured	47.5	4	5	27.5	27.5	102	70	27

have reported prevalence rate of 20.26%, 35% and 8.7% (9,10,11) In our study the prevalence rate of fractured anterior teeth was 4.41% which was similar to a study conducted by Zerman N and Cavalleri G. in 1993.(12) In the present study, the prevalence of anterior teeth fracture was more in boys, as more boys are engaged in rough outdoor games than girls. Our results were in concurrence with the many study reports.(13,14,15) Were as some studies, have reported not much difference in the prevalence of boys and girls.(2,8,11,16,17)

We observed that 12-year age group had more fractures (7.14%) when compared to 15 years age group (5.03%) the observation was in contrast to some studies.(10,13) Central incisors were most commonly affected (83.2%) than other anterior teeth. The reasons being its vulnerable position in the oral cavity, frequent protrusion of incisors or inadequate lip coverage hence reduced cushioning effect. It was observed that sports related injury was more common followed by falls, pushing and fighting, and road accidents. Males (37.5%) were affected more than females (20%) in sports related injuries and the results were in concurrence with other study reports.(4,9,13) In classrooms, teachers supervise the children and their activity is relatively controlled; moreover, children spend most of their time outside and falls could result from a variety of conditions. Therefore the risk of trauma was greater in outdoors than indoor in both the age groups. Mouth guards should be encouraged and made compulsory in all contact sports and, children should be taught what should be done with avulsed tooth.

In our study the frequency of traumatic injuries to permanent upper incisors increased in relation to the increasing over jet. An over jet greater than normal thus creates an obvious risk for injuries. The incidence of anterior teeth fracture increased with antero posterior molar relationship, which is statistically

significant ($P < 0.001$). Similar results were obtained by other studies.(8,19)

In conclusion, the dental injuries are frequently occurring during the different stages of life but they are particularly common in childhood (in the present study the age group more prone for injuries is 12 years). There is a strong relationship between malocclusion and fractured anterior teeth and over jet of more than 3mm have an increased risk of sustaining traumatic injury to their incisors.

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