

# Prevalence of Anterior Tooth Fracture due to Trauma

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## ABSTRACT

**Aim:** To evaluate the prevalence of anterior tooth fracture due to trauma in 2000 patients randomly from the population of south Canara district.

**Materials and methods:** The present study was conducted on 2000 patients attending the Department of Conservative Dentistry and Endodontics, AB Shetty Dental College, Mangalore, and rural satellite centers of Nitte University. Each patient was examined for anterior tooth fracture due to trauma under dental chair in a good illumination of light using sterilized mouth mirror, explorer, tweezers and teeth are isolated by cotton rolls. The patient who had anterior tooth fracture were questioned with a standard questionnaire from oral health survey WHO format 2013, to find its relation associated to age, gender, location, occupation, etiology, type of fracture and its relation to molar.

**Results:** According to the present study, prevalence of anterior tooth fracture due to trauma in south Canara population was low and found to be 18.8% with increase in prevalence in males (56.2%) between the age group of 36 and 45 years (33.2%), common etiological factor seen was falls (44.7%). The most common type of fracture was enamel-dentine fracture (44.7%) with class 1 molar relation (55.6%).

**Conclusion:** The prevalence of anterior tooth fracture due to trauma was most commonly seen in males with increased prevalence in age group between 36 and 45 years, common etiological factor being falls, type of fracture most commonly seen are cases with enamel-dentine fracture with class 1 molar relation.

**Keywords:** Anterior tooth, Falls, Fracture, Trauma.

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**Conflict of interest:** None

## INTRODUCTION

A dental practitioner frequently encounters management of traumatic injuries to the teeth and its supporting tissue during the course of his dental practice.<sup>1</sup> Traumatic dental injury (TDI) has been a great public dental health

concern due to various reasons, some of which being its occurrence at a young age, the cost and the duration of the treatment, which may even continue lifelong. The number of traumatic dental injuries, resulting from facial trauma has shown a marked increase since last 30 years, it now includes a broad spectrum of variables like oral and environmental factors and human behavior. Fracture, displacement or loss of teeth that are an outcome of facial trauma can have a significant negative functional and esthetics effect on the individual.<sup>2</sup>

Traumatic dental injuries are caused due to an external impact on a tooth and its surrounding tissues.<sup>1</sup> The impact may either be direct or indirect. The outcome of a TDI may be damage to dental as well as peri-radicular structures. There is exhibition of various types of dental injuries starting from minor enamel fractures to complicated fractures of crown and/or root and even extraction.<sup>2</sup>

Traumatic dental injuries can occur during any age group, but prevalence more frequently in teenagers.<sup>3</sup> It may be due to various causes like falls, accidents or outcome of violence. Traumatic dental injuries have also shown to occur in males and with single tooth involvement being the most affected are class 2 fracture. It is a genuine dental emergency which require immediate assessment and management specially in young ages (5-7 years), when many present teeth continues to develop.<sup>4</sup> Dental professionals are quite aware about the risks of traumatic dental injuries but they are not able to disseminate the same to general public and prevent its occurring, also several epidemiologic studies have referred it as a serious dental health problem.<sup>3</sup>

Hence, the aim of the present study is to evaluate the prevalence of anterior tooth fracture due to trauma.

## MATERIALS AND METHODS

After obtaining institutional ethical clearance, the study was conducted in month of June to July 2014, on randomly selected 2000 patients from the outpatient department of conservative dentistry and endodontics and its five different rural centers.

## Sample Selection Criteria

Urban group was the patients reporting to Department of Conservative Dentistry and Endodontics, AB Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore. Rural group was the patients reporting to five rural centers in Bailoor, Firangipet, Hejimidikody,

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Mundkoor and Nitte. Patients, who were selected randomly, were segregated in six groups based on age between 15 and 66 years.

### Exclusion Criteria

- Patient undergoing orthodontic treatment.
- Patients with recent maxillofacial trauma.
- Patients with limited mouth opening.

### Inclusion Criteria

- Patient above the age group of 15 years.
- Patient who are not physically or mentally challenged.

All the patients were informed about the nature of the survey and its objectives and were ensured, complete confidentiality of their information. A verbal informed consent was taken. A standardized questionnaire was prepared according to WHO health assessment form 2013 which was filled by the examiner.

### Clinical Examination

Each patient was examined for anterior tooth fracture under dental chair in a good illumination of light using sterilized mouth mirror, explorer and tweezer. The patients who had fractured anterior teeth due to trauma were questioned with a standard questionnaire to find its relation associated with age, gender, location, occupation, etiology, anterior tooth fracture classified according to WHO classification, molar relationship according to Angle's classification.

### Scoring Criteria: WHO Scoring Criteria

Teeth affected by dental trauma are coded as follows:

- 0—No sign of injury
- 1—Treated injury
- 2—Enamel fracture only (plate 47)
- 3—Enamel and dentine fracture (plate 48)
- 4—Pulp involvement (plate 49)
- 5—Missing tooth due to trauma (plate 50)
- 6—Other damage
- 9—Excluded tooth

All completed questionnaires were analyzed and the data were transferred on the Microsoft Office Excel sheet and subjected to SPSS version 16 to statistically analyze using Pearson's Chi-square test.  $p < 0.05$  was considered to be statistically significant.

## RESULTS

### Prevalence of Anterior Tooth Fracture due to Trauma

The sample size of this study included 2000 patients. Out of 2000 patients, 365 (18.8%) cases had due to anterior tooth fracture due to trauma.

### Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Age

Out of 365 cases with anterior tooth fracture due to trauma, 33.2% of cases were noticed in the age group of 36 to 45 years of age and 25.8% of cases were seen in the age group of 25 to 35 years of age (Table 1).

### Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Gender

Out of 365 cases with anterior tooth fracture due to trauma, 56.2% cases affected are males and 43.8% of cases affected were females (Table 2).

### Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Occupation

Out of 365 patients with anterior tooth fracture due to trauma, 38.4% of the cases were seen among workers, 20.6% of cases were seen among housewives (Table 3).

### Prevalence of Anterior Tooth Fracture with Respect to Location

Out of 365 cases with anterior tooth fracture due to trauma, 45.2% cases were seen in rural centers and 43.2% were seen in urban areas (Table 4).

**Table 1:** Prevalence of anterior tooth fracture due to trauma with respect to age

Age	Count	Fracture	Total
15-25	Count	28	126
	Percentage within age	22.2%	100.0%
	Percentage within fracture	7.7%	6.3%
26-35	Count	92	514
	Percentage within age	17.9%	100.0%
	Percentage within fracture	25.2%	25.7%
36-45	Count	121	640
	Percentage within age	18.9%	100.0%
	Percentage within fracture	33.2%	32.0%
46-55	Count	64	412
	Percentage within age	15.5%	100.0%
	Percentage within fracture	17.5%	20.6%
56-65	Count	50	254
	Percentage within age	19.7%	100.0%
	Percentage within fracture	13.7%	12.7%
> 66	Count	10	54
	Percentage within age	18.5%	100.0%
	Percentage within fracture	2.7%	2.7%
Total	Count	365	2000
	Percentage within age	18.2%	100.0%
	Percentage within fracture	100.0%	100.0%

	Chi-square test		
	Value	df	p-value
Pearson's Chi-square	3.950 <sup>a</sup>	5	0.557
No. of valid cases	2000		

<sup>a</sup>0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.86



**Table 2:** Prevalence of anterior tooth fracture due to trauma with respect to gender

			Fracture	Total
Gender	Male	Count	205	1100
		Percentage within gender	18.6%	100.0%
		Percentage within fracture	56.2%	55.0%
	Female	Count	160	900
		Percentage within gender	17.8%	100.0%
		Percentage within fracture	43.8%	45.0%
Total	Count	365	2000	
	Percentage within gender	18.2%	100.0%	
	Percentage within fracture	100.0%	100.0%	

Chi-square test			
	Value	df	p-value
Pearson's Chi-square	0.245 <sup>a</sup>	1	0.621
No. of valid cases	2000		

<sup>a</sup>0 cells (0.0%) have expected count less than 5. The minimum expected count is 164.25

**Table 3:** Prevalence of anterior tooth fracture due to trauma with respect to occupation

			Fracture	Total
Occupation	Laborer	Count	46	221
		Percentage within occupation	20.8%	100.0%
		Percentage within fracture	12.6%	11.1%
	Housewife	Count	70	407
		Percentage within occupation	17.2%	100.0%
		Percentage within fracture	19.2%	20.4%
	Student	Count	22	117
		Percentage within occupation	18.8%	100.0%
		Percentage within fracture	6.0%	5.9%
	Worker	Count	140	813
		Percentage within occupation	17.2%	100.0%
		Percentage within fracture	38.4%	40.7%
Business	Count	87	441	
	Percentage within occupation	19.7%	100.0%	
	Percentage within fracture	23.8%	22.1%	
Total	Count	365	1999	
	Percentage within occupation	18.3%	100.0%	
	Percentage within fracture	100.0%	100.0%	

Chi-square test			
	Value	df	p-value
Pearson's Chi-square	2.522 <sup>a</sup>	4	0.641
No. of valid cases	1999		

<sup>a</sup>0 cells (0.0%) have expected count less than 5. The minimum expected count is 21.36

**Table 4:** Prevalence of anterior tooth fracture due to trauma with respect to location

			Fracture	Total
Location	Urban	Count	160	957
		Percentage within location	16.7%	100.0%
		Percentage within fracture	43.8%	47.8%
	Rural	Count	165	843
		Percentage within location	19.6%	100.0%
		Percentage within fracture	45.2%	42.2%
	Semi-urban	Count	40	200
		Percentage within location	20.0%	100.0%
		Percentage within fracture	11.0%	10.0%
Total	Count	365	2000	
	Percentage within location	18.2%	100.0%	
	Percentage within fracture	100.0%	100.0%	

Chi-square test			
	Value	df	p-value
Pearson's Chi-square	2.903 <sup>a</sup>	2	0.234
No. of valid cases	2000		

<sup>a</sup>0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.50

### Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Etiology of Trauma

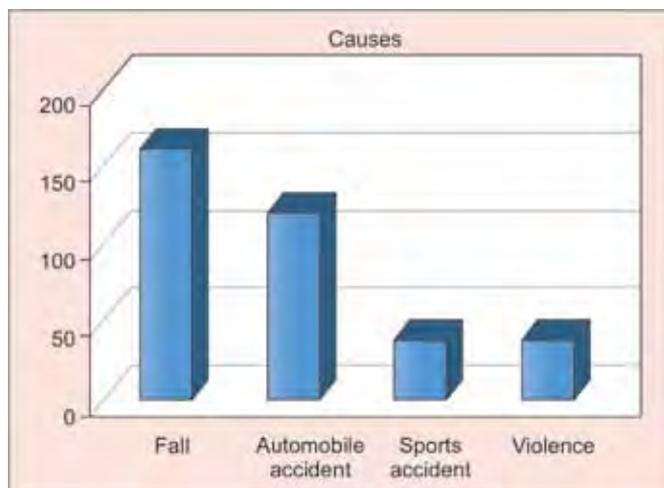
Out of 365 patients with anterior tooth fracture due to trauma, 44.7% were because of falls and rest of the 55.4% of patients had anterior tooth fracture because of violence, sports and traffic accidents with slight variation in frequency and percentage (Table 5 and Graph 1).

### Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Type of Tooth Fracture

Out of 365 cases with anterior tooth fracture due to trauma, 44.7% of teeth showed WHO score 3, i.e. enamel and dentine fracture, followed by WHO score 2 was seen in 33.6% of cases and rest 22% cases included WHO score 4 and 6 (Table 6 and Graph 2).

**Table 5:** Prevalence of anterior tooth fracture due to trauma with respect to etiology

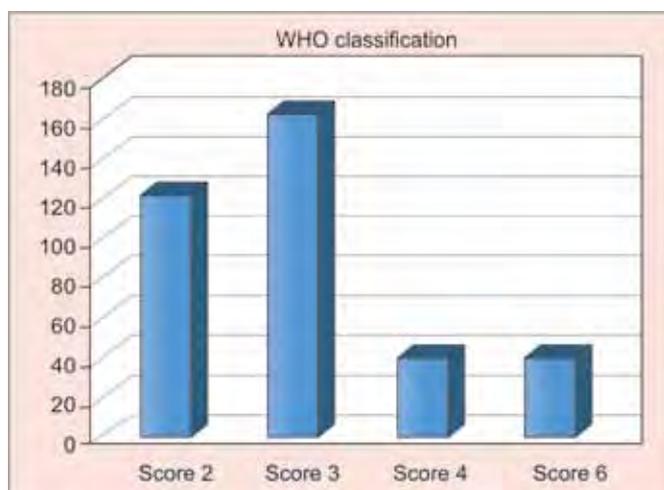
		Frequency	Valid percentage
Valid	Fall	163	44.7
	Automobile accident	122	33.4
	Sports accident	40	11.0
	Violence	40	11.0
	Total	365	100.0
Missing	999	1635	
Total		2000	



**Graph 1:** Prevalence of anterior tooth fracture due to trauma with respect to etiology

**Table 6:** Prevalence of anterior tooth fracture due to trauma with respect to type of tooth fracture

	WHO scores	Frequency	Valid percentage
Valid	Score 2	122	33.4
	Score 3	163	44.7
	Score 4	40	11.0
	Score 6	40	11.0
	Total	365	100.0
Missing	999	1635	
Total		2000	



**Graph 2:** Prevalence of anterior tooth fracture due to trauma with respect to type of tooth fracture

**Prevalence of Anterior Tooth Fracture due to Trauma with Respect to Molar Relationship**

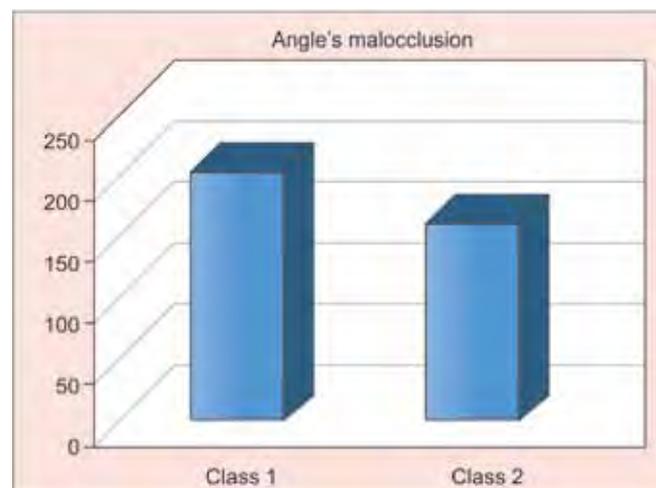
Out of 365 patients with anterior tooth fracture due to trauma, 55.6% cases were seen with class 1 molar relation and 44.4% of cases were seen with class 2 molar relation (Table 7 and Graph 3).

**DISCUSSION**

In the present study, it was observed that the overall prevalence of anterior tooth fracture due to trauma

**Table 7:** Prevalence of anterior tooth fracture due to trauma with respect to molar relation

		Frequency	Valid percentage
Valid	Class 1	203	55.6
	Class 2	162	44.4
	Total	365	100.0
Missing	999	1635	
Total		2000	



**Graph 3:** Prevalence of anterior tooth fracture due to trauma with respect to molar relation

was 18.8% in 2000 patients of south Indian population. In a study conducted by Hegde et al in the same geographical location during the year 2010 to 2011, the overall prevalence was about 11.5%, which shows an increase in the prevalence of anterior teeth fracture due to trauma. Maximum prevalence of fracture of anterior teeth was seen in the age group of 36 to 45 years (33.2%) followed by the age groups 25 to 35 years (25.2%) which was not statistically significant ( $p > 0.001$ ) (Table 1). The increase in prevalence is due to their involvement in greater risks of road traffic accidents, falls and general tendency in taking greater risks. Studies done by Hegde et al<sup>1</sup> shows the maximum prevalence of anterior tooth fracture due to trauma in the age group of 15 to 30 years of age, i.e. 53.9%. Similar studies done by Kovács et al,<sup>4</sup> Lam et al<sup>5</sup> show children and adolescents are the common age group seen in the prevalence of anterior tooth fracture due to trauma.

A study done by Hecova et al concluded that Males are involved in accidental injuries more often than female. Similarly, the prevalence of anterior teeth fracture with respect to gender was found to be males (56.2%) greater than females (43.8%). However, it was not statistically significant ( $p > 0.001$ ) (Table 2). Similar result was found in a different geographical location by Glendor,<sup>2</sup> Caldas et al,<sup>6</sup> Andrade et al,<sup>7</sup> Levin et al,<sup>8</sup> Hecova et al,<sup>9</sup> Lam et al,<sup>5</sup> Zuhail et al<sup>10</sup> in their study males showed higher prevalence of anterior tooth fracture due to trauma that could be attributed to occupational hazards, sports injuries, violence, road traffic injuries.



Studies show that 38.4% cases were seen among workers and 20.6% were seen among housewives (Table 3). On comparing the society in which they live, rural population showed higher prevalence of anterior tooth fracture than semiurban, i.e. 45.2%, but it is not statistically significant ( $p > 0.001$ ) (Table 4).

Anterior tooth fracture due to trauma can prevail due to variety of etiologic factors, fall being the most common one (44.7%) (Table 5 and Graph 1). Similar findings were observed by Hegde et al,<sup>1</sup> Caldas et al,<sup>6</sup> Levin et al,<sup>8</sup> Hecova et al,<sup>9</sup> Lam et al,<sup>5</sup> Zuhail et al<sup>10</sup> show that the most common etiologic reasons are falls, automobile, bicycle accidents, collisions and sporting activities. Hecova et al<sup>9</sup> and Comfort et al<sup>11</sup> automobile accidents (33.4%), sports accidents (11%), violence (11%) are the rest of the etiologic factors that contributes for anterior tooth fracture due to trauma looking into the type of fracture of the anterior tooth due to trauma, WHO score 3 (44.7%) being the most common one seen in this study (Table 6 and Graph 2). Similar findings were observed by Katharina et al,<sup>12</sup> Hecova et al,<sup>9</sup> Kovács et al.<sup>4</sup> Elli's class 1 (33.6%) being the second most common and the rest 22% cases included Elli's class 3, 4 and 7 fracture. Whereas studies done by Caldas et al<sup>6</sup> and Comfort et al.<sup>11</sup> The commonest type of injury was enamel fracture alone (9.9%), followed by enamel-dentin fracture (4.8%). Majority of the accidents occurred at home showed that Elli's class 1 was most common. Individuals with Elli's class 1 fracture might not undergo treatment as they don't have any complaints or they won't realize the fracture. This may be due to the fact that individuals do not give importance to their dental injuries as they might not have any pain and esthetic problems.

Taking molar relationship into consideration, prevalence of anterior tooth fracture due to trauma occurred most frequently among patients with class 1 molar relationship (55.6%) and rest being class 2 molar relationship (44.4%). This observation was similar with findings of the study by Hegde et al<sup>1</sup> (Table 7 and Graph 3).

## CONCLUSION

Traumatic dental injury is a public dental health problem and dental professionals must press for legislation and educational campaigns to prevent dental injuries as well as to provide the necessary information to help

policymakers create an appropriate and safe environment. Fall was the most important cause of teeth fracture that are more seen in males with an increased incidence in 36 to 45 years of age. Among the type of fractures seen, enamel-dentin fracture was the most common one with class 1 molar relationship having anterior tooth fracture due to trauma.

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