



## MANAGEMENT OF TRAUMATIZED ANTERIORS - A SERIES OF CASE REPORTS

**Dr. Samit Mondal**

Department of Orthodontics, Asst. Professor, Burdwan Dental College & Hospital, Burdwan, West Bengal

**Dr. Jagori Sarkar\***

Department of Conservative Dentistry, Reader, Kusum Devi Sunderlal Dugar Jain Dental College & Hospital, Kolkata, West Bengal \*Corresponding Author

**ABSTRACT** The anterior teeth are the pillars of aesthetic dentistry and it is important to treat them properly since beauty is key to good mental as well as physical health. Trauma to anterior teeth may be due to accidents, faulty occlusion, abnormal eating habits or fights which can affect any age group or gender. We have treated few such cases in the following series of case reports which include patients with trauma causing fracture of teeth involving enamel, dentin or pulp as well as a case of tooth discoloration and intrusion corrected by endodontic treatment followed by orthodontic management.

### KEYWORDS :

#### INTRODUCTION

Anterior teeth are the most favorite teeth of patients and dentists. Often in the day to day life they may disfigure and give an displeasing appearance. The art and science of dentistry helps a dentist to restore aesthetic and masticatory functions of these traumatized teeth. Trauma to the oral region comprises 5% of all injuries for which people seek treatment. In preschool children the figure is as high as 18% of all injuries<sup>1</sup>. The incidence of dental injuries with respect to the total number of facial injuries was 48.25%<sup>2</sup>. The highest incidence of anterior dental trauma occurs between seven and twelve years of age<sup>3-6</sup>. The leading cause is the increase in sporting activities and confrontations with others of the same age. In a study done by Avninder Kaur et al the prevalence of Traumatic Dental Injury (TDI) was found to be 5.1% out of which 96.1% of the injuries were to the maxillary anterior teeth.

The causes for the same are as follows:

- Increased overjet with protrusion
- Environmental determinants
- Human behaviour ( Risk taking children, bullied children, emotionally stressful conditions, obesity and attention – deficit hyperactivity disorder)
- Presence of illness, learning difficulties, physical limitations and inappropriate use of teeth
- Oral piercing
- Facial injury due to road traffic accidents
- Athletic injuries
- Physical abuse, assaults and torture<sup>7</sup>

Maxillary central incisor was the most common tooth to be affected due to trauma (96%). Ellis class I fracture was the main type of TDI (78.4%) due to falls while playing (58.8%) were found to be the main cause. Over jet over 3 mm and inadequate lip coverage were found to be important contributing factors for TDIs<sup>8</sup>. Males (45.3%) had traumatic dental injury levels approximately twice as high as females (25.2%) and the prevalence increases with age.

The management of these types of injuries to teeth start with a good diagnosis via proper case history, examination and radiographs followed by a treatment protocol to reduce symptoms, improve appearance and function. We shall discuss a series of case reports below to see the management of few fracture cases of anterior teeth.

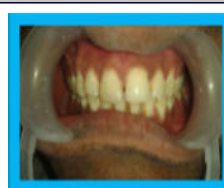
#### Case presentation:

##### Case 1:

A 27 year old male patient reported to the dental hospital with chief complaint of sensitivity since last 5 days in the broken tooth in the upper front region of jaw due to fall from bicycle two months back. Upon clinical examination Ellis class 2 fracture was observed in 11. Sensitivity was the only symptom and no other significant finding was noted. The tooth was restored with light cure composite resin after minimum preparation, acid etching with 37% of phosphoric acid, shade selection, application of dentin bonding agent (Tetric N Bond – Total etch).



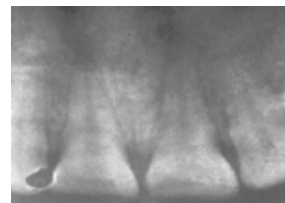
Pre operative view



Post operative view

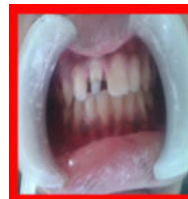
##### Case 2:

A 19 year old patient reported to the dental hospital with the chief complaint of pain in the upper front region of the jaw since 5 days. He gave a history of injury due to a fall while playing football 5 days back. Upon clinical examination Ellis class III fracture observed in 11 and Ellis class II fracture in 21. Tenderness on percussion was observed in 11 and vitality test was positive in 11 and 21. Patient was advised an intraoral periapical radiograph which revealed that there was fracture line extending to pulp chamber in 11 and dentin in 21.



Radiograph showing fracture

The fracture line extended upto the pulp chamber so root canal treatment (access cavity preparation, working length determination, biomechanical preparation, evaluation of master cone radiograph and obturation) was done in 11 followed by post space preparation, impression making, cast post insertion and porcelain fused to metal crown. 21 was asymptomatic so we had restored it with light cure composite resin restoration after acid etching and applying dentin bonding agent.



Before crown placement



Post operative photograph

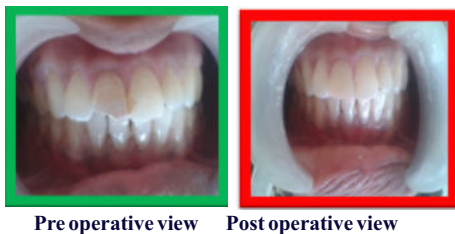
##### Case 3:

A 25 year old female patient reported to the dental hospital with the chief complaint of broken tooth the upper front region of the mouth. She gave history of automobile accident 15 days back. Upon examination Ellis class III fracture was diagnosed in 12 which was

already root canal treated with a faulty restoration. Patient was advised an intraoral periapical radiograph which showed fractured crown up to the cervical third and faulty restoration in 12. The tooth was asymptomatic and endodontically treated, the post space was prepared, impression was taken and cast post fabricated in 12 followed by porcelain fused to metal crown was given.

#### Case 4:

A 23 year old female patient reported to the dental hospital with the chief complaint of discolored upper front tooth. She gave a history of getting hit by a ball 15 years back. However, she did not seek treatment that time since the tooth was asymptomatic. The clinical examination revealed discoloration and fractured incisal edge in tooth number 11. Vitality test showed the tooth number 11 was non vital. An intra oral periapical radiograph was advised. The intraoral periapical radiograph revealed a periapical radiolucency and fractured incisal edge in 11. Periapical radiolucency was seen in the radiograph while discoloration and incisal edge fracture was seen clinically. So, the case was managed by endodontic treatment (access cavity preparation, working length determination, biomechanical preparation, evaluation of master cone radiograph and obturation) followed by walking bleach technique with sodium perborate and hydrogen peroxide (6%) for removal of the discoloration and composite restoration for fractured incisal edge in 11.



#### Case 5:

A 45 year old patient reported to the dental hospital with pain in upper front region of the mouth. He gave a history of fall from an auto rickshaw 2 months back. On clinical examination it was found that luxative intrusion was present in 11. Patient was advised an intra oral periapical radiograph and an oral panoramic radiograph. On radiographic examination it was seen that 11 is intruded into the tooth socket (approximately 2mm) and almost touching the floor of the nose. Radiolucency was present in the periapical region of 11. No fracture or any other abnormalities observed in the radiograph.



#### Pre operative radiograph Orthodontic extrusion Post operative view

Under local anesthesia endodontic treatment (access opening, working length evaluation, biomechanical preparation, master cone evaluation and obturation) was done followed by post obturation restoration with light cure composite resin. The correction of intrusion was done by fixed orthodontic therapy one month after the completion of endodontic treatment.

#### Discussion:

All the cases presented are result of injury to the anterior teeth mainly caused by accidents and have been managed by different methods. In the first case, fracture of the incisal third of the crown in 11 was managed by light cure composite resin restoration. According to Dr. Mehlman if the fracture includes both enamel and dentin, a composite build up must be performed<sup>9</sup>.

In the second case, fracture of middle third of crown involving enamel, dentin and pulp was managed by root canal treatment followed by cast post and crown in 11. In the third case, fracture of cervical third of crown involving enamel, dentin and pulp which was previously endodontically treated was managed by cast post and crown in 21. According to Kapil Loomba et al fractures of anterior teeth involving the cervical third up to the cervical line of the tooth should be treated by

post and core restoration after the completion of endodontic therapy<sup>10</sup>. Cast post has been given in 12 since the tooth structure remaining after tooth preparation for crown was insufficient to retain the core material if a fibre post was given.

The following points were kept in mind before enlarging the canals to receive the post.

- Conservation of as much of tooth structure as possible.
- At least 4–5 mm of gutta-percha should be left at the root apex for the adequate apical seal.
- Adequate post length; a ratio of crown length to post length should be at least 1:1<sup>11</sup>.

Minimal enlargement of the root canal to maintain sufficient dentin around the tooth to prevent root fracture. A minimal dentin thickness of 1 mm around the post should be provided<sup>12</sup>.

In the fourth case discolored tooth was endodontically treated followed by bleaching of non vital tooth by walking bleach technique. According to Dental trauma guide yellowish discoloration of the tooth crown may be seen in the permanent dentition as a sequel to traumatic injuries affecting the primary predecessors<sup>13</sup>. This may have been the most probable cause for discoloration in this case. In this study 6% hydrogen peroxide has been used since bleaching materials containing greater percentage of hydrogen peroxide was occasionally associated with the development of external root resorption<sup>14</sup>. The porcelain shade guide was used to evaluate the shade before and after bleaching. Before it was more towards the darker yellowish shades of the guide and after it was more towards the lighter shades in the shade guide. In a study done by William F. Freccia et al the teeth were stained in vitro to compare and evaluate the results of three commonly used nonvital bleaching techniques: the thermocatalytic, the "walking bleach," and the combination. The rapidity of the walking bleach technique in respect to a decrease of operator time was highly significant<sup>15</sup>.

In the last case intrusive luxation was managed by root canal treatment followed by orthodontic extrusion of the intruded tooth. Endodontic treatment can prevent the necrotic pulp from initiating infection-related root resorption. Endodontic therapy should preferably be initiated within 3-4 weeks post-trauma<sup>16</sup>. This is a case of minor intrusive luxation with 11 (<3mm) with the root tilted distally and intruded into the socket almost touching the floor of the nose and the crown tilted more mesially towards 21 where root canal treatment is done followed by orthodontic extrusion of the intruded tooth. The tooth has a closed apex, non vital and periapical involvement is seen so endodontic treatment was done. In the majority of the cases, the treatment of choice for traumatically intruded permanent teeth with complete root formation should be the orthodontic repositioning rather than the surgical repositioning. This approach will lead to force magnitude (light and continuous) and direction control allowing the desired and precise movement<sup>17</sup>.

All the above cases have been diagnosed and treatment planning has been done with written informed consent taken from the patients. In all the cases mentioned in this series esthetic restorative material has been used. Colour selection has been done on clean teeth and with the natural humidity of the oral cavity since enamel dehydration reduces its translucency by 82%, misleading the clinician to select a lighter and more opaque resin than the natural tooth colour<sup>18</sup>. The insertion of different types of resin as well as the colours must be done by a technique that allows the restoration of enamel and dentin separately. This incremental approach allows the perfect masking limits between tooth and restoration reproducing more accurately the optical and physical-mechanical characteristics of each dental substrate<sup>19</sup>.

After traumatic crown fractures, prognosis for pulp vitality is good to excellent. The table shows the comparison of level of fracture to the pulpal prognosis<sup>20</sup>.

| Level of fracture                                  | Prognosis of pulp                                               |
|----------------------------------------------------|-----------------------------------------------------------------|
| Enamel infraction                                  | Pulp survival: 97-100%                                          |
| Enamel fracture                                    | Pulp survival: 99-100%                                          |
| Enamel-dentin fracture                             | Pulp survival: 75-98%                                           |
| Uncomplicated crown fracture                       | Pulp canal obliteration: 0.2-0.5% (concomitant luxation injury) |
| Enamel-dentin fracture, complicated crown fracture | Pulp survival after: direct pulp capping: 72-81 %               |

The mean length of 5 years before replacement of a composite resin restoration can be expected to rise in the upcoming years<sup>20</sup>. Therefore, due to the variable prognosis the patients succumbing to such traumatic injuries must be kept on follow ups so as to prevent any further complications in future.

## Conclusion:

### It can therefore be concluded that:

- The dental traumatic injuries should be treated as endodontic emergencies and treatment administered as quickly as possible.
- The treatment protocol must be planned taking care to preserve as much as vital pulp as possible.
- To restore the tooth back to its pre trauma position.
- To keep the patients on a proper follow up to monitor any further complications that may occur in future.

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