

# Management of Horizontal Fracture: A Case Report

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## Abstract

Traumatic dental injuries often occur to the teeth and their supporting tissues and they are the main reasons for emergency visit to a dental clinic. Management of a fracture depends on its position and the extent of root involvement. Horizontal fracture is a term defined by a perpendicular or oblique fracture line to the long axis of the root. It is relatively infrequent, occurring in less than 3% of all dental injuries.

**Method:** A patient reported with pain, swelling, pus discharge and mobile tooth. After clinical and radiographic assessment a diagnosis of horizontal fracture was made. Patient was explained the pros and cons of treatment plan which included extraction of the mobile tooth fragment, root canal treatment, crown lengthening, metal cast post and fixed prosthesis.

**Keywords:** Horizontal fracture, gingival margin, crown lengthening, laser, removable prosthesis, cast post.

## Introduction

Traumatic dental injuries of teeth are among the main causes of emergency treatment in dentistry. Incisors are most frequently involved teeth and the largest proportion of injuries in permanent dentition occurs in the form of crown fractures.[1,2]Uncomplicated enamel and dentin fracture is most common, whereas those involving crown and root with pulpal exposure constitute only 5%-8% of all traumatic injuries.[3,4] A review of published case reports indicate that 85% of traumatized incisors fracture in an oblique fashion from labial to lingual aspect and that the fracture line proceeds in apical direction.[5] Horizontal root fractures in the permanent dentition have been reported to comprise 0.2%-7% of all traumatic injuries to teeth and are most prevalent in maxillary anterior teeth.[6,7]The type and location of fracture depends on age of patient, amount of force, and direction of blow. Proper clinical and radiographic examination is required for correctly diagnosing root fracture. A clinician must check for mobility of the coronal fragment and the pulp vitality. Radiographically, a radiolucent line is seen separating the apical and coronal fragments [8, 9]. Two or three radiographs taken at different angulations may be sometimes needed to detect the angle of fracture. The management of horizontal root fracture depends on the location of the fracture and mobility and the vitality of the tooth.

## Case Report

A 39 year old male patient reported to the department of conservative dentistry and endodontic Rama dental college Hospital and Research Centre with a chief complain of mobile tooth in upper anterior tooth region with a history of trauma in the same region 25 years ago. On clinical examination tooth 21 was noticed to be discolored with a sinus opening and pus discharge from the same. The coronal fragment was mobile and fracture line was not visible clinically. On radiographic examination a sub gingival horizontal fracture line was noticed with periodontal widening and periapical radiolucency. Treatment plan was explained to the patient as follows:

1. Extraction of the mobile tooth fragment
2. Root canal treatment of 21
3. Fabrication of removable prosthesis from the extracted tooth fragment (for inter appointment aesthetic purpose)
4. Crown lengthening using laser
5. Cast post fabrication
6. Permanent crown

On first appointment, the mobile tooth fragment was extracted under local anaesthesia (fig:- 1, 2 )



**Figure:-1 (Preoperative)**



**Figure: 2 (Tooth Fragment Extracted)**

Then working length was determined and BMP was done followed by calcium hydroxide dressing and temporary restoration fig: - 3, 4, 5



**Figure: 3 (Preoperative Radiograph)**



**Figure: 4 (Working Length)**



**Figure: 5 (Calcium Hydroxide Dressing)**

Impression was then taken and cast was poured. The extracted tooth fragment was then used to fabricate a removable prosthesis and was delivered to the patient on same appointment for esthetical inter appointment purpose. Figure 6, 7

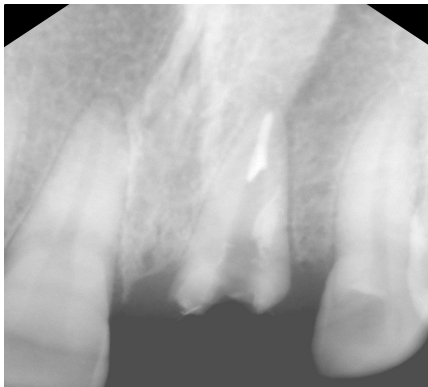


**Figure: 6 (Removable Prosthesis)**



**Figure: 9 (Crown Lengthening)**

After crown lengthening with help of laser, post space was made using GG drills leaving a 5mm gutta perch a apically fig: - 10. Then pattern fore cast post was fabricated using inlay wax. The patient was then recalled after 3 days. On his third visit, the metal cast post was luted and impression was taken for fabrication of permanent crown.fig:- 11 after a week permanent porcelain fused metal crown were delivered to the patient fig: - 12, 13



**Figure: 10 (5mm Apical Gp)**



**Figure: 11 (Post Luted Radiograph)**



**Figure: 12(Cast Post Cemented)**



**Figure: 13 (PFM Crown Cemented)**

## Discussion

Dental trauma, and ensuing fracture of the permanent anterior teeth, can be one of the most stressful situations in a dental practice, demanding a comprehensive treatment planning. The first step for control of inflammation and pain management is a well-executed root canal treatment. This would also be the foundation upon which any reconstructive treatment on the tooth can be based [10]

In the reported case the patient has a horizontal fracture and was very much concerned about his aesthetics. Assessment following extraction of the fractured segment showed the inadequate height of the remaining tooth structure to support a restoration. Hence, the option of cast post fabrication with crown lengthening and fixed prosthesis was considered. The principles of treating permanent teeth are reduction of displaced coronal fragments and immobilization. There are a number of treatment factors that have a negative influence on healing: forceful application of splints [11] and rigid splints. Dislocation of the coronal fragment and diastase's between fragments has the greatest influence upon healing response. The first step for control of inflammation and pain management is a well-executed root canal treatment. This would also be the foundation upon which any reconstructive treatment on the tooth can be based [12]. In this case, the fracture line extended below the cervical line and the

coronal fragment was mobile therefore immediately after extraction endodontic treatment was performed to relieve the inflammation and pain. Since the remaining tooth structure was insufficient to provide retention so various options were considered like: - a) surgical extrusion b) forced orthodontic extrusion and periodontal surgery for crown lengthening. Here crown lengthening was done in order to increase the crown root ratio and to increase the retention. Cast post was used because it has more fracture resistance.[13] According to Gurtu and Signal [14]; the use of a post ensures support and stability to the tooth. It also helps to retain the root fragments by radicular anchoring thereby strengthening the restoration complex which is subjected to tangential stresses. Post placement, in addition to bonding, provides retention via a friction bond and assists in preventing dislodgement to nonaxial forces<sup>15</sup>. The other important consideration is the biologic width. It is defined as the physiologic dimension of the junctional epithelium and connective tissue attachment and is approximately 2 mm<sup>16</sup>. Infringement of the biologic width by placement of a restoration within this zone may result in gingival inflammation, pocket formation and alveolar bone loss<sup>17</sup>. In the present case, a minimal osteotomy and gingivectomy to provide a 2mm circumferential ferrule, as well as aesthetic correction of the gingival levels in the anterior segment was done. The cast post was cemented and porcelain fused to metal crown was delivered.

## Conclusion

“Preservation of natural dentition and restoration of the oral cavity to a normal functional state” is the primary goal in dentistry. The treatment of root fracture may be a painstaking job for both dentists and patients. Successful management of root fractures often involves a multidisciplinary combination of endodontic, orthodontic, periodontal and prosthetic therapy. A multidisciplinary approach can help save teeth which would otherwise be indicated for extraction. The pros and cons of a tedious and long conservative therapy should always be weighed against the option of extraction and replacement with other fixed prosthesis.

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To cite this article: Management of Horizontal Fracture: A Case Report: Dr. Deeksha Dubey, Dr. Sharad Sharma, Dr. Asheesh Sawhny, Dr.N.Sridevi, Rama Univ. J. Dent. Sci. 2020 March; 7 (1): 5-8