Management of Vertically Fractured Maxillary Second Molar

Dr. Jyothi K.N.
Professor and H.O.D., Department of Conservative Dentistry and, Endodontics, Sri Siddhartha Dental College, Agalakote, Tumkur, Karnataka.

Abstract:

Vertical tooth fractures are longitudinal fractures of crown and /or root which are caused by trauma, heavy occlusal forces and dental procedures. There is little research on longitudinal tooth fractures related to diagnosis and treatment out come. There are few reports where fractured tooth can be salvaged intact and fully healthy when repositioned early and stabilized. This case report explains the management of vertically fractured maxillary second molar by intra coronal splinting and full coverage restoration.

Key Words: Vertical tooth fracture, Intracoronal splinting, Adhesive technique, Full coverage restoration.

Introduction:

Cracked teeth and their related entities, as well as vertical root fractures are longitudinal fractures of the crown and / root. These fractures occur in all tooth groups and are caused by occlusal forces and dental procedures. There is relatively little research on longitudinal tooth fractures, particularly on clinical outcome related to diagnosis and treatment. Most treatment modalities are based on opinion and anecdotal information\(^1\). When a vertical tooth fracture extends below the gingival attachment the recommended treatment has been extraction. As asserted by Walton after the...
Management of Vertically Fractured Maxillary Second Molar

Diagnosis of a split tooth is confirmed saving the tooth is not an option. But the literature also reveals long term case studies by David A Hall upto 20 years where a fractured tooth can be completely salvaged, intact and fully healthy when repositioned early and stabilized. The healing was observed by cementum deposition.\(^2\)

Masaka in 1980 and Aouate developed a technique for preserving vertical root fractures using 4 META adhesive extra orally and then with replantation. But they do not address the issue of potential biological cementum repair.\(^3\)

The present case report explains the management of vertical fracture in maxillary second molar by intracoronal splinting using advanced adhesive technique followed by a full coverage restoration.

**Case Report:**

A female patient aged 35 years was referred to the department of conservative dentistry and Endodontics from out-patient department Sri Siddhartha Dental college, Tumkur. Patient c/o pain on chewing in the right posterior tooth region. She gave h/o trauma one month ago due to fall and was hurt on the chin. On examination there was vertical fracture of tooth 17, the fracture line running mesio distally splitting the tooth into 2 halves. The fragments were intact and were in position without any displacement, but could be separated by wedging with a probe. The fracture line had extended subgingivally involving the furcation and passing through the pulp chamber. There was no sign of periodontal pocket. The tooth was tender on percussion. It was diagnosed as complicated crown-root fracture of 17 (split tooth). The sequence of treatment planned was – splinting the tooth with orthodontic band, root canal treatment, intra coronal splinting of fragments with self etching.
adhesive and composite resin, crown preparation followed by cementation of metal crown. Immediately after the examination & diagnosis of vertical tooth fracture in relation to 17 patient was referred to orthodontia department for cementation of orthodontic band to hold the fragments in position (fig.1&2)

In the next appointment root canal opening was done. The fracture line was clearly seen running mesiodistally involving both the marginal ridges and through the pulp chamber and the palatal canal(fig.3). The root canal treatment was completed and temporary restoration was given.

In the subsequent appointment temporary restoration was removed, access cavity was thoroughly debrided with saline and dried. Self etching adhesive (Multilink) was applied to the cavity according to manufacturer’s instructions and the cavity was restored with packable light cured composite resin (Tetric ceram – Ivoclare vivadent) (fig.4&5). Orthodontic band was removed and the tooth was prepared to receive a metal crown(fig.6). Temporary crown was cemented initially followed by full metal crown(fig.7).
Tooth is periodically evaluated once in a month. Tenderness to percussion has gradually reduced and the patient is able to chew on the tooth. Periodontal attachment is intact without pocket formation. IOPA radiograph does not show any sign of bone loss in the furcation or interdental area. Further periodic evaluation is planned once in three months till one year and later once a year to know the long term success of the treatment.

**Discussion:**

Tooth fractures include trauma related crown, crown-root fractures and a broad group of cracked teeth. American association of Endodontists classify cracked teeth as⁴ – Craze lines

- Cuspal fractures
- Cracked teeth
- Split tooth
- Vertical root fracture.

Split tooth fractures are primarily mesio distal fractures that cross both marginal ridges and extend deep to shear onto the root.
surface. The more centered the fracture is occlusally, the greater the tendency to extend apically. These fractures are more devastating. Mobility of one or both segments will be present. These fractures usually include the pulp. Maintaining an intact tooth is challenging if not impossible. Prognosis is variable. When the fracture extends to and surfaces in the middle to cervical third of the root, there is reasonable chance of successful treatment and restoration.

There are various treatment modalities in the literature to bind cracked teeth together, like the use of adhesives, amalgam with retention on both sides of the infractions and full coverage crowns, and experimental approaches using lasers CO2, Nd-YAG.

The outcome of the treatment is not extensively reported for teeth with infractions. Cameron reported a 75% success after 10 years following the placement of the crowns. Guthrie and Defiore found that 24 of 25 teeth restored with acrylic crowns were asymptomatic after one year. Brynjulfson et al achieved pain relief in 90% of their patients after protective restorations including endodontic treatment. Tan et al showed an 85% survival rate of 2 years after protective crowns were placed. According to Leif K Bakland a 5 year survival prediction appears reasonable in most cases. Dr. David A Hall has followed his cases up to 20 years where a split tooth can be completely salvaged, intact and fully healthy when repositioned early and stabilized where the healing was observed by cementum deposition.

In the present case report the fracture in maxillary right second molar was almost centered running mesiodistally involving both the marginal ridges and the pulp cavity similar to one of the case reports by Dr. David A Hall. Root canal treatment was carried out under orthodontic band.
cementation. Later the tooth fragments were splinted with self etching adhesive, restored with light cured composite resin and a full metal crown was cemented. The tooth is followed up for 6 months with no signs of failure.

Treating longitudinal tooth fractures is challenging and long term follow up is necessary.

References:


Corresponding author address:
Dr. Jyothi K.N.
No: 101, Swajyothi, 2ND Cross, 4TH Main, Income Tax Layout, Near Attiguppe Vijayanagar, Bangalore.-560040.
PH. 080-23396000, 9845184346.
E- Mail: drjyothingsh0@gmail.com