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Novel Matricing Technique for Management of Fractured Cusp Conundrum – A Clinician's Corner

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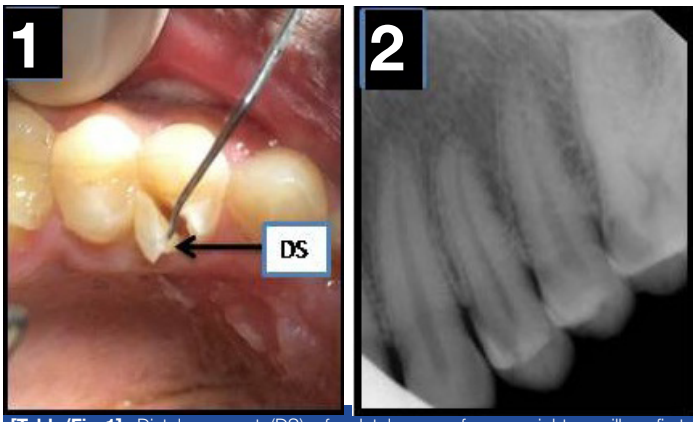
ABSTRACT

Longitudinal tooth fracture can be classified as craze lines, fractured cusp, cracked tooth, split tooth and vertical root fracture based on extent and severity of the fracture line. The most common type of longitudinal tooth fracture is fractured cusp that poses the treatment dilemma. Retention of the fractured cusp segment temporarily with matrix band followed by permanent bonded restoration and finally removal of tooth fragment during crown preparation is a novel technique. This paper throws light on a matricing and holding technique for the management of supra-crestally fractured palatal cusp of maxillary first premolar in a 29-year-old Asian male.

Keywords: Craze lines, Cracked tooth, Longitudinal tooth fracture, Split tooth, Vertical root fracture

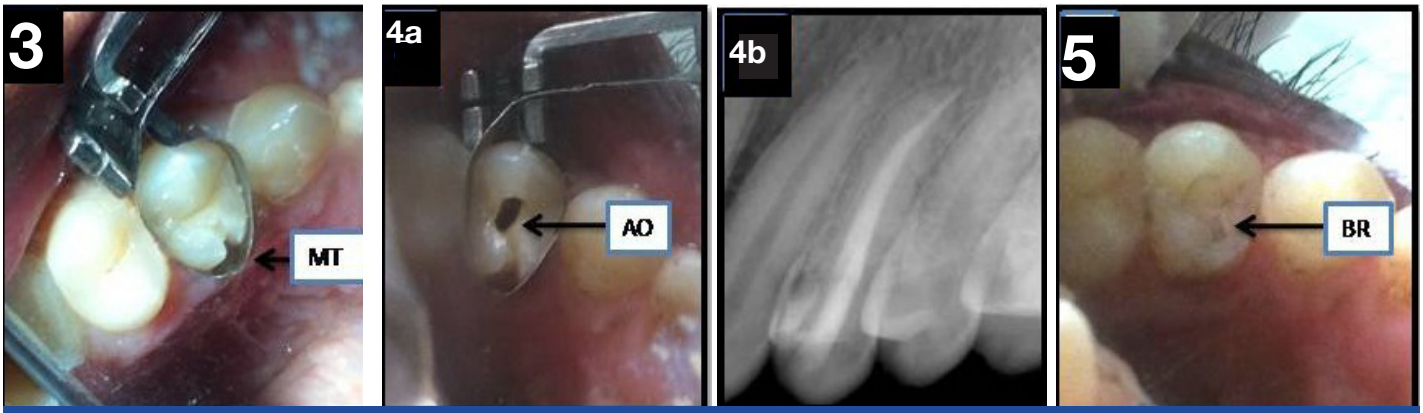
A 29-year-old healthy Asian male reported to the Department of Conservative Dentistry and Endodontics, CDER, AIIMS, New Delhi, with chief complaint of pain on biting in upper right posterior region since two months when he had suffered a road traffic accident. Careful clinical and radiographic examination revealed that distal segment of palatal cusp of upper right maxillary first premolar (tooth #14) was fractured and fracture line extended sub-gingivally [Table/Fig-1,2]. It showed complicated crown-root fracture with pulp exposure and hence decided to perform endodontic treatment in tooth #14. Under cotton roll isolation, matrix band was applied to hold the segments together [Table/Fig-3]. Conservative access cavity was made in the centre of tooth #14. Single sitting root canal treatment was performed [Table/Fig-4a,b]. After completion of root canal treatment, bonded restoration in the form of dual cure resin was given [Table/Fig-5]. Then fractured segment was removed [Table/Fig-6]. Crown cutting was done [Table/Fig-7] and rubber base impression was taken. Patient was recalled after one week when porcelain-fused to metal crown was given as a final restoration [Table/Fig-8]. At 12 months follow-up, patient was asymptomatic with normal sulcus depth and no signs of periapical changes radiographically [Table/Fig-9].



[Table/Fig-1]: Distal segment (DS) of palatal cusp of upper right maxillary first premolar was fractured. **[Table/Fig-2]:** Pre-operative radiograph.

DISCUSSION

In longitudinal tooth fracture, a fracture line is present in the vertical plane or along the long axis of crown or root that propagates over time [1]. According to American Association of Endodontics (AAE), longitudinal tooth fracture can be classified as craze lines, fractured cusp, cracked tooth, split tooth and vertical root fracture depending upon extent and severity of injury. The longitudinal tooth fracture can be diagnosed using various methods like thorough history of the complaint, radiographs, pulpal and periapical tests, controlled wedging technique, dyes, microscope and transillumination, cone beam computed tomography, ultrasound and infrared thermography. Fractured cusp is the most common type of longitudinal tooth fracture and is seen in teeth weakened by large intra-coronal restorations, large carious lesion, excursive interferences, para-functional occlusal habits, ageing and traumatic injuries [2]. Usually cusp fractures originate along the internal line angles of intra-coronal preparations and propagate towards enamel surface diagonally or horizontally and are complicated by a vertical component when the crack crosses a buccal or a lingual groove or a proximal marginal ridge [3]. It



[Table/Fig-3]: Matricing technique (MT) was used to hold the fractured cusp in place. **[Table/Fig-4a]:** Conventional access opening (AO) was done. **[Table/Fig-4b]:** Post-obturation radiograph. **[Table/Fig-5]:** Bonded restoration (BR) was given.

[Table/Fig-6]: Fractured tooth fragment was removed. **[Table/Fig-7]:** Crown cutting was carried out.

[Table/Fig-8a]: Porcelain fused to metal crown was given. **[Table/Fig-8b]:** Post-crown cementation radiograph. **[Table/Fig-9]:** Radiograph at 12-month follow-up revealed normal periapical tissue.

is most commonly seen in the disto-lingual cusp of mandibular molars [2]. In posterior teeth, non-functional cusps are more prone to fracture than functional cusps. The fracture line often extends in mesio-distal and bucco-lingual directions commonly involving one or both marginal ridges as well as a buccal or lingual groove and terminates in the cervical region either parallel to the gingival margin or slightly sub-gingival.

Fractured cusp is the most common and least devastating of all longitudinal tooth fractures. Once the fractured segment is removed, it can be managed either by simple means where no treatment is needed or by complex procedures like crown lengthening. In matricing technique, fracture segment is retained temporarily with matrix band followed by permanent bonded restoration and finally removal of tooth segment. Rationale behind temporarily retaining the fractured cusp fragment was that it helped in the proliferation of granulation tissue to occupy the space and re-attachment of periodontium to the root dentin surface [4]. This prevented any future possibility of pocket formation in the involved root surface area. Early diagnosis is important, as restorative intervention can limit propagation of the fracture, microleakage and involvement of the pulpal or periodontal tissues, or disastrous failure of the cusp.

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