

## Management of Severely Curved Mandibular Second Premolar- A Case Report

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**ABSTRACT:** Dilaceration is the change in axial inclination of the root which occurs as a result of previous trauma to the permanent tooth bud. Owing to the complex anatomy of their roots, the management still remains a challenge. Knowledge of this complex anatomy and its variation are essential for successful endodontic outcome. This case report outlines the diagnosis and successful endodontic management of dilacerated mandibular second premolar.

**KEYWORDS:** Dilaceration, dilacerated premolar, dilacerated lower second premolar, management of apical curvature, unusual morphology.

### I. INTRODUCTION

Diversity among root or canal configurations tend to exhibit various complexities in their management strategies. It is very imperative to know that all the teeth will not possess a straight root or canal. The term dilaceration describes the change in the direction of crown and root of the tooth, axially (Latin: Dilacero, means-tear up). Chohayeb (1983), defined dilaceration as a deviation up to 20° or more in apical portion of root along the long axis of the tooth. Tomes (1848) described dilaceration to be a deviation in the vertical relationship of a crown of a tooth to its root. Stewart symbolised tooth dilaceration to the hand of a traffic policeman, whereas Moreau used the term scorpion tooth. According to Hamasha et al. (2002), a tooth is considered to be dilacerated mesially or distally if there is a 90° or greater angle along the axis of the tooth or root.<sup>[5]</sup>

Dilaceration or root curvatures are anomalies occurring due to previous trauma to the primary predecessor tooth or due to any developmental disturbances. Dilacerations are more

frequently isolated in permanent dentition, especially in posterior teeth with no sex predilection.<sup>9</sup> Root canals might display variations like acute curvature in the apical third or curvature throughout the canal, dilacerated root or S-shaped canal or curvature of mesial canal in the apical third.<sup>[9]</sup>

The presence of such curvatures might greatly influence the root canal instrumentation procedure. Inappropriate access cavity preparation or insufficient knowledge on dilacerated tooth would result in mishaps like ledge formation, canal blockages, zipping/elbow formation and apical or strip perforation. Such endodontic adversities could compromise the efficacy of disinfection, reduce the fracture resistance of the affected tooth and ultimately jeopardize the quality of apical seal (Wu-2000, Hulsmann -2005, and Schafer & Dammascke-2009).<sup>[6]</sup>

Root dilacerations in anterior teeth and premolars are common in the apical third of the roots.<sup>[4]</sup> Trauma while extracting primary molars can lead to dilaceration of developing premolars due to the close proximity of deciduous molar roots. Dilacerations are more common in mandibular third molars and less frequent in mandibular second premolars.<sup>[3]</sup>

For mandibular premolars, calcification of crown begins at 24 months and eruption takes place by 11- 13 years of age. Trauma or any developmental disturbances during this time interval could lead to dilacerations.<sup>[5]</sup>

Greater the root curvature, more challenging it is to instrument and enlarge the apical portion of root. In management of curved canals, achieving adequate instrumentation with efficient disinfection remains cumbersome.<sup>[5]</sup>

It is critical to reduce the apical preparation in case of dilacerations for two reasons, (i) smaller diameter instruments results in less engagement of the dentinal walls, and (ii) smaller diameter instruments are flexible and the chances of canal transportation could be significantly reduced.<sup>[9]</sup> However decrease in apical preparation in the case of curved canals are safe, it might decrease the disinfection efficacy of the irrigant. The expertise clinicians could also have difficulties in management of dilacerated tooth with the basic, available endodontic strategies. Proper radiographs, adequate access cavity design, pre-curving of the endodontic hand files, minimal apical preparation, necessary irrigation protocol and calcium hydroxide dressing during inter-appointments could potentially increase a favourable outcome in the management of dilacerated teeth.<sup>[9]</sup>

This case report involves successful endodontic management of mandibular second premolar with dilacerated root.



**Figure-1: Pre-operative radiograph and sinus tracing with #20 guttapercha**

## II. CASE REPORT:

A 24 year old male patient reported to the department of conservative dentistry and endodontics with the chief complaint of pain and swelling in his lower left back teeth region for the past two days. History, revealed that the patient had pain which was sharp, pricking and radiating in nature that increased on eating and relieved gradually. The patient had no contributory medical and surgical history. On Intraoral examination, the presence of dental caries in 35 that was extending beyond the dentino-enamel junction was evident.

Clinically, the cavitated 35 also responded positive for tenderness to percussion. The patient also had an intra-oral swelling with sinus tract and pus discharge in relation to 35. Cold test and electric pulp testing revealed a negative response (with- 35) in comparison to the positive contralateral tooth. On radiographic examination (Figure-1), there was an apical radiolucency with an apical curvature that was evident in 35. Hence, a diagnosis of Dental caries with chronic apical abscess was made and an endodontic therapy was planned. Following inferior alveolar nerve block (27 gauge needle- Unolok; Local Anaesthesia- with adrenaline, 1: 80000) in the left mandibular region, single tooth rubber dam isolation was done. Access cavity preparation was performed using round end tapered diamond (Mani, japan) and canals were located. After identification of the canal, orifice enlargement was done with gates-glidden drill #2(Mani, Japan). Patency filing was done with #8 k-file (Mani, Japan), following which the working length was estimated using Ingles radiographic method (Figure-2). Shaping and cleaning was performed up to F1 protaper (Protaper gold, Dentsply) and copious irrigation was done using 5.25% of sodium hypochlorite (Prime dental, pvt, ltd). A final rinse of saline irrigation was done and calcium hydroxide dressing was given and cavity was restored with Intermediate Restorative Material. Dam isolation was removed and Incision and drainage was done with no-15 bard parker blade. On the second visit, irrigation was done and calcium hydroxide dressing was given and the cavity was restored with Intermediate Restorative Material (Figure-3). Following 2 weeks of calcium hydroxide medicament, the patient was recalled and was found to be asymptomatic. After irrigation and drying of the canals, obturation was performed with 6% gutta-percha(Dentsply) and zinc oxide eugenol sealer (Figure-4 & Figure-5). After 2 weeks, coronal seal with composite resin was given.

The patient was recalled at 1, 3, 6 and 12 months after coronal sealing and was found to be asymptomatic (Figure-6 and figure-7).



**Figure-2: Working length determination using 15# k-file**

### III. DISCUSSION:

Dilacerations generally results from a previous history of trauma to the primary predecessor tooth. Posterior teeth are commonly affected than anterior teeth. The order of incidence of dilaceration includes mandibular second molar, maxillary first molar, mandibular first molar, maxillary canine, maxillary second premolar, mandibular incisor, mandibular canine, first and second premolar.<sup>[6]</sup>

The current article demonstrates a case of dilaceration in mandibular second premolar. Dilacerations in mandibular premolars were less than 2% (malcic et al, 2006) in the Croatian population. In a study by Patit et al, there was a 0.5 % prevalence of dilacerations in the Indian population. Schafer et al (2002) stated that 84% of root canals were curved and 17% of teeth had second curvatures and classified them as S-shaped root canals.<sup>[12]</sup>

Angled radiographs help to determine the apical curvatures if present. The dilacerated roots can be identified, easily on a periapical radiograph if it is curved mesially or distally. If present buccally or lingually it represents a bull's eye appearance. Diagnosis can also be made by CBCT to determine the exact position and location of the dilacerated tooth.<sup>[9]</sup>

The radiographic diagnosis of the current case involves distally dilacerated mandibular second premolar and two-rooted mandibular first premolar. The incidence of more than 1 root, more than 1 canal, and more than 1 foramen is less frequent in the mandibular second premolar in comparison to the mandibular first premolar.<sup>[6]</sup>

The present case reported with sinus tract adjacent to the alveolar mucosa of 35. A peri-apical infection, ruptures the nearby thin cortical plate, penetrates the periosteum and forms sinus tracts. Pus discharge from the sinus tracts are due to the destroyed periodontal tissues of the involved tooth. In mandibular region the thin areas of alveolar bone are sighted on the labial surface for anterior teeth and lingual surface for posterior teeth. Since the causative tooth was dilacerated, it could have been responsible was transportation of infection through thinner tissues present adjacent to it.<sup>[7]</sup>

Non-surgical treatment should be the first choice in endodontic therapy. Outcome of endodontic therapy is majorly influenced by adequate cleaning and shaping and proper debridement of the canals. Apical curvature of root results in difficulty in shaping and debridement. The advantage of using rotary Ni-Ti instruments over stainless steel is that it has reduced coronal binding to the dentinal walls and less apical extrusion of debris. In the current case, hand instrumentation was done with stainless steel K-files followed by cleaning and shaping with Ni-ti rotary instruments. In curvatures, files must be pre-curved for negotiating the canals till the radiograph apex. Scouting and patency filing were performed with smaller diameter files. It is mandatory to irrigate and verify patency between each cycle of instrumentation. Use of sodium hypochlorite as an irrigant and calcium hydroxide as a medicament during inter-appointments could potentially reduce the bacterial load in root canals.<sup>[7]</sup>

Protaper gold is a variable tapered instrument which could provide good centered apical preparation.<sup>[11]</sup> The apical preparation was kept as minimal as possible in the present case and hence the size F1 was preferred.

There are chances of coronal microleakage and bacterial contamination following endodontic therapy.<sup>[11]</sup> Bonded restorations prevent microleakage and provides adequate strength to withstand masticatory load. Composite resin is a core material which has a fracture resistance equal to that of amalgam. According to Seon et al (2008), coronal sealing with composite restoration provides substantial strength to endodontically treated tooth.<sup>[14]</sup>

Dilacerations must be properly diagnosed and managed efficiently, as it could increase the potential risk of iatrogenic mishaps during endodontic therapy. Hence, clinicians should be aware of the root anatomy of any individual teeth before the commencement of endodontic therapy.



**Figure-3: Calcium hydroxide dressing and restoration with IRM.**



**Figure-4: Radiograph of master-cone**



**Figure-5: Post-op radiograph following obturation**



**Figure-6: Follow up radiograph- 6 months**



Figure-7: Follow up radiograph- 1 year

#### IV. CONCLUSION

Severely curved canals are to be treated with extreme caution. It is essential to maintain the same anatomy of root canals without any mishaps. Novel approaches should be appreciated for treating dilacerated teeth.

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