

Palatal Cervical Enamel Projection in a Four Rooted Maxillary First Molar: A Case Report

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Abstracts: Dental plaque has been implicated as the primary etiology in periodontal disease. Developmental aberrations in tooth morphology such as a Cervical Enamel Projection (CEP) may predispose the affected area to plaque accumulation and consequently cause periodontal breakdown. Cervical enamel projection is the most common anatomic variation in molar teeth. CEPs were most likely found on the buccal surfaces of mandibular molars. Maxillary first molars are particularly noteworthy for anatomical variations of the root canals. The least frequent anomaly appears to be that of the double palatal roots. The aim of this study was to present a case with CEP in palatal side of the first maxillary molar with 2 palatal roots.

Key words: Cervical enamel projection, periodontal destruction, four rooted maxillary molar, double palatal roots

INTRODUCTION

Dental plaque has been implicated as the primary etiology in periodontal disease (Loe *et al.*, 1965). Developmental aberrations in tooth morphology such as a Cervical Enamel Projection (CEP), enamel pearl or palatogingival grooves may predispose the affected area to plaque accumulation and consequently cause periodontal breakdown. Early diagnosis of these anomalies may improve the prognosis of the involved teeth (Machtei *et al.*, 1997). Cervical enamel projection is the most common anatomic variation in molar teeth. CEP has been defined as a dipping of the enamel from the cemento-enamel junction toward the furcal area of molars (Bissada and Abdelmalek, 1973).

In 1949, Atkinson first mentioned the possible relationship between CEPs and periodontal pocket formation (Atkinson, 1949). Several studies reported the prevalence of CEP ranging from 8.6-32.6%. The variations might have resulted from different study designs and ethnic populations (Machtei *et al.*, 1997). CEPs were most likely found on the buccal surfaces of mandibular molars (Bissada and Abdelmalek, 1973). Machtei *et al.* (1997) concluded that mandibular molars with class 2 bifurcation defects are more likely to have CEP. Hou and Tsai (1987) reported high prevalence of CEP (82.5%) in teeth with bifurcation involvement.

In the literature, there is only one report of palatal location of CEP in the maxillary molar (Chan *et al.*, 2010). Master and Hoskins suggested a classification system based on the extent of cervical enamel projecting into the

furcation area. In grade I, there is a distinct change in the CEJ in which enamel slightly projects into the bifurcation area. In grade 2, the CEJ margins approach the bifurcation area but do not invade it completely. In grade III, the CEJ is in direct contact with the bifurcation area (Masters and Hoskins, 1964). The other category of ectopic enamel formation with lower prevalence is enamel pearl which is defined as an ectopic globule of enamel that is often connected to coronal enamel by a CEP (Darwazeh and Hamasha, 2000). Maxillary first molars are particularly noteworthy for anatomical variations of the root canals.

Several studies revealed that the majority of maxillary first molar teeth had three roots but some studies reported 4 or 5 roots with a corresponding number of root canals (Adanir, 2007). The least frequent anomaly appears to be that of the double palatal roots (Christie *et al.*, 1991). In the literature, there was not any report of cervical enamel projection on palatal surface of 4 rooted maxillary molar teeth. The aim of this study was to present a case with CEP in palatal side of first maxillary molar with 2 palatal roots.

CASE REPORT

A 41 years old systemically healthy, nonsmoking female with chief complaint of gum disease, referred to the periodontic Department of the Faculty of Dentistry, Shahid Beheshti University in October 2010. The dental history showed that the patient had infrequent dental visits. The date of last scaling was 3 months before her first appointment. A periodontal and radio graphic

Table 1: Periodontal charting of maxillary teeth

Factors	17	16	15	14	13	12	11	21	22	23	24	25	26	27
BPD/CAL	538/648	632/732	222/121	222/131	322/222	314/313	212/212	624/623	567/579	323/323	325/325	426/426	616/626	555/656
PPD/CAL	667/667	523/623	233/232	323/222	323/323	223/222	222/112	522/622	557/458	335/334	223/223	323/323	523/646	435/555
MOB.	I	-	-	-	-	-	-	-	I	-	-	-	I	I
F.I.	III	II (D)	-	-	-	-	-	-	-	-	-	-	I (M, B), IV (D, P)	I(B),I(D)

BPD: Buccal Pocket Depth, CAL: Clinical Attachment Level, PPD: Palatal Pocket Depth, MOB: Mobility, F.I: Furcation Involvement

Table 2: Periodontal charting of mandibular teeth

Factors	48	45	44	43	42	41	31	33	34	35	37	38
BPD/CAL	325/326	243/324	326/335	428/427	529/4210	867/9810	448/8811	527/10510	523/632	322/233	224/225	223/333
LPD/CAL	555/556	326/437	638/547	538/448	545/878	445/879	445/779	436/769	522/522	222/223	337/437	333/333
MOB.	I	-	I	I	III	III	III	III	I	I	II	I
F.I.	-	-	-	-	-	-	-	-	-	-	I (L)	-

BPD: Buccal Pocket Depth, CAL: Clinical Attachment Level, LPD: Lingual Pocket Depth, MOB: Mobility, F.I: Furcation Involvement

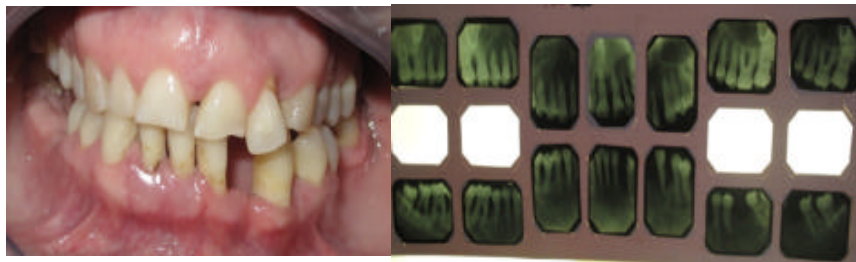


Fig. 1: Overall clinical and radiographic view



Fig. 2: Clinical and radiographic view of tooth 26 with palatal cervical enamel projection and 2 palatal roots

examinations and charting was performed (Fig. 1, Table 1 and 2). Her oral hygiene was poor with an O'Leary plaque index of 85%. Based on non contributory medical history, consistency of severity of periodontal tissue destruction with age and bacterial deposits and severity and extent of the disease, a diagnosis of generalized severe chronic periodontitis was made (Armitage, 1999). The overall prognosis of poor was assigned for the patient.

In palatal side of left maxillary first molar, there was severe attachment loss with gingival recession. The tooth had 4 roots (2 buccal and 2 palatal roots) and a cervical enamel projection on palatal side of the tooth which was grade 2 based on Masters and Hoskins classification. The distal and palatal furcation involvement was grade IV (Fig. 2). The prognosis of poor was assigned for this tooth. The written consent was obtained from the patient. Initial periodontal treatment including oral hygiene

instructions and supragingival and subgingival scaling and root planning were performed and hopeless teeth were extracted. One month later, at the reevaluation appointment, plaque index, periodontal pocket depth and presence of plaque and calculus were assessed. Remained deep pockets (≥ 5 mm) were scheduled for surgical interventions. One of these sites was posterior of left maxillary quadrant. In this area, under local anesthesia, incision and flap reflection were done and root surfaces were debrided thoroughly. Then the cervical enamel projection was removed and the distopalatal root was amputated because of grade IV distal and palatal furcation involvement (Fig. 3). Osteoplasty was performed in buccal and palatal alveolar bones. The flaps were reapproximated and sutured (Fig. 4). The patient was referred to endodontic department for root canal therapy of tooth number 26 after 2 weeks (Fig. 5). Consequently, the tooth



Fig. 3: Distopalatal root amputation and CEJ removal



Fig. 4: The flaps were reapproximated and sutured

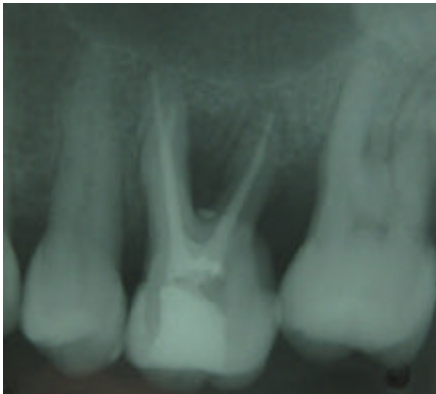


Fig. 5: Root canal therapy was performed after 2 weeks



Fig. 6: The patient was instructed to clean the palatal side of the tooth with proximal brush



Fig. 7: Treatment modalities showed acceptable results in the resolution of periodontal

was restored and amputated root was sealed with composite resin. The caries detected on palatal surface of palatal root was arrested and did not need any further restoration. The patient was instructed to clean the palatal side of the tooth with proximal brush (Fig. 6). The treatment modalities resulted in the resolution of periodontal inflammation and pocket reduction in tooth 26 (Fig. 7). The recall interval of 2 months was assigned for the patient.

DISCUSSION

Although, bacterial plaque is a primary cause of the initiation and progression of periodontal disease, anatomic factors such as CEPs are often associated with advanced localized periodontal destruction (Risnes *et al.*, 2000). The enamel covering the cervical enamel projection prevents the formation of a connective tissue attachment. Instead, the gingival tissue adjoining the CEP is attached to the tooth by an epithelial attachment which is less resistant to the insult of bacterial plaque (Atkinson, 1949). Goldstein described this attachment as a locus minoris resistance (Goldstein, 1979). The morphology of CEP enables the adherence of dental plaque. This together with a reduced access for oral hygiene measures and the proximity to the furcation area might enhance periodontal breakdown in the furcation (Hou and Tsai, 1987). Machtei *et al.* (1997) and Hou and Tsai (1987) reported high prevalence of CEP in teeth with bifurcation involvement.

Hou and Tsai (1987) and Swan and Hurt (1976) reported CEP grade III to be the most commonly found enamel projection but Machtei *et al.* (1997) reported that grade II was the most prevalent. In this case the tooth had CEP grade II. Some researchers indicated that a higher prevalence of CEPs was found in the mandibular molars

than in the maxillary molars and mandibular first molars showed the highest prevalence (Hou and Tsai, 1987). However, other investigators reported a greater prevalence of CEPs on second mandibular molars (Bissada and Abdelmalek, 1973; Swan and Hurt, 1976).

In this case, we found a CEP in palatal side of the first maxillary molar. In the literature, there is only one report of palatal location of CEP in the maxillary molar (Chan *et al.*, 2010). In this case, tooth # 26 had 2 palatal roots which is the least frequent anomaly of maxillary first molars. One notable study describing maxillary molars with 2 palatal roots was that of Christie *et al.* (1991) who suggested a classification for such teeth based on the degree of separation of their roots and their divergence.

Ectopic enamel removal is generally recommended during periodontal surgeries to allow new attachment to form (Atkinson, 1949). Tsao *et al.* (2006) concluded that mandibular molars with class 2 furcation involvement and CEPs could achieve similar results when enameloplasty/odontoplasty was performed as compared to those without CEPs using various surgical modalities (Tsao *et al.*, 2006). The removal of CEP would contribute to the promotion of collagen fiber attachment in grade I and shallow grade II furcal lesions (Hou and Tsai, 1987). But in more severe lesions some additional surgical interventions such as tunneling or root resection would be required. In the present case, the cervical enamel projection was removed and because of grade IV furcation involvement of distal and palatal furcations, the distopalatal root was resected and the patient was instructed to clean the site with interdental brush. Finally, these treatment modalities showed acceptable results in the resolution of periodontal inflammation and pocket reduction to a maintainable level.

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