

Cemental tear on the first maxillary premolar in the patient with facial palsy: an uncommon type of root fracture

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Abstract

A 56-year-old female patient came to the department complaining of pain in the upper right back tooth region. The patient reported a history of paralysis in the right half of the body. There is neither swelling nor inflammation in the gingiva. No sinus tract is present in the vestibular area. There were no noticeable caries lesions. Right first maxillary premolar with significant periodontal pocket and grade 2 mobility on palpation. There is tenderness in the percussion. The patient refused treatment alternatives and had the tooth extracted. The middle third of the root contains a completely detached fragment in the middle third. The root fragment was sent for biopsy for histological analysis. Cementum, dentin, and inflammatory cells were found during histological examination and were suggestive of cemental tear.

Keywords: Cemental tear, Premolar, Root fracture.

1. Introduction

Cementum is a hard, avascular connective tissue with a comparable composition to the bone, including around 44% to 50% hydroxyapatite by weight and the remainder being collagen and non-collagenous matrix proteins [1]. Organic matrix predominantly consists of type 1 collagen fibrils. Cementum serves a functional purpose in the insertion apparatus by embedding the collagen fibres of the periodontal ligament to the tooth surface [2]. The cemental tear is a unique type of root surface fracture that may cause periapical and periodontal tissue destruction [3]. It is a surface root fracture involving cementum and, in some cases, dentin [4].

One of the root fractures that has not been adequately reported in the literature is a cemental tear. The possible etiological factors are age, trauma from occlusion, or traumatic event. A few cemental tears on the labial/lingual (palatal) portions of tooth roots may exist and are hard to identify on preoperative radiographs. The Cone Beam Computed Tomography (CBCT) will yield a better diagnostic value for the cemental tear. Nevertheless, the accurate diagnosis of cemental tears should be confirmed by histological examination or direct inspection of the fractured cementum fragment and the root surface of the extracted teeth. The present case report describes the management of a rare type of complicated root fracture caused by a cemental tear.

2. Case Report

A 56-year-old female patient reported to the department of dentistry. She had pain in the upper right back tooth region for three months. The pain was severe, radiating, and aggravated by chewing food. The patient revealed a history

of paralysis in the right half of the body but was hesitant to reveal the reason. The patient did not use any medications, including anticoagulants, and no other findings were observed during the extra-oral examination. However, during intraoral examination and inspection, no caries lesion was present. The gingiva showed no plaque or no inflammation. No sinus tract was visible in the vestibular region. During palpation, Buccal vestibular tenderness was noted in the maxillary first premolar region, and tenderness on percussion was present apically. Grade 2 mobility present bucco-palatally. A deep periodontal pocket over 8mm deep is present on the buccal aspect without exudation.

The patient refused to accept alternate treatment options and had her tooth extracted. The tooth was removed and examined. A totally detached root fragment was found on the mesial aspect, and it is extending from the coronal third to the middle third (Figure 1). The fragment measures more than 5mm in width and extends from the labial aspect to the palatal aspect. The diagnostic possibility of vertical root fracture is eliminated, as vertical root fracture is a longitudinally oriented fracture of the root that originates from Apex and propagates to the coronal part [5]. The specimen was sent for biopsy, and histopathological examination revealed cementum, dentin, and inflammatory cells on the fractured fragment. The cementum is mainly acellular with a large number of inflammatory cells (Figure 2). The diagnosis of complex root fracture with cemental tear was verified based on the above findings.

3. Discussion

Root fractures are considered to be the third most common cause of tooth loss. A root fracture is defined as a fracture involving dentin, cementum, and pulp [6]. Root fractures constitute 0.5 to 7% of all dental injuries and are characterized by fracture lines involving the root in a horizontal and diagonal plane [7]. The cemental tear is a

rare form of root fracture and can be diagnosed after a biopsy. The present case was also reported after extraction, as mentioned in the previous case reports. The biological basis for cemental tear appears to be a weak interface between cementum and dentin compared to tooth and periodontal interfaces [8].

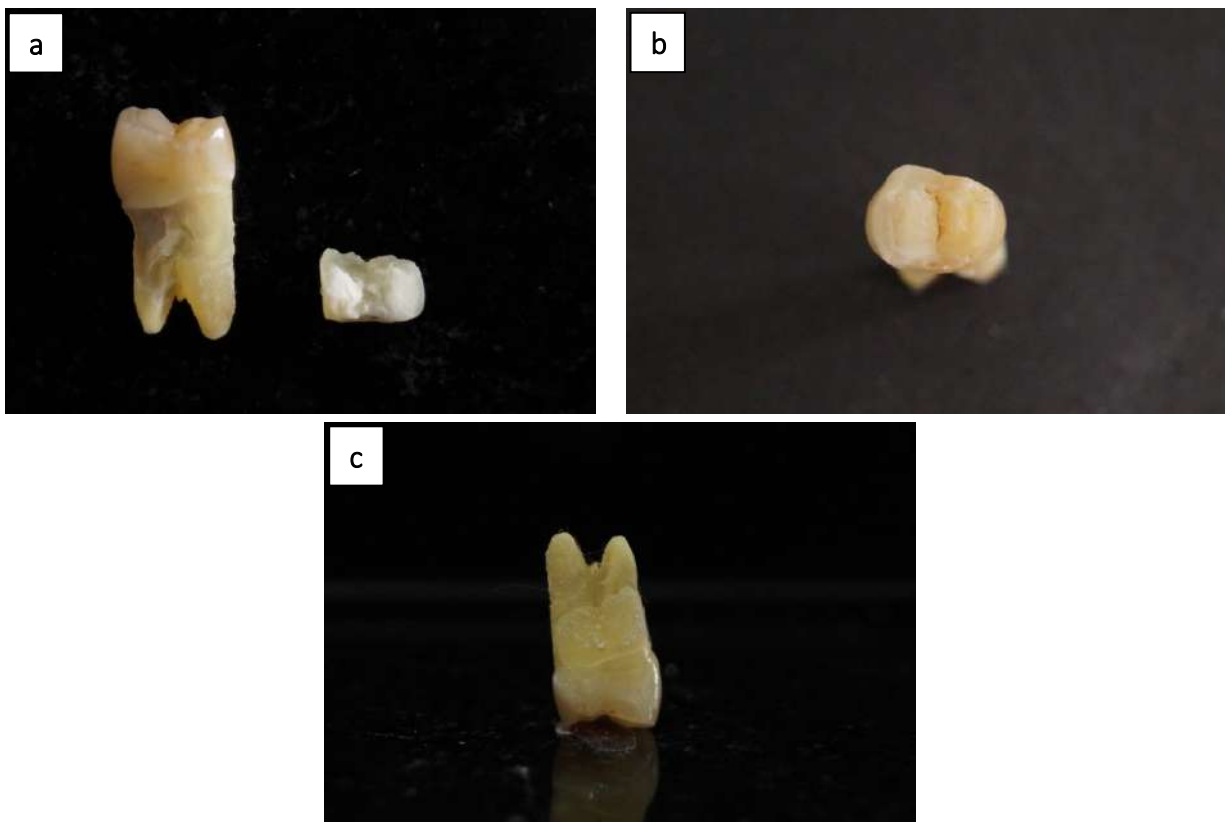


Figure 1: Clinical images of a. detached fragment and the mesial aspect of extracted maxillary first premolar b. The occlusal view without a carious lesion c. Extracted tooth with fracture line.



Figure 2: An image of the cemental layer from the tooth's root in H & E stain at a 10x magnification.

Table 1. An overview of case reports involving cemental tear in various teeth.

Authors	Year	Tooth	Aspect
Kasaj A <i>et al.</i>	2009	Maxillary right first premolar	Mesial aspect
Hsueh-Jen Lin <i>et al.</i>	2010	Mandibular second molar	Mesial aspect
Nagata M <i>et al.</i>	2016	Maxillary right central incisor	Mesial and distal aspect
Pilloni A <i>et al.</i>	2018	Maxillary central incisor	Mesial aspect
Teng Kai Ong <i>et al.</i>	2019	Maxillary anterior incisors	Distal aspect
Borkar SA <i>et al.</i>	2019	Maxillary central incisor	Mesial and distal aspect
Takayoshi Nagahara <i>et al.</i>	2021	Mandibular right central incisor	-
Pedercini <i>et al.</i>	2021	Maxillary central incisors	Proximal aspect
Present case		Maxillary right first Premolar	Mesial aspect

Giller and Keskin reported a prevalence of cemental tears of 0.89%. Ozkan and Ozkan reported a similar lower frequency of 1.9% using a cone beam computed tomography images study. The classification proposed by Lee *et al.* cannot be classified because the proposed classification is primarily on radiographic features, which is missing from the report [9].

A deep periodontal pocket was observed in this case report, and it is one of the primary characteristics of cemental tears, along with swelling clinically [10]. In patients over the age of 60 years, sinus tracts are not present in approximately 73.2% of affected teeth, compared with 46.4% in patients under the age of 60. This is probably because, with age, the cortical bone can become more resistant to microbial invasion and inflammatory bony destruction. It is consistent with this case report, where there is no sinus tract exists [3].

The location of the fracture fragment is an apico-coronal location and proximal aspect, which is unusual in the above age group of 60 years. The length of the separated fragment was more than 3mm, which is above normal [11]. Occurrence in maxillary premolar without carious lesion is a rare entity, occurrence in maxillary central incisors is common (Tab. 1) [12-19]. Age, gender, tooth type, and attrition are predisposing factors for cemental tears. Clenching habit and occlusal trauma are predisposing factors based on previous reports. The patient in the present case report had reported being paralysed on the right side, which could be the reason for a higher occlusal load, predisposing to a root fracture [10]. These findings suggest that the force and direction of occlusal force, number of roots, and root morphology may have an impact on the apico-coronal location of cemental fracture [3, 20]. The radiographic presentation of a radiographic detached fragment from the root surface could support the presence of a cemental tear. The Bucco-lingual presence of cemental tear is difficult to detect in Periapical radiographs. Therefore, using CBCT images could help overcome the shortcomings of two-dimensional radiographs. CBCT helps in detecting complete and incomplete cemental tears. Early detection can prevent further deterioration. Ong TK *et al.* presented two case reports on the detection, diagnosis, and successful treatment plan for cemental tear and the importance of CBCT in decision-making [15].

Histopathologically, cemental tears are made up of cellular or acellular cementum, with or without cementocytes present in lacunae. Occasionally, the cemental fragment has some peripheral dentin adhering to it. Lymphocytic infiltration is predominantly found with focal destruction of cortical bone, neutrophils, and plasma cells may also be seen. The denuded root surface is devoid of cementum. The histopathological examination has been regarded as the gold standard for the definitive diagnosis of cemental tear [9]. Histopathological reports of a fractured fragment with H&E staining have dentine, cementum, and inflammatory cells suggestive of the cemental tear. The clinical findings and histopathological results suggested a cemental tear, which was diagnosed following extraction.

6. Conclusion

This case report is a rare type of mesiodistal root fracture as a result of a cemental tear with poor restorative prognosis, managed by extraction. The diagnosis was confirmed after clinical and histopathological examination.

Conflicts of interest: Authors declared no conflicts of interest.

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