

REVIEW ARTICLE

Cemental Tear

Predisposing Factors, Clinical Signs Symptoms, Diagnosis and its Management

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ABSTRACT:

A cemental tear is a rare condition in which a total or partial detachment of the cementum occurs along the root surface at the cemento-dentinal junction and is associated with moderate to severe periodontal attachment loss. Literature regarding this article was searched from Pub Med, Medline and Google during the period of Jan 2008- Dec 2012. Cemento-dentinal tear is more frequently seen in older men above 60 years, single-rooted vital or nonvital teeth, particularly the incisors and premolars are involved. Other significant etiological factors are traumatic occlusion, poor ability of tissue healing due to age and structural weakness of the cementum. Its diagnosis can be confirmed by clinical signs and symptoms, (presence of localized periodontal pockets with exudates and localized pain) by radiographic findings (as a radiopaque fragment) and surgical inspection. The treatment of cemental tears involves scaling and root planning, open flap debridement, bone graft, regenerative tissue guide, apical surgery and dental extraction.

KEY WORDS: Cemento-dentinal junction, Apical lesion, Fracture, Cemental tear, Periodontal disease.

INTRODUCTION:

Cemental tear is a particular kind of root surface fracture which is rarely observed in clinical dentistry. It is classified as a complete or incomplete detachment of the cementum, arising within the root surface along the cemento-dentinal junction or along an incremental line.^{1,2} It is observed that cemental separation is a reason for periodontal or periapical tissue breakdown and is frequently associated with a periodontal pocket of variable depth.^{3,4} At rest, the prevalence of cemental separation is not known; this may be due to difficult recognition of cemental fragment and limited case reports or studies available in the literature.

Difficulty in early diagnosis of cemental separation and its management causes severe localized periodontal and periapical lesion with angular bony breakdown and influences the prognosis of teeth.⁵ Therefore, correct evaluation of cemental split has great clinical importance.¹ Cervical cemental breakdown is different from vertical root fracture that involves the long axis of the root and passes through the root canal space.^{6,7,8} The cementum detachment occurs frequently in the mid-cervical or in the apical root and its diagnosis can be established by clinical signs and symptoms, radiographic findings and surgical examination.^{7,9} This article discusses the etiological factors responsible for cemental split with its clinical and radiographic characteristics and management approaches.

METHODOLOGY

Literature search for this review was done from January 2008 to December 2012 with key words and phrases, cemental tear, perio-endo lesions, vertical root fracture, guided tissue regeneration, non-surgical periodontal

treatment etc. utilizing search engines PubMed, Medline and Google scholar.

ETIOLOGICAL FACTORS

At present, the mechanism by which cemental breakdown occurs are not completely understood but several etiologic factors including age, gender, tooth type, trauma, occlusion, traumatic incident, attrition, and high brittleness of cementum are responsible for it.^{10,11,12} (Table 1) Other causes that are considered for the development of cemental tears includes, scaling and previous periodontal procedures, tooth extraction which damage the cementum of adjacent tooth, structural flaws at the cemento-dentinal junction.^{12,13}

Cemental tear is more frequent in male and older patients above 60 years.¹⁴ Incisors are the commonly involved teeth.⁴ Anatomic distributions of the teeth showed maxillary incisors are the dominant group followed by mandibular incisors and maxillary premolars.¹⁵ A study reported that high occlusal force of male patients in anterior single-rooted teeth is a predisposing factor of cemental split.¹⁶ During aging, physiochemical alteration of the cemento-dentinal interface, increased fibrosis and the decreased collagen extensibility make the cementum more prone to detachment.^{17,18}

Lin et al found in his study that endodontic therapy and post/core placement has little link with the cemental separation.² He also said that Vertical root fracture has close relation with post placement as it is not possible that the stress from a post can separate the dentin and dentin-cementum junction.² Vertical root fracture (VRF) occurs in non-vital posterior teeth (83.3%) between 40-60 years of age (55%).^{19,20} On the other hand, cemental split occurs in anterior vital teeth (65.3%) above 60 years of age (73.1%).^{21,22} Traumatic occlusion is also depicted as the major reason of cervical cemental separation.²³ Noma et al observed that a collective effect of strain originated with repetitive loading on premolars can cause cracks in the cemento-enamel junction, leading abrasion and abfraction cavities, in addition to a fracture along the root surfaces, aiding the development of cemental splits.¹³

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Received: June 24, 2013

Revised: August 28, 2013

Accepted: September 10, 2013

The length, Size and Site of Cemental Tear: The length of cemental fragment has a range of 3.0-6.0 mm, a width of 2.0-4.0mm, and a thickness of 1.0-1.5 mm.²⁴ A report described that the thickness of cementum augments throughout life, so this thickened cementum in older individuals is more susceptible to break as compared to adolescents.²⁵ Light microscopic inspection of a study discovered that the detachments were frequently observed alongside the cemento-dentinal interface.²⁶

Examination for mesio-distal site revealed that the majority of cemental splits are on the proximal side of root surfaces so early recognition in radiographs is possible if some separation of cementum has occurred.^{5,27} For apico-coronal site, Ishikawa et al described that cemental separation were often observed in the cervical third.¹ Though, another study found that cemental tears present more frequently in the middle third (45.3%) and apical third (41.5%) of root surface as compared to cervical third.²⁸ Lin HJ et al described that continuous excessive strain (such as attrition) could lead to cementum displacement on the thicker place (such as the apical third) or on the tensional part (such as the middle third) of an anterior single rooted tooth. As considering the unnecessary tensional forces on the posterior teeth, such as vertical or lateral force, numbers of roots, integrity of dentition, also add to this action.²

Clinical sign symptoms and Radiographic presentation: The clinical complaints of cemental separation are the occurrence of localized periodontal pockets with bleeding on probing as well as localized tenderness and swelling but tooth may response to vitality.^{6,18,29}

Radiographic assessment is always necessary to the identification of cemental breakdown.³⁰ A study recommends that before and throughout root canal procedure, radiographs should be cautiously observed for the occurrence of cemental separation, particularly for referred cases and teeth that are not giving response to conventional endodontic management.³¹

On preoperative radiograph, the detached cementum visible as a radiopaque piece in the proximal surfaces of the root within the periodontal ligament.^{5,32} However, in buccal or lingual surfaces, this image can be covered by the tooth root, making the diagnosis difficult.³³ In these cases, computed tomography should be taken to make a differential identification between root fracture (Table 2) and cemental split.^{34,35} A radiopaque foreign body should be suspected to be a cemental split/tear with radiograph or surgical examination.³⁶

Differential diagnosis includes root fracture (particularly in endodontically treated teeth or bridge abutments), periapical infection, periodontal abscess caused by foreign body or incomplete instrumentation and loss of attachment due to cemental tears.³⁷

Table 1. : Predisposing factors for cemental split/tears in teeth

Gender	Occurs frequently in Male
Age	Above 60
Tooth type	Single rooted teeth, commonly incisors and premolars are involved
Location	Usually on the proximal sides in the mid-cervical of root surfaces

Table 2.: Difference between Cemental split/tear and Root fracture

Cemental tear	Vertical Root fracture
It is a total or partial detachment of the cementum primarily occurs in the cementum-dentin interface.	It involves the long axis of the root and pass through the root canal space It occurs between 40- 60 years.
It usually arise in old age above 60 years	It commonly observe in posterior teeth (molars)
It typically involves single-rooted teeth (incisors and premolars) It presents in vital or non-vital teeth	It occur in non-vital teeth (RCT, post/core placed teeth)

Fig 1. : Detached fragment, cemental split is exposed in oral cavity.



TREATMENT APPROACHES:

The fragments of cementum visible or not to the oral cavity can initiate a localized attachment loss and numerous management approaches have been recommended;^{26,27}

- a). Scaling and root planning²⁸
- b). Open flap debridement¹⁶
- c). Regenerative tissue guide and bone graft^{38,39,40}
- d). Apical surgery
- e). Intentional replantation,⁴²
- f). Extraction in cases of unfavorable scenario.

Nonsurgical management for periodontal diseases has been advised as the first line of treatment, as scaling and root planning are successful in the resolution of periodontal diseases, decreasing the depth of periodontal pockets.^{27,28}

A case reported, when part of the cementum segment was showing to the oral cavity and the pocket depth was less than 4mm, only nonsurgical management was done.³⁰ (Fig.1) Another case report mentioned that conservative procedure should be adopted in cases in which the cemental fragment is exposed, since it causes less morbidity, as well as reducing the management time and expenditure.³⁹ Sandeep reported a treatment of cemental split, removed the fragment, curettage and clean the defect and restored with MTA and followed by application of Glass ionomer.¹⁶ If affected teeth in cemental tear are nonvital due to the spread of infection from the periodontal pocket through the lateral canals, first root canal treatment should be performed.⁴⁰ In cemental breakdown cases with periapical infection, endodontic treatment should be done followed by apical surgery and removal of cemental fragments.³¹ The long term prognosis of teeth with cemento-dentinal tear is poor.³⁵ Earlier studies have revealed that teeth treated for cemental tear with many different approaches are at last extracted.^{40,41,42}

CONCLUSION:

Cemental tear is a rare type of root fracture that usually demonstrates clinical features resembles the periapical or periodontal disease. The knowledge of the clinical and radiographic features of the cemental split/tear is essential in dental practice to avoid misdiagnosis and needless treatment of teeth with cemental tears. Dental clinicians should know the predisposing factor (such as age, gender, anterior teeth, and traumatic occlusion etc.) and appropriately assess the radiographs and pulp vitality of teeth. Non surgical periodontal therapy should be an appropriate and conservative treatment modality for this rare lesion.

ACKNOWLEDGEMENT:

The author is highly thankful to Prof. Nasreen Amanat, Principal Dental Section, BUMDC for guidance and encouragement in writing this review.

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