ARTICLE IN PRESS
+ MODEL
Journal of the Formosan Medical Association (2017) xx, 1–7
Available online at www.sciencedirect.com
ScienceDirect
journal homepage: www.jfma-online.com

Review Article

Cemental tear: To know what we have neglected in dental practice

Po-Yuan Jeng [a], Arlinda Luzi Luzi [a,**], Rocio Marco Pitarch [a,***], Mei-Chi Chang [b,c,f], Yu-Hsueh Wu [d], Jiiang-Huei Jeng [e,*]

[a] Department of Dentistry, Universidad CEU Cardenal Herrera, Valencia, Spain
[b] Chang Gung University of Science and Technology, Kwei-Shan, Taoyuan City, Taiwan
[c] Department of Dentistry, Chang Gung Memorial Hospital, Taipei, Taiwan
[d] Department of Dentistry, Far Eastern Memorial Hospital, New Taipei City, Taiwan
[e] School of Dentistry, National Taiwan University Medical College and Department of Dentistry, National Taiwan University Hospital, Taipei, Taiwan

Received 20 August 2017; received in revised form 5 September 2017; accepted 6 September 2017

KEYWORDS
Cemental tear;
Clinical characteristics;
Surface root fracture;
Periodontal/periapical breakdown;
Recurrence;
Predisposing factors

Cemental tear is a special kind of root surface fracture, contributing to periodontal and periapical breakdown. However, it is a challenge for doctors to diagnose, resulting in delayed or improper treatment. We reviewed the predisposing factors, location, radiographic/clinical characteristics, diagnosis and treatments of cemental tears. From the literature, patients with cemental tear were mainly males, over 60 year-old. Possible predisposing factors include gender, age, tooth type, traumatic occlusal force and vital teeth. Cemental tears were common in upper and lower anterior teeth, single or multiple, and can be present in cervical, middle and apical third of roots. Morphology of cemental tears can be either piece-shaped or U-shaped. Clinically, cemental tear shows a unitary periodontal pocket and signs/symptoms mimicking localized periodontitis, apical periodontitis and vertical root fractures. Treatment of cemental tears include scaling, root planning, root canal treatment, periodontal/periapical surgery, guided tissue regeneration, bone grafting, and intentional replantation. Recurrence of cemental tear is possible especially when the fracture involves root apex. Extraction is recommended for teeth with poor prognosis. In conclusion, cemental tears can involve both periodontal and

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

* Corresponding author. School of Dentistry, National Taiwan University Medical College and Department of Dentietry, National Taiwan University Hospital, No 1, Chang-Te Street, Taipei, Taiwan.
** Corresponding author. Department of Dentistry, Universidad CEU Cardenal Herrera, Pou de condesa road, Number 5, 46115, Alfara del Patriarca, Valencia, Spain.
*** Corresponding author. Department of Dentistry, Universidad CEU Cardenal Herrera, Pou de condesa road, Number 5, 46115, Alfara del Patriarca, Valencia, Spain.
E-mail addresses: arlinda.luzi@uchceu.es (A.L. Luzi), rocio.marco@uchceu.es (R.M. Pitarch), jhjeng@ntu.edu.tw (J.-H. Jeng).
[f] Equal contribution to first author.

http://dx.doi.org/10.1016/j.jfma.2017.09.001

periapical area. Dentists should understand the predisposing factors and clinical features of cemental tears for early diagnosis/treatment to prevent bone loss/tooth extraction.

Introduction

Cemental tear is a special type surface root fracture involving cementum and sometimes the root dentin (Fig. 1A—F).[1,2] It leads to appearance of a deep pocket, retaining plaque and calculus, and eventually causing periodontitis.[2—5] Cases of cemental tear are rarely reported in the literature because the presence of this disease is often neglected, misdiagnosed and under-reported. Dentists may treat these clinical cases as pure periodontal and periapical lesions due to misdiagnosis of cemental tears. In some cases, the presence of cemental tear was realized after the extraction of non-healing teeth.[1,2,6] Some failed cases with unknown reason, are due to the presence of cemental tear.

Cemental tear may present difficulty in clinical diagnosis. It may involve periodontal and periapical tissue breakdown, soft tissue swelling, pain and sinus tract with exudation (Fig. 1A—F). Case reports showed that clinicians treated the teeth with cemental tears by non-surgical periodontal treatment, root canal treatment or/and non-surgical retreatment alone are often not effective to eradicate this disease.[3,7—9] If dentists could have diagnosed the cemental tear properly, unnecessary treatment and further bone loss could be avoided. The clinicians as well as their patients could have spent less money, time and effort in resolving the situation.

The clinical features, diagnostic skills and differential diagnosis of cemental tears should be summarized and emphasized. However, limited information was recorded in the published literature. Cemental tear is often not mentioned or deeply discussed in the periodontal or endodontic textbooks. The aim of this study is to review the predisposing factors, location, clinical features, diagnosis, morphology, histology and management of cementum tears.

Epidemiology and predisposing factors of cemental tears

The prevalence, incidence, etiology and mechanisms of cemental tear in general population is unknown. The reported cases were mainly males, and it is more common in patients over 60 year-old. However, several factors are suspected to be the predisposing factors as summarized in Table 1, including age, gender, tooth type, trauma from occlusion and vitality of teeth.[1,5,10—12]

Age

Age is considered to be a predisposing factor for cemental tear (Fig. 1C—F), indicating the changes in cementum/dentin during aging. Most cases report were in patients over 50 year-old. According to the study of Lin et al. (2011), among 71 patients, 10 (14.1%) were over 80 year-old, 29 (40.9%) were 70—80, 13 (18.3%) were 60—70 years old, and 19 were below 60.[1] A possible explanation is the cementum changes through aging.[2,5,10] Throughout life, the thickness of cementum in elders and teenagers differ 3 to 5 times, depending on the root portion and tooth type.[13—15] In elder patients, the adhesion of proteoglycan (between dentin and cementum) weakened. In addition, the function of collagen is to restrict the stretching of periodontal ligament (PDL). When the extension of PDL is not controlled properly, it may exert extensive or inadequate force on cementum and contribute to the separation of cementum from dentin.

Gender

Regarding sex, cemental tear occurred more frequently in male patients. In the study of Lin et al. (2011), among 71 patients with cemental tears, 55 (77.5%) were male, while 16 were female. The relationship between sex and cemental tear showed a statistically significant difference (P-value < 0.001).[1] Up to now, there was no obvious explanation for this relation. Probably, males have stronger occlusal forces than females or there are intrinsic differences of cementum between genders. But more cases should be collected for further analysis.

Dental trauma

Although most cases are over 50 year-old, a 22 year-old male patient with cemental tear on the central incisor was reported.[6] Apparently, there could be other predisposing factors. The anamnesis of the patient included a history of trauma during wresting with a sibling. Also, a case of cemental tear on a central incisor, which the patient was hit by a baseball 20 years ago.[9] In the study of Lin et al., only 6 patients recalled a history of traumatic injury.[1] Traumatic event such as acute injury is often described as a factor of cemental tear.[1,2,5,10,11] When excessive force is applied to the tooth and the periodontal ligaments are stressed too much, the fibers could lead to the separation of the cementum from the dentin. Cementum is embedded by Sharpey's fibers (extrinsic fibers), which connect cementum to the bone. In contrast, the connection of cementum-dentinal junction by a glycoprotein-like layer is generally weaker than the connection between cementum and PDL.[16] Cementum is more susceptible to separate from the dentin under excessive force. However, in the study of Lin et al., most patients (57/63) patients had no memory of

Please cite this article in press as: Jeng P-Y, et al., Cemental tear: To know what we have neglected in dental practice, Journal of the Formosan Medical Association (2017), http://dx.doi.org/10.1016/j.jfma.2017.09.001