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Nik Madihah Nik Azis

Department of Restorative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, nikmadihah@ukm.edu.my

Nurulhuda Mohd

Department of Restorative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, nurulhuda.mohd@ukm.edu.my

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CASE REPORT

Management of Severe Localized Periodontal Destruction Associated with A Cemental Defect: A Case Report

Nik-Madihah Nik-Azis*, Nurulhuda Mohd

Department of Restorative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

**Correspondence e-mail to: nikhadihah@ukm.edu.my*

ABSTRACT

This case involved the management of a possible cemental tear, which resulted in poor response to nonsurgical periodontal therapy. This case was managed by exploratory surgery, along with the intention to surgically reduce the periodontal pocket. Exploratory surgery revealed a localized cemental defect. The periodontium healed with pocket closure after exploratory surgery and open-flap debridement. The difficulty in clinically diagnosing a localized periodontal destruction and the lack of consensus on managing these cases were highlighted. The possibility of an undiagnosed cemental defect in a tooth with localized periodontitis should be considered in cases not responding to periodontal therapy.

Key words: localized periodontitis, cemental tear, iatrogenic dentistry

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INTRODUCTION

Severe localized periodontal destruction is the hallmark of rapidly progressing periodontitis, previously classified as localized aggressive periodontitis.¹ The differential diagnosis of these cases is usually a diagnosis of exclusion, in which other causes such as endodontic, trauma, occlusal and anatomical causes are eliminated. One of the possible causes of severe localized periodontal destruction is a cemental defect or a cemental tear.

Cementum is a layer of mineralized tissue covering the root surfaces and, occasionally, small portions of tooth crowns. Cementum contributes to the repair process after root surface damage and serves to adjust the tooth position to new requirements. A cemental defect can be caused by multiple factors, such as root surface removal from scaling and root planing,² anatomical anomaly, or a cemental tear.

Cemental tear is a specific type of cemental defect where a surface root fracture involving the cementum and sometimes the root dentine occurs. Cemental tear is defined as complete or incomplete separation within the root surface along the cemento-dentinal interface or

along an incremental line.³ It is a plaque-retentive factor that can lead to deep periodontal pockets, eventually causing periodontitis adjacent to the cemental tear. According to the new periodontal classification,⁴ cemental tear is classified under localized tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis.

A definitive diagnosis of a cemental tear can only be confirmed with histological or possibly by the clinical finding of the torn cemental fragment.⁵ Dentists may misdiagnose or delay the diagnosis of these cases owing to its nonspecific presentation. A degree of suspicion is necessary for early diagnosis and management to prevent the loss of supporting structures and eventually tooth loss.

CASE REPORT

Examination and Diagnosis

70-year-old Malay female, was referred to the Periodontics Clinic, Universiti Kebangsaan Malaysia with a complaint of mobile teeth and swollen gums

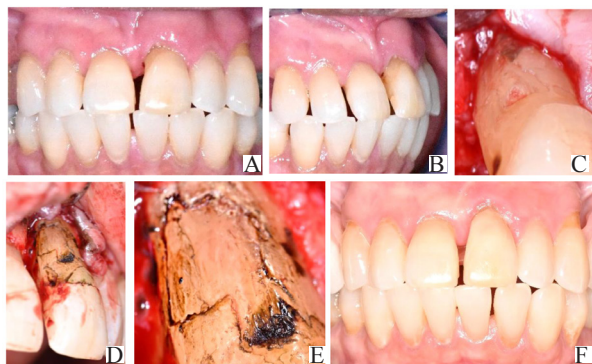


Figure 1. A- Frontal view of the anterior teeth during first visit to the clinic, B- Lateral view of tooth 21 during emergency visit due to buccal abscess, C- Intra-operative view of cemental defect of tooth 21, D- Lateral view of tooth 21 after staining with methylene blue, E- Close-up view of cemental defect after staining, F- Frontal view of anterior teeth during review visit at one year.

(Figure 1A). She had diabetes type II, rheumatoid arthritis, and hypertension that was well controlled. She was under regular follow-up with her physician and was generally fit and well. Consent was obtained from the patient regarding the use of her case for academic purposes.

On examination, the patient was found to be partially dentate with multiple missing teeth in the upper and lower dentition. Tooth 21 was grade II mobile, extruded by 1.5 mm with suppuration on palpation. The patient was diagnosed with generalized periodontitis, Stage IV Grade B. Tooth 21 was deemed of questionable prognosis owing to increased bone loss relative to her age and the mobility associated with the tooth. Treatment plan for tooth 21 included the following: a) occlusal adjustment of tooth 21 to minimize occlusal trauma owing to the extruded tooth, b) nonsurgical management of tooth 21 with plans to implement management if residual deep pockets are present on 21, and c) monitoring of the vitality of tooth 21.

Nonsurgical Management

Behavior management including professional mechanical plaque removal and oral-hygiene education was initially performed. The patient was subsequently treated with one course of nonsurgical periodontal therapy, i.e., root surface debridement. However, during therapy, she reported an incident of a ‘fall’ where she sustained soft-tissue injury to her upper and lower lips. The patient reported the upper anterior teeth to feel sensitive owing to the fall. During examination after the fall, all her teeth were responsive to electric pulp test (EPT) and cold test.

One week after the fall incident, she presented with a periodontal abscess associated with tooth 21 (Figure 1B). The patient reported noticing the abscess two to

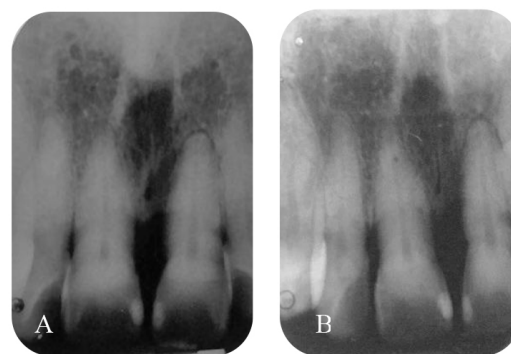


Figure 2. A- Intra-oral radiograph during first visit to the clinic, B- Intra-oral radiograph before surgical management

three days after the last visit. It was the first incident of abscess associated with the tooth that she can recall. On examination, an ovoid gingival swelling measuring 1 cm × 1cm was found on the buccal of tooth 21. The tooth was slightly tender to pressure. The probing pocket depth was 10 mm both at the mesiobuccal and the mesiopalatal aspects of the tooth. The periodontal abscess was treated with drainage through the periodontal pockets and root surface debridement.

Throughout the nonsurgical management phase, the tooth responded to pulpal sensibility tests as measured by EPT and cold test. After the nonsurgical therapy, most periodontal pockets resolved except that on the tooth 21. The pocketing measured 6 mm mesially and 6 mm midbuccally.

Surgical Management

The questionable prognosis of tooth 21 was discussed with the patient, along with the possible treatment options. The patient opted for exploratory surgery and open-flap debridement of the tooth depending on the surgical findings. A preoperative radiograph was taken, and it showed 50% remaining bone support with widening of periodontal ligament space (Figure 2B).

Full-thickness papilla preservation flaps were raised to expose the bony defect buccally and palatally. Angular bone loss extending from the mesial to the buccal surface of tooth 21 was noted. The bony defect was measured to be 1–1.5 mm in depth. Granulation tissue was present in the bony defect, and some calculi were found on the mesiobuccal and distobuccal surface of the root. During surgery, a cemental defect was observed on the buccal surface at the mesio-buccal line angle of tooth 21 (Figure 1C). The defect had negative margins and measured less than 1 mm in length. After staining with methylene blue dye, the tooth surface was observed under a microscope at 10× magnification (Zeiss Opmi CS/NC – 2TM). Neither fracture line nor root fracture was detected. The defect had a negative margin in the cementum with some cementum loss, exposing the underlying dentine (Figures 1D and 1E).

Granulation tissue was removed, and the root surfaces were debrided with hand instruments. Osseous recontouring was conducted with hand instruments. The surgical site was irrigated with chlorhexidine 0.12% and saline. The flap was adapted and replaced apically from the original position. The flap was approximated with vicryl 5/0 by using a modified mattress and simple interrupted sutures. The cemental defect was now equigingival and restored with glass ionomer cement.

Follow-up of the Patient

The patient is currently undergoing regular 3-monthly supportive periodontal therapy for the past two years. Her periodontal health is currently stable with no recurrent deep periodontal pockets. She required only supra-gingival scaling and polishing during these visits. Her plaque index and bleeding index remained below 25%. Tooth 21 had no fremitus, no mobility, and no suppuration (Figure 1F). There was no contact on tooth 21 in protrusion and lateral excursions. The deepest periodontal pocket was 4 mm with no bleeding. The patient was satisfied with the treatment received, and she attended follow-up until the pandemic when she became reluctant to attend to minimize her risk of exposure to COVID-19.

DISCUSSION

Differential diagnosis

The diagnosis of a localized periodontitis associated with a cemental defect has been investigated only in case reports and described only in cross-sectional studies possibly owing to the difficulty in diagnosis and small number of cases. The possible differential diagnosis of reported cemental tear cases in literature is summarized in Table 1. A conclusive diagnosis of a cemental tear requires histological findings and the clinical and radiographical appearance of the torn cemental fragment. The difficulty in accurately diagnosing a cemental defect is illustrated by the present case.

Before the exploratory surgery for the patient, the possible diagnosis of tooth 21 were as follows: a) localized periodontitis; b) alteration in the root surface such as vertical root fracture, root resorption, or cracked tooth; c) endo-perio lesions; and d) cervical decay. After the finding of a cemental defect during surgery, the differential diagnosis included the following: a) iatrogenic factors owing to vigorous nonsurgical instrumentation, b) cemental tear, and c) abfraction/ non-carious tooth surface loss. For the present case, cemental tear seemed to be the most likely diagnosis given the localized nature of the defect and the history of trauma to the tooth during a fall.

However, histological investigations to conclusively determine the diagnosis were not possible. There was no cemental fragment found during surgery.

For the patient, the etiologic factors including age, trauma, occlusal overloading, and previous periodontal treatment were all present. Additional factors discussed in literature that may predispose a tooth to cemental tears include the presence of structural weakness at the cementum–dentin interface, decreased strength of dentin because of fatigue with increased age, and prior endodontic therapy.^{3,5} As discussed by Lin et al., the maxillary or mandibular incisors (76.1%) are most frequently affected by cemental tears.³ It occurs more in patients older than 60 years of age (73.2%). Teeth with cemental tears are prone to have abscess formation (66.2%), a deep pocket >6 mm (73.2%), positive vitality test (65.3%), and healthy antagonist teeth (84.3%). All these factors were present in the case of this patient.

Treatment Options

The decision-making process in the management of a localized periodontal pocket based on clinical findings is depicted in the flowchart in Figure 3. The diagnosis is essentially a diagnosis of exclusion, where other common factors such as endodontic, occlusal, and traumatic causes are ruled out. Treatment options for the management of a cemental tear are also not well explored in literature. The available reports are reviewed in Table 1. The treatment outcome for a tooth with cemental tears is associated with the treatment technique and the apico-coronal location of the cemental tear.

For this patient, the surgical management and the location of the cemental tear, which was in the middle third of the root, increased the prognosis of the tooth. In a retrospective study of 71 teeth with cemental tears, Lin et al. found that the percentage of healed cemental tear cases located in the apical, middle, and cervical third of roots is 11.1%, 66.7%, and 60.0%, respectively.³ By surgical management, 57.7% of cemental tears heal, whereas only 28.6% cases heal after nonsurgical treatment.

The patient had a positive response to pulp-sensitivity tests and favorable occlusal scheme with no guidance on tooth 21 during protrusion and excursions. She was also a highly motivated patient. Hence, exploratory surgery was opted for the patient.

This case report had some limitations. First, no histological investigations were performed. Second, no fragment of detached cementum was found, essentially limiting us to making a diagnosis of exclusion. Third, other possible causes including iatrogenic ones were unable to be ruled out.

Table 1. Differential diagnosis and management of cases of cemental defects/ tears

Reference	Clinical Findings	Differential Diagnosis	Management	Outcome
Ishikawa et al., 1996 ⁶	Suppuration Mobility Edema Fistula	Adult periodontitis Cemental tear	Open-flap debridement and removal of fragment (four cases) Removal of fragment during root planing (one case) No treatment (two cases)	Not discussed
Camargo et al., 2003 ⁷	Localized deep periodontal pocket Sinus tract	Vertical fracture Perio-endo lesion	Root end resection Removal of cemental fragment Guided Tissue Regeneration (GTR) with bone graft	Resolution of sinus tract, periodontal pocket and radiographic bone fill
Marquam et al., 2003 ⁸	Deep periodontal pocket Separated cemental fragment	Root fracture Periodontal abscess Endo-perio lesion Cemental tear	Open-flap debridement Removal of cemental fragment GTR with bone graft	Resolution of periodontal pocketing with a 4-year follow-up
Chou et al., 2004 ⁹	Deep periodontal pocket Separated cemental fragment	Cemental tear Vertical root fracture	Open-flap debridement Removal of cemental fragment	Resolution of periodontal pocketing with favorable outcome at a 7-year follow-up
Steward & McClanahan, 2006 ¹⁰	Recurring sinus tract Mobility Bone loss Deep periodontal pocket depth	Cemental tear	Extraction and biopsy	Not relevant
Tulkki et al., 2006 ¹¹	Localized deep periodontal probing depth	Cemental tear	Open-flap debridement Removal of cemental fragment GTR with bone graft	Resolution of periodontal pocketing with favorable outcome at a 4-months follow-up
Tai et al., 2007 ¹²	Repeated swelling	Cemental tear	Two periapical surgery and removal of two cemental fragments	No resolution with persistent small swelling was noted at the alveolar mucosa
Schmidlin et al., 2012 ¹³	Increased mobility Deep periodontal probing depth	Apical periodontitis Cemental tear	Tooth splinting Open-flap debridement Removal of cemental fragment GTR with Emdogain	Resolution of periodontal pocketing with favorable outcome at a 10-year follow-up
Damasceno et al., 2012 ¹⁴	Nonresolving pain Localized inflammation Moderately deep periodontal pocket	Foreign body Cemental tear	Removal of cemental fragment Nonsurgical periodontal therapy	Resolution of pain and asymptomatic at 2-year follow-up

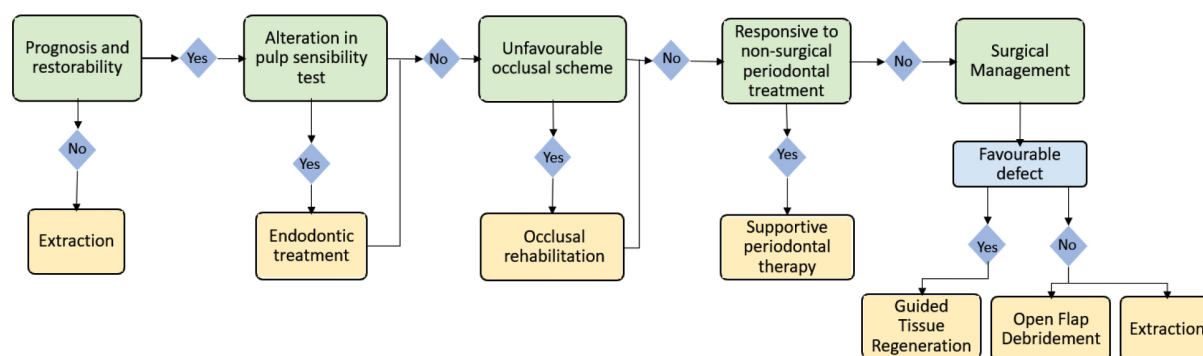


Figure 3. Flowchart of treatment options for localized periodontitis

CONCLUSION

This case highlighted the difficulty in diagnosing a cemental defect in a localized periodontitis case and the lack of consensus on the management protocol for these defects. Cases with localized periodontitis not responding to periodontal therapy may be instigated by local causes, such as a cemental defect. The management of these cases could include exploratory surgery to determine the location and the prognosis of these teeth.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this case report.

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