

Furcation-Bone Defect: Management with Non-Surgical Endodontics

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Abstract

This clinical case report presents the management of furcation-bone defect that is considered as one of the most significant prognostic factors for the loss of molars. Treatment of furcation-bone loss is a challenge to dentists due to the misdiagnosis. Early and appropriate diagnosis is therefore, essential for the successful outcome of treatment provided. A young female patient with history of repeated facial swelling and failure of treatment at two dental clinics attended our clinic. Radiographic examination revealed that she had undiagnosed radix entomolaris and was suffering from large furcation- bone loss. Non-surgical Root canal treatment was performed with multiple intracanal Ca(OH)₂ dressings in offending tooth # 36 which had a big composite restoration. Regular clinical and radiographic follow up showed gradual elimination of swelling and radicular radiolucency on the intraoral radiographs. The tooth was reinforced with porcelain fused to metal crown in the month of July last year and since then without any clinical or radiographic complaint.

Keywords: Furcation Defect; Furcation Involvement; Radix Entomolaris; Unusual Root Morphology

Introduction

A furcation is the place where the roots of multirrooted teeth divide and take separate paths from one another. Mandibular molars generally have two roots while maxillary molars have three roots. Hence, a furcation is called as bifurcation and trifurcation depending on number of roots. An area of bone loss at the root bifurcation or trifurcation point of a tooth is defined as furcation-bone defect. Its etiology includes anatomic factors, root fractures, trauma from occlusion, extension of periodontal disease and endo-periodontal diseases [1]. Minimal furcation bone loss remains undetectable radiographically and becomes visible after 30% - 40% of the bone loss. Literature search discloses that molars, as compared to other teeth are more vulnerable to periodontal ailments and subsequent furcation involvement and the most common teeth to be extracted or lost [2]. Successful treatment to retain teeth with furcation defect is one of the most difficult clinical situations a dentist encounters in his practice [3]. The degree of furcation involvement may be assessed by exploring the defect with a periodontal probe and is classified from grade I to IV depending on extent of furcation involvement [4].

Case Report

A 22-year-old female student of dentistry attended our dental clinic with the chief complaint of repeated swelling on the left side of mandible in first molar area and persistent salty taste. History revealed that she felt the swelling for the first time around 9 months ago for which she went to her family dentist. He diagnosed it as periodontal swelling and performed incision drainage of the abscess and prescribed some antibiotics. The swelling subsided but for a short period of time and recurred repetitively. She went to another dentist but as no improvement was observed, she was advised extraction of the offending tooth with implant replacement.

Intraoral examination discovered that the tooth #36 was slightly mobile with big occlusal restoration (Figure 1) but no pain. The tooth was tender on percussion and palpation. Swelling around gingival margins was present. The tooth had periodontal pockets measuring depth of 5 mm at the mesial and distal ends on buccal surface. Radiographic examination showed big furcation defect with thickening of periodontal fiber spaces and absences of lamina dura. Periapical X-ray disclosed presence of an unusual third root which could be confirmed by applying SLOB rule of radiography [5] (Figure 2).



Figure 1: Tooth # 36 with big restoration and Swelling.



Figure 2: Initial X-ray with large furcation-bone defect.

Pulp testing with thermal and electrical tests indicated sluggish pain response as compared to adjacent healthy tooth indicative of vital pulp undergoing slow degeneration. It led to diagnosis of endo-perio lesion Type I.

Treatment

It was therefore, decided to perform non-surgical root canal treatment of the affected tooth first and if required correction of bony defect using bone graft. With consent of the patient, under local anesthesia, chamber of the tooth #46 was opened. Pus discharge was observed from the chamber with foul smell. Mesio Buccal canal started bleeding profusely as soon as navigating file entered into it. Under copious irrigation with normal saline the canals were negotiated and prepared using protapers rotary files. Special care was taken not to miss and to expose and debride the canal of the extra root of the tooth. The canals were then filled with chlorhexidine 0.12% as final rinse for 5 minutes. The canals were then dried and the access cavity sealed hermetically with cotton and Cavit.

Four days later, the swelling were found reduced but still there. Previous packing was removed and paper points were inserted into the canals. The paper points had rotten smell so Calcium Hydroxide was placed into the canals. On next appointment, the swelling had entirely subsided but bony defect was present. Intracanal dressing was changed and patient recalled after one month. On this recall visit, clinically the tooth has become asymptomatic and there were signs of bone formation. Root canals were therefore, obturated using corresponding gutta percha points and the coronal access was perfectly sealed using a composite. She was advised to visit every month for follow up. On each visit radiograph showed improvement in furcation defect (Figure 3 and Figure 4) and at the 6th month visit the bone healing had been accomplished (Figure 5) and patient was given porcelain fused to metal crown. The tooth, since past one and a half year is firmly standing in the socket performing its normal function (Figure 6).



Figure 3: Post obturation healing after one month.

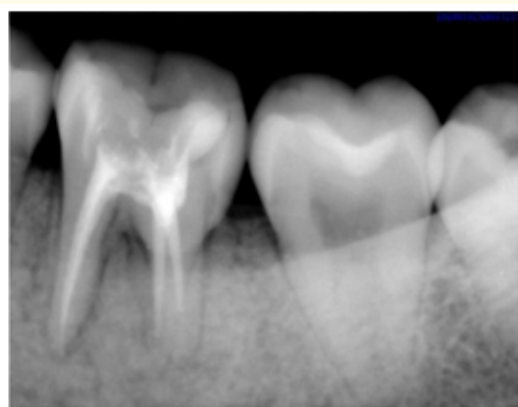


Figure 4: Follow-up after four months.



Figure 5: Complete radicular healing after 6 months.



Figure 6: Clinical pic showing the tooth in function.

Discussion

Endoperiodontal lesions are difficult to diagnose and misdiagnosis often leads to either unnecessarily prolonged treatment or loss of a treatable tooth and also patient's trust [6]. These lesions are classified as type I, II and III [7]. A type I lesion is primarily endodontic in origin and a type II lesion is basically periodontal in origin with pulp involvement but the pulp is usually normal or sometimes damaged by retrograde pulpitis. A type III lesion is a combined case of an endodontic and periodontal disease with usually dead pulp.

In this case, diagnosis was confirmed as Type I endo-perio lesion because of the following reasons:

1. The pulp status revealed that it was undergoing degeneration causing periodontal bone defects evident on radiographs.
2. Radiologically furcation bone loss was apparently visible but history of pain was not present.
3. Periodontal bone loss and PDL space widening was associated to tooth # 46 and the overall periodontal conditions in other oral segments were comparatively normal.
4. Patient's history and intraoral examination revealed that patient had a big occlusal composite restoration which would have been a source of infection in the pulp.
5. A periodontal lesion of endodontic origin has a draining sinus adjacent to offending tooth or within gingival sulcus. In this case, patient gave an history of salty taste which could be indicative of presence of such invisible sinus in the gingiva. The patient didn't complain of salty taste after 2 - 3 visits which may be because of healing of sinus.

Furcation bone defect is often present in all the three type of endo-perio lesions and those present in type II and III are hard to treat [8]. Furcation - bone loss associated with Type I lesions is often managed well with endodontic treatments [9]. Due to lack of proper diagnosis, this case had previously been extensively treated by two dentists without any favorable results.

Variation in anatomic morphology of a tooth poses difficulty during endodontic therapy. In this case, the affected tooth had three roots and prevalence of such variation reported in literature is 6.40% [10]. Mandibular first molars typically have two roots, one placed mesially and the other distally, but they sometimes have an additional distolingual root [11]. This anatomic variation is known as Radix Entomolaris [12] and etiology of such variation is not yet known [13] and an accurate diagnosis and watchfully cautious application of clinical skills satisfactorily change the prognosis of mandibular molars having this type of root morphology [14].

Failure to detect an extra root may lead to partial debridement and incomplete preparation of the root canal system with subsequent failure of the treatment [15]. An attending clinician should be well aware of variation in the apical 2/3rd of the extra root as moderate to severe curve mesially, distally or lingually may be present. A classification based on the curvature has been proposed [16]. Type I refers to a straight root canal, type II refers to an initial curve which continues as a straight canal and type III refers to an initial curve in the coronal part of the root canal and a second curve beginning in the middle which remains continuous to the apical 1/3rd [17]. This classification is further modified as small type, having the length shorter than half of the length of the distobuccal root and conical type, appearing even smaller than the small type without a root canal in it [18]. Knowledge of the such variable applied root morphological anatomy saves a dentist from committing endodontic complications like furcal perforation, strip perforation, transportation, root fracture, ledge formation, loss of working length and intracanal instrument separation [19,20].

Radiographic interpretation poses difficulty in accurate diagnosis as a conventional radiograph presents a two dimensional picture of 3-dimensional objects and thus superimpositions cause limited visualization [21]. Spiril Computed Tomography (SCT) is recommended in such cases as it is more accurate and precise examination method for the localization of superimposed objects.

Conclusion

A vigilant diagnosis is mandatory for successful outcome of the treatment and if detected and treated early by endodontic therapy, these furcation defects resolve with regeneration of new interfurcal bone and long term studies of treated teeth with such defects have shown striking prognosis [4].

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