



Tunnel Preparation- Management Of Furcation Involved Molar

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Abstract

Treating multi-rooted teeth with furcation involvement presents some of the greatest challenges to the success of periodontal therapy. In advanced furcation involvement, the tunnel preparation procedure is preferable to extraction when other treatments are excluded for financial or other reasons. However the tunnelling procedure has been studied least often. Thus, the aim of this case report was to describe a conservative and therapeutic treatment modality for the horizontal defect of periodontal tissues in the furcation area of a mandibular molar.

Keywords: Tunnel Preparation- Management Of Furcation Involved Molar

Introduction

A furcation is defined as the anatomic area of a multi-rooted tooth where the roots diverge. Furcation involvement refers to the pathologic resorption of bone within a furcation [1]. The examination of such teeth is done clinically by using Naber's periodontal probe. Indices for furcation involvement are based on the horizontal measurement of attachment loss in the furcation area or by a combination of horizontal and vertical measurements. Glickman classified furcation involvement into four grades [2] - Grade I: Incipient lesion, no radiographic changes; Grade II: Cul de sac lesion, some amount of bone loss present in furcation area, defects do not communicate and can be seen radiographically; Grade III: Bone is not attached to dome of furcation, furcation entrance covered by soft tissue; Grade IV: Soft tissue recession exposing furcation opening, probe passes through and through. Later on, a sub-classification referring to the vertical bone loss from the furcation fornix was introduced to complement the horizontal classification [3] -

1. Subclass A: vertical bone loss 3 mm or less.
2. Subclass B: vertical bone loss from 4 to 6 mm.

3. Subclass C: bone loss from the fornix of 7 mm or more.

A new classification system has been proposed as of 2018 [4].

Primary etiologic factor in the development of furcation defect is bacterial plaque. Hence thorough oral hygiene measures to keep the area plaque free should have been sufficient to contain the damage. However the prognosis of such teeth is further decided by several other factors like local anatomic factors (e.g., root trunk length, root morphology), local developmental anomalies (e.g., cervical enamel projections), pulpal pathology, combined lesions, iatrogenic factors etc [5]. So the reasons for compromised results in the furcation areas include the lack of proper access both to the patient for brushing and to the dentist for proper instrumentation due to the furcation anatomy [6]. Consequently there is a persistence of pathogenic microbial flora and thus advancement of the disease which ultimately leads to tooth loss.

The objectives of furcation therapy hence should be the eradication of the microbial plaque from the

exposed surfaces of the root complex and the institution of an anatomy of the affected surfaces that aids proper self-performed plaque control [7]. To achieve these objectives, the different treatment modalities include non-surgical periodontal therapy, open flap debridement, furcation-plasty, regenerative techniques, root resection/ hemisection, tunnelling and finally extraction in case of hopeless prognosis [8].

Tunnel preparation is a way to manage furcation defects especially those with "through-and-through" defects [9]. If the root anatomy permits it, the bi- or tri-furcations are broadened by resection of bone, to give access for inter-radicular cleaning post-surgically by the patient using an interdental brush. In general, this technique does not require endodontic or restorative treatment. Usually, this type of the resective therapy is performed in mandibular molars, which have a short root trunk, a wide separation angle and long divergence between the mesial and distal roots [10]. Tunnel can be prepared in a maxillary molar also (mesio-buccal and disto-buccal) [11]. The major drawbacks of the procedure include risk of root sensitivity and root caries development [12].

Case Report

A 45 year old male patient with satisfactory oral hygiene was referred to the OPD of the department of Periodontia for gum swelling and pain with respect to the right first mandibular molar. Clinical and radiographic examinations (Figs 1 & 2) confirmed the diagnosis of grade III furcation involvement. After complete history taking, phase I periodontal therapy was accomplished and the patient was re-evaluated after four weeks. Tunnelling procedure under local anaesthesia (2% lignocaine hydrochloride and 1:80,000 adrenaline) was finalized after necessary blood investigations. A full mucoperiosteal flap was raised with the help of sulcular incision to the expose the furcation. Complete debridement of granulation tissue followed by scaling and root planing was done. Inter-radicular osteotomy was done with round bur to create the tunnel (Fig. 3) and then the flap was repositioned on the alveolar crest and sutured (Fig. 4). The patient was discharged after prescription of antibiotics and analgesics and was recalled after a week for suture removal. Patient was educated for mechanical (interproximal brush) and chemical plaque control (0.2% chlorhexidine mouthwash). Patient followed regular 3-6 months maintenance visits for a period of one year.

Fig. 1- Clinical examination



Fig. 2- Radiographic examination



Fig. 3- Tunnel prepared**Fig. 4 Suturing of the flap**

Discussion

The ultimate goal of treatment for teeth with advanced furcation involvement is to eliminate the furcation by widening the entrance of the furcation area by round burs, so that the patient can properly maintain the area free of plaque. Nevertheless, the treatment approach depends on the grade of furcation involvement, severity of periodontal disease, bone loss in the furcation lateral and apical to the defect and tooth mobility^[13]. The horizontal tissue defect depth determines the healing potential at furcation-involved sites. If the horizontal tissue defect did not exceed 3 mm, periodontal health could be established at furcation-involved sites merely by means of scaling, root planing and if required by furcation-plasty^[14].

Though Hamp et al^[15], (1975) reported caries development in four out of seven "tunnels" (total 310 teeth) during a five years "follow-up" period (failure rate of about 60%) and painted a grim picture of tunnelling procedure, Hellden et al. (1989)^[16] reported 75% of the re-examined teeth (total 156 teeth) were caries free and in function at the time of "follow-up" examination. Little et al (1995) found that 84 percent of tunnelled molars (5 maxillary and 13 mandibular) were caries-free at six years after treatment^[17]. Vandersall et al in 2002 stated that regular three- to six-month supportive periodontal therapy along with the use of fluoride rinses and dentifrice, lowered the risk of root caries in tunnelled mandibular molars^[18].

Conclusion

Tooth extraction is the ultimate or last and radical treatment modality in periodontally compromised teeth. The tunnel preparation procedure is preferable

to extraction when other treatments are excluded for financial or other reasons.

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