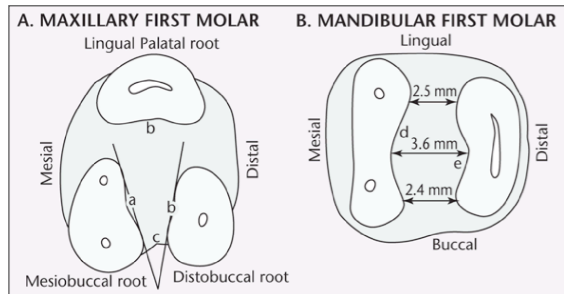


PROGNOSIS OF TREATMENT OF FURCATIONS

Regardless of the treatment method used, longitudinal studies indicate that molars are at greater risk for tooth loss than non-molar teeth. Class II or III furcations have a worse prognosis than non-surgically treated class I furcations (as low as 45% at 5 years vs. 90%).

One reason has to do with the difficult anatomy of furcations. The most difficult furcations to treat are those where the roots are not flared and the furcation entrance is smaller than the cavitron or bur tip diameter. If concavities are deep (see schematic below), then access to these areas, even with flared roots, is difficult (Fig 1).



(taken from Dimensions of Dental Hygiene, May 2010)

Causes for failure long term include root fracture, caries, continued periodontal attachment loss and endodontic complications. Remember, the incidence of patent canals in the furcation of extracted molar teeth is between 20-60%.



Fig 1

Of course, ideal oral hygiene and periodontal maintenance will help curb caries or periodontal disease progression. The use of occlusal appliances may also help reduce the risk of root fracture.

All cases are patients of Dr. Pamela Nicoara unless otherwise specified.

FURCATION ETIOLOGY AND CLASSIFICATIONS

What causes bone loss in the furcation? Obviously, periodontal infection is the most well known, but furcation bone loss is also influenced by anatomical factors such as short root trunk length, the flare of the roots, root concavities, bulbous crown contours limiting hygiene and enhancing food impaction, poorly contoured restorations, furcal pulp canals, enamel projections and enamel pearls. External factors such as immune status (influenced by general systemic health, stress levels, diet, exercise, etc), smoking status, and level of oral hygiene, among others, also contribute to the amount of disease present. These factors in turn influence the success of treatment of a furcation lesion.

No discussion on furcations is complete without first defining the various levels of severity of furcation involvement. There are several classification systems which range in definition from radiographic appearance to surgical bony walls present, including defining a vertical component. The simplest and most commonly used system is Hamp's Classification from 1975 defining horizontal furcal loss:

Class I: Less than 3mm loss.

Class II: Greater than 3mm loss, but not including the total width of the furca.

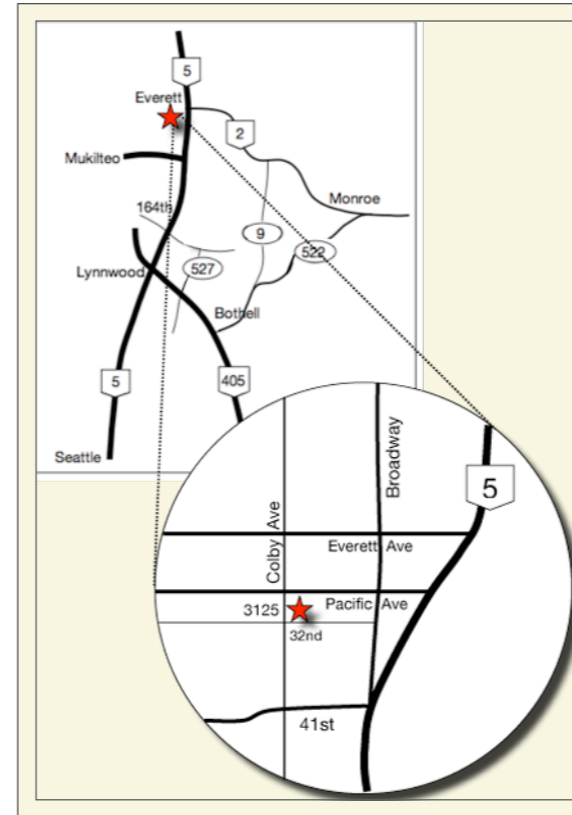
Class III: 'Through and Through' loss.

This issue of **ProbeTips** will review the most recent literature regarding the treatment of furcation lesions, the long term prognosis of treatment, and the options available to potentially prevent such lesions.

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PROBE TIPS

A QUARTERLY PERIODONTAL
NEWSLETTER

BY PAMELA NICOARA DDS MSD

Furcations



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Treatment of Furcation Lesions

GENERAL CONSIDERATIONS

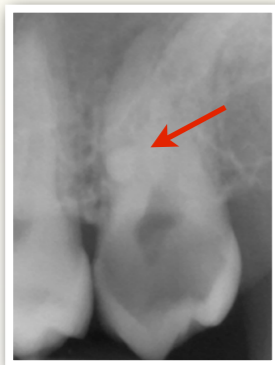
Historically, the treatment of furcation lesions ranges from the most conservative non-surgical scaling and root planing, to surgical flap debridement, gingivectomy, root amputation, hemisection and tunneling. The most recent advances in periodontal therapy include regeneration in such defects with bone, membranes, or bioactive gels, either individually or in combination.

ODONTOPLASTY/OSTEOPLASTY

The reduction of bulbous enamel contours or the removal of enamel where it should not be, such as enamel projections or enamel pearls (see below) is essential to providing an environment that will help prevent further furcation bone loss in any furcation, and permit an opportunity for treatments such as regeneration to occur in class II or III defects in particular. This also applies to overhanging or bulbous restorations. Thick facial ridges of bone can



Enamel Projection



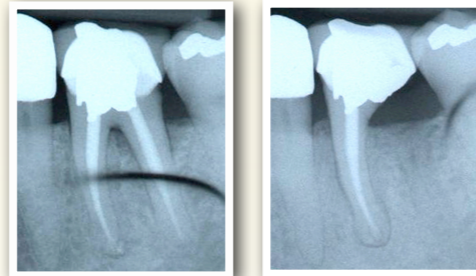
Enamel Pearl (taken from Google images)

also contribute to food impaction, and should be reduced. If the furcation lesion is a class I lesion, no other treatment may be necessary.

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ROOT AMPUTATION, HEMISECTION AND TUNNELING

When only one root is infected and contributing to furcation bone loss, and when the rest of the tooth appears in good condition, removal of the damaged root is an option for attempting to maintain the tooth when implants or fixed partial dentures are not an option. For Cases 1 and 2 below, the distal root was fractured, and removed. For the mandibular molar, the socket is grafted.



Case 1 at time of hemisection

For the maxillary molar, the socket is left to resorb in order to facilitate oral hygiene by the patient.



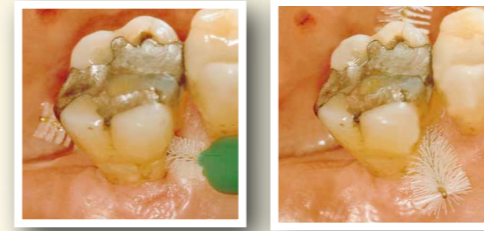
Case 2 pre-operative and at 4 years

Root canal therapy is usually necessary.

Other reasons for root removal include a root that cannot be instrumented endodontically, or severe vertical bone loss that cannot be regenerated.

Tunneling is complete removal of the soft tissue and bone in a class III situation to allow the patient complete access to the furca with oral hygiene instruments (see next panel). These

procedures are best performed in molars with short root trunks and flared roots.



Use of Proxybrush in Furca (taken from JCP 2001)

REGENERATION

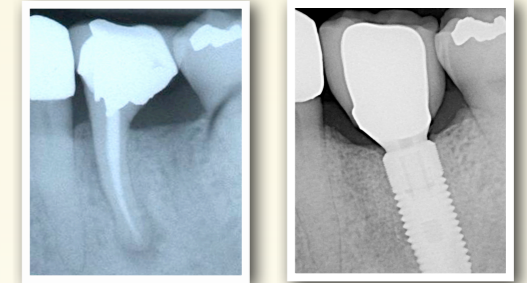
Of the three classes of furcation invasion, only class II lesions are most successfully treated with regeneration. This is because of the limitations of regeneration which require a defect depth deep enough to be regenerated (which excludes shallow class I lesions), and enough existing walls of bone to regenerate against (which excludes class III lesions which have no bony walls). Mandibular teeth are more successfully treated than maxillary teeth due to the more complex anatomy of a maxillary molar.

The most recent systematic reviews indicate that resorbable membranes are superior to non-resorbable membranes with regard to bone fill, and that using a membrane gains more bone fill than flap debridement alone.

The average reduction in depth, however, is only 1mm. Does the expense for the cost of regenerative materials outweigh the less than ideal long term prognosis? On the other hand, if the tooth can be maintained for 5 years, and the patient is able to commit financially and with regard to regular maintenance, then the improved technology available 5 years from now may give patients a better long term replacement option than what is currently available today.

EXTRACTION

If there are multiple etiologies for the formation of the furcation lesion, particularly if the tooth is infected endodontically, the



Case 1 cont'd, (1 year after hemisection and after implant restoration)

long term prognosis declines significantly. Even for teeth treated with surgical means in the past, recurrent infection via root fracture (See Case 1 cont'd) or recurrent caries (Case 2 at 4 years) leads to a hopeless situation.

Extraction of such teeth will permanently resolve infection. With the availability of dental implants, or the use of fixed or removable partial dentures, extraction and tooth replacement offers a solution with a significantly improved long term prognosis.

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complete references available on request
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