**Lec.4 Treatment of Furcation Involvement**

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Treatment of a defect in the furcation region of a multirooted tooth is intended to meet two objectives:

1. Elimination of the microbial plaque from the exposed surfaces of the root complex

2. Establishment of an anatomy of the affected surfaces that facilitates proper self‐performed plaque control.

**Different methods of therapy are recommended:**

• **Class I furcation involvement:** scaling and root planing (SRP); furcation plasty

• **Class II furcation involvement:** furcation plasty; tunnel preparation; root resection; tooth extraction; guided tissue regeneration at mandibular molars

• **Class III furcation involvement:** tunnel preparation; root resection; tooth extraction.

* **Scaling and root planing**

Is the removal of hard and soft bacterial deposits from the tooth and root surfaces in order to simplify the self-performed plaque control measures.

* **Furcation plasty**

Furcation plasty involves the following procedures:

• Reflection of a soft tissue flap (mucoperiosteal flap) to obtain access to the inter‐radicular area and the surrounding bone structures.

• Removal of the inflammatory soft tissue from the furcation area followed by careful SRP of the exposed root surfaces.

•Odontoplasty: removal of tooth substance in the furcation area in order to widen a narrow entrance of the furcation and to reduce the horizontal depth of the involvement.

• Osteoplasty: recontouring of bony defects in the furcation area.

• Positioning and suturing of the mucosal flaps at the level of the alveolar crest in order to cover the furcation entrance with soft tissue.

• **Side effects of this procedure:**

1-Hyper sensitivity of the area

2-Root surface caries

3-More destruction of the periodontal tissue.

* **Tunnel preparation**

Tunnel preparation is a technique used to treat deep class II and class III furcation defects in mandibular molars. This type of resective therapy can be offered at **mandibular molars** which have a **short root trunk, a wide separation angle, and long divergence between the mesial and distal root.**

Following the reflection of buccal and lingual mucosal flaps, the granulation tissue in the defect is removed and the root surfaces are scaled and planed.The furcation area is widened by the removal of some of the inter‐radicular bone. The alveolar bone crest is recontoured; some of the interdental bone, mesial and distal to the tooth in the region, is also removed to obtain a flat outline of the bone. Following hard tissue resection, enough space will have been established in the furcation region to allow access for cleaning devices to be used during self‐performed plaque control measures. The flaps are apically positioned to the surgically established inter‐radicular and interproximal bone level and sutured.

* **Root Separation and Resection (RSR)**

 -**Root separation:** It involves the sectioning of the root complex and the maintenance of all roots.

**-Root resection**: it includes the removal of one or more roots from a multi rooted tooth to allow access to the furcation area for cleaning. After raising buccal & palatal flaps, sectioning should start in the affected furcation. The cut is made with a tapered diamond bur cooled by sterile water. A wide enough space should be made to elevate the root, taking care not to remove too much substance from the part of the tooth to be retained (Below Figure).

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**In selection of root to be retained, the following factors should be considered:**

1. The length of the root trunk
2. The divergence between the root cones
3. The length and the shape of the root cones
4. Fusion between root cones
5. Amount of remaining support around individual roots
6. Stability of individual roots
7. Access for oral hygiene devices
* The root resection & hemisection should be proceeded by endodontic treatment for the root that will be retained in the place. A small cavity is made at the entrance of the canal of the root to be removed & packed with amalgam to produce a permanent seal at the point of amputation. Also during endodontic treatment, we may found curved & calcified root that should be scarified).
* In case where, the furcation of a 1st mand. Molar is involved to extent which calls for root resection, it is usually easy to decide which root is preferable to maintain from the periodontal aspect.
* If the amount of the remaining periodontium around the 2 roots is similar, it is often preferable from the endodontic point of view to maintain the distal root because this root has generally only one wide root canal and is therefore easily accessible for endodontic treatment .
* Root resection of maxillary 1st premolars is possible only in rare cases due to the anatomy of the tooth. The furcation is often located at the apical level that the maintenance of one root serves no meaningful purpose. In most cases, therefore, a furcation involvement of degree III in maxillary 1st premolar leads to tooth extraction.
* In cases of max.molars, when we have furcation involvement calls for root resection, we can preserve the 2 buccal roots (MB, DB) or the palatal root with one of these 2 roots. We cannot maintain the palatal root only because of its relation to the neighboring & opposing teeth (cannot be used as abutment).

**Guided tissue regeneration (GTR) &Bone grafting**

 Some of the periodontal surgical techniques, not only aimed to eliminate the disease but also aim to produce regeneration of periodontal tissue which has been destroyed by disease, & thereby produce increased attachment level .From these techniques are guided tissue regeneration& bone grafting.

In GTR technique, a barrier membrane is adapted to fit over the defect & the root of the tooth in order to guide the fibroblast cell of periodontal ligament to contact the root surface during healing & prevent other cells of oral epithelium, gingival connective tissue from contacting the root surface so that leading to new connective tissue attachment.

**Bone substitute materials or bone grafting:**

1. **Autogenous bone grafting**: grafts transferred from one position to another within the same individual.
2. **Allografts:** grafts transferred between genetically dissimilar members of the same species.
3. **Xenografts:** grafts taken from a donor of another species.
4. **Alloplasts:** synthetic materials which are used as substitutes for bone grafts.

**Tooth extraction**

 The indications for extraction are:

1-When the destruction of the periodontium has progressed to such a level that no root can be preserved.

2-When the maintenance of the affected tooth will not improve the overall treatment.

3-When treatment of furcation involved tooth will not result in condition which can be properly maintained by self-performed plaque control measures.

**"Don't judge each day by the harvest you reap but by the seeds that you plant."**

**Robert Louis Stevenson**