**Periodontal surgery**

**Part 2** **Dr.Huda Jasim Jebur**

**2. Flap procedures:**

* **Main objectives of the flap procedures:**

1. Facilitate the debridement of the root surfaces, the removal of the pocket epithelium and the inflamed connective tissue.
2. Eliminate the deepened pockets (the original Widman).
3. Cause a minimal amount of trauma to the periodontal tissues and discomfort to the patient.

* **Advantages of flap operations include:**

1. Existing gingiva is preserved.
2. The marginal alveolar bone is exposed where by the morphology of bony defects can be identified and the proper treatment rendered.
3. Furcation areas are exposed, the degree of involvement and the “tooth–bone” relationship can be identified.
4. The flap can be repositioned at its original level or shifted apically, thereby making it possible to adjust the gingival margin to the local conditions.
5. The flap procedure preserves the oral epithelium and often makes the use of surgical dressing additionally.
6. The post-operative period is usually less discomfort to the patient when compared to gingivectomy.

* **Flaps are divided into 2 types depend on thickness of flap:**

1. **Full thickness flap:** flap includes: epithelia, connective tissue, periosteum reflected from underneath bone **(mucoperiosteal flap).**
2. **Partial thickness flap:** flap includes: epithelia and connective tissue reflected form bone and periosteum **(split flap).**

**Classification of Flaps**

**1- The original Widman flap:**

In 1918 Leonard Widman published one of the first detailed descriptions of the use of a mucoperiosteal flap design aimed at removing the pocket epithelium and the inflamed connective tissue, thereby facilitating optimal cleaning of the root surfaces.

* The main **advantages** of the “original Widman flap”procedure in comparison to the gingivectomy procedure include, according to Widman (1918):

• Less discomfort for the patient, since healing occurred by primary intention

• Possible to re‐establish a proper contour of the alveolar bone in sites with angular bony defects.

* **Technique**

1. Sectional releasing incisions are first made to demarcate the area scheduled for surgery.These incisions are made from the mid‐buccal gingival margins of the two peripheral teeth of the treatment area and are continued for several millimeters out into the alveolar mucosa. The two releasing incisions are connected by a gingival incision,which follow the outline of the gingival margin and separate the pocket epithelium and the inflamed connective tissue from the non‐inflamed gingiva.Similar releasing and gingival incisions, if needed, are made on the lingual aspect of the teeth.

2. A mucoperiosteal flap is elevated to expose at least 2–3 mm of the marginal alveolar bone. The collarof inflamed tissue around the neck of the teeth is removed with curettes and the exposed root surfaces are carefully instrumented. Bone recontouring is recommended in order to achieve an ideal anatomic form of the underlying alveolar bone.

3. Following careful debridement of the teeth in the surgical area, the buccal and lingual flaps are laid back over the alveolar bone and secured in this position with interproximal sutures.

Widman pointed out the importance of placing the soft tissue margin at the level of the alveolar bone crest, so that no pockets would remain. Often the interproximal areas are left without soft tissue coverage of the crestal bone.

**2-Modified flap operation**

In 1931, Kirkland described a surgical procedure to be used in the treatment of “periodontal pus pockets”. The procedure was called the modified flap operation, and is basically an access flap used to allow proper root debridement.

* **Technique**

1. Pocket incisions are made on both the labial and the lingual aspects of the interdental area. The incisions are extended in a mesial and a distal direction.

2. The gingiva is retracted labially and lingually to expose the diseased root surfaces which are carefully debrided .Angular bony defects are curetted but no bone is removed.

3. Following the elimination of the pocket epithelium and granulation tissue from the inner surface of the flaps, these are replaced at their original position and secured with interproximal sutures.

In contrast to the original Widman flap, the modified flap operation does not include **(1)** extensive removal of non‐inflamed tissues and **(2)** apical displacement of the gingival margin.

The method could be useful in the anterior regions of the dentition for esthetic reasons, since the root surfaces are not markedly exposed. Another advantage of the modified flap operation was the potential for bone regeneration in intrabony defects that, according to Kirkland (1931), frequently occurred.

**3-Apically repositioned flap**

In the 1950s and 1960s new surgical techniques for the removal of soft and, when indicated, hard tissue periodontal pockets were described.

The importance of maintaining an **adequate zone of attached gingiva** after surgery was now emphasized. One of the first authors to describe a technique for the preservation of the gingiva following surgery was **Nabers (1954).** The surgical technique developed by Nabers was originally denoted **“repositioning of attached gingiva”** .In 1962; Friedman proposed the term **apically repositioned flap** to describe more appropriately the surgical technique introduced by Nabers.

Friedman emphasized the fact that, at the end of the surgical procedure, the entire complex of the soft tissues (gingiva and alveolar mucosa), rather than the gingiva alone, was displaced in the apical direction.

Thus, rather than removing gingiva which would be in excess after osseous surgery (if performed), the whole mucogingival complex was maintained and repositioned apically. This surgical technique was used on buccal surfaces in both upper and lower jaws and on lingual surfaces in the lower jaw, while a bevel flap technique had to be used on the palatal aspect of maxillary teeth where the lack of alveolar mucosa made it impossible to reposition the flap in an apical direction.

* **Technique**

According to **Friedman (1962)** the technique should be performed in the following way:

1. A reverse bevel incision is made using a scalpel with a Bard–Parker® blade (No. 12B or No. 15).How far from the buccal/lingual gingival margin the incision should be made is dependent on the pocket depth as well as the thickness and the width of the gingiva .If preoperatively the gingiva is thin and only a narrow zone of keratinized tissue is present, the incision should be made close to the tooth. The beveling incision should be given a scalloped outline, to ensure maximal interproximal coverage of the alveolar bone when the flap subsequently is repositioned. Vertical releasing incisions extending out into the alveolar mucosa (i.e. past the mucogingival junction) are made at each of the end points of the reverse incision, thereby making apical repositioning of the flap possible.

2. A full‐thickness mucoperiosteal flap including buccal/ lingual gingiva and alveolar mucosa is raised by means of a mucoperiosteal elevator. The flap has to be elevated beyond the mucogingival line in order to be able later to reposition the soft tissue apically. The marginal collar of tissue, including pocket epithelium and granulation tissue, is removed with curettes ,and the exposed root surfaces are carefully scaled and planed.

3. The alveolar bone crest is recontoured with the objective of recapturing the normal form of the alveolar crest, but at a more apical level. The osseous surgery is performed using burs and/ or bone chisels.

4. Following careful adjustment, the buccal/lingual flap is repositioned to the level of the newly recontoured alveolar bone crest and secured in this position. The incisional and excisional technique used means that it is not always possible to obtain proper soft tissue coverage of the denuded interproximal alveolar bone. A periodontal dressing should therefore be applied to protect the exposed bone and to retain the soft tissue at the level of the bone crest. After healing, an “adequate” zone of gingiva is preserved and no residual pockets should remain.

* To handle periodontal pockets on the **palatal aspect of the maxillary teeth**, Friedman described a modification of the “apically repositioned flap”, which he termed the **beveled flap**:

1. In order to allow the tissue at the gingival margin to follow the outline of the alveolar bone crest properly, a conventional mucoperiosteal flap is first elevated.

2. Tooth surfaces are debrided and osseous recontouring is performed.

3. The palatal flap is subsequently replaced and the gingival margin is adjusted to the alveolar bone crest by a secondary scalloped and beveled incision.The flap is secured in this position with interdental sutures.

* Among a number of suggested **advantages** of the apically repositioned flap procedure, the following have been emphasized:

• Minimum pocket depth postoperatively

• If optimal soft tissue coverage of the alveolar bone is obtained, the post‐surgical bone loss is minimal

• Postoperative position of the gingival margin may be controlled and the entire mucogingival complex may be maintained.

* The removal of periodontal tissues by bone resection and the subsequent exposure of root surfaces (which may cause **esthetic and root sensitivity problems**) are regarded as the main **disadvantages** of this technique.

**4-Modified Widman flap**

**Ramfjord and Nissle (1974)** described the modified Widman flap technique that is also recognized as the **open flap curettage technique**. It should be noted that, while the original Widman flap technique included both apical displacement of the flap(s) and osseous recontouring (elimination of bony defects) to obtain proper pocket elimination, the modified Widman flap technique is not intended to meet these objectives.

* The main advantages of the modified Widman flap technique in comparison to the other procedures previously described are, according to Ramfjord and Nissle (1974):

• Possibility of obtaining a close adaptation of the soft tissues to the root surfaces

• Minimum of trauma to which the alveolar bone and the soft connective tissues are exposed

• Less exposure of the root surfaces, this from an esthetic point of view is an advantage in the treatment of anterior segments of the dentition.

* **Technique**

1. According to the description by Ramfjord and Nissle (1974), the initial incision , which may be performed with a Bard–Parker® knife (No. 11), should be parallel to the long axis of the tooth and placed approximately 1 mm from the buccal gingival margin in order to properly separate the pocket epithelium from the flap. If the pockets on the buccal aspects of the teeth are <2 mm deep or if esthetic considerations are important, an intracrevicular incision may be made. Furthermore, the scalloped incision should be extended as far as possible in between the teeth, to allow maximum amounts of the interdental gingiva to be included in the flap. A similar incision technique is used on the palatal aspect. Often, however, the scalloped outline of the initial incision may be accentuated by placing the knife at a distance of 1–2 mm from the mid‐palatal surface of the teeth. By extending the incision as far as possible in between the teeth, sufficient amounts of tissue can be included in the palatal flap to allow for proper coverage of the interproximal bone when the flap is sutured. Vertical releasing incisions are not usually required.

2. Buccal and palatal full‐thickness flaps are carefully elevated with mucoperiosteal elevator. The flap elevation should be limited and allow only a few millimeters of the alveolar bone crest to become exposed. To facilitate the gentle separation of the collar of pocket epithelium and granulation tissue from the root surfaces, an intracrevicular incision is made around the teeth (second incision) to the alveolar crest.

3. A third incision made in a horizontal direction and in a position close to the surface of the alveolar bone crest separates the soft tissue collar of the root surfaces from the bone.

4. The pocket epithelium and the granulation tissues are removed by means of curettes. The exposed roots are carefully scaled and planed, except for a narrow area close to the alveolar bone crest in which remnants of attachment fibers may be preserved.Angular bony defects are carefully curetted.

5. Following the curettage, the flaps are trimmed and adjusted to the alveolar bone to obtain complete coverage of the interproximal bone .If this adaptation cannot be achieved by soft tissue recontouring, some bone may be removed from the outer aspects of the alveolar process in order to facilitate the all‐important flap adaptation. The flaps are sutured together with individual interdental sutures. Surgical dressing may be placed over the area to ensure close adaptation of the flaps to the alveolar bone and root surfaces. The dressing, as well as the sutures, is removed after 1 week.

**5-Papilla preservation flap**

In order to preserve the interdental soft tissues for maximum soft tissue coverage following surgical intervention involving treatment of proximal osseous defects, **Takei et al. (1985)** proposed a surgical approach called papilla preservation technique. For esthetic reasons, the papilla preservation technique is often utilized in the surgical treatment of anterior tooth regions.

* **Technique**

1. According to the description by Takei et al. (1985), the papilla preservation flap technique is initiated by an intrasulcular incision at the facial and proximal aspects of the teeth without making incisions through the interdental papillae. Subsequently, an intrasulcular incision is made along the lingual/palatal aspect of the teeth with a semilunar incision made across each interdental area. The semilunar incision should dip apically by at least 5 mm from the line angles of the teeth, which will allow the interdental tissue to be elevated in the facial flap. In situations where an osseous defect has a wide extension into the lingual/palatal area, the semilunar incision may be placed on the facial aspect of the interdental area to include the papillae in the lingual/palatal flap.

2. A curette or interproximal knife is used to free the interdental papilla carefully from the underlying hard tissue. The detached interdental tissue is pushed through the embrasure with a blunt instrument.

3. A full‐thickness flap is reflected with a periosteal elevator on both facial and lingual/palatal surfaces.The exposed root surfaces are thoroughly debrided and bone defects carefully curetted.

4. While holding the reflected flap, the margins of the flap and the interdental tissue are trimmed to remove pocket epithelium and excessive granulation tissue. In anterior areas, the trimming of granulation tissue should be limited in order to maintain the maximum thickness of tissue.

5. The flaps are repositioned and sutured using cross mattress sutures. Alternatively, a direct suture of the semilunar incisions can be placed as the only means of flap closure. A surgical dressing may be placed to protect the surgical area. Then dressing and sutures are removed after 1 week.

**“To be yourself in a world that is constantly trying to make you something else is the greatest accomplishment.”**

**Ralph Waldo Emerson**