

Modified Widman Flap Surgery: At A Glance

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ABSTRACT

There are numerous surgical procedures of which modified Widman flap is a standard procedure for open debridement. It was given by (Widman 1918, Ramfjord & Nissle 1974, Ramfjord 1977). It is classified as access flap operation as the main goal of this is to provide access and visibility to the periodontally involved tissues. It is characterized by precise incision, partial flap reflection with an atraumatic procedure. The main aim is to provide healing (regeneration or long junctional epithelium formation) and not necessarily pocket elimination. Post-operative pain and swelling are minimal as the as the alveolar bone is partially exposed. This article gives an outline about the history, indications, contraindications, advantages, disadvantages, procedure and the healing.

Key words: modified Widman flap, surgical procedure, open debridement.

INTRODUCTION

According to Webster's - "Flap is a piece of tissue partly severed from its place of origin for use in surgical grafting and repair of body defects. [1] Flap procedures have been used mainly for three purposes (1) surgical elimination of periodontal pockets; (2) to induce reattachment and bone regeneration in periodontal pockets; (3) to correct gingival and mucogingival defects and deficiencies. [2] Widman [3] gave the reverse bevel scalloping type of gingival incision in 1916 as a modification of Neumann's periodontal flap surgery. [4] Modified Widman Flap is classified with the "access flap operations" as the goal is to provide access to periodontally involved

tissues. [5] The aim of the procedure is maximum healing and reattachment of periodontal pockets with minimum loss of periodontal tissues during and after the surgery. [2] The main characteristics are precise incisions, partial flap reflection and an atraumatic procedure. The main goal is to provide improved visual access to periodontally involved tissues [10] and "healing" by regeneration or a long junctional epithelium with minimum tissue loss [5] and Post-operative pain and swelling are less as alveolar process is only partially exposed. [5]

Bone repair within the boundaries of lesion occur if procedure is carried out in deep infrabony pockets. [6,7] The amount of bone fill is dependent upon (a) osseous defect anatomy(three-walled defect provide better mold for repair than two-walled), (b) remaining crestal bone, (c) extent of chronic inflammation. Long junctional epithelium is found interposed between the regenerated bone tissue and the root surface. [8,9] It is also called as access flap operation. [10]

HISTORICAL BACKGROUND

Neuman introduced mucoperiosteal flap in 1911

The procedure involved up to 6 teeth, also involved intrasulcular incision and two vertical releasing incisions adjacent to defect. The flaps were raised up to mucogingival fold and approximately 2mm of gingiva and bone was removed in the areas of deep pocket and the flaps were sutured back to their position. [4]

Widman in 1916 presented modification of Neuman's flap to the Scandinavian Dental

Association and the same was published in 1918.

Procedure involved an inverse bevel incision 1mm away from the free gingival margin, extending to alveolar crest and continues to interdental papilla with two vertical releasing incisions at the midline of the teeth to raise a trapezoidal flap. [3]

Cieszynski in 1914, introduced reverse bevel incision in the periodontal flap operation for access for scaling and removal of granulation tissue and bone. [11]

Ramfjord and Nissle in 1974 modified the original Widman flap procedure and coined the term "Modified Widman flap". [12]

Zentler in 1918 gave the use of a crevicular mucoperiosteal flap for the surgical pocket elimination. [13]

Kirkland in 1931 first described flap procedure for reattachment and called it as "Modified flap operation". The procedure involved incisions made intracrevicularly through the bottom of the pocket and scaling and curettage after the elevation of flap. [14]

Modified Widman flap surgery first was brought in by Birger Oestman during the 1930's and was called a Widman-Oestman flap. [12]

During 1930's and 1940's the periodontal surgery included gingivectomy and especially in maxillary anterior region Oestman's modification of Widman flap was used for acceptable aesthetic results. [2]

The term "modified Widman flap" was adopted as the procedure was modified by several persons which included open subgingival curettage for reattachment. [2]

It should be known that the modified Widman flap is not identical to the original Widman flap nor to any other similar flap procedure. [15,16,17]

INDICATIONS:

- Deeper interdental defects and pocket depth more than 5-7mm. [5]
- When minimal gingival recession is desired. [2]
- Can be combined with respective methods and special procedures such as

hemisection, root resection, wedge excisions, osseous implantations etc. [5]

CONTRAINDICATIONS:

- Narrow band of attached gingiva. [5]
- Osseous surgical procedures. [5]
- Insufficient attached gingiva.

ADVANTAGES:

- Less sensitivity. [19]
- Active pathologic aspects of pocket are eliminated. [2]
- Less mechanical trauma when compared to closed curettage. [19]
- Root planning with direct vision. [5]
- Minimal bone removal. [19]
- Conservation of periodontal tissue. [19]
- There is an intimate healthy adaptation of tooth surface collagenous connective tissue and epithelium. [5]
- Facilitates oral hygiene. [19]
- Healing with primary intention. [5]
- Crestal bone resorption is minimal. [5]
- Pocket closure by reattachment [20] and bone regeneration. [21,22]
- Reattachment with formation of cementum. [18]
- Post-operative discomfort is less. [5]

DISADVANTAGES:

- Higher skills required. [19]
- Exact placement of interproximal flaps. [19]
- Areas of interproximal bony craters shows flat or concave architecture immediately after removal of surgical dressing. [2]

RAMFJORD TECHNIQUE:

- **Principles of the Three Incisions:**
 1. Paramarginal first incision: Severing the soft tissue pocket wall with the 12 B scalpel.
 2. Flap reflection and sulcular incision.
 3. Horizontal incision: Extends into the interdental areas.
- **Surgical Protocol:**
 1. First incision-Paramarginal, scalloping.

2. Full thickness flap reflection.
3. Second incision-sulcular
4. Third incision-horizontal.
5. Removal of the delineated soft tissues and osseous curettage.
6. Root planning.
7. Flap repositioning.
8. Suturing.

PROCEDURE:

1. Hygienic and preparatory phase-

The procedure should lapse at least 3-4 weeks after hygienic and preparatory phase as it facilitates healing, collagen maturation, precise flap adaptation and optimal wound contraction. [12] The gingival shrinkage makes it easy to establish how far the initial incision should be placed for good esthetic results. [12]

2. Sterile technique.

3. Adequate anesthesia for pain control.

4. Initial Incision-

Scalloped inverse bevel incision using Bard Parker # 11 is given which starts from 0.5 to 1.5mm from the margin of gingiva and extends to the alveolar crest. (Figure:1)

If the pockets are greater than 2mm then incision is placed at least ½-1mm away from the margin. [12] Intracrevicular incision or incision at the free gingival margin is used when esthetics are important or buccal pockets are shallow. Scalloping incision is given on the palatal aspect in order to insure interproximal adaptation of flap. [12] This incision continues as a wedge excision distal to the last tooth. [5]



(Figure:1- Initial Incision)

For proper adaptation of flap palatally the scalpel should be slightly directed parallel to long axis of tooth. [12] (Figure:2)



(Figure:2- Initial incision parallel to long axis of tooth on palatal aspect.)

Location of this incision is based on the thickness of gingiva, width of attached gingiva, contour of marginal gingiva, gingival objectives and esthetic considerations. [10] Incision is started from the greatest scallop of gingiva around the tooth that is distal aspect of tooth. [10]

5. Flap Reflection-

Full thickness flap only for 2-3 mm is raised with mucoperiosteal elevators to access the surface of teeth, alveolar crest and interproximal alveolar process. [12] To protect the bone from drying out the flap is allowed to rest against the bone. [12]

6. Second Incision-

Intrasulcular incision is carried around each tooth with 12B surgical blade. [5] It is made between the gingiva and hard structure and apically extends beyond the base of the pocket. [5] (Figure:3)



(Figure:3- second Incision)

7. Third incision-

Horizontal incision is done with a blade in the interproximal area. The knife is placed on the alveolar process to cut the collar of gingival tissues which have been separated from buccal or lingual flaps of teeth. [5] (Figure:4)



(Figure:4- Third Incision)

8. Removal of Dissected Tissues-

Curettes are used to remove loosened collar of gingival tissue. [12]

9. Debridement and Root Planing-

Root surface should be cleaned and planed in direct vision with the help of curettes and ultrasonic devices after removal of granulation tissue. [5] Complete removal of granulation tissue is not necessary, but if removed will reduce the risk of pathogenic microorganisms. [5] Soft tissues are removed even from the bony surface of intrabony lesions. [12] Curettage is done without holding the flaps away from the bone for any length of time. [12] Curettage is not done in the region of residual periodontal membrane attached to roots of teeth which are close to alveolar crest. [12]

10. Flap Adaptation-

Flaps are adapted to each other interproximally and to the bone with digital pressure. [12] If the adaptation is incomplete between the flaps and teeth or between buccal and lingual flaps then the flaps have to be thinned or some bone may be removed from the outer aspects of alveolar processes in order to enhance adaptation. [12]

11. Suturing-

Individual interproximal sutures are to be given. [12] Deep bites should not be taken as it will fold the flap margins and prevent primary healing. [12] The initial incision

permits tight closure in the interdental areas. [5] Mattress sutures can be used if the flaps are extremely thin. [5]

12. Post-operative Measures-Protocol. [5]

- Topical disinfection, e. g., CHX0.1–0.2 % for at least two weeks.
- Systemic medication if indicated; antiphlogistic for 2–3 days, antibiotics.
- Topical application of cold packs or ice for 2–3 days to prevent swelling.
- Professional evaluation and cleaning 7–10 days post-operative and after suture removal every 2–3 weeks for two months.

HEALING:

It is by regeneration or by formation of long junctional epithelium. [8,9] There will be soft tissue recession during healing. [23] Major apical shift of soft tissue will occur during first 6 months and continues for >1 year. [24]

Factors influencing the degree of soft tissue recession and remodeling includes initial height and thickness of supracrestal flap tissue and amount of crestal bone resorption. Bone repair occurs within the boundaries of intrabony lesions. [7,22]

Crestalbone resorption can also be seen.

The bone fill amount depends upon;

- a. Anatomy of osseous defect (three-walled intrabony defect provides better mold)
- b. The amount of crestal bone resorption, and
- c. Chronic inflammation extent.

Apical cells of junctional epithelium are at the same level on the root that closely coincides with presurgical attachment level. [23] A small amount of new cementum can be seen coronal to the apical areas of healed periodontal wound. [9] Early stages of healing, collagen fibers within new cementum have no specific orientation but in later stage fibrils are connected to gingival fibers. [2]

Collagen fibrils are covered by apatite crystals indicating calcification. [2] Areas of collagen fibers extended into calcified newly formed cementum suggesting that calcification had occurred at

the surface of the cementum and had established connective tissue reattachment to the tooth following treatment. [2]

DIFFERENCE BETWEEN ORIGINAL AND MODIFIED WIDMAN FLAP SURGERY:

1. Initial incision is parallel to long axis of teeth and flaps are less separated from underlying bone in modified procedure to prevent unnecessary bone resorption. [12]
2. Vertical incisions are not used in Modified Widman procedure. [14]
3. First incision is at 0.5- 1mm from the margin in Modified Widman procedure where as in Original Widman flap it starts 1-2mm from the margin.
4. Bone architecture is not corrected in Modified Widman procedure whereas minimal recontouring is indicated in Original Widman procedure.
5. After second incision the loose collar of tissue is cut with sharp knife which will avoid excessive curettment on root surfaces with intact periodontal fiber attachment. [12]
6. Third incision allows removal of collar of tissue in the interproximal area without trauma to the alveolar crest and interproximal bone. [12]
7. Close interproximal flap adaptation with exaggerated palatal scalloping of flap is given much attention in original Widman procedure. [12]

CONCLUSION

It is well established fact that periodontitis is caused by a group of highly specific microorganisms, organized as a bio-film on the tooth surface. Hence, therapeutic modalities such as maintenance of oral hygiene, debridement by scaling and root planning or open flap debridement in deeper and inaccessible areas can be done. Open-flap debridement includes conventional surgical procedures such as the modified Widman flap procedure which mainly aims at reattachment and readaptation of pocket

walls rather than the surgical eradication of the outer walls of the pockets.

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