"Access Flap" Surgery, Open Flap Debridement (OFD)— Modified Widman Flap (MWF)

Of the numerous periodontal surgical techniques, the oft-modified Widman flap ("Modified Widman Flap," MWF) remains the standard procedure for open periodontitis therapy (Widman 1918, Ramfjord & Nissle 1974, Ramfjord 1977). It is classified with the "access flap operations" because the goal of the flap reflection is primarily to provide improved visual access to the periodontally involved tissues.

The method is characterized by precise incisions, partial flap reflection and an atraumatic procedure, whose goal is not necessarily pocket elimination but "healing" (regeneration or a long junctional epithelium) of the periodontal pocket with minimum tissue loss. Because the alveolar process is only partially exposed, post-operative pain and swelling are rare.

The main goals of the procedure include optimum mechanical subgingival root planing and "decontamination" with direct vision, as well as healing by primary intention following close interdental flap adaptation. No ostectomy is performed. However, minor contouring osteoplasty can be performed to improve the facial or oral osseous morphology, primarily to achieve the desired interdental defect closure.

Indications

- The MWF is indicated for the treatment of all types of periodontitis, but is especially effective with pocket depths of 5–7 mm.
- Dependent upon the pathomorphologic situation on the individual teeth, the MWF may be combined with larger and fully reflected flaps (resective methods) and special procedures such as wedge excisions, root resection, hemisection, osseous implantations etc., and infrequently also with gingivectomy/gingivoplasty (combined surgical procedures, p. 366).

Advantages

- Root cleaning with direct vision
- "Tissue friendly"
- Reparative, with healing by primary intention
- Minimal crestal bone resorption
- Lack of post-operative discomfort

Contraindications

There are but few contraindications for the MWF:

- Lack of or very thin and narrow attached gingiva can render the technique difficult, because a narrow band of attached gingiva does not permit the initial scalloped incision (internal gingivectomy). In such situations, it may be necessary to employ the classic marginal or even an intrasulcular incision.
- MWF is contraindicated for osseous surgical procedures (expansive osteoplasty or ostectomy) with very deep osseous defects and *irregular* bone loss facially and orally, and if apical flap repositioning is planned (cf. resective surgical methods, p. 355).

Disadvantages

See contraindications.

Principles of the Modified Widman Procedure—Ramfjord Technique

- 1 Initial incision—continuous, "scalloping," paramarginal (intragingival) incision; no vertical releasing incisions
- **2** Partial mobilization of the mucoperiosteal flap (full thickness flaps both facially and orally) within the attached gingiva to the alveolar crest
- 3 Second incision—sulcular incision
- Third incision–horizontal incision, also interdentally; 4 removal of the delineated tissue and all granulation tissue
- 5 Root cleaning and planing with direct vision
- Flap adaptation, complete coverage interdentally. 6

700 First Incision—Scalloping

The MWF technique differentiates the typical six treatment steps listed at the left:

The first incision sharply dissects the pocket epithelium and portions of the subepithelial infiltrate. This effectively thins the marginal gingiva, insuring ideal flap repositioning postsurgically. The gingiva is then reflected using an elevator, but only to the extent that the alveolar crest can be visualized.

The second incision is sulcular/intrasulcular around each tooth. This separates the pocket epithelium and junctional epithelium from the root surface, to the fundus of the pocket.

Inverse Bevel, Paramarginal This incision determines the shape of the flap and is performed both facially and orally using a 12B scalpel. It is an inverse bevel incision, extending to the alveolar crest. The distance of the incision from the gingival margin will vary depending on the width of the interdental spaces that must be covered (0.5 to 1.5 mm). The incision becomes intrasulcular in the interdental areas.

Right: Incision, schematically.

701 Flap Reflection

A small elevator is used to reflect a full thickness yet only partially mobilized mucoperiostial flap, as atraumatically as possible. The flap is reflected for one reason only: To permit direct visualization of the root surface and the alveolar crest.

Right: The schematic shows clearly that the facial flap is not reflected beyond the mucogingival line (black arrow): Conservative flap reflection!

702 Second Incision— Intrasulcular

This incision is a purely intrasulcular incision that is carried around each tooth. between the hard structure and the gingiva, beyond the base of the pocket and extending to the apical extent of the pocket epithelium.

The 12B scalpel is also indicated for this second incision.

Right: Schematic depiction of the second, intrasulcular incision (red).













The final incision is horizontal, and serves, especially in the interdental area, to release the pocket tissues sharply and atraumatically. The soft tissue and all of the granulation tissue within the pocket are thereby removed. The most important element of the procedure now follows: Systematic scaling and planing of the root surfaces using fine curettes or ultrasonic instruments with *direct vision*. This critical procedure requires significant time. Supportive alveolar bone is *not* removed, but minimal osteoplasty may be performed as necessary.

Finally, the flaps are repositioned. Because of the shape of the flaps created by the initial scalloping incision, secure and complete coverage of the interdental bone is possible. This enhances healing by *primary intention*.

Adherence to these principles is routinely associated with excellent long-term results in terms of maintenance or even true gain in periodontal attachment (Knowles et al. 1979; Fig. 727). The principles are therefore also applicable to other flap surgical procedures.













703 Third Incision—Horizontal The horizontal incision is carried along the alveolar crest from the facial to the oral aspect, or the reverse, thus separating the supracrestal pocket tissue from its supporting subjacent tissues, especially in the interdental area.

Left: The schematic clearly depicts the bony pocket, especially the interdental osseous crater. The horizontal incision does not approach the base of the pocket (note red spears and the profile of the bony architecture apical to it).

704 Root Planing with Direct Vision

Fine curettes are used in the depth of interdental craters to remove remnants of pocket epithelium and granulation tissue. Systematic root cleaning and planing is performed with repeated rinsing (NaCl 0.9 %) and evacuation by the dental assistant, with *direct vision*.

Left: Schematic depiction of the removal of granulation tissue and root cleaning/planing with a universal curette.

705 Tight Coverage of Interdental Defects

The facial and oral flaps are tightly adapted over the bone and between the teeth by means of interrupted interdental sutures. Because "new papillae" were created by the initial scalloping incision, it is usually possible to completely cover interdental bony defects.

Left: The schematic clearly shows the coverage of the interdental area. In the molar regions, this is not always possible (healing occurs by secondary intention).

Principles of the MWF—Occlusal View

The surgical principles of the Ramfjord technique described above will be depicted here schematically from the occlusal view (horizontal section). The geometry of flap design and flap repositioning can be appreciated particularly well when viewed from the occlusal aspect. The initial incision is scalloped, somewhat removed from the free gingival margin buccally and palatally, creating "new papillae" for subsequent complete closure of interdental defects.

In the interdental regions, the incision may become a purely intrasulcular incision, to provide adequate tissue for sub-

706 Primary Incision – "Scalloping"

The first incision is a scalloped, inverse bevel incision (internal gingivectomy) in the maxillary posterior segment (Fig. 712). This incision continues into a wedge excision distal to tooth 16. The second (intrasulcular) and third (horizontal) incisions are not depicted here.

Right: Instrumentarium (I) scalpel with blade 12 B, surgical forceps.

707 Partially Reflected Flaps

After reflecting mucoperiosteal flaps, the excised soft tissues are removed, the osseous defects are carefully curetted, and all root surfaces are cleaned and carefully planed with direct vision.

Right: Instrumentarium (II)—narrow and broad elevators (depicted: Prichard elevator).

708 Flap Re-Adaptation, Suturing

Complete coverage of the interdental bone is accomplished by tension-free fixation of the papilla tips using interrupted sutures. If sufficient tissue is available, the facial and oral papilla tips can actually be repositioned side-byside before fixation. This ensures complete coverage of the interdental areas.

Right: Instrumentarium (III) needle holder and needle-suture combination (4–0 silk). sequent complete closure of the interdental space. The scalloped margin of the flap provides tight closure of the curetted interdental osseous craters (e.g., two-wall bony pockets).

At the distal end of the arch, the primary incision may end as a wedge excision, providing access to and therapy for pockets or furcation involvement in this region (wedge excisions, p. 319). Osseous craters and furcation involvement in this region also may be treated using regenerative methods (p. 323).





"Access Flap"/Modified Widman Procedure—Case Presentation

Surgical Procedure, Step-by-Step

The systematic procedure for conservative flap reflection according to the principles of the Ramfjord technique will be depicted in the maxillary right sextant.

The 42-year-old female presents with mild to moderate chronic periodontitis. Phase 1 therapy (initial therapy) is complete. Patient cooperation/compliance was "only aver-

age." The goal of a PI and BOP index below 20% was not achieved.

Also in other sextants (not depicted here), minor surgical procedures were indicated.

Findings after initial therapy:

PI: 30% BOP: 32% TM: 0–2 See accompanying figures for the clinical picture, probing depths, gingival contour and radiographic survey.











709 After Initial Therapy

The gingivae remain inflamed despite initial therapy. Mild hemorrhage occurs upon probing of the pockets. The patient's oral hygiene must be checked repeatedly and OHI provided even after the planned surgical procedures. Additional instructions and motivation must be provided to the patient during each maintenance phase appointment (recall).

Left: Sagittal diagram of the initial condition. Arrows: Pocket probing depth.

710 Probing Depths Following Initial Therapy; Tooth Mobility (TM)

Interdental probing depths up to 7 mm persist after initial therapy.

Radiographic Survey

Mild to moderate attachment loss is observed in the premolar region. Between teeth 17 and 16, the interdental septum has resorbed to the midpoint of the root.

711 Occlusopalatal View

Mild inflammation is also obvious from the oral aspect in the sextant between 13 and 17, especially in the interdental area. Near the deep pocket around 16 and 17, signs of pocket activity (exudate) persist despite initial therapy.

712 Planned First Incision and Flap Reflection

The planned initial scalloping incision and the extent of the flap to be reflected are indicated.

Solid red line: Initial scalloping horizontal incision. Hatched area: The planned flap reflection ends coronal to the mucogingival junction (dashed red line and arrow).

Right: Surgical protocol.

713 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 especially into the interdental areas



"Access Flap"— Surgical Protocol

• First incision—

2

- paramarginal, scallopingFlap reflection
- (full thickness flaps)Second incision—sulcular
- Third incision—horizontal
- Removal of the delineated soft tissues (pocket exudate), "osseous curettage"
- Root planing with direct vision
- Flap repositioning, suturing



Initial Incisions: Facial and Oral

714 Scalloping Paramarginal Initial Incision—Facial

The first "scalloping incision" is an inverse bevel incision (internal gingivectomy).

If teeth are crowded, this incision may become a purely intrasulcular one in interdental areas, to ensure sufficient tissue for the "new" papillae destined to completely cover the interdental region.

715 Scalloped Primary Paramarginal Incision— Palatal View

The incision is performed identically on the palatal surfaces. In order to ensure that the rather resilient palatal flaps can be re-adapted to the tooth and osseous surfaces, the primary incision should not be made too far removed from the height of the gingival margin (*maximum* 1–2 mm). The palatal flap is usually non-mobile, and this flap must be thin and even.

















716 Removal of the Sharply Dissected Pocket Tissues

Once the flaps are reflected and the second and third incisions are performed (Fig. 713), the sharply demarcated tissue is easy to remove. Granulation tissue should also be removed to provide direct vision of the root surfaces to be cleaned and thoroughly planed. Complete elimination/removal of all granulation tissue is not *per se* necessary, but will reduce the risk that pathogenic microorganisms (e. g., *Aa* or *Pg*) will remain in the tissues post-surgically.

717 Debridement—

Root Planing with Curettes After removal of the pocket soft tissues, the root surfaces are cleaned and planed using fine universal or Gracey curettes, thus thoroughly eliminating the biofilm as far as possible. This procedure can also be accomplished using ultrasonic devices. *Root planing is the most time-consuming procedure during flap surgical procedures.*

Left: Schematic depiction of root surface cleaning with a universal curette (M23A; Deppeler).

718 Root Cleaning and Planing with a Fine Polishing Diamond

Hard deposits (calculus) can also be removed mechanically, e. g., with rotating diamond stones (Perio-Set; 40 μ m abrasiveness), and root planing with the 15 μ m diamonds. Low rpm and constant rinsing/cooling with Ringer's solution must always accompany the use of rotating diamonds. The diamond stones of the *Perio-Set* (Fig. 541) should not be considered as replacements for curettes, but enhancements!

719 Palatal View

The resilient palatal tissue must also be reflected to permit root planing with direct vision. Note the deep interdental crater between 16 and 17 (cf. Fig. 710).

Left: Rinsing solutions—physiologic NaCl (0.9%) and H_2O_2 (3%), or betadine for disinfection and to reduce hemorrhage (cf. FMT, Fig. 651).

720 Flap Adaptation Using Interrupted Sutures

Close approximation of the flaps upon bone and tooth surfaces is a prerequisite for optimum healing. Fixation of the flaps is accomplished by means of interdental interrupted sutures. The scalloping form of the initial incision usually permits tight closure in the interdental areas. If the flap tissue is extremely thin, the use of mattress suturing is indicated for flap fixation (p. 308).

Right: Palatal view.

721 Suture Removal— Carefully!

Sutures should be removed at one week. By this time the wound margins have adhered to each other and the healing process is well underway; however, careless handling of the sutures could disturb the delicate attachments between and among the flaps, the osseous surface and the tooth/root.

Right: Pointed scissors, fine forceps and "two steady hands" minimize any risk of tissue damage.

722 Tooth Cleaning

Following suture removal, the surfaces of the teeth are cleaned using soft rubber cups and mildly abrasive prophy paste (or dentifrice) (cf. "RCP method," p. 251). Since wound healing is not yet complete (regeneration at the depth of the pocket, new junctional epithelium) care must be exercised that no paste is forced into the sulcus, beneath the formerly reflected soft tissue flap.

Right: Protocol for the post-operative measures.

723 Following Suture Removal and Tooth Cleaning

Two weeks post-surgically, the patient must re-initiate home care, but carefully. It is recommended that the chlorhexidine rinses be continued. The field of operation should be *professionally* cleaned by the dental hygienist during subsequent appointments, ca. every two weeks.

Right: Despite the effort to close the interdental area, a small "crater" remains between teeth 16 and 17.













Post-operative Measures— Protocol

- Topical disinfection, e.g., CHX 0.1–0.2 % for at least two weeks
- Systemic medication only as indicated (p. 287)
- antiphlogistic for 2–3 days
 antibiotics
- Prevention of swelling: Topical application of cold packs or ice for 2–3 days
- Professional evaluation and cleaning 7–10 days post-op, and after suture removal every 2–3 weeks for two months



"Access flap"/Modified Widman Procedure

Summary

The 42-year-old patient with mild to moderate chronic periodontitis exhibited deficient oral hygiene at the initial examination. Even after initial therapy, mild gingival inflammation was in evidence; between molars 16 and 17, signs of mild pocket activity (exudate) persisted.

Probing depths returned to physiologic levels six months following the surgical procedure.

Even the deep defect between 16 and 17 exhibited a probing depth of only 4 mm.

These excellent results can also be attributed to the great improvements by the patient in home care. Because of the gingival shrinkage, mainly in the interdental region, special emphasis should be placed on interdental hygiene.

PI: 10%

BOP: 9%

The initial recall was set at three months; if patient cooperation/compliance continues, subsequent recalls may be at 4–6 month intervals.

724 Before Surgery

Despite initial therapy, mild gingival inflammation persists (BOP: 32%). Application of finger pressure between 16 and 17 elicits release of minimal exudate. The treatment of choice is *surgical* ("access flap") with direct vision.

Left: An untreated pocket (facial surface of tooth 14). The probing depth is depicted in red (bar and arrows).

725 Pocket Probings and TM Following Initial Therapy— Before Surgery

Following initial therapy, which consisted of closed supra- and subgingival scaling, pockets of 4–7 mm persist, especially interdentally.

Pocket Probings and TM Six Months after Surgery

At the recall examination six months after the surgical procedure, no probing depths beyond the 4 mm level are detected.

726 Six Months Post-operative

Even after the careful and conservative MWF procedure, the teeth appear slightly "elongated" and the interdental spaces are more open. Recommendations for interdental hygiene are determined by the anatomic/morphologic situation.

Left: A slightly deepened sulcus persists ("residual pocket," red bar). The former probing depth has been reduced through shrinkage (1) as well as periodontal healing ("repair," 2).





Long-term Results Following Various Treatment Modalities

Periodontitis can be treated "closed" (*subgingival scaling and root planing*) or "open" (*surgically*). The therapeutic modality selected will depend upon the type of periodontitis (chronic, aggressive), the severity of the disease, and upon the many factors discussed previously (see etiology and pathogenesis, p. 21; diagnosis/risk factors, p. 165; treatment planning, p. 208). The goal of therapy, however, is the same for each type of treatment: Reduction of pocket depth and gain of attachment.

The clinical results that can be expected from various treatment methods and with variably progressive periodontal disease over the long term were described in the second half of the 1970s by Ramfjord et al. (1975), Ramfjord (1977) as well as Knowles et al. (1979). During those years, the authors compared closed root planing with the modified Widman procedure (described today as the "access flap" procedure), as well as with surgical pocket elimination. The latter is characterized by the *resective treatment methods* (p. 355). Eight years following treatment, probing depths of 7–12 mm pockets were reduced by 3–4 mm by *all treatment modalities*, with attachment gain less than 3 mm!



Conclusions

As one considers these long-term results, it is important to realize that during the entire 8-year follow-up examinations of the patients, 3-month recall intervals were observed: The plaque control by the therapist and patient was therefore quite beyond average. Under these strict conditions, it is not surprising that the long-term results with regard to pocket reduction (Fig. 727) did not differ dramatically among the three procedures.

If one considers the results following MWF therapy alone, it becomes clear that with physiologic probing depths of 1-3 mm, no surgery is necessary. To do so leads to clinical

attachment loss! The deeper the probing depths, the more pronounced will be the pocket reduction and therewith the indication for surgical intervention, e.g., via MWF.

Note: *Regenerative methods* such as bone transplantation and GTR were only in the developmental phases when these large clinical trials were performed, and therefore were not taken into consideration; the same is true for the much-discussed combination of mechanical and medicinal therapies today (p. 287). The problem of deep *residual* pockets has not yet been successfully solved (incomplete regeneration, Fig. 728).