DENTALIST

PERIODONTICS

sample

BY: Dr. Alireza Ashouri

Phase II (SURGICAL)Periodontal Therapy

Many moderate to advanced cases cannot be resolved without surgically gaining access to the root surface for root planing and reducing or eliminating pocket depth to allow the patient to remove biofilm. A periodontal flap is a section of gingiva, mucosa, or both that is surgically separated from the underlying tissues to provide for the visibility of and access to the bone and root surface.

Clinical indication for flap surgery includes: periodontal pockets that are deeper than 5mm after initial therapy and persistence bleeding upon probing even though complete SRP and patient's favorable oral hygiene has been implemented. If phase I has not been rendered thoroughly or the patient's oral hygiene is not favorable, periodontal surgery is contraindicated.

Surgical techniques are used for pocket therapy and for correction of related morphologic problems (i.e., mucogingival defects). Objective of periodontal flap surgery in the treatment of periodontitis include: (1) increase access to the root surface for periodontal debridement, allowing the clinician to remove all irritants (the primary objective); (2) reduce or eliminate pocket depth, and (3) reshape soft and hard tissues (osseous recontouring) to attain a harmonious topography.

The difficulty of complete removal of local etiological factors increases as the pocket becomes deeper. The irregularities and concavities on the root surface also add to the difficulty of instrumenting the root surfaces. Most of these problems can be remedied by resecting or displacing the soft tissue wall of the pocket, which increases the visibility and accessibility of the root surface.

IMPORTANT NOTES:

- Reduce bleeding during the surgery is among the reasons to perform initial periodontal debridement before periodontal surgery. Hence, before performing periodontal surgery, it is important to control plaque.

- The creation of a healthy sulcus and a restored periodontium with a gain of attachment is the ideal result of treatment.

- A surgical flap approach to periodontal pocket elimination permits healing by primary intention, retention of gingiva and increases opportunity for new attachment.

- Areas with irregular bony contours, deep craters, and other defects usually require a surgical approach.

- Pockets around teeth where access to the root surface for complete removal of root irritants is not clinically possible are an indication for surgery. This occurs frequently around molars and premolars.

- Furcation involvement of grade II or III may require a surgical approach to ensure the removal of irritants around root surfaces. If root resection or hemisection is necessary, surgical intervention will be needed.

- Intrabony pockets distal to the last molars, which in many cases are complicated by mucogingival problems, often require surgery.

- Cases with shallow pockets and good hygiene but bleeding on probing can be caused by mucogingival problems in areas where there is no keratinized tissue. Trauma to these areas can cause bleeding.

- Pocket elimination consists of reducing the depth of the periodontal pocket to that of a physiologic sulcus to enable cleaning by the patient. Resective and regenerative techniques can be used to accomplish this goal.

- Pocket depth reduction after flap surgeries is often due to formation of long junctional epithelium.

- In periodontal surgery, it is important to determine the position of the base of the pocket to the mucogingival junction.

Classification of Flaps

Periodontal flaps can be classified on the basis of the Bone exposure after flap reflection; Placement of the flap after surgery and Management of the papilla

Regarding Bone Exposure After Reflection

In a *full-thickness flap,* all of the soft tissue, including the periosteum, is reflected to expose the underlying bone using blunt dissection. This complete exposure of and access to the underlying bone is indicated when resective osseous surgery is contemplated.

The *partial-thickness(split-thickness) flap* includes only the epithelium and a layer of the underlying connective tissue. The bone remains covered by a layer of connective tissue that includes the periosteum.

The partial-thickness flap is indicated when the flap is to be positioned apically or when the operator does not want to expose bone. The partial-thickness flap may be necessary when the crestal bone margin is thin and exposed with an apically placed flap or when dehiscences or fenestrations are present. The periosteum left on the bone may also be used for suturing the flap when it is displaced apically.

Regarding Flap Placement After Surgery

In *nondisplaced flaps,* flap is returned and sutured in its original position. In *displaced flaps,* flap can be placed apically, coronally, or laterally to their original position. Both full-thickness and partial-thickness flaps can also be displaced. To do so, the attached gingiva must be totally

separated from the underlying bone, thereby enabling the unattached portion of the gingiva to be movable. Palatal flaps cannot be displaced because of the absence of unattached gingiva.

Apically displaced flaps preserve the outer portion of the pocket wall and transform it into attached gingiva. They eliminate the pocket and increase the width of the attached gingiva at the same time.

Regarding Management of The Papilla

With the *conventional flap,* the interdental papilla is split beneath the contact point of the two approximating teeth to allow for the reflection of the buccal and lingual flaps. The conventional flap is used (1) when the interdental spaces are too narrow, thereby precluding the possibility of preserving the papilla, and (2) when the flap is to be displaced. Conventional flaps include the modified Widman flap, the undisplaced flap, the apically displaced flap, and the flap for reconstructive procedures.

The *papilla preservation flap* incorporates the entire papilla in one of the flaps. It is mostly used in anterior region as well as for regenerative procedures.

Flap Design

- The base of the flap should be wider than the free margin to provide proper blood supply.
- The lines of the incision should not be placed over any defect in the bone to avoid delay healing.
- Incisions should not be made over a bony eminence.
- Corners of the flaps should be rounded to enhance healing.

Periodontal Flap Incisions

Periodontal surgery involves the use of horizontal (mesial-distal) and vertical (occlusal-apical) incisions. The #15 or #15C surgical blade is used most often to make these incisions.

Horizontal Incisions

The External Bevel Incision starts at the surface of the gingiva apical to the periodontal pocket and is directed coronally toward the tooth apical to the bottom of the periodontal pocket. The external bevel incision, or simply bevel incision, is used primarily in gingivectomy.

The Internal (Reverse) Bevel Incision, is the opposite of the external bevel incision. The internal bevel incision starts at the surface of the gingiva and is directed apically to the bone crest. The starting point on the gingiva is determined by whether the flap is apically displaced or not displaced.

It is the incision from which the flap is reflected to expose the underlying bone and root and expose the sulcular lining of the pocket. The internal bevel incision accomplishes three

objectives: (1) it removes the pocket lining; (2) it conserves the relatively uninvolved outer surface of the gingiva, which, if apically positioned, becomes attached gingiva; and (3) it produces a sharp, thin lap margin for adaptation to the bone–tooth junction. The internal bevel incision is basic to most periodontal flap procedures.

The crevicular(sulcular/second) incision, is made from the base of the pocket to the crest of the bone. This incision, together with the initial reverse bevel incision, forms a V-shaped wedge that ends at or near the crest of bone. This wedge of tissue contains most of the inflamed and granulomatous areas that constitute the lateral wall of the pocket as well as the JE and the connective tissue fibers that still persist between the bottom of the pocket and the crest of the bone. The incision is carried around the entire tooth. A periosteal elevator is inserted into the initial internal bevel incision, and the flap is separated from the bone.

Interdental Incision, is made to separate the collar of gingiva that is left around the tooth. The Orban knife is usually used for this incision. The incision is made not only around the facial and lingual radicular area but also interdentally.
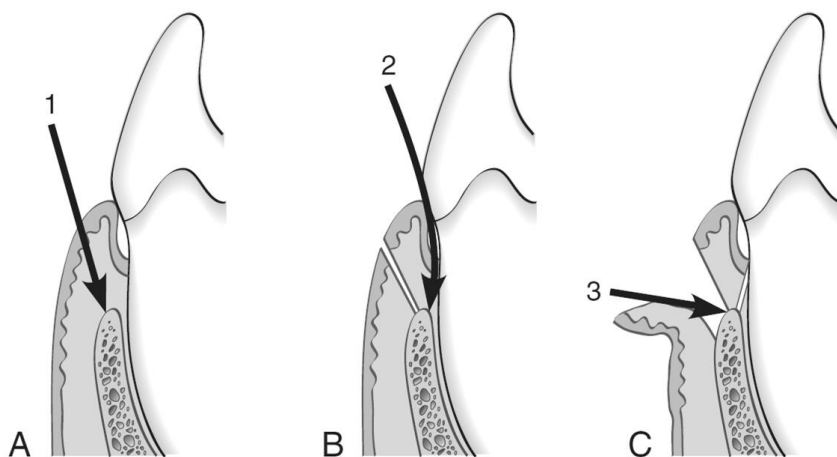
The three incisions necessary for flap surgery.
(A) First (internal bevel) incision; (B) second (crevicular) incision; and (C) third (interdental) incision.

Vertical Incisions

Vertical (oblique) releasing incisions can be used on one or both ends of the horizontal incision. Vertical incisions at both ends are necessary if the flap is to be apically displaced. Vertical incisions must extend beyond the mucogingival line to reach the alveolar mucosa; this allows for the release of the flap to be displaced. Facial vertical incisions should not be made in the center of an interdental papilla or over the radicular surface of a tooth. Incisions should be made at the line angles of a tooth either to include the papilla in the flap or to avoid it completely. The vertical incision should also be designed to avoid short flaps (mesiodistal) with long, apically directed incisions, because this could jeopardize the blood supply to the flap.

NOTES

- Vertical incisions in the lingual and palatal areas are avoided.

- In periodontal flap surgery, the design of the incision is influenced by *the frenum attachment; depth of the vestibule; amount of attached gingiva and presence of infrabony defects*.

Periodontal Surgical Techniques

Periodontal surgery limited to the gingival tissues only, without the use of periodontal flaps can be classified as *gingival curettage* and *gingivectomy.*
Periodontal flap surgery is one of the most frequently used procedures, particularly for moderate and deep pockets in the posterior areas. Periodontal flap surgery provides access for root instrumentation and pocket reduction via gingival resection, osseous resection, and periodontal regeneration.

Gingivectomy

It means "excision of the gingiva." By removing the pocket wall, gingivectomy provides visibility and accessibility for complete calculus removal and thorough root planing. This creates a favorable environment for gingival healing and restoration of a physiologic gingival contour.

Indications

- Elimination of suprabony pockets if the pocket wall is fibrous and firm.
- Elimination of gingival enlargements (Drug-Induced Overgrowth of Gingiva)
- Elimination of suprabony periodontal abscesses.

Contraindications

- **Access to bone required.** The primary factor for selecting periodontal flap surgery rather than gingivectomy is the need to access to the bony defect.
- **Intrabony pockets.**
- **Narrow zone of keratinized tissue**.
- **Aesthetics.** Gingivectomy should not be performed in maxillary anterior region and patients with gummy smile.
- **High postoperative risk of bleeding.**

Disadvantages:

- Healing occurs by secondary intention and thus the patient may have pain and discomfort.
- Removing significant amount of attached gingiva.
- Providing no access to the bone.

DENTALIST

The step-by-step technique for gingivectomy is as follows:

1. The periodontal pocket is mapped out on the external gingival surface by a pocket marker.
2. Periodontal knives (e.g., Kirkland) are used for external bevel incisions on the facial and lingual surfaces. Orban periodontal knives are used for interdental incisions.
3. After removal of the excised pocket wall and irrigating the area, implement the SRP.
4. Cover the area with a surgical dressing.

Gingivoplasty

Gingivoplasty is similar to gingivectomy, but is a reshaping of the gingival deformities mostly due to periodontal diseases, to create physiologic gingival contours with the sole purpose of recontouring the gingiva in the absence of pockets.

Such deformities include: (1) gingival clefts and craters; (2) craterlike interdental papillae caused by NG; and (3) gingival enlargements. Gingivoplasty may be accomplished with a periodontal knife, a scalpel, rotary coarse diamond stones, or electrodes. The technique resembles that of the festooning of an artificial denture. Residual soft tissue interdental craters not associated with underlying bony changes are eliminated by gingivoplasty.

Healing After Gingivectomy

The initial response after gingivectomy is the formation of a protective surface blood clot. The underlying tissue becomes acutely inflamed with necrosis. The clot is then replaced by granulation tissue. In 24 hours, an increase occurs in new connective tissue cells, which are mainly angioblasts beneath the surface layer of inflammation and necrotic tissue. By the third day, numerous young fibroblasts are located in the area. The highly vascular granulation tissue grows coronally and creates a new free gingival margin and sulcus. Capillaries derived from the blood vessels of the periodontal ligament migrate into the granulation tissue, and within 2 weeks they connect with the gingival vessels.

After 5 to 14 days, surface epithelialization is generally complete. During the first 4 weeks after gingivectomy, keratinization is less than it was before surgery. Complete epithelial repair takes about 1 month. Vasodilation and vascularity begin to decrease after the fourth day of healing, and they appear to be almost normal by the 16th day. Complete repair of the connective tissue takes about 7 weeks.

Gingival Curettage

It describes the scraping of the gingival wall of a periodontal pocket to remove the chronically inflamed tissue. Note that when the root is thoroughly scaled and planed, and the biofilm and calculus are removed, the inflammation in the tissue automatically resolves without tissue curettage. Therefore, the use of curettage to eliminate the inflamed granulation tissue is

unnecessary. The SRP with additional curettage do not improve the condition of the periodontal tissue beyond the improvement that results from SRP alone.

Gingival curettage consists of the removal of the inflamed soft tissue lateral to the pocket wall and the junctional epithelium. *Subgingival curettage* refers to the procedure that is performed apical to the junctional epithelium and that severs the connective tissue attachment down to the osseous crest. The *excisional new attachment procedure* is a definitive subgingival curettage procedure that is performed with a knife. It should also be understood that some degree of curettage is accomplished unintentionally during scaling and root planing and is referred to *inadvertent curettage.*

Curettage does not eliminate the causes of inflammation (bacterial plaque). Therefore, curettage should always be preceded by SRP, which is the basic periodontal therapy procedure.

Indications
Indications for curettage are very limited. It can be used after SRP for the following purposes:

1. As part of new attachment attempts in moderately deep intrabony pockets located in accessible areas in which a nonflap type of "closed" surgery is indicated.

2. As a nondefinitive procedure to reduce inflammation when aggressive surgical techniques (e.g., flaps) are contraindicated due to different factors (e.g., health conditions). In these patients, the goal of pocket elimination is compromised, and their prognosis is impaired.

3. On recall visits as a method of maintenance treatment for areas of recurrent inflammation and pocket depth, especially where pocket reduction surgery has previously been performed.

Procedure
Gingival curettage always requires local anesthesia. The curette is selected so that the cutting edge is against the tissue (e.g., Gracey no. 11-12 for mesial surfaces, or 4R-4L Columbia Universal curette). The instrument is inserted, angled more than 90 degrees to engage the inner lining of the pocket wall, and it is then carried along the soft tissue, usually in a horizontal stroke.

NOTES:
- Maximum shrinkage after gingival curettage can be expected from tissue that is edematous.

- In the anterior maxilla, gingival curettage and root planing apical to the base of the periodontal pocket should be avoided. The removal of the junctional epithelium and the disruption of the connective tissue attachment expose nondiseased cementum resulting in attachment loss and gingival recession.

Healing After Scaling and Curettage

Immediately after curettage, a blood clot fills the pocket area, which is totally or partially devoid of epithelial lining. Hemorrhage is also present in the tissues with dilated capillaries and abundant PMNs, which appear on the wound surface. This is followed by a rapid proliferation of granulation tissue with a decrease in the number of small blood vessels as the tissue matures.

The restoration and epithelialization of the sulcus generally require 2 to 7 days and restoration of the JE occurs in 5 days after treatment. Immature collagen fibers appear within 21 days. Sometimes, healing results in the formation of a long, thin junctional epithelium with no new connective-tissue attachment.

Flap Surgery

Periodontal laps are used in surgical periodontal therapy to accomplish the following: Access for root instrumentation; Gingival resection; Osseous resection and Periodontal regeneration.
To fulfill these purposes, five different lap techniques are used: (1) the modified Widman flap, (2) the undisplaced flap, (3) the apically displaced flap, (4) the papilla preservation flap, (5) and the distal terminal molar flap.

The objectives of the undisplaced and apically displaced flaps include root surface access and the reduction of probing depth. The choice of which procedure to use depends on two important anatomic landmarks: the transgingival probing depth and the location of the mucogingival junction. These landmarks establish the presence and width of the attached gingiva, which are the basis for the decision.

The papilla preservation flap is used when possible, in regenerative and aesthetic cases to minimize recession and loss of interdental papillae. The distal terminal molar lap is used for treating pockets and osseous defects on the distal surface of the terminal maxillary and mandibular molars.

Modified Widman Flap (MWF)

The MWF facilitates root instrumentation. It does not attempt to reduce the pocket depth, but it does eliminate the pocket lining. The reduction that occurs after this technique is due to tissue shrinkage because of the removal of etiological factors. This technique offers the healthy collagenous connective tissue to tooth surfaces, and it provides access for adequate instrumentation of the root surfaces and immediate closure of the area.

In MWF 3 horizontal incisions are utilized: the internal bevel incision 0.5 to 1 mm away from the gingival margin; the crevicular incision and the interdental incision. Then a full-thickness flap is reflected 2 to 3 mm away from the alveolar crest. The gingival collar and granulation tissue that still attached to the root, are removed with curettes. Hence, After the initial incision

and raising of a flap in the modified Widman technique, the next step is *removal of inflammatory tissue*.

The root surfaces are scaled and planed. Residual periodontal fibers attached to the tooth surface should not be disturbed. Bone architecture is not corrected unless it prevents intimate flap adaptation. Every effort is made to adapt the facial and lingual interdental tissue in such a way that no interdental bone remains exposed at the time of suturing. The flaps may be thinned to allow for close adaptation of the gingiva around the entire circumference of the tooth.

The main advantages of the MWF include:
- 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, which from an esthetic point of view is an advantage in the treatment of anterior segments of the dentition.

Undisplaced Flap (Open flap debridement without apically positioned flap)

This flap is used to improve root surface access and the reduction of probing depth. This flap is an excisional procedure of gingiva. Comparing to MWF, the lining of the pocket wall is removed by utilizing the initial incision. Therefore, it may be considered as an internal bevel gingivectomy.

Apically Displaced Flap (Open flap debridement with apically positioned flap)

The apically displaced flap is selected for cases that present with a minimal amount (<3 mm) of attached gingiva. For this reason, the internal bevel incision should be made as close to the tooth as possible (i.e., 0.5 to 1.0 mm). No need exists to determine where the bottom of the pocket is. The flap is placed at the tooth–bone junction by apically displacing the flap and, therefore, it is sutured to an apically position regarding the original position of the soft tissue. With some variants, the apically displaced flap can be used for pocket eradication, widening the zone of attached gingiva, or both. Besides, osseous surgery and management of Intrabony pockets is applicable. Depending on the purpose, the apically displaced flap can be a full-thickness flap or a split-thickness flap. The split-thickness flap requires a thick gingiva. In patients at the risk of root caries or dentin hypersensitivity or in esthetic zone, apically displaced flap is not recommended. This flap is frequently performed for the management of moderate and deep pockets, furcation involvement and crown lengthening.

Distal Terminal Molar Flap (Distal Wedge)

The treatment of periodontal pockets on the distal surface of terminal molars is often complicated by the presence of bulbous fibrous tissue over the maxillary tuberosity or prominent retromolar pads in the mandible. Some of these osseous lesions may result from incomplete repair after the extraction of impacted third molars.

DENTALIST

Access to these distal areas may be obtained by a single horizontal incision, two converging horizontal incisions, or two parallel incisions extending distally from the distal surface of the terminal molar to the mucogingival junction distal to the tuberosity or the retromolar pad. Adequate keratinized gingiva is required for this technique. After performing the incisions, a wedge of tissue created in which removed.

Resective Osseous Surgery

Osseous surgery is defined as the procedure by which changes in the alveolar bone can be accomplished to rid it of deformities induced by the periodontal disease process or other related factors such as exostosis and tooth supraeruption. Osseous surgery can be either additive or subtractive. *Additive osseous surgery* includes procedures directed at restoring the alveolar bone to its original level, whereas *subtractive osseous surgery* is designed to restore the form of preexisting alveolar bone to the level present at the time of surgery or slightly more apical to this level.

The architecture is "positive" if the radicular bone is apical to the interdental bone. The bone has "negative" architecture if the interdental bone is more apical than the radicular bone. Flat architecture is the reduction of the interdental bone to the same height as the radicular bone. Osseous form is considered "ideal" when the bone is consistently more coronal on the interproximal surfaces than on the facial and lingual surfaces.

One-wall angular defects usually need to be recontoured surgically. Three-wall defects, particularly if they are narrow and deep, can be successfully treated with techniques of new attachment and bone reconstruction. Two-wall angular defects can be treated with either method, depending on their depth, width, and general configuration. Therefore, one-wall defects; wide, shallow two-wall defects, and interdental craters may be treated by resective surgery. Two-walled defects (craters) are the most common bony defects found in patients with periodontitis.

Osteoplasty refers to reshaping the bone without removing tooth-supporting bone. Ostectomy, or osteoectomy, includes the removal of tooth-supporting bone. Irregularly distributed shallow to moderate craters in the interseptal bone are best eliminated by osteoplasty.
Osseous resective therapy is performed in combination with apically positioned flaps. The procedure eliminates periodontal pocket depth and improves tissue contour to provide a more easily maintainable environment.

The technique of ostectomy is best applied to patients with early to moderate bone loss (2 to3 mm) with moderate-length root trunks that have bony defects with one or two walls. These shallow to moderate bony defects can be effectively managed by osteoplasty and ostectomy.

Patients with advanced attachment loss and deep intrabony defects are not candidates for resection because to simulate a normal architectural form, so much bone must be removed that the survival of the teeth could be compromised.

Ostectomy to a positive architecture requires the removal of the line–angle inconsistencies (widow's peaks), as well as some of the facial, lingual, and palatal and interproximal bone. The result is a loss of some attachment on the facial and lingual root surfaces but a topography that more closely resembles normal bone form before disease.

Crown Lengthening (CL)

Crown lengthening (CL) is a form of osseous resective surgery. Inadequate clinical crown length is the most appropriate indication of CL. The other indication is deep subgingival caries. CL procedures are performed to provide retention form to allow for proper tooth preparation, impression procedures, and placement of restorative margins and to adjust gingival levels for aesthetics.

CL surgery is done the way that the biologic width(BW) is preserved. The BW is defined as the physiologic dimension of the JE and connective tissue attachment. This measurement is relatively constant at approximately 2 mm ($\pm30\%$). The violation of BW by the placement of a margin of a restoration within its zone may result in gingival inflammation, pocket formation, and alveolar bone loss. Consequently, it should be at least 3 mm between the gingival margin and bone crest. This allows for adequate BW when the restoration is placed 0.5 mm within the gingival sulcus.

Surgical crown lengthening may include the removal of soft tissue or both soft tissue and alveolar bone. Reduction of soft tissue alone (using gingivectomy or flap techniques) is indicated if there is adequate attached gingiva and more than 3 mm of tissue coronal to the bone crest. Inadequate attached gingiva and less than 3 mm of soft tissue require a flap procedure and bone recontouring. In the case of caries or tooth fracture, to ensure margin placement on sound tooth structure and retention form, the surgery should provide at least 4 mm from the apical extent of the caries or fracture to the bone crest.

CL Indications
- Subgingival caries or fracture.
- Inadequate clinical crown length for retention.
- Unequal or unaesthetic gingival heights.

CL Contraindications
- Surgery would create an unaesthetic outcome.
- Deep caries or fracture would require excessive bone removal on contiguous teeth.
- The tooth is a poor restorative risk.

Margin Placement Guidelines

- **Rule 1:** If the sulcus probes 1.5 mm or less, place the restoration margin no more than 0.5 mm below the gingival tissue crest. This is especially important on the facial aspect.

- **Rule 2**: If the sulcus probes more than 1.5 mm, place the margin no more than half the depth of the sulcus below the tissue crest.

- **Rule 3**: If a sulcus greater than 2 mm is found, especially on the facial aspect of the tooth, evaluate to see if a gingivectomy could be performed to lengthen the teeth and create a 1.5-mm sulcus. Then the patient can be treated using rule 1.

NOTES

- The gingival tissues remain healthier when margins of crowns are placed above the gingival crest.

- After the cementation of a crown, chronic gingivitis would most likely be the result of a subgingival finish line.

- Restoration of the tooth in which has undergone surgical CL can be initiated 4-6 weeks after the surgery. It is recommended that tooth restored with a provisional restoration before or immediately after the CL and the fabrication of final restoration starts 3 months after the CL.

Healing After Flap Surgery

- **Immediately after suturing (≤24 hours):** a connection between the flap and the tooth or bone surface is established by a blood clot.

- **1-3 days after flap surgery:** the space between the flap and the tooth or bone is thinner. Epithelial cells migrate over the border of the flap, and they usually contact the tooth at this time. When the flap is closely adapted to the alveolar process, there is a minimal inflammatory response.

- **One week after surgery**: an epithelial attachment to the root has been established by hemidesmosomes and a basal lamina. The blood clot is replaced by granulation tissue derived from the gingival connective tissue, the bone marrow, and the PDL.

- **Two weeks after surgery**: collagen fibers begin to appear parallel to the tooth surface. Union of the flap to the tooth is still weak because of the presence of immature collagen fibers.

- **One month after surgery**: a fully epithelialized gingival crevice with a well-defined epithelial attachment is present.

- Full-thickness flaps, which denude the bone, result in a superficial bone necrosis after 1 to 3 days. Osteoclastic resorption follows and reaches a peak at 4 to 6 days

and then declines. This results in a loss of bone of about 1 mm. The bone loss is greater if the bone is thin.

- Following periodontal surgery, the curetted root surface is repopulated by cells derived from periodontal ligament; alveolar bone; epithelium and gingival connective tissue but *not the cementum.*

- Osteoplasty with the use of diamond burs and included as part of the surgical technique results in areas of bone necrosis with a reduction in bone height, which is later remodeled by new bone formation. The final shape of the crest is determined more by osseous remodeling than by surgical reshaping.

- Patients may complain of cold sensitivity following flap surgery because of gingival recession. Hypersensitivity slowly disappears in a few weeks. An important factor in reducing hypersensitivity is biofilm control. Patient must be informed that desensitizing agents do not produce immediate relief and must be used for several days or even weeks to produce results.

- Patients are instructed to rinse with 0.12% chlorhexidine immediately after the surgical procedure and twice daily thereafter until normal biofilm control can be resumed.

Final Outcome of Periodontal Pocket

If the epithelium proliferates along the tooth surface before the other tissues reach the area, the result will be a long junctional epithelium. If the cells from the gingival connective tissue are the first to populate the area, the result will be fibers parallel to the tooth surface and remodeling of the alveolar bone with no attachment to the cementum. If bone cells arrive first, root resorption and ankylosis may occur. Finally, only when cells from the PDL proliferate coronally is there new formation of cementum and PDL.

Periodontal Therapy in Esthetic Zone

In some areas, such as the anterior maxilla, periodontal disease should be treated nonsurgically, and periodontal access surgery is rendered only when absolutely necessary. Compromise therapy is feasible in the anterior maxilla. This therapy consists of thorough subgingival root planing while attempting to not detach the connective tissue attachment beneath the JE. Gingival curettage should be avoided.

If a surgical flap is absolutely necessary for access to the root surface for SRP, *papilla preservation technique* is recommended. this technique is minimized gingival recession and preserved the interdental papilla.

Another important precaution is to avoid root planing apical to the base of the pocket to the osseous crest. The removal of the JE and the disruption of the connective tissue attachment

exposes the non-diseased portion of the cementum. Root planing and the removal of the non-diseased cementum may result in excessive shrinkage of the gingiva, which results in increased gingival recession.

Periodontal Dressings (Periodontal Packs)

Dressings have no curative properties but assist healing by protecting the tissue rather than providing "healing factors." Thus, the primary objective of using a dressing is to protect the wound. The dressing minimizes the likelihood of postoperative infection, facilitates healing by preventing surface trauma during mastication, and protects the patient from pain induced by contact of the wound with food or with the tongue during mastication.

Periodontal packs are either Zinc Oxide–Eugenol Dressing or Noneugenol Dressing. Eugenol in the ZOE type of dressing may induce an allergic reaction that produces reddening of the area and burning pain in some patients. Periodontal dressing should be removed 1 week after the surgery.