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Lec : 7


Flap Surgery



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A periodontal flap is a section of gingiva and/or mucosa surgically separated from the underlying tissues to provide visibility of and access to the bone and root surface.



Objectives

Flaps are used in pocket therapy for the following:

1. Increase accessibility to root deposits for scaling and root planing.
2. Eliminate or reduce pocket depth by resection of the pocket wall.
3. Gain access for osseous resective surgery if it is necessary.
4. Expose the area to perform regenerative methods.



In moderate to advanced cases, and in cases with furcation invasion and infrabony defects, it may be difficult and even impossible to resolve periodontal inflammation completely with nonsurgical therapy alone.

Periodontal access surgery enhances access for root instrumentation and allows for reduction of periodontal pockets and correction of osseous defects.

In the anterior maxilla, where aesthetics is of high priority, recession and loss of interdental papillae can present major aesthetic problems that are both difficult and unpredictable to treat.

In the posterior sextants, access for definitive root instrumentation is much more restricted due to multiple anatomic factors, especially around multirrooted teeth.



CLASSIFICATION OF FLAPS

Periodontal flaps can be classified based on the following:

- Bone exposure after flap reflection
- Placement of the flap after surgery
- Management of the papilla

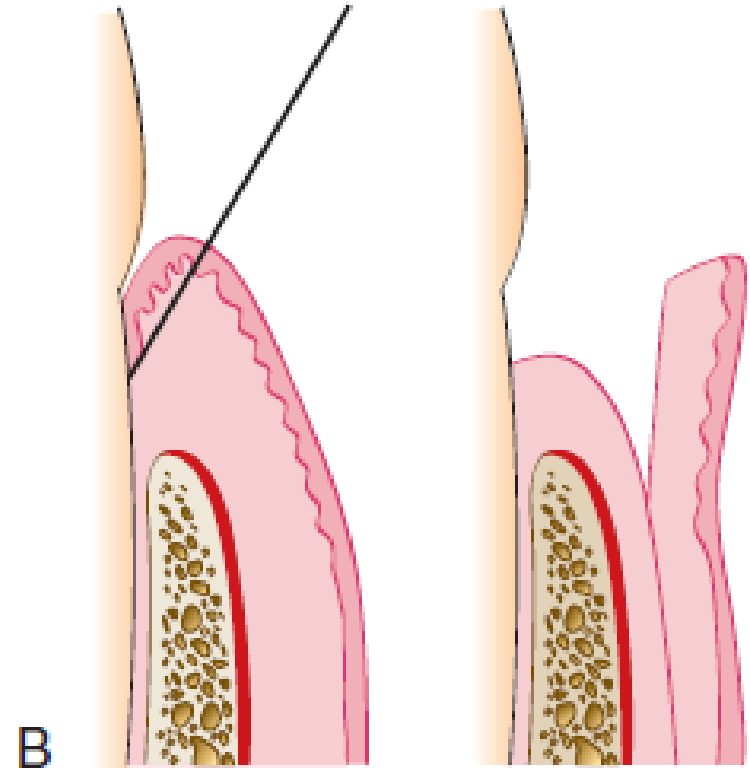
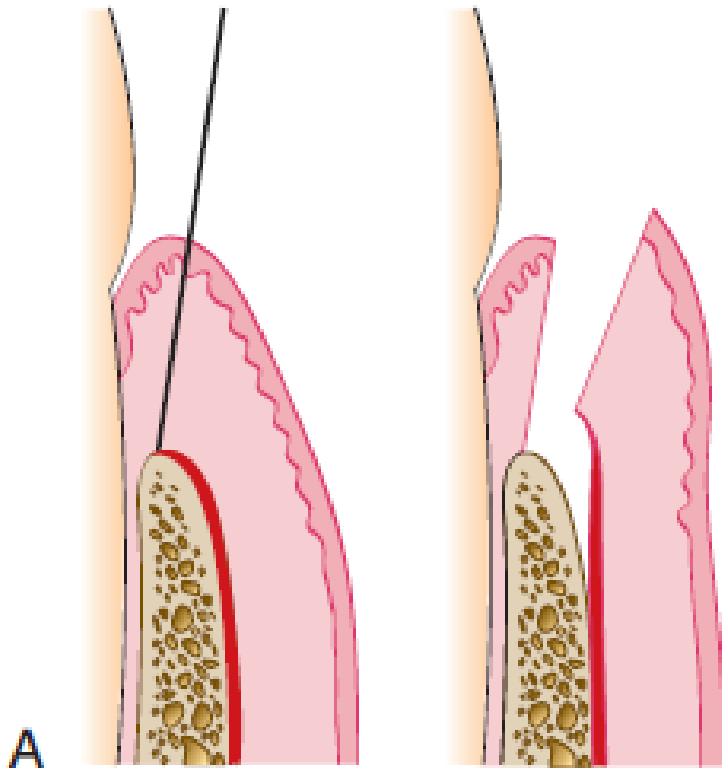


Based on bone exposure after reflection, the flaps are classified as either full-thickness (mucoperiosteal) or partial-thickness (mucosal) flaps.

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

→ The *partial-thickness flap* includes only the *epithelium* and a layer of the underlying connective tissue. The bone remains covered by a layer of connective tissue, including the *periosteum*. This type of flap is also called the *split-thickness flap*. The *partial-thickness flap* is indicated when the flap is to be positioned apically or when the operator does not want to expose bone.





A, Diagram of the internal bevel incision to reflect a full-thickness (mucoperiosteal) flap. Note that the incision ends on the bone to allow for the reflection of the entire flap.

B, Diagram of the internal bevel incision to reflect a partial-thickness flap. Note that the incision ends on the root surface to preserve the periosteum on the bone.



Based on flap placement after surgery, flaps are classified as

- (1) *Non displaced flaps*, when the flap is returned and sutured in its original position, or
- (2) *displaced flaps*, which are placed apically, coronally, or laterally to their original position. Both full-thickness and partial-thickness flaps can be displaced, but 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. However, palatal flaps cannot be displaced because of the absence of unattached gingiva.

Apically displaced flaps have the important advantage of preserving the outer portion of the pocket wall and transforming it into attached gingiva. Therefore these flaps accomplish the double objective of eliminating the pocket and increasing the width of the attached gingiva.



Based on management of the papilla, flaps can be conventional or papilla preservation flaps.

In the *conventional flap*, the *interdental* papilla is split beneath the contact point of the two approximating teeth to allow reflection of the buccal and lingual flaps. The incision is usually scalloped to maintain gingival morphology and retain as much papilla as possible. 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 by means of crevicular interdental incisions and a horizontal incision at the base of the papilla, leaving it connected to one of the flaps.



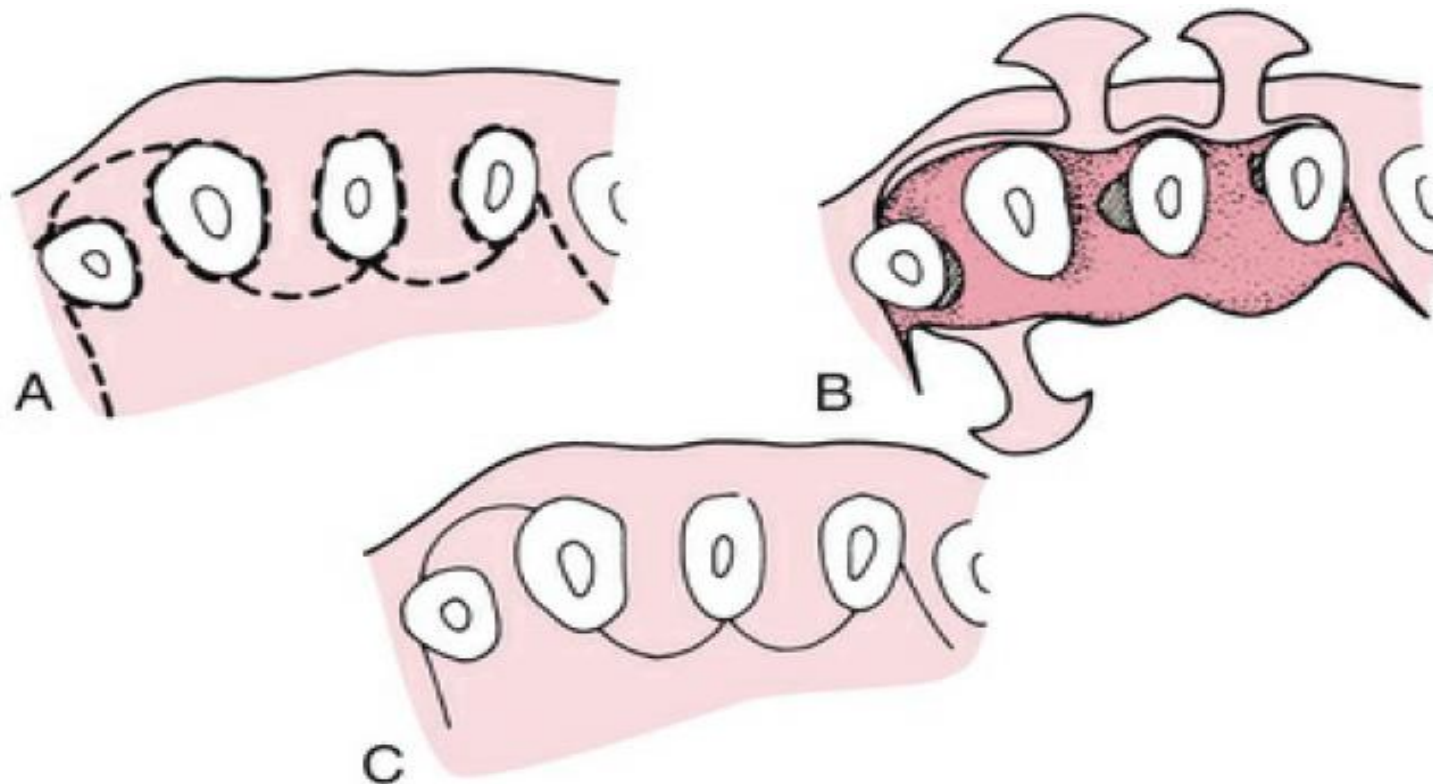


FIG. 60.8 Flap design for a papilla preservation flap. (A) Incisions for this type of flap are depicted by interrupted lines. The preserved papilla can be incorporated into the facial or the lingual–palatal flap. (B) The reflected flap exposes the underlying bone. Several osseous defects are seen. (C) The flap has been returned to its original position, where it covers all of the interdental spaces.



INCISIONS

Periodontal flaps use horizontal and vertical incisions.

Horizontal Incisions

Horizontal incisions are directed along the margin of the gingiva in a mesial or a distal direction. Two types of horizontal incisions have been recommended: the internal bevel incision, which starts at a distance from the gingival margin and is aimed at the bone crest, and the crevicular incision, which starts at the bottom of the pocket and is directed to the bone margin. In addition, the interdental incision is performed after the flap is elevated.



1

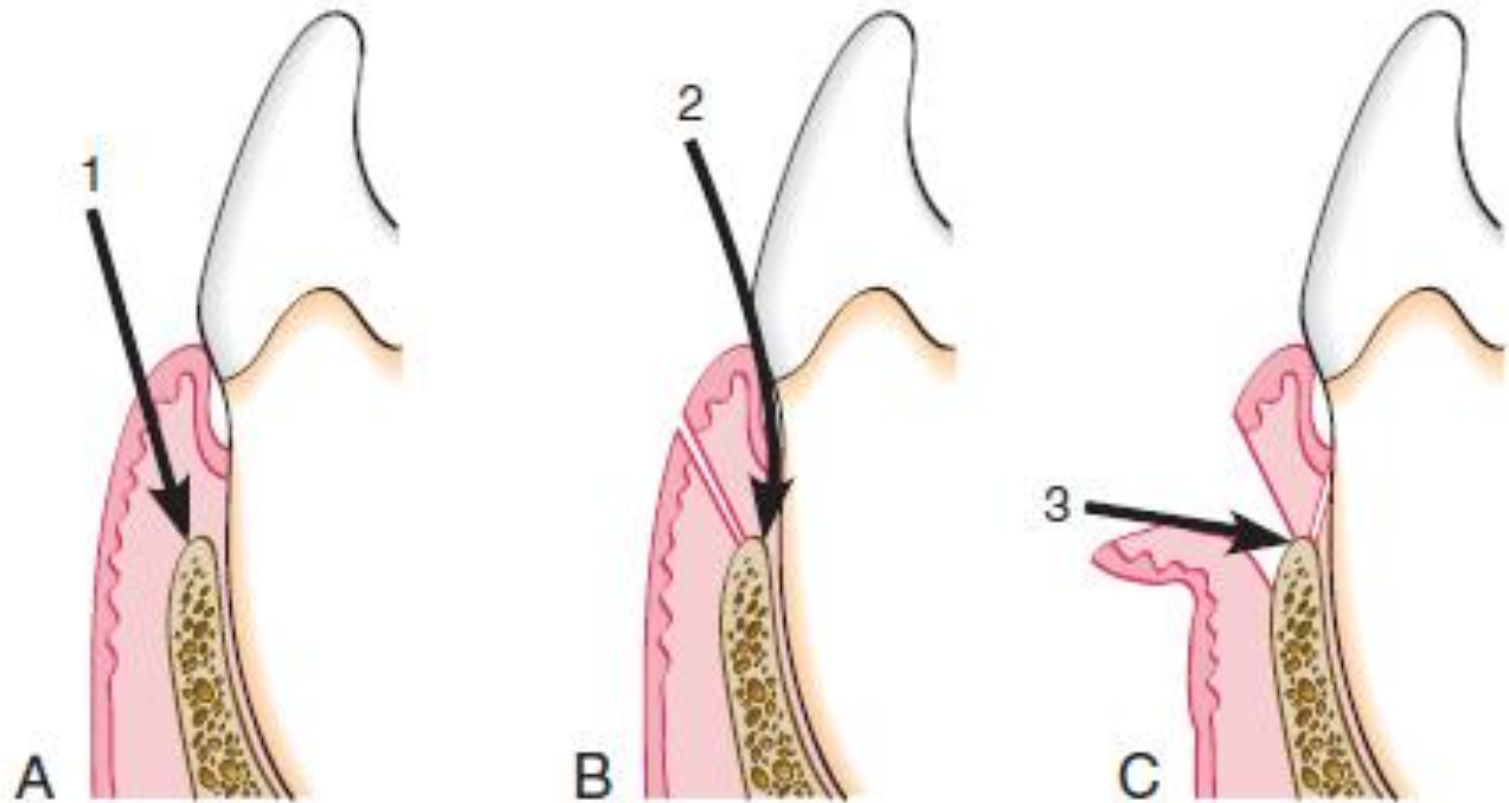
The *internal bevel incision* is basic to most periodontal flap procedures. It is the incision from which the flap is reflected to expose the underlying bone and root. The internal bevel incision accomplishes three important objectives:

- (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 flap margin for adaptation to the bone-tooth junction.



This incision has also been termed the *first incision* because it is the initial incision in the reflection of a periodontal flap, and the *reverse bevel incision* because its bevel is in reverse direction from that of the Gingivectomy incision. The #15 surgical blade is used most often to make this incision. That portion of the gingiva left around the tooth contains the epithelium of the pocket lining and the adjacent granulomatous tissue. It is discarded after the crevicular (second) and interdental (third) incisions are performed.

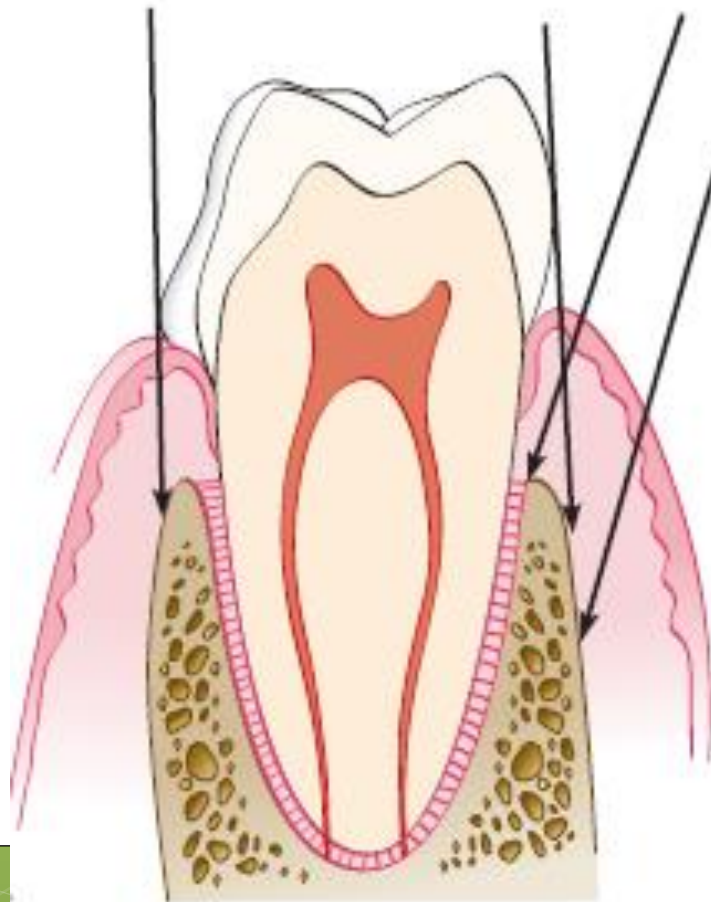




Three incisions necessary for flap surgery. A, First (internal bevel) incision; B, second (crevicular) incision; C, third (interdental) incision.



The internal bevel incision starts from a designated area on the gingiva and is directed to an area at or near the crest of the bone. The starting point on the gingiva is determined by whether the flap is apically displaced or not displaced.





2

The *crevicular incision*, also termed the *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 ending 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 junctional epithelium 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. The beak-shaped blade is usually used for this incision.






3

A periosteal elevator is inserted into the initial internal bevel incision, and the flap is separated from the bone. The most apical end of the internal bevel incision is exposed and visible.


With this access, the surgeon is able to make the *third incision, or interdental incision, 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, connecting the facial and lingual segments to free the gingiva completely around the tooth.





These three incisions allow the removal of the gingiva around the tooth (i.e., the pocket epithelium and the adjacent granulomatous tissue). A curette or a large scaler can be used for this purpose. After removal of the large pieces of tissue, the remaining connective tissue in the osseous lesion should be carefully curetted so that the entire root and the bone surface adjacent to the teeth can be observed.

Flaps can be reflected using only the horizontal incision if sufficient access can be obtained in this way and if apical, lateral, or coronal displacement of the flap is not anticipated. If vertical incisions are not made, the flap is called an *envelope flap*.



Vertical Incisions

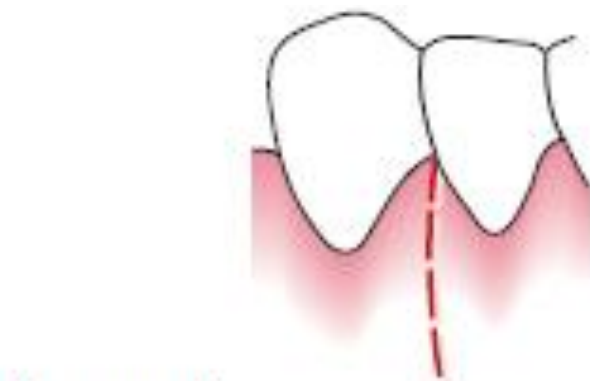
Vertical or oblique releasing incisions can be used on one or both ends of the horizontal incision, depending on the design and purpose of the flap. Vertical incisions at both ends are necessary if the flap is to be apically displaced.

In general, vertical incisions in the lingual and palatal areas are avoided. 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 long (coronal-apical) and narrow (mesial-distal) flaps, and flaps with the base narrower than the margin, because this could jeopardize the blood supply to the flap.





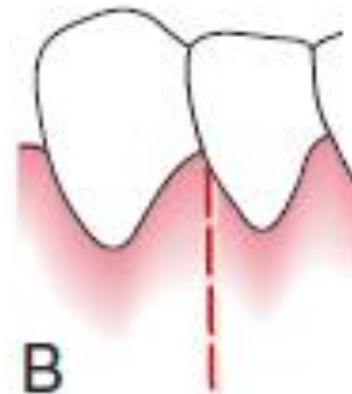
Incorrect



A



Correct



B

Incorrect (A) and correct (B) locations of a vertical incision.

This incision should be made at the line angles to prevent splitting of a papilla or incising directly over a radicular surface.



Several investigators proposed the *interdental denudation procedure*, which consists of horizontal, internal bevel, nonscalloped incisions to remove the gingival papillae and denude the interdental space. This technique completely eliminates the inflamed interdental tissue. Healing is by secondary intention and results in excellent gingival contour. It is contraindicated when bone grafts are used for the graft material placed interdentally will not be covered.

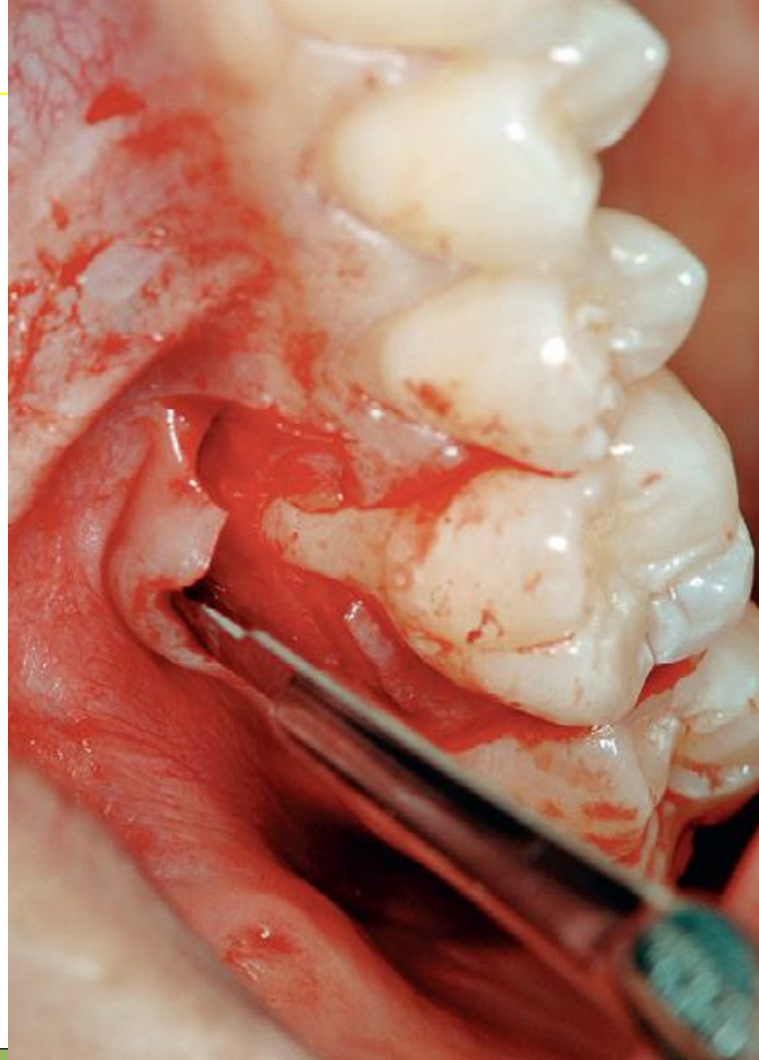


ELEVATION OF THE FLAP

When a full-thickness flap is desired, reflection of the flap is accomplished by blunt dissection. A periosteal elevator is used to separate the mucoperiosteum from the bone by moving it mesially, distally, and apically until the desired reflection is accomplished.



Sharp dissection is necessary to reflect a partial-thickness flap. A surgical scalpel (#15) is used.



To fulfill the objectives of flap surgery, five different flap 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 modified Widman flap facilitates root instrumentation. It does not attempt to reduce the pocket depth, but it does eliminate the pocket lining.
- 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 transgingival interdental probing depth is used to provide a guide for the placement of the submarginal scalloped incision.
- The transgingival probing depth is the distance from the gingival margin down to the bone. It is measured by inserting the probe into the gingival crevice through the attachment apparatus and down to the bone.
- Transgingival probing is also called *bone sounding*.



- 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 flap is used for treating pockets and osseous defects on the distal surface of the terminal maxillary and mandibular molars.



Modified Widman Flap

- The original Widman flap used two vertical releasing incisions connected by a submarginal scalloped internal bevel incision to demarcate the area of surgery.
- This technique offers the possibility of establishing an intimate postoperative adaptation of healthy collagenous connective tissue to tooth surfaces, and it provides access for adequate instrumentation of the root surfaces and immediate closure of the area.



The step-by-step technique for the modified Widman flap is as follows:

- Step 1: The first incision parallel to the long-axis of the tooth is a scalloped internal bevel incision to the alveolar crest starting 0.5 to 1 mm away from the gingival margin. The papillae are dissected and thinned to have a thickness similar to that of the remaining flaps.



- Step 2: Full-thickness flaps are reflected 2 to 3 mm away from the alveolar crest.



- Step 3: The second, crevicular incision is made in the gingival crevice to detach the attachment apparatus from the root.
- Step 4: The interdental tissue and the gingival collar are detached from the bone with a third incision.



- Step 5: The gingival collar and granulation tissue are removed with curettes. The root surfaces are scaled and planed.

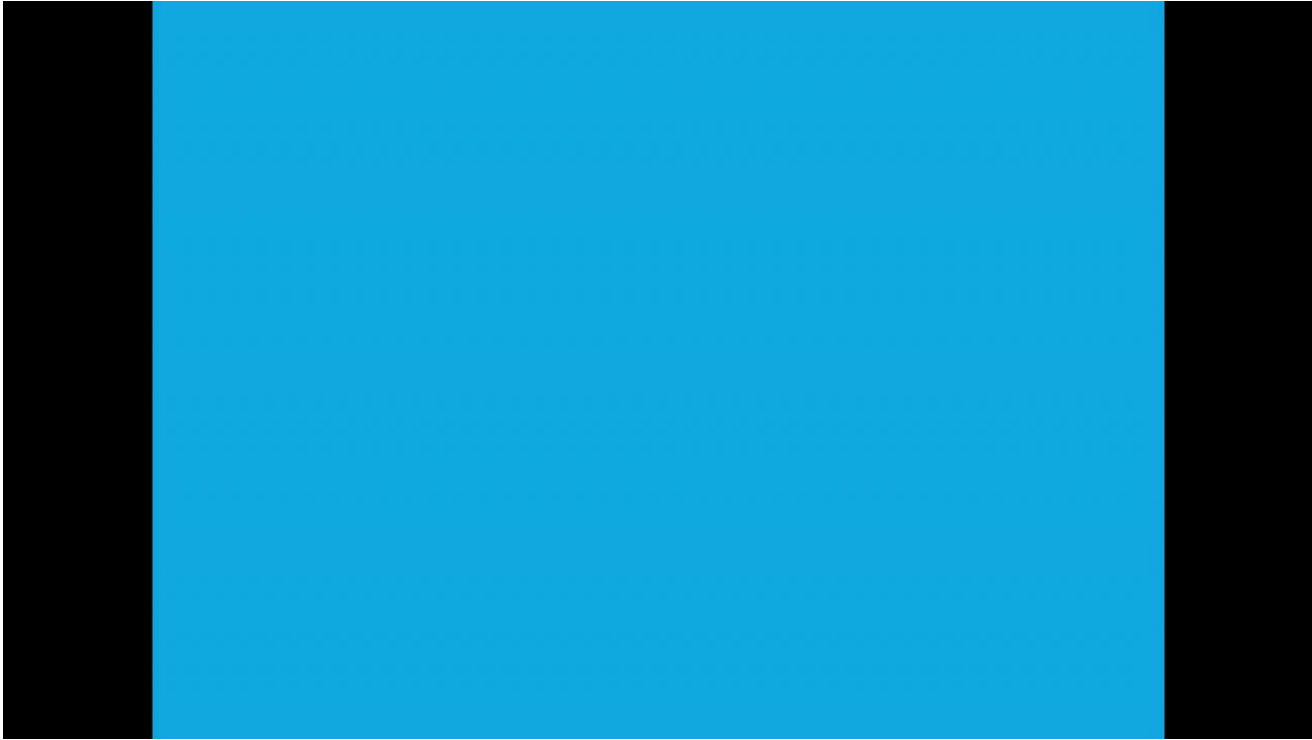
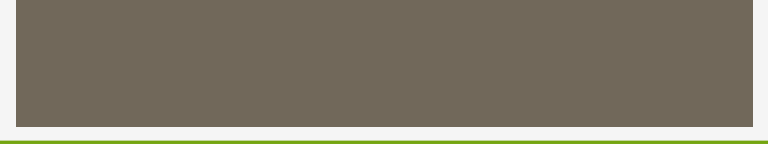


- Step 6: Bone architecture is not corrected unless it prevents intimate flap adaptation. Every effort is made to adapt the facial and lingual interdental tissue in such a way that no interdental bone remains exposed at the time of suturing.



- Step 7: The flaps are stabilized with sutures and covered with a surgical dressing.





Undisplaced Flap

- Currently, the undisplaced flap may be the most frequently performed type of periodontal surgery. For the undisplaced flap, the submarginal scalloped internal bevel incision is initiated at a distance from the tooth that is roughly one-half to two-thirds the interdental transgingival probing depth.
- This incision can be accomplished only if sufficient attached gingiva remains apical to the incision.

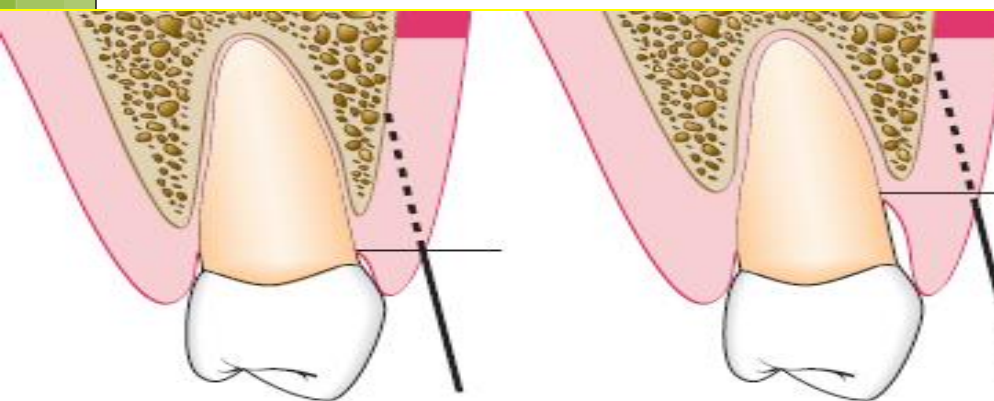


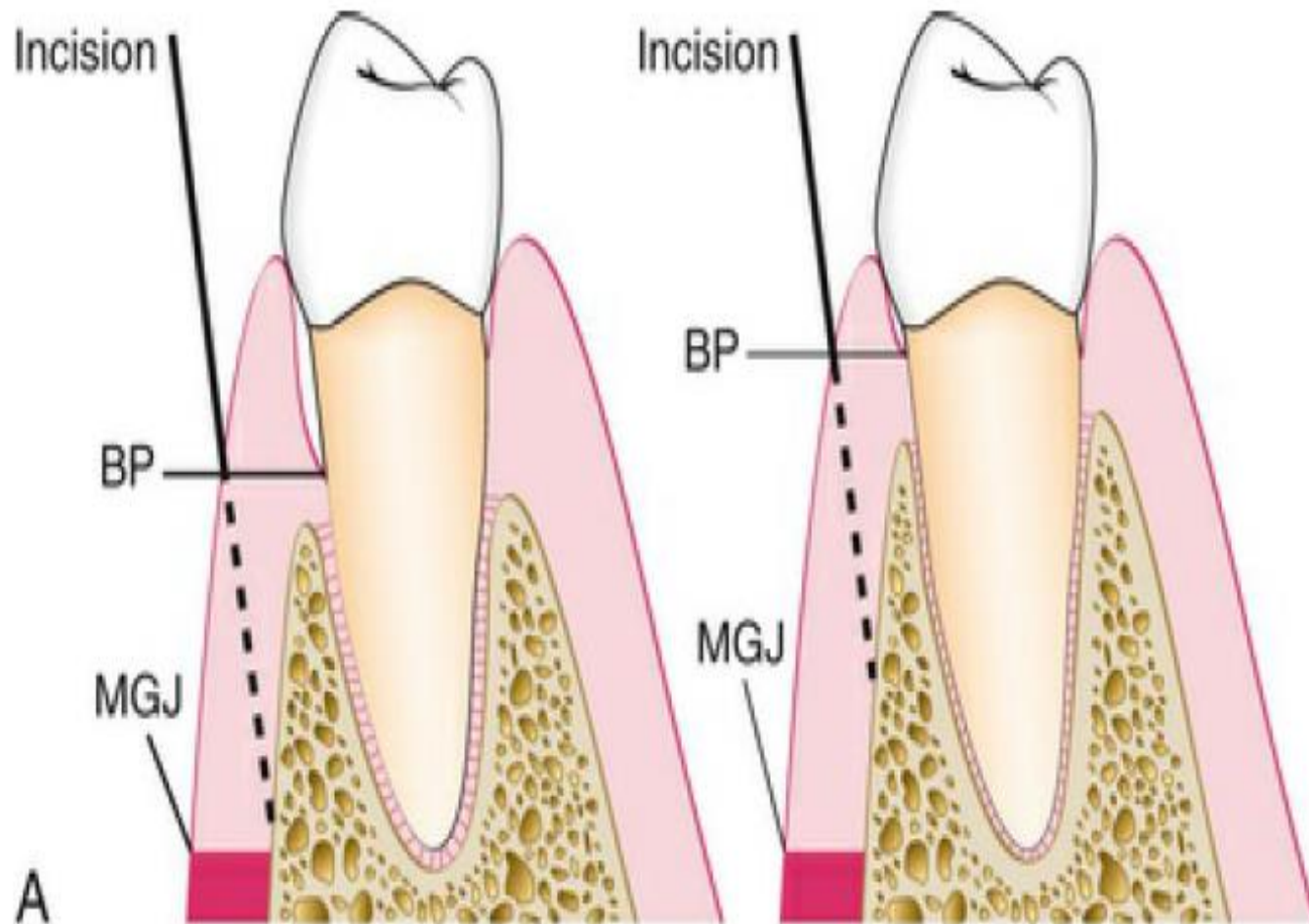
- the two anatomic landmarks, the transgingival interdental probing depth and the mucogingival junction, must be considered to evaluate the amount of attached gingiva that will remain after surgery.

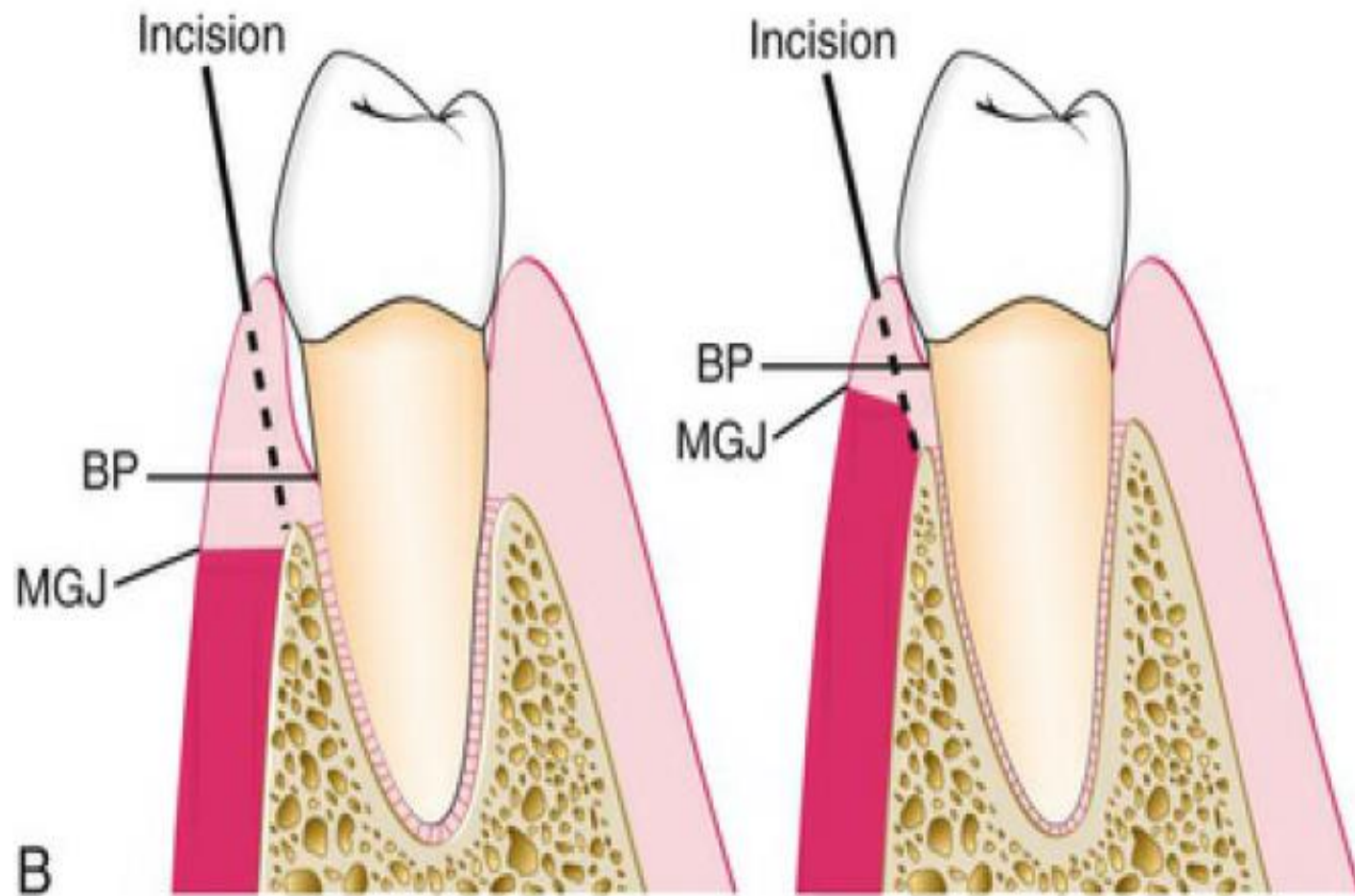


The step-by-step technique for the undisplaced flap is as follows:

- Step 1: The periodontal probe is inserted into the gingival crevice and penetrates the junctional epithelium and connective tissue down to bone.
- Step 2: The mucogingival junction is assessed to determine the amount of keratinized tissue.
- Step 3: The initial placement of the submarginal scalloped internal bevel incision is based on the transgingival interdental probing depth and the mucogingival junction. The incision is made parallel to the long axis of the tooth and directed down to the alveolar bone.









- Step 4: Full-thickness flaps are reflected 1 mm apical to the mucogingival junction.
- Step 5: The crevicular is made in the gingival crevice to detach the attachment apparatus from the root.
- Step 6: The gingival collar and granulation tissue are removed with curettes. The root surfaces are scaled and planed.



- Step 7: Osseous recontouring is performed to eliminate defects and reestablish positive architecture.
- Step 8: The flaps are adapted on the alveolar crest with the flap margin well adapted to the roots. The flaps may be trimmed and rescalloped if necessary.
- Step 9: The flaps are stabilized with sutures and covered with a surgical dressing.



Apically Displaced 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).



APICALLY DISPLACED FLAP

With some variants, the apically displaced flap technique can be used for (1) pocket eradication and/or (2) widening the zone of attached gingiva. Depending on the purpose, it can be a full-thickness (mucoperiosteal) or a split-thickness (mucosal) flap. The split-thickness flap requires more precision and time, as well as a gingival tissue thick enough to split, but it can be more accurately positioned and sutured in an apical position using a periosteal suturing technique.



The step-by-step technique for the apically displaced flap is as follows:

- Step 1: A marginal scalloped internal bevel incision parallel to the long axis of the tooth is made down to the crest of bone.
- Step 2: If used, vertical incisions are made extending beyond the mucogingival junction. It is important that the vertical incisions—and therefore the flap elevation—reach past the mucogingival junction to provide adequate mobility to the flap for its apical displacement.

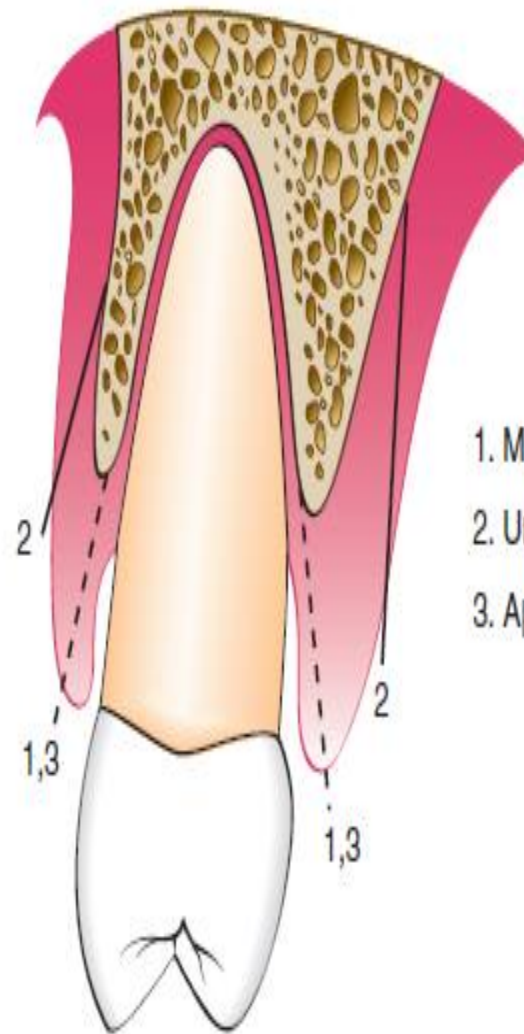


- Step 3: The flap is reflected in full thickness or partial thickness, depending on the thickness of the gingiva and the objective of the surgery.
- Step 4: Crevicular and interdental incisions are made, and the marginal collar of tissue is removed.
- Step 5: After degranulation, scaling and root planing, and osseous surgery if needed, the flap is displaced apically.



- Step 6: If a full-thickness flap was reflected, an independent sling suture positions the flap margin at the alveolar crest, and a surgical dressing can prevent its coronal movement. If a partial-thickness flap was reflected, it can be apically displaced with an independent sling suture, and further stabilized with periosteal sutures. A periodontal dressing can prevent its coronal movement.





1. Modified Widman

2. Undisplaced

3. Apically Displaced





IN THE NEXT LECTURE

- ◉ (4) the papilla preservation flap.
- ◉ (5) and the distal terminal molar flap.

