**Periodontal Plastic and Aesthetic Surgery**

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**Mucogingival surgery** was initially introduced in the literature by Friedman to describe surgical procedures for the correction of relationships between the gingiva and the oral mucous membrane, with special reference to three problem areas: attached gingiva, shallow vestibules, and a frenum interfering with the marginal gingiva.

The 1996 World Workshop in Clinical Periodontics renamed **mucogingival surgery as periodontal plastic surgery**, a term originally proposed by Miller in 1993 and broadened to include the following areas:

• Periodontal-prosthetic corrections

• Crown lengthening

• Ridge augmentation

• Aesthetic surgical corrections

• Coverage of the denuded root surface

• Reconstruction of papillae

• Aesthetic surgical correction around implants

• Surgical exposure of unerupted teeth for orthodontics

**Periodontal plastic surgery** is defined as the surgical procedures performed to correct or eliminate anatomic, developmental, or traumatic deformities of the gingiva or alveolar mucosa.

**Mucogingival therapy** is a broader term that includes non-surgical procedures such as papilla reconstruction by means of orthodontic or restorative therapy. Periodontal plastic surgery includes only the surgical procedures of mucogingival therapy.

Periodontal plastic and esthetic surgery are addressed in the following:

1. problems associated with attached gingiva.
2. Problems associated with excessive gingival display.
3. problems associated with interdental papillary loss.
4. Gingival pigmentation.
5. Aberrant frenum.
6. Double lip.

**1-Problems Associated with Attached Gingiva**

The ultimate goal of mucogingival surgical procedures is the creation or widening of attached gingiva around teeth and implants. Attached gingiva is not synonymous with keratinized gingiva because the latter also includes the free gingival margin. The width of the attached gingiva is determined by subtracting the depth of the sulcus or pocket from the distance between the crest of the gingival margin and the mucogingival junction. No minimal width of attached gingiva has been established as a standard necessary for gingival health. People who practice good, atraumatic oral hygiene can maintain excellent gingival health with almost no attached gingiva. However, individuals whose oral hygiene practices are less than optimal can be helped by the presence of keratinized gingiva and vestibular depth.

**Widening the attached gingiva accomplishes four objectives:**

1. Enhances plaque removal around the gingival margin

2. Improves aesthetics

3. Reduces inflammation around restored teeth

4. Allows gingival margin to bind better around teeth and implants with attached gingiva

**Techniques to Increase Attached Gingiva**

**•Gingival augmentation apical to the area of recession:** The donor graft tissue (i.e., pedicle or free) is placed on a recipient bed apical to the recessed gingival margin. No attempt is made to cover the denuded root surface where there is gingival and bone recession.

**• Gingival augmentation coronal to the recession** (i.e., root coverage)**:** The donor graft tissue (i.e., pedicle or free) is placed covering the denuded root surface. Apical and coronal widening of the attached gingiva enhances oral hygiene procedures, but only the latter can correct an aesthetic problem.

**1.Gingival Augmentation Apical to Recession**

**A.** **Free Gingival Autografts**

Free gingival grafts are used to create a widened zone of attached gingiva**.**

**The Classic Technique**

**Step 1: Prepare the recipient site:** A firm connective tissue bed is prepared to receive the graft by incising at the existing mucogingival junction with a #15 blade to the desired depth, blending the incision on both ends with the existing mucogingival line. Periosteum should be left covering the bone.

**Step 2: Obtain the graft from the donor site:** The classic or conventional free gingival graft technique consists of transferring a piece of keratinized gingiva approximately the size of the recipient site. The palate is the usual site from which the donor tissue is removed. The graft should consist of epithelium and a thin layer of underlying connective tissue.

**Step 3: Transfer and immobilize the graft**: Remove the sponge from the recipient site; reapply it with pressure if necessary, until bleeding is controlled. Remove the excess clot. A thick clot interferes with vascularization of the graft. Position the graft, and adapt it firmly to the recipient site. Suture the graft at the lateral borders and to the periosteum to secure it in position. The graft must be immobilized. Any movement interferes with healing.

**-Advantages**

* Free gingival graft technique is simple &predictable procedure

**-Disadvantage**

* The patient fearful of palatal surgery.
* Limitation of the amount of tissue that can be removed.
* Color discrepancy.

**Variant Technique (the strip technique)**

The free gingival graft technique is a predictable procedure, but the donor site (i.e., palate) is left with an open wound that must heal by secondary intention. The following variant technique attempt to minimize the donor site wound by removing the donor tissue in a different configuration and altering the shape to maximize coverage over the recipient site. The strip technique, consists of obtaining two or three strips of gingival donor tissue about 3 to 5 mm wide and long enough to cover the entire length of the recipient site. These strips are placed side by side to form one donor tissue and sutured on the recipient site.

**-Advantages**

* The rapid healing of the donor site. The epithelial migration of the close wound edges (3 to 5 mm) allows rapid epithelialization of the open wound.
* The donor site usually does not require suturing and heal in (1 – 2) weeks.

**B. Free Connective Tissue Autografts**

Free gingival grafts have a number of disadvantages. Esthetics may be compromised because of the **colour difference** between the graft and recipient site tissues, while there is also the problem of a **large denuded site in the palate**, which must heal by **secondary intention**. These disadvantages have been overcome by the use of connective tissue (CT) grafts, which involve placement of de-epithelialized connective tissue into the recession defect. Healing of the donor site is by primary intention, reducing discomfort for the patient. The colour match with the tissues is also better. Connective tissue grafts are commonly harvested from the palate, provided there is adequate thickness of tissue. The retro-molar pad area can also be used because of the thickness of the sub-mucosa in this area. This graft material is carefully sutured into place and a coronally advanced flap placed and sutured over it.

**2.Coronal augmentation/ Pedicle Autograft**

**A. Laterally (Horizontally) Displaced Pedicle**

The laterally (horizontally) positioned flap can be used to cover the isolated, denuded root surfaces that have adequate donor tissue adjacent to the recipient site. The vestibular depth must exist to laterally move the pedicle.

**Step 1. Preparing the recipient site:** Epithelium is removed around the denuded root surface. The exposed connective tissue will be the recipient site for the laterally displaced flap. The root surface is thoroughly scaled and root planed.

**Step 2. Preparing the flap:** The periodontal tissue of the donor site should have a satisfactory width of attached gingiva without dehiscence or fenestration in the bone. A partial-thickness flap used, because it offers the advantage of rapid healing at the donor site and reduces the risk of loss of facial bone.

**Step 3. Transferring the flap**: Slide the flap laterally onto the adjacent root. The flap should be placed flat and be firm without excess tension on the base. Stabilize the flap to the adjacent gingiva and alveolar mucosa with interrupted sutures. A suspensory(sling) suture may be used around the involved tooth to prevent the flap from slipping apically.

**B. Coronally advanced flap procedure**

The purpose of the coronally displaced flap procedure is to create a split-thickness flap in the area apical to the denuded root surface. The flap is coronally positioned to cover the root.

 **Classic technique**

**Step 1.** With two vertical incisions, delineate the flap. These incisions should go beyond the mucogingival junction. An internal bevel incision is made from the gingival margin to the bottom of the pocket to eliminate the diseased pocket wall. Elevate a mucoperiosteal flap using a sharp dissection.

**Step 2.** Scale and plane the root surface.

**Step 3.** Return the flap, and suture it at a level coronal to the pretreatment position. Cover the area with a periodontal dressing. The postsurgical appointment is made after 1 week. The periodontal dressing is replaced for an additional week if necessary.

**C. Semilunar coronally positioned flap**

**Step 1.** A semilunar incision is made following the curvature of the receded gingival margin and ending about 2 to 3 mm short of the tip of the papillae. This location is important because the flap derives its blood supply from the papillary areas.

**Step 2.** Perform a split-thickness dissection coronally from the incision, and connect it to an intrasulcular incision.

**Step 3**. The tissue collapses coronally, covering the denuded root. It is then held in its new position with a moist gauze. Many cases do not require sutures or periodontal dressing.

This technique is simple and predictably provides 2 to 3 mm of root coverage. It can be performed on several adjoining teeth. The technique is indicated for areas where the recession is not extensive (<3 mm) and the facial gingival biotype is thick. It is successful for the maxillary anterior area to cover root surfaces exposed at the crown margins.

**D. Guided Tissue Regeneration (GTR)** **for Root Coverage**

GTR should result in reconstruction of the attachment apparatus, along with coverage of the denuded root surface.

**Step 1.** A full-thickness flap is reflected to the mucogingival junction, continuing as a partial-thickness flap 8 mm apical to the mucogingival junction.

**Step 2.** A membrane is placed over the denuded root surface and adjacent tissue. It is trimmed and adapted to the root surface and covers at least 2 mm of marginal periosteum.

**Step 3.** A suture is passed through the portion of the membrane that will cover the bone. This suture is tied on the exterior and to bend the membrane, creating a space between the root and membrane. This space allows the growth of tissue beneath the membrane.

**Step 4.** The flap is then positioned coronally and sutured.

**E- The pouch and tunnel technique**

is also referred to as the coronally advanced tunnel technique. To minimize incisions and the reflection of flaps and to provide abundant blood supply to the donor tissue, placement of the subepithelial donor connective tissue into pouches beneath papillary tunnels allows intimate contact of donor tissue with the recipient site. The aesthetic result is excellent. The technique is especially effective for the anterior maxillary area in which vestibular depth is adequate and there is good gingival thickness.

An advantage of this technique is thickening of the gingival margin after healing. The thicker gingival margin is stable, allowing for the possibility of creeping reattachment of the margin.

**Step1.** Initial sulcular incisions are made using #15c and #12d blades. Small, contoured blades and minicurettes are used to create the recipient pouches and tunnels.

**Step 2.** On the buccal aspect, an intrasulcular incision is made around the necks of the teeth. The incision is extended to one adjacent tooth mesially and distally using a #15c blade.

**Step 3.** The papillae are kept intact and undermined to maintain their integrity and carefully released from the underlying bone, which allows coronal positioning of the papillae.

**Step 4.** An envelope, full-thickness pouch, and tunnel are created and extended apically beyond the mucogingival line by blunt dissection for insertion of the free connective tissue graft through the intrasulcular incision.

 **Step 5.** A donor surgical site is created to obtain a connective tissue graft of adequate size and shape to be placed at the recipient site. The donor tissue connective tissue is contoured to fit into the recipient tunnel and pouch.

**Step 6.** A mattress suture placed at one end of the graft helps to guide the graft through the sulcus and beneath each interdental papilla. The border of the tissue is gently pushed into the pouch and tunnel using tissue forceps and a packing instrument. The graft is pushed from the adjacent tooth on one side of the surgical area to the adjacent tooth on the other side. A mattress suture placed on one end of the graft helps to maintain the graft in position while the buccal tissue covers the connective tissue graft.

**Alternative Donor Tissue**

Another technique to minimize the use of the palate as a donor site is the use of acellular dermal matrix (ADM) as a substitute for palatal donor tissue. The use of the palate as a donor site for gingival augmentation has numerous disadvantages.

This product is commercially available under the name **AlloDerm**, and it is derived from donated human skin. In addition to avoiding palatal donor surgery, ADM offers the advantage of availability of unlimited donor tissue for the treatment of multiple teeth in a single surgical appointment.

 "Life is really simple, but we insist on making it complicated."

 Confucius