

# Current Perspectives on Soft Tissue Grafting in Periodontal Surgery

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In an education course, Peter C. Shatz, DDS, Kennestone Periodontics PC, Atlanta, Georgia, USA, discussed current perspectives on the management of patients for soft tissue grafting for root coverage and ridge augmentation.

## HEALTHY PERIODONTIUM

Because periodontal health and tooth restoration are intertwined, Dr Shatz first reviewed the anatomy and physiology of the healthy periodontium.

The gingiva functions as a natural biological seal that separates the oral cavity from the inside of the body, and it comprises numerous layers (Table 1).

According to Dr Shatz, the biologic width includes a natural seal that develops around teeth and dental implants, protecting the alveolar bone from infection and disease. This represents the soft tissue that is attached to the portion of the tooth coronal to the crest of the alveolar bone, and it helps to preserve periodontal health and remove irritation that might damage the periodontium.

The periodontal ligament, however, primarily has a supportive and load transfer function. In contrast, around a healthy dental implant, the gingival layers comprise the following:

- Gingival margin
- Sulcus
- Junctional epithelium
- Epithelial-metal interface
- Supra-alveolar connective tissue adhesion

## PERIODONTAL AND PERI-IMPLANT DISEASE

Bacterial pathogenic plaque is the primary cause of periodontal and peri-implant disease. This leads to inflammation with apical migration of junctional epithelium and loss of connective tissue fibers. Acute inflammation progresses to chronic inflammation and ultimately leads to periodontal bone loss.

## HEALING AFTER GINGIVECTOMY

Following gingivectomy, the healing stages involve initial clot formation, followed by epithelial and vascular responses, both of which occur at the same rate to cover the wound and reestablish a capillary bed. Epithelial migration begins 24 hours postsurgery, progressing at a rate of 0.5 mm/d until its completion by 7 to 10 days. The new dentogingival unit that results is similar to normal free gingiva.

## HEALING AFTER GINGIVAL FLAP SURGERY

Dr Shatz discussed the 2 types of gingival flaps. A full-thickness flap extends all the way down to the level of bone, whereas a split-thickness flap represents any flap of less than full-thickness depth. Postsurgery, healing occurs by primary intention (suturing facilitates healing by joining the 2 flap margins) or secondary intention (spontaneous healing that occurs at the donor site on the hard palate, where graft harvesting creates a tissue deficit that heals by adhesion of granulating edges).

## FUNDAMENTALS OF SUCCESSFUL SURGERY

To ensure best surgical results, Dr Shatz emphasized the need for the following:

1. *Sharp dissection:* Clean, fresh blades should be used at different stages in the process.
2. *Maintenance of flap vascularity:* A large flap will heal better than a small, narrow flap, for example.

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Table 1. Gingival Layers

Layer	Description
Gingival margin	—
Sulcus	—
Junctional epithelium	Last line of gingival defense; up to 18-cells thick, nonkeratinized, attached to tooth and connective tissue; acts as a semipermeable barrier
Epithelial-enamel or epithelial-cementum interface	—
Supra-alveolar connective tissue fibers within the keratinized tissue	—
Interface between cementum and Sharpey fibers	Connective tissue fibers at the ends of the periodontal ligament that insert into dentin or cementin and the periosteum of bone

Table 2. Surgical Medications

Medication	Dosage
Cephalexin, 500 mg (21 tablets)	TID for 1 wk, beginning 1 d before surgery
Naproxen sodium, double-strength, 550 mg (21 tablets)	TID for 1 wk, beginning 1 h before surgery
Combined acetaminophen, 325 mg, and oxycodone, 5 mg (10 tablets)	1 tablet every 4 to 6 h for pain (do not drive)

3. *Appropriate coaptation of flaps at the end of surgery:* This is a significant factor in achieving predictable outcomes.
4. *A sterile field:* Although this is impossible to achieve in the oral cavity, the following steps can be taken to reduce contamination: frequent hand washing; rinsing with an American Dental Association–approved therapeutic mouthwash; and prescribing a broad-spectrum antibiotic, such as a cephalexin or clindamycin, if the patient is allergic to cephalexin (Table 2).

It takes 7 to 14 days for the junctional epithelium to begin to attach to the tooth and 21 to 28 days for connective tissue fiber attachment. Collagen is responsible for holding the tissue together, and it creates the keratinized tissue below the epithelium. Therefore, after surgery, the patient’s tissue needs to be held apposed long enough for collagen to appear for reattachment. Since it takes approximately 21 days for the tissue flaps to be strong enough to support themselves, use of a suture material that remains in situ for this length of time is optimum. Polyglycolic acid is the preferred suture material. Final maturation of the flap occurs approximately 60 to 90 days postsurgery.

#### HEALING FOLLOWING PERIODONTAL FLAP SURGERY

Immediately after surgery, patients will experience inflammation, swelling, pain, and discomfort at the surgical site, which will increase over the first 3 days, decreasing thereafter. Clot formation occurs within the first 24 hours, so patients should be advised that it is normal to bleed a little during this time.

Since swelling can cause flap failure, managing inflammation is paramount to improve the chances of surgical success. Nonsteroidal anti-inflammatory drugs are therefore key—in particular, short-term naproxen sodium (double-strength at 550 mg, starting 1 hour before surgery for 7 to 10 days). Like cephalexin, naproxen is administered 3 times daily, thereby increasing compliance. Narcotics can also be prescribed short-term for pain relief (Table 2).

#### SURGICAL ANATOMY

For soft tissue grafting, the hard palate is the safe zone for gingival graft harvest. While it is important to avoid the greater palatine foramen and greater palatine artery, the safe zone for grafting is the area from the distal aspect of maxillary canine to the midpalatal aspect of the maxillary first molar. Other important landmarks to avoid include the mental, inferior alveolar, lingual, and mylohyoid nerves.

#### PRINCIPLES OF DENTAL SUTURING

According to Dr Shatz, the primary objective of placing sutures is to position and secure surgical flaps in the correct place to promote optimal healing. This is important for patient comfort, hemostasis, wound size reduction, and prevention of unnecessary bone destruction.



Table 3. Soft Tissue Grafting Techniques

Technique	Tissue Type
Free onlay graft	Autogenous Allogenic
Free subepithelial graft	Autogenous Allogenic
Pedicle graft	Autogenous
Combination procedures	Mix of materials and techniques

Table 4. Allogenic Dermis and Autogenous Masticatory Mucosa as Grafting Materials

	Allogenic Dermis	Autogenous Masticatory Mucosa
Advantages	No donor site involved Allows access to an unlimited amount of tissue Proven track record in controlled clinical trials	Simple technique Proven track record in controlled clinical trials Involves keratinized tissue Tissue thickness can be controlled
Disadvantages	Cost Fixed tissue thickness Human-derived tissue	Poor match with surrounding tissue Patient morbidity (pain, bleeding)

To avoid bending needles, the suture needle should be grasped 2 to 3 mm from the tip of the holder, in the middle of the body portion, not at the point or swaged end. The 2 most commonly used needles in dental surgery are the 3/8 circle and the 1/2 circle, and a variety of suture materials are available (nonabsorbable or absorbable).

The surgeon's knot is the preferred suture tie because all suture material types can hold this. Sutures should be pulled just tight enough to secure the flap in place without restricting the flap's blood supply. The flap should not be blanched when sutures are tied, however, and they should be placed  $\leq 3$  mm from the flap margins to prevent tear-through during maximum swelling, 24 to 48 hours postsurgery.

**MUCOGINGIVAL SURGERY**

Dr Shatz also discussed some of the main indications for mucogingival surgery, including the need to maintain, widen, or create a zone of attached tissue. Various soft tissue grafting materials include the following:

- Autogenous masticatory mucosa
- Autogenous connective tissue
- Autogenous skin
- Allogenic dermis
- Allogenic skin
- Allogenic fascia

Soft tissue techniques (Table 3) are available, and the indications for soft tissue grafting are numerous (eg, inadequate zone of keratinized tissue, gingival recession, restorations abutting gingiva, and soft and hard tissue defects).

Dr Shatz compared the use of allogenic dermis with autogenous masticatory mucosa as grafting materials (Table 4).

He stressed that while healthy teeth need some associated keratinized tissue (<1-mm thickness), teeth undergoing restorative work require more because their preparation creates a nidus of inflammation that requires the bone to be protected by a larger volume of keratinized gingival tissue. The fundamental purpose of performing soft tissue grafting is therefore to increase the zone of keratinized gingiva. However, with respect to surgical outcomes, it is important to warn patients that 100% root coverage cannot be guaranteed, concluded Dr Shatz.

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