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WOUND MANAGEMENT

Wound Reconstruction Techniques: Free Skin Grafts

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Unlike skin flaps, which include a vascular connection to the body, free skin grafts are portions of skin that are completely isolated from one area of the patient's body and used to resurface a remote full-thickness skin defect.[1-3] Skin grafts are usually considered for reconstruction of larger defects when there are few to no other viable repair options (see **NONGRAFTING OPTIONS FOR WOUND RECONSTRUCTION**), such as wounds that lack available adjacent skin and do not allow for primary closure, tension-relieving techniques, or simple local skin flap reconstruction. For example, axial pattern skin flaps are rarely able to extend beyond the more proximal regions of the extremities, particularly on the forelimb. Therefore, skin grafts are often chosen for sizable wounds on the distal extremities.

SKIN GRAFT HEALING PROCESS

Free grafts initially lack a vascular attachment when transferred to the recipient wound bed. These ischemic skin segments must survive the initial 36 to 48 hours after transplantation by absorbing liberated tissue fluid (mostly plasma) from the recipient bed via capillary action, similar to a sponge. During this period of plasmatic imbibition, the graft appears slightly cyanotic until capillaries from the recipient bed unite and sprout within exposed vessels on the deep surface of the graft to reestablish circulation in a process called inosculation.

In the ensuing several days, as undisturbed capillaries sprout and remodel, the surface color of the graft begins to turn from slightly purplish to more pink. At the same time, fibroblasts proliferate and begin to actively migrate from the recipient bed through a relatively weak fibrin layer "scaffold" toward the graft. Eventually, they produce a collagen bridge between the 2 surfaces, holding the viable graft securely in place. When successful, this process is known as a graft take.

FACTORS IN GRAFT SUCCESS AND FAILURE

Ensuring ideal conditions at the recipient bed

RESTORATION MISSON
Full-thickness meshed sheet grafting and punch grafting are 2 of the most common grafting procedures performed in small animal practices.

Nongrafting Options for Wound Reconstruction

Before skin grafting is undertaken, owners should be made aware of possible alternatives for wound closure. Successful outcome of a graft cannot be guaranteed, and grafts may not survive despite ideal conditions and technique. In addition, the owner must assume responsibility for proper postoperative care, especially bandage care, as this is a critical factor in ensuring eventual success.

Direct Flaps
In the author's hands, in select circumstances, direct flaps provide a highly successful option to close extensive extremity wounds even to the level of the paw.[1] These flaps use in situ donor skin in a remote region to close an extremity defect. The affected extremity containing the skin defect is brought up to an elevated donor flap or tunnel on the lateral chest or abdominal wall. The elevated flap is sutured to the recipient bed on the extremity. With time, the flap becomes vascularized and integrated onto the extremity defect. The donor flap skin attachment (pedicle) is divided in stages over a period of weeks to complete the transfer. Major disadvantages to this technique are that direct flaps require prolonged immobilization of the affected limb to the trunk, which may or may not be tolerated by the patient (especially cats), and they may require several staged surgical procedures, which may be costly.

Second Intention Healing
Second intention wound healing can be an option in some open limb wounds, although it is very slow and generally results in an unsightly scar. Defects near joints that are left to heal on their own may seriously impair limb function if scar formation is excessive or wound contraction is significant.

and strict adherence to bandaging and aftercare are just as important to eventual graft success as the actual grafting technique followed. Therefore, the surgeon's first priority is to carefully consider if and when the wound bed is suitable for grafting (**BOX 1**).

Although free skin grafts require a well-vascularized recipient bed for survival, granulation tissue formation is not an absolute necessity.[1] Immediate grafting of a fresh skin defect may be considered, but only when the bed is clearly suitable for free grafting, such as over a healthy muscle or periosteal surface with minimal evidence of surgical trauma, inflammation, or bleeding. However, a healthy, pink, smooth, nonexudative granulation bed is the ideal substrate for a skin graft take, and most successful surgeons prefer to wait until this has formed (**FIGURE 1**). Chronic granulation beds are pale and have a relatively poor vascular supply, so they are not considered good recipient beds for free grafting; they must be excised and allowed to re-form a suitable well-vascularized bed first.[1]

Fluid (e.g., blood, pus, or serum) accumulation under the graft can separate the graft from the bed and prevent or delay revascularization, which often results in graft death. Recipient beds that have undulating surfaces create poor contact between the graft and bed and can result in inconsistent inosculation. Likewise, islands of epithelium remaining on the recipient bed block capillary ingrowth to the graft directly above them. Infection of the bed can cause fibrinolysis and break down the early fibrin scaffold that temporarily fastens the graft to the bed. Absence of this scaffold effect prevents fibroblast migration, ultimately leading to a lack of strong collagen fixation between the graft and bed.[1]

BOX 1 Ideal Qualities of a Graft Recipient Bed

- Bed is free of foreign material
- Bed is free of epithelium and devitalized tissue
- Bed has a smooth surface
- Bed has a uniform healthy, red, vascularized surface
- Bed is free of hemorrhage, inflammation, and pus

KEY POINT

In the early stages of graft healing, before a firm collagen bond has formed, any motion between the graft and recipient bed "shears off" fragile capillaries attempting to revascularize the graft, greatly increasing the risk of graft necrosis. Proper bandaging and care and limited patient activity are essential to prevent this risk. Owners must be aware of these priorities before surgery.

TYPES OF SKIN GRAFTS

Free grafts can be applied as a sheet over an entire recipient surface area, or they can be applied to a bed as multiple smaller grafts in a variety of shapes and sizes, sometimes called partial coverage grafts.[1] Depending on the surgeon's resources and training, skin grafts may be harvested as split-thickness or full-thickness grafts.

Split- Versus Full-Thickness Grafts

Split-thickness skin grafts include epidermis and a variable amount of underlying dermal tissue. These thin grafts lack durability and hair growth and are more susceptible to contraction, but they generally take readily without significant risk of graft necrosis. An advantage of split-thickness sheet grafting is that even expansive harvested donor beds rapidly heal by adnexal reepithelialization, often without the need for surgical reconstruction. Split-thickness sheet grafts, however, require expensive specialized equipment and training for effective harvesting.

Full-thickness skin grafting does not require extensive experience or training and can be performed with readily available instruments from a standard general surgery pack. A full-thickness skin graft includes the entire dermis as well as the epidermis. Due to their greater depth, full-thickness grafts rely on plasmatic imbibition to a greater extent early in the process of healing, and sprouting capillaries take longer to fully spread and nourish the dermis. For this reason, full-thickness grafts may not take as consistently as split-thickness grafts.[1,4] Also, unlike split-thickness donor beds, most full-thickness donor bed defects require surgical closure.

Full-thickness skin grafts are preferred by many small animal surgeons because they are much more durable and cosmetic (they contain variable amounts of hair follicles and glands). In addition, when harvested as a sheet, they are less susceptible to secondary graft contraction, which is particularly important when grafting in the region of a joint to preserve mobility. In the author's experience, properly executed full-thickness skin grafts can achieve take rates comparable to those published regarding split-thickness grafts in small animals, particularly cats.[5]

Sheet Versus Partial Coverage Grafts

Sheet grafts are usually "meshed" (multiple full-thickness incisions through the graft) to allow for drainage and help the graft contour to the defect surface. If needed, meshing can also help expand the graft somewhat to cover more expansive defects (**FIGURE 1**). In such cases, mesh incisions created by a scalpel blade are oriented perpendicular to the direction needed for graft expansion.

Punch, pinch, strip, and stamp grafts are used to partially cover a recipient bed. These smaller grafts can be spread out over the bed to increase the total surface

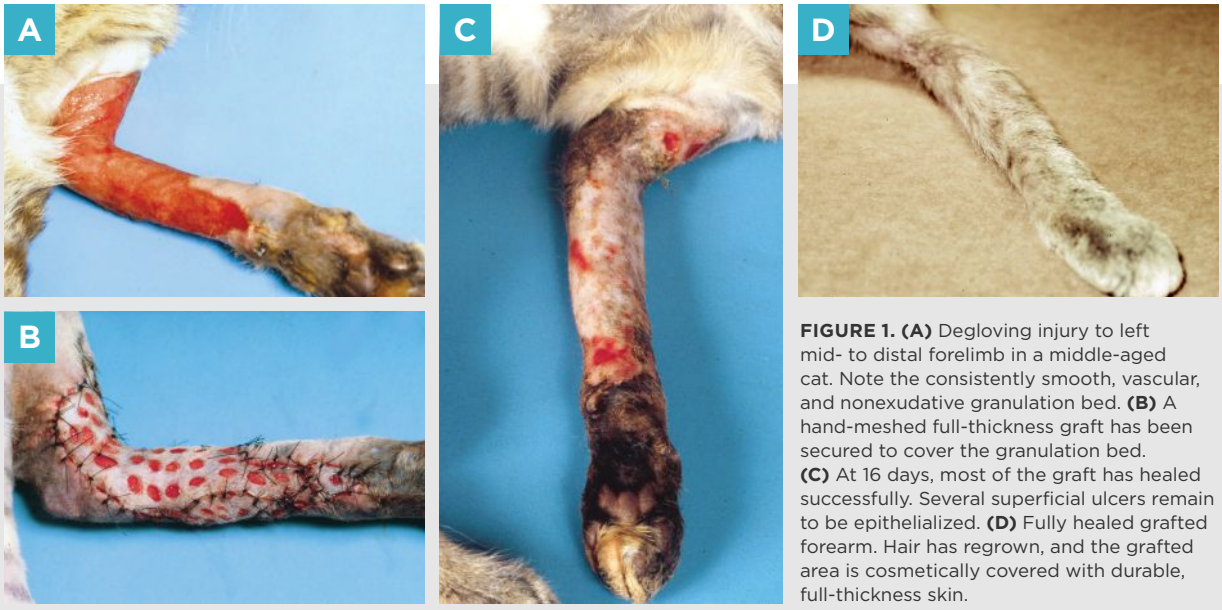

FIGURE 1. (A) Degloving injury to left mid- to distal forelimb in a middle-aged cat. Note the consistently smooth, vascular, and nonexudative granulation bed. **(B)** A hand-meshed full-thickness graft has been secured to cover the granulation bed. **(C)** At 16 days, most of the graft has healed successfully. Several superficial ulcers remain to be epithelialized. **(D)** Fully healed grafted forearm. Hair has regrown, and the grafted area is cosmetically covered with durable, full-thickness skin.

area a small harvested graft can cover. Open spaces between these smaller graft "islands" allow for drainage until the granulation bed is covered by migrating epithelial cells originating from the graft boundaries. When these grafts are nestled within the granulation bed (e.g., punch grafts), they can survive under less-than-ideal recipient bed conditions (**FIGURE 2**).

Smaller partial coverage grafts conform to irregular recipient beds and are relatively easy to place. The goal of these widely spaced graft segments is to rapidly epithelialize the wound defect. Unfortunately, the result is less than cosmetic and is much less durable when compared with full-thickness sheet grafts, so these grafts should not be considered for weight-bearing areas such as the paw or elbow. Partial coverage grafting techniques are described in more detail elsewhere.[1,3]

GRAFT PROCEDURE: STEP BY STEP

Preoperative Antibiotics

All granulation beds are contaminated with bacteria to some extent. Some surgeons routinely culture the wound bed before grafting to ensure the most appropriate antibiotic is chosen during the grafting procedure. The author does not routinely culture the bed provided it is fully covered with healthy granulation tissue and is nonexudative. The author prefers to apply a liberal amount of silver sulfadiazine cream over the area for 1 to 2 days before the proposed grafting procedure (bandages are changed daily). First-generation cephalosporin antibiotics are then given intravenously at anesthetic induction and repeated every 90 minutes until the procedure is completed so that high tissue levels are achieved during

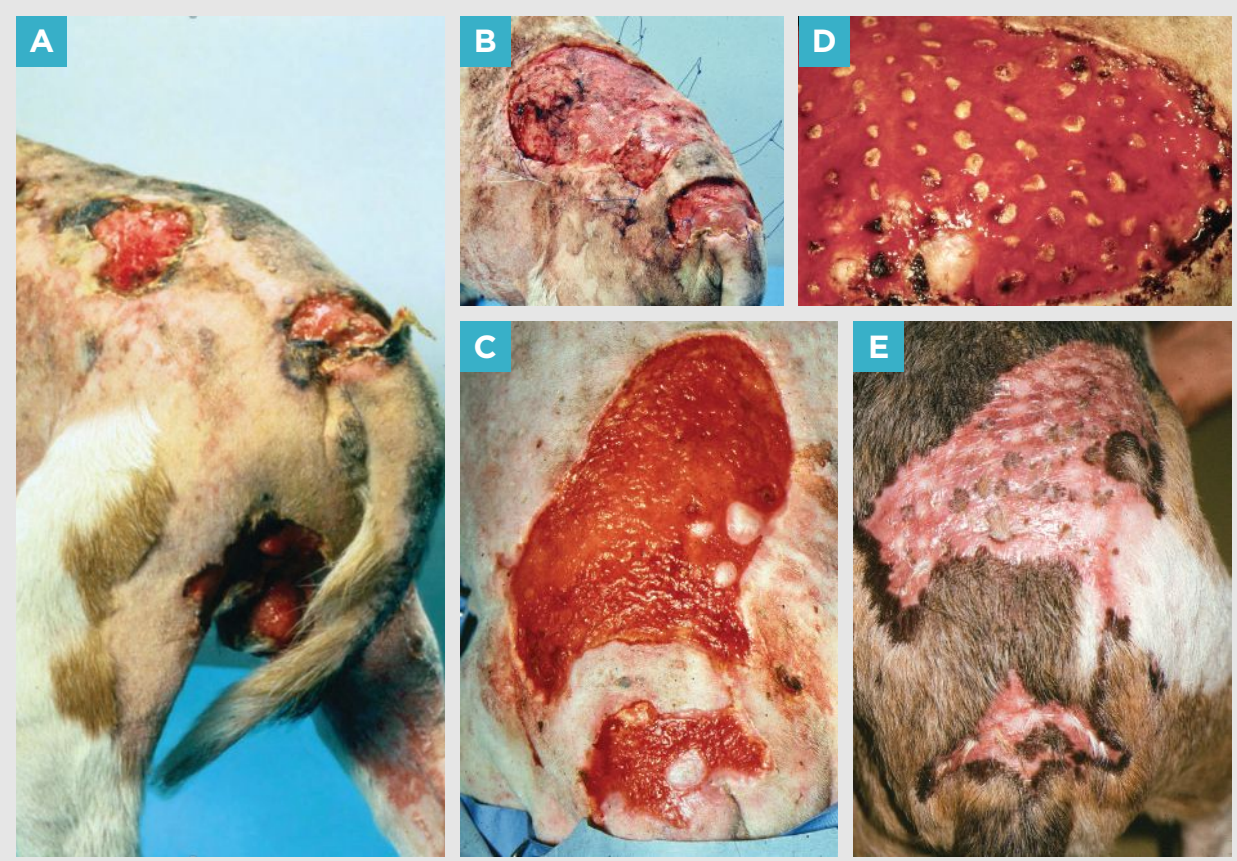

FIGURE 2. (A) Severe calcinosis cutis affecting the lumbosacral region in a beagle with Cushing's disease. **(B)** Dermal necrosis and infection of the affected region necessitated extensive full-thickness skin debridement and open wound management. The looped sutures were used for tie-over bandages in this challenging region to dress. **(C)** Following successful open wound management, the wound bed is covered with granulation tissue. Expanding islands of white epithelialized tissue can be seen within portions of the bed. **(D)** Small punch grafts can be seen evenly interspersed within a portion of the granulation bed 5 days after implantation. **(E)** Healed punch-grafted area at 5 weeks. Note there has been significant contraction of the original wounds, and the surface, while epithelialized, has sparse hair cover and is somewhat disfigured.

graft harvesting and application. Generally, postoperative systemic antibiotics are not considered essential, but if they are elected, they should not be continued for longer than 5 to 7 days after surgery.

Skin Graft Donor Site Choice

For sheet grafts, choose a donor site with ample surrounding loose skin to allow primary closure of the site without tension. The donor site should be in a location that allows access to both donor and recipient sites without having to alter the animal's position and should appear healthy with no evidence of trauma, inflammation, or infection. The author often prefers the lateroventral trunk region for a sheet graft donor site because the skin is of uniform thickness, there is usually plenty of surrounding skin, it does not contain a subdermal panniculus muscle layer, and achieving hemostasis is generally not an issue. However, nearly any region of the body with ample healthy, redundant skin can be used.

Surgical Preparation of Donor and Recipient Beds

On the day of surgery, the donor area is routinely aseptically prepared. Before liberally clipping hair from the region of the recipient site, coat the bed with sterile lubricating gel and then cover it with sterile gauze sponges. After clipping, the defect is cleansed and gently scrubbed with sponges soaked with a stock solution of 2% chlorhexidine gluconate diluted with saline (1:40) to create a 0.05% solution. Aseptically prepare the remaining skin surrounding the defect in a routine fashion.

Intraoperative Considerations

The procedure must be conducted under strict aseptic technique. The harvested graft and recipient bed must not be allowed to dry out at any time. While the recipient site is being prepared, the author wraps the graft in a moistened gauze pad that is secured with forceps to the cover drape so it is not accidentally discarded. Alternatively, the surgeon can prepare the recipient bed first and cover it with moistened gauze before graft collection. For efficiency, an assistant can close the donor site while the surgeon prepares and applies the harvested graft to the moistened recipient bed. When using sheet grafts, any islands of epithelialization in the wound bed should be sharply excised. In addition, any hemorrhage from the wound bed should be fully controlled and any debris removed before grafting.

Skin Graft Techniques

A full-thickness sheet graft is most often used in small animals because of its inherent durability and hair growth. Punch grafts are sometimes chosen when durable or cosmetic repair of a skin defect is unnecessary and the surgeon desires to hasten epithelialization of the wound bed. Punch grafts are easy to harvest, but the procedure is tedious when employed in larger defects.

Meshed Sheet Graft

BOX 2 outlines the key technical points of a successful sheet grafting procedure.

Design the Graft Template

After the recipient bed region and donor areas are widely clipped and aseptically prepared, design the sheet graft to completely cover the recipient bed with a uniform layer of skin.

First, wipe the skin around the recipient site free of moisture. Using sterile paper such as a surgical glove paper wrap or four-quadrant draping material, create a template of the recipient bed by pressing the paper

BOX 2 Key Technical Points for Meshed Sheet Grafting

- Keep the graft moist throughout the procedure
- Remove slightly more skin than the actual size of the recipient bed
- Ensure that the graft has no attached subdermal tissue (i.e., is properly defatted)
- Bathe the graft periodically with cool saline
- Cut staggered rows of full-thickness mesh holes in the graft
- Ensure that the graft is not applied too tightly or too loosely
- Ensure uniform contact between the graft and the bed
- Overlap the edge of the graft with the defect margin and secure it with fine sutures around the periphery

Punch grafts are easy and inexpensive to perform, and are considered "forgiving" due to the fact that if a number of grafts dislodge or do not survive, they can simply be replaced.

onto the moistened, raw wound surface and lifting to retain a moist impression of the defect. Cut out the template along the boundary of the impression area with scissors, and use a marking pen to indicate the direction of the desired hair growth in the recipient site.

Place the template over the selected donor skin site, orienting it such that the hair growth in the donor area is in the same direction as that marked on the template. Mark the donor site about 1 cm outside the border of the template to ensure adequate coverage since the graft, when harvested, can be expected to shrink somewhat. Redundant skin, if any, can be excised during graft placement.

Remove the Sheet Graft

Incise the proposed graft margins with a clean scalpel blade and sharply remove the graft at a level between the dermis and hypodermis. Avoid trauma and excess handling of the skin graft with thumb forceps during skin undermining; use skin hooks or stay sutures if needed. Control hemorrhage and cover the donor area with moistened sponges. Ideally, the donor site should be cosmetically closed *after* the graft is prepared and placed on the defect. If graft placement is delayed, store the graft in a moistened sponge that is secured to the cover drape with forceps.

Prepare the Graft for Placement

All subcutaneous tissue must be meticulously and fully removed from the deep surface of the graft (i.e., defatting). Fat removal can be achieved by anchoring the margins of the graft to a sterile piece of corrugated cardboard with the deep surface showing. Smaller grafts can be draped over a sterile 4-inch roll of Vetrap (3M, 3m.com) or the like. Stretch the graft on the chosen surface and secure it with stay sutures or skin staples placed evenly around the perimeter of the graft edge. The graft surface must be kept moist during the defatting process.

Either sharp Metzenbaum scissors or a #10 BP scalpel blade (preferred by the author) can be used to remove any remaining fat. The defatted cut surface of the graft should have a cobblestone or "stippled" appearance, and the graft should appear opaque when held up to a bright light.

Immerse the graft in a saline bowl to spot any remaining strands of fat that should be excised. All subdermal fat must be removed from the graft before its final placement in the bed. Some dermal adnexa will also be removed during the defatting process, and the amount of hair growth on the healed grafted area may appear accordingly sparse.

Place and Anchor the Graft

Place the graft with the epidermal layer surface up and create small (less than 1 cm), staggered, uniformly oriented, parallel, full-thickness scalpel incisions (preferably perpendicular to the desired direction for graft expansion if needed) throughout the graft to allow drainage of fluid collecting between the graft and bed. Ideally, the sheet graft should slightly overlap the edges of the bed to be sure all wound edges are covered. Fix the graft to the wound edges with 4-0 monofilament nonabsorbable sutures, allowing this overlap to remain. Sutures are not typically placed between the graft and the wound bed, although some surgeons do this in an attempt to limit any shifting within the central aspect of the graft.

Key Point

After suturing, sheet grafts must maintain even contact with the underlying recipient bed to help ensure effective revascularization. The sutured graft must not be under significant tension, which might inadvertently lift it off the bed, particularly on concave defects. The graft should shift along the bed surface just slightly when touched with a finger.

Punch Graft

This partial coverage grafting technique is best used when there is a thick granulation bed in the defect in which the grafts can be firmly seated (**FIGURE 2**).

Because these grafts are nestled within a pocket and surrounded by vascular tissue, the author often chooses this method when the recipient granulation bed is less than ideal or the patient has a systemic disease that increases the risk of infection or poor healing. Punch grafts are easy and inexpensive to perform, and are considered "forgiving" due to the fact that if a number of grafts dislodge or do not survive, they can simply be replaced. The goal is to cover the defect with skin graft plugs staggered and spaced evenly throughout the defect, about 1 to 1.5 cm apart.

Harvest the Grafts

Generally, a 6-mm Baker's punch is used to harvest the plugs of skin, generally from the shoulder or trunk area. Try to punch the skin on an angle parallel to the local hair shafts so any hair regrowth will lie down against the skin surface. If possible, note hair growth direction during harvesting so that when the plugs are implanted and properly oriented, hair growth will be in a uniform direction similar to surrounding skin.

Prepare the Grafts for Placement

Metzenbaum or iris scissors can be used to lift and cut each plug from its subcutaneous fatty attachments. Trim any remaining fat from the plug so that the dermis is fully exposed at the depth of the plug. This is highly important because fat left on the dermis will block inosculation and increase the chance of graft failure. Store the harvested skin plugs in moistened saline-soaked sponges, and close the small donor defects with individual sutures.

Place the Grafts

Use a 4-mm Baker's punch to core circular holes into the granulation bed. The smaller hole compensates for graft contraction after harvesting so that the grafts fit snugly. Sever the cored granulation plugs at the base using iris scissors or a #15 blade. If active bleeding is observed from the holes or pockets, plug them individually with sterilized cotton swabs for at least 4 to 5 minutes before applying the grafts. Otherwise, active bleeding tends to push the grafts from their foundation.

Insert each harvested skin graft into the granulation bed, ideally such that the epidermal layer is level with the granulation surface. When using this technique in thinner granulation beds, either cut the harvested skin plugs thinner to sit flat with the surface of the bed or insert them into angled pockets (instead of cores) made with a #15 blade. Some surgeons choose to fix each skin plug to the granulation bed with a single fine absorbable suture.

BANDAGING

After surgery using either technique, the site should be carefully bandaged so the graft remains immobilized. Most sheet skin grafts are applied to mid- to distal extremities, and bandages in these areas have a natural tendency to migrate distally. Bandages must not be allowed to shift distally at any time. Proper choice and application of the 3 layers of the bandage are essential to ensure graft survival.

First, liberally and uniformly apply a triple antibiotic ointment (oil base) to a nonadherent or low-adherence dressing. Ointments are chosen because they protect the graft from desiccation, and the antibiotic reduces bacterial proliferation. The author prefers a petroleum-impregnated fine-weave material for the low-adherence contact layer (e.g., Adaptic [3M, acelity.com]). Skin staples or tacking sutures can be used to secure the overlapping contact layer to the skin outside the grafted area to avoid shifting.

Next, apply unfolded 4 × 4 gauze sponges (4 × 8 lengths) in a spiral fashion around the contact layer in 2 layers and use sterile, self-adherent rolled gauze (e.g., Kerlix [Covidien, medtronic.com]) to secure the pads around the extremity or area that was grafted. Layer nonsterile cast padding on top, moving from the toes proximally, until a thick, firm secondary absorptive layer is created. Depending on the graft region, the bandage is generally extended above the adjacent joint in the process of application. Use an additional layer of gauze to create a firm, cohesive secondary contact layer.

Finally, apply an outer tertiary layer of elastic wrap (e.g., Elastikon [Johnson & Johnson, jnjsportsmed.com]) to cover and protect the underlying bandage layers. Adhesive tape or elastic wrap can be used to secure the bandage to the fur or skin to prevent slippage. White adhesive tape is often applied on the distal aspect of the limb and used as "stirrups" to additionally secure the bandage.

Additional measures (e.g., slings, meta-splints, reinforcement rods) to immobilize the graft and limb are applied as indicated based on the location of the graft area if additional rigidity and support are

Sedation of hyperactive patients may be warranted during the healing period.

necessary. Tie-over dressings are quite effective at immobilizing grafts in difficult areas such as the thigh, sacral, or perineal regions. If the surgeon is familiar with negative-pressure wound management, this technique can be highly effective at firmly immobilizing the graft to the bed, particularly in areas where bandaging can be difficult.[6]

AFTERCARE

Avoid excessive or unnecessary bandage changes in the early postoperative period. Generally, the bandage is changed after surgery if there is strikethrough or if the bandage becomes soiled or wet or migrates. Otherwise, without these conditions, the author prefers to wait 3 to 5 days for the first bandage change to avoid disrupting the critical early healing phases of the graft.

Sedation or anesthesia is recommended for bandage changes to avoid traumatizing or shifting the fragile graft during bandage removal and reapplication. Take special care to avoid lifting or shifting the graft from the underlying bed, particularly when changing the contact layer. If the bandage layers are stuck together during the bandage change, soften them first by soaking them in warm, sterile saline, then peel the separate layers off slowly.

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Carefully inspect the graft and irrigate it with sterile saline before applying a new bandage, following the description above. Viable grafts appear pink to lavender in color. Dead grafts have a black or off-white appearance and are generally not firmly adhered to the bed. However, during the first bandage change, do not become overly concerned if the graft is somewhat discolored or pale. Discolored graft skin should not be removed prematurely, since underlying hair follicles and deeper skin adnexa often survive and serve as islands for epithelialization.

After the initial critical bandage change, if healing appears to be proceeding appropriately, subsequent changes can be planned every 3 to 5 days. Bandages are kept clean and dry throughout the postoperative period. A plastic IV bag can be placed over the distal bandage when exposure to wet surfaces is expected but should not be left for more than several hours at a time.

Sedation of hyperactive patients may be warranted during the healing period. Any motion of the affected limb can cause the inner bandage layers to rub against the graft, which can be catastrophic; therefore, physical activity should be kept to an absolute minimum, especially for the first 5 days. The author usually hospitalizes patients until the first bandage change has taken place. After the first change, dogs are confined to a cage at home and leash-walked when taken outdoors to void only. Cats should be confined to a cage or carrier if possible. Generally, healing is complete at 2 weeks after grafting, at which point the graft can be either left uncovered or bandaged with a light padded wrap if the patient is active or a known "chewer." TVP

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CONTINUING EDUCATION

Wound Reconstruction Techniques: Free Skin Grafts

TOPIC OVERVIEW

This article provides an overview of how skin grafts heal, tips for avoiding graft failure, and a description of full-thickness meshed sheet and punch grafting.

LEARNING OBJECTIVES

Upon completion of this article, readers should be able to:

- Explain the process of skin graft healing, how to avoid common factors that impede the healing process, and when to choose skin grafting to treat a wound
- Identify the area(s) of the body where full-thickness sheet grafts are most commonly employed in small animals and other available surgical options
- Describe the characteristics of an ideal recipient graft bed and explain the proper technique for skin grafting and bandaging

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1. **True or false: Free skin grafts differ from skin flaps in that grafts have no vascular supply.**

2. **True or false: The placement technique is more important to graft success than the condition of the graft bed at the time of grafting.**

3. **Under optimal circumstances, how many days does a typical skin graft rely on plasmatic imbibition to stay alive before significant inosculation takes place?**
   a. 1 day
   b. 2 days
   c. 3 days
   d. 4 days

4. **What is the best course of action if, during the first bandage change, part of the graft is dark colored (almost black)?**
   a. This is normal at the first bandage change; no action is needed.
   b. This indicates the graft is dead; it should be debrided entirely and left as an open wound.
   c. This is cause for concern, but the black surface tissue should be left in place at this time.
   d. This is cause for concern, and the discolored area should be removed, leaving the other areas that are pink.

5. **Which characteristic indicates that a graft may be failing during the first bandage change at 5 days?**
   a. The surface of the graft is moist.
   b. The color of the graft is pink.
   c. The graft shifts and is not adhered to the bed.
   d. The graft is edematous.

6. **Which is not a characteristic of an ideal graft bed?**
   a. A surface devoid of epithelialized tissue
   b. A smooth surface
   c. Red, well-vascularized granulation tissue
   d. A pyofibrinous surface

7. **Which of the following statements about sheet skin grafting is true?**
   a. Graft skin should not overlap the surrounding skin around a defect.
   b. Graft skin should have a smooth layer of fatty hypodermis.
   c. Graft skin surface area should be slightly larger than the defect surface area.
   d. Graft skin should be under significant tension when sutured to prevent shifting on the graft bed.

8. **What is an ideal contact layer for a sheet or punch skin graft?**
   a. Dry 4 × 4 gauze
   b. Triple antibiotic–coated, petroleum-impregnated fine weave gauze
   c. Triple antibiotic–coated 4 × 4 gauze
   d. Telfa pad

9. **Which of the following postoperative care steps is inappropriate for a patient that has received a skin graft?**
   a. Leash walks after surgery to help stimulate vascularization of the wound bed
   b. Strict confinement throughout the healing period, particularly the first 5 to 7 postoperative days
   c. Using a waterproof cover over the bandage when the patient is outside to void
   d. Careful daily monitoring of the bandage for any shifting, fluid strikethrough, or patient discomfort

10. **Generally speaking, on which postoperative day should a bandage be first changed if it is well taken care of and there are no signs of strikethrough?**
    a. Day 1
    b. Day 1 to 3
    c. Day 3 to 5
    d. Day 5 to 7