Skin and Composite Grafting Techniques in Facial Reconstruction for Skin Cancer

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KEYWORDS

• Skin graft • Composite graft • Skin cancer • Mohs reconstruction • Facial reconstruction • Melanoma • Local flap • Cartilage

KEY POINTS

- In Mohs reconstruction, full-thickness skin grafts are generally preferred over split-thickness grafts due to decreased contracture and improved color, contour, and texture.
- A variety of modifications to grafting technique can improve graft survival, restoration of normal contours, functional outcomes, and overall aesthetic results.
- Because grafts do not carry their own blood supply, optimizing recipient site conditions with a vascular bed is of paramount importance, particularly when performing composite grafts.
- Skin and composite grafts may be combined with other approaches to minimize distortion and optimize cosmetic subunits.

OVERVIEW OF SKIN ANATOMY IN RELATION TO GRAFTING

The skin is the body's largest organ, and it varies widely in thickness and character across the anatomic regions of the face. Successful grafting is predicated on a basic understanding of this functional anatomy. The skin's epidermis includes basal cell, prickle cell, granular cell, and keratin layers, and the epidermis attaches to the dermis via the basement membrane, which is the anatomic landmark that differentiates in situ or preinvasive lesions from invasive cutaneous malignancy. The dermis, in turn, affords skin most of it tensile strength. The dermis is penetrated by epidermal appendages, blood vessels, nerves, and cells. The richly vascularized and innervated pilosebaceous units include sebaceous glands, hair follicles, and arrector pili muscles that contain stem cells and have substantial regenerative potential.[1] The fibroblasts found in the dermis facilitate wound contraction during healing and produce collagen, elastin, and ground substance. Epithelialization of cutaneous defects occurs from wound edges and the basement membrane along hair follicles and adnexal structures. Blood supply derives from both a deep subdermal plexus and a superficial plexus that supplies the superficial dermal papillae.[2]

The skin serves a role as both graft and recipient in most cases of reconstruction. There are a variety of situations where skin grafts are indicated, and grafts are particularly useful for resurfacing superficial defects. Full-thickness skin grafts are also helpful in young patients who have tight skin and sizable defects that are not readily amenable

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to adjacent tissue transfer. Although skin grafts often minimize the need for additional facial skin incisions, they are susceptible to developing a "patchlike" appearance due to mismatch of color, contour, or texture if not carefully planned. Because of such concerns, skin grafts are used judiciously, proving especially useful in cases that cannot be reconstructed with a local flap or where major distortion would ensue. With thoughtful application of the principles presented herein, many patients can benefit from these aesthetic approaches. As evidence-based approaches evolve in facial plastics,[3] grafting practices should become more consistent so as to achieve optimal outcomes.

Skin grafts may be harvested as full-thickness, split-thickness, or composite grafts with or without hair-bearing skin. The viability of the graft depends on the vascular supply to the recipient bed, thickness of the graft, appropriate compression of graft to recipient site, and patient factors, such as smoking, hypoxemia, diabetes, radiation, and history of prior surgery at the site.[4] Exposed bone, tendon, and cartilage all decrease the probability of successful graft survival. Some irregularity at the junction of skin grafts and surrounding skin is common. When patients are routinely counseled preoperatively regarding the potential role for postoperative dermabrasion or other similar refinements, there is greater acceptance of procedures to achieve optimal match and camouflage of the reconstruction.

RECIPIENT BED PREPARATION

Several technical refinements may improve skin grafting outcomes. Meticulous attention to sterile technique is crucial, because infection greatly increases the likelihood of graft loss. Free grafts are particularly vulnerable to infection, because they do not carry their own blood supply. A variety of approaches may be used for bolstering, including conventional tie-down bolster, quilting sutures, and use of custom contoured compressive dressing. Nobecutane spray may also be used as a transparent antibacterial dressing that

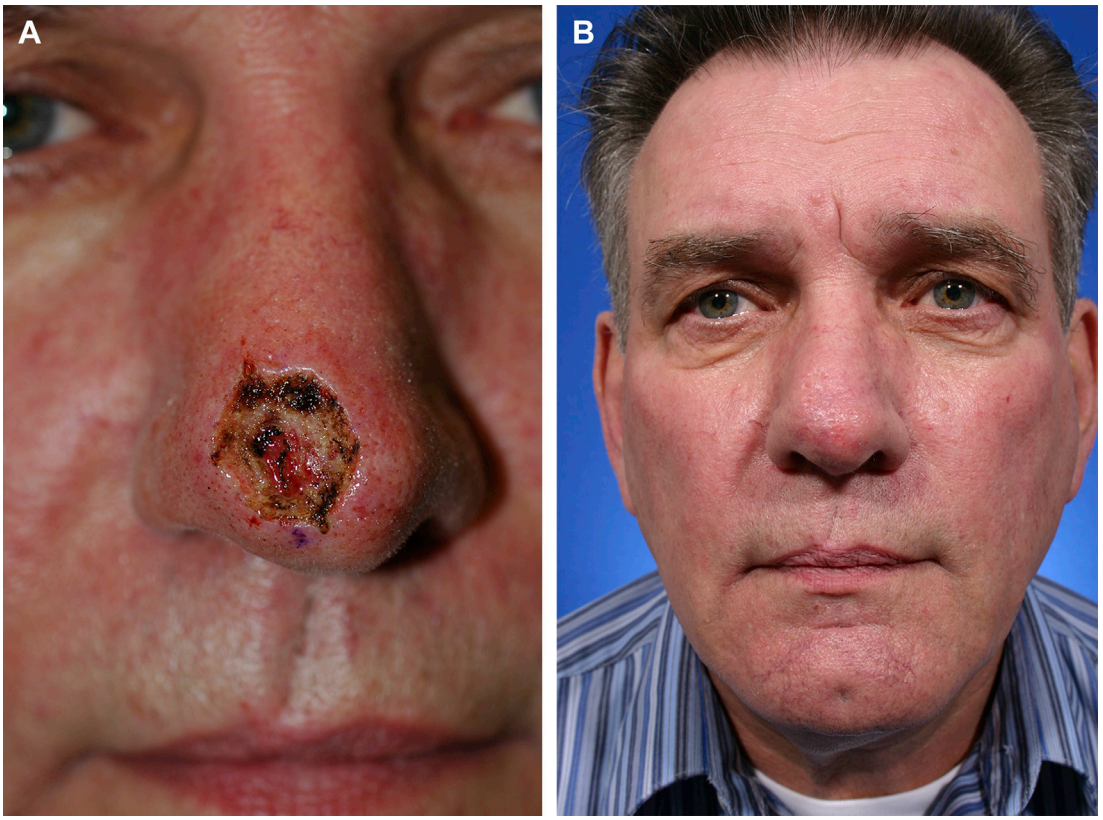

Fig. 1. (*A*) A 1.5-cm superficial defect of paramidline nasal tip after micrographic excision of carcinoma. (*B*) Defect repaired with full-thickness skin graft. Reconstruction with skin graft achieves favorable color and contour match, despite resurfacing only the resected portion of the nasal tip unit. Skin grafting avoided the alar distortion that would likely occur with local flap to a sizable defect at this location.