

Reuse of Skin Graft Patches for the Coverage of Skin Defects

Yusuf Kenan Coban, MD,* Nazim Gumus, MD†

A skin graft contains squamous epithelium, which spreads in a radiating outward fashion on the wound surface. This movement of epithelium results in the healing of a defect area. Split-thickness skin grafting is used widely for wound coverage. This type of graft is one of the best alternatives in the repair of large wounds resulting from burn and avulsive injuries, which may affect a large body surface area. The use of mesh techniques in skin grafts can effectively enhance the surface area coverage by epithelization heals the interface of the grafts. On the contrary, a small skin island surrounded with granulation tissue also can produce an epithelization center that heals the defect by epithelization in a radier fashion. At this point, it can be logical to reuse a skin graft patch after its first application to the wound because skin grafts can be taken from their wound bed at 7 to 8 days postoperatively, while the ingrowth of fibrous tissue and vessels into the grafts is continuing. At that time, some epithelization has formed around the original skin graft patch. Therefore, taking a skin patch from its bed after surrounding epithelization has formed allows the patch to be ready to be used again in another area of wound coverage.

The same tissue or organs have been used more than once for different surgical aims.^{1,2} Cornea, saphenous vein graft, bone graft, and cardiac valves were implanted again in the same patients because graft disposition, hematoma, stenosis, or other causes required us to resuse skin graft tissue. In this study, a piece of skin graft was used two or three times as a source of squamous epithelium for the coverage of skin defects. Although this reuse is well-known procedure, the literature lacks any information about reuse of skin graft patches for defect coverage.

From *Kahramanmaraş Süteü İman University, School of Medicine, Plastic Surgery Department Kahramanmaraş, Turkey; and Numune Hospital, Plastic Surgery Department, Adana, Turkey.

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MATERIALS AND METHODS

Three patients, ages 4, 13, and 27, who had burn wounds at two different anatomical areas were examined in this study. The first patient was female, and the others were male. There were feet wounds in two patients and lower-extremity burns in one patient. Granulation tissue formed in all of the patients' wounds after wound care, dressing, eschar excision, and treatment of infections. Split-thickness skin grafts were divided into diameters of 1 to 2 cm². These patches were put on the wound surface at a 1- to 2-cm distance from each other in only one anatomical area (Figures 1A, 2A, and 3A). Then, a tie-over dressing was used and immobilized by a splint for 5 days. On the sixth day, the first dressing was changed, and then the other dressing change was made 3 days later. After the sixth day, the skin graft was harvested on the wound surface, and these grafts were implanted on the other anatomical defect sites or at a different location of the same region (Figure 1B and C, Figure 2A, and Figure 3A). This way, the same graft patch was used two or three times for the coverage of different defects. After the removal of graft patch, a new skin defect grew on the wound. This defect and others were covered by the spreading of remnant squamous epithelium, which was located in the margin of the graft patch (Figure 1D).

RESULTS

A skin graft patch was removed from the nearly granulated area by using a blade on the sixth day. This tissue was examined histopathologically under the light microscope. We observed the spread of squamous epithelium from near the graft margin to the wound surface (Figure 4). All of the defects were covered by graft patches and secondary epithelization without any extra skin grafting procedures. A skin graft piece was implanted two or three times, and loss of the graft was not observed. Feet wounds were closed in 3 weeks, and lower-extremity defects healed in 6 weeks (Figure 1E and F, Figure 2B and C, and

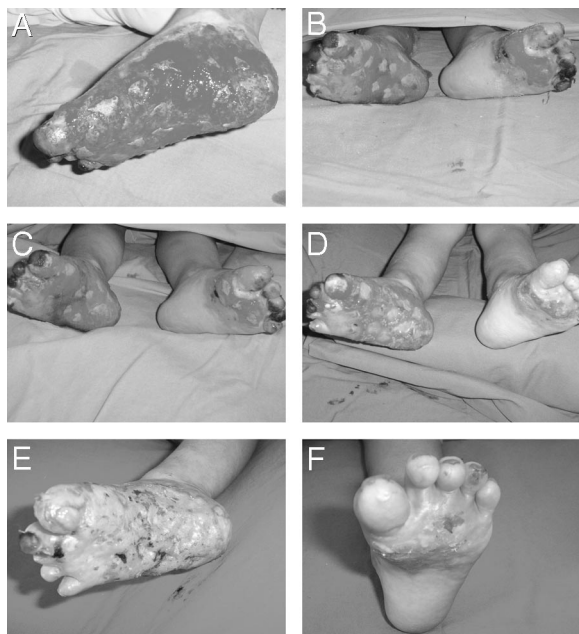


Figure 1. A. Right foot skin defect was grafted with split-skin pieces. All of the grafts were placed approximately 1 to 2 cm from each other. B. Appearance of grafts and foot on the seventh day after grafting. C. Appearance of grafting from right foot to left foot on 7th day after first grafting. D. Appearance of skin wounds 2 weeks later. E. Epithelization completed on right foot wound after 3 weeks. F. Appearance of left foot wound and skin grafts.

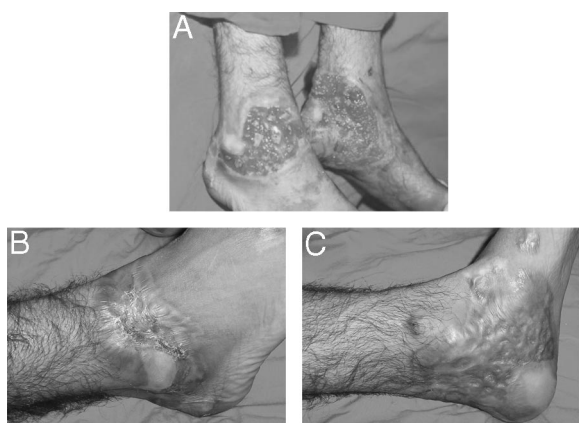


Figure 2. A. Appearance of re-grafting from left foot to right foot on sixth day after first grafting. B. In the same patient, right foot defect closed. C. In the same patient, left foot defect closed.

Figure 3B). A popliteal contracture occurred in a patient with thigh and leg burns 4 months later (Figure 3B). Z-plasty was required for the correction. The healed skin developed a “cobblestone appearance,” which did not look good cosmetically, but there was no excess scar formation. All patients wore burn garments to prevent the formation of hypertrophic scars.

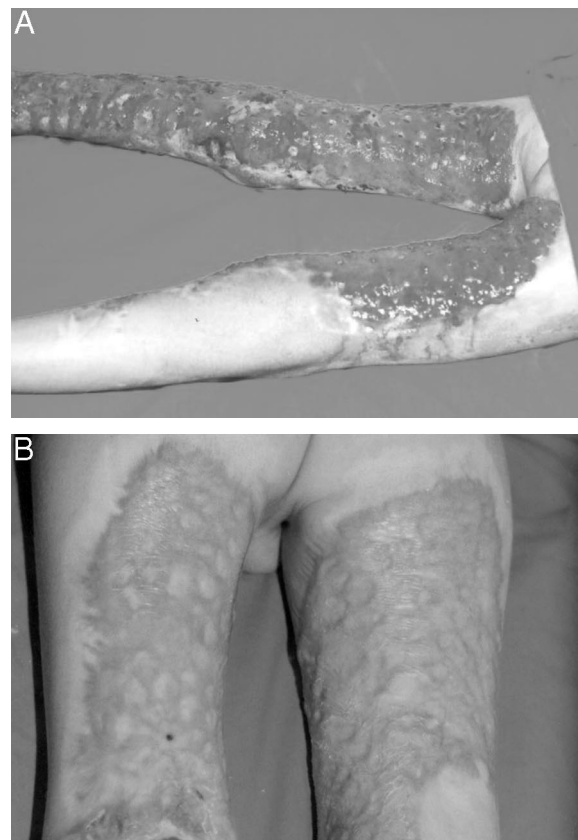


Figure 3. A. Appearance of lower-extremity skin defect and re-grafting from left to right. In this patient, skin graft pieces were reused in the same wound to decrease the distance between patches. B. Appearance of same patient's at a later time.

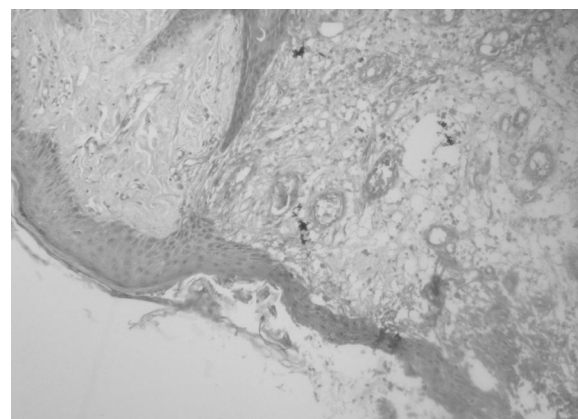


Figure 4. Appearance of histopathological finding of skin graft and near granulation tissue on sixth day after grafting. Note the spreading of squamous epithelium over granulation tissue. Hematoxylin and eosin, magnification $\times 100$).

DISCUSSION

Stamp skin graft, patch graft, mesh graft, microskin graft, and expended stamp skin graft are different

types of split-thickness skin grafts. They have proved to be effective treatments for major skin defects when the area of available donor skin is inadequate.³⁻⁸ All of these skin grafts cover the wound surface in two different ways. First, the graft closes itself on the surface and second, secondary epithelization covers the defect. The first dressing after grafting was made on the sixth day, and a biopsy was taken for the investigation of epithelium spreading from the graft margin to a wound surface. Histopathologic examination demonstrated that there was epithelial proliferation in the graft margin and that it was spreading on the defected area.

Clinically, after the elevation of graft, epithelial remnants migrated on the wound, and then healing was completed. In later dressings, new epithelium became visible on the graft margin and this finding showed that the possibility of epithelial migration was more than before. Similar results were observed by Varma et al.⁵ In their study, at the first dressing on the fifth postoperative day, there was no evidence of the graft taking, but there was clear evidence of skin islands on subsequent dressing changes 11 days after surgery.

Squamous epithelium migrates over either the skin graft margin or intact skin margin. The healing process is completed by the epithelial migration between the patches. This process is very useful in the closure of larger areas than the harvesting graft size. Lin and associates³ demonstrated that, to improve the healing process, the interpatch distance was better kept within 5 mm for microskin graft. According to this study, the possible longest interpatch distance is related to the expansion ratio and the size of the microskin patch, and when the patch side-length is doubled, then the interpatch distance will be doubled. Because we used bigger skin grafts than a micrograft, the interpatch distance was determined to be 1 to 2 cm, and the longest interpatch distances were divided

with reimplantation of skin graft pieces for rapid coverage of the area.

Widely expanded postage stamp grafts are described by Meek.⁹ This technique uses small pieces of skin graft and has proved to be an alternative to mesh grafts.⁴ In our study, small pieces of skin graft also were used, but we preferred to use them in a different way. Skin grafts were reused two or three times. It may be another alternative for the coverage of wounds in some clinical situations in which general anesthesia was not possible for systemic reasons to have a skin graft operation of the patient. Small skin grafts may be taken from the wounds at the bedside. The most striking disadvantage of this method is that it needs much more prolonged healing time when compared with standard skin grafting operations. We believe that this kind of grafting may be applicable in some selected clinical situations.

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