

Bilateral Subcutaneous Island Pedicle Flap for Closure of Lower Extremity Surgical Defects

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The closure of some lower extremity surgical defects may challenge the dermatologic surgeon. This is especially the case with older patients who have severely atrophic, friable skin that makes suture placement difficult if there is any wound tension.

We describe the bilateral subcutaneous island pedicle flap as a suitable closure technique for lower extremity defects when primary linear or layered closure is not an option. In our case report, 2 triangular flaps on opposite sides of the defect were incised down to the subcutaneous tissue, advanced into the surgical defect, and sutured into place with buried subcutaneous sutures.

This repair is an excellent consideration for thin skin resembling tissue paper in which minimal wound tension is necessary for sutures to hold properly. The bilateral subcutaneous island pedicle flap is a versatile, effective means of repairing many lower extremity defects when primary linear or layered closure is not an option.

A variety of repairs has been described for closure of surgical lower extremity defects. These include second intention, full- and split-thickness skin grafts, rotation flaps, triangular flaps, and primary closures, side-to-side layered closures, or simple closures. The bilateral subcutaneous island pedicle flap, or bilateral V-Y advancement flap, is shown to be a versatile, effective means of repairing many facial defects following excisional surgery and has been widely described for defects of the ear, nasolabial fold, and lip area.¹⁻³ We demonstrate how this repair may also be considered for closure of lower extremity defects.

In many instances, skin on the lower extremities is very friable secondary to epidermal and dermal atrophy

that occurs over time. When repair of these defects is attempted with a primary or complex layered closure, tension causes the suture to tear through the cutaneous tissue. When this occurs, other methods, such as second intention, adjacent tissue transfer, grafting, and the bilateral subcutaneous island pedicle flap, must be considered. The bilateral subcutaneous island pedicle flap is an excellent choice because it has reduced tension for closure compared with primary linear or layered closure and has better vascular supply than a graft.

The bilateral subcutaneous island pedicle flap has advantages over other closure techniques that make it well suited for many lower extremity defects. One advantage is that the bilateral subcutaneous island pedicle flap is smaller than a standard advancement flap and, because the tissue is mobilized without having to elevate the central portion of the flap, does not require as much undermining as other cutaneous repairs. Less undermining limits complications, such as hematoma and nerve damage, and increases the surrounding vascular supply, thereby reducing the risks of ischemia and wound dehiscence. This especially benefits patients taking

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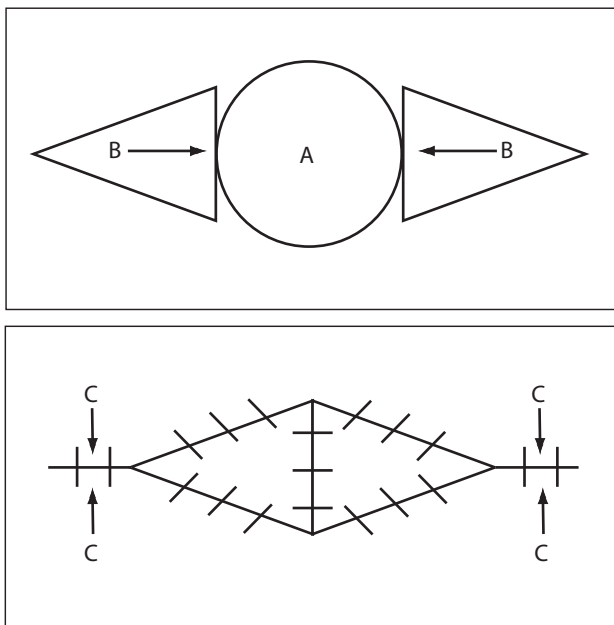


Figure 1. Closure of a defect with a bilateral subcutaneous island pedicle flap, with A indicating the surgical defect, B indicating the 2 triangular flaps that are cut and advanced into the surgical defect and sutured into place. C indicates secondary defects created at the apex of the flaps that are repaired with a V-Y closure.

anticoagulant medication or who have a bleeding diathesis.¹

Because there is only one area to heal, the bilateral subcutaneous island pedicle flap has a faster healing rate, resulting in a lower chance of infection as compared with a traditional graft. A Burow wedge graft also has no second distant site to repair; however, this graft has no pedicle attachment and therefore has less vascular supply and a higher risk of necrosis compared with the bilateral subcutaneous island pedicle flap.

Another advantage is that the bilateral subcutaneous island pedicle flap has less stress and motion on adjacent tissue surrounding the defect as compared with a traditional primary closure because the pedicle is pulled and pushed into place. In addition, the flap depends on a generous fatty layer, making the lower extremities an excellent choice for this type of repair. Also, the flap optimizes tissue match by using tissue immediately adjacent to the defect, making it more cosmetically favorable than techniques such as a graft or distant flap. Finally, the flap maximizes tissue conservation by using tissue that may otherwise have been discarded, such as in a side-to-side closure with Burow's triangles.

METHOD

Figure 1 models the procedure in which minimal superficial undermining is performed postexcision around the defect, which allows the best line of closure depending on the lines of tension. Two triangular flaps of the same



Figure 2. Patient with squamous cell carcinoma on the upper leg (A), with a surgical defect post excision (B). Triangular flaps are advanced into the defect, meeting in the middle (C), with the triangular flaps sutured into place (D). Patient one month after bilateral subcutaneous island pedicle flap closure (E).

size are identified on opposite sides of the defect and marked with gentian violet. Both triangles are carefully incised down to the subcutaneous tissue. The incisions are made such that the base of each triangle borders the defect and the triangular flaps, or islands, are completely separated from the surrounding skin. Careful dissection around the triangular flaps is performed, ensuring that a small vascular pedicle is retained medially, allowing for maximum mobility. The flap incisions are carried through the epidermis, dermis, and fat to the muscle fasciae. Tissue advancement may be facilitated by undermining the margins of both the defect and the flap.

Using a skin hook, the triangular flaps are then advanced into the surgical defect to meet in the middle and sutured into place with buried subcutaneous sutures. The bases of the flaps are sutured at their centers. The secondary defect created at the apex of each flap is then repaired with a V-Y closure. Small defects (0.5–1 cm) are repairable with a single bilateral subcutaneous island pedicle flap; however, many larger defects will require the use of 2 flaps to provide complete closure. The flaps sometimes require minimal resurfacing with an erbium:YAG or carbon dioxide laser to provide the optimal cosmetic outcome.⁴

RESULTS

The patient in this case report was a 64-year-old male with a history of squamous cell carcinoma on the lower extremities. The patient presented with a 6-month history of a rapidly growing lesion on his left anterior thigh. The lesion was excised and the defect was repaired successfully with bilateral subcutaneous island pedicle flaps (Figure 2).

LIMITATIONS

The bilateral subcutaneous island pedicle flap may cause more additional scarring than other closures, which may warrant postoperative laser resurfacing or dermabrasion. The flap closures have a higher risk of necrosis than simple layered closures, especially in patients with poor vasculature or predisposing vascular disease. In some patients, a complex layered closure may be a better option because it is a quicker closure, thereby reducing the risk of wound infection.

CONCLUSION

The relatively reduced amount of vasculature and the higher amount of tension limit the closure options for a lower extremity defect. We demonstrated that the bilateral subcutaneous island pedicle flap is a versatile, effective means of repairing many lower extremity defects in addition to repairing facial defects, which previous studies support.¹⁻⁵ Thus, strong consideration should be given to repairing many lower extremity defects with the bilateral subcutaneous island pedicle flap when primary linear or layered closure is not an option.

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