

# Flap Coverage of a Chronic Hallux Ulcer

For nonhealing, noninfected plantar ulcerations of toes, flap coverage can be a viable alternative, providing there is adequate vascular supply to the digit. This article presents an interesting case, wherein the digital ulcer was covered with a flap from the same toe. The flapped area was then covered with a skin graft.

Tzvi Bar-David, DPM<sup>1</sup>  
Keith R. Springer, DPM, FACFAS<sup>2</sup>  
Robert Tournambe, MD<sup>3</sup>

Simple and complicated skin flaps are a well-accepted method for covering defects and ulcerations on the foot. Most of the literature has concentrated on heel and plantar defects. The literature describes digital flaps rotated to cover more proximal ulcerations (1, 2). Although digits may have a small surface area and limited means of circulation, in certain situations flap coverage of a chronic ulcer may be the preferred method of treatment. This is applicable in the hallux, wherein maintenance of the first metatarsophalangeal joint (MPJ) function is critical.

It is well documented that first MPJ motion is essential during the propulsive phase of gait (3). When this joint is dysfunctional, there is an alteration in the weightbearing forces, with a greater distribution of weight to the lesser MPJ's and to the hallux interphalangeal joint (IPJ). In the insensitive or compromised foot, this often leads to new ulcerations and further complications. Flap coverage of a hallux ulcer can prevent amputation and thus maintain a functionally adequate weightbearing distribution.

## Case Presentation

A 65-year-old white male presented to Cabrini Medical Center for treatment of a chronic nonhealing mal perforans ulcer on the plantar aspect of the interphalangeal joint of the right hallux (Fig. 1). The ulceration began 6 months prior to admission. Gross infection with cellulitis and systemic manifestations were never

present, and cultures routinely taken were negative. Significant medical history included atrial fibrillation, which was well controlled with quinidine sulfate, and excessive alcohol abuse. Significant surgical history was a McBride bunionectomy of the involved foot 10 years prior.

Clinically, the patient had a hallux rigidus, with no motion at the first MPJ. Vascular studies were all normal. He was neuropathic bilaterally due to his excessive alcohol use. The ulcer was 1.5 cm. in diameter, located directly plantar to the IPJ and extended to bone. There was a poor granulation base and a surrounding fibrotic rim. Standard radiographs demonstrated severe degenerative joint disease of the first MPJ. There was no evidence of osteomyelitis or proximal Charcot disease. Gallium-67 citrate scan was also negative.

Standard laboratory admission tests (complete blood count with differential, SMA 18, and urinalysis) were all normal. The diagnosis was mal perforans of the IPJ secondary to hallux rigidus and alcoholic neuropathy.

The authors' goal was closure of the ulcer and regaining first MPJ range of motion. This would be accomplished by staged procedures. If closure of the ulcer failed, amputation may be necessary. The first stage of treatment was excision of the ulcer with bone biopsy and wound cultures.

Intraoperative wound cultures demonstrated *Staphylococcus aureus* and *Escherichia coli* sensitive to all antibiotics. The bone culture was negative, and bone biopsy demonstrated findings consistent with chronic inflammation. Since the ulceration was deep, the authors believed that anaerobes might be present, and he was placed on Timentin.<sup>4</sup>

After 2 weeks of strict nonweightbearing, local care, and intravenous antibiotics, the patient returned to the operating room. The ulcer was debrided to a healthy bleeding base, and from the lateral aspect of the great

From the Department of Surgery, the New York College of Podiatric Medicine, New York, New York.

<sup>1</sup> Assistant Professor.

<sup>2</sup> Professor, Diplomate, American Board of Podiatric Surgery. Address correspondence to: 55 East 124th Street, New York, New York 10035.

<sup>3</sup> Attending Plastic Surgeon, Cabrini Medical Center, New York, New York.

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<sup>4</sup> Smith Kline Beecham, Inc., Pittsburgh, Pennsylvania.



**Figure 1.** Chronic nonhealing ulcer of the plantar aspect of the right hallux.

toe, a proximally based full thickness rotational flap of ~2.5 cm. in length and 1.0 cm. in width was created, and rotated to cover the ulcerative site (Fig. 2). The donor site was covered with a split thickness skin graft obtained from the contralateral thigh.

After 1 week, the flap and graft seemed to have taken. A Keller arthroplasty with remodeling of the first metatarsal head was performed. The patient was maintained for 72 hr. of strict bed rest with leg elevation.



**Figure 2.** Proposed flap coverage over the ulcer, with a skin graft to cover the donor site.



**Figure 3.** One month after the flap coverage of the ulcer, with the skin graft covering the donor site.



**Figure 4.** One year after surgery. The flap and graft have completely taken and covered the defects.

The patient was discharged 1 month after admission. Partial weightbearing in a wooden shoe was initiated 3 weeks after the final procedure. The patient continued

to heal (Fig. 3) without any complications and returned to regular shoes in 2 months. At 1-year follow-up, the hallux had completely healed, and the patient returned to his regular activities (Fig. 4).

### Summary

Flap coverage of chronic nonhealing digital ulcerations is a viable treatment option, providing there is sufficient vascular flow to the involved area. If primary flap coverage had not been performed, exposure of the bone may have led to osteomyelitis. In this specific situation, flap coverage alone might not have been sufficient to prevent reoccurrence because of the pressure exerted on the IPJ when hallux rigidus is present. Staging of the procedures with flap coverage followed by joint remodeling proved to be an appropriate surgical protocol.

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