V-Y Advancement Flap Coverage of Toe-Tip Injuries

R. Ravindra Bharathi, MBBS, MS, MCh,[1] J. Terrence Jose Jerome, MBBS, DNB(Ortho), MNAMS,[2] Nicholas S. Kalson, BSc (Hons),[2] and S. Raja Sabapathy, MBBS, MS, MCh, FRCS (Ed)[3]

Toe-tip injury presents a challenging problem. There are few techniques that provide cover for distal toe defects, and most injuries are usually treated with terminalization or a skin graft. In patients with toe-tip injuries where there is preservation of the plantar toe pulp, V-Y flap advancement is a therapeutic option. In this article, we describe the surgical technique used and present the results of 10 patients with dorsal oblique or transverse toe injuries that underwent V-Y flap advancement for defect coverage. Eight patients had distal great toe injuries, 1 had a dorsal oblique amputation of the third toe, and 1 had a transverse amputation at the metatarsophalangeal joint level. Mean follow-up was 5 months, at which time all patients had returned to their previous activity level, and showed acceptable levels of scarring. The V-Y advancement flap, commonly used in fingertip injuries, when indicated and carefully performed gives excellent contour and padding, maintains toe length, and provides good cosmesis for treatment of toe amputations. Level of Clinical Evidence: 4. (The Journal of Foot & Ankle Surgery 48(3):368–371, 2009)

Key Words: amputation, injury, skin, toe, trauma, wound coverage

Various procedures have been described for distal foot reconstruction: adipofascial flaps for dorsal foot and ankle soft tissue defects (1); combined pedicled toe fillet flaps for lesions at the metatarsophalangeal joint (MTP) (2); retrograde-flow medial plantar island flaps for plantar defects (3–5); retrograde dorsalis pedis (6) or first dorsal metatarsal artery flaps (7–9); and distally based first web flaps using the dorsal communicating artery (10).

These methods have limitations and relatively few techniques have been reported for the distal toe, which often poses a challenge for the plastic surgeon (11). Local flap techniques are restricted to, at best, the proximal two thirds of the toe by the limited anterior reach afforded by their pedicle (8). They result in donor site morbidity by exposing tendons, scarring, or poor graft uptake (6).

This paucity of options has meant that distal toe injuries are treated conservatively, either with terminalization or skin grafting. Skin grafting can result in a deformed, hypersensitive, and shortened tip. Although it is generally thought that the biomechanics of the foot are relatively unaffected by reduced toe length, the deformity is noticeable and patients may feel self-conscious (11, 12). Also, a shortened great toe does not allow the patient to wear thong or flip-flop style footwear, commonly worn in many countries.

The ideal procedure for distal toe injuries involving partial or complete nail bed loss should maintain toe length, and cover the defect with nontender, well-padded skin. An alternative to grafting or amputation is the V-Y advancement technique, commonly used in fingertip injuries where length reduction and cosmetic compromise are considered unacceptable. V-Y advanced flaps have been used in the sole of the foot in patients with Bowen's disease (13), and for diabetic foot ulcers involving the metatarsal head (5, 14). Dorsal oblique and transverse toe amputations are the best indication for this method, which requires sufficient toe pulp to allow V-Y lengthening. In this article, we present the results of a retrospective case series of patients with distal toe injuries treated with V-Y advancement.

Patients and Methods

Patients with transverse or dorsal oblique toe lesions treated with V-Y advancement at our institution between March 2007 and March 2008 were included in the study, and descriptive characteristics of the patients are depicted in Table 1. The operative procedure entailed positioning the patient supine on the operating table and using spinal anesthesia and a tourniquet on the thigh. In transverse amputations, the remaining

Address correspondence to S. Raja Sabapathy, MS, MCh, DNB, FRCS Ed, Department of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, 313, Mettupalayam Road, Coimbatore - 641 043, India. E-mail: rajahand@vsnl.com

[1]Consultant Plastic Surgeon, Department of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, Coimbatore, India.

[2]Fellow, Department of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, Coimbatore, India.

[3]Head of the Department, Department of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, Coimbatore, India.

Financial Disclosure: None reported.

Conflict of Interest: None reported.

1067-2516/09/4803-0014$36.00/0

doi:10.1053/j.jfas.2009.01.010