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Modification of the Syme Amputation to Prevent Postoperative Heel Pad Migration

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ABSTRACT

The Syme amputation (ankle disarticulation level amputation) can be a valuable procedure for properly selected patients but might be underused owing to the problem of postoperative migration of the heel pad cushion. The present report presents a modification of the Syme amputation technique to prevent postoperative heel pad migration. The technique was performed in 12 patients, most of whom were male patients with diabetic foot infections. At an average follow-up of 7 years, the soft tissue cushion remained in a stable position, without ulceration. Also, patient satisfaction was high with the Syme level of amputation using the modified technique.

Lower extremity amputations are a common terminal management strategy for patients with diabetes (Fig. 1), peripheral vascular disease, trauma, and tumors. Multiple levels of amputation exist, with the level of amputation chosen according to the healing and rehabilitation potential, appropriate prosthetic fitting, and surgical oncologic margin requirements. The unifying dictum for all lower extremity amputations has been the maintenance of the extremity length when at all possible to maximize function, decrease energy expenditure, and simplify prosthetic usage. Often, past the level of midfoot amputations, many surgeons only consider transtibial (below the knee) amputations because of the allowance for superior gait mechanics with less energy consumption (1). I believe that in many cases, the Syme amputation would be a more appropriate amputation level. However, in cases in which the ankle and/or rearfoot healing potential is acceptable, the Syme ankle disarticulation has often been overlooked because of either surgeon inexperience with the level of amputation or the occurrence of varus or posterior displacement of the plantar heel pad over time (2,3). To maximize the positional stability of the weightbearing pad, I have performed a "modified" Syme amputation that incorporates an anterior osteodesis of the inferior-anterior lip of the amputation flap to the anterior tibia and tenodesis of the peroneal tendons to the planter lateral corner of the heel pad flap. The purpose of the present study was to examine the results in a case-controlled series and describe the surgical technique.

Fig. 1. (*A*) Photograph and (*B*) radiograph of multidrug-resistant, acutely infected, Charcot midfoot dislocation with fractures in a medically frail patient.

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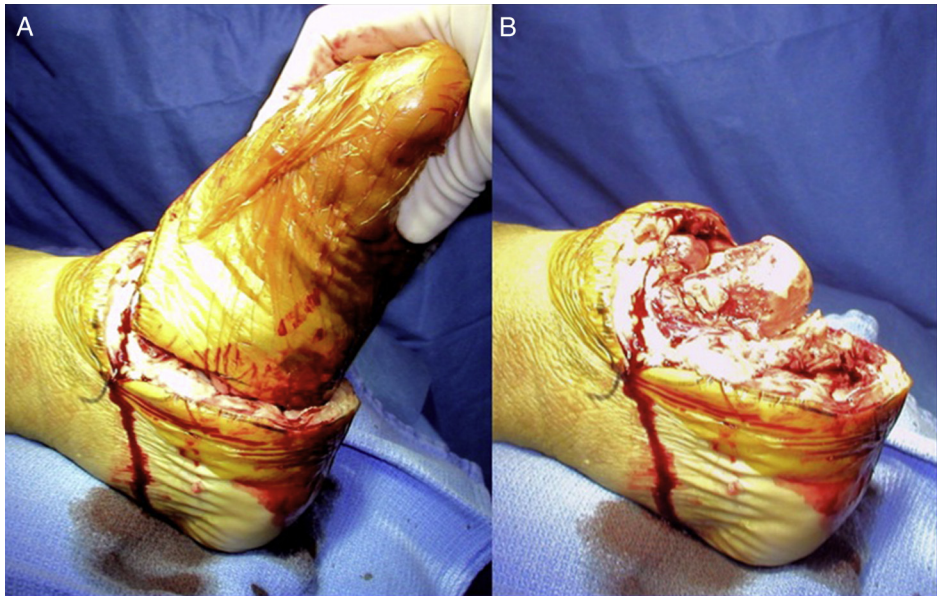

Fig. 2. (*A* and *B*) Incisions used to disarticulate the midfoot from the rearfoot.

Surgical Technique

The Syme amputation is performed as a single stage, rather than the traditional (historical) 2-stage approach. The procedure is performed with the patient under regional or general anesthesia as needed. Perioperative antibiotics are given and continued postoperatively according to the individual case requirements (e.g., extent of infection, culture results). The incision is represented by a large V-shaped "fish mouth," with the apex positioned at approximately the anterior margin of the ankle joint. The distal foot is disarticulated and removed as 1 unit through the transverse tarsal joint, and the peroneal tendons are preserved (Fig. 2). The talus is then pulled forward with a large bone hook and removed by severing all ligamentous attachments. The calcaneus is dissected in a subperiosteal fashion, maintaining the integrity of the peroneal tendons, and removed; and the long flexor, posterior-medial tendons and anterior tendons are sacrificed and removed as far as reach allows. Next, the calcaneus is removed. Care should be taken to not perforate the skin when removing the calcaneus. The Achilles tendon insertion is dissected free from the calcaneal tuber and fascial connections and allowed to retract freely—no evidence should be seen of the posterior soft tissues migrating with the Achilles tendon. The calcaneus can be taken en masse (Fig. 3) or piecemeal by successive osteotomies. During dissection, great care should be taken to protect the posterior-medial vascular structures and the terminal divisions of the posterior tibial artery. All devitalized tissues should be removed, and hidden pockets of infection should be searched for, debrided, and thoroughly irrigated. The plantar intrinsic muscles are preserved as much as possible. Tourniquet release is recommended after the calcaneus has been

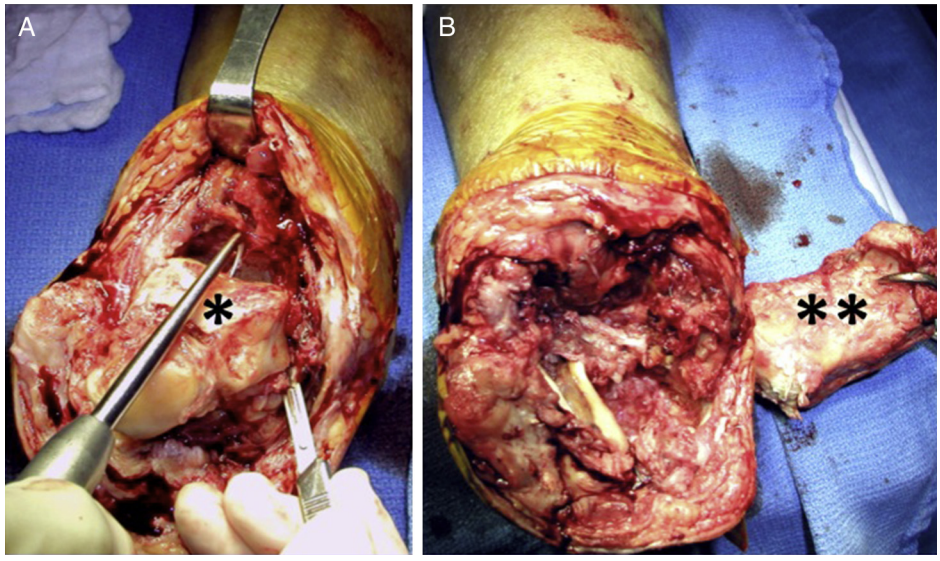

Fig. 3. Removal of the (*A*) talus (*asterisk*) and (*B*) calcaneus (*double asterisks*).