

TREATMENT OF HALLUX VALGUS COMPLICATED BY OSTEOMYELITIS IN THE COMPROMISED PATIENT

Raymond G. Cavaliere, DPM, FACFAS

Jennifer Ostrowski, DPM

INTRODUCTION

Much has been written about geriatric hallux valgus correction. Surgical approaches include all types of bunion corrections; from the simplest McBride type to the use of osteotomies, joint resections, fusion, and joint replacement. There is a subset of patients who require surgery on the first ray who are extremely compromised. These are the elderly with significant peripheral vascular disease, who may or may not be diabetic, who may have other comorbid disease, and who all present with bone exposure. In these patients, any elective surgery is risky. Without surgery, they will require first ray amputation or perhaps below knee amputation. Other comorbid medical conditions, affecting the feet include diabetes mellitus, gout, rheumatoid arthritis, osteoarthritis, and others.

Foot ulceration occurs in this patient population due to a multitude of causes, and is a major cause of disability. Neuropathy from diabetes, mechanical stress from abnormal bony pressure and abnormal gait patterns, poor circulation, gouty tophi, and trauma are some of the major causes of foot ulcerations.

Vascular ulcers surrounding the first metatarsophalangeal joint are usually found medially versus plantar. Plantar ulcers are often seen in diabetes. Sensory loss and high plantar pressure may be essential factors in ulceration. Limited joint mobility, deformity, callous formation, motor neuropathy, weight and height have all been shown to relate to foot pressure and may contribute to foot ulceration. Age, duration of diabetes, and obesity are associated with diabetes complications and foot ulceration.

Bone lesions frequently occur in the feet of diabetic patients, particularly those with peripheral neuropathy and foot ulcerations. Ulcers that occur on the forefoot of a compromised patient, which are difficult to close, will result in eventual osteomyelitis. If bone exposure is present for any length of time, assumption can be made that osteomyelitis is present. Treatment strategies at that time should include simple exostectomy, which will allow for decompression of the soft tissues and allowing healing to occur. Bone culture is obtained at the time of surgery

as is bone specimen for histologic study. Bacteria growing from bone will make the diagnosis of osteomyelitis.

The precise role of surgery in managing osteomyelitis in the compromised foot is evolving. Surgical debridement of infected tissues hastens healing and allows for culture and specimen retrieval. Infected bone should be removed only if it is apparent that healing will not occur in any other circumstance. Bones that are necessary for maintaining the structural integrity of the foot should be guarded as much as possible. The approach to performing amputations should be conservative, and the limb should be left as functional as possible.

CLINICAL SCENARIOS

Case 1 is an 85-year-old woman with a long-standing history of worsening hallux valgus, overlapping second and third hammertoes, diabetes mellitus, and peripheral vascular disease. The initial presentation was for an interdigital ulceration treated by amputation of toes one and two. There have been 2 prior revascularizations, and the patient is now non bypassable. The foot is cool with non-palpable pedal pulses. She is status post left trans-metatarsal amputation, and ambulates without assistance. Blood glucose showed good diabetic control.

The patient developed chronic ulceration over the medial aspect first metatarsal head and over the lateral aspect of the fifth metatarsal head. These ulcerations were traumatic and vascular in etiology. Treatment was with minimal resection of the first metatarsal head through a medial approach. This minimally invasive surgery was chosen to allow for resection of necrotic exposed bone, thereby decompressing tented soft tissues. Correction of the hallux valgus is formidable.

The weightbearing aspect of the first metatarsal head is maintained as are the sesamoids. The great toe is bandaged medially, maintaining appropriate alignment. Wound care is provided daily with irrigation and packing. Intravenous antibiotics are given for 4-6 weeks as deemed appropriate (Figures 1, 2).

Anteroposterior and lateral foot radiographs show

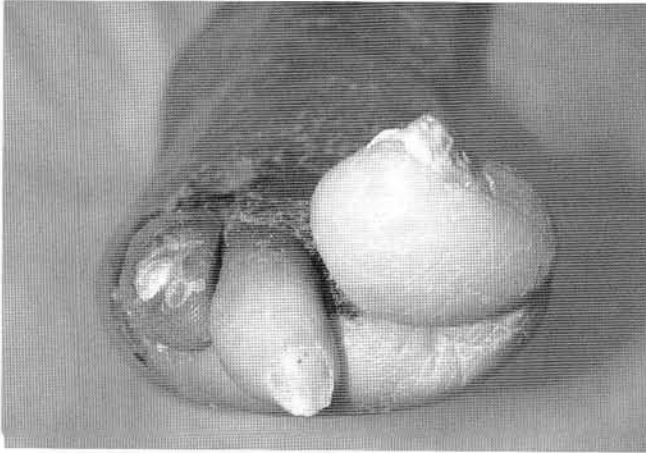


Figure 1. Good alignment great toe following minimal resection first metatarsal head. Medial ulcer closed. Osteomyelitis successfully treated. Significant peripheral vascular disease exists.



Figure 2. Functional hallux after first metatarsal head resection.



Figure 3. Subcapital resection first metatarsal head allows for hallux valgus correction, removal of exposed, necrotic bone and preservation of weight-bearing function.



Figure 4. Hallux is in acceptable alignment.

good alignment of the first ray after first metatarsal head resection for exposed bone and osteomyelitis (Figures 3, 4).

Case 2 is a 100-year-old woman with a history of tophaceous gout, severe hallux valgus, and peripheral vascular disease. She developed pain over the great toe joint and was admitted with a diagnosis of septic arthritis. She was evaluated and treated via joint injections of steroid and developed subsequent ulceration and infection over the first metatarsal head. Bone was exposed, and her problem was limb threatening. She was treated by resection of exposed bone through a medial approach, which allowed for full correction of her deformity, allowed for wound care, and eventual healing of the ulceration. Antibiotics both intravenously and by mouth were given for a period of 6 weeks (Figures 5-8).

PROCEDURE

Subcapital osteotomy was first described by Heuter (1870-1871) and later modified by Mayo (1908) and Soresi (1931). The overall results of this procedure were poor due to the amount of bone resected. This leaves the first metatarsal incapable of supporting weight. Weightbearing function of the foot is lost and patient will experience additional deformity, pain, lateral metatarsalgia, and gait disturbance. Other areas of ulceration are likely. With minimal resection of bone, weightbearing function of the first metatarsal can be preserved (Figures 9 and 10).

The procedure is performed out of absolute necessity. The patient has exposed first metatarsal head bone and there is likely osteomyelitis. There are comorbid conditions

and the patients' vascular status is poor. This is an attempt to salvage the foot or at least the first ray. The surgical approach is medial, through the ulceration with approximately 1 cm extension of the wound through incision both distally and proximally. The distal end of the first metatarsal is resected allowing for removal of exposed, possible necrotic tissue. The weightbearing surface is maintained. As little bone is removed as possible. The first metatarsal head medial hyperostosis is resected as well.



Figure 5. Healing ulceration medial aspect first metatarsal head after bone resection. Hallux valgus has been corrected and a functioning, well positioned great toe remains.



Figure 7. Ulceration closed. Foot viable.

Attempts are made to leave the base of the great toe proximal phalanx intact. If there is infection here then minimal resection is performed, allowing for functional anatomy to be maintained. This procedure allows for correction of severe hallux abductus and valgus and allows for hallux repositioning and realignment through appropriate dressings. If bone is infected but not totally necrotic, it can be left in place and allowed to drain and be treated with appropriate antibiotics (Figures 11-14).



Figure 6. Healing ulceration weeks after subcapital bone resection.



Figure 8. Full healing of ulcer with successful treatment of osteomyelitis. Patient is ambulatory and the foot can be placed in a shoe.

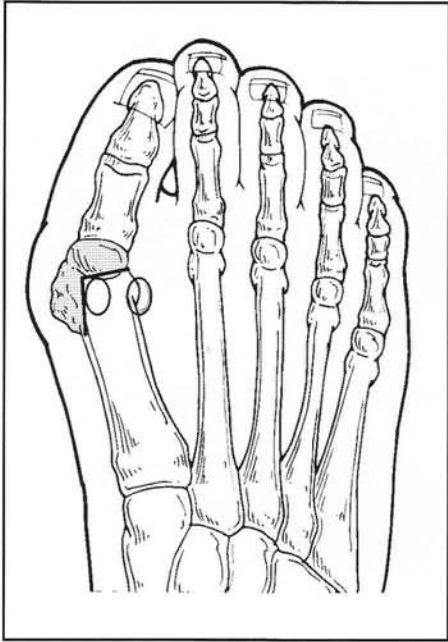


Figure 9. Mini-Mayo type first metatarsal head resection.

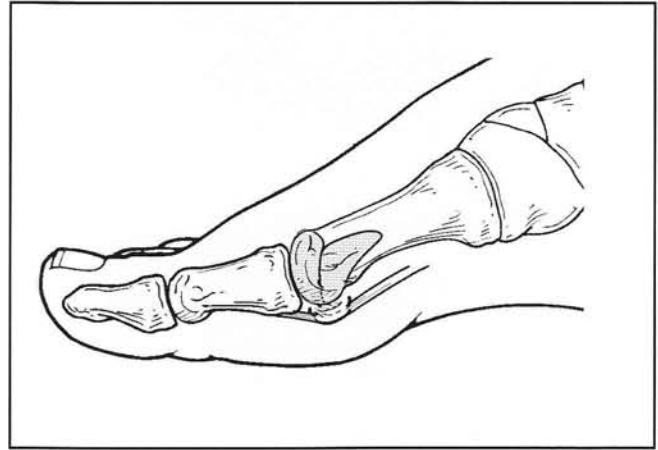


Figure 10. Mini-Mayo first metatarsal head resection.



Figure 11. Example of severe HAV with ulceration and peripheral vascular disease.



Figure 12. Same patient as above. Hallux valgus, ulceration, and peripheral vascular disease.



Figure 13. Excessive hallux valgus. Medial ulceration.



Figure 14. Successful healing. Acceptable alignment. Retained weightbearing function.

SUMMARY

The original Mayo operation entailed complete removal of the first metatarsal head and became unpopular due to problems such as increasing amounts of lateral metatarsalgia. Today, this procedure is still not recommended for hallux valgus correction.

The mini-Mayo type first metatarsal head resection is a very useful procedure for this special sub-set of hallux valgus patients with complicating osteomyelitis. It allows for correction of deformity that allows for repositioning of the great toe from lesser toe impingement. The exposed bone is resected, allowing for treatment of the bone infection. Decompression of localized soft tissues allow for healing of the ulceration. Weightbearing function of the foot is preserved. The patient may wear good quality running shoes or specially fitted shoes postoperatively.

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