Cleveland Clinic

A Decade of Independence: Functional Success After Syme Amputation: A Case Report

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Background

Type 2 diabetes mellitus is the leading cause of nontraumatic lower-extremity amputation in the United States due to its association with peripheral neuropathy, peripheral arterial disease, and chronic foot ulceration.[1,2] Patients who fail limb salvage or partial foot amputations frequently progress to below-knee amputation (BKA), a procedure associated with increased cardiopulmonary demand, reduced mobility, and higher long-term mortality.[1,3]

Syme amputation (SA), first described in 1843, is an ankle disarticulation that preserves the heel pad, creating a durable, end-bearing residual limb.[4] By maintaining maximal limb length and allowing distal weight bearing, SA reduces metabolic energy expenditure and preserves cardiopulmonary reserve compared with BKA.[5] These physiologic advantages translate into improved gait efficiency, balance, and functional independence.[5–7]

Despite these benefits, SA is infrequently performed due to concerns regarding wound healing and vascular adequacy in patients with diabetes and PAD. Contemporary evidence, however, supports reliable outcomes with proper patient selection, particularly in the presence of adequate posterior tibial artery perfusion and optimized nutritional status.[5–7] Advances in vascular evaluation and prosthetic technology further support reconsideration of SA as a limb-preserving alternative.

Purpose

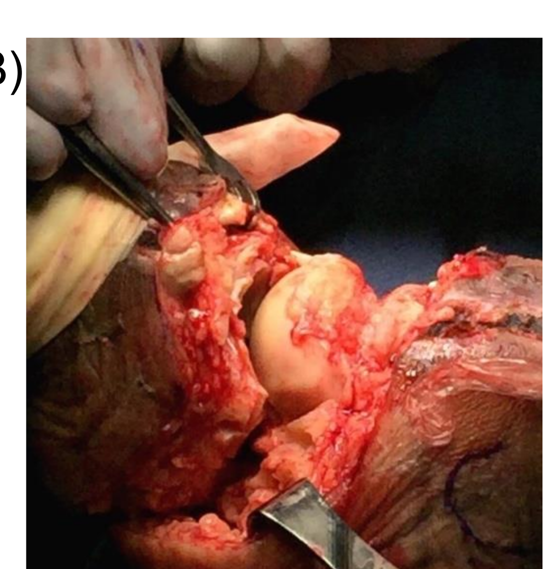
This poster aims to highlight the long-term durability and functional success of SA in a patient with PAD and multiple comorbidities. The purpose is to reintroduce SA as a limb-preserving alternative that maintains limb length, reduces metabolic energy expenditure, preserves cardiopulmonary reserve, and improves overall quality of life.[5]

Case Study & Surgical Technique

The patient is a 72-year-old male with type 2 diabetes mellitus, PAD, paroxysmal atrial fibrillation, hypertension, hyperlipidemia, and chronic kidney disease stage 3 post kidney transplant. He had multiple prior foot interventions, including hallux amputation, partial ray resections, transmetatarsal amputation, and lateral bony resection with Achilles tendon lengthening between 2014 and 2015. Vascular assessment included an above-knee popliteal to dorsalis pedis bypass, with post-bypass pulse volume recordings showing ABI 0.86, posterior tibial artery 0.65, and dorsalis pedis artery 0.86. Due to persistent wound dehiscence and impaired perfusion, BKA was recommended, but the patient declined. He met criteria for SA, including ABI ≥ 0.7, adequate posterior tibial perfusion, and albumin ≥ 3.0 g/dL.

In the operating room, the patient received 2 g IV Ancef, was positioned supine, and underwent general anesthesia. The right foot was prepped with Hibiclens, and a thigh tourniquet was applied. A transverse incision was made distal to the medial and lateral malleoli, extending obliquely for a plantar flap (A). The foot was disarticulated at the talonavicular joint, and the talus and calcaneus were removed carefully, preserving the soft tissue envelope (B) (C). A Steinmann pin was used to mobilize the calcaneus for safe Achilles tendon release, and specimens were sent to pathology. Redundant tissue was excised, and the distal tibia was leveled with a sagittal saw. Three drill holes were placed in the distal tibia, and FiberWire was passed through the plantar flap and secured (D). A 7.0 TLS drain was placed laterally, and deep and subcutaneous tissue were reinforced with 3-0 Vicryl. The skin was closed with 4-0 nylon and staples, dressed with Betadine, Xeroform, and a bulky compressive bandage, followed by a plaster cast. The patient was instructed to remain non weightbearing.

(A)

(B)

(C)

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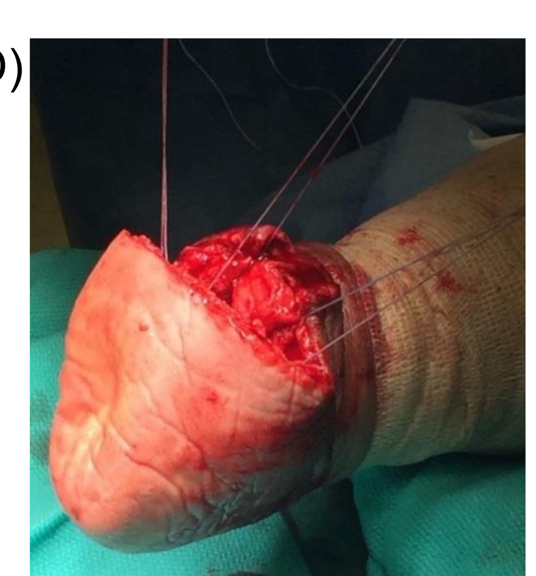
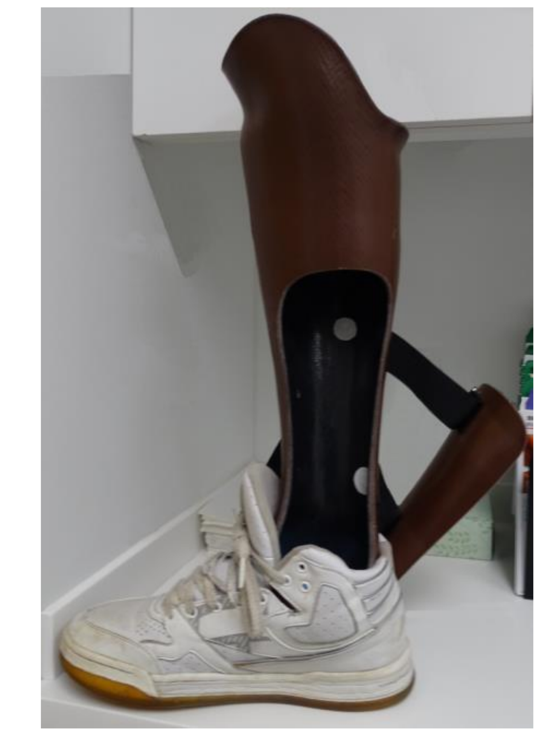


Figures


(A)


(B)


(C)


(D)

(A) Immediate post-operative state (2015) with the drain in
(B) 1 year follow-up (2016) post-operatively
(C) Syme partial foot prosthesis with removable blunt sleeve
(D) 10 year follow up (2025) post-operatively

Outcomes

At 10-year follow-up (October 2025), the patient had required no further surgical intervention and experienced no progression to a more proximal amputation. He maintained prosthetic ambulation, with intermittent pressure ulcers managed conservatively. SA allowed end-bearing, preserved limb length, and functional ambulation with low prosthetic energy demand.[6,7]

Conclusion

This case highlights the importance of revisiting SA as an underutilized, limb-sparing procedure. In appropriately selected patients, SA provides superior functional outcomes compared with BKA by preserving limb length and enabling end-bearing, reducing metabolic and cardiopulmonary burden.[5] Patients demonstrate improved gait symmetry, balance, and quality of life, with lower prosthetic energy demands and greater independence.[6,7] With modern vascular assessment and prosthetic technology, SA remains a durable and physiologically sound option for limb salvage in patients with diabetes and PAD.

References

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