Developments in surgical, medical, and rehabilitation methods have greatly increased attempts and success rates of lower limb reconstruction; not surprisingly, this has decreased the number of primary posttraumatic amputations. Nevertheless, there is still a defined niche for the very long posterior tibial artery (VLPTA) flap as long as the sole of the foot and the posterior tibial neurovasculature are uncompromised. Such instances might include cases of extensive soft tissue, neurovascular, and bony injuries, which would necessitate immediate or early amputation. Lengthy hospitalization and issues of patient compliance may make limb reconstruction inappropriate in certain patients with mental illness or learning disability. Lastly, the VLPTA flap should be considered in those with failed limb salvage secondary to complications such as osteomyelitis, nonunion, or malunion of bone.

**METHODS**

In all 3 case reports, approximately 10 cm of tibia was preserved, which is optimal length for fixation and fitting of lower limb prostheses. The intrinsic foot muscles and the sole of the foot were harvested with subsequent proximal dissection of the posterior tibial neurovascular pedicle. The heel pad was then secured over the anterior aspect of the tibia and any remaining areas of soft tissue deficit were covered with a split skin graft. Russel et al. accurately review the anatomy and precise technique of flap elevation.

**CASE SERIES**

**Case 1**

A 19-year-old student sustained multiple fractures following a head-on collision with a truck at 90 mph. Her injuries included fracture of the orbit, pubic rami, acetabulum, femur, tibial plateau, and a midshaft comminuted tibia-fibular fracture with extensive soft tissue deficit over the anterior aspect of the leg. Initial management included external fixation, intramedullary nail fixation of the tibia, and latissi-
mus dorsi myocutaneous free flap attached end to end to the anterior tibial artery. She continued to have severe osteomyelitis and soft tissue infection despite debridement and intramedullary and intravenous antibiotics over a 2-year period. Below-knee amputation was fashioned using the VLPTA flap. Five months later, she was fitted with below-knee prosthesis, is ambulating well, and most recently returned to horse riding. In this case, due to nerve preservation, the heel pad overlying the tibial tuberosity was sensate. Hence, when she walked the prosthesis pressure was transferred to the heel pad aiding her ability to ambulate.

Case 2
A 34-year-old man, known intravenous drug user and cigarette smoker, presented with gross swelling of the entire leg and scrotum; he also had an ulcerating lesion on his calf. Within days, the ulcer became necrotic and necrotizing fasciitis was diagnosed, with cultures growing *Streptococcus milleri*. Intravenous antibiotics were prescribed and debridement inevitably left him with considerable soft tissue loss; in particular there was significant loss to gastrocnemius and soleus muscles. Split skin grafting was used to cover the deficit. Unfortunately, over time he developed a severe equinus deformity of the ankle and it was decided 4 years after his primary presentation to undergo below-knee amputation with reconstruction using the VLPTA flap. At 8 months, he was ambulating well with prosthesis. Two years later, debridement of a small skin wound was necessary; recovery has since been unremarkable.

Case 3
A 52-year-old factory worker sustained a comminuted tibial fracture involving ankle and knee joints with loss of soft tissue over anterior aspect of the leg and foot after being crushed between 2 tractors. The wounds were debrided, the tibia...
was stabilized with external fixation, a fasciotomy was performed, and intravenous antibiotics were administered. A latissimus dorsi myocutaneous free flap was attached end to side to the posterior tibial artery to cover the defect. Unfortunately, osteomyelitis was still present 3 years later, and he developed an equinus deformity of the ankle. This gentleman underwent below-knee amputation and reconstruction using the VLPTA flap. His recovery was uneventful aside from trimming of the below-knee amputation stump due to pain on ambulation. He is no longer in pain and walks with prosthesis and stick (Fig. 1).

**LITERATURE REVIEW**

A computer-aided literature search was performed using EMBASE (from 1980) and Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations, and Ovid MEDLINE(R) 1948 to Present using the following key words/phrases: fillet of sole flap and very long posterior tibial artery flap. References from articles raised from the search were also considered to expand literature review (Table 1).2–8

**DISCUSSION**

All patients now have a viable flap and ambulate with some form of lower limb prosthesis. A number of cases report sensation over the stump and can manage 120° range of movement at the knee joint. Four out of 13 cases were complicated with minor infection of the flap and all were successfully treated with antibiotics and/or excision.

As previously mentioned, the sole of the foot flap is superior to all other flaps for coverage of amputation stumps simply because it is specifically designed for weight bearing and less likely ulcerate. A sensate stump also allows early detection of ill-fitting prostheses again preventing breakdown of the flap. An intact posterior tibial nerve potentially has a role for proprioception and thus aids ambulation. The VLPTA flap is versatile in the sense that it can be utilized for above-knee amputation and below-knee amputation. One of the major benefits of the VLPTA flap is that where there is not enough local tissue to perform a below-knee amputation the flap can supply the extra tissue and possibly prevent an above-knee amputation. Furthermore, the presence of a pedicled flap negates the need for microsurgery and can therefore be performed in centers that lack the equipment and expertise to perform microsurgery.

We do, however, advise that the patient undergo an arteriogram if the posterior tibial artery has been utilized for attachment of prior free flaps for soft tissue coverage. This should aid in the decision to “reuse” the posterior tibial artery for the VLPTA flap, particularly in cases when previous flaps have failed.

Concerns have been raised about kinking or thrombosis of the long pedicle; fortunately, these concerns are unfounded as there have been no reports of this complication to date.

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