

Soft Tissue Reconstruction Using a Distally Pedicled Biceps Femoris Flap in Refractory Fracture-Related Infection around the Knee: An Orthoplastic Approach

Michael R. Bauer¹, Dirk J. Schaefer¹, Mario Morgenstern², Rik Osinga², Florian Frank², Martin Clauss²

1 - Department of Plastic, Reconstructive, Aesthetic and Hand Surgery, University Hospital Basel, Switzerland

2 - Department of Orthopaedics and Traumatology, University Hospital Basel, Switzerland

INTRODUCTION AND AIM

Fracture-related infections (FRI) with extensive soft tissue defects around the knee represent a major challenge in extremity reconstruction. Successful treatment requires an orthoplastic approach integrating radical debridement, stable fixation, infection control, and robust soft tissue coverage. In cases with multiple prior reconstruction failures, limb salvage becomes increasingly difficult. This report aims to highlight the role of a regional muscle flap — the distally pedicled biceps femoris flap — as a last-resort option for knee preservation.



Figure 1: Large defect over the lateral femur with exposed bone following multiple failed reconstruction attempts.

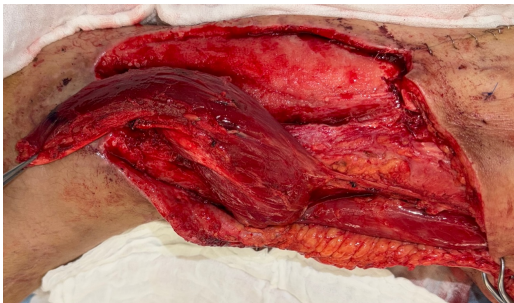


Figure 2: Elevated and distally reflected long head of biceps femoris muscle with visible vascular pedicle.



Figure 3: Fully integrated flap 8 weeks postoperatively.

METHODS

A patient with a distal femoral fracture (AO 32-C3, Gustilo-Anderson type II) initially treated with an intramedullary nail and lateral plate developed FRI with a fistulating soft tissue defect over the lateral distal thigh. Following implant removal, radical debridement, and re-osteosynthesis with a retrograde femoral nail, multiple reconstructive procedures were performed. Soft tissue reconstruction attempts included a lateral gastrocnemius flap, a split vastus lateralis muscle flap, a distally pedicled gracilis flap and a free anterolateral thigh (ALT) flap, all of which failed to provide sufficient and durable coverage. As a final salvage procedure, a distally pedicled biceps femoris muscle flap was performed. The long head of the biceps femoris was harvested and transected at its origin on the pubic bone, while the short head was preserved to minimize impairment of knee stability and function. Residual viable tissue from the initial gastrocnemius flap was preserved. Finally the biceps femoris muscle flap and the partially exposed vastus lateralis were covered with split-thickness skin grafts.

RESULTS

The distally pedicled biceps femoris flap achieved stable soft tissue reconstruction with satisfactory integration and resolution of infection. Dead space was effectively obliterated, and durable coverage of the distal femur was obtained. The knee joint was preserved without clinically relevant impairment of knee function or stability, thereby avoiding knee arthrodesis or above-knee amputation.

CONCLUSION

The distally pedicled biceps femoris muscle flap is a rarely used but valuable salvage option for complex soft tissue defects around the lateral distal femur and knee. Even after failure of standard local and free flap procedures, it can represent a reliable last-resort option for limb salvage. The biceps femoris flap can be particularly useful for defects beyond the reach of the gastrocnemius flap in the lateral regions of the knee and distal thigh when conventional local options have failed and further free flap reconstruction is not feasible.