VASCULARIZED FIBULAR GRAFT IN A CASE OF CHRONIC TIBIA OSTEOMYELITIS

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STATEMENT OF PURPOSE:

Nonunion of the tibia in a pediatric patient can be devastating to life. This pathology is rare; however, limb salvage is paramount. The purpose of this study is to review a case of tibial nonunion due to osteomyelitis and the surgical method used to correct the pathology.

LITERATURE REVIEW:

The vascularized fibular graft was first described in 1975 by Taylor.[1] The technique is now an important tool in the treatment of skeletal defects resulting from trauma, tumor, radiation bone necrosis or osteomyelitis. The problems are often compounded by infection, poor condition of the soft tissues, and or multiple previous surgeries.[2] One of the accepted methods to treat a tibial defect with infection is with a vascularized fibular graft.[3] The graft may be taken from the contralateral or ipsilateral limb.[4] Due to their inherent vascularity, vascularized bone grafts unite with host bone rapidly, are more resistant to infection, and grow with the patient over time. Therefore, radical resection of infected and necrotic bone and soft tissue can be successfully undertaken.[5]

CASE STUDY:

A two year old male with no significant past medical history presented to ED from an outside hospital with a two day history of Left leg pain and swelling. MRI was obtained demonstrating left tibia osteomyelitis. He was taken for a total of eight irrigation and debridements and treated with targeted intravenous antibiotics. He sustained a pathologic fracture of the left tibia which later became a nonunion **(Fig. 1).** Therefore, recommendation was made for a vascularized fibular graft.

In the operative procedure, the orthopedic team made an anteromedial incision which was followed by dissection down to bone. The distal and proximal ends of the tibia were resected to healthy appearing bone margins. The distal tibiofibular joint was then secured with a 3.5mm transyndesmotic screw. The same was performed at the proximal tibiofibular joint. The plastic surgery team

CASE STUDY CONTINUED:

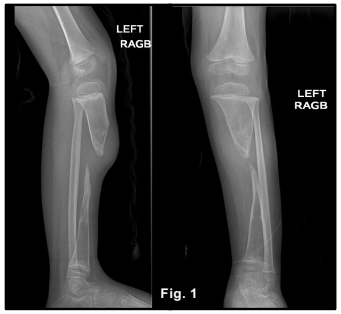

Fig. 1

then made a lateral incision along the fibula and carefully dissected the vascularized fibular graft. The peroneal nutrient artery and periosteum remained intact **(Fig 2).** The middle 2/3 of the fibula was harvested by making bone cuts proximally and distally **(Fig. 3).** The vascularized fibular graft was then mobilized through the soft tissues and placed in the tibial segment defect. A series of reamers were then used in the proximal tibial canal up to a size 9. The proximal end of the vascularized fibular graft was then placed in the intramedullary canal and temporarily held with a Steinmann pin. The distal end of the fibular graft was then docked to the distal fragment of the tibia. After confirming alignment with C-arm, two stacked one third semitubular plates were placed over the medial aspect of the tibia from the proximal metaphysis to the distal segment bridging the fibular graft. The plates were then secured to the proximal and distal tibia using standard AO technique. A screw was placed in the fibular graft for extra stability. Final images confirmed acceptable alignment and fixation of the fibular graft **(Fig. 4)** The medial and lateral incisions were closed in layers using absorbable suture. The patient underwent application of a short leg splint. The patient tolerated the

CASE STUDY CONTINUED:

procedure without difficulty and was taken to the recovery room in stable condition. Following surgery, the patient was placed in an above knee cast for four weeks to ensure non-weightbearing. At six weeks post operatively, the patient was transitioned to a patellar weight bearing short leg cast. At 3 months post operatively, the patient showed signs of bony union and was slowly transitioned from cast to fracture boot to supportive shoe. At one year, the patient was able to ambulate without assistance from a brace. Plans for potential hardware removal will be pursued in the future to prevent stunting of graft hypertrophy.

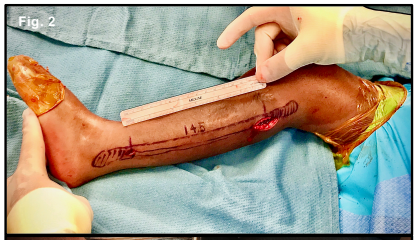
Fig. 2

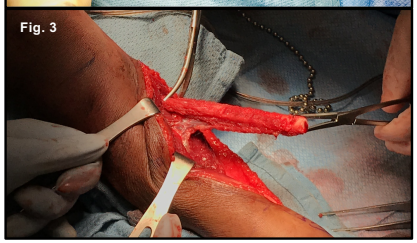
Fig. 3

DISCUSSION:

This particular pathology and treatment have been well documented in the literature. The decision was made to utilize the ipsilateral fibula due to the risk of failure which may necessitate a below knee amputation. The patient was observed closely for stress fracture as this is a very common sequelae after the procedure.

CONCLUSION:

Nonunion due to osteomyelitis of a long bone in a child can be devastating leading to amputation. Vascularized fibular grafts are an ideal solution to this problem in pediatric patients due to their ability to grow and remodel as the child grows, their resistance to infection as an autograft, and their excellent blood supply including the endosteal and periosteal blood supplies. This case demonstrates the ideal use of a vascularized fibular graft with its inherent properties in the pediatric population.


Fig. 4

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