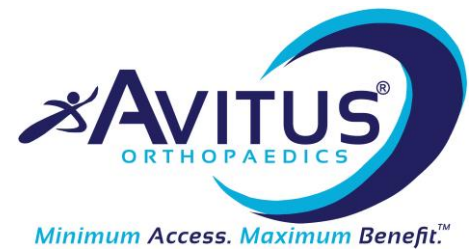


WHITE PAPER SERIES

Tibiotalar & Subtalar Joint Arthrodesis with Proximal Tibia Bone Graft Harvest



Surgery performed by Jeffrey McAlister DPM, fellowship trained foot and ankle surgeon at the CORE Institute AZ.

Case Presentation

The following is a case of a 31-year-old Hispanic male with a history of a tibial pilon fracture and talus fracture/dislocation. Index procedure was performed in Mexico and was appropriately fixated but an unrecognized CFL injury left the patient in incongruent varus. At the eight-month mark, the patient had healed his talus fracture and nearly healed his pilon fracture. Weight bearing radiographs showed significant incongruent ankle varus and retained hardware (IMAGE 1). A follow-up computed tomography (CT) scan of the distal tibia and ankle revealed a healed pilon and talus fracture, but severe articular defects and arthritis. Patient was counseled on the long-term sequelae of these injuries and was consented for an ankle and subtalar joint fusion with bone grafting.

Operative Technique

A 1.5 cm incision was made at the proximal medial tibia parallel to the tibial tuberosity. Blunt dissection was carried down to the level of periosteum. The Avitus® Pilot Hole Creator was used to perforate the cortex and create a 1 cm entry point. Next, the Avitus® Bone Harvester was inserted. A series of scraping and cutting maneuvers were executed during which the suction powered device rapidly obtained cancellous bone from the medullary and metaphyseal regions with liquid bone marrow continuously aspirating into the handle of the device (IMAGE 2). The device provided live feedback on bone volume and allowed the surgeon to quickly visualize the obtained volume. 10 CC's of cancellous graft and 20 CC's of bone marrow were easily harvested (IMAGE 3). The procedure took approximately 5 minutes, much quicker than traditional techniques with obvious benefits of volume. The incision was packed with a gelatin sponge and closed in layers (IMAGE 4). No additional bone voice fillers were used to back-fill.

The cancellous bone was packed into the fusion sites with forceps (IMAGE 5, on pg. 2). The graft handling characteristics were as expected: dense, packable and morselized in a ready-to-use consistency, which made it easy to use. The liquid marrow was poured directly into the fusion site.

After the graft was packed appropriately into the two fusion sites, the joints were aligned and a load-sharing intramedullary nail was inserted into the hindfoot and tibia. All incisions were closed in layers and the patient's lower extremity was dressed in a bulky compressive dressing.

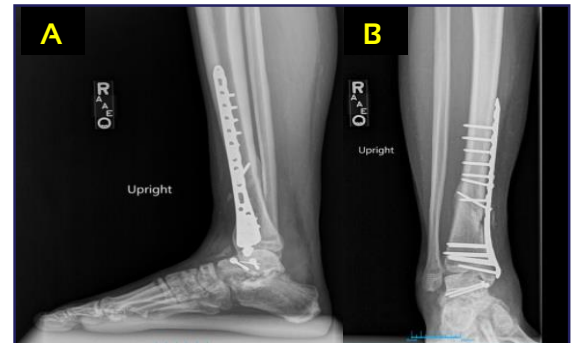


IMAGE 1 :: A) Pre-operative lateral weightbearing radiograph demonstrating severe subtalar joint arthritis B) Pre-operative anteroposterior (AP) weightbearing radiograph demonstrating varus and tibiotalar joint arthritis



IMAGE 2 :: Avitus® Bone Harvester procuring cancellous bone and marrow under fluoroscopy. A medial approach was used to harvest the proximal tibia bone graft.



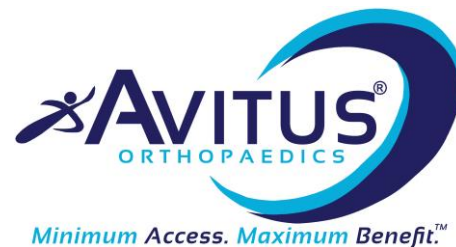
IMAGE 3 :: 10 CC's of cancellous bone and 20 CC's of bone marrow was retrieved from the Avitus® Bone Harvester approximately 5 minutes.



IMAGE 4 :: Gelatin sponge packed into surgical site as a hemostatic agent

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Operative Cost Savings

No additional bone graft was required or used for this complex tibiotalar and subtalar joint fusion. The Avitus® Bone Harvester saved the hospital \$6,095.

Typically, the alternatives commonly used during these types of cases may include: 4.5 CC's of recombinant human platelet-derived growth factor (rhPDGF-BB) with 5 CC's of osteoinductive allogenic scaffold.

Post Operative 8 week follow up

The patient reported little pain (VAS, 2 out of 10) at the proximal tibial bone harvest site that had improved by two weeks. No infections were recorded at the harvest site. No periarticular fractures were noted. No hematoma at proximal tibial site. Cancellous bone regeneration can be seen on the near 8 week follow up radiograph of the proximal tibia (IMAGE 6). The pilot hole cortical window will be present for several months with surrounding endosteal growth and cancellous regeneration seen on radiographs. Expect this to be present for up to 6 months.

Near osseous fusion at the 8 week mark is noted on weight bearing radiographs (IMAGE 7).

Patients requiring tibial bone graft harvest are recommended to be non-weightbearing for approximately 6-8 weeks.

Practical Pearls

- Harvest site is guided by required graft volume: calcaneus, distal tibia, proximal tibia (increasing in volume)
- Incision should be a half centimeter larger than the tip of the Harvester with a small SENN retractor
- Trajectory of the Avitus® Pilot Hole Creator should be confirmed using fluoroscopy to ensure entry into the metaphysis.
- Back-filling is surgeon's preference

Conclusion

This is one example of how the Avitus® Bone Harvester has enabled me to provide my patients high volume autograft for primary and revision fusions with excellent outcomes and cost-savings.

-Jeffrey McAlister, DPM
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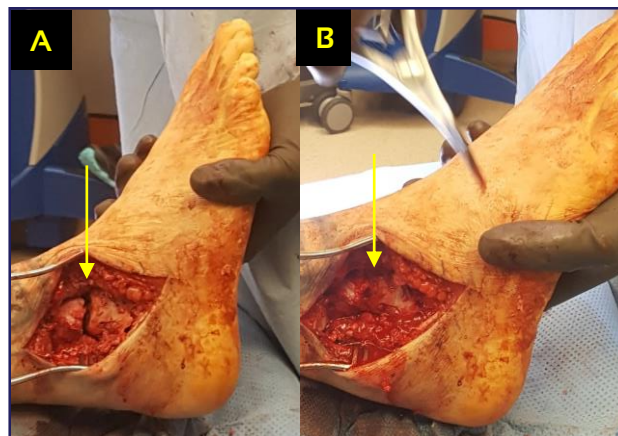


IMAGE 5 :: A) Before packing defect B) After packing defect with Avitus® gold standard cancellous bone.



IMAGE 6 :: A) 12/8/2017 – intraoperative radiograph of harvest site B) 2/1/2018 – post operative radiograph of harvest site showing cancellous bone regeneration

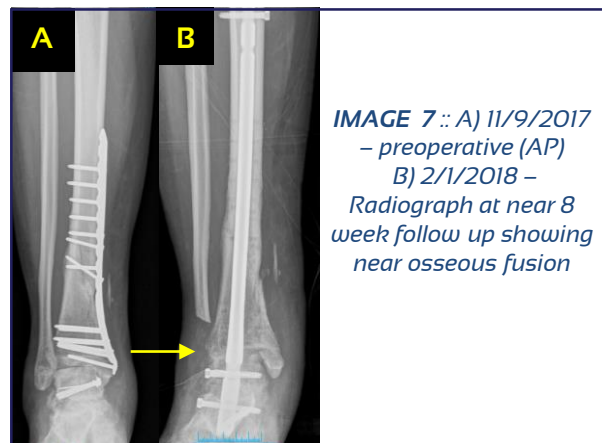


IMAGE 7 :: A) 11/9/2017 – preoperative (AP) B) 2/1/2018 – Radiograph at near 8 week follow up showing near osseous fusion