

CASE STUDY: Two stage ORIF of distal radius fracture with bone loss with proximal tibia bone harvest using Avitus® Bone Harvester

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**CASE STUDY:
TWO STAGE ORIF OF DISTAL
RADIUS FRACTURE WITH BONE
LOSS WITH PROXIMAL TIBIA
BONE HARVEST USING THE
AVITUS® BONE HARVESTER**

CLINICAL PRESENTATION:

59-year-old male fell from greater than 9 feet onto an outstretched left hand and wrist. He presented with an open, severely comminuted distal radius fracture with a 5cm bone loss. The patient was taken to the operating room for irrigation and debridement, open reduction and internal/external fixation. After debridement, a proximal tibia bone harvest was performed for the distal radius. The patient was then placed in a cast and followed by the orthopedic surgeon.

OPERATIVE TECHNIQUE:

The external fixator was removed and a dorsal spanning bridge plate was placed. The volar approach of Henry was utilized to expose the distal radius and remove the antibiotic spacer. The bone ends were sharply debrided to healthy appearing bone. The ipsilateral tibia was chosen as the autograft bone harvest site. Gerdy's tubercle was identified by palpation and fluoroscopically; then, a 1.5cm incision was made. Care was taken to divide the iliotibial band and periosteum in separate layers. The Avitus® Pilot Hole Creator was used to make a

POST-OPERATIVE FOLLOW UP:

The patient's wounds healed well, and pain from the tibia bone graft harvest site was resolved by 2 weeks. He remained non-weight bearing on the left leg for 6 weeks resulting from BMI of 44 and the large amount of bone graft harvested. He began weightbearing at 6 weeks without difficulty or pain from his tibia harvest site (EXHIBIT 6). Distal radius bony union was confirmed by radiographs and CT scan at 3 months (EXHIBIT 7, EXHIBIT 8) and underwent subsequent removal of hardware shown in the 1 year follow up radiographs in EXHIBIT 9. Patient was weaned from wrist orthosis and began therapy for wrist range of motion and strengthening. At 1 year follow up the patient had normal sensation to his hand, could make a composite fist and obtained wrist range of motion of 50 degrees in flexion and 40 degrees in extension.

**BY
STEVEN REGAL MD**

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CLINICAL PRESENTATION

59-year-old male fell from greater than 10 feet onto an outstretched left hand and was found to have an open, severely comminuted distal radius fracture with bone loss and median nerve dysfunction (**EXHIBIT 1**). He was taken to the operating room urgently for irrigation and debridement, carpal tunnel release, and open reduction with internal/external fixation. After a thorough debridement, there was a 5cm bone void in the distal radius metaphysis (**EXHIBIT 2**). Antibiotic cement was placed into the defect for stage 1 of the Masquelet technique (**EXHIBIT 3**). For stage 2, it was planned to remove the external fixator and antibiotic spacer and to perform revision open reduction internal fixation with autologous bone grafting from the ipsilateral proximal tibia. The Avitus® Bone Harvester would be utilized to obtain cancellous bone graft and marrow.

OPERATIVE TECHNIQUE

The external fixator was removed and a dorsal spanning bridge plate was placed. The volar approach of Henry was utilized to expose the distal radius and remove the antibiotic spacer. The bone ends were sharply debrided to healthy appearing bleeding bone.

The ipsilateral tibia was chosen as the autograft bone harvest site. Gerdy's tubercle was identified by palpation and fluoroscopically; then, a 1.5cm incision was made. Care was taken to divide the iliotibial band and periosteum in separate layers. The Avitus® Pilot Hole Creator was used to make a

1cm corticotomy to allow entrance into the tibial metaphysis. The Avitus® Bone Harvester was introduced through the cortical window and cancellous bone and marrow were quickly harvested under fluoroscopy (**EXHIBIT 4**). The Avitus® Bone Harvester is a sharp suction powered hollow curette that enables efficient harvesting of cancellous bone and marrow into the handle of the device. 35cc of cancellous bone and 30cc of bone marrow were harvested in 8 minutes (**EXHIBIT 5**). The harvest site was backfilled with synthetic calcium sulfate/phosphate. Periosteum, muscle fascia, and skin were then closed. The harvested bone graft was then placed into the radial defect followed by volar plate internal fixation.

POST OPERATIVE FOLLOW UP

The patient's wounds healed well, and pain from the tibia bone graft harvest site was resolved by 2 weeks. He remained non-weight bearing on the left leg for 6 weeks resulting from BMI of 44 and the large amount of bone graft harvested. He began weightbearing at 6 weeks without difficulty or pain from his tibia harvest site (**EXHIBIT 6**). Distal radius bony union was confirmed by radiographs and CT scan at 3 months (**EXHIBIT 7, EXHIBIT 8**) and underwent subsequent removal of hardware shown in the 1 year follow up radiographs in **EXHIBIT 9**. Patient was weaned from wrist orthosis and began therapy for wrist range of motion and strengthening. At 1 year follow up the patient had normal sensation to his hand, could make a composite fist and obtained wrist range of motion of 50 degrees in flexion and 40 degrees in extension.

CONCLUSION



The Avitus® Bone Harvester is a fast and efficient way of harvesting large volumes of autologous cancellous bone and marrow. This device makes the harvesting process quick and easy with a minimally invasive approach. I would recommend the Avitus® Bone Harvester when large amounts of cancellous bone are needed for trauma reconstructions and nonunion procedures.

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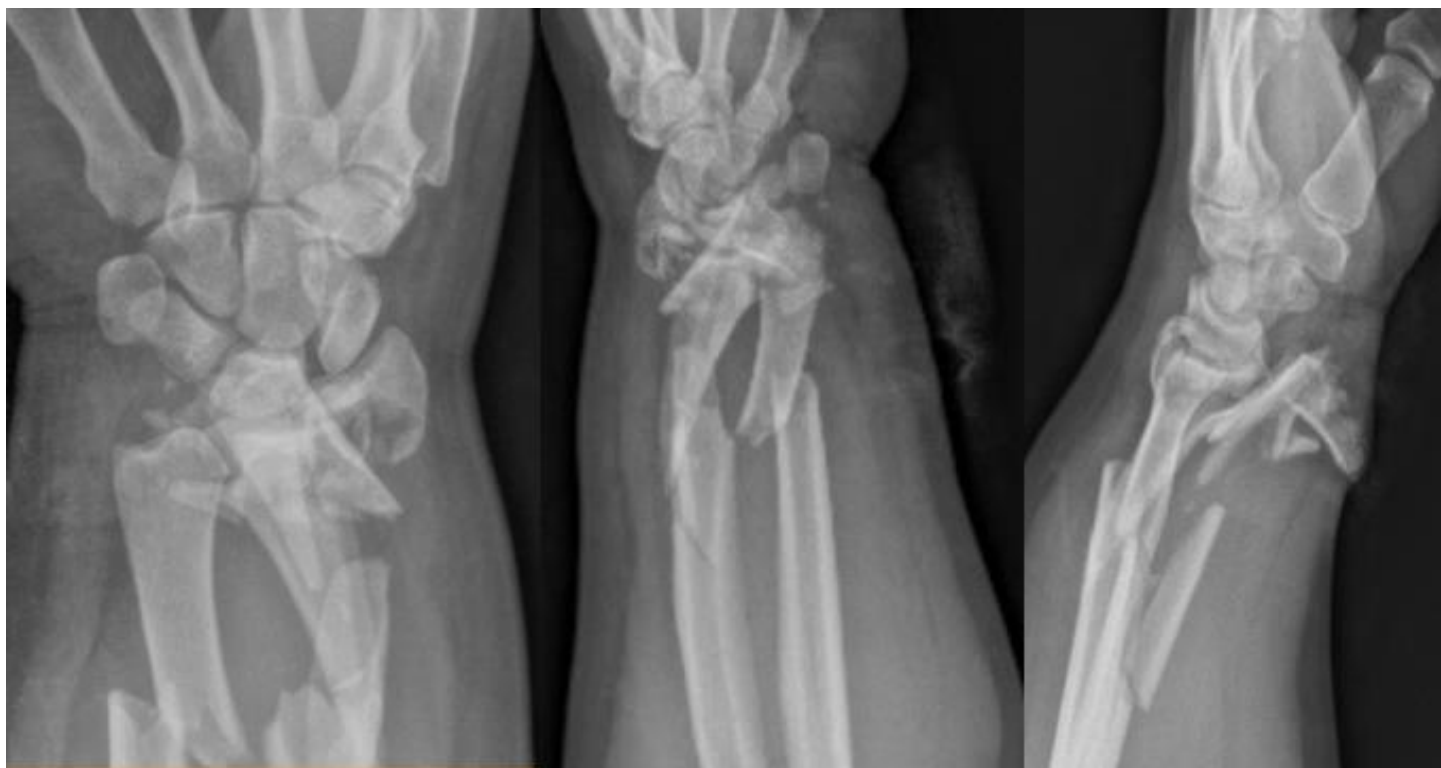


EXHIBIT 1 :: PA, oblique and lateral radiographs demonstrating severely comminuted distal radius and ulna fractures

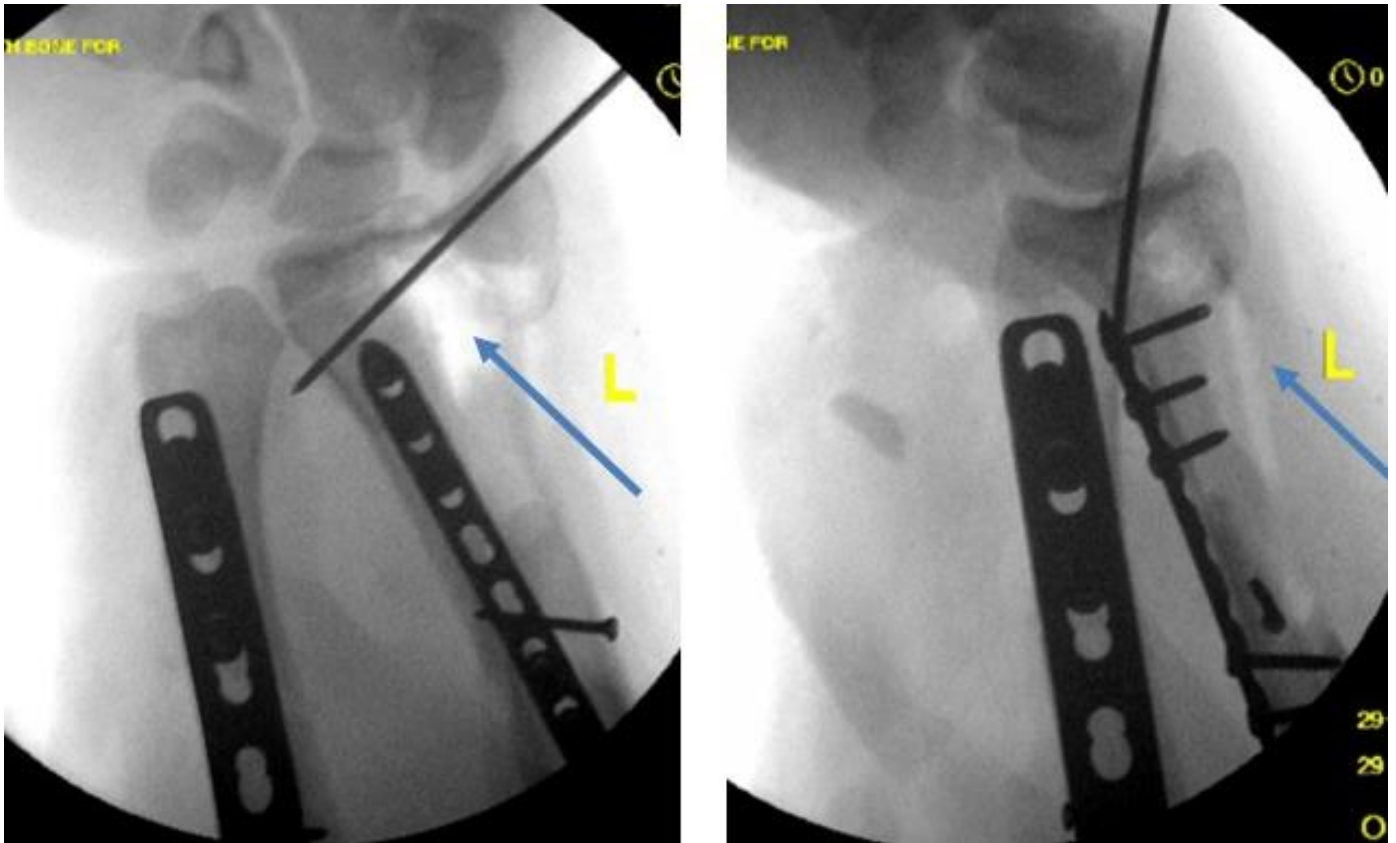


EXHIBIT 2 :: PA and lateral intra-operative radiographs depicting a 5 cm bone defect (arrows) in the radial metaphysis

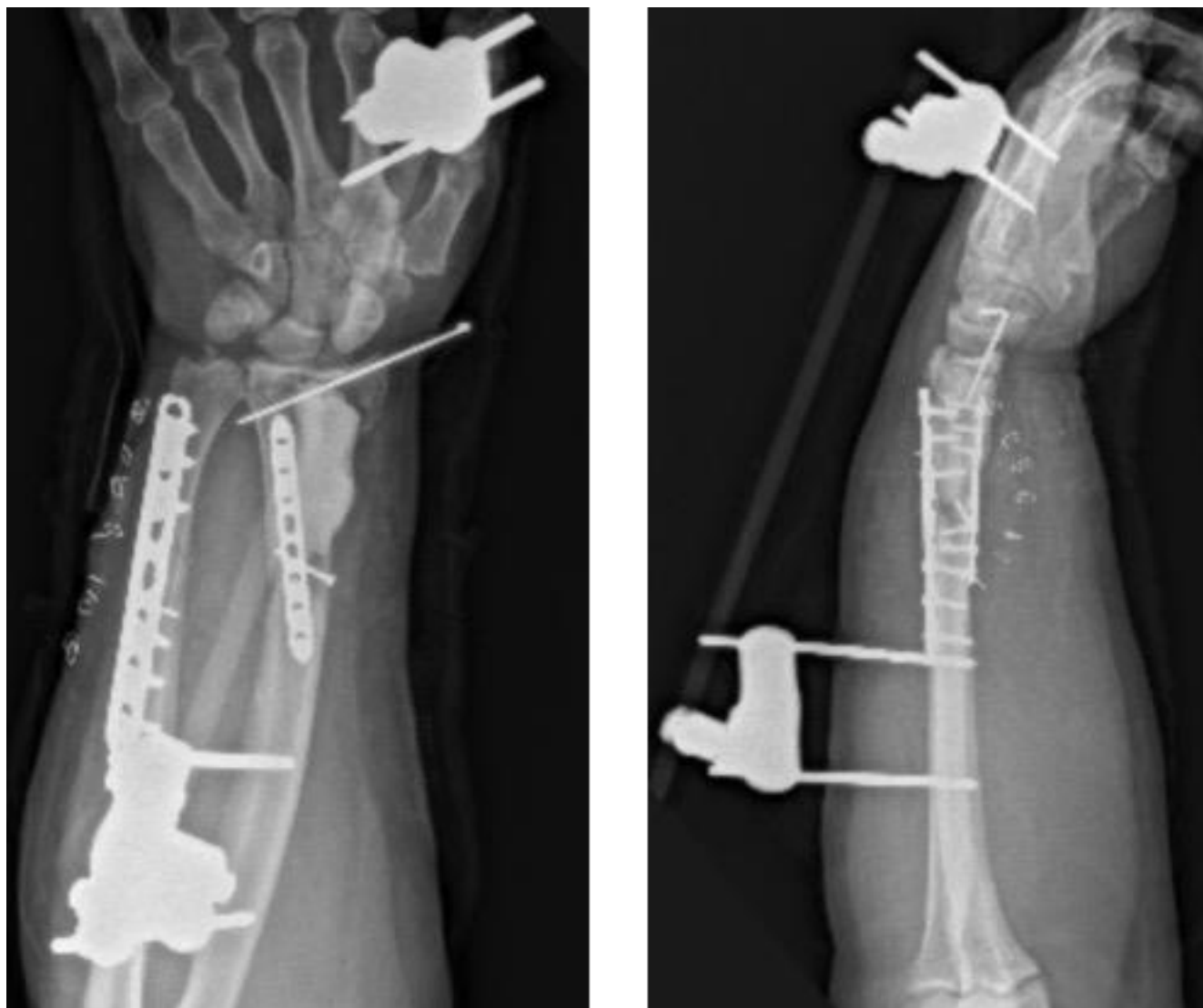


EXHIBIT 3 :: PA and lateral radiographs illustrating placement of antibiotic cement in the radial defect as well as internal/external fixation

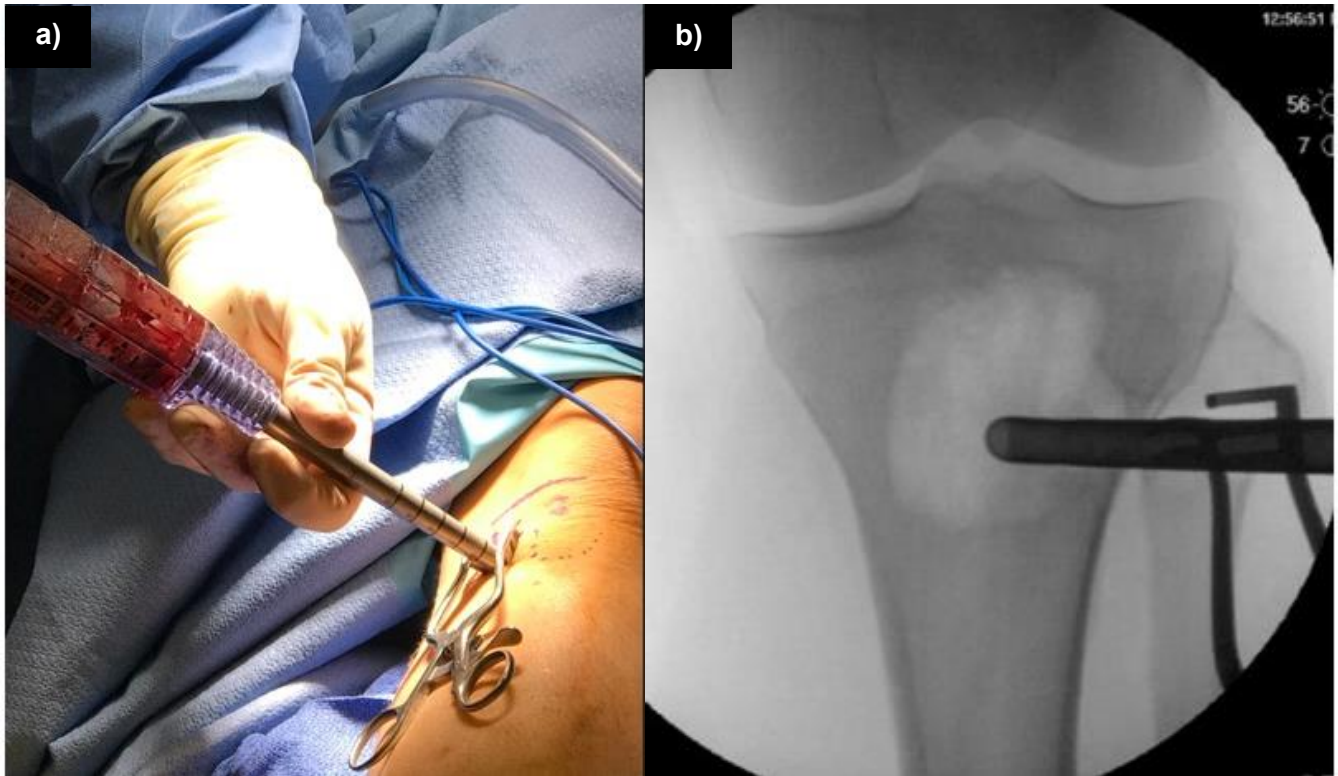


EXHIBIT 4 :: a) Clinical photo of proximal ipsilateral tibia bone harvesting with Avitus® Bone Harvester and b) intraoperative radiograph of harvest progression

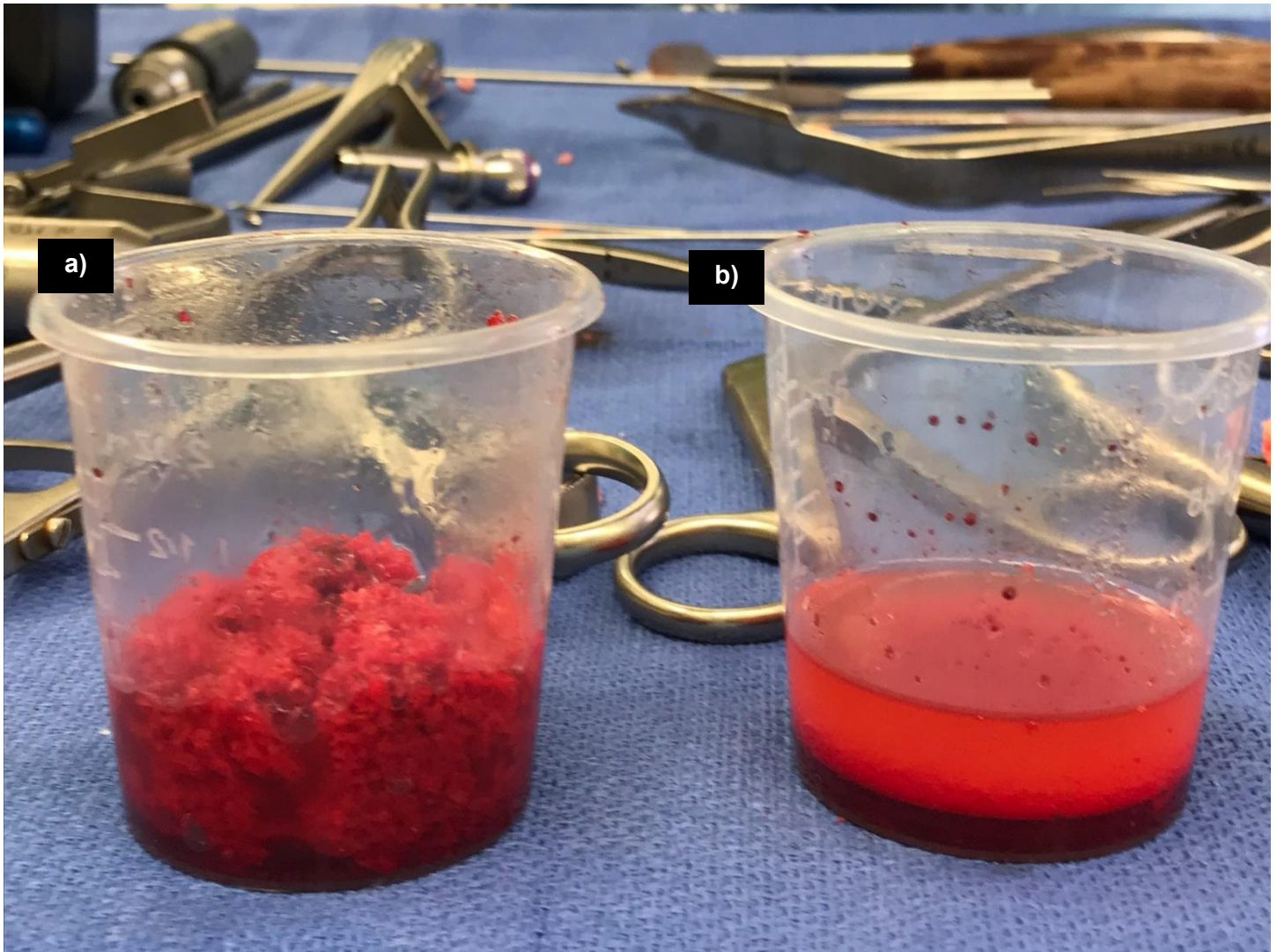


EXHIBIT 5 :: Clinical photographs of a) 35cc of autologous bone graft and b) 30cc of bone marrow procured with Avitus® Bone Harvester in 8 minutes



EXHIBIT 6 :: 3 months post-operative a) AP and b) lateral radiographs of left proximal tibia harvest site



EXHIBIT 7 :: 3 month post-operative a) PA and b) lateral radiographs showing bony union

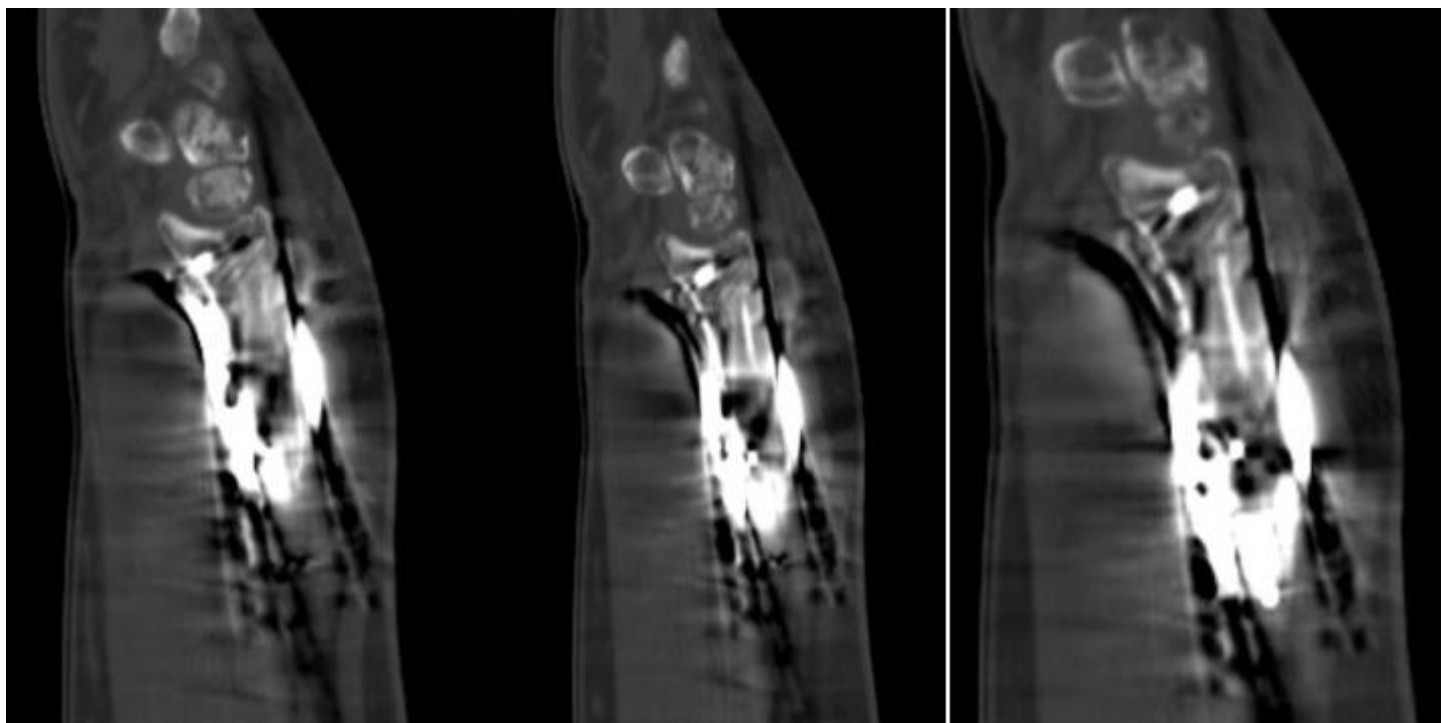


EXHIBIT 8 :: 3 month post operative CT sagittal plane slices showing distal radius bony union



EXHIBIT 9 :: 1 year post-operative a) PA, b) oblique and c) lateral radiographs, post hardware removal (the dorsal spanning bridge plate (on the radius) and the ulna plate were removed)