

Repair of an infected tibial shaft fracture in a 60-year-old alcoholic using nanocrystalline hydroxyapatite (NanoBone® Bone Graft)

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Preoperative

The patient was a 60-year-old male who presented to the emergency department with a midshaft fracture of the right tibia. Complicating conditions included chronic alcohol abuse, an enlarged liver and spleen, and renal insufficiency.

Four days after admission to the hospital, the tibial fracture was treated using an osteosynthesis plate with bicortical screws in the proximal segment and cortical screws in the distal segment of the tibia. Three additional screws were placed at approximately ninety degrees to the axis of the plate in the distal tibia to attempt to hold fragments in place. The patient was discharged 7-days following surgery.



Fig. 1. Postoperative radiographs

Surgical Procedure

Eight weeks after the initial surgical intervention, the patient was readmitted to hospital. Upon examination, the affected tibia was grossly infected and there was skin breakdown over the fracture site.

The patient was taken to the operating theatre and the osteosynthesis plate and all screws were removed. The infected portion of the tibia, including the original fracture site, was resected. A Septopal® Chain (Biomet, Berlin, Germany) of thirty beads, containing 7.5mg of gentamicin sulphate per bead, was placed in the resection site. The lower leg was stabilized with an external ring fixator. Swabs showed infection with multisensitive staphylococcus aureus.

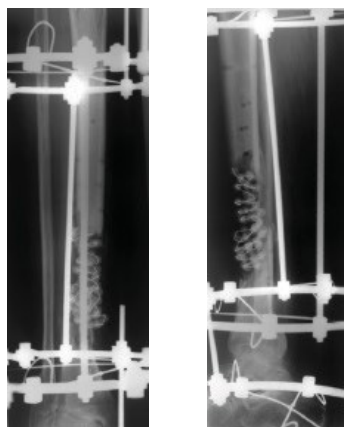


Fig. 2. 8-weeks postoperative radiographs demonstrating infection interventions

Bone Graft Substitute Clinical Case Series

After four weeks, the patient was returned to the operating theatre. The Septopal Chain was removed, and the resected portion of the tibial shaft was filled with 15ml of NanoBone Bone Graft Putty (Artoss GmbH, Warnemünde, Germany) and covered with Genta-Coll® fleece (Resorba Medical GmbH, Nuremberg, Germany) resorbable equine collagen containing gentamicin sulphate. To ensure a tube-like structure, the graft material was placed around a roll of Genta-Coll fleece as a placeholder.

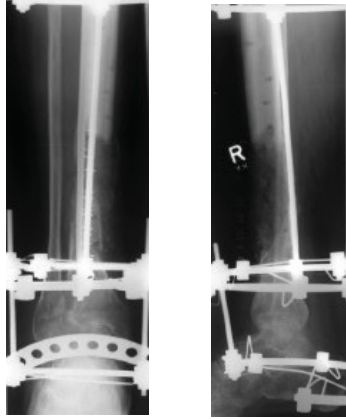


Fig. 3. 12-weeks postoperative radiographs showing removal of chain and filling with 15ml of NanoBone

Postoperative Course

Despite reduced compliance of the patient, discharge from hospital was possible after two weeks. The skin defect resolved at 7-weeks after surgery. The external ring fixator was removed 27 weeks following surgery. At twelve months post-grafting with NanoBone Bone Graft, the tibia appears fully healed on radiographs. The patient is weight-bearing and has returned to normal daily activities.

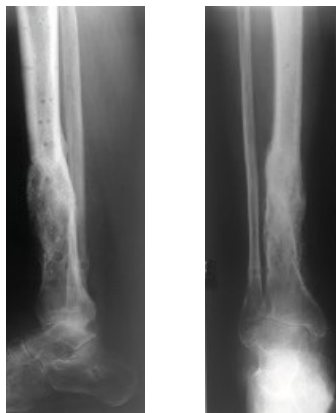


Fig. 4. 12-months postoperative radiographs demonstrating tibial healing