

Septic Ankle Arthrodesis with Autologous Fibula Transfer

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Introduction

In cases of ankle joint infection, the therapeutic goal is permanent infection control with restoration of full weight-bearing capacity of the extremity. In many cases, infection control can only be achieved through resection arthroplasty followed by ankle arthrodesis. The gold standard is arthrodesis using an external fixator to avoid foreign material in the infected bone. To achieve adequate consolidation of the arthrodesis, fixator wearing times of several months are routinely required. Insufficient consolidation of the arthrodesis is a frequent complication.

Methods

In our case series, we treated 14 patients aged between 34 and 89 years with septic arthrodesis (6 male / 8 female). In 9 patients, staphylococci were identified as the causative pathogen (including *Staphylococcus aureus* in 4 cases). In 3 patients *Enterobacterales*, in one patient *Cutibacterium acnes*, and in one patient *Streptococcus agalactiae* were detected.

A two-stage surgical approach was employed. Initially, resection arthroplasty was performed with application of an AO external fixator. Under targeted antibiotic therapy, soft tissue consolidation and infection control were achieved in all patients within 10 days. Subsequently, resection of the ipsilateral fibula was performed, followed by intramedullary stabilization of the ankle joint through the calcaneus, using the fibula as an autologous bone graft to provide additional fixation of the arthrodesis. An Ilizarov ring fixator was then applied. Radiological consolidation assessment was performed after 8 weeks using the RUST Score. Antibiotic therapy was administered for a total of 6 weeks with initial intravenous application. *Enterobacterales* were treated with ciprofloxacin during oral sequential therapy. For the remaining pathogens, non-biofilm-active antibiotic treatment was administered.

Results

In all patients, adequate consolidation of the arthrodesis was confirmed by CT after 8 weeks, allowing removal of the fixator. The bone grafting procedure enabled a marked reduction of duration of Ilizarov fixator treatment in this patient cohort — from the conventional 12 to 16 weeks to 8 weeks. Follow-up examinations demonstrated complete consolidation of all arthrodesis after 8 weeks (RUST Score >8). Infection control was achieved in all patients during follow-up over 12 to 24 months. No complications occurred at the fibula harvest site or at the insertion point of the fibula at the heel.

Conclusion

Given the poor wearing comfort and the risk of pin site infection, the reduction of duration of fixator treatment represents a significant benefit for patients. The use of autologous bone grafting allowed complete avoidance of foreign material within the bone, while still achieving rapid and complete consolidation in all patients.

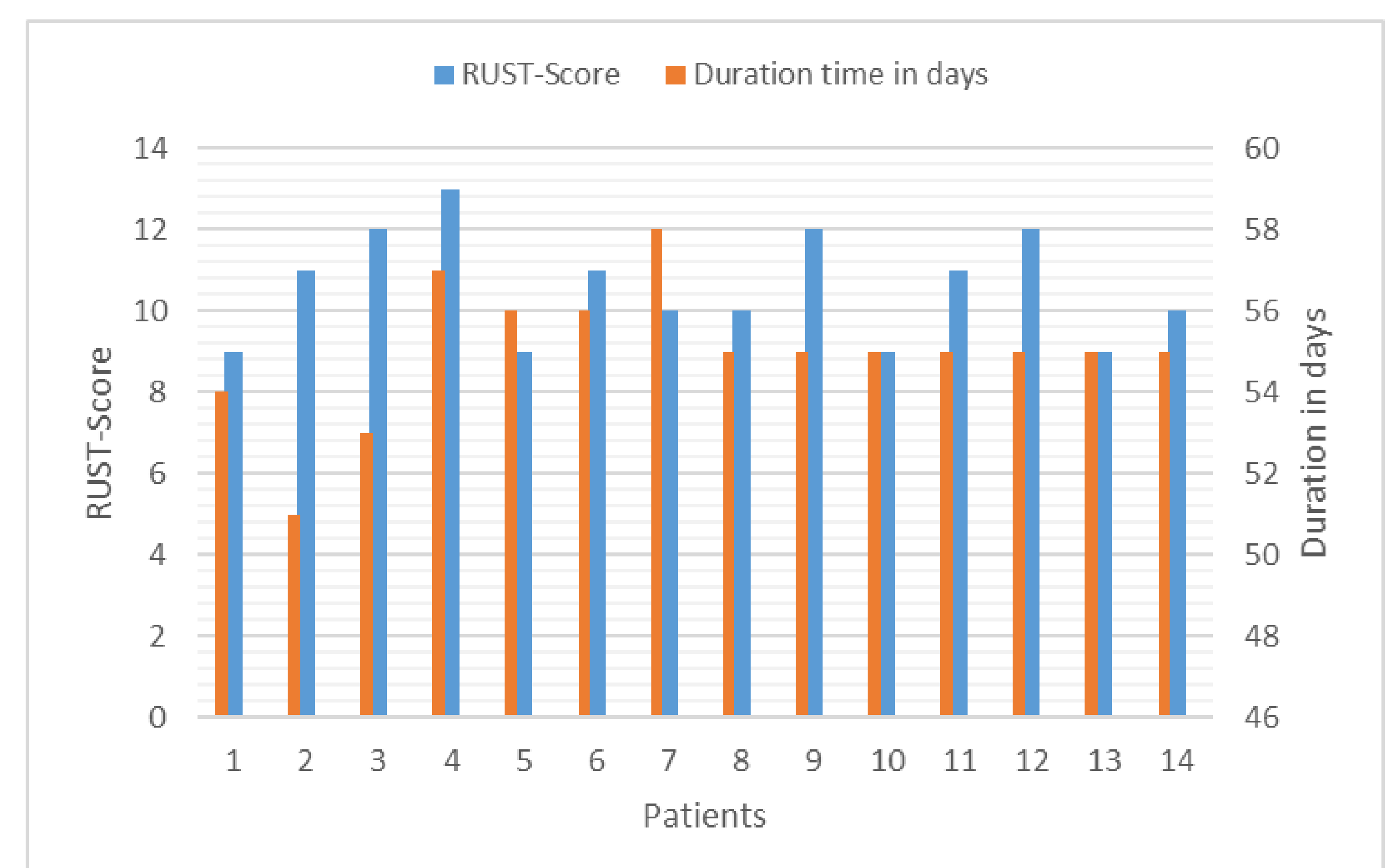


Fig. 1) Bar chart of all 14 patients showing the duration of external fixator treatment in days (orange) and the degree of bony consolidation assessed using the RUST score (blue).



Fig. 2) Clinical course of an infected open fracture. (A) Infected open fracture. (B) Status post resection arthroplasty. (C) Arthrodesis using an Ilizarov ring fixator.

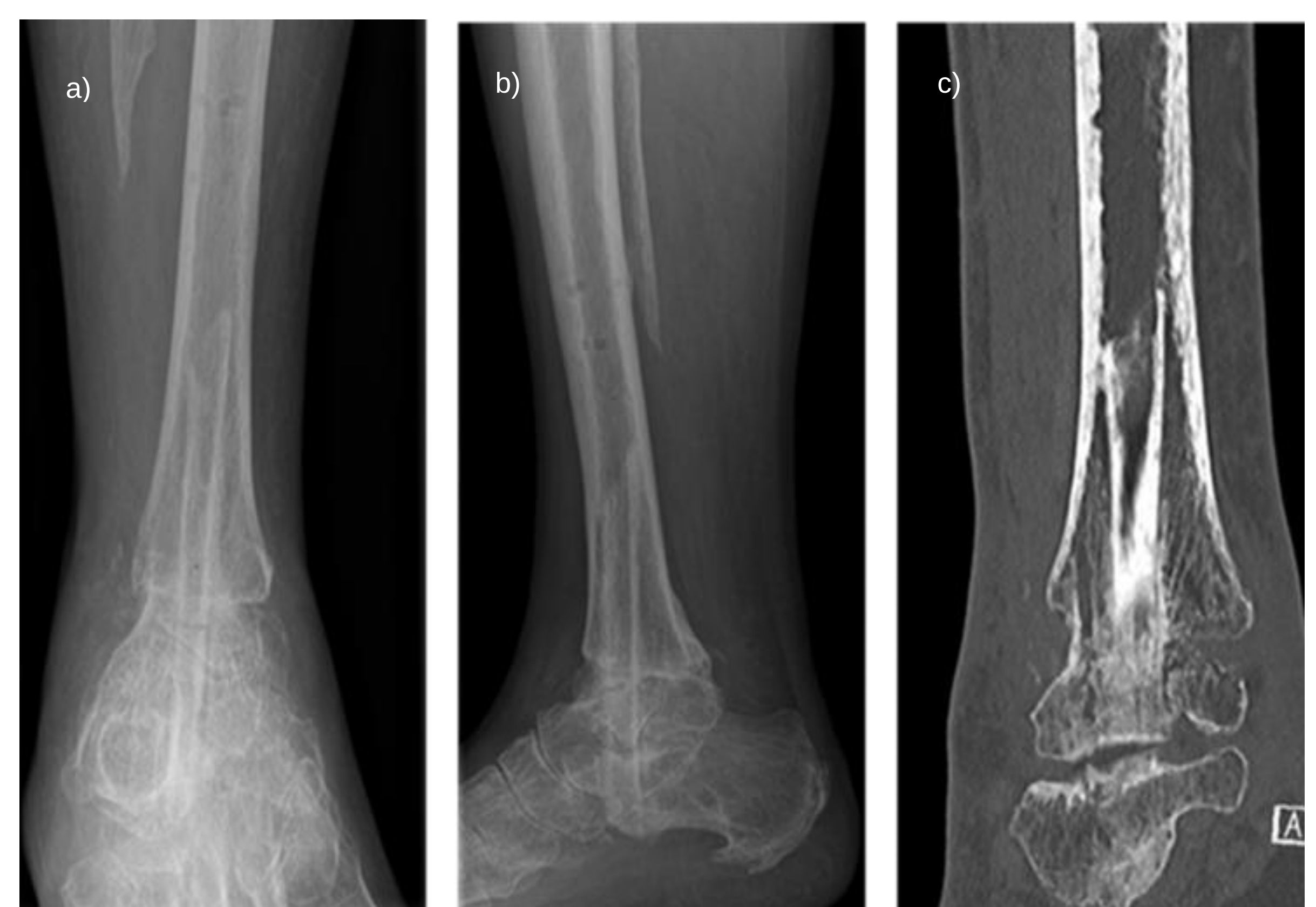


Fig. 3) Postoperative assessment of bony consolidation. (A) Anteroposterior (AP) radiograph. (B) Lateral radiograph. (C) CT scan after 12 weeks.