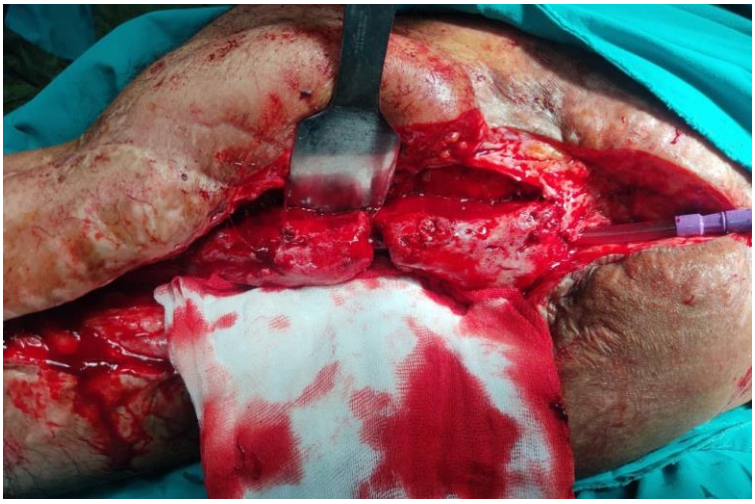
Can Internal Fixation Be Safe in Infection? A Staged Strategy for Femoral Nonunion in the Elderly

Background:
Infected nonunion is a challenging condition in orthopedic surgery, particularly in elderly patients with compromised bone quality and multiple comorbidities. It is defined as failure of fracture healing with persistent infection beyond the expected healing period. Management is further complicated by bone defects following debridement. While techniques such as bone transport, vascularized grafts, and allografts exist, their application in elderly patients is limited. The induced membrane (Masquelet) technique offers a biological solution combined with infection control.

Methods:
We present a case of a 60-year-old male with infected proximal femoral nonunion following failed fixation with a dynamic condylar screw after prior external fixation. A staged surgical approach was used. The first stage included implant removal, radical debridement, and placement of an antibiotic-loaded cement spacer. After 6 weeks, and upon improvement of clinical and laboratory infection markers, definitive internal fixation with local antibiotic augmentation was performed.

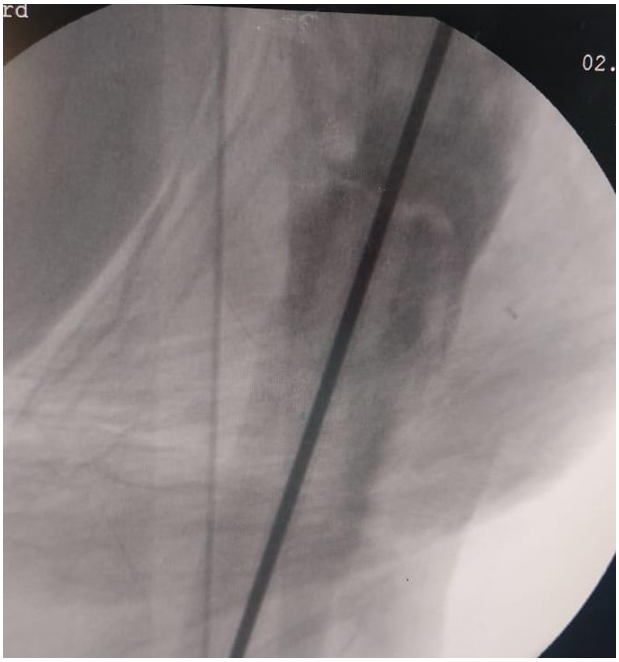
Results:
The patient achieved successful infection control and fracture union at 6 months. Internal fixation provided stable mechanical support, improved patient comfort, and facilitated early mobilization compared to external fixation. The induced membrane technique supported biological healing despite the compromised host factors.

Conclusion:
Staged internal fixation combined with the Masquelet technique is an effective strategy for managing infected femoral nonunion in elderly patients. It allows eradication of infection while providing mechanical stability and a favorable biological environment for healing. This approach is reproducible, cost-effective, and particularly suited for a growing elderly population with complex reconstructive needs.



Removal of implant and radical soft tissue and bone debridement

Bone Still viable after good debridement



(PMMA) cement spacer is implanted

Second Stage with definitive internal fixation

Median time to union was longer than average reaching 6 months