# Hardware Retention in the Management of Chronic Polymicrobial Infected Forearm Fracture: A Case Report

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## Introduction

Management of unstable fractures complicated by rare fungal infections presents a significant clinical challenge. Fungal infections of orthopedic implants are uncommon and are mostly reported in immunocompromised patients as opportunistic infections. Within the immunocompetent group, Candida is the most common. Acremonium species are an uncommon culprit in osteosynthesis associated infections (OAI), and there are no previous reports in the literature involving Acremonium species infection in this specific clinical setting. A clinical dilemma occurs in these cases, as the decision to retain hardware for stability often conflicts with standard recommendations for hardware removal to achieve infection control.

## Case Presentation

A 27-year-old male presented to the trauma team after sustaining multiple gunshot wounds to the abdomen and forearm. The patient sustained a comminuted distal third both-bone forearm fracture, which was classified as a grade 3 open fracture. Following initial stabilization and irrigation, the patient underwent a formal operative debridement and open reduction and internal fixation (ORIF) utilizing a bridge plating technique for both the radius and ulna. Antibiotic impregnated beads were also placed intraoperatively.

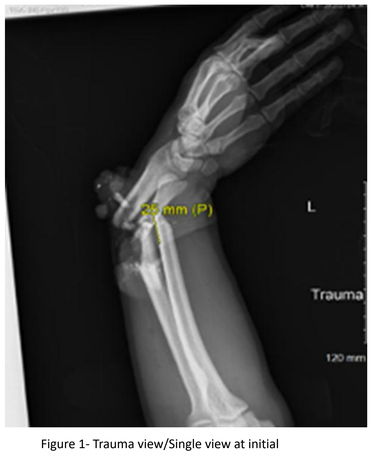


Figure 1- Trauma view/Single view at initial presentation- Demonstrating comminuted distal third both bone forearm fracture

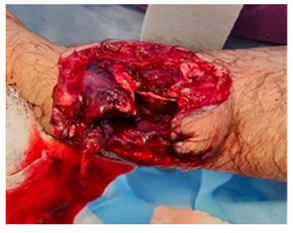

Figure 2- Image showing Grade 3 open fracture at initial presentation with severe soft tissue damage

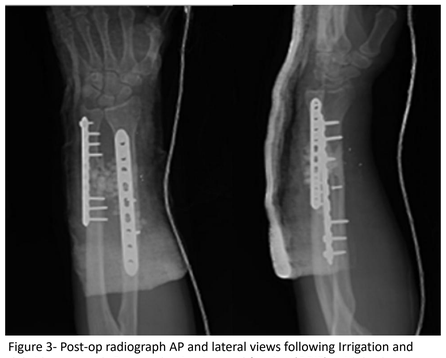

Figure 3- Post-op radiograph AP and lateral views following Irrigation and debridement with Open reduction internal fixation (ORIF), with bridge plating technique of both-bone fractures day one after presentation.

## Complications & The Clinical Dilemma

Twelve days following the initial ORIF, the patient developed an area of skin necrosis and exposed hardware consisting of the radial fixation plate. Tissue cultures from a subsequent excisional debridement grew Candida albicans and Acremonium species. Later culture samples revealed an additional fungal species, *Scedosporium apiospermum*. The Infectious Disease team recommended removing the plates, noting that the infection was unlikely to clear with retained hardware. However, the fractures remained unstable with no radiographic signs of healing, and the unstable nature of the fractures posed a serious risk of sacrificing the limb if deprived of structural stability. Ultimately, a multidisciplinary decision was made to retain the hardware, prioritizing mechanical stability while attempting to manage the ongoing infection.

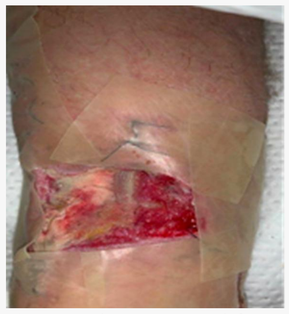

Figure 4- Wound appearance at 4 weeks from initial injury, non-healing with soft tissue defect most likely requiring a graft

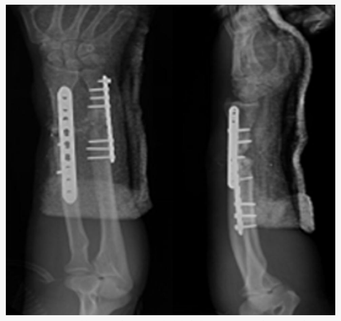

Figure 5- Six weeks post initial ORIF AP and Lateral views- No radiographic signs of callus formation noted

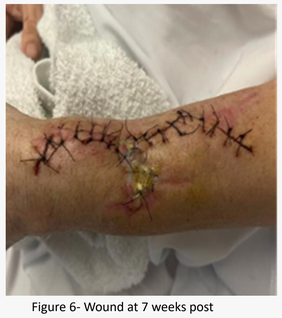

Figure 6- Wound at 7 weeks post injury

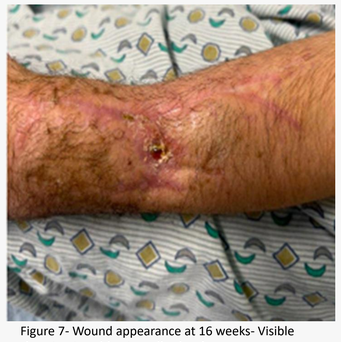

Figure 7- Wound appearance at 16 weeks- Visible sinus tract probing to radius hardware

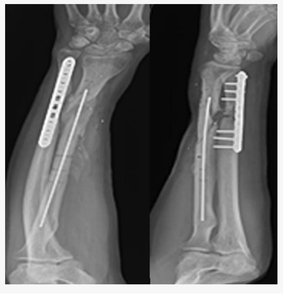

Figure 8- - Eighteen weeks post ORIF, and following radius hardware removal, repeat I&D and placement of intramedullary flexible k-wire

## Management

The patient underwent multiple staged, excisional debridement accompanied by wound VAC treatment. Antifungal Amphotericin beads were placed in the wound and around the implants. Systemic antifungal therapy initially included intravenous Anidulafungin, which was later switched to intravenous Amphotericin B, and eventually a new antifungal, Posaconazole, was initiated. Twelve weeks after the initial injury, the patient presented to the emergency department with purulent discharge, wound dehiscence, and exposed hardware. A hardware exchange was performed during his fifth debridement; the radial side plate was replaced with an antibiotic impregnated cement spacer, and a 2.0-millimeter diameter intramedullary k-wire was inserted to maintain stabilization.

## Conclusion

Medical management continued while the patient was monitored on suppressive therapy until reasonable stability could be achieved. A year from the initial injury, the infection was completely eradicated. The patient then underwent definitive fixation of his ulna and radius fractures, which was augmented by autologous iliac crest bone grafting. He subsequently achieved complete osseous union of his fracture at 14 months. This case demonstrates that in complex fracture-related fungal infections, prioritizing mechanical stability via hardware retention can be a successful strategy. A staged, multidisciplinary approach that couples continued attempts at infection eradication with maintenance fracture stabilization and debridement is crucial for limb salvage.

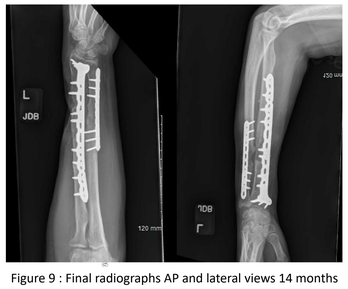


Figure 9 : Final radiographs AP and lateral views 14 months from index injury date. Complete osseus union of both bone fractures noted with appropriate bridging callus formation

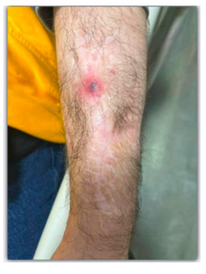

Figure 10 - wound appearance 14 months after injury. Consolidated graft with healing surgical wound

## References