

GUNSHOT INJURY CAUSING OPEN FEMUR FRACTURE TREATED WITH MASQUELET TECHNIQUE

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Introduction

The Masquelet induced-membrane technique is effective for treating critical-sized diaphyseal bone defects resulting from high energy trauma. We report a case of femoral fracture secondary to gunshot injury treated with this technique.

Report

A 26-year-old man had sustained a Gustilo-Anderson IIIA Winquist-Hansen III open distal third femur fracture from a shotgun injury. A 10cm devitalised anterolateral bone fragment was discarded during the initial debridement and external fixation surgery. He was subjected to another debridement and antibiotic bone-cement beads were inserted for a surgical site infection (Fig.1A,1B). The fixator was subsequently exchanged for a retrograde femoral nail, and an antibiotic-impregnated cement spacer was inserted (Fig.1C,1D). At 6weeks, the cement spacer was removed, and the bone defect filled with cancellous autogenous bone graft. Partial weight-bearing ambulation was commenced until fracture union was achieved at 18months post trauma (Fig.1E,1F).

Discussion

The Masquelet technique is a staged reconstruction of critical-sized bone defects, where primary introduction of a polymethylmethacrylate (PMMA) spacer induces formation of a highly vascularized and osteogenic pseudosynovial membrane envelope. The pseudomembrane becomes the substratum of a successful secondary bone grafting procedure by creating favourable local conditions for osteointegration, achieving an optimal state at 6-8 weeks. This process requires mechanical stability, which may be achieved with an external fixator or internal fixation. An intramedullary device has the advantages of permitting early weight-bearing due to its superior mechanical properties, is less cumbersome when compared with external fixators, and reduces the volume of bone graft required at the second stage.

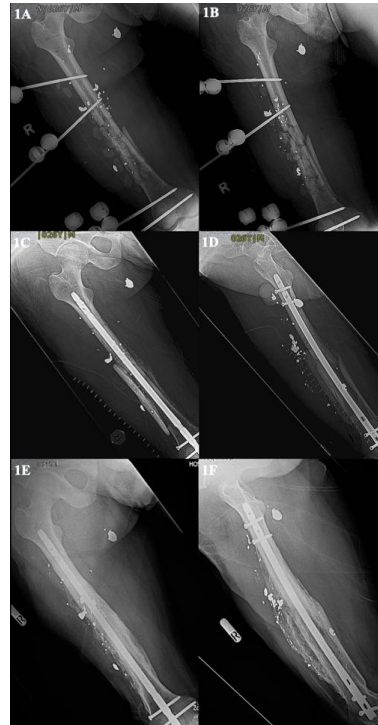


Fig 1A-F: X-rays taken after external fixation and antibiotics cement beads (A,B), 1st stage Masquelet (C,D), fracture union (E,F).

Conclusion

Masquelet technique is reliable in management of critical-sized bone defects. An intramedullary nail provides the necessary mechanical stability, allowing early mobilization and weight-bearing.

Reference

1. Masquelet, Alain, et al. "Bone repair using the Masquelet technique." *JBJS* 101.11 (2019): 1024-1036.
2. Klein, Céline, et al. "The Masquelet technique: current concepts, animal models, and perspectives." *Journal of tissue engineering and regenerative medicine* 14.9 (2020): 1349-1359.