**Management of Bone Defects of Long Bones Following Gun Shot Injuries Using Different Reconstruction Techniques: A Comparative Study**

***Mohamed Elkhosousy, MD***

**Purpose:** The aim of the study is to compare the different modalities of bone defect reconstruction following gun shot injuries in long bones.

**Methods:** 60 patients from Yemen with different types of gun shot injuries in long bones were included in our study. 26 had tibial injuries while 34 had femoral injuries, with bone defects ranging from 5 cm up to 16 cm. Of the 60, 42 patients had soft-tissue defects; they needed bone defect reconstruction in conjunction with soft-tissue reconstruction. In our study, 4 modalities of treatment were used including managing the defects with bone transport, acute compression and distraction osteogenesis, Masquelet technique with bone graft, and lastly reconstruction using fibula strut graft. All 4 methods were compared according to duration until consolidation, complications, refracture rate, quality of the new bone, and functional outcomes following treatment.

**Results:** The mean duration of consolidation was 7 months (range, 4-11 months) with the fibular strut graft the fastest method to achieve consolidation while using bone transport has the longest duration to achieve consolidation. However, fibular strut graft has the highest refracture rate especially when used in management of femoral defects. It takes up to 2 years for the fibula to achieve the same diameter of the main bone. Bone transport and Masquelet technique with bone graft had a high success rate of union and consolidation in spite of long duration of treatment; however, bone transport with external fixators had a better functional outcome and allows early postoperative mobilization. Acute compression and distraction osteogenesis have the same results as bone transport with a shorter duration of treatment as its use is limited to small defects.

**Conclusion:** Management of bone defects following gun shot injuries is challenging especially if combined with soft-tissue defects. Different modalities of bone defect management can be used to restore bone length and alignment. Each method has its own advantages and disadvantages, with bone transport to be the best method for hard consolidation and better functional outcomes.