Outcome Following the Failed Anatomical Reduction of Ankle Fractures

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Summary
The anatomic reduction and fixation of ankle fractures results in good functional outcome and few complications. If poor reduction and fixation is not recognized intra-operatively the early functional results are poor necessitating revision surgery.

Introduction
Primary osteoarthritis of the ankle joint is rare. This is due to the congruency of the talar dome within the tibial plafond and the ligamentous and syndesmotic constraints. Whilst osteochondral injury to the articular surfaces can occur during ankle fracture, careful anatomical reconstruction of the bony anatomy is vital to avoid damaging increases in contact pressure which may lead to symptomatic secondary osteoarthritis.

Methods
A retrospective study was completed examining the quality of anatomical reduction achieved and the functional outcome following the operative management of ankle fractures at a University teaching hospital. Consecutive patients undergoing surgery following ankle fracture between 1st January 2009 and 31st December 2009 were included in the study. The fracture pattern was classified using the AO classification system. The quality of anatomical reduction was recorded by the senior author from the immediate post-operative radiographs using the criteria described by Pettrone1. The post-operative functional outcome was recorded using the Lower Extremity Function Score (LEFS) and a modified American Orthopaedic Foot and Ankle Society (AOFAS) score. Post-operative complications and further surgery at follow-up were obtained from the case notes.

Results
Forty seven patients were included, 31 females and 16 males with a mean age of 51 years (17-74 years) and a mean follow-up of 17.41 months (13-24 months). Most injuries were type B (87.2%; 41 cases) with 9 B1 fractures, 22 B2 (two of these cases were open injuries), and 10 B3. The remainder (12.8%; 6 cases) were grade C injuries with only 2 C1, 1 C2, and 3 C3. Standard plate and screw fixation was used in the majority of cases (85.1%; 40 cases). In a further 5 cases a syndesmosis screw was also used. Two cases were managed with manipulation under anaesthesia and a moulded cast. The quality reduction and fixation was inadequate in 14 (29.8%) cases. Six of these cases went on to have further surgery due to debilitating ankle symptoms including one failed revision surgery complicated by wound infections leading to below knee amputation. Three patients with adequate reduction and fixation underwent surgery for removal of prominent metalwork. Mean LEFS following inadequate reduction was 47.5 (+/- 29.6) and AOFAS 39.6 (+/- 17.3). Mean LEFS following satisfactory reduction was 57.3 (+/- 21.0) and AOFAS 43.3 (+/- 14.9).

Conclusion
Anatomic reduction and fixation of ankle fractures produces good functional results and few complications. Inadequate reduction and fixation of ankle fractures leads to poor early clinical outcome requiring further surgery.