

Asymmetric Femoral Shaft Fracture Comminution: Does It Make a Difference?

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Purpose: The purpose of this study was to evaluate the effect of symmetry and extent of comminution on healing in femoral diaphyseal fractures treated with intramedullary nails.

Methods: 600 fractures were reviewed for diaphyseal comminution. Inclusion criteria included OTA 32C fractures with comminution extending >3 cm. Segmental bone loss cases were excluded. Two cohorts were evaluated: symmetric comminution (SC), with fragments circumferentially around the nail (Figure 1, left); and asymmetric comminution (AC), where comminution is eccentric to the nail with no surrounding fragments (Figure 1, right). Characterization included comminution and length. Outcomes included time to union (mRUST [modified Radiographic Union Score for Tibial Fractures]), nonunion, and infection. Demographic and other injury factors were reviewed.

Results: No difference in mechanism of injury, fracture classification, retro / antegrade nailing, or infection was found. Cohorts had similar age, sex, smoking status, body mass index, and time to full weightbearing. The AC cohort (n = 22) and SC cohort (n = 97) had an average of 11.4 cm and 11.7 cm length of comminution, respectively. Both cohorts demonstrated similar rates of union and frank nonunion. AC group had a 40.9% rate of union, 9.1% nonunion, and 50.0% asymptomatic nonunion refusing additional procedures. SC group had 40.0% rate of union, 5.2% nonunion, and 54.6% asymptomatic nonunion.

Conclusion: This study demonstrates extreme comminution (>3 cm) is a definable risk for delayed healing or nonunion. AC is not an infrequent finding with no clearly established methodology for treatment. "Bridging" nails through the comminuted region of the femoral shaft do not provide sufficient stability to achieve the high rate of union historically found with routine femoral nailing (>97%). Patients should be counseled as to the potential need for secondary procedures in order to achieve union.



SYMMETRIC COMMINATION (SC)

ASYMMETRIC COMMINATION (AC)

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device they wish to use in clinical practice.