

Improved Reduction and Alignment of Distal Third Tibial Fractures With Suprapatellar Intramedullary Nailing

Matthew Hague MBChB; Dominic Xavier Texeira Esq; Thomas Richard Edward Anderson MBBS; Michael Williamson MD; Alex Trompeter MBBS

St George's Hospital NHS Foundation Trust, London, United Kingdom

Purpose: Tibial fractures are routinely managed with intramedullary nailing using both the infrapatellar and, increasingly, the suprapatellar intramedullary entry technique. In treating distal third tibial fractures, restoration of the axis alignment, and therefore accurate reduction of the distal fragment, minimizes the risk of tibiotalar joint malalignment and optimizes outcome. The aim of this study was to investigate whether there was a difference in accuracy of reduction and axis alignment when nailing distal third tibial fractures using either the suprapatellar or the infrapatellar tibial nailing entry technique.

Methods: Data was retrospectively analysed from our prospectively collected trauma database in a UK major trauma center. Only distal third tibial fractures involving a fracture within 2 Müller squares of the tibial plafond were included. Postoperative AP and lateral radiographs of the tibia were analyzed using the Paley method for deformity assessment. Coronal and sagittal plane malalignment were measured. The coronal plane malalignment was defined on the AP radiograph as the difference between the anatomic axis of the proximal segment and the axis line through the distal segment as defined by the anatomic lateral distal tibial angle (aLDTA). The sagittal malalignment was defined on the lateral radiograph as the difference between the anatomic axis of the proximal segment and the axis line through the distal segment as defined by the anatomic anterior distal tibial angle (aADTA).

Results: A total of 125 distal tibial fractures were included and analyzed. 74 intramedullary nails were inserted using the suprapatellar technique and 51 intramedullary nails were inserted using the infrapatellar technique. In the coronal plane, mean malalignment in the suprapatellar technique group was $2.84 \pm 0.69^\circ$ and $4.73 \pm 0.92^\circ$ in the infrapatellar technique group ($P < 0.01$). In the sagittal plane, mean malalignment in the suprapatellar technique group was $4.03 \pm 0.84^\circ$ and $3.45 \pm 0.91^\circ$ in the infrapatellar technique group ($P = 0.42$). Confidence intervals were calculated at a 95% level.

Conclusion: Suprapatellar tibial nailing is an increasingly accepted technique in the management of distal tibial fractures. It is shown here that the suprapatellar technique demonstrates improved radiographic alignment of the distal tibial segment in the coronal plane compared to the infrapatellar technique. We conclude that the suprapatellar technique may be potentially superior in preventing malalignment when treating distal third tibial fractures, leading to possible improved clinical outcomes.