

All Lateral Versus Medial and Lateral Flexible Intramedullary Nails for the Treatment of Pediatric Femoral Shaft Fractures

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Purpose: Multiple techniques for flexible intramedullary fixation of pediatric femur fractures have been described. To our knowledge, no study comparing medial and lateral entry versus all lateral entry retrograde nailing has been reported. The purpose of this study is to compare surgical outcomes, radiographic outcomes, and rates of complications between these techniques.

Methods: An IRB-approved, retrospective review of patients treated by retrograde, dual flexible intramedullary fixation of femur fractures was performed at a Level I pediatric trauma center from 2005-2012. Demographics, blood loss, and operative time were collected from the medical and surgical record. We assessed radiographs for fracture pattern and canal fill as well as shortening, and angulation at the time of osseous union. Rates of symptomatic hardware and hardware removal were noted. Data was compared between patients treated with all lateral entry nailing and those treated with medial and lateral entry nailing using the Student *t*-test and correlation statistics.

Results: 282 children with femoral shaft fractures were treated with retrograde flexible intramedullary fixation using Ender's stainless steel nails (Richards). 109 were treated with two lateral entry nails and 173 were treated with one medial and one lateral entry nail according to surgeon preference. There were no statistical differences in gender, weight, body mass index, blood loss, or fracture pattern between the two groups. The average total anesthesia time was 31 minutes shorter in the all lateral group ($P < 0.0001$). There was no difference between the techniques in shortening or coronal angulation at union, regardless of fracture pattern. In comminuted fractures, the all lateral group demonstrated less sagittal angulation (0.6° vs 3.3° , $P = 0.0162$). In the all lateral group, there was a strong correlation between fill of the canal and reduced shortening at union. No statistical differences were found in the presence or degree of varus alignment, procurvatum, or recurvatum between the two constructs. However, all femurs that healed with greater than 10° of valgus were instrumented with the all lateral technique ($P = 0.015$). There were no differences between the groups in the rate of symptomatic hardware removal or surgical complications.

Conclusion: Final fracture alignment, surgical complications, and rates of symptomatic hardware are clinically comparable between pediatric femur fractures treated with all lateral entry flexible nailing and those treated with medial and lateral flexible nailing. The all lateral technique is potentially a faster procedure, although when using this construct, specific attention should be paid to percentage of canal fill of the nail and ensuring that the fracture is not reduced in a valgus position.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.