

Fixator-Assisted Nailing (FAN) for Distal Femoral Valgus Deformity

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Background

- Correction with external fixation is accurate and adjustable
- Prolonged external fixation treatment is difficult for patients to tolerate
- FAN provides the accuracy of external fixation and the comfort of internal fixation

Methods

- IRB-approved, retrospective study (2002–2009)
- 22 patients (24 limbs)
- 8 males, 14 females
- All had valgus in the distal femur
- Average age = 35 years (range, 14–59 years)
- Average pre-op mechanical lateral distal femoral angle (mLDFA) = 81° (range, 67–88°)
- Average follow-up = 19 months (range, 3–76 months)
- Implant: retrograde nail with diameter of 10–14 mm
- Pre-op mechanical axis deviation (MAD) in 3 limbs was medial (range, 10–40 mm) due to concomitant proximal tibial vara

Results

- Average pre-op mLDFA was 81° (range, 67–88°) and post-op was 90° (range, 80–104°) ($p < .001$)
- Average pre-op MAD was 32 mm (range, 6–64 mm). Average post-op MAD was 12 mm (range, 0–50 mm) ($p < .001$).

COMPLICATIONS

- 2 (8%) of 24 limbs had complications
 - 1) Bone infection: resolved with irrigation, débridement, and I.V. antibiotics
 - 2) Gait disturbance: resolved with aggressive physical therapy

Conclusion

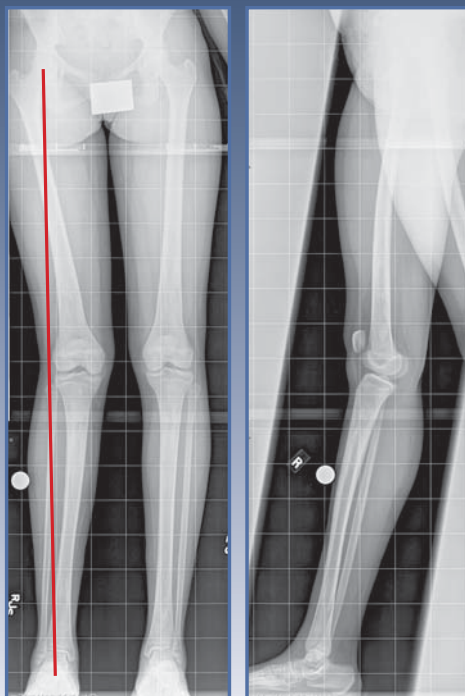
- Fixator-assisted nailing combines the accuracy of external fixation with the comfort of internal fixation
- Fixator-assisted nailing is effective for distal femoral valgus deformity correction
- Complications were easily resolved with appropriate treatment

References

- Eralp L, Kocaoglu M. Distal tibial reconstruction with use of a circular external fixator and an intramedullary nail. Surgical technique. J Bone Joint Surg Am. 2008;90 Suppl 2 Pt 2:181–94.
- Gugenheim JJ Jr, Brinker MR. Bone realignment with use of temporary external fixation for distal femoral valgus and varus deformities. J Bone Joint Surg Am. 2003;85(7):1229–37.
- Kocaoglu M, Eralp L, Bilen FE, et al. Fixator-assisted acute femoral deformity correction and consecutive lengthening over an intramedullary nail. J Bone Joint Surg Am. 2009;91(1):152–9.

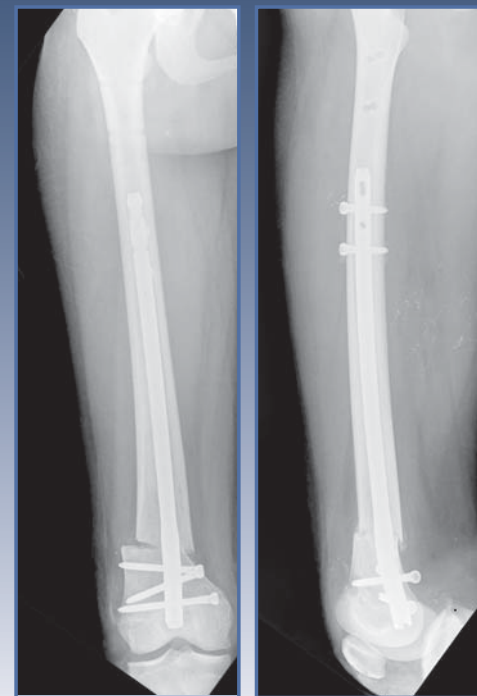
CASE EXAMPLE

PRE-OP



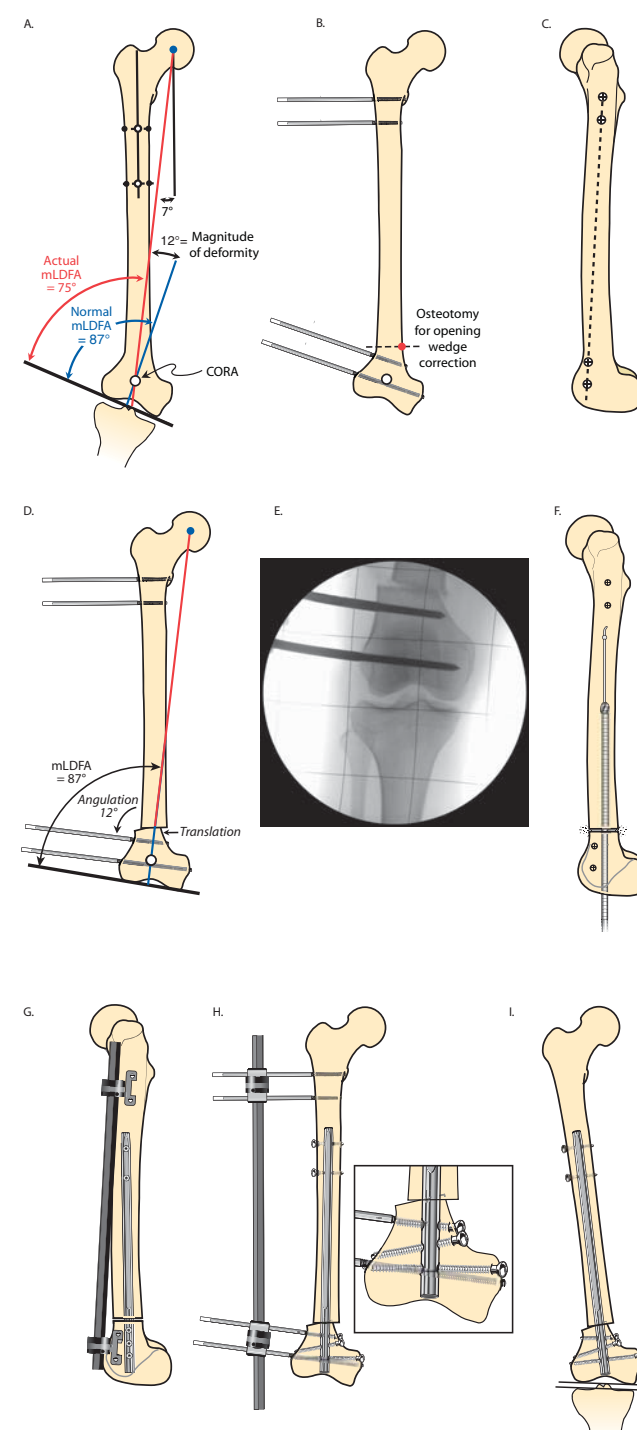
Eighteen-year-old female patient with right genu valgum. Preoperative mLDFA was 79°.

POST-OP



A 10.5-mm diameter retrograde knee nail was inserted. Corrected mLDFA was 93°.

TECHNIQUE



A. 12° valgus deformity of the distal femur (mLDFA, mechanical lateral distal femoral angle; CORA, center of rotation of angulation).

B. Insertion of two pairs of external pins from the lateral side. Plan for the opening wedge osteotomy.

C. Distally, the pins are anterior in the femur to keep them out of the planned nail path. Proximally, the pins are mid-diaphyseal because the retrograde nail will stop short of the pins.

D. Deformity corrected with angulation and translation.

E. Radiograph of distal pins.

F. Femur is reamed in a retrograde direction. The reamings exit the osteotomy site and serve as an autogenous bone graft.

G. Nail is then inserted and locked proximally and distally. The fixator body is anterior to the femur so that it does not obstruct the visualization of the femur by the image intensifier.

H. Distal screws are inserted medially. Detail of screw pattern.

I. Fixator is then removed, and the nail maintains the correction.

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