Antegradе Femur: Step by Step

Internal Lengthening Nail Course
Baltimore Deformity Precourse
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Disclosures

Ellipse: Consultant
Stryker: consultant and royalties
Smith and Nephew: consultant
Technical Details:

**Intramedullary Nails**
- Diameter: 8.5, 10.7 and 12.5 mm
- Sizes: 215–365 mm

**Telescoping Rod Diameter (Male)**
- 3.5 mm = 6.5 mm
- 10.7 mm = 8.5 mm
- 12.5 mm = 10.0 mm

**Locking Screws**
- 3.5 mm Locking Screws: length = 20–60 mm
- 1.0 mm Locking Screws: length = 20–60 mm
- 3.0 mm Locking Screws: length = 20–75 mm

**End Cap**
- Sizes: Standard

*Also, available with a 10° Proximal Bend*
*Also, available with a 10° Distal Bend*

*0.6 mm nails have a proximal geometry of 10.7 mm located 40 mm from the top of the nail. 10.7 mm and 12.6 mm nails have a consistent diameter throughout.*
Implant Selection

2 Options:
1. Trochanteric Entry
2. Piriformis Fossa Entry

Piriformis for greater than age 18
Trochanteric entry for less than 18
Limb Length Discrepancy Calculation

Assess LLD
Understand source of LLD

Limb Length Discrepancy = (d₂ - d₁) + LIFT =
LLD 30 mm
Femur LLD = 22 mm
Osteotomy Calculation

Rod is pulled out of Distal fragment as Lengthening proceeds

Goal is to have 5 cm in Distal segment at end of Lengthening

Distal thin tip starts At 3 cm

Calculate the following to determine the measurement from the distal end of the implant.

A) 3.0 cm (distal distraction rod length).
B) The desired amount of bone lengthening (up to 8.0 cm).
C) Add an additional 4.0 cm to 6.0 cm.

\[ A + B + C = \text{Measurement from the Distal End of the Implant to Perform Osteotomy.} \]

This measurement determines the suggested level of the osteotomy.
SNL= osteotomy + lengthening + 50 + 30
STEP : Patient Positioning

Supine on a radiolucent table with a bump under the ipsilateral buttock
STEP: Surgical Incision

Locate entry point and make 1.5 cm longitudinal incision for drill bit venting*.

*Drill bit venting is conducted at the level of the corticotomy to decrease intramedullary pressures during reaming as well as facilitate bone grafting of the corticotomy site with bone reamings.
STEP: Venting of the Femoral Intramedullary Canal and First Step of the Osteotomy

Three holes are drilled at the osteotomy site.
4.8 mm
New drill
STEP : Guidewire Insertion

Incision is made for access to Piriformis Fossa and Guidewire is inserted up to distal end of femur.
STEP : Intramedullary Reaming

Canal is reamed up to the distal end of the Nail

Reamed up to the distal end of the Nail
Ream 2 mm larger than nail diameter
Rotational markers or Steinman Pins are inserted out of the path of the nail.
STEP : Guidewire Removal

Lengthening nails is solid
Insert PRECICE Nail with use of assembled Antegrade Femoral Guide Arm
STEP : Complete Osteotomy of the Femur
STEP: Complete PRECICE Nail Insertion

Advance PRECICE implant across gap and into distal end of the femur

Nail is passed across osteotomy site up to distal end of the femur
Straighten anterior bow by lifting leg

Resist tendency for femur to go into varus with Manual pressure
STEP : Osteotomy Confirmation

Distal leg and bone are rotated slightly to confirm osteotomy.
Proximal and Distal Locking Screws Insertion
Insert distal screws first

Insert proximal screws via jig after rotation dialed in
16 y/o male with congenital LLD 45 mm
LLD = 4.5 cm
25 y/o male
Congenital LLD
3 months postop!

Troch entry
Nail can lead To varus
Clubfoot, LLD 1 inch

Piriformis Entry- my preference
In adult
SNL = 170 + 40 + 50 + 30
SNL = 290

Nail choice is 305

Expect 6.5 cm of thick nail in Distal segment
12 year old male with congenital LLD
Technical Points

• Trochanteric for age 18 and younger
• Piriformis for adult
• Reaming
  – 10.5 for 8.5 nail
  – 12.5-13 for 10.7 nail
• Rotate around nail to complete osteotomy
• Insert distal locking first and then dial in rotation and then insert prox locking with jig
• Distraction
  – 0.33 mm 4x per day for 4 days
  – Then decrease to 0.33 mm 3x per day