

Extramedullary Internal Limb Lengthening

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Summary:

Extramedullary implantable limb lengthening (EMILL) uses an implantable nail attached to the bone like an internal-external fixator. Cantilever forces can be neutralized by inserting a small diameter solid rod as a guide inside the medullary canal. EMILL expands the indications for internal limb lengthening to younger children with smaller diameter and length bones and to bones with impassable medullary canals. One must follow the same principles as with external fixation lengthening including prevention of joint subluxation and contracture by preparatory surgery (eg, pelvic osteotomy), soft tissue releases, temporary arthrodesis, and bracing.

Lengthening should be restricted to amounts no >5 cm to avoid complications. A retrospective review of EMILL cases performed at the authors' institution since 2015 was performed. Thirteen patients underwent 14 EMILL procedures; 10 femurs and 4 tibias. Twelve of 13 patients lengthened to within 5mm of their preoperative goal. There were no mechanical nail failures. No patient had a significant axial deviation of the bone during distraction. Three patients required unplanned operations. EMILL is safe and effective in patients who would otherwise require external fixation.

INDICATIONS FOR EXTRAMEDULLARY LENGTHENING

Femur

- (1) Age under 7 with open greater trochanteric physis
- (2) The diameter of bone < 14.5 mm
- (3) Length of bone between physes at least 140 mm
- (4) Inability to place intramedullary implant due to impassable medullary canal

Tibia

- (1) Open proximal tibial physis with ankle joint present
- (2) The diameter of bone < 14.5 mm
- (3) Length of bone between physes at least 150 mm
- (4) Inability to place intramedullary implant due to anatomy or retained implant.

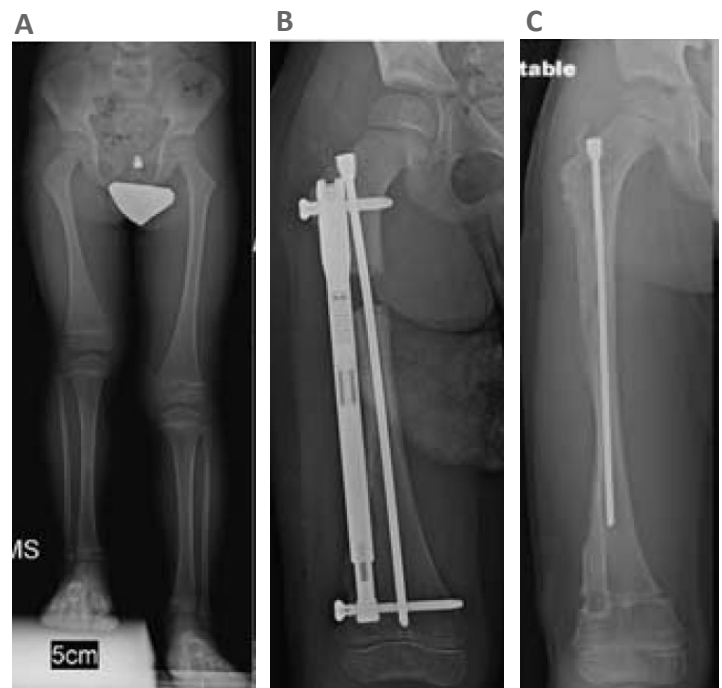


FIGURE A, AP standing x-ray of a patient with right congenital femoral deficiency. The diameter of the femoral diaphysis is too narrow to accommodate an intramedullary lengthening nail, although the length of the bone is adequate. The hip is well covered and the knee was stable on clinical examination. **B**, Gradual (0.75 mm/d) lengthening with an extramedullary trochanteric **PRECICE** nail over the **SLIM** rod. **C**, Postoperative anteroposterior and lateral x-ray at the time of removal of an extramedullary femoral lengthening nail. Note the distal metaphyseal channel where the nail was docked into the bone.

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