

Lengthening with Monolateral Ex Fix vs. Magnetic IM Nail in Congenital Femoral Deficiency (CFD)

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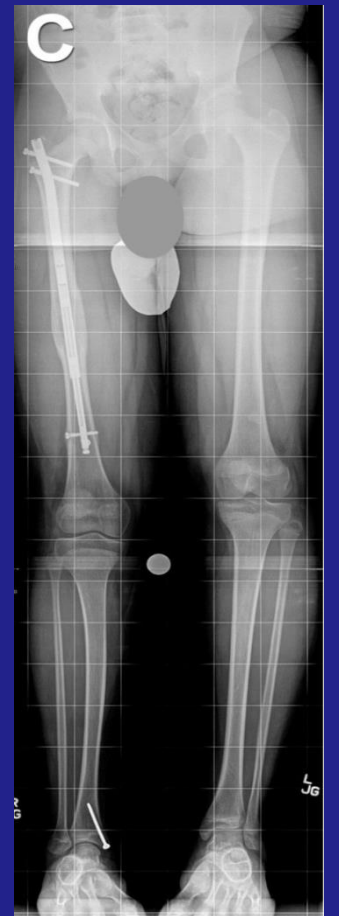
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Objective:

Compare outcomes of lengthening for CFD with **monolateral ex fix** versus **magnetic IM lengthening nail**

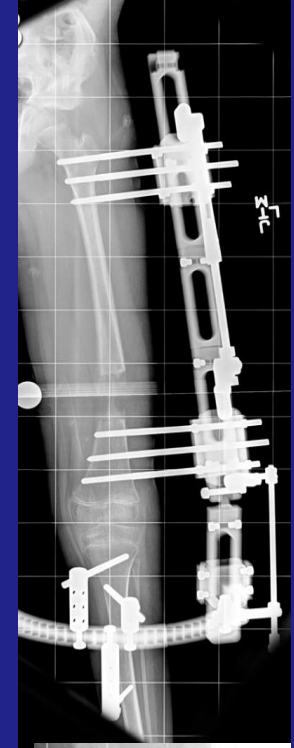


Monolateral External Fixator

- 6 half pins; perpendicular to the mechanical axis
- Hinged at knee axis to prevent knee subluxation
- Femoral osteotomy at distal metaphysis

Magnetic IM Lengthening Nail

- Troch entry to avoid AVN and osteotomy at apex of bow on lateral view
- Brace knee during lengthening to prevent subluxation
- Prophylactic ACL/PCL reconstruction if knee instability



Methods

- IRB-approved retrospective review: January 2006 to January 2015
- Minimum 1 yr follow-up after lengthening

Monolateral Ex Fix Group:

- 32 patients (10 males / 22 females)
- Mean age: 9.4 ± 3.8 yrs
- Prior hip surgery: 23 (11 Super Hip / 12 Dega)
- Prior knee surgery: 10 (Super Knee)
- Mean lengthening goal: 5.6 ± 1.8 cm

Methods

Magnetic IM Nail Group

- 30 patients (14 males / 16 females)
- Mean Age: 15.4 ± 4.9 yrs
- Prior hip surgery: 12 (8 Super Hip / 4 Dega)
- Prior knee surgery: 6 (Super Knee)
- Mean lengthening goal: 5.0 ± 1.4 cm

Results

- Similar final results in both groups:
 - Distraction Index (mm/day): Ex fix: 0.7; IM: 0.9; $p=0.99$
 - Consolidation Index (days/cm): Ex fix: 29; IM: 35; $p=0.08$
 - Final ROM
 - Flexion: Ex fix: 120° ; IM: 119° ; $p=0.90$
- Lengthening achieved:
 - Ex fix: 5.55 ± 1.74 cm
 - IM Nail: 4.75 ± 1.40 cm
- Significantly fewer adverse events in IM nail group ($p<0.001$)
 - Ex fix: 31 adverse events
 - IM Nail: 8 adverse events

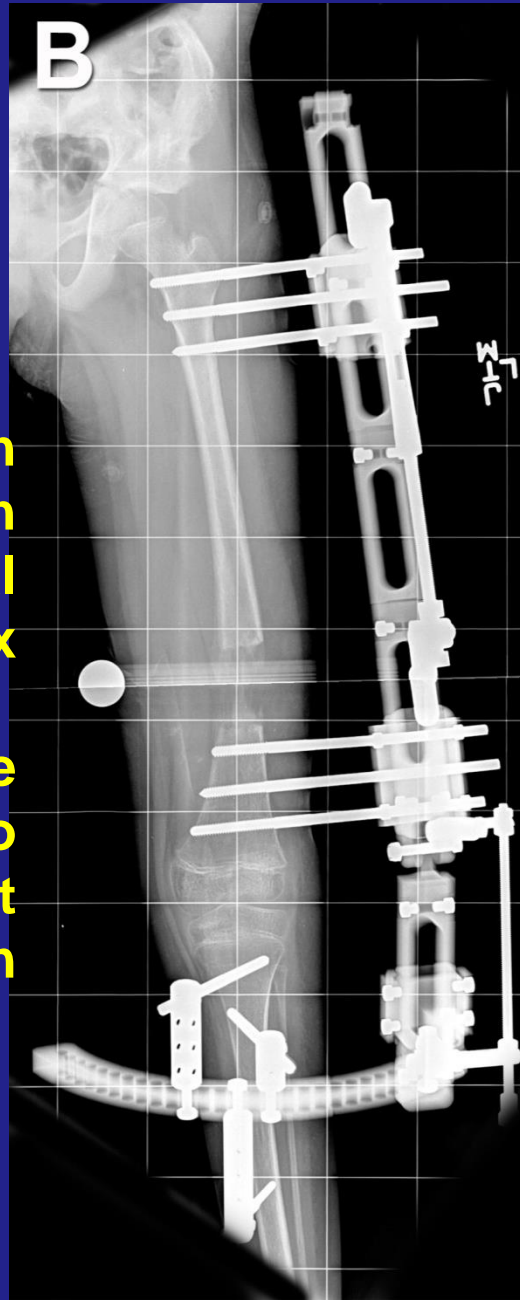
10 y.o. girl, left CFD with 5-cm LLD

Pre-op

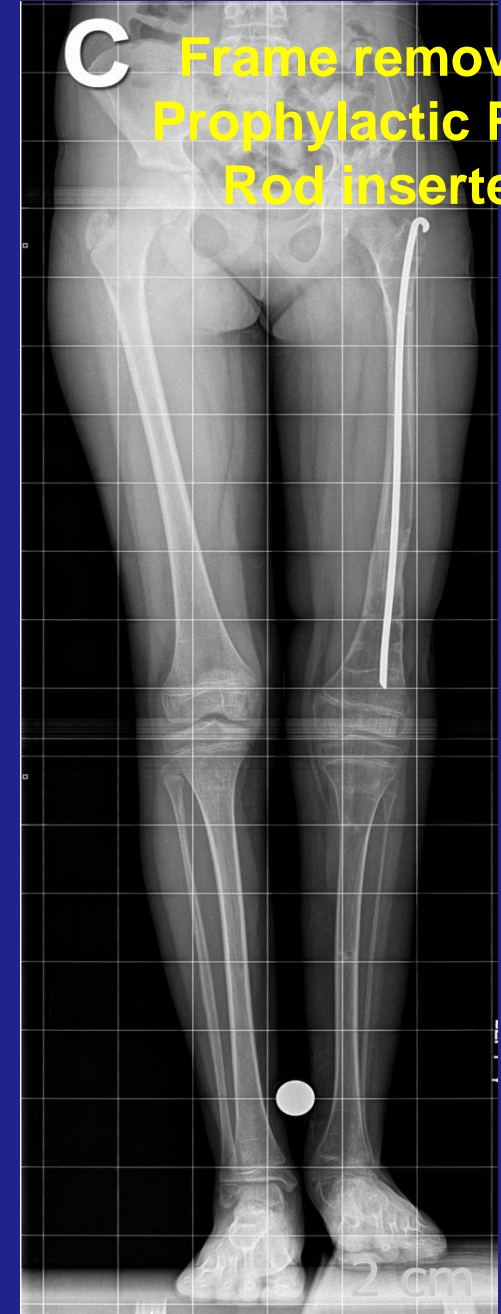


After length achieved with monolateral ex fix

Note knee hinge to prevent subluxation



Frame removed; Prophylactic Rush Rod inserted



11 y.o. boy, right CFD with 5.5-cm LLD



Obtained
immediately
after IM nail
insertion



Results: Complications

	Device	Adverse Events / Lengthening Session	p value
Current study (2016)	Monolateral fixator vs. IM nail	1.80 vs. 1.00	= 0.02
Black et al. (JBJS 2015)	Circular fixator vs. IM nail	2.4 vs. 1.2	= 0.02

Conclusions

- Significantly fewer adverse events in IM nail group
- Age of the patient is important:
 - IM nail for children > 8 years
 - Monolateral ex fix for children > 3 years
- Protection of unstable knee is crucial (bridging ex fix or dynamic splint)

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Author Disclosures:

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