Paley ORTHOPEDIC & SPINE INSTITUTE
at St. Mary's Medical Center

Orthex Computer Dependent External Fixation
&
Drive Rail Monolateral External Fixation

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St. Mary's Medical Center, West Palm Beach, Florida, USA

Professor of Orthopedics, Florida Atlantic University

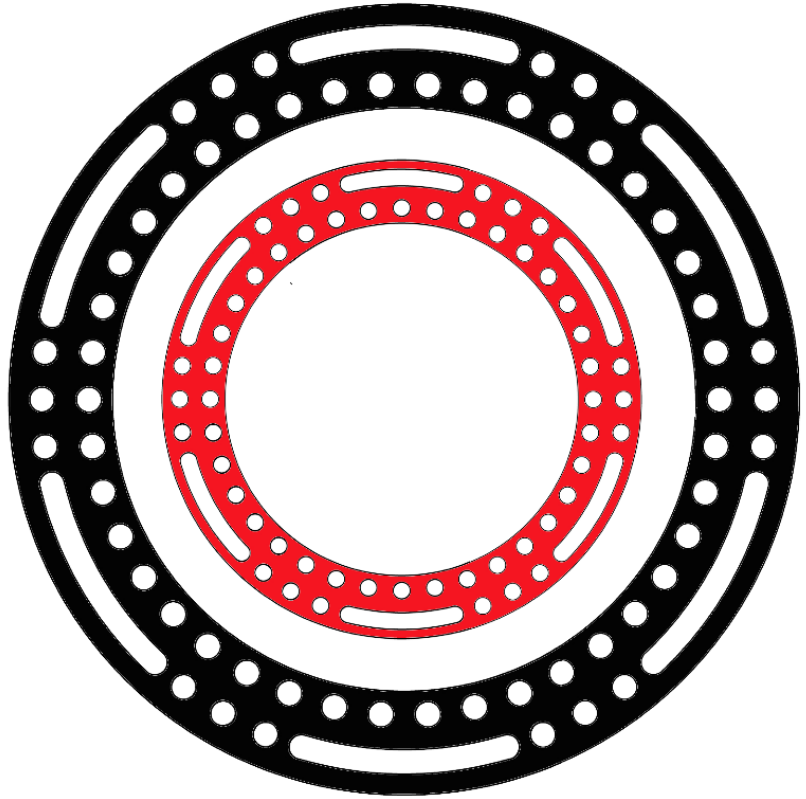



ORTHEX Frame

Ring Design

Two rows:

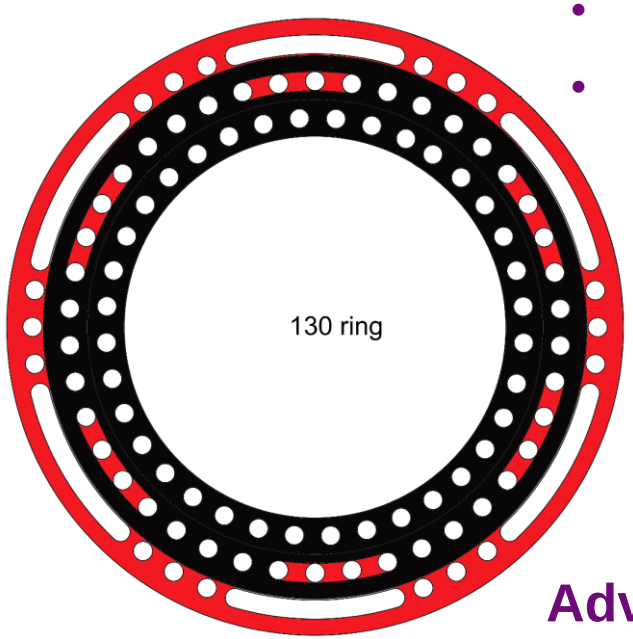
- inner row holes
- outer row slots



Advantages:

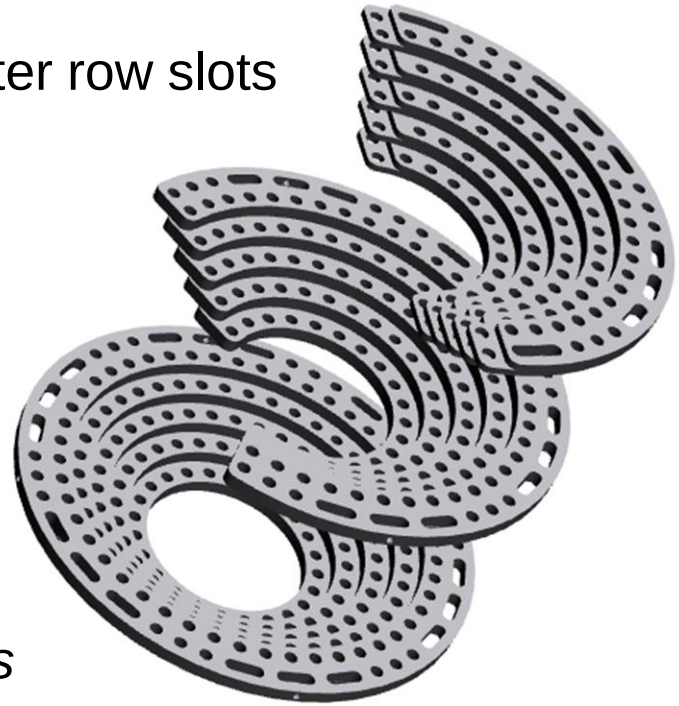
- *More Bending/Cantilever strength*
- *More options for pin/wire/strut fixation*

Concentric Ring Design



155 ring

- Inner row matches next size down outer row
- Outer row matches next size up inner row outer row slots



Advantages:

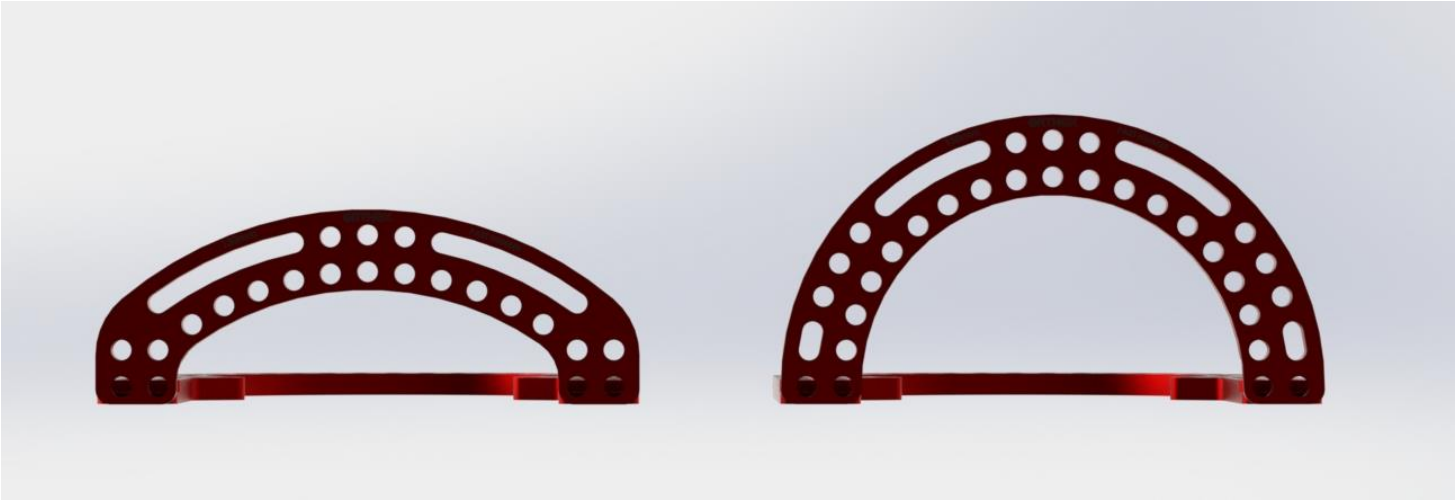
- *Can connect either via threaded rods or struts*
- *Tapered frames to fit anatomy when using struts*
- *Cylindrical frames when using threaded rods*

Special Rings

- Foot Rings
- 2/3 Rings
- Low Profile Arch

Closing Foot Ring

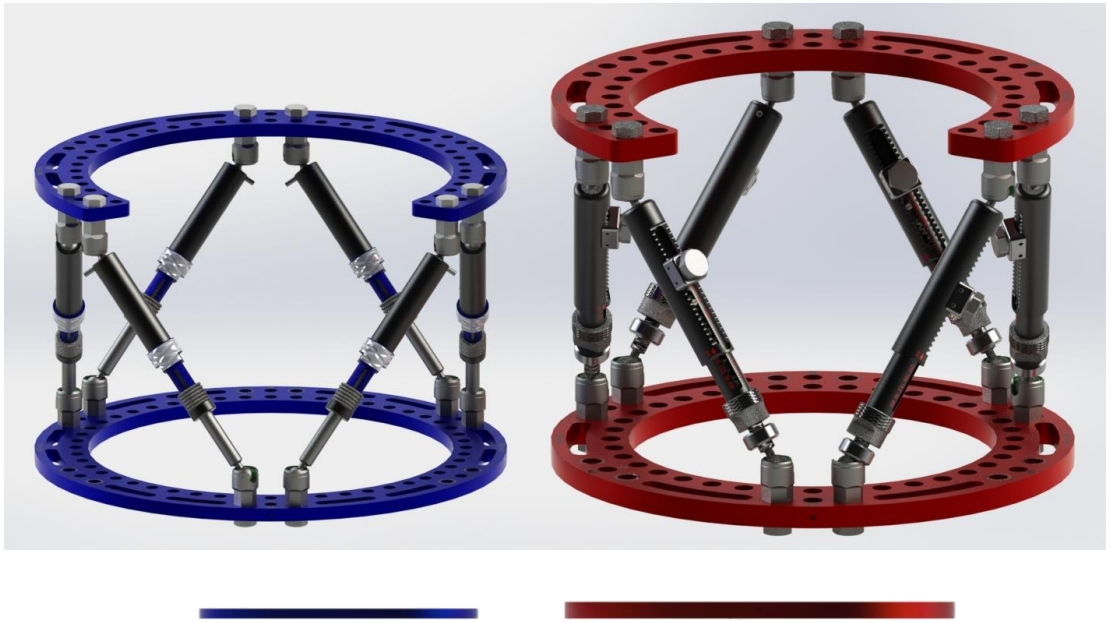
- Foot Rings: short and long
- 2/3 Rings
- Low Profile Arch

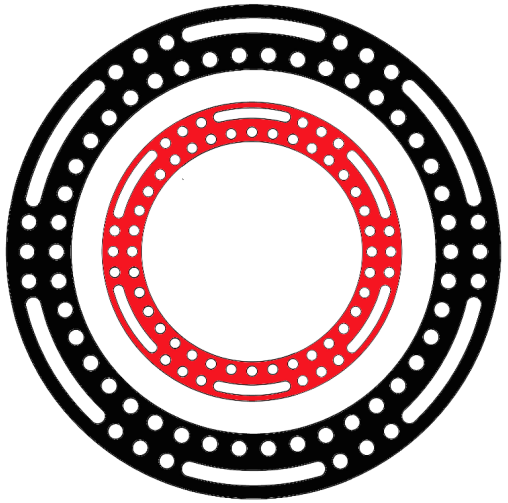


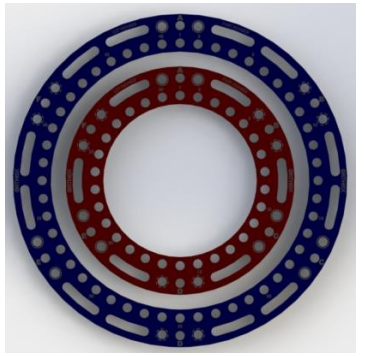
Adult & Pediatric Rings

Full Rings, Partial Ring, Footplate, Specialized Arch

- **Adult:** 105, 130, 155, 180, 205, and 230mm*
- **Small-Bone/Pediatric:** XS, Small, Medium, Large
- **Peds frame is 60% lighter**



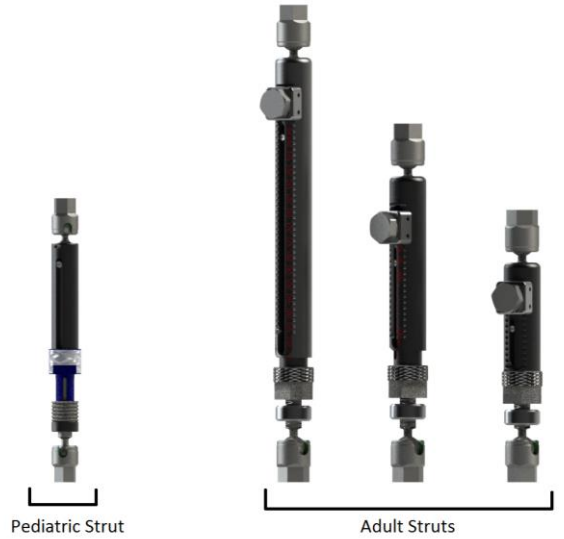




Adult & Pediatric Struts

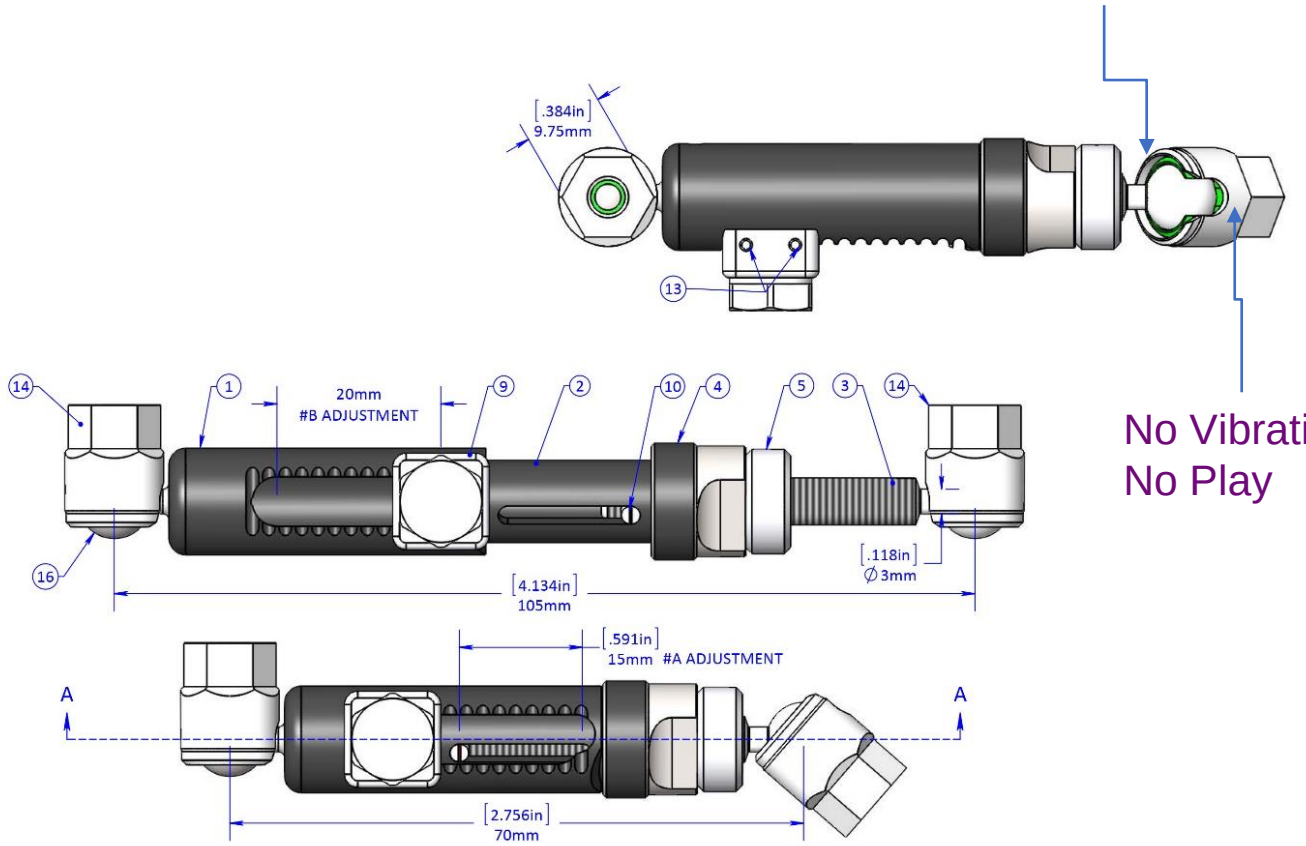
Full Rings, Partial Ring, Footplate, Specialized Arch

- **Adult:** 105, 130, 155, 180, 205, and 230mm*
- **Small-Bone/Pediatric:** XS, Small, Medium, Large
- **Peds frame is 60% lighter**



Strut Design

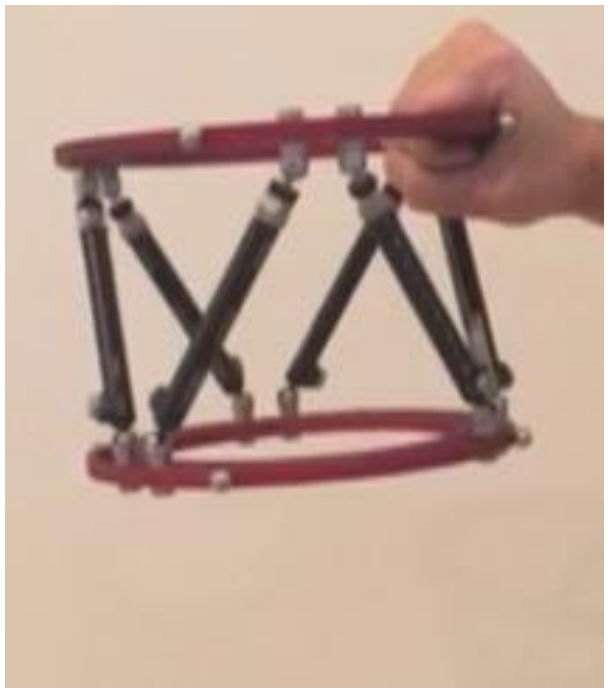
Ball and Socket Construction



No Vibration
No Play

Paley Frame: No Vibration
TSF : Vibration

TSF-vibration



Orthex-no vibration

Struts

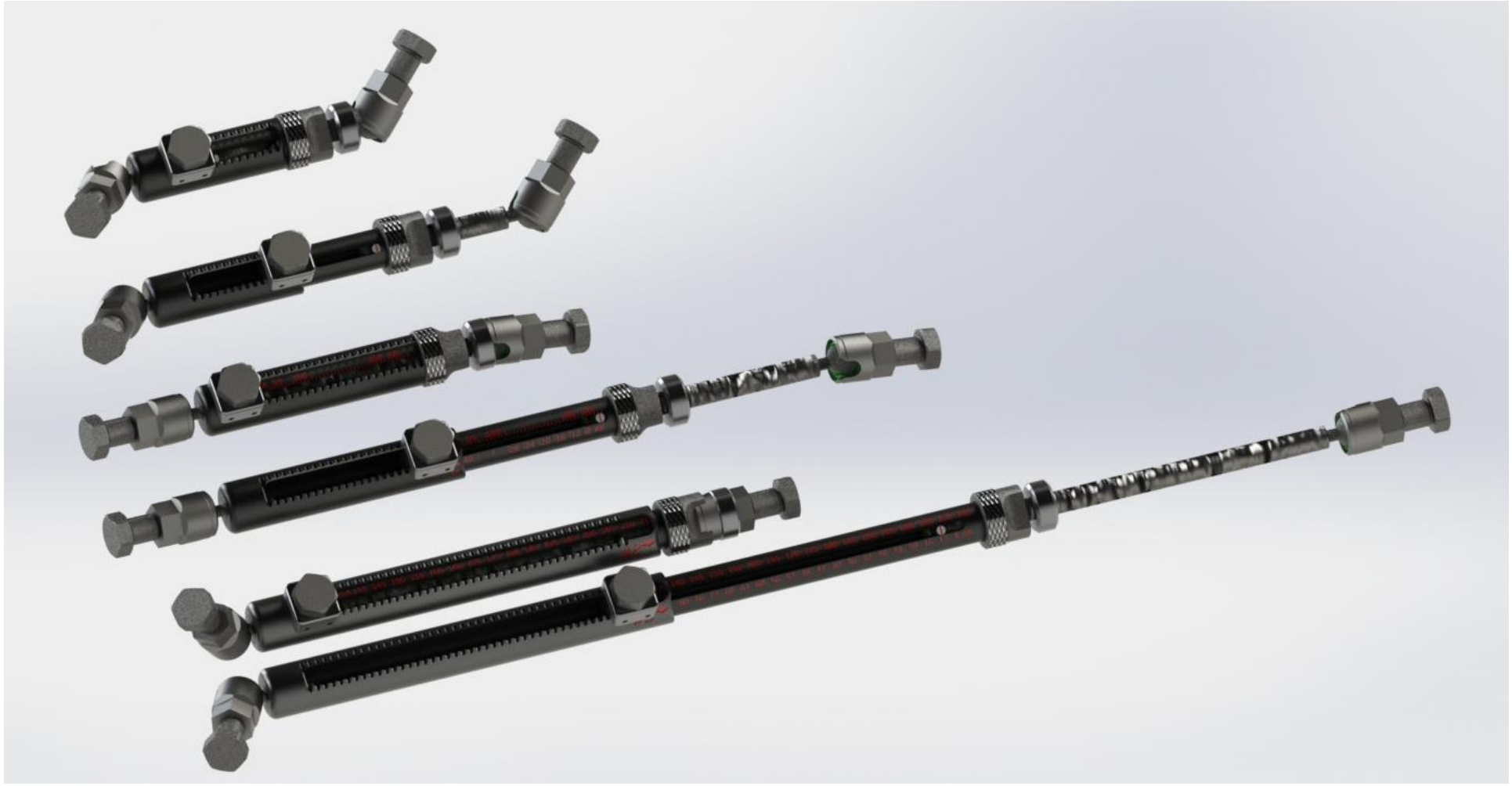
- Telescoping Struts
- Improved Range
- Fewer Sizes,
- Fewer Strut Changes

Fully collapsed strut, 137mm

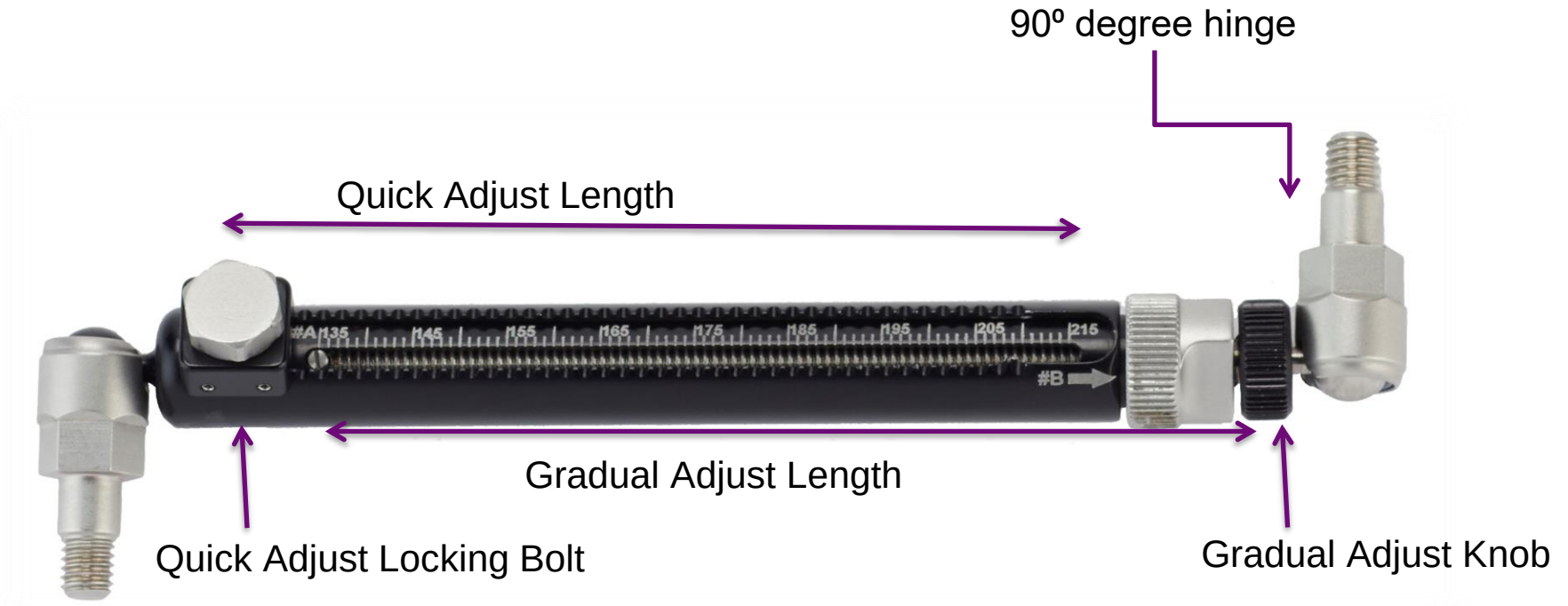
Partially Extended, 215mm

Fully Extended, 295mm

3 Strut Sizes



All Struts are both Standard & Fast Fix



TSF

	Standard Struts				Fast Fx ®			
Size:	Extra Short	Short	Medium	Long	Extra Short	Short	Medium	Long
Range:	75-96 mm	90-125 mm	116-178 mm	170-280 mm	91-121mm	116-152 mm	143-205 mm	195-311 mm
Cat. No.:	7107-0205	7107-0210	7107-0220	7107-0230	7107-0705	7107-0710	7107-0720	7107-0730

Orthex struts are the most efficient

Efficiency:max-min / min

Orthex PaleyFrame				
Size	*Min.*	*Max*	*Range*	*Efficiency*
Small	70	105	35	0.5
Medium	93	170	77	0.8
Large	137	295	158	1.2

Smith & Nephew TSF				
Size	*Min.*	*Max*	*Range*	*Efficiency*
Extra Small	91	121	30	0.3
Small	116	152	36	0.3
Medium	143	205	62	0.4
Large	195	311	116	0.6

Orthofix TL-Hex				
Size	*Min.*	*Max.*	*Range*	*Efficiency*
Small	92	122	30	0.3
Medium	114	184	70	0.6
Large	158	318	160	1.0

**Z-Plate Strut Extender*			
Z-Min	*Z-Max*	*Range*	*Efficiency*
20	155	135	6.8
43	220	177	4.1
87	345	258	3.0

Strut with Z-Plate

Fewer Strut Changes

- Fewer Strut Changes
- Reduced Inventory

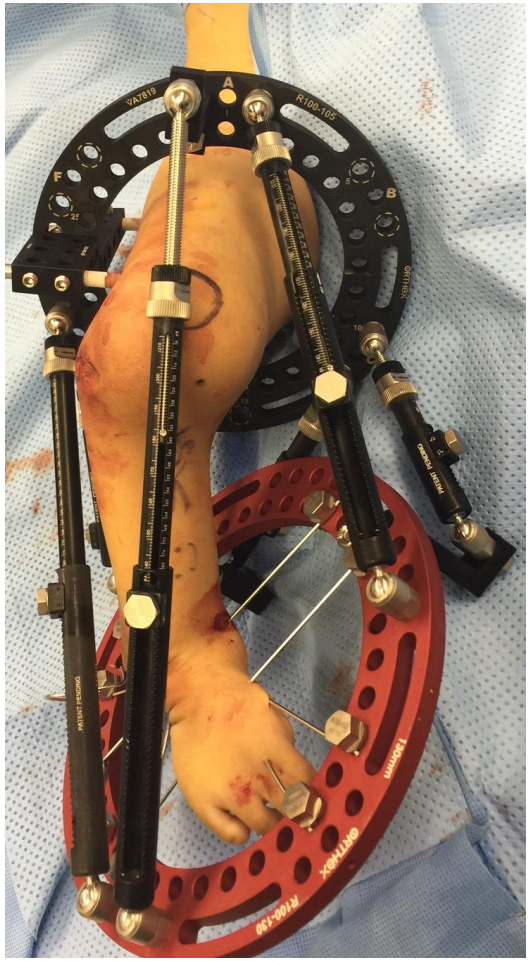
Strut Appointments			
Orthex	Adjust Only	Change Only	Smith & Nephew
4	2	2	4
4	0	4	6
2	0	2	5
7	4	3	7
6	4	2	5
0	0	0	3
4	3	1	5
4	2	2	6
6	1	5	9
0	0	0	3
37	**16**	**21**	**53**

Z-plates allow Extreme frame angles: 90° angle with rings touching

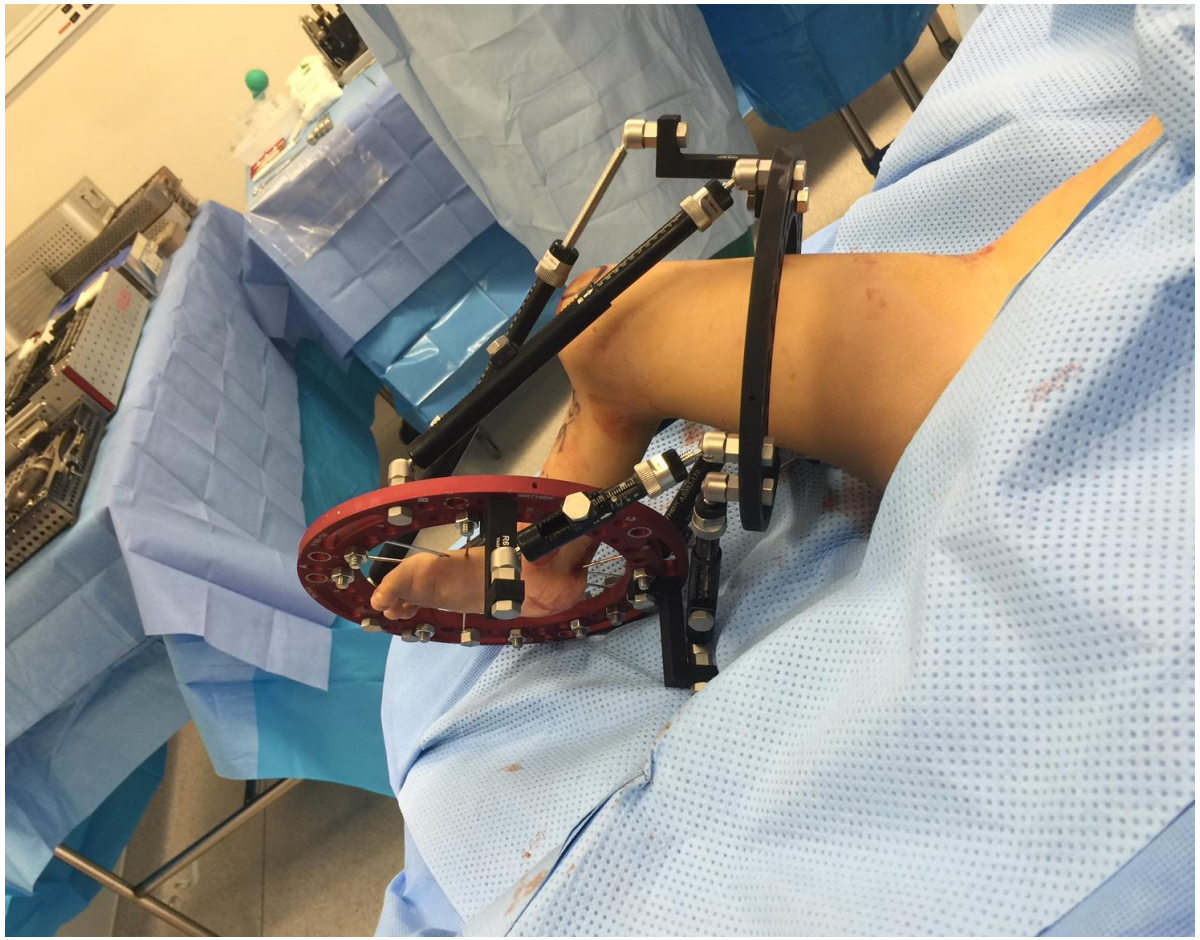
Z-plates: extend the longest strut and shorten the shortest strut

Z-plate extension

Extreme Frame



Extreme Frame



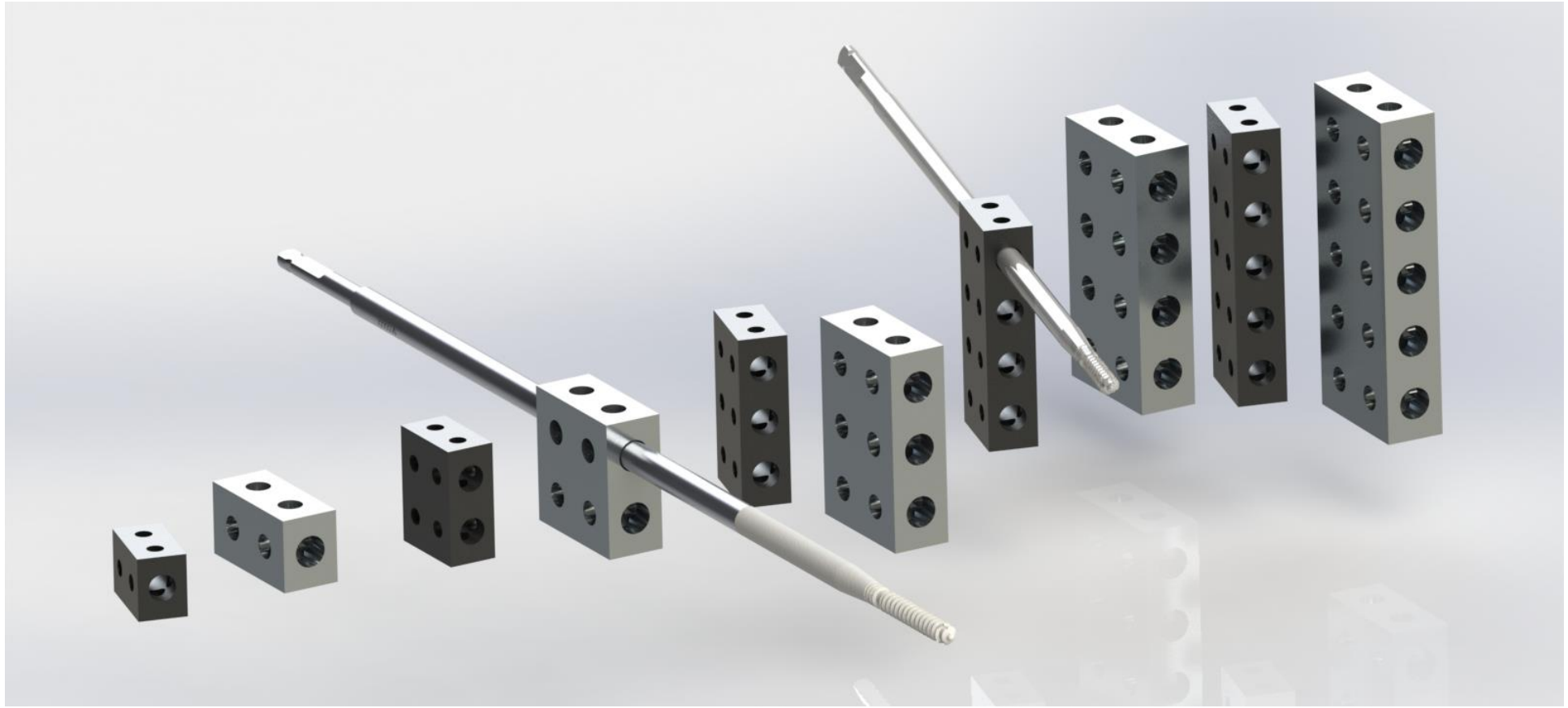
During Correction

Half-Pin Blocks

- Double column half pin blocks
- Pin clamp effect effect due to wider pin grab (strengthens the cantilever of the pin)
- More stable/prevents pins bending/need fewer pins
- Improved drill guidance and accuracy

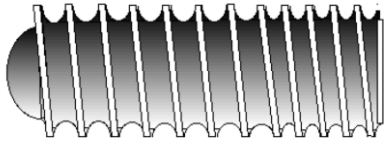
Half-Pin Blocks

- One hole to five hole peds and adult



PaleyPin™

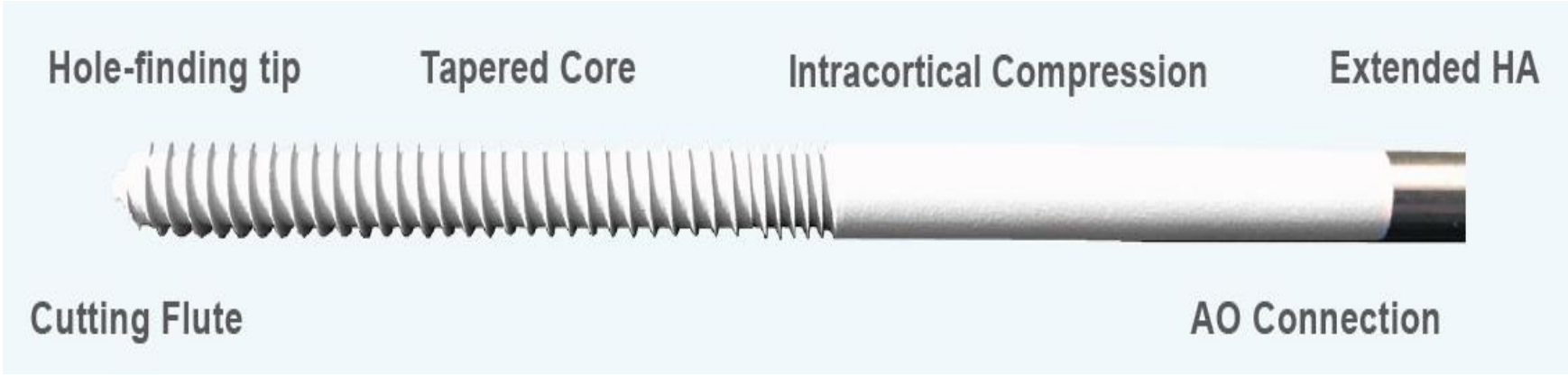
- Variable Pitch Thread Half Pin (pat pend)



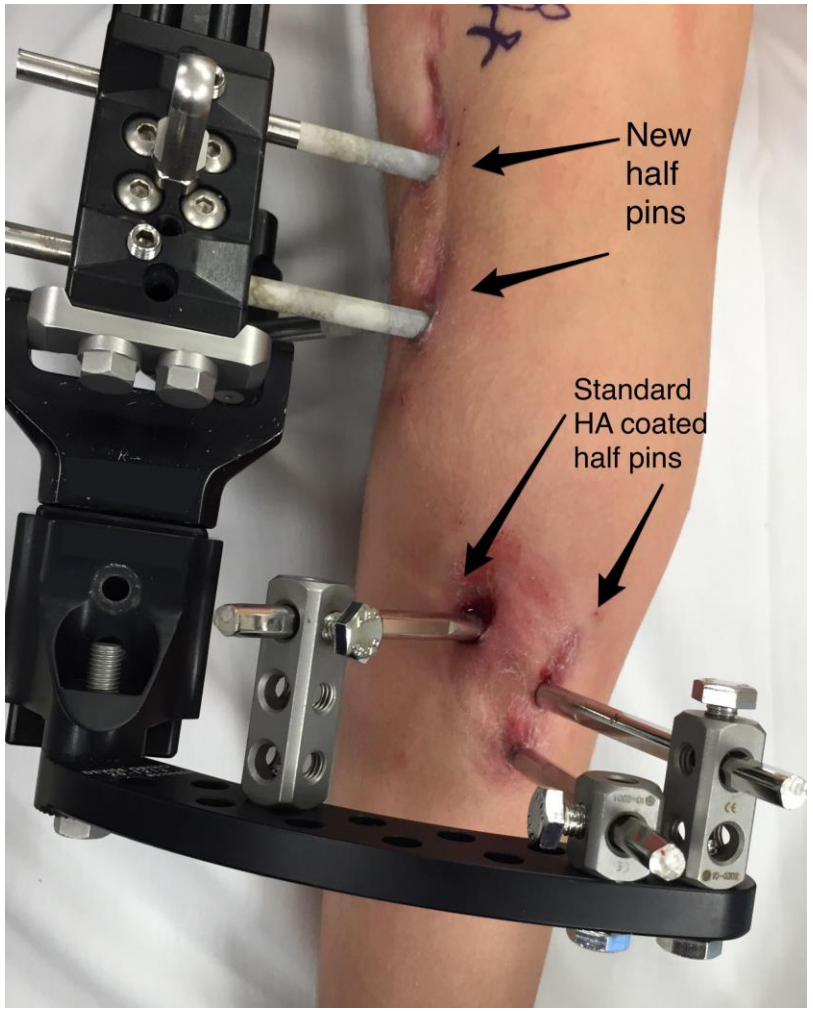
- Extended HA Coated Half Pin

- Hole Locator Tip
- Tapered Core/ Non-tapered Threads
  - Adult (3.0mm, 4.5mm, 6.mm OD) (10-60mm)
  - Peds (3.0mm, 4.0mm, 5.0mm OD) (10-50)

HA Coated Pins & Wires

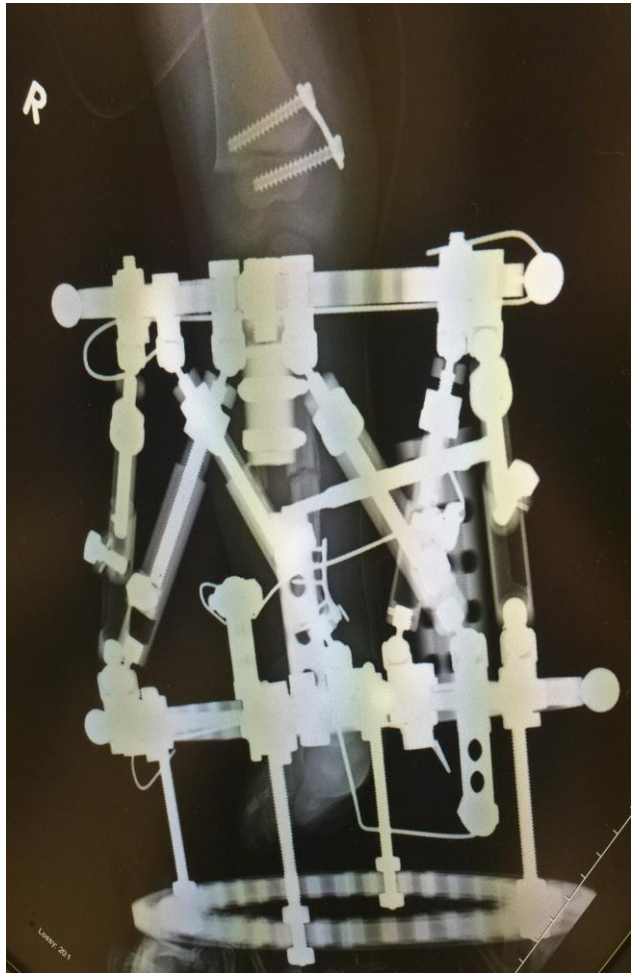


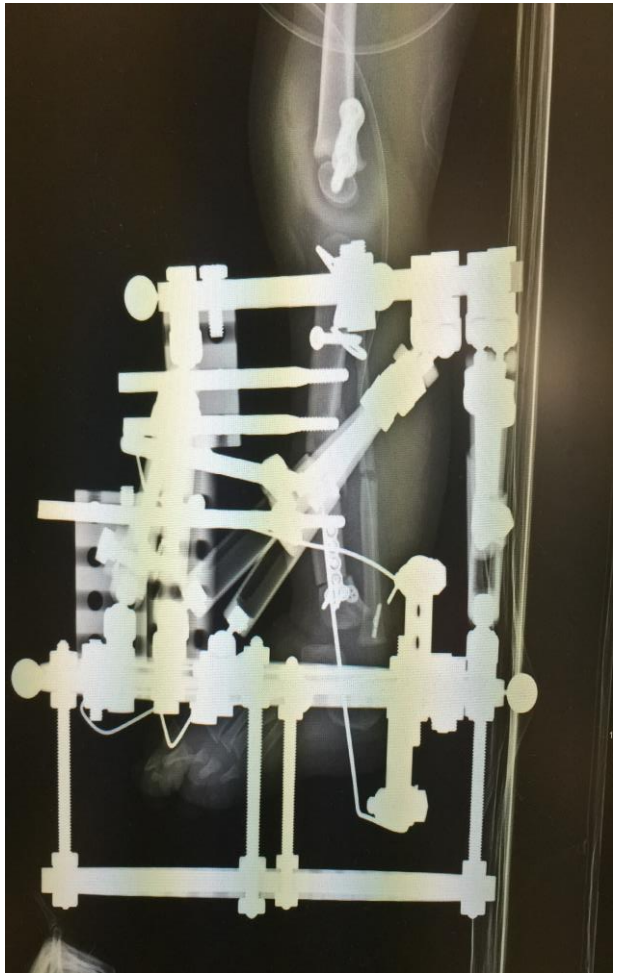
PaleyPin™

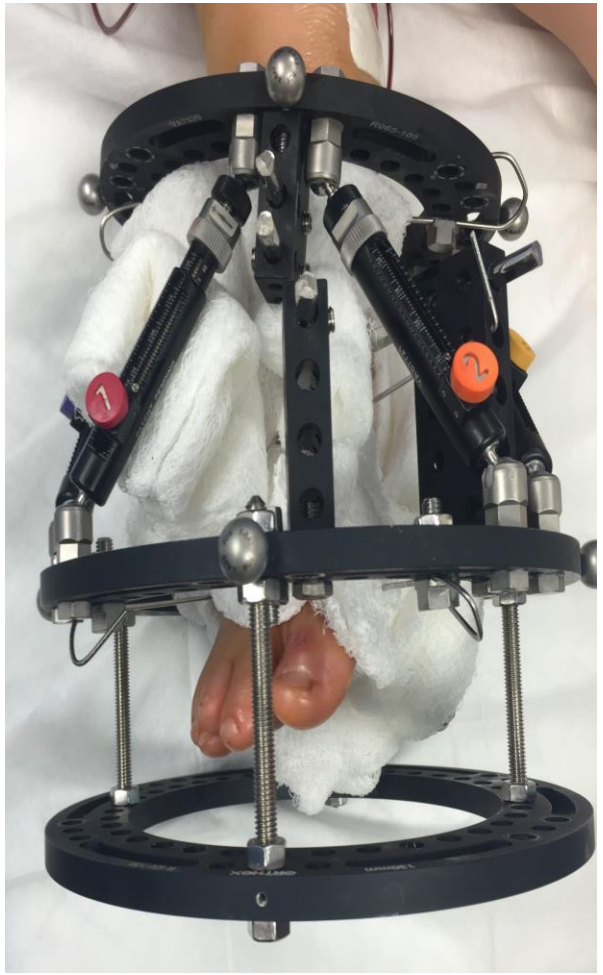


Ring Positioning Software (RPS)

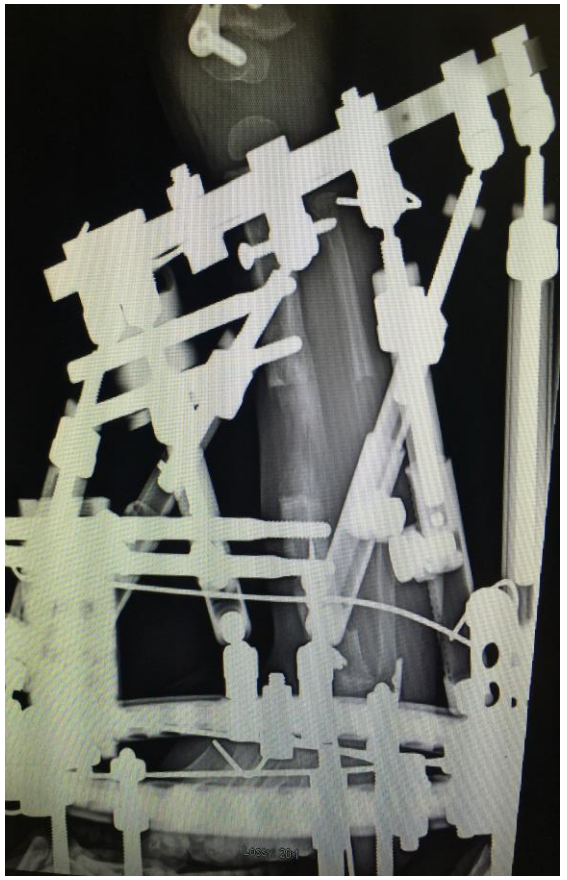
Fibular Hemimelia

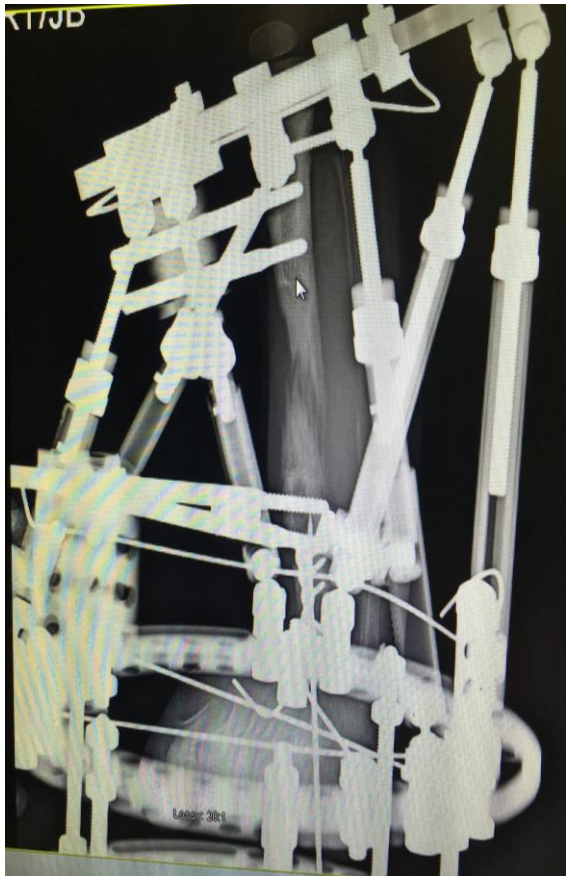




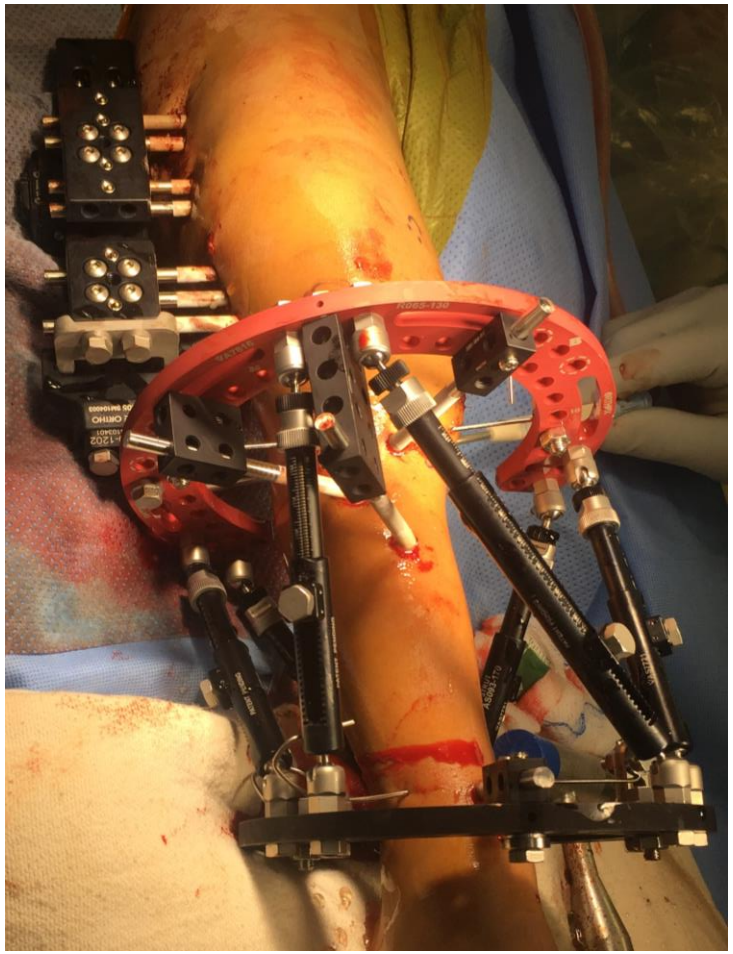


50mm Lengthening
20 deg Procurvatum

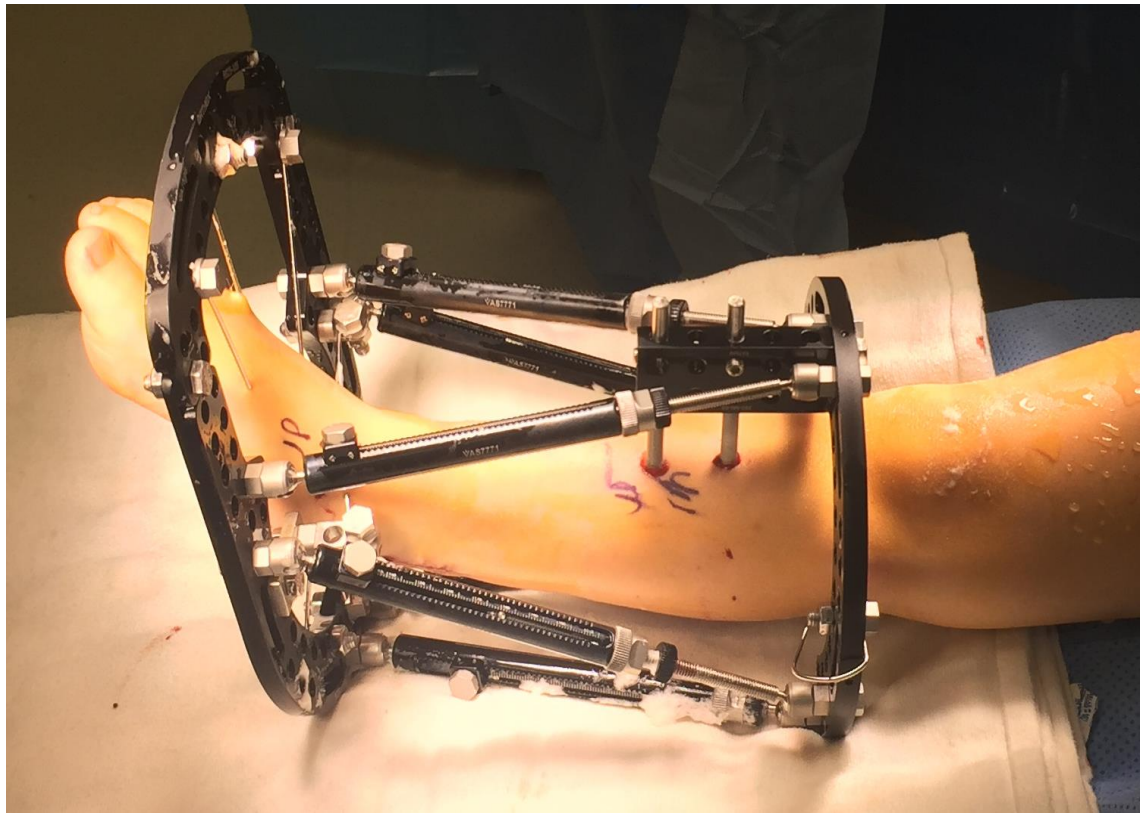




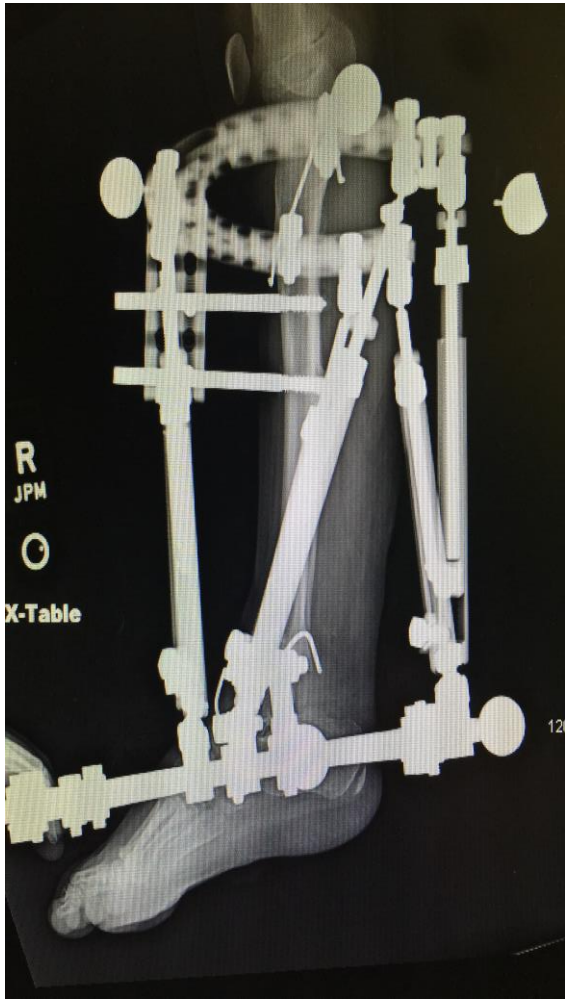
CFD & FH

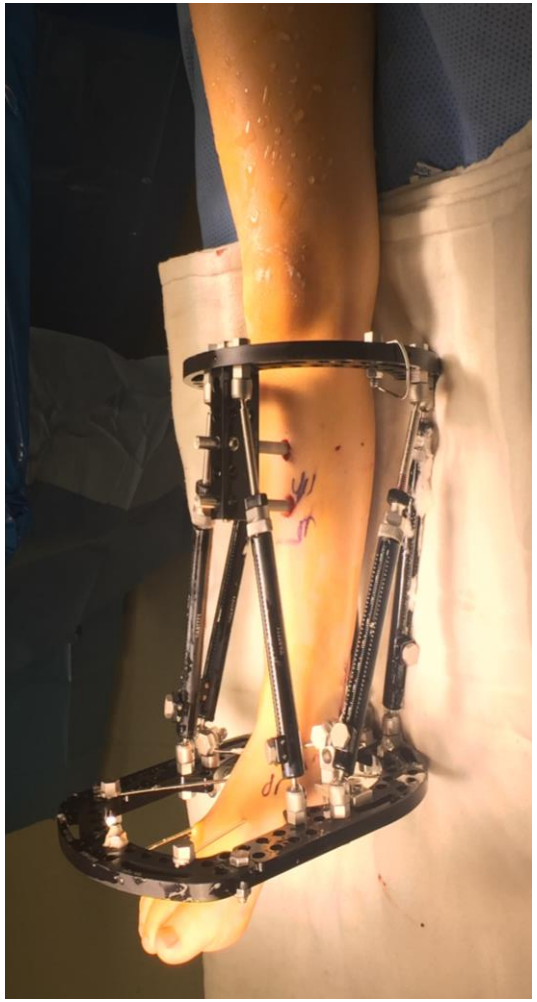


Foot Frame



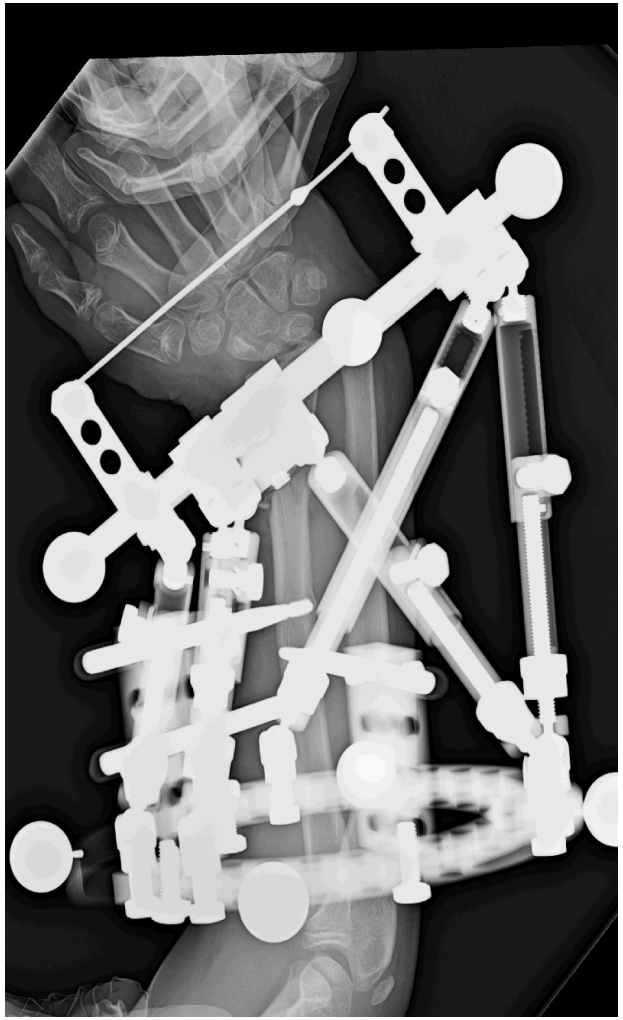
Foot Frame

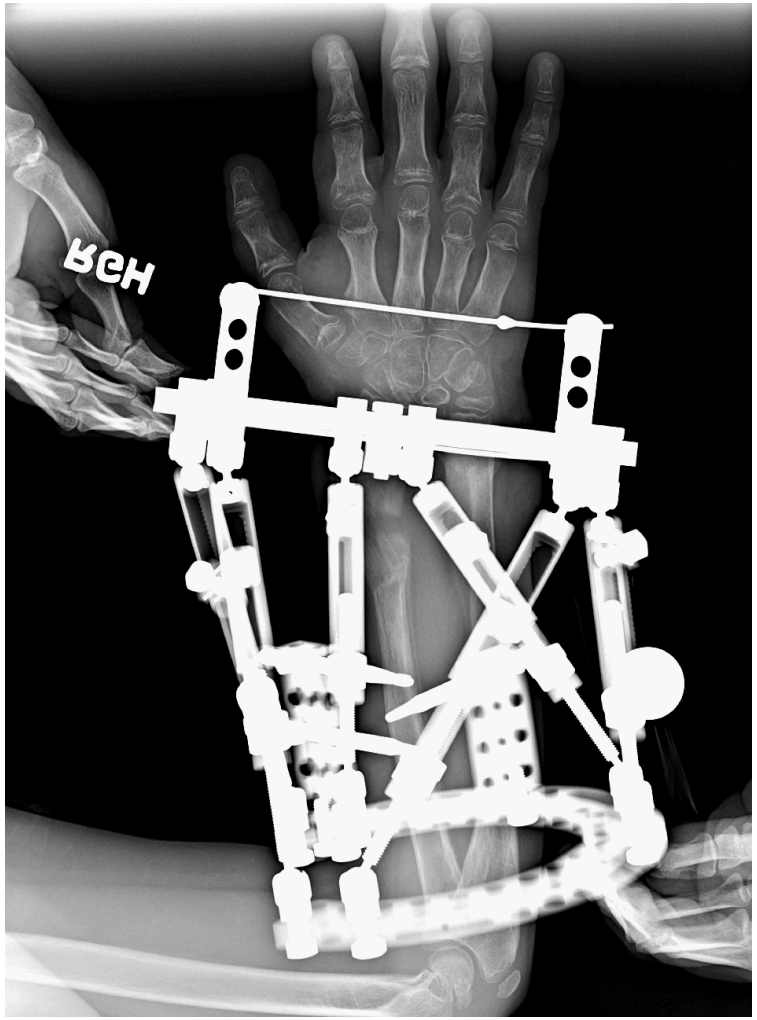




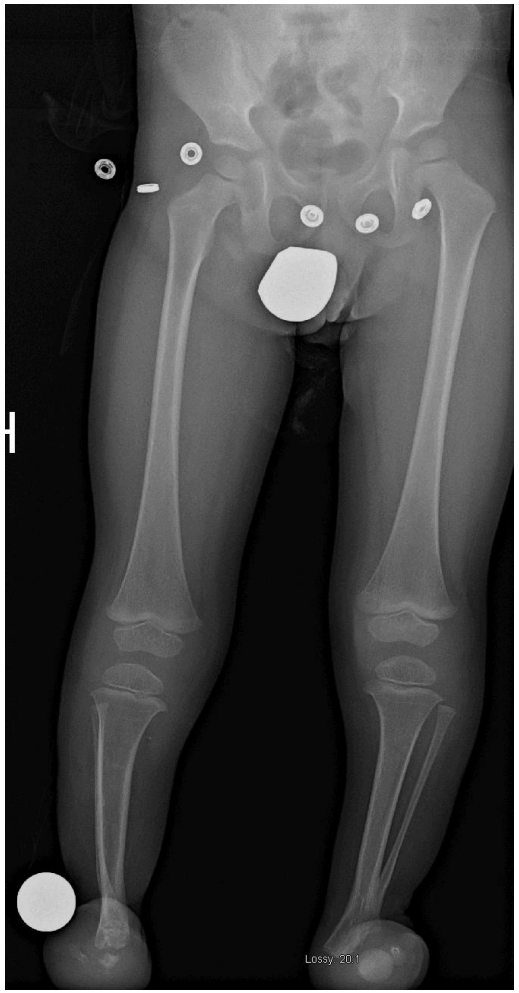
Distal Radial Growth Arrest

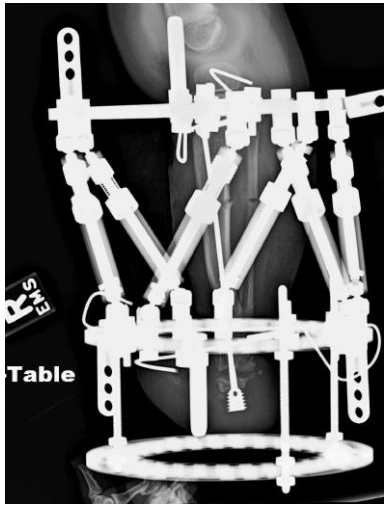
Radial Growth Arrest

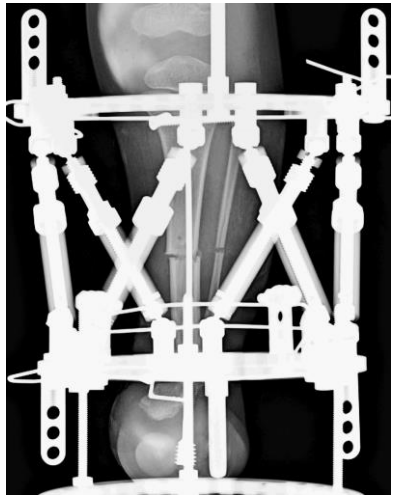




Pediatric Frame - 18mo. old child

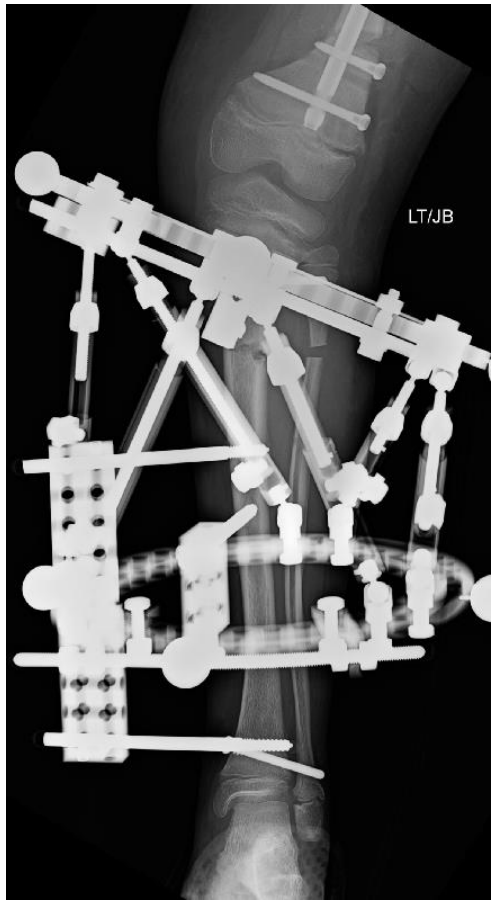


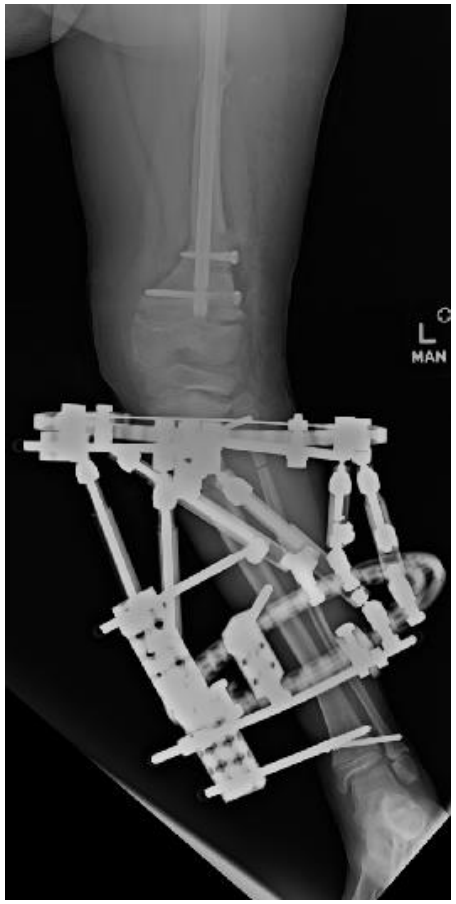


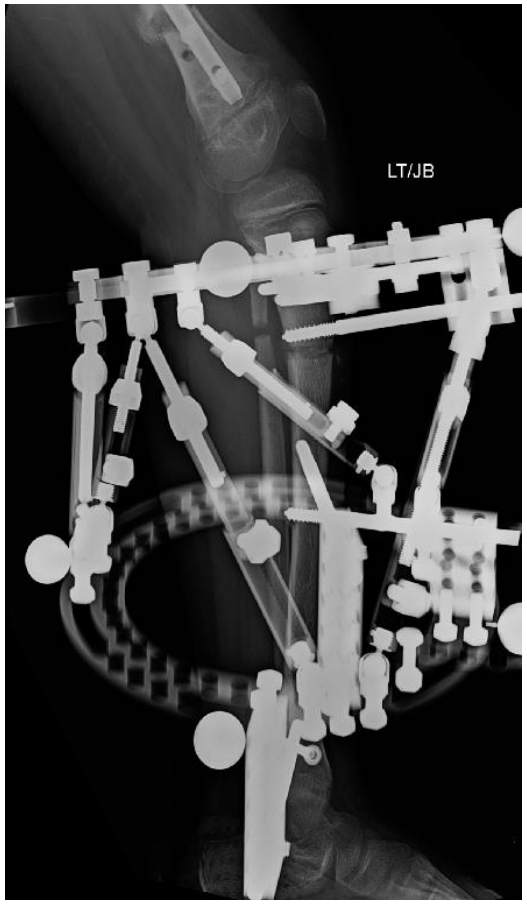


Severe Genu Valgum & Procurvatum Bilateral (Fanconi Syndrome)

Two Level Acute Correction Femurs
Gradual Correction Tibias



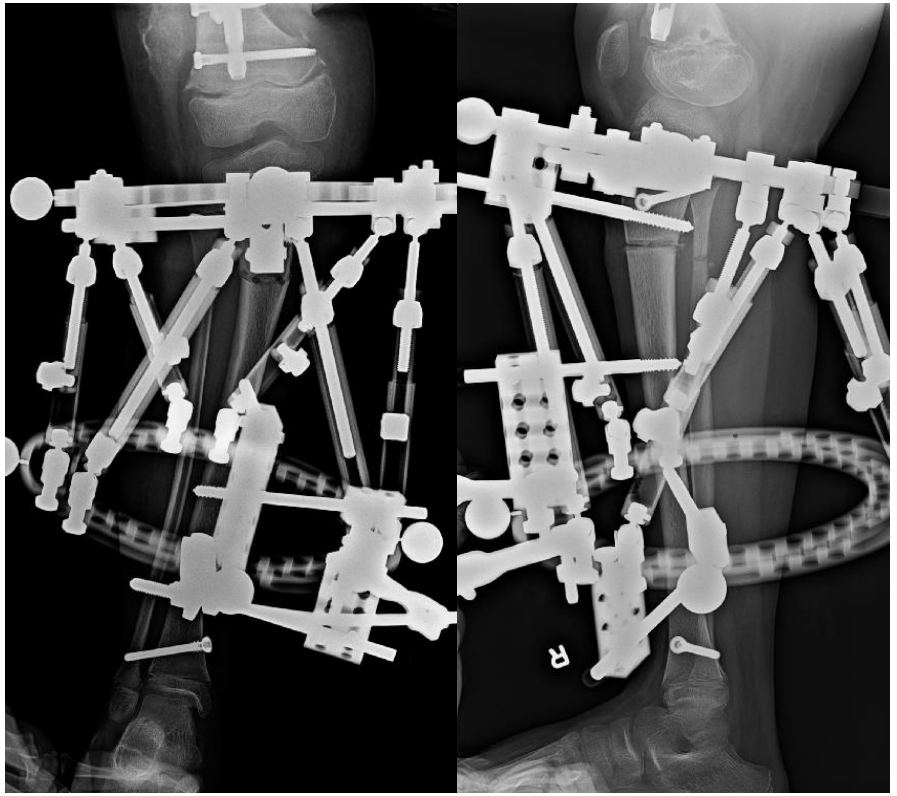




10-29-2018

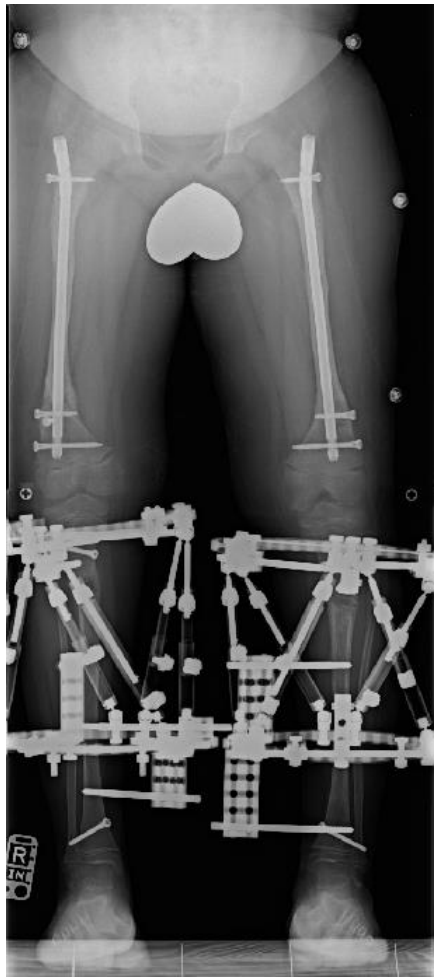
Two Level Acute Correction Femurs
Gradual Correction Tibias

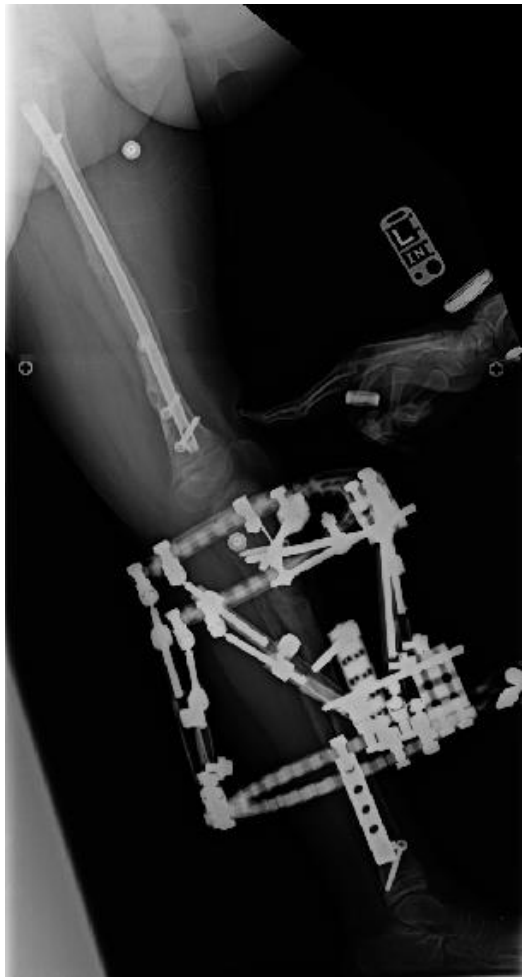
11-12-2018



11-16-2018

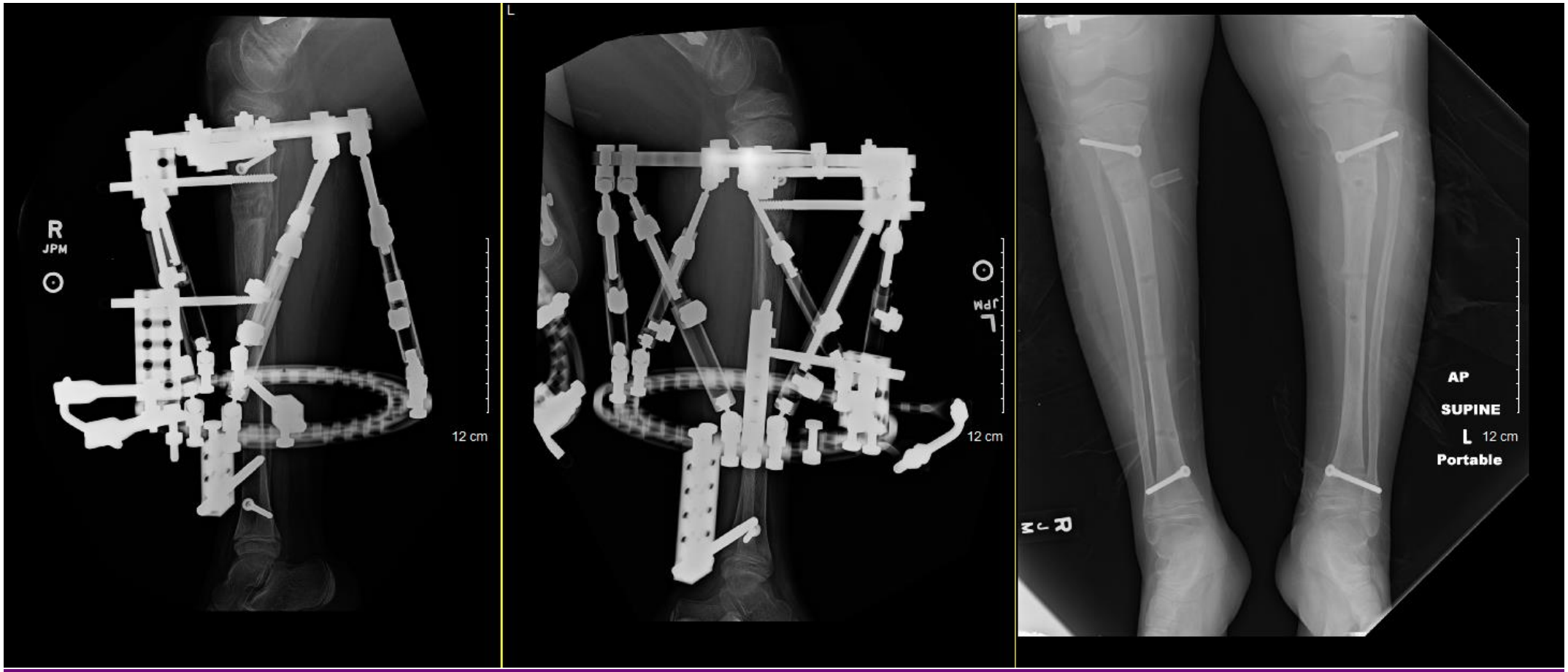
Full Correction Achieved





2-4-2019

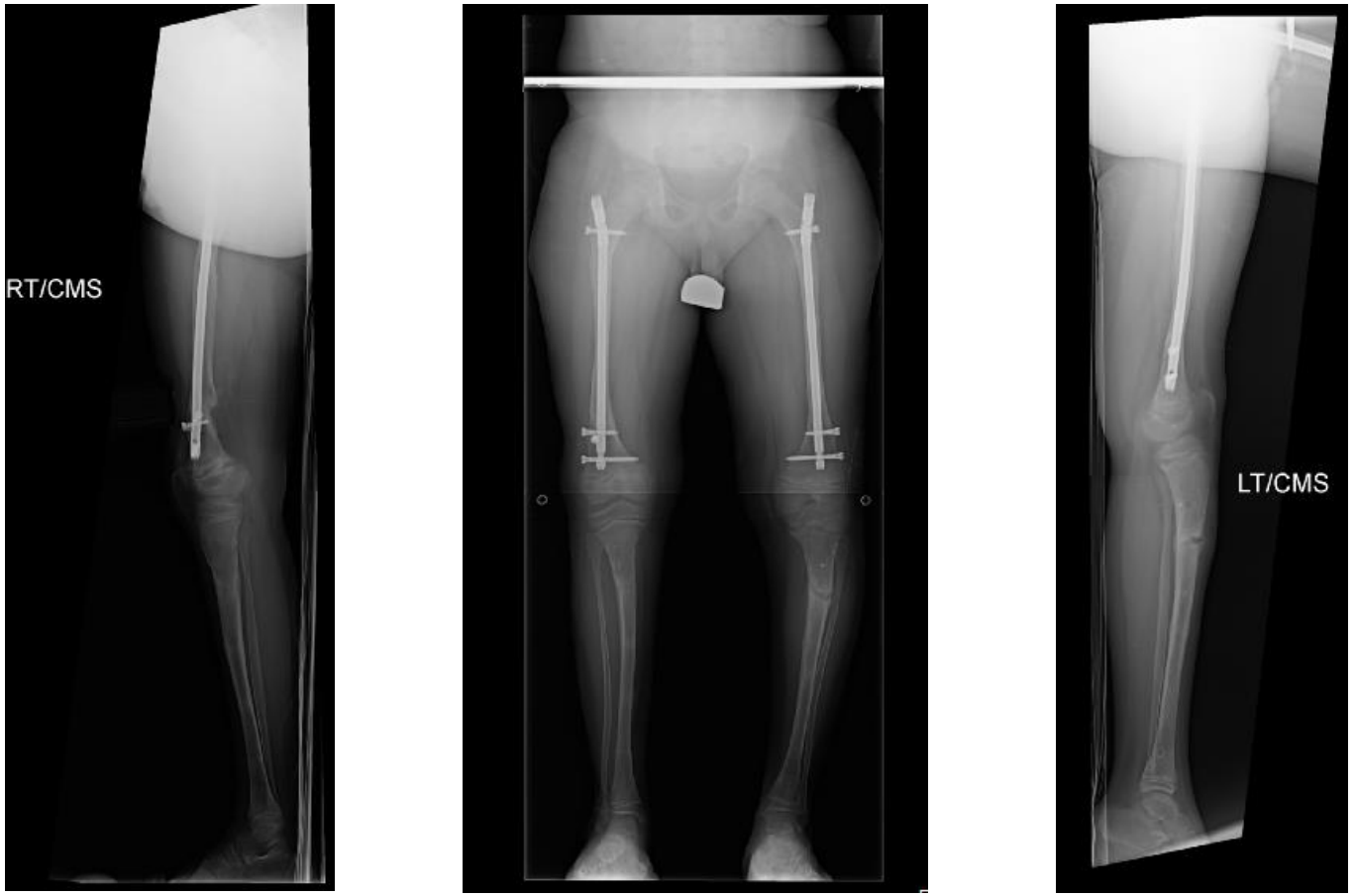
After Lengthening Completed: removal



3 /4/2019

3/5/2019

Final Result:
Fracture Left Tibia with Varus

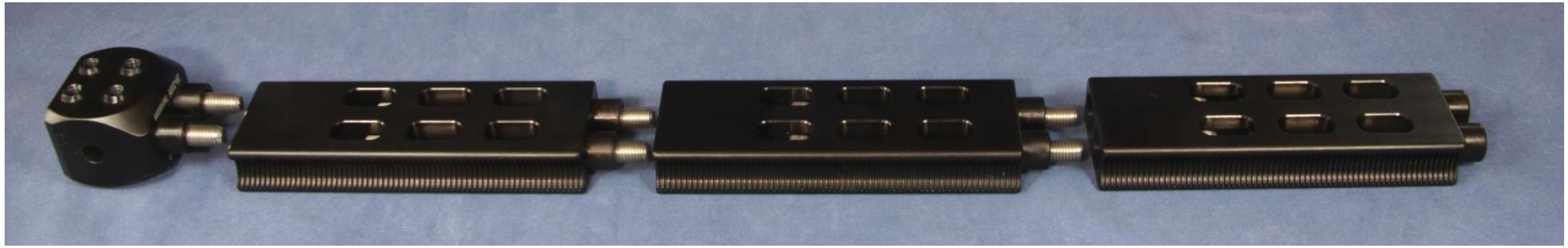


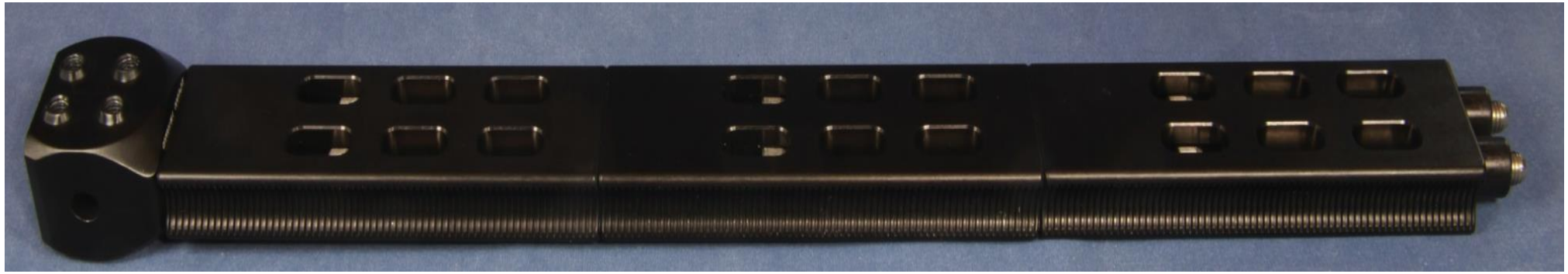
8/5/2019

Drive Rail

A New Level in Rail Technology

Modular Rail Segments



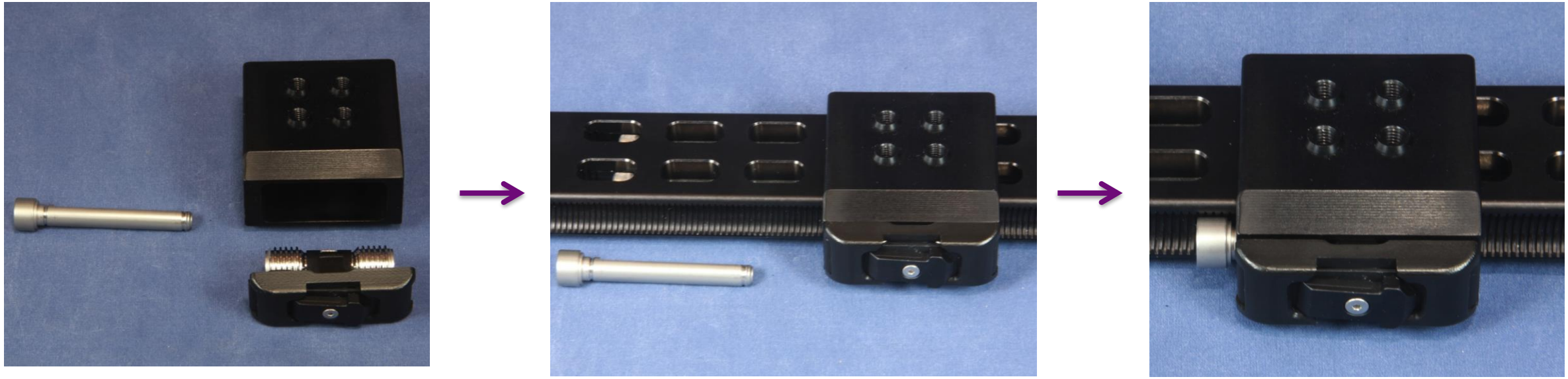


Rail Assembly

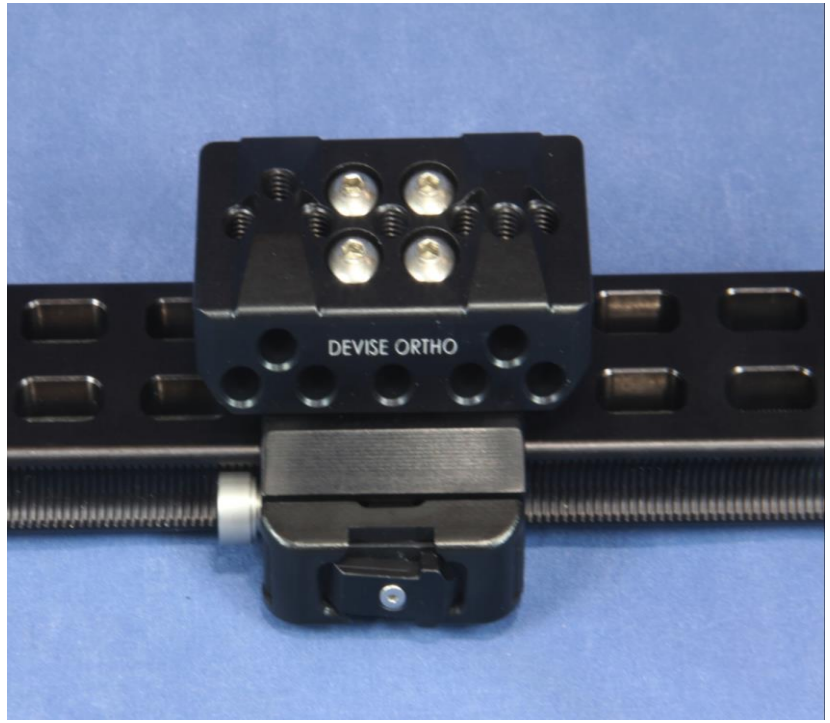
Unique Lengthening Mechanism (patented)

no distraction rod

Assembly of Lengthening Mechanism



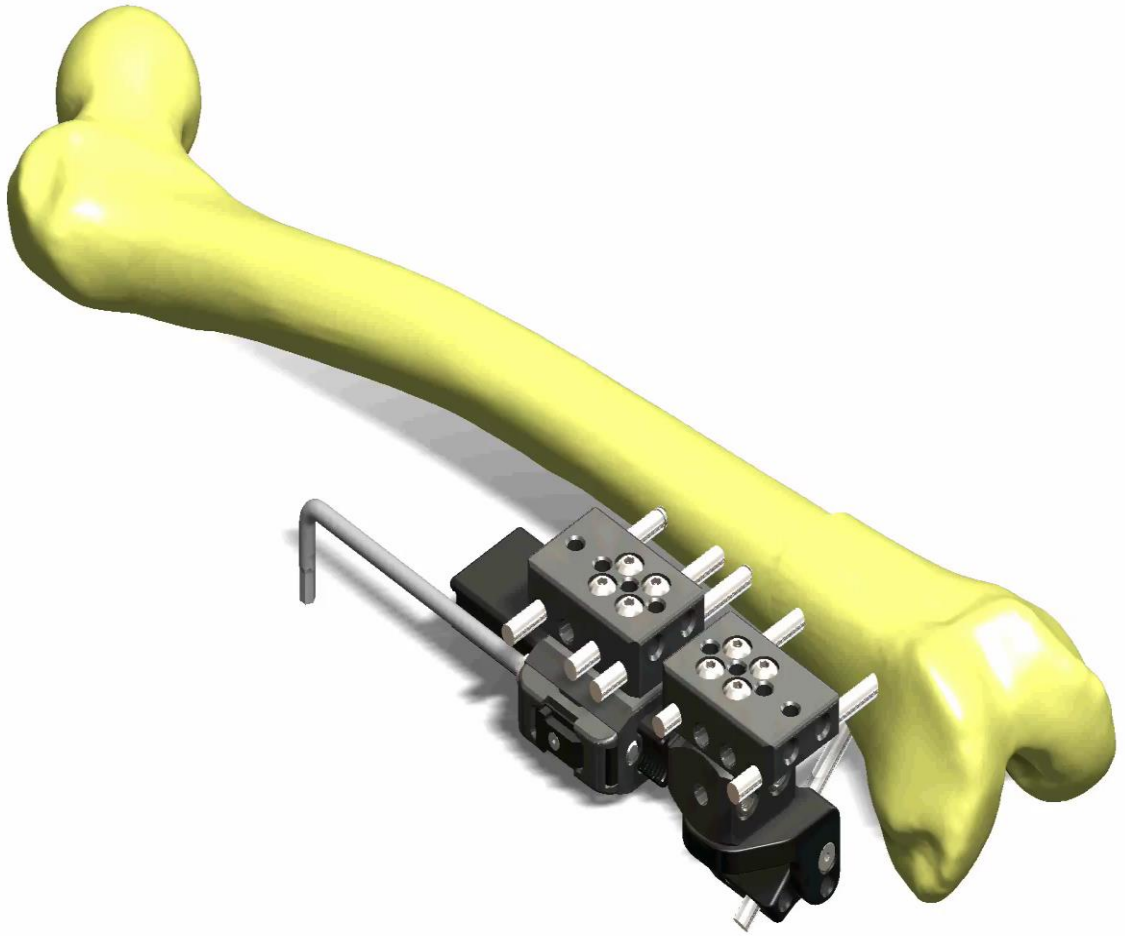
Assembly of Cars (pin clamps)



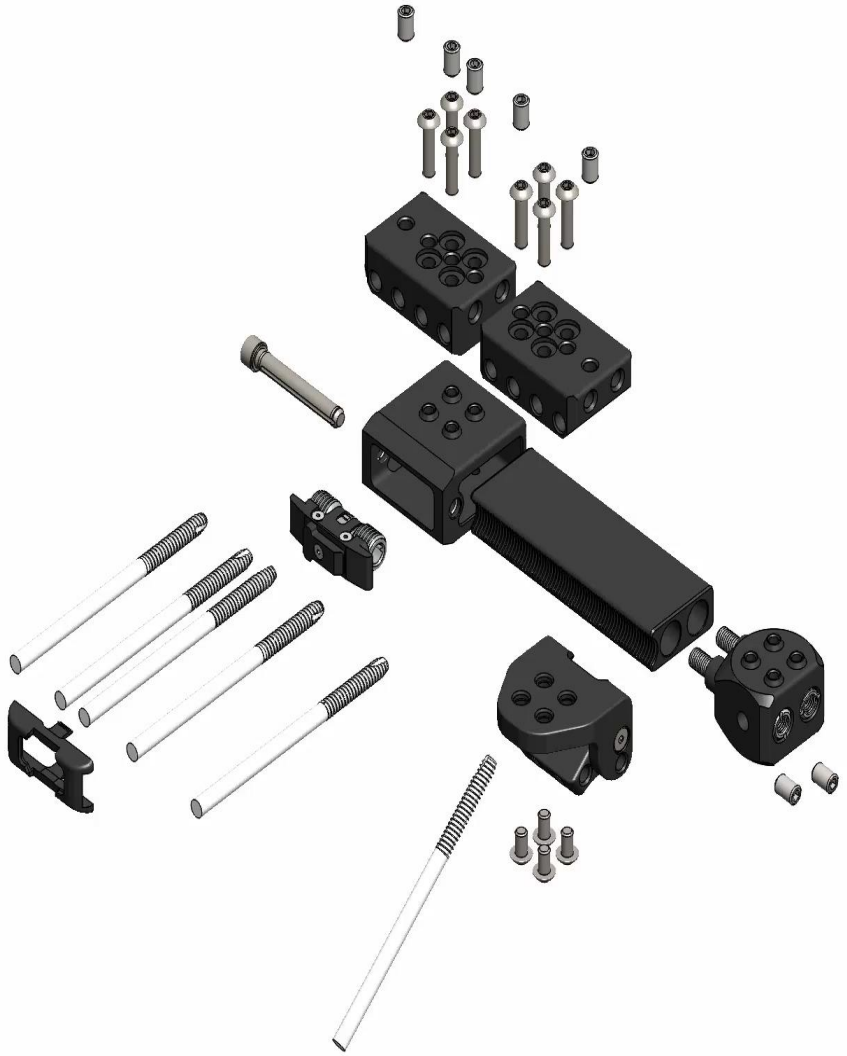
End Car

Wide Variety of Cars: Pin Clamps

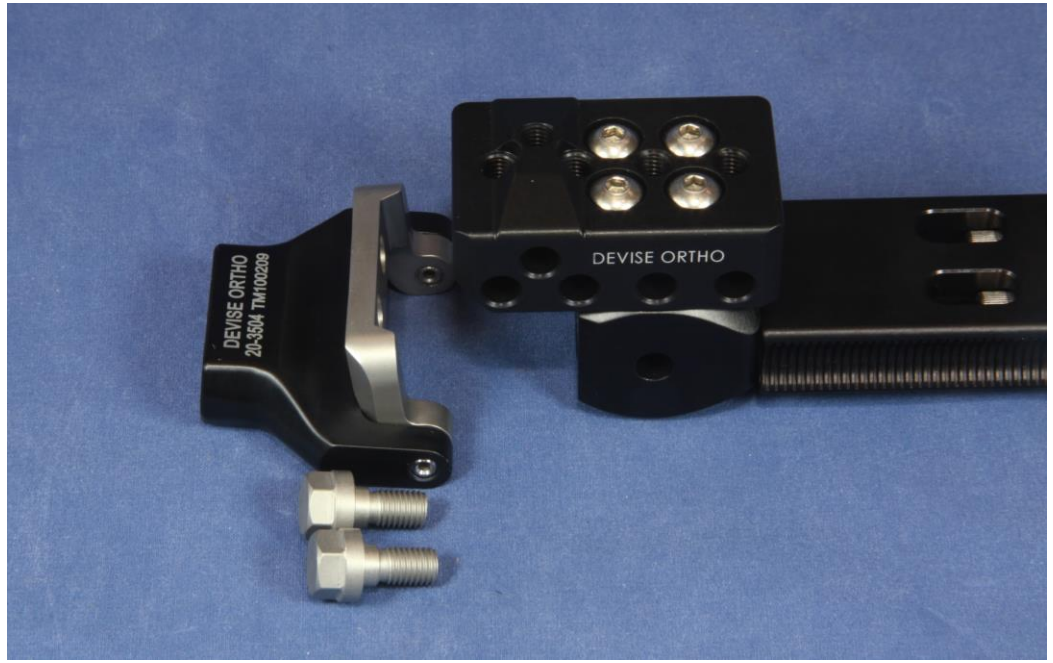
Lengthening

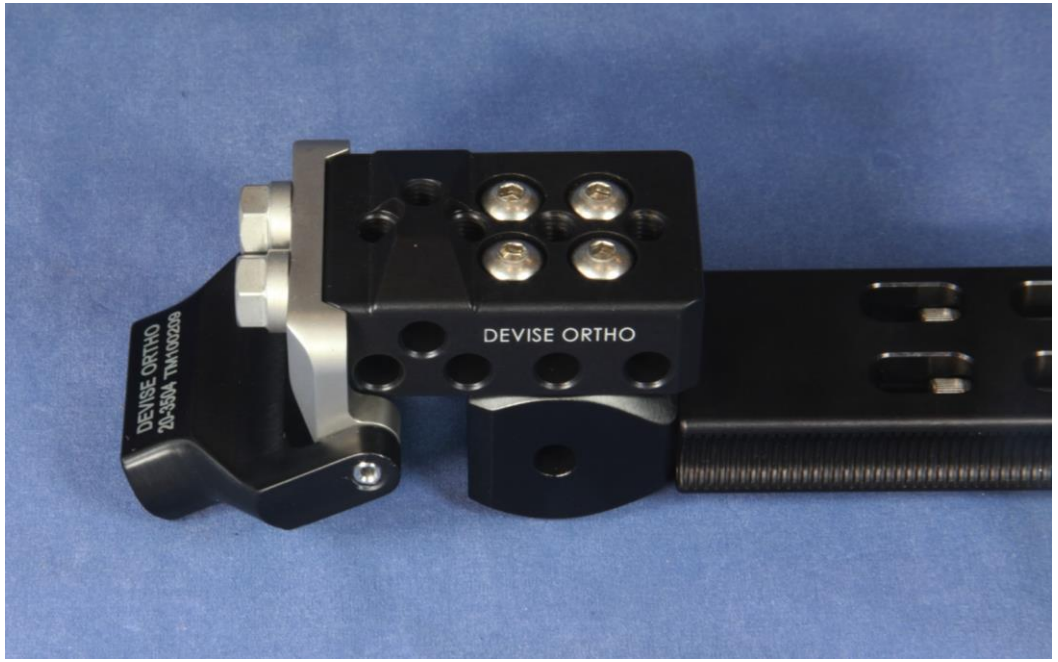


Basic Assembly



Add a Hinge


DEVISE ORTHO
DEVISE ORTHO
20-3504 TM100209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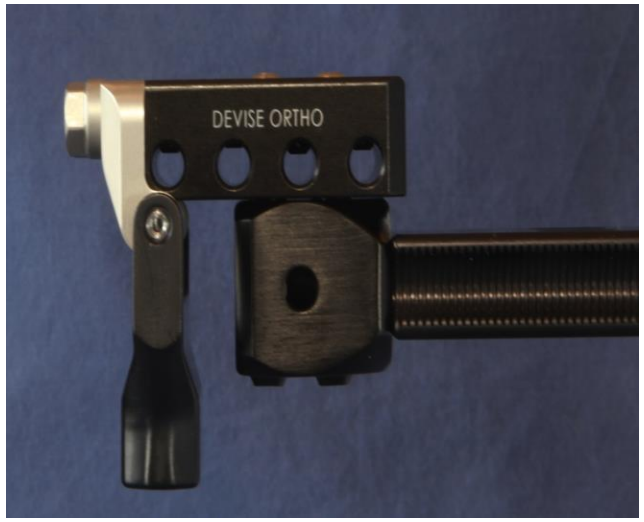
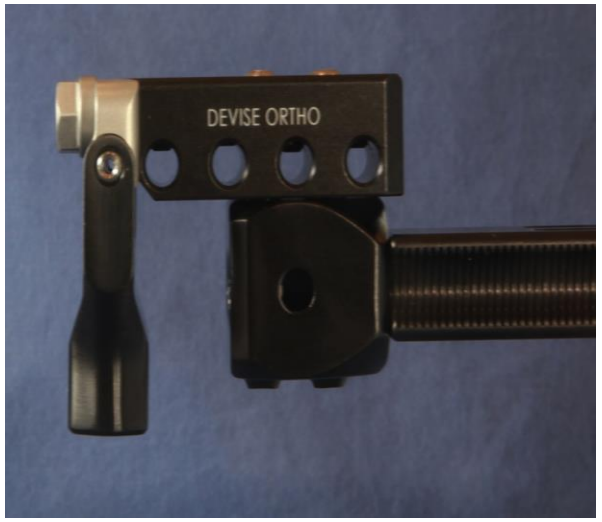
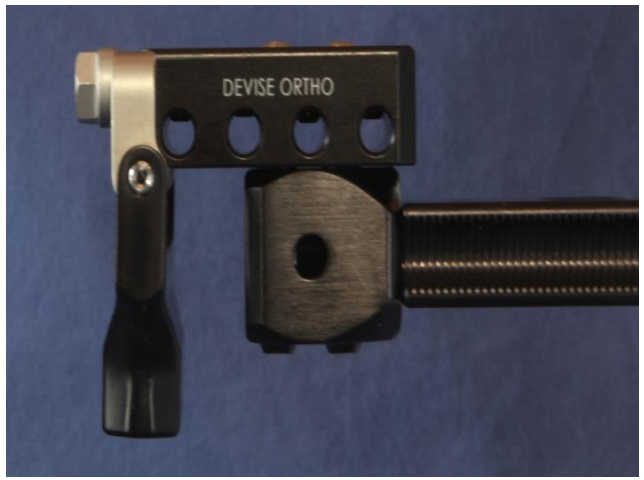
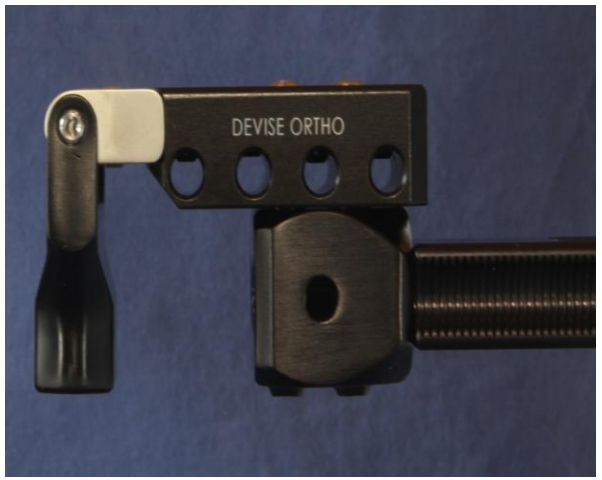
DEVISE ORTHO
20-3504 TM100209

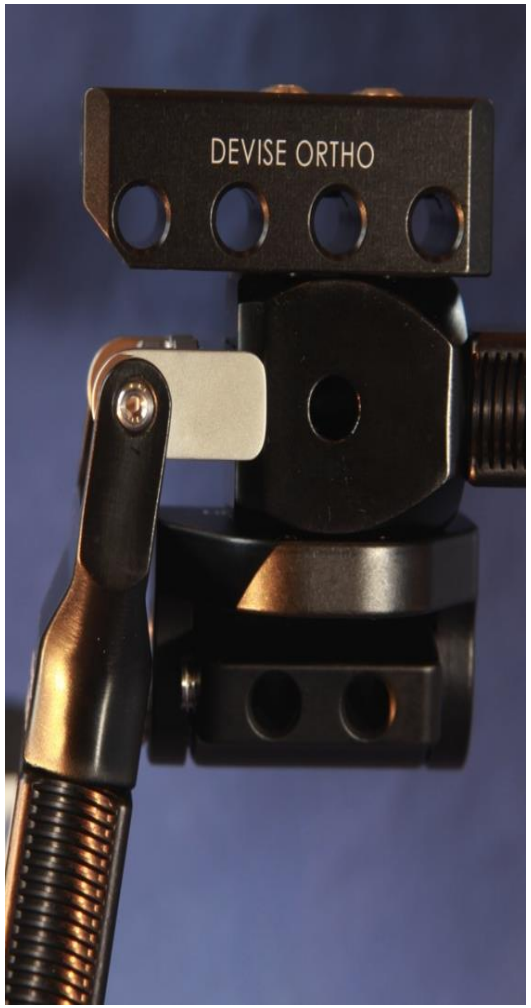
Hinge Options on End Car/Rail





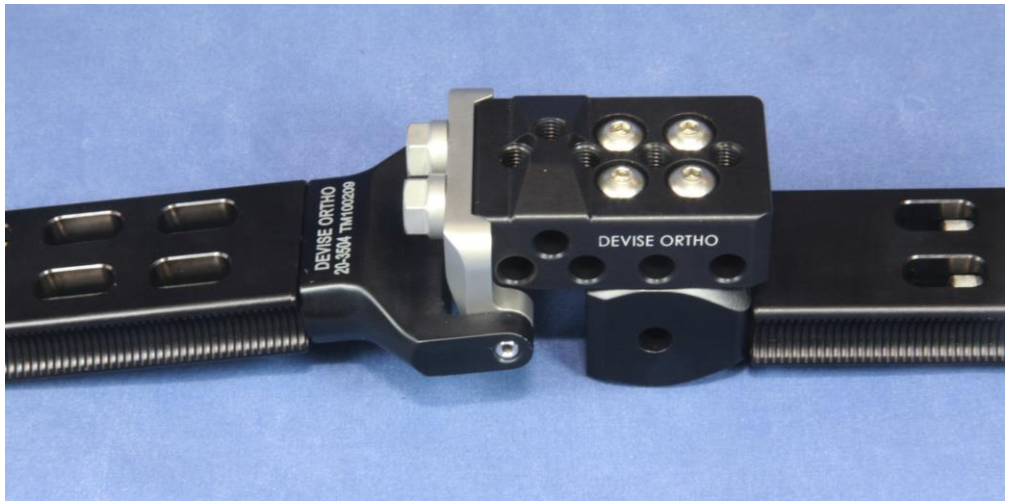




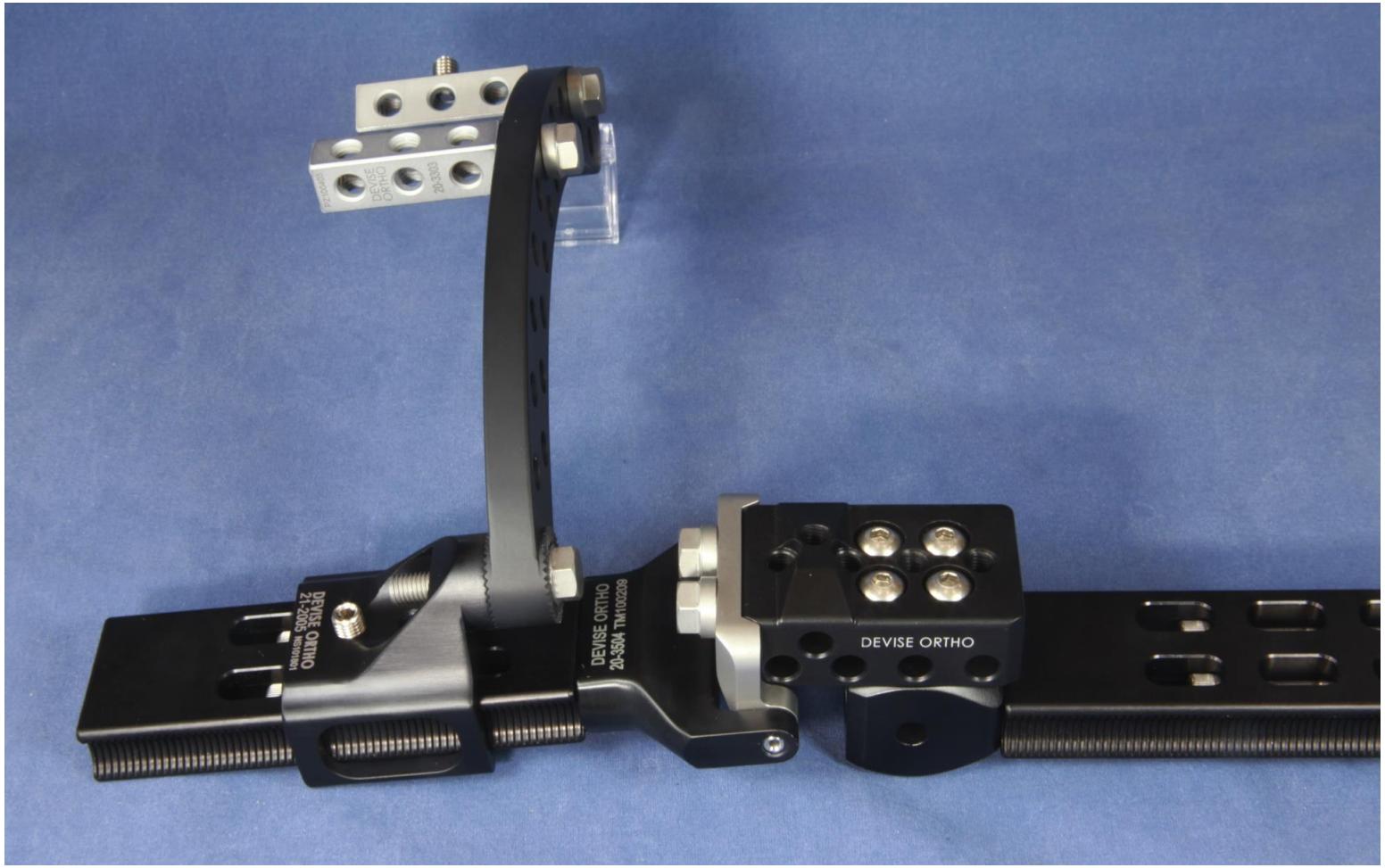


Hinge option on Moving Car
e.g. Hip Hinge

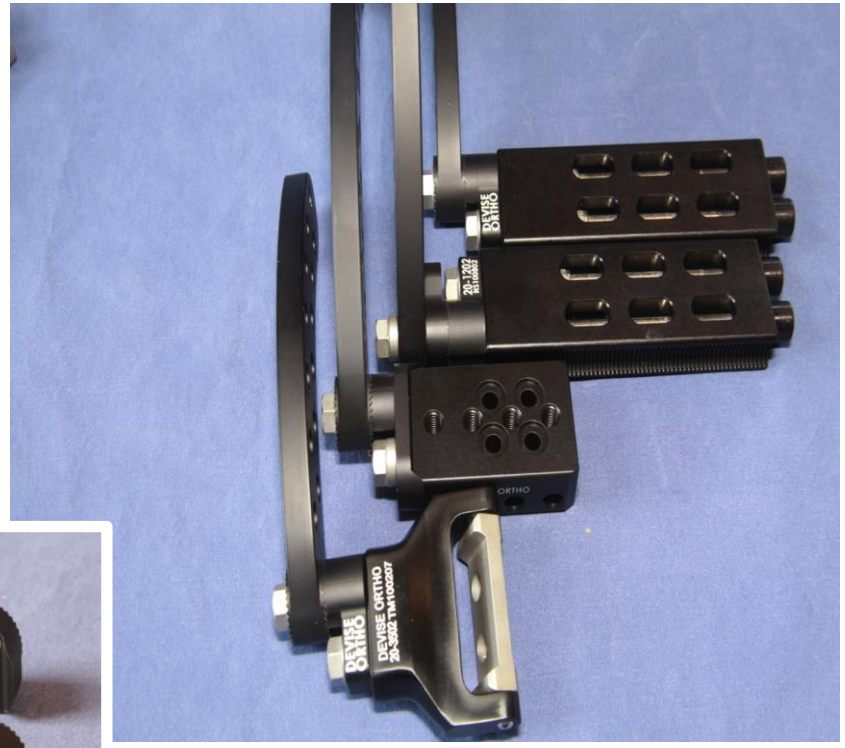
Extend Rail from Hinge



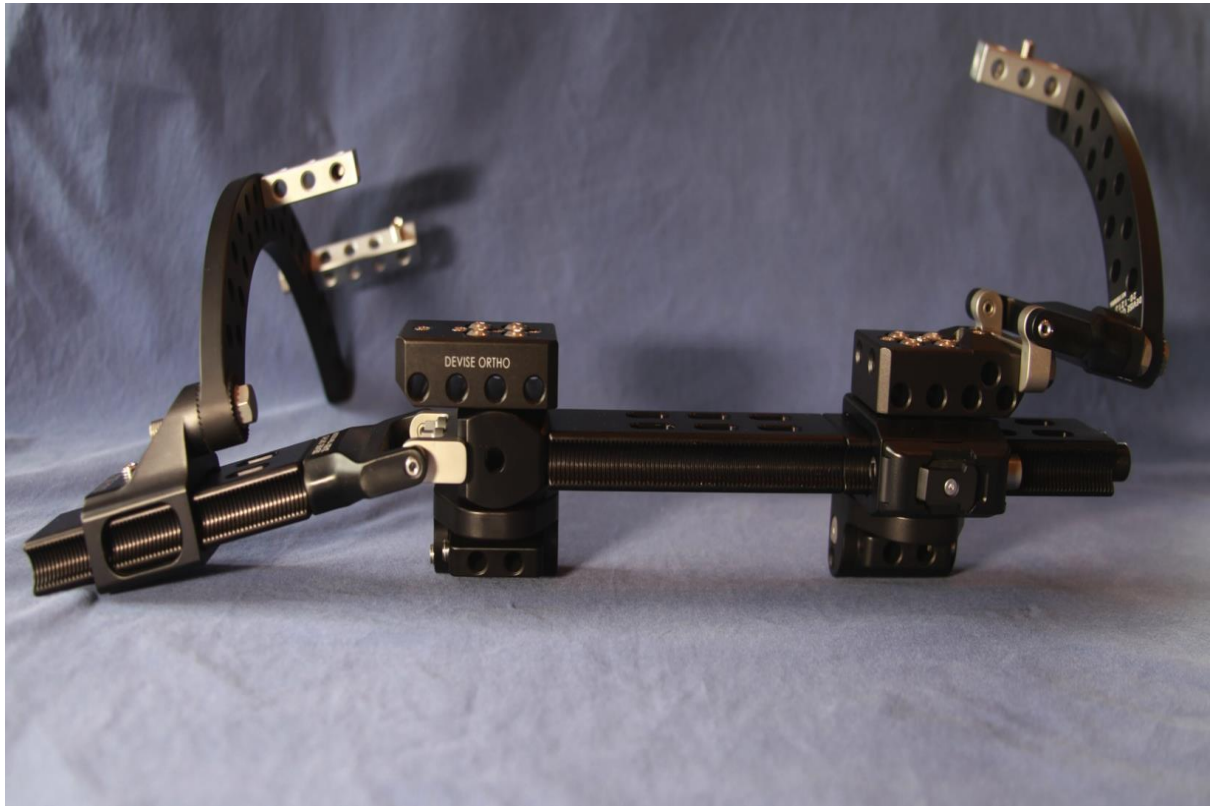
Add an Arch

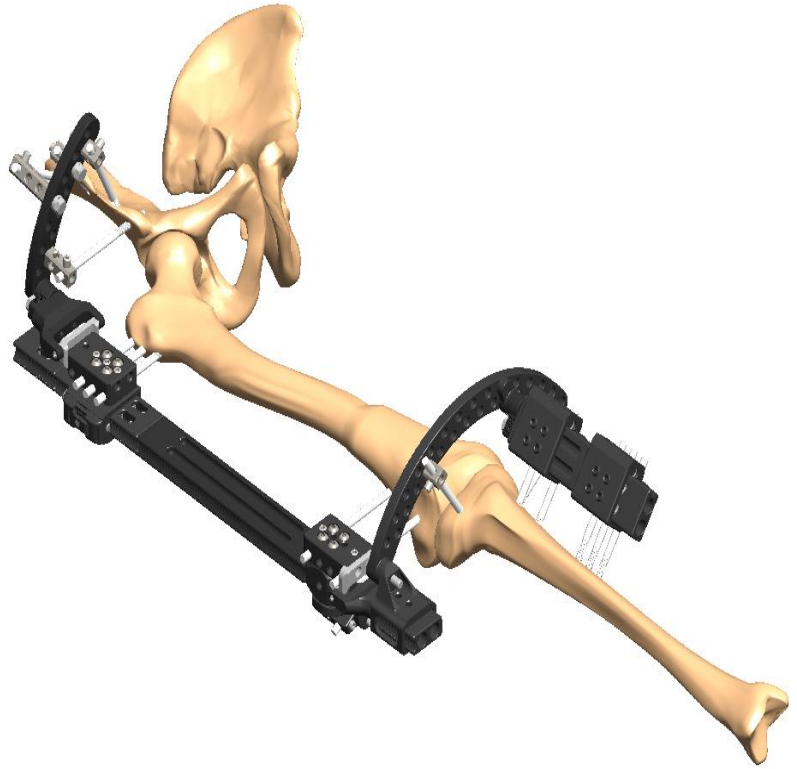


Arch Connectors

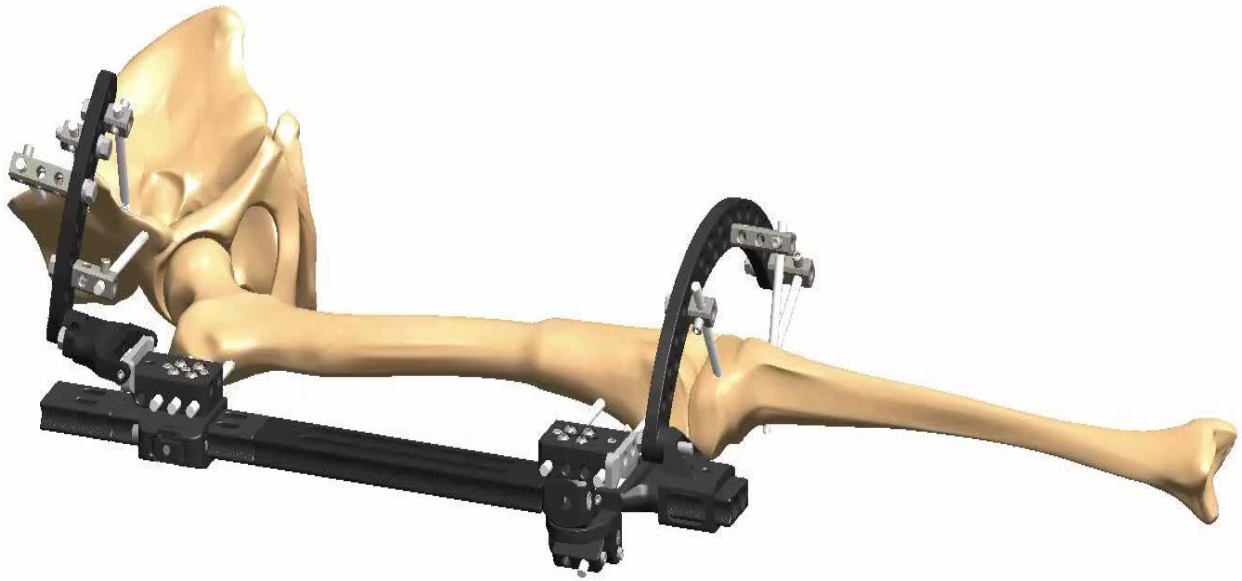


Hip and Knee Hinge Construct

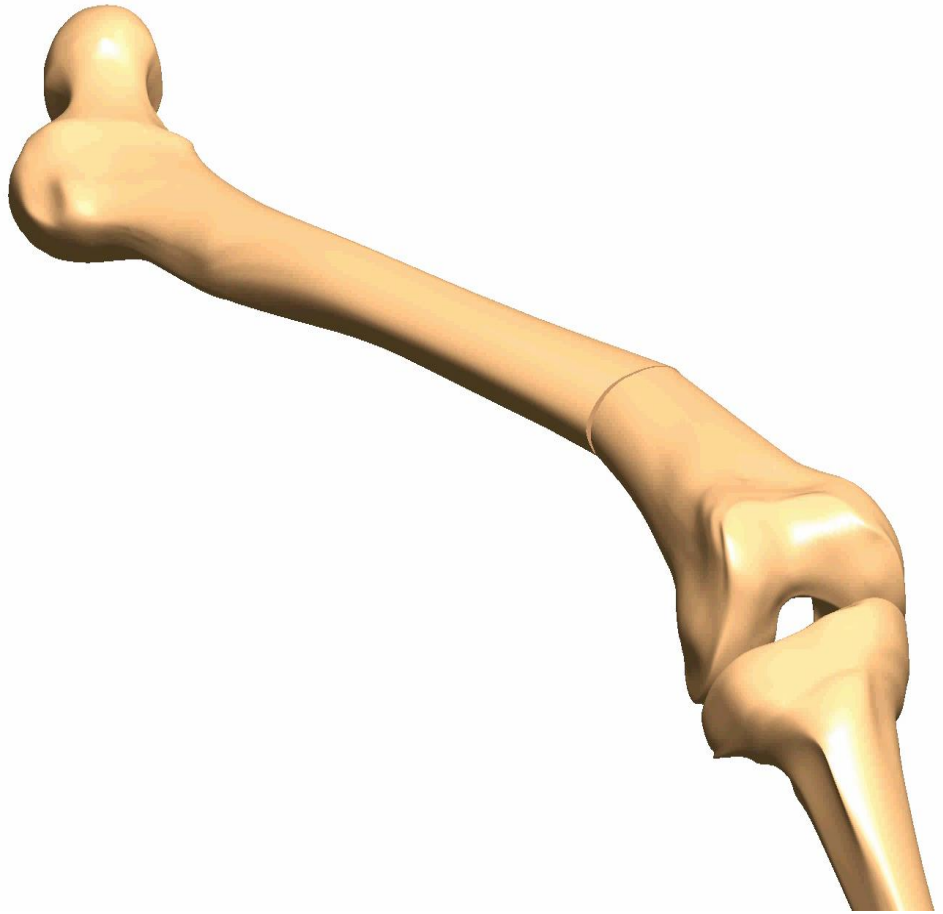




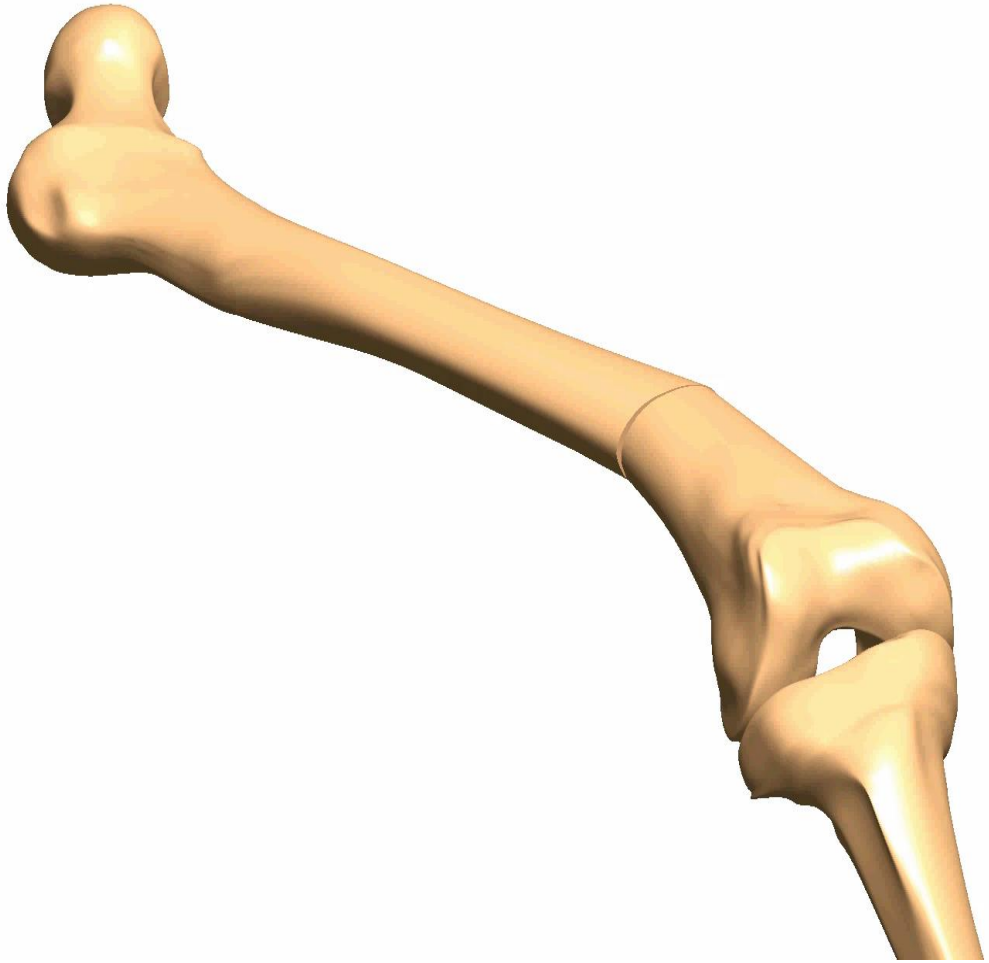
Hip & Knee Hinges with Lengthening



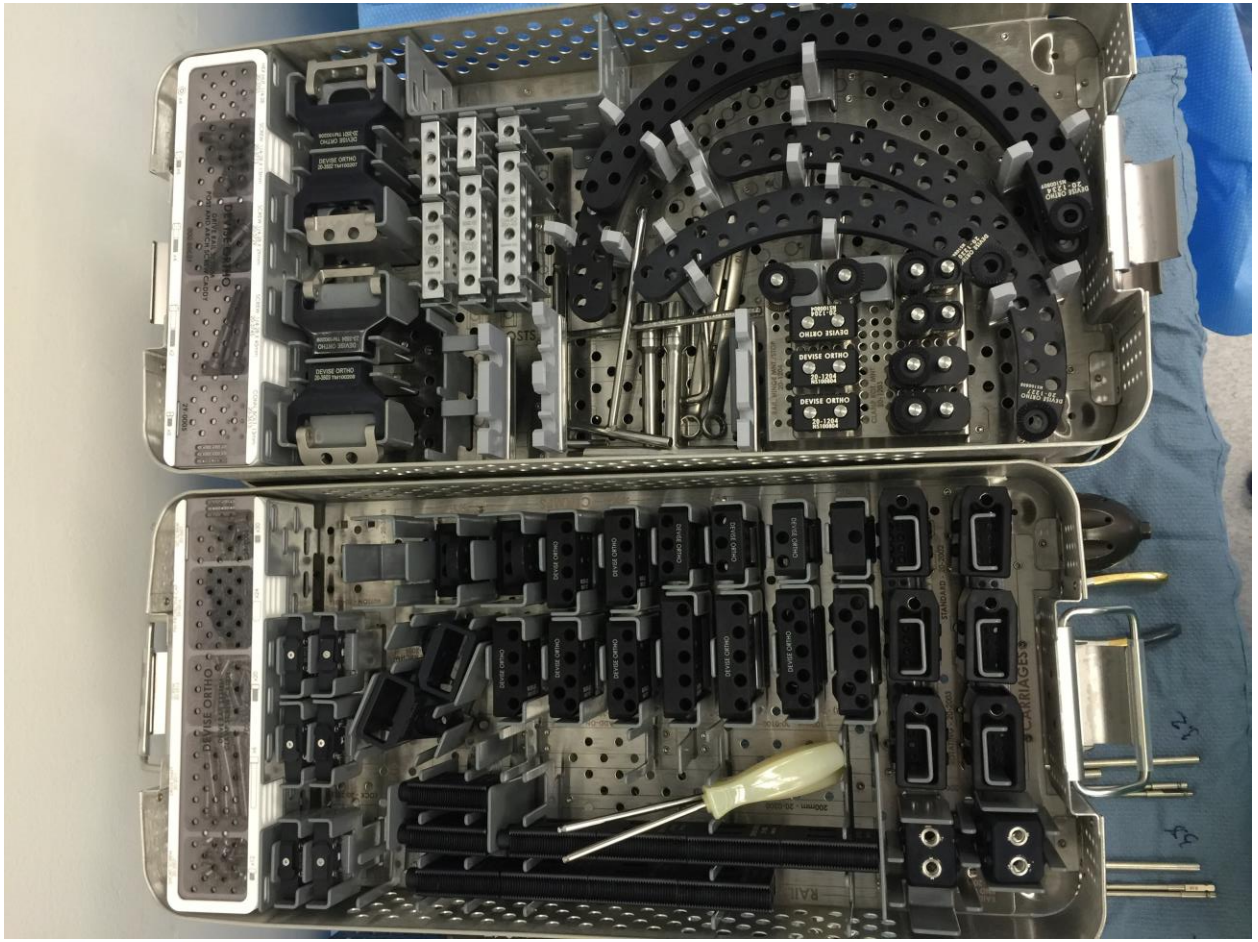
Angular Correction with Swivel Car



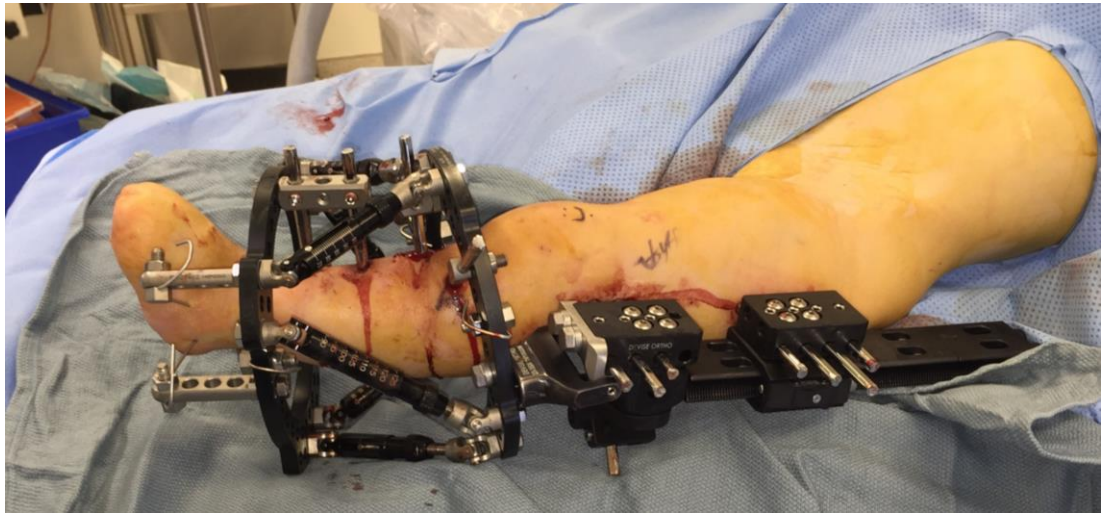
Swivel Car Connected to Knee Hinge

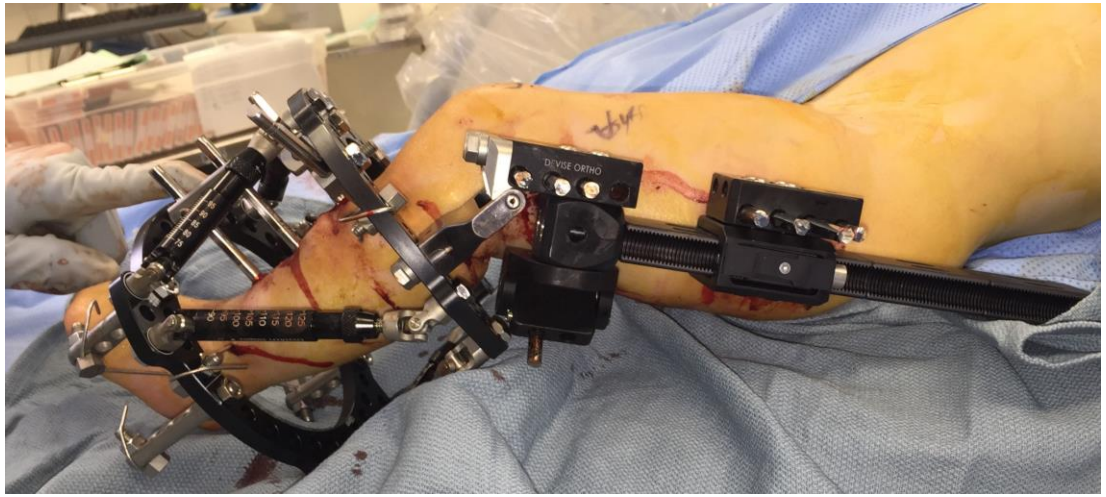


First Clinical Use of Drive Rail
July 2015



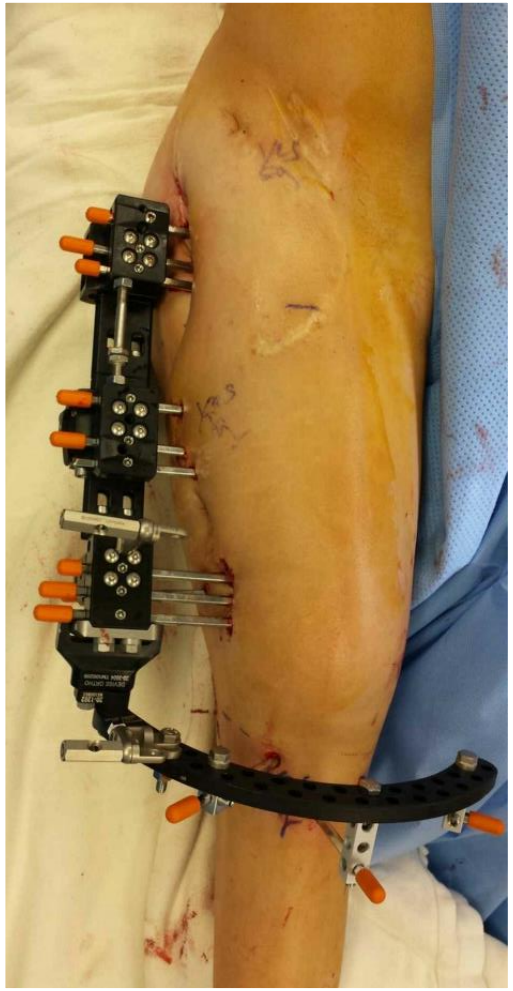
Lengthening Femur & Tibia



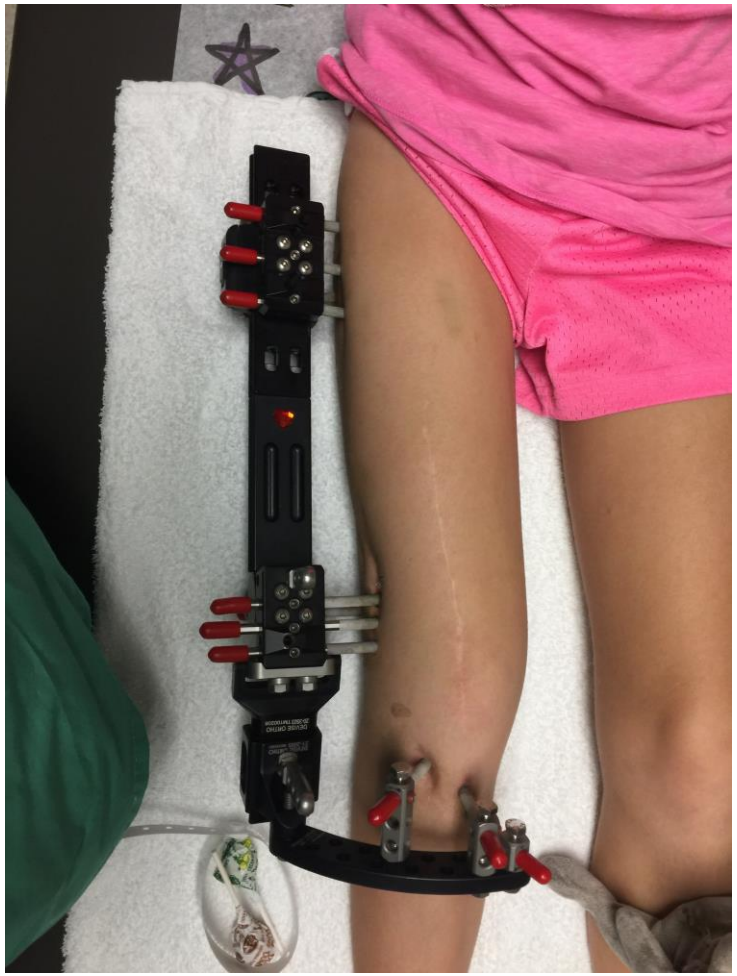


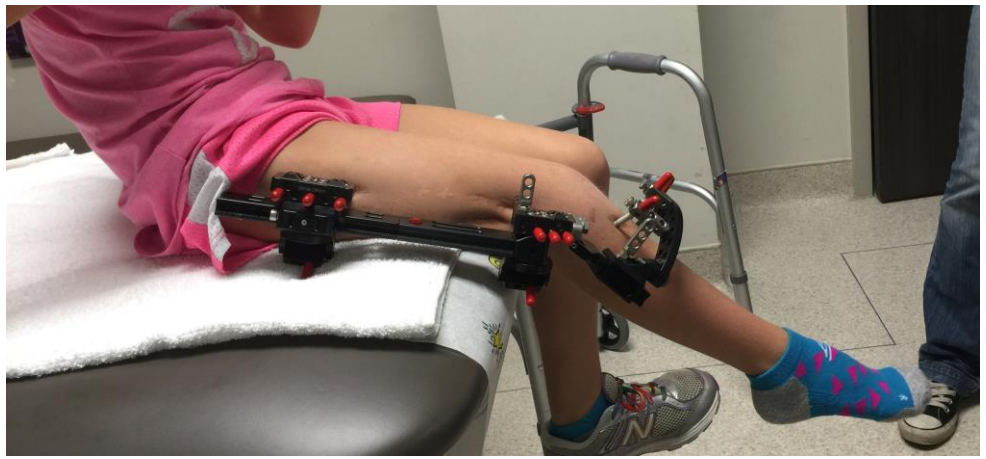
Lengthening Arms: Dwarfism

Lengthening Femur with Knee Hinge

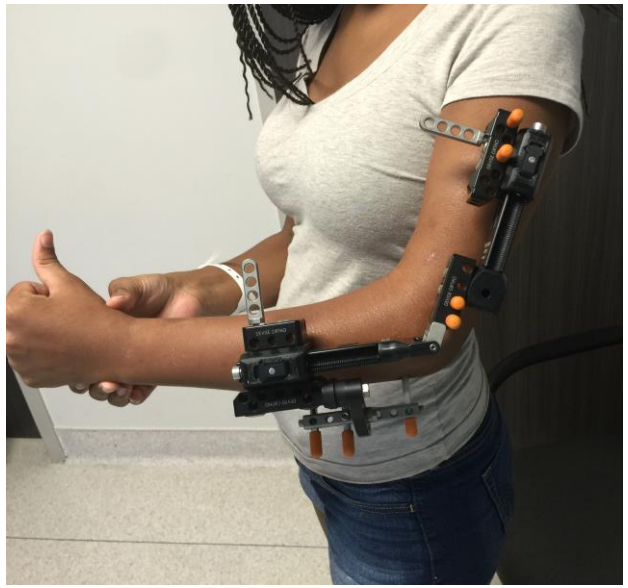


CFD Lengthening

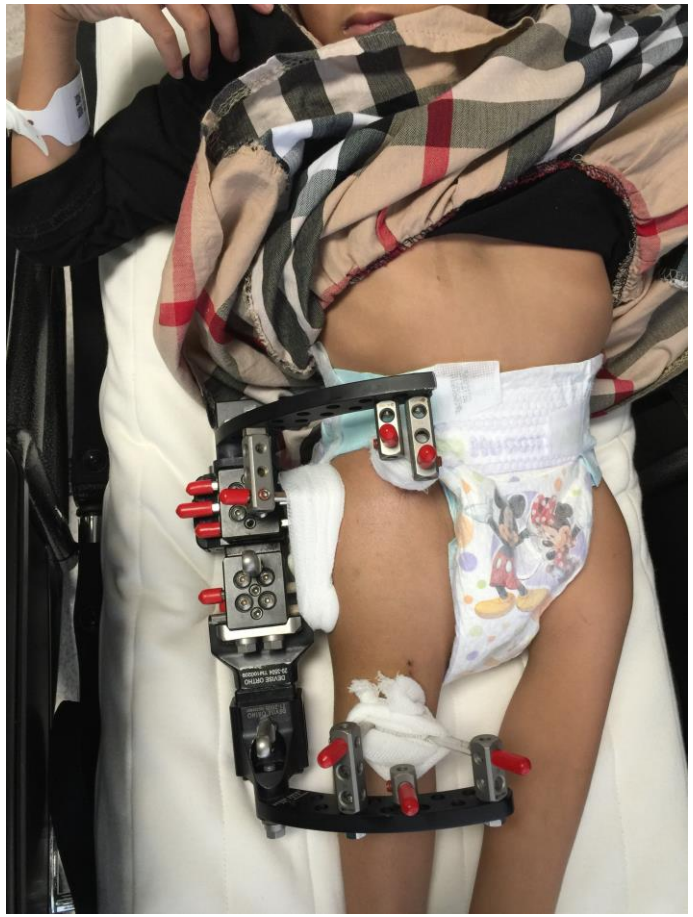


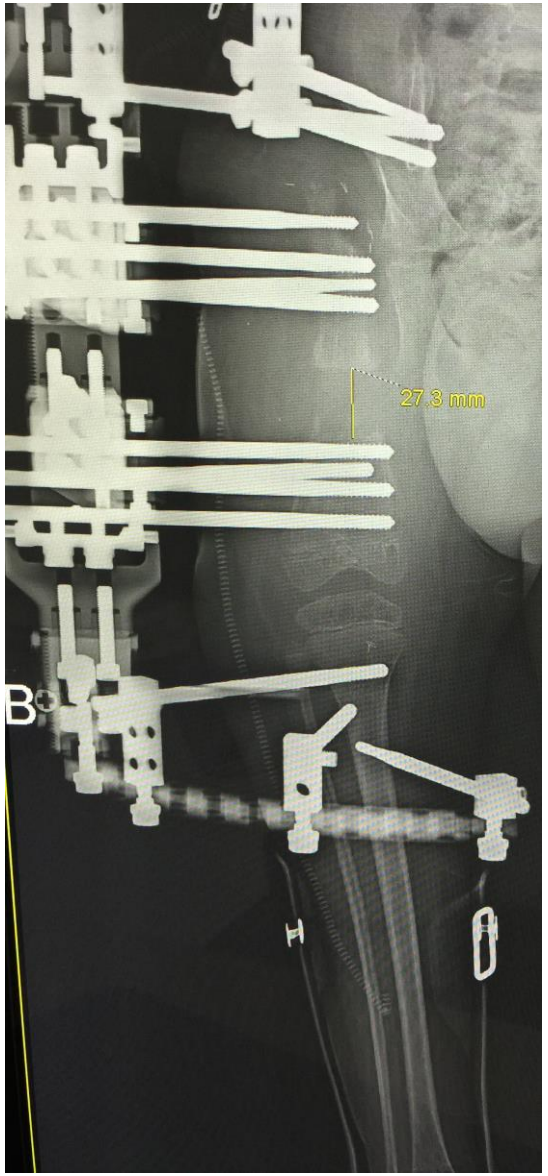


Elbow Contracture



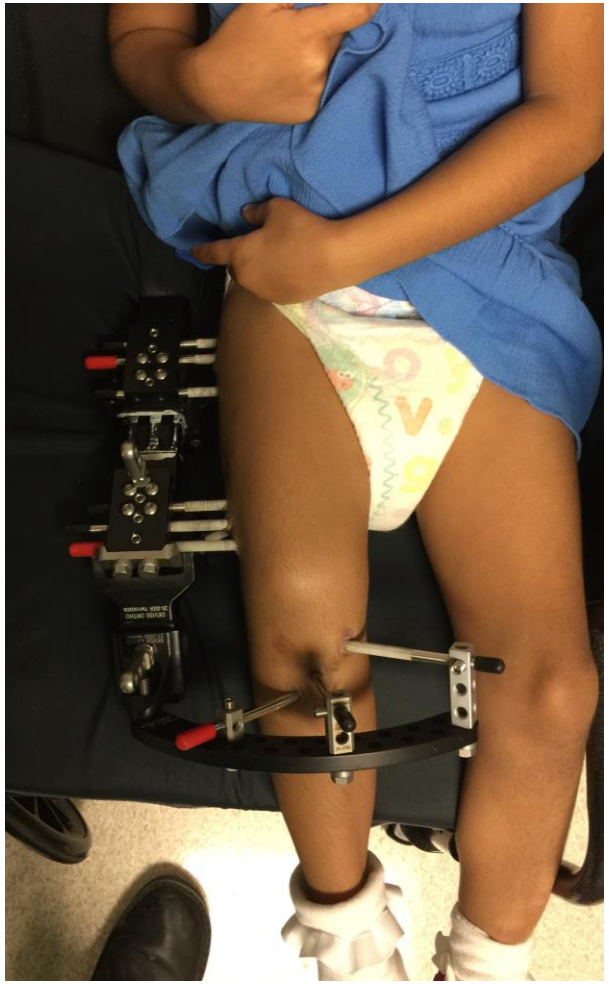
CFD: No Hip; Very Short Femur
Ex Fix: Pelvis-Femur-Tibia

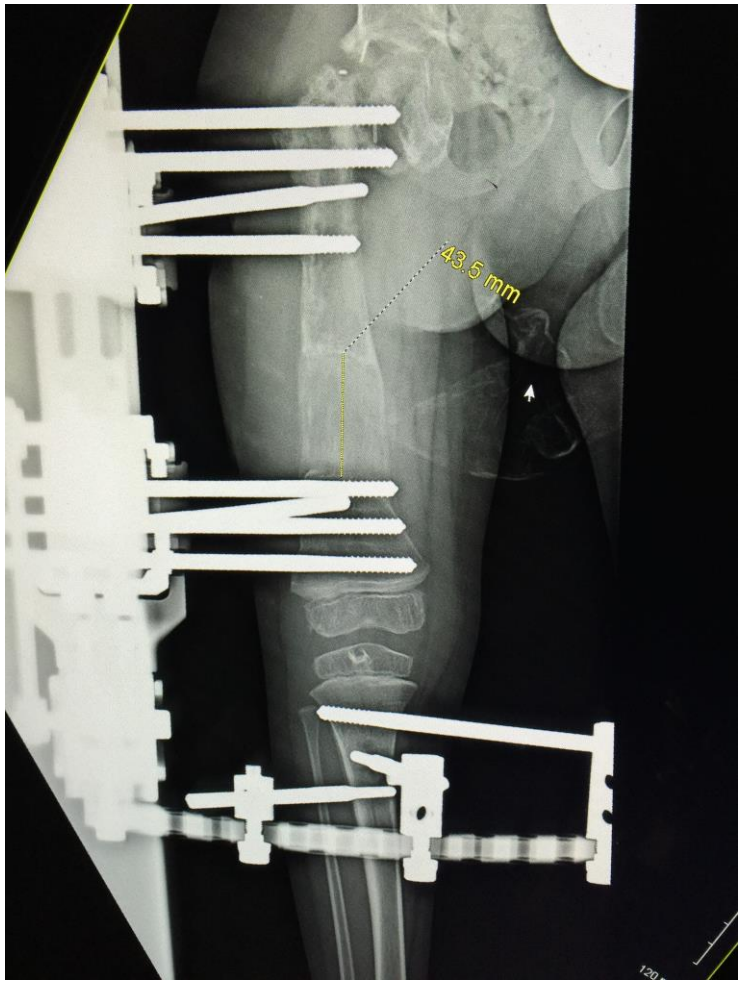



27.3 mm

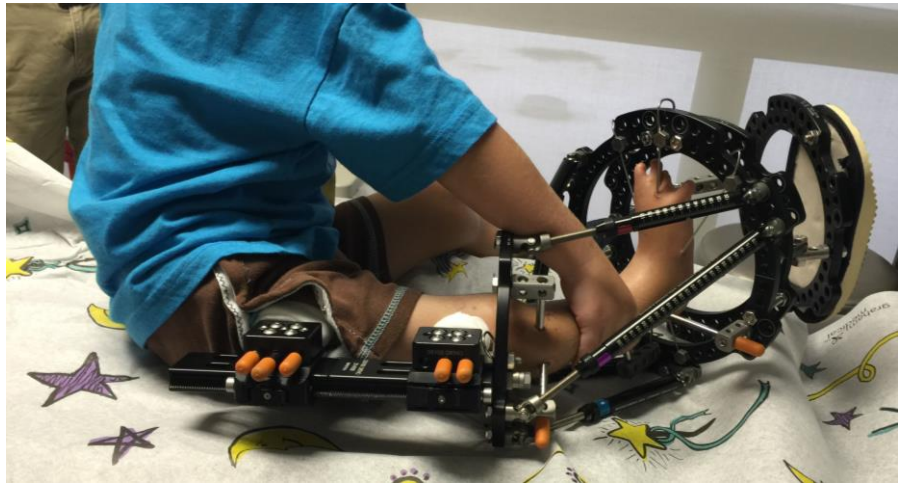
CFD Lengthening

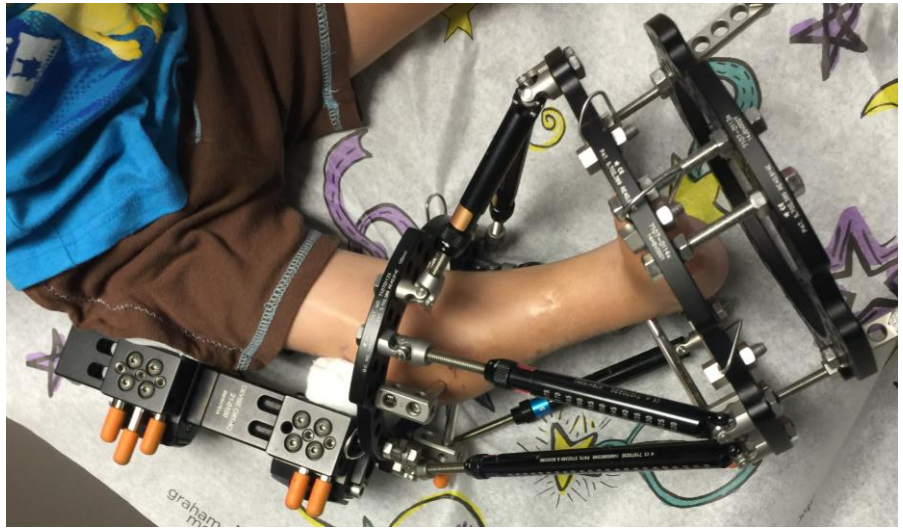
CFD Lengthening



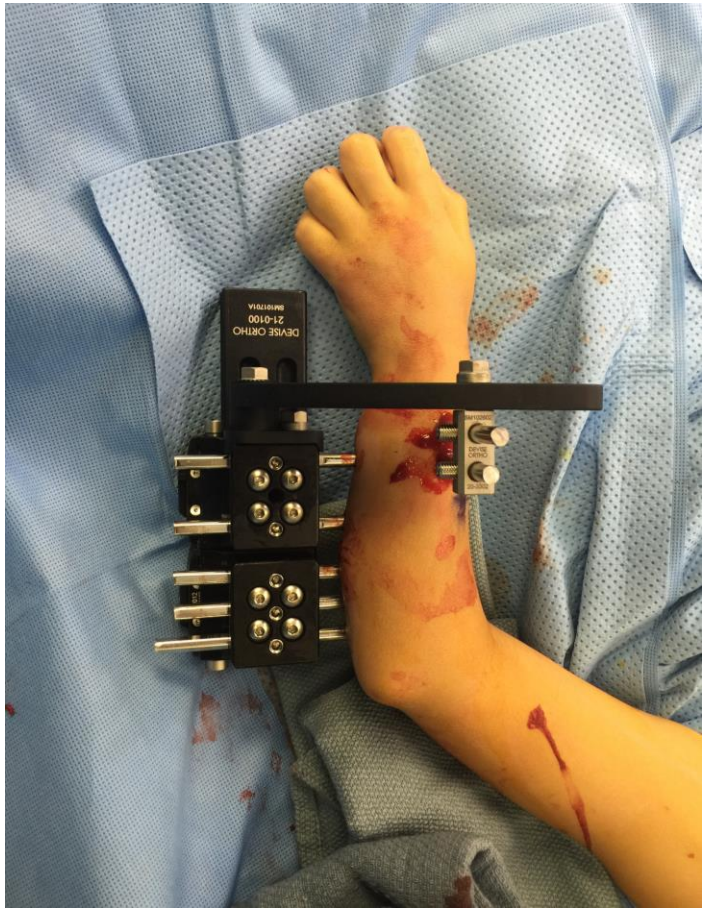


Tibial Hemimelia





Forearm Lengthening



Summary

- Most Modular Rail System
- Can *Span Joints* better than any other Rail
- Peds and Adult with one Rail size
- Unique Lengthening mechanism
- Most efficient design
- Integrates well with Circular Device