

Foundation Iliac Fusion Combined With Shilla

*A Technique For The Treatment Of Neuromuscular
Scoliosis (NMS) With Pelvic Obliquity*

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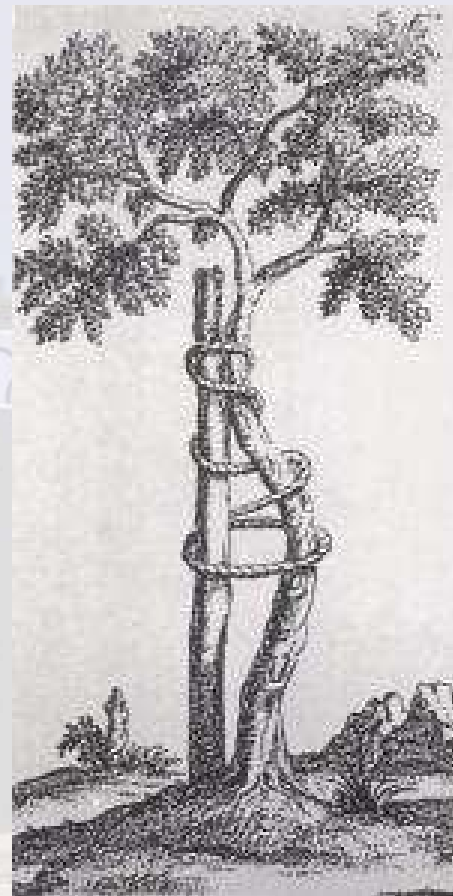
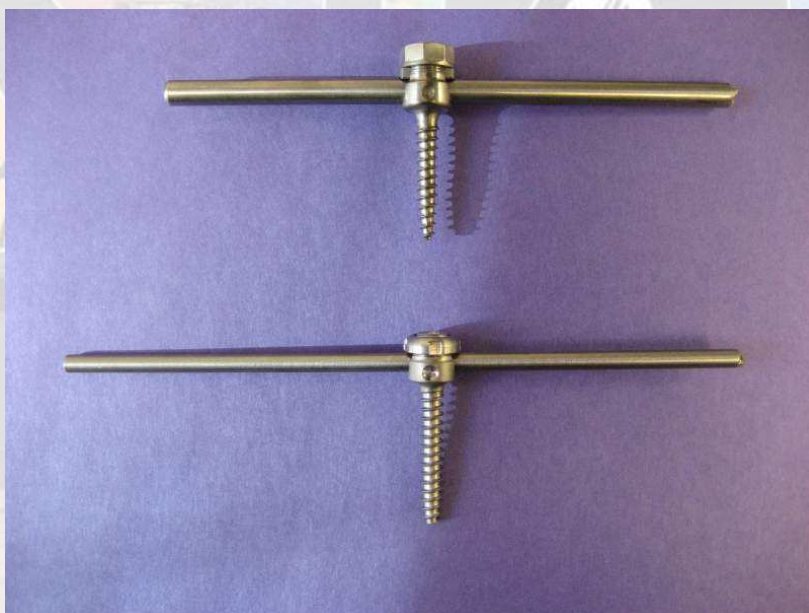


Disclosures

- POSNA BOD
- AAP Executive Committee
- Project Perfect World Medical Advisory Board
- Miracle Feet Medical Advisory Board
- Consultant Orthopediatrics
- Medtronic charitable donation
- US 9,463,050 B2 October 11, 2016. Sliding rod system for correcting spinal deformity. Richard M. Schwend (US).

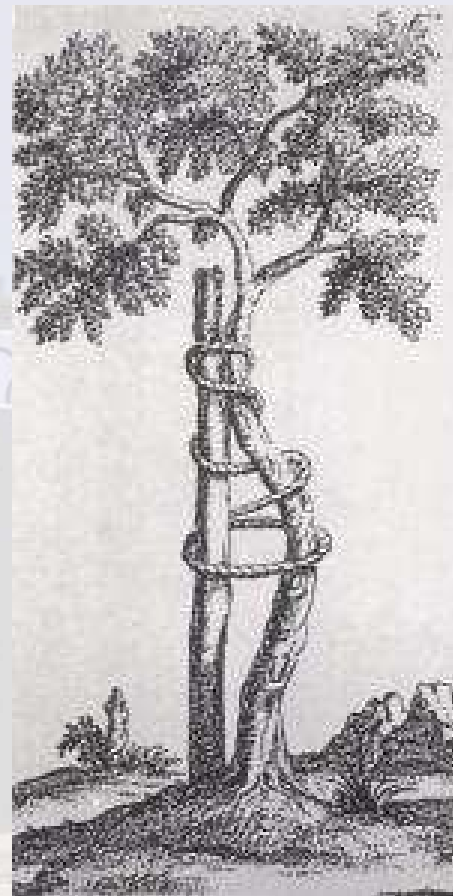
Principles of Shilla

- Harness the growth of the spine through the end plates.
- Maintain flexibility to prevent auto-fusion and stiffness.
- Load share among multiple vertebral levels.
- Less constrained system, guides the growth of the abnormal spine to a more normal shape and position.



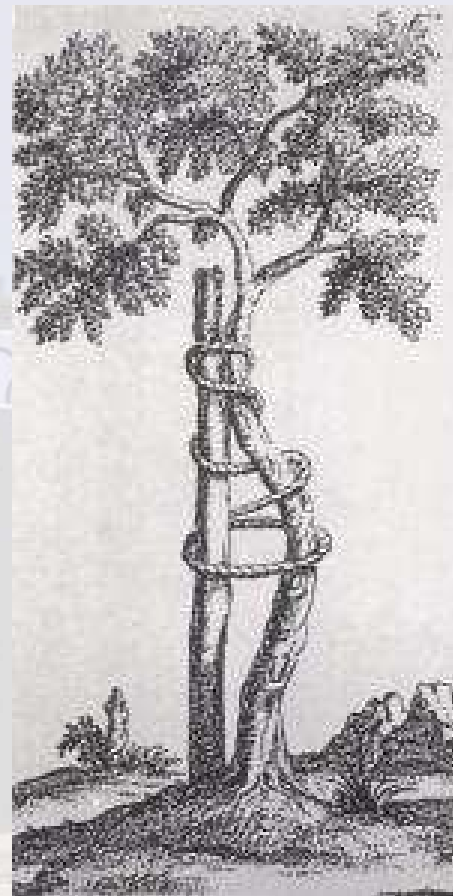
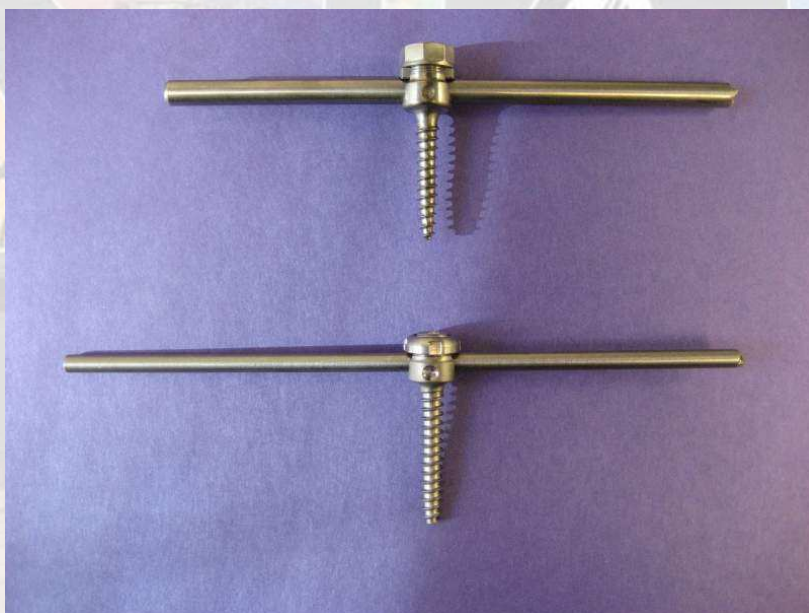
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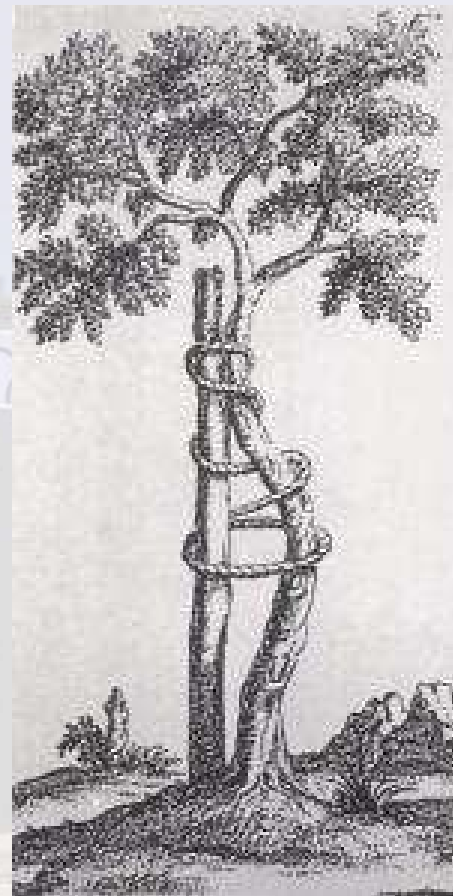
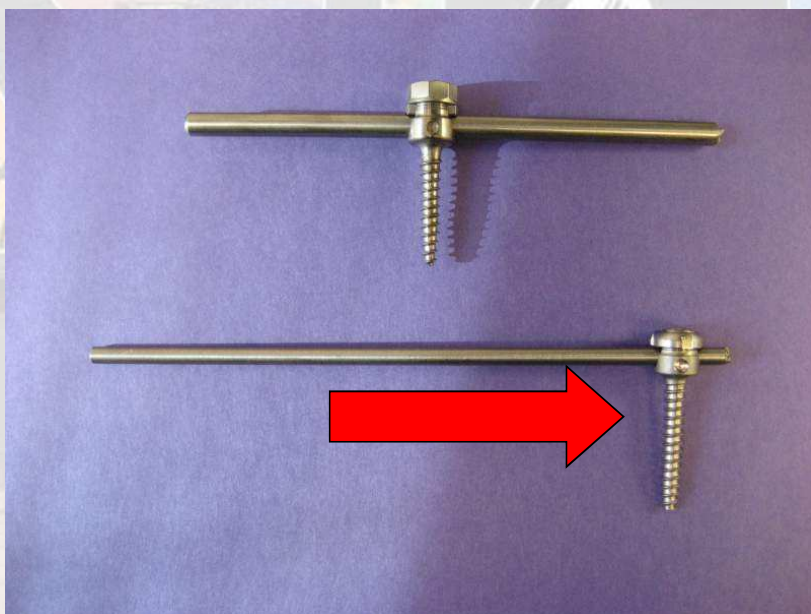
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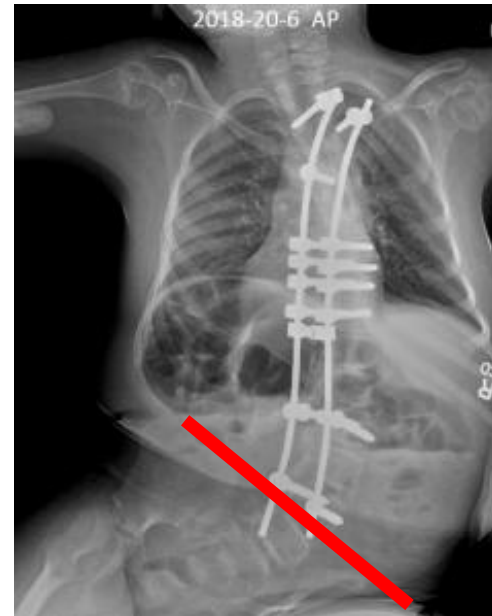
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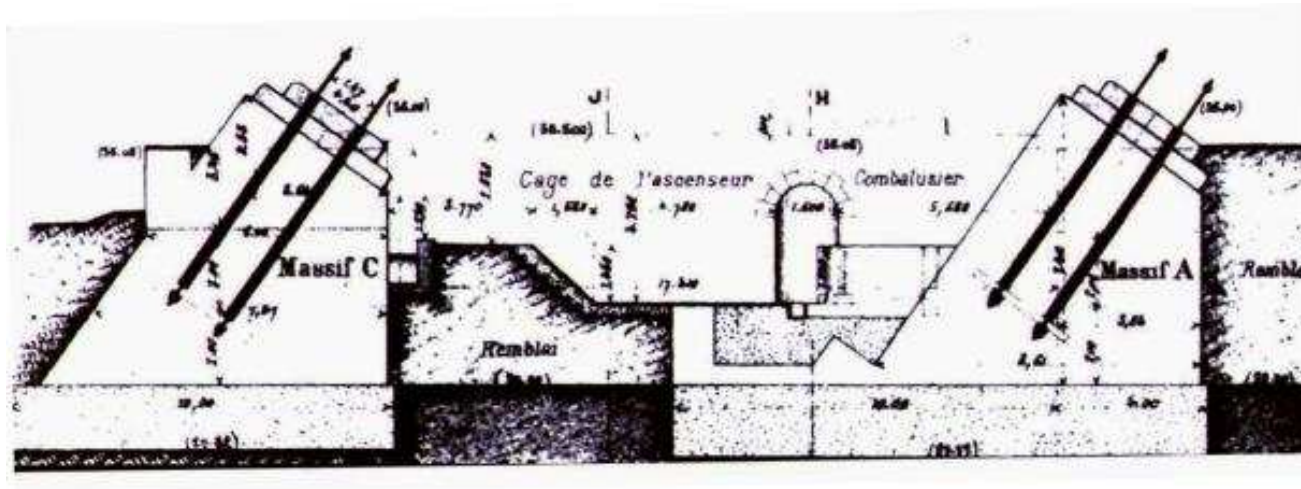
The Problem: Pelvic Obliquity Progression

- A 3 yo old girl with SMA and pelvic obliquity (from GSSG)
- At 9 years follow up...



Ideal

- The reason
 - Apical fusion technique can't control the pelvic obliquity
- Inspiration and method
 - The Pylon Concept
 - Hard foundation(fixed and fusion)+ growth friendly rod-screw system.
 - Correct apex of deformity without fusion



Indications and Methods

- Enough growth remaining to be worthwhile (under age 10 years).
 - Typically 5-9 years of age.
- Sufficient end plates to drive the growth.
- Flexible curve.
- Surgical goals:
 - balanced spine over a level pelvis
 - secure pelvic foundation
 - minimal constraint/prominence of the upper implants
 - minimal spine exposure to maintain **growth and flexibility**
- IRB approved, single center, retrospective, cohort study
- 2008-July 2017 – Inclusion: NMS patients who underwent a Shilla technique with pelvic screw foundation.
- Minimum 2 years follow up.

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Results: 17 cases- 7 met inclusion criteria

CASE	GENDER	DIAGNOSIS	BLOOD LOSS	AGE	FOLLOW UP TIME	PELVIC OBLIQUITY (DEGREE)			COBB ANGLE (DEGREE)			APEX LOCATION			T1-S1 LENGTH(CM)		
						preop	1 year Postop	Last follow up	preop	1 year Postop	Last follow up	preop	1 year Postop	Last follow up	preop	1 year Postop	Last follow up
1	F	SMA2	450	8.6	6.6	-14	2	-4	42	10	31	T5	T5	T2	28.7	30.7	42.4
2	M	spina bifida	750	3.5	7.2	9	3	2	62	18	20	L5	L4-5	L4	18.4	20.0	25.2
3	F	SMA2	700	5	3.9	37	3	0	121	21	23	T11	T11	T10-11	20.8	30.9	35.2
4	F	CP	1450	5.2	10.2	18	4	-5	53	18	84	T10	T9	T3	30.4	33.5	42.5
5	F	CP	1150	4.7	5	-23	-4	-1	67	36	28	L3	L3	L2	29.0	34.3	39.4
6	M	CP	320	5.2	5.3	-31	-4	-8	75	26	40	L4	L3	L3	24.6	28.5	36.9
7	M	CMDCongenital muscular dystrophy	280	6.7	2	11	5	6	92	56	63	T11	T10	T10	26.5	31.4	33.0
mean			728.6	5.6	5.7	20.4	3.6	3.7	73.1	26.4	41.3				25.5	30.0	36.4

T1 S1 length 25 cm Preop → 30 cm one year post op → 36 cm final FU at 5.7 years. 1cm/year.

Case 1

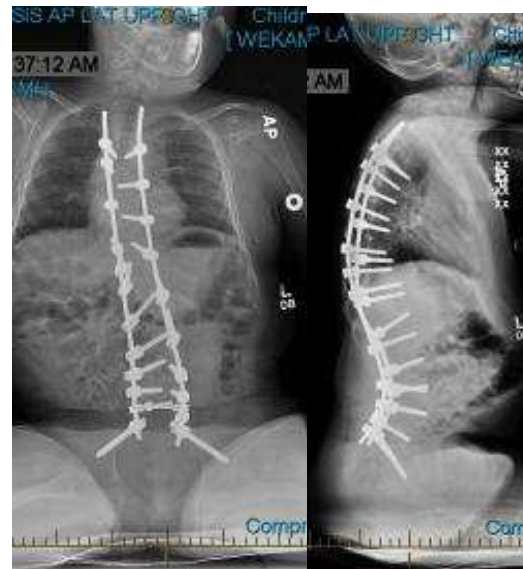
- 5 yf GMFCS 5 CP
- Functional goal: comfort, sitting, care, nutrition.



Postop



1 year follow up



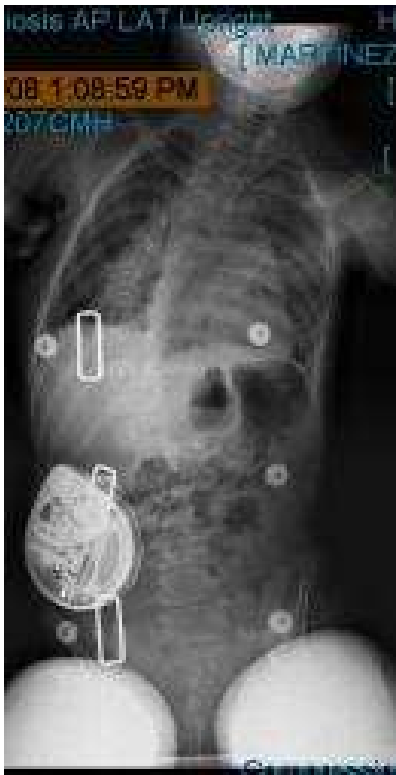
2 year follow up



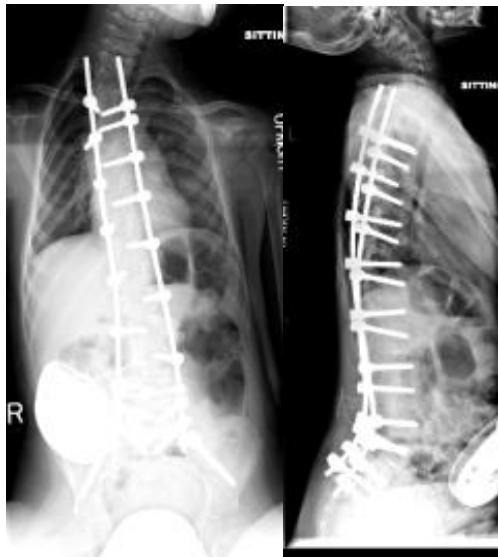
5 year follow up

Case 2 July 2008

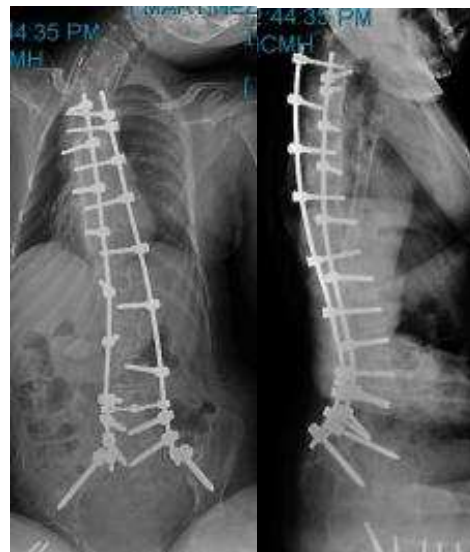
- 5 yf GMFCS 5 CP 22 kg
- Functional goal: comfort, sitting, care, nutrition.



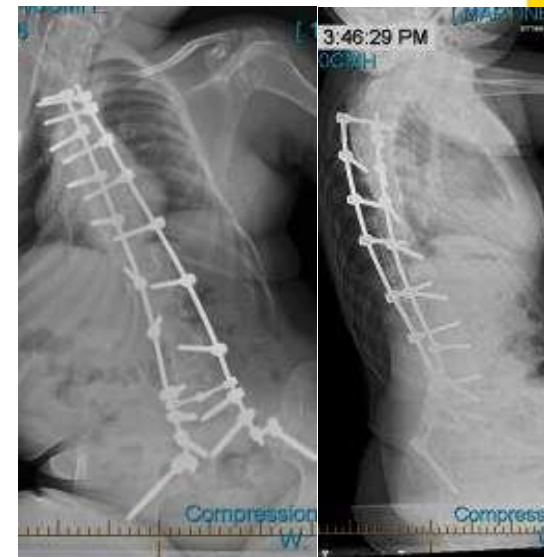
postop



1 year follow up

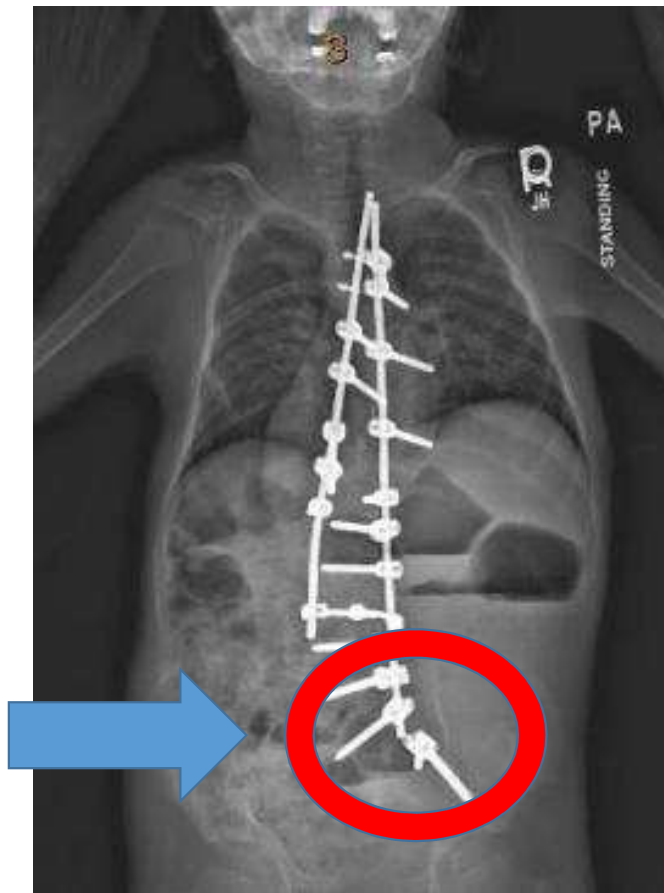


2 year follow up

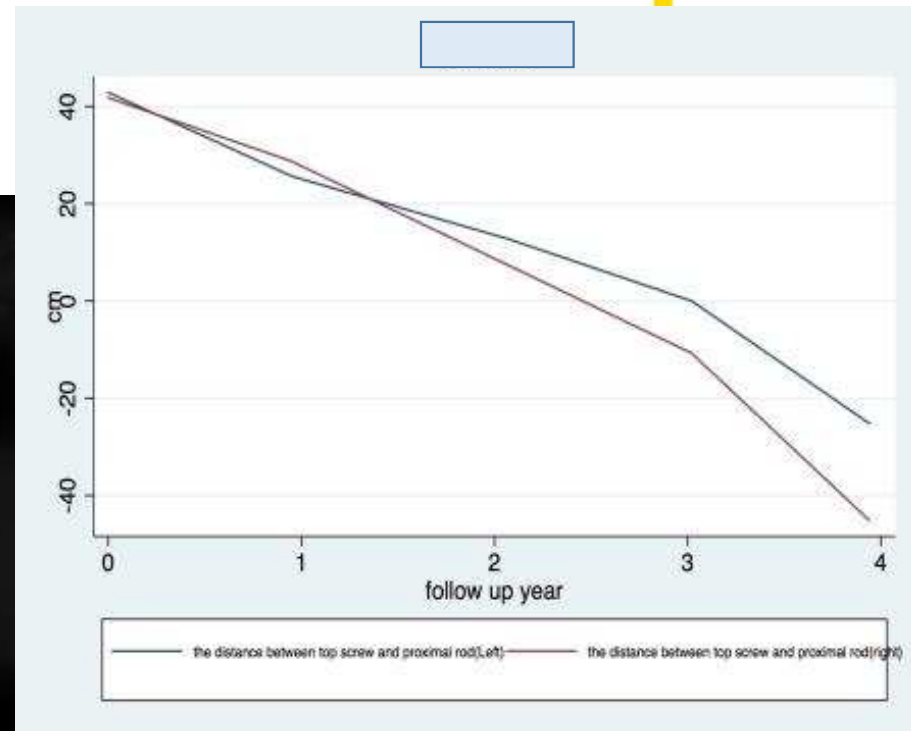


10 year follow up

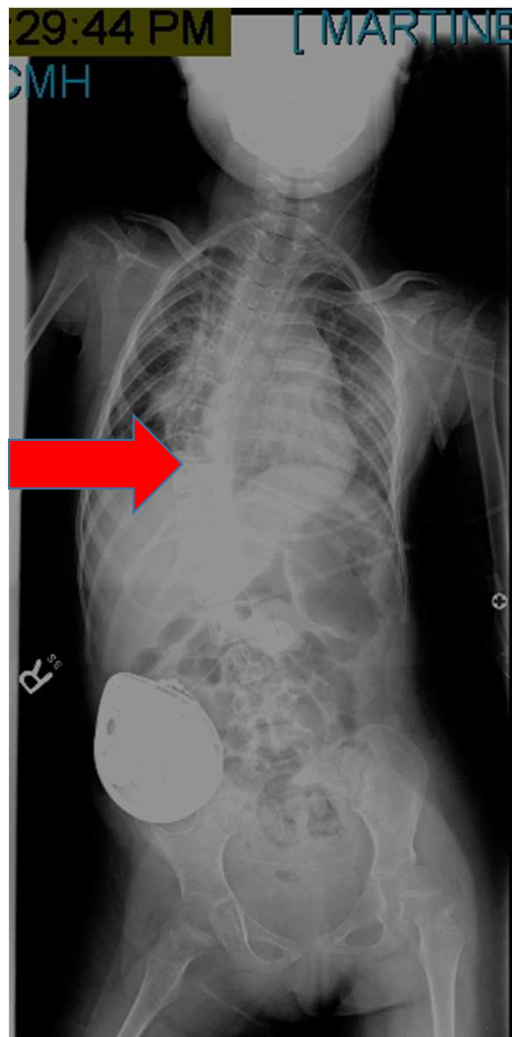
Complications Ouch!- infection



13 yo, 5 year post op



Apex migration



Apex T10



10 years postop
Only had index
surgery

Apex T3

Lessons Learned

- This technique allows
 - Spine to stay flexible while implants guide the growth
 - Natural end plate growth drives the growth
 - Balanced spine over level pelvis. Pelvic obliquity improved and not deterioration at FU
 - Potential for “one and done” surgery, but not always
- Avoid Crankshaft. Don’t expose the spine “extra-periosteal”. Use C arm and navigation to not even see the spine.
- Do the surgery when spine still flexible
- May see new apex at proximal part of the construct
- Avoid PJK
- Need for better design