Proximal Junctional Kyphosis in Surgically Treated Young Children With Scoliosis: Incidence, Risk Factors, and Management

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PJK in children treated with GR surgery

- 88 patients with EOS treated with dual growing rods
- PJK developed in 23 patients (26%)
- The significant independent risk factors for PJK:
  - an LIV at or cranial to L3,
  - a proximal thoracic scoliosis of 40° or more,
  - and a main thoracic kyphosis of 60° or more.

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Risk Factors for Proximal Junctional Kyphosis Associated with Dual-Rod Growing-Rod Surgery for Early-Onset Scoliosis

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Case Series

Proximal Junctional Kyphosis After Vertical Expandable Prosthetic Titanium Rib Insertion

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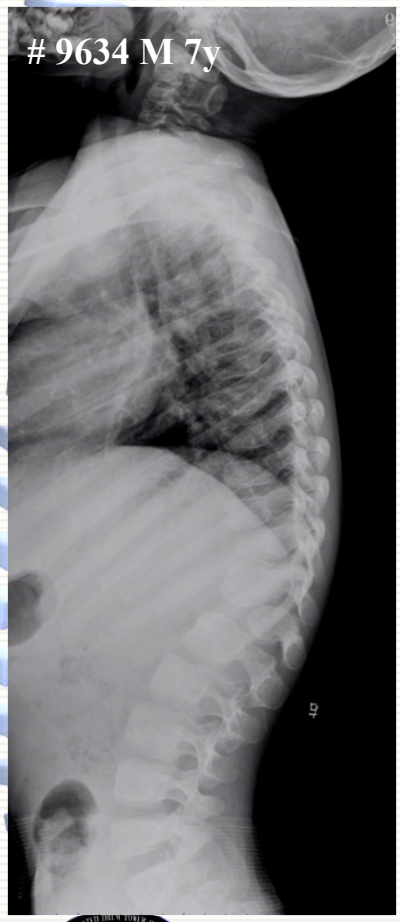
A total of 68 patients underwent VEPTR treatment at a single institution

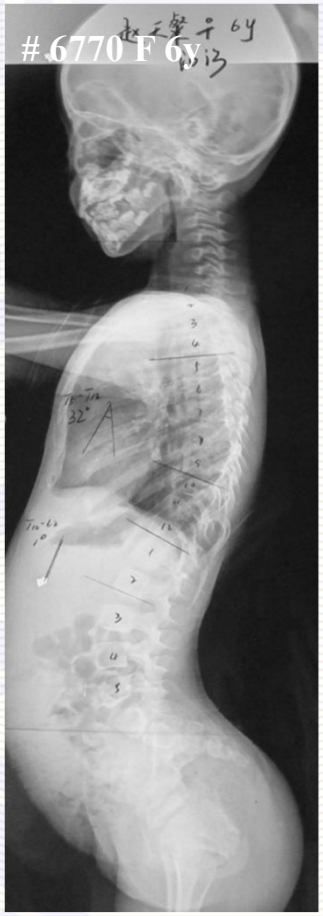
Four patients developed PJK (6%).

Patients with preoperative thoracic hyperkyphosis may be at higher risk. PJK can develop within the first year of VEPTR treatment.

PJK in children treated with fusion surgery



CS, T10-L2, T12'
HV VCR



CS,
PSF T7-L1

Natural Course of PJK in AIS

- Most of PJK was progressed within 3 months after surgery and did not progress significantly after 2 years postoperatively
- The incidence of PJK at 7.3 years postoperation was 26% (50 of 193 patients).
- The average PJA increased 15.2° until 2 years postoperatively and then increased 1.7 ° until final follow-up in the PJK group.

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Proximal Junctional Kyphosis in Adolescent Idiopathic Scoliosis Following Segmental Posterior Spinal Instrumentation and Fusion

Minimum 5-Year Follow-up

Yongjung J. Kim, MD, Keith H. Bridwell, MD, Lawrence G. Lenke, MD, Junghoon Kim, MD,

Prevalence of PJK

AIS		Adults	
Lee	46%	Kim	39%
Kim	28%	Mendoza-Lattes	35%
Hollenbeck	9.2%	Bridwell	27.8%
Helgeson	8.1% (PS)	Misuru -yagi	26%

Objective

To determine the incidence, risk factors, and behavior of proximal junctional kyphosis (PJK) in young children undergoing posterior instrumented spinal fusion.

Material and Methods

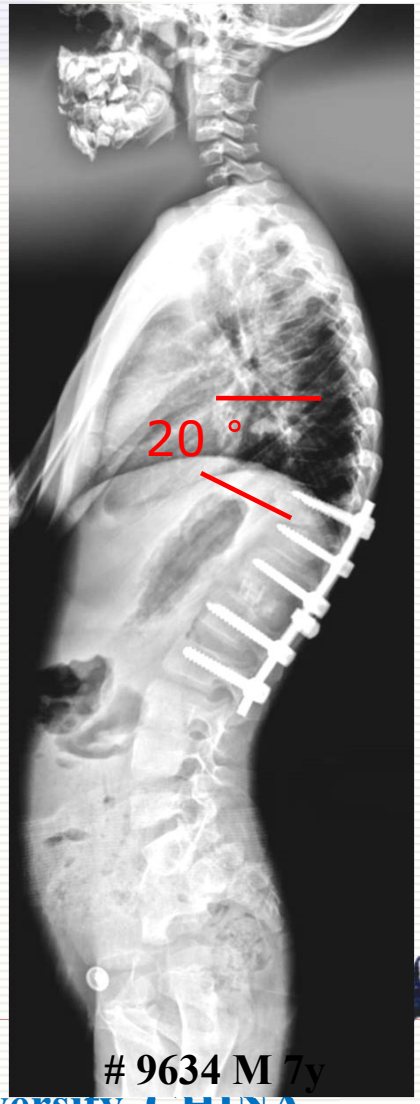
Inclusion criteria

- Age at surgery less than 10 yrs
- Diagnosed with congenital scoliosis
- Surgery: posterior fusion≥4 levels
- Follow-up>2y
- UIV location:T1-T11

Proximal junctional angle measurement

PJA

- **The proximal junction was defined as the caudal endplate of the UIV to the cephalad endplate of 2 proximal vertebrae.**



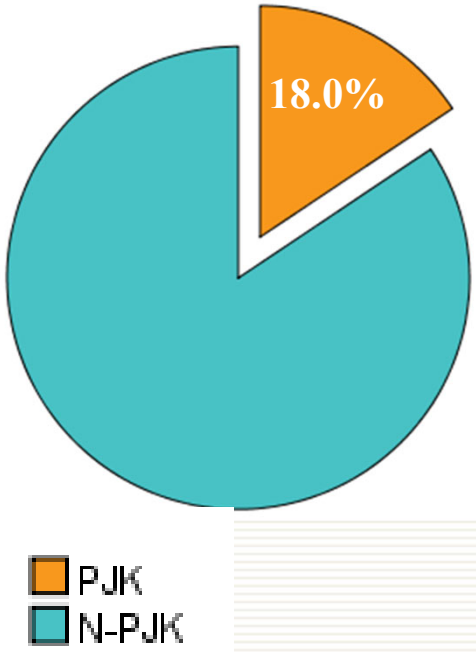
 # 9634 M 7y

Results

61 consecutive patients	• From 2009 to 2011 in our institution
Age	• 5.4 years (2-10 years)
Follow-up	• 2.7 years (2-4years)

Results

Incidence of PJK



61consecutive young children with scoliosis were included

Overall incidence of PJK was 18.0% (11/61) at follow-up

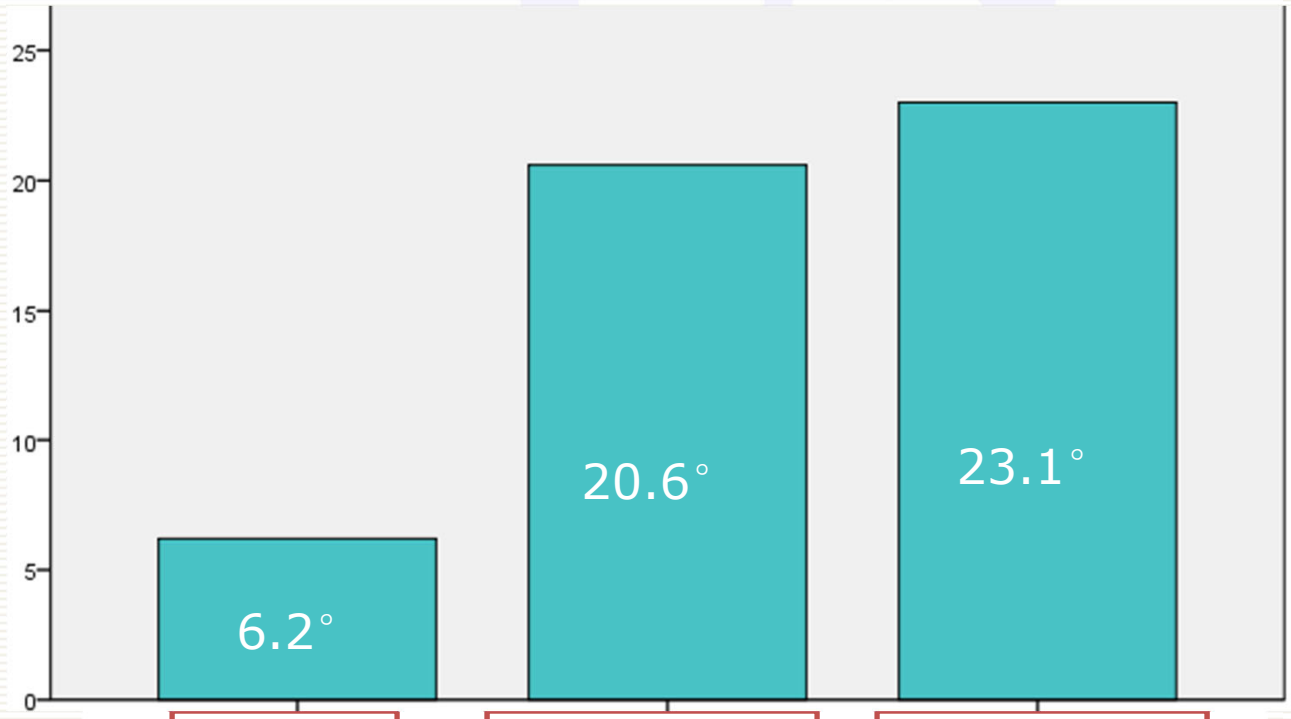
3m-po-op:10 PJK

3-6m:11 PJK

2y-po-op:9 PJK

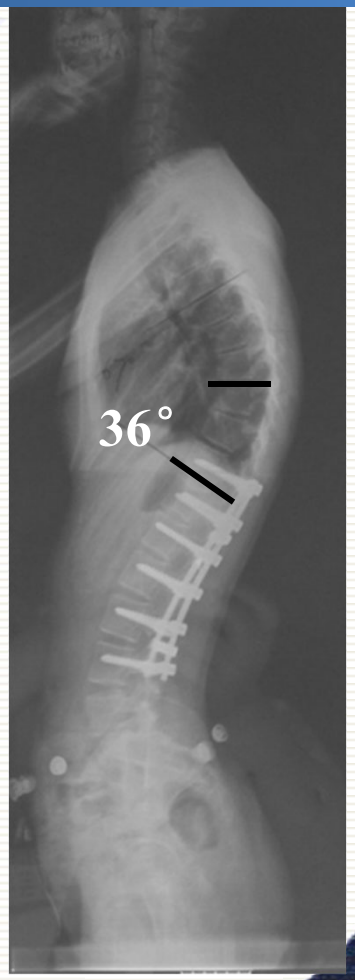
Results

Progression of PJA in PJK group

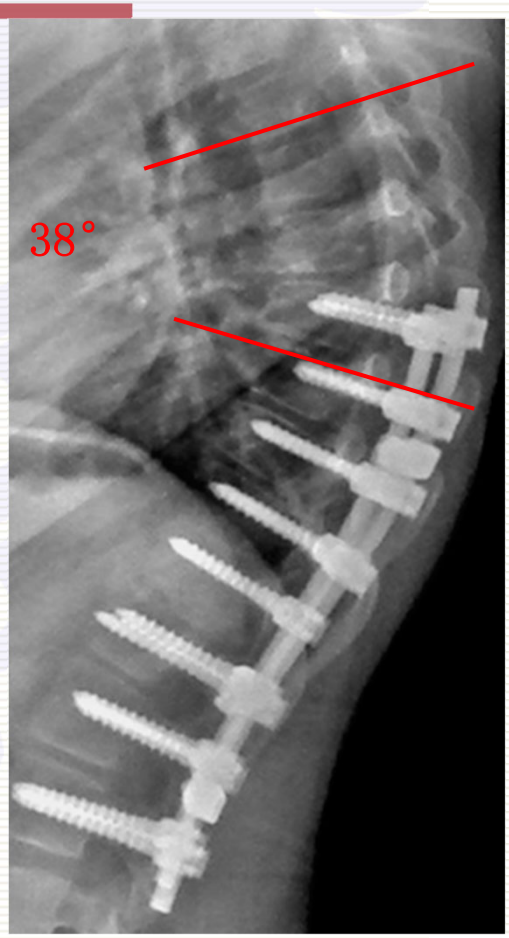


Radiographic Findings of PJK

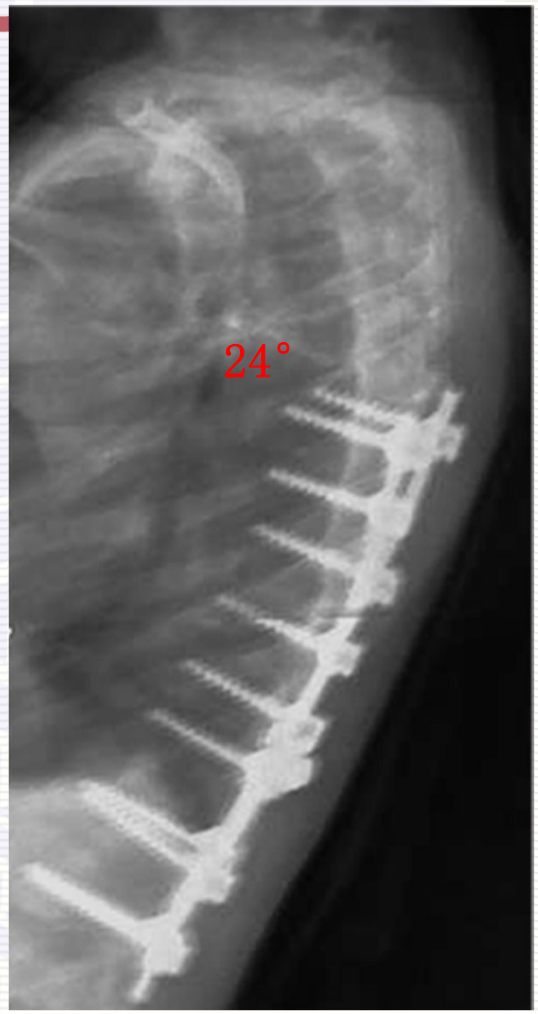
- Kyphotic deformity
- Bone implant interface failure
- Bone failure



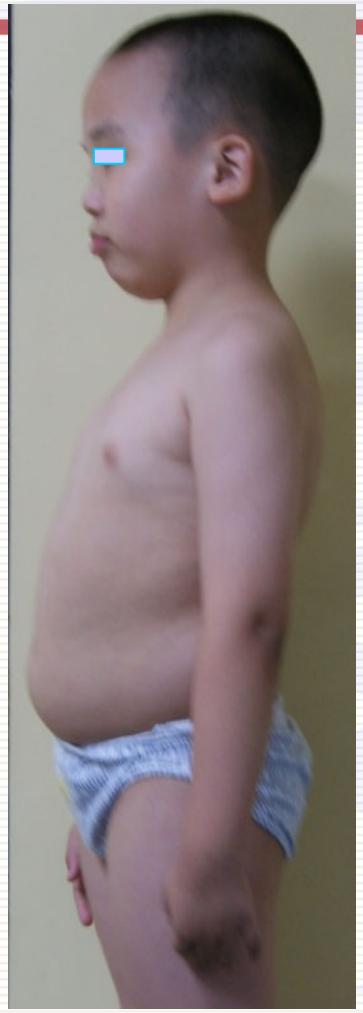
Bone fuilure of UIV



Dislodgement of upmost screws

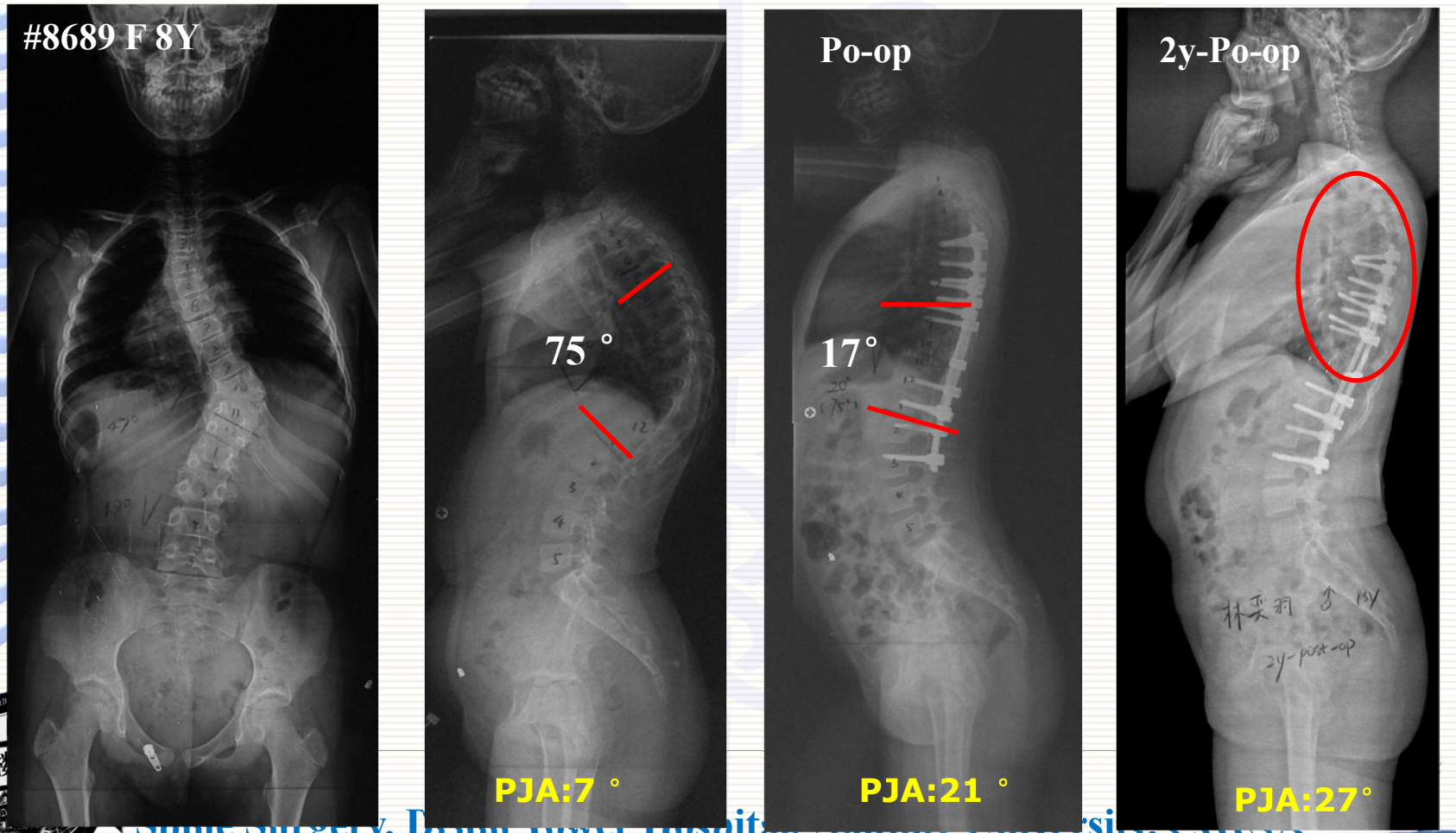


No clinical symptoms

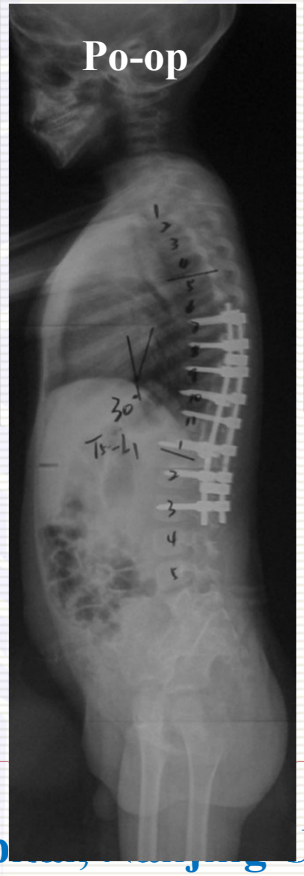


Discussion

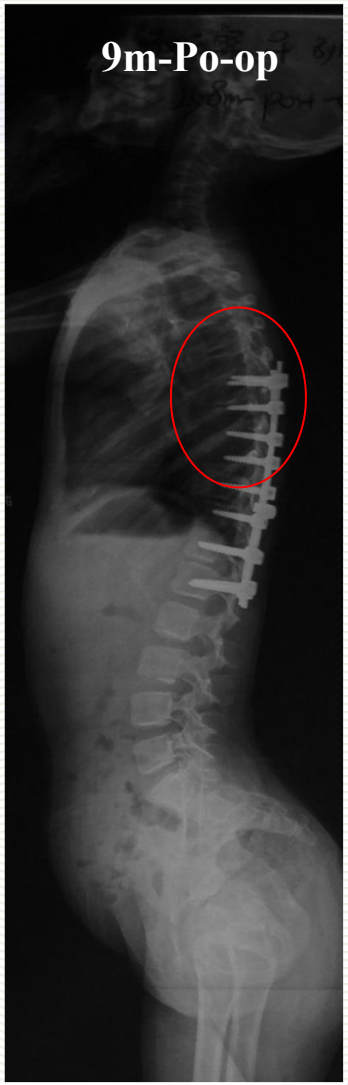
Hyperkyphosis



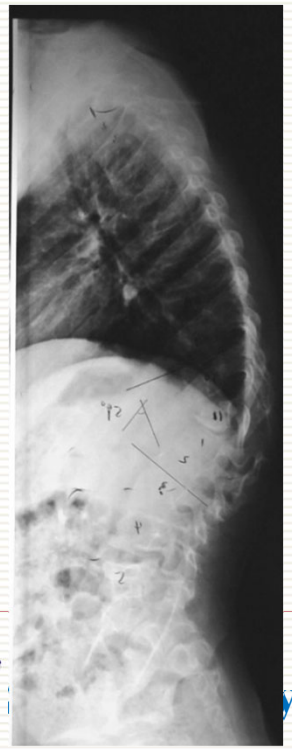
Proximal instrumentation failure

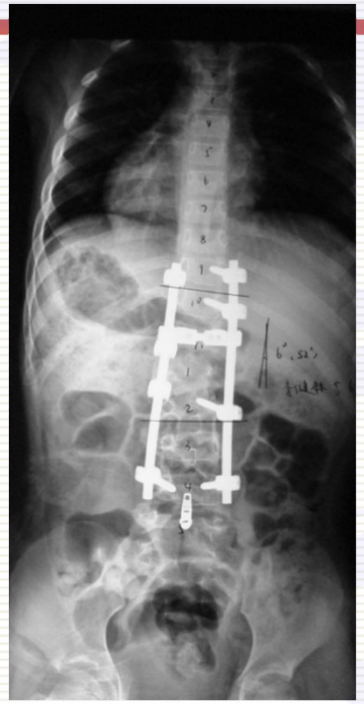


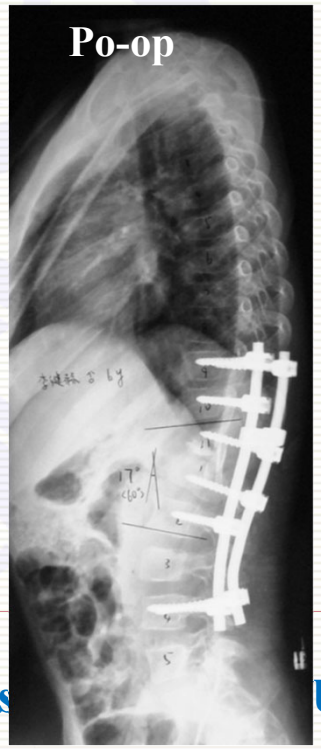
Un-matching of rod contour

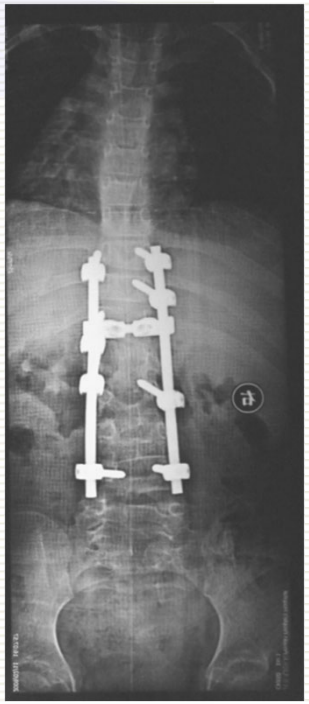


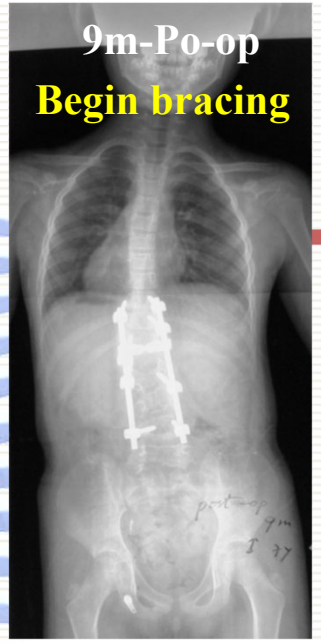
Bracing for PJK



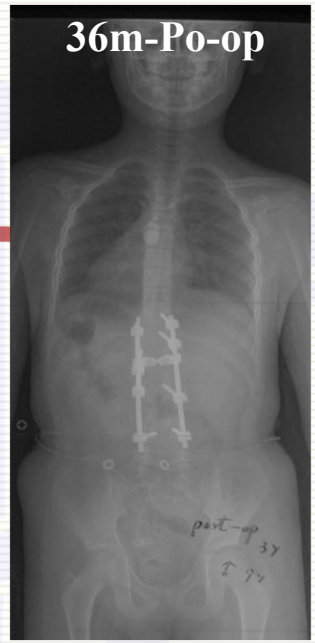


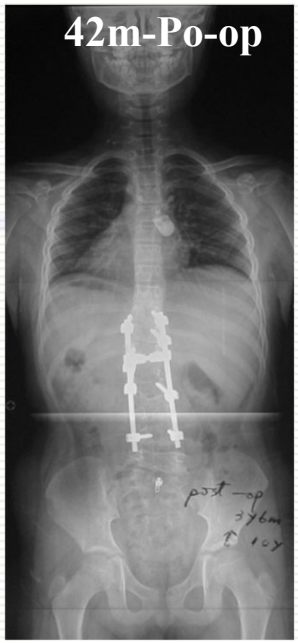




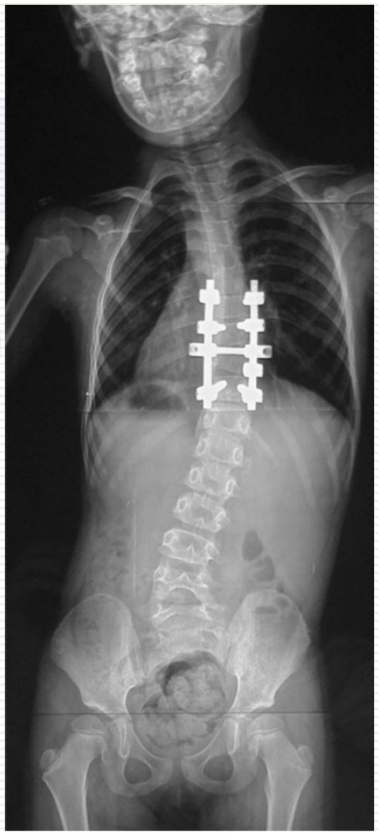

9m-Po-op
Begin bracing

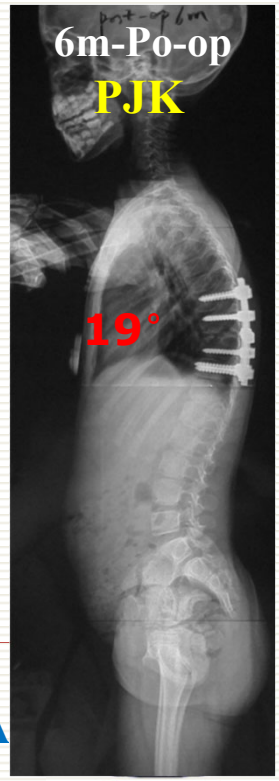

24m-Po-op

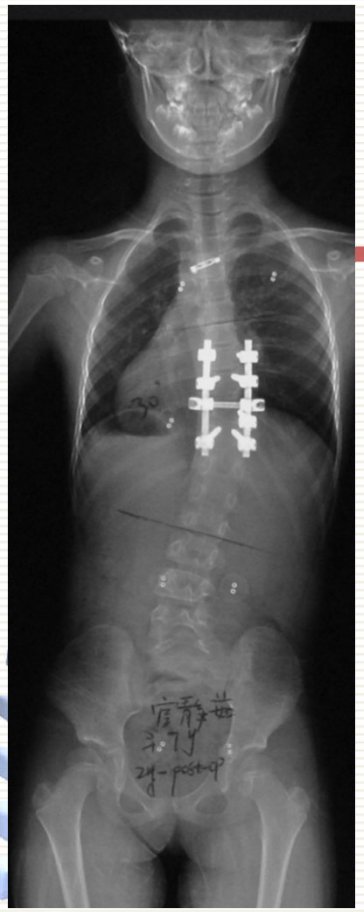

36m-Po-op


42m-Po-op

Occurrence of DJK after Bracing








2y-Po-op
3m-Po-B
PJK:16°


2y+3m-Po-op
6m-Po-B


PJK:10°


DJK:16°

Conclusion

Not a lower incidence of PJK in children with fusion surgery.

PJK mainly occurred within 6 months postoperatively, and its risk factors included preoperative hyperkyphosis , proximal instrumentation failure, and un-matching of rod contour.

Bracing served as a salvage option for PJK in young children.


Thank you for
your attention!