1st International Congress on
Early Onset Scoliosis & Growing Rods
Madrid, Spain
2-3 November 2007

Debates:
VEPTR vs. Growing Rods Non-Congenital

George H. Thompson, M.D. (Growing Rods)
Cleveland, OH
John Flynn, M.D. (VEPTR)
Philadelphia, PA

Expandable (Growing) Rod Techniques

Single rod - Thompson

Dual rods - Akbarnia

- Luque “trolley”
- SHILLA procedure - McCarthy

VEPTR - Vertically Expandable Prosthetic Titanium Rib - Campbell

- “Not truly a growing rod system”

Controversies

- Obtaining and maintaining deformity correction
- Achieving adequate spinal growth
- Allowing lung development
- Decreasing the high incidence of complications

Single Growing Rod

George H. Thompson, M.D.

Submuscular Isola Rod With or Without Limited Apical Fusion in the Management of Severe Spinal Deformities in Young Children: A Preliminary Report

Blakemore LC, Scoles PV, Poe-Kochert C, Thompson GH

Spine 2001; 26: 2044-2048

Patients

53 children

6.7 yrs. (1.4 - 10.7 yrs.)

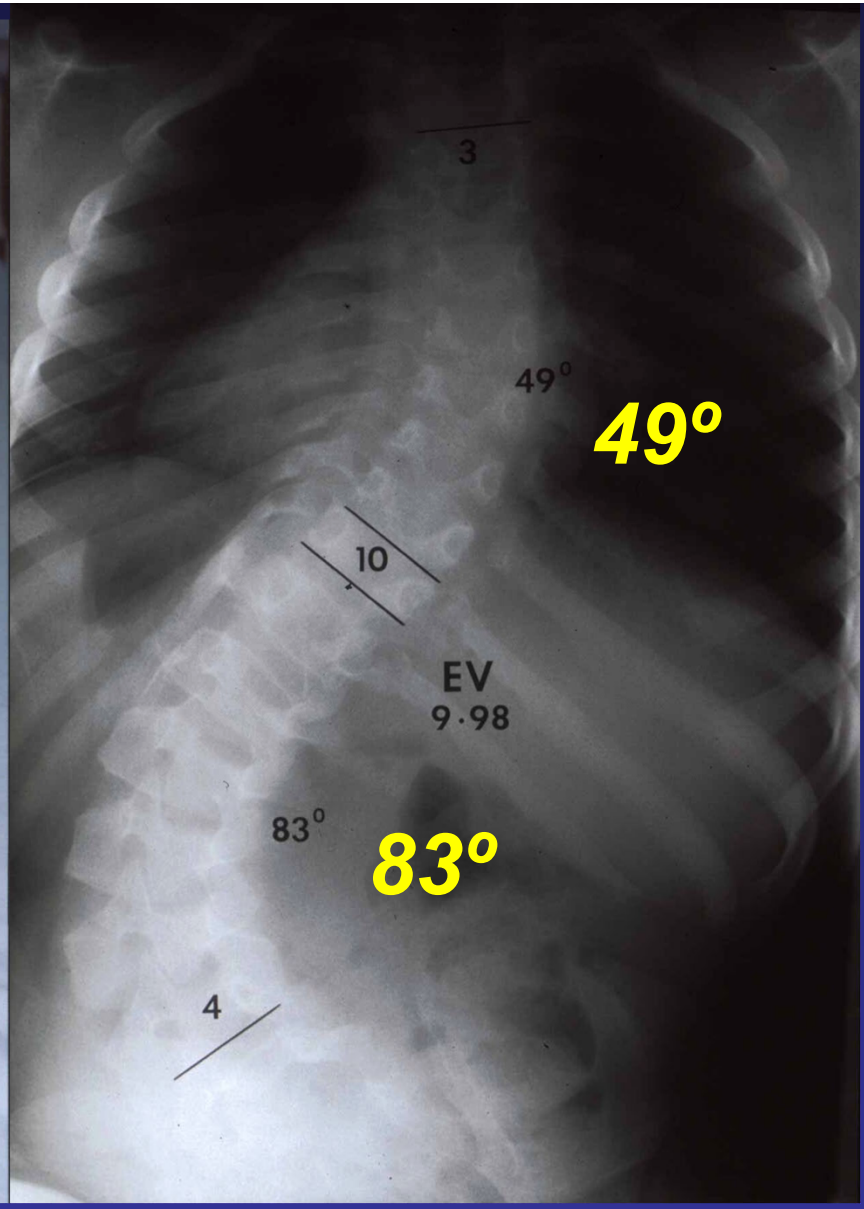
34 females, 19 males

Treatment

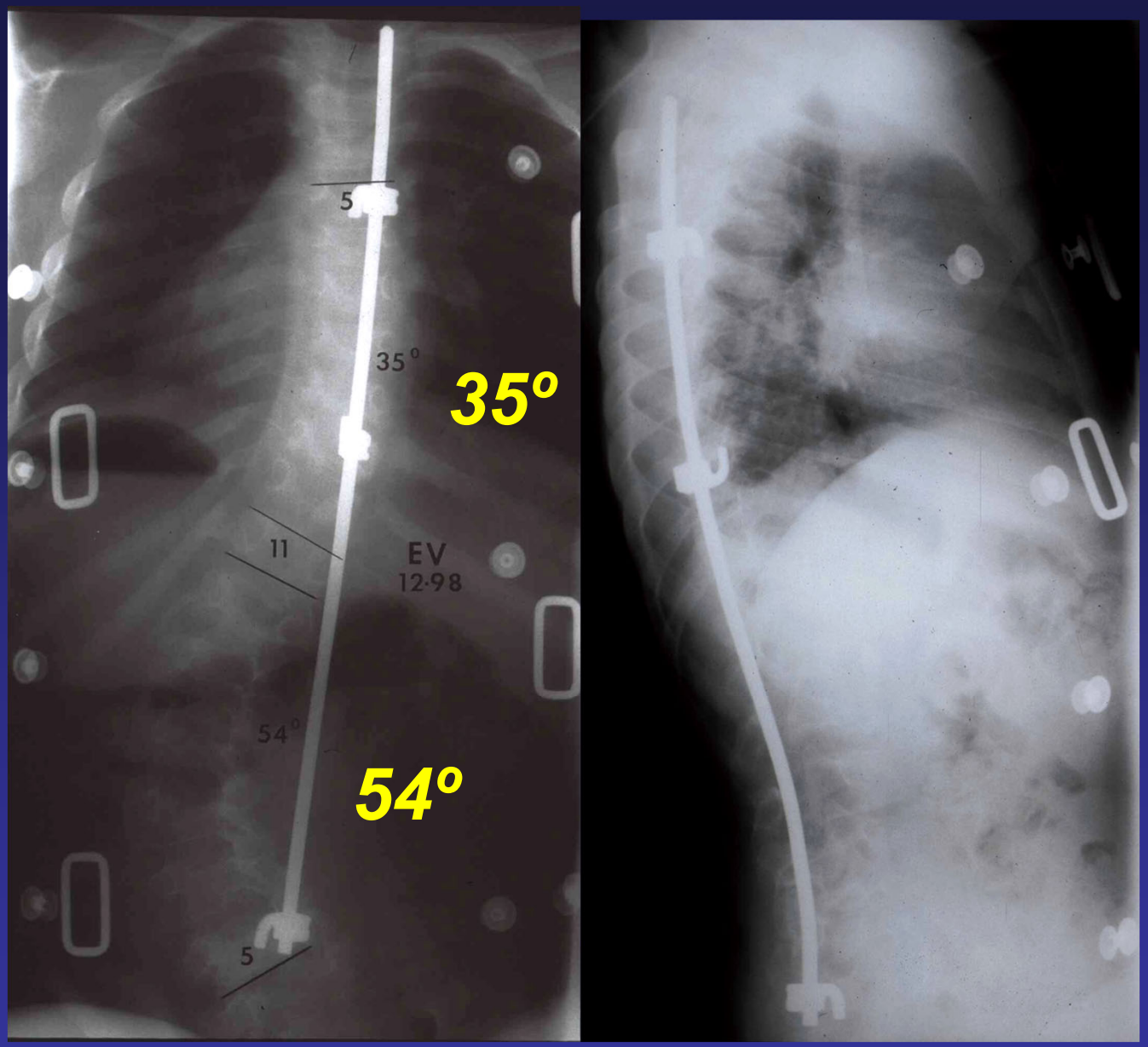
- Submuscular rods only 38
- Apical fusion and rod 15
- # Lengthenings / pt. 5 (3 - 7)

Completed fusions 28

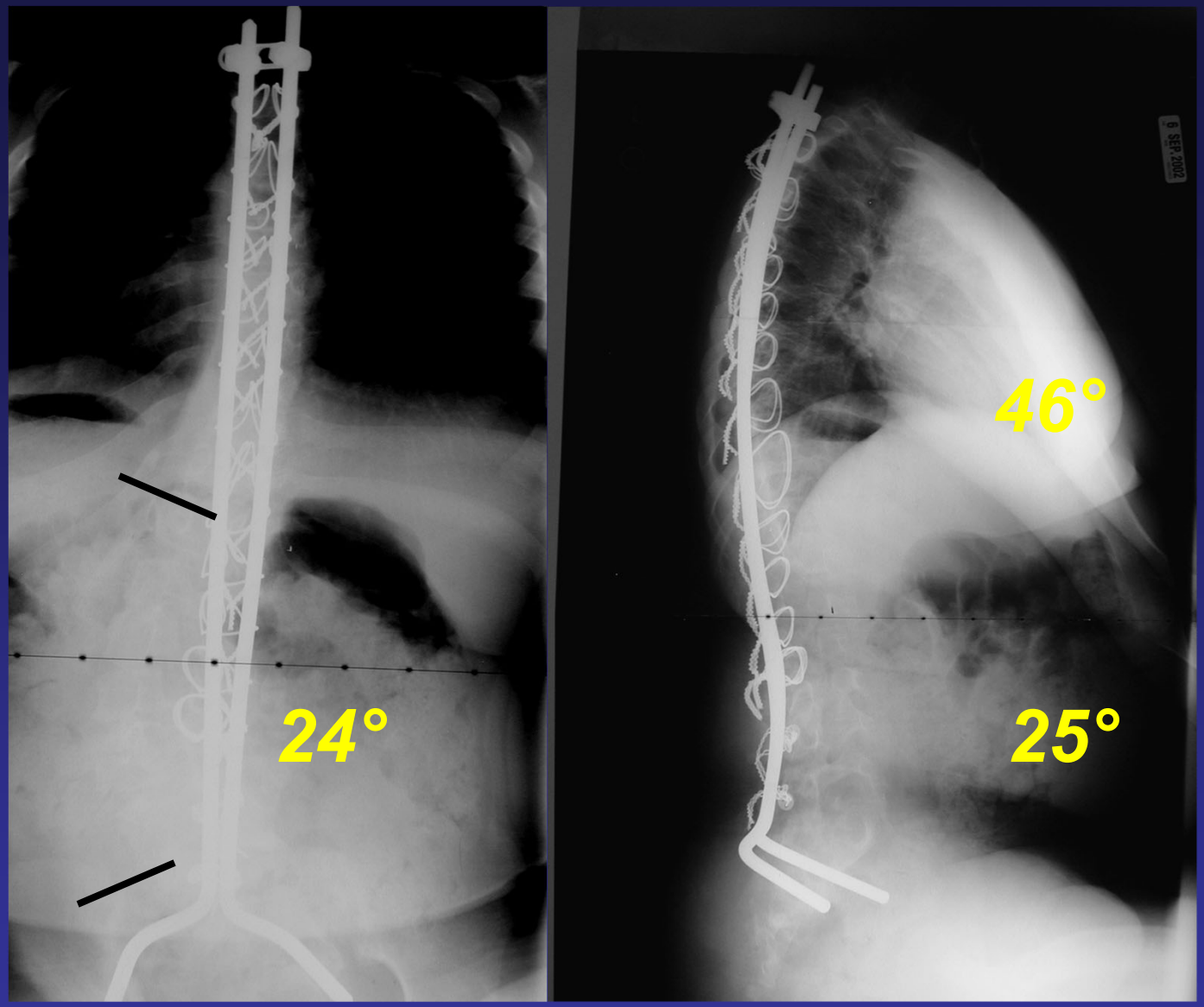
Follow-up 5.2 yrs. (1.2 – 9.1 yrs)



7+5 yo female SCIWORA + hypophosphatasia 9-98



3 mos postoperative 12 - 98

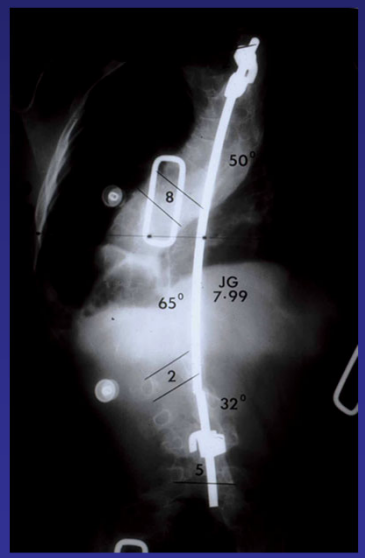


EV 13+5 s/p ASF, PSF & LRI 7-04

Complications

11 patients (21%), 19 complications

- **Rod breakage 7**
- **Hook dislodgement 10**
  - ***Upper hook 8***
  - ***Lower hook 2***
- **Infection 2**



Dual Growing Rods

Behrooz Akbarnia, M.D.

Dual Growing Rods

Comparison of Single and Dual Growing Rod Techniques Followed Through Definitive Surgery: A Preliminary Study

Thompson GH, Akbarnia BA, Kostial P, Poe-Kochert C,Armstrong DG, Roh J, Lowe R, Asher MA, Marks DS

Spine 2005; 30:2039-2044

Patients

Study Criteria

- Single or dual growing rod
- Definitive spinal fusion
- Minimum 2 years follow-up

Patients – 28 patients

- 21 RBCH
- 7 SDCSD data base

Study Groups

Group 1 – 5 patients

- Short single Isola growing rod
- Anterior and posterior apical fusion

Group 2 – 16 patients

- Single Isola growing rod
- No apical fusion

Group 3 – 7 patients

- Dual Isola growing rods
- No apical fusion

Radiographic Results

Group	1	2	3
Scoliosis (º)			
• Preop initial	85±23	61±13	92±21
• Postop initial	44±21	36±7	39±15
• Preop final	77±20	55±15	33±16
• Postop final	65±20	39±15	***26±18***

Radiographic Results

Group	1	2	3
Length / Growth (cm)			
• Elongation	3.8±2.8	3.9±4.9	*5.9±1.5*
• T1 – S1 / yr	-0.2±1.2	0.5±.95	*1.04±.65*
(Postop initial to preop final)			
• T1 – S1 / yr	0.3±1.02	1.04±.09	*1.51±.58*
(Postop initial to postop final)			
Percent expected	25%	*80%*	*130%*
• Total (cm)	6.4±1.4	7.6±4.7	*11.8±4.0*

Complications

Group 1 – 4 patients 80%

- Rod breakage (3)
- Hook displacement (5)

Group 2 – 3 patients *19%*

- Rod breakage (3)
- Hook displacement (1)
- Other (1)

Group 3 – 2 patients 29%

- Rod breakage (1)
- Other (1)

What Are We Learning

Growing rods effective in:

- Controlling curve progression
- Allowing spinal growth

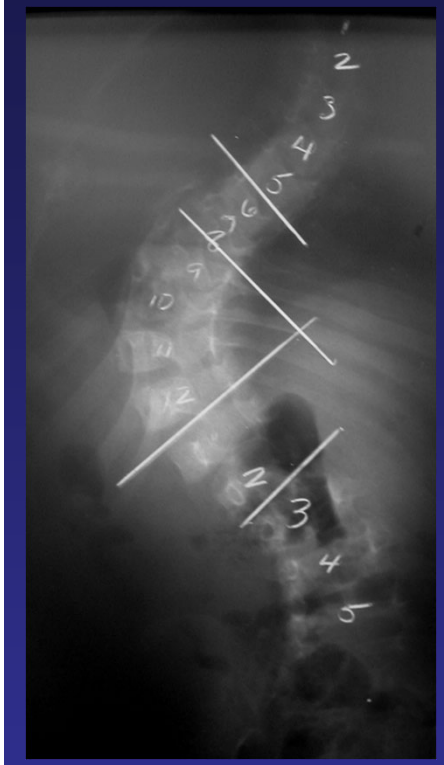
Dual rods better than a single rod

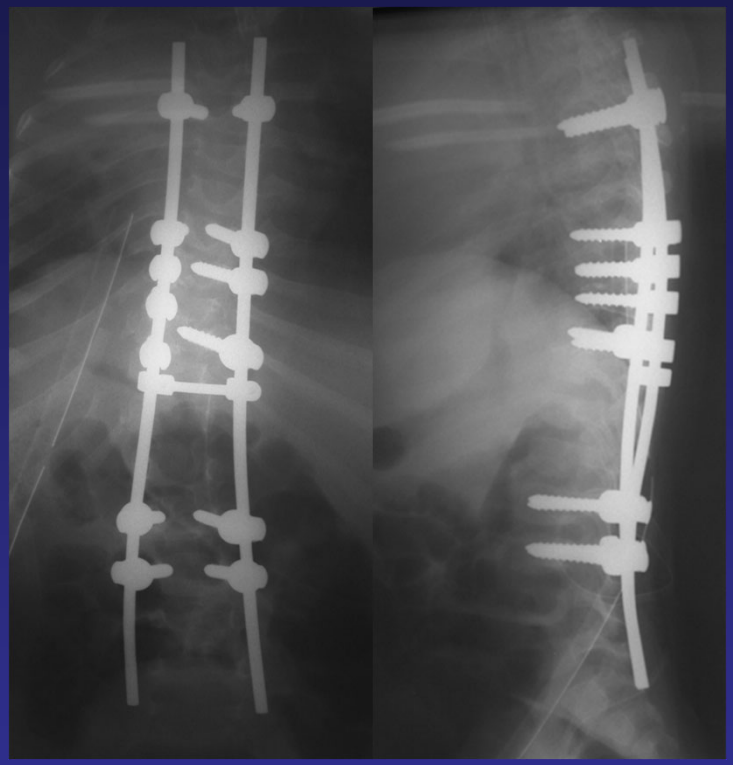
- Stronger
- More frequent lengthenings

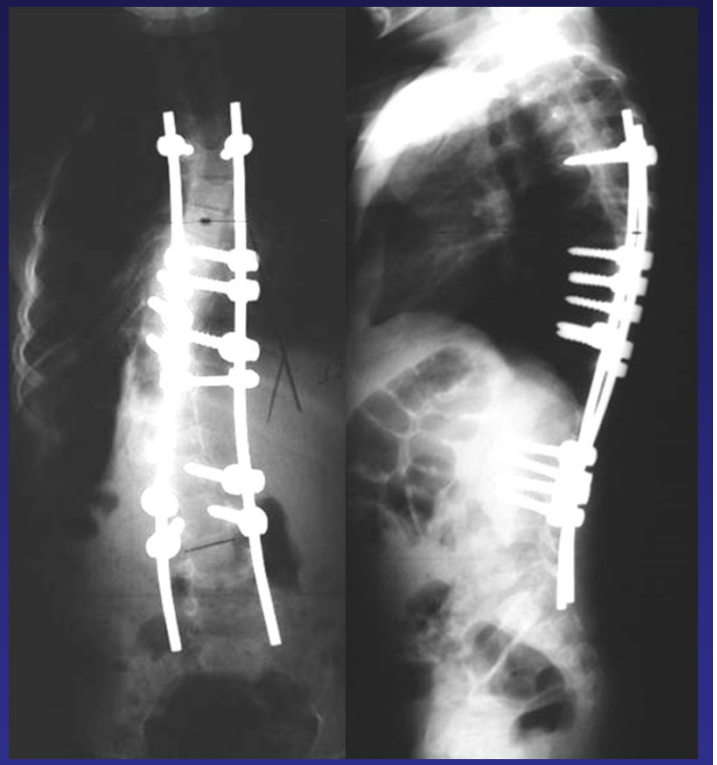
Avoid apical fusions ? – curve stiffening, crankshaft, less correction, more complications

Shilla Procedure

Rick McCarthy, M.D.





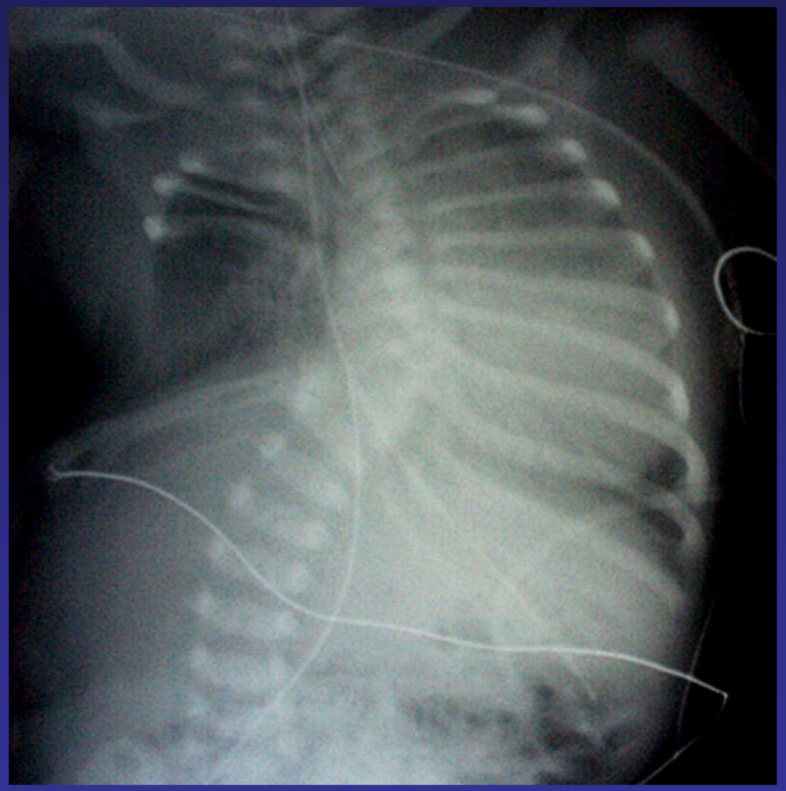


Preop ***Postop*** ***2 yr postop***

VEPTR

Robert M. Campbell, Jr.,M.D.

Thoracic Insufficiency Syndrome



Describes the inability of the thorax to support normal respiration or lung growth

R.M.Campbell, Jr

VEPTR Strategies

Volume Depletion Deformities

I – Absent ribs and scoliosis

II – Fused ribs and scoliosis

IIIa – Foreshortened thorax

Jarcho-Levin syndrome

IIIb – Transverse constricted thorax

Jeunes syndrome

Infantile idiopathic scoliosis

“Opinion” Based Surgery

Growing rods better than VEPTR for non-congenital spinal deformities

Avoids surgery on a potentially normal chest wall

Better biomechanical stability

- **Spine rather than rib**
- **Theoretical better correction**
- **Fewer complications**

Conclusions

Growing rods beneficial in EOS

- Spinal growth
- Lung development

Complication rate moderate but manageable

Exact indications and best implant system controversial

Cosmesis not ideal


Thank You