Definitive Fusion in 12 Early-onset scoliosis with Growing Rod

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Introduction

EOS (Early-onset scoliosis)

Severe deformity

TIS (Thoracic insufficiently syndrome)

→ **Life threatening health risk**

Campbell; *JBJS, 2003*

Davies; *Arch Dis Child, 1971*

Limited Fusion

(Apical fusion, wedge resection, etc)

Fusionless treatment

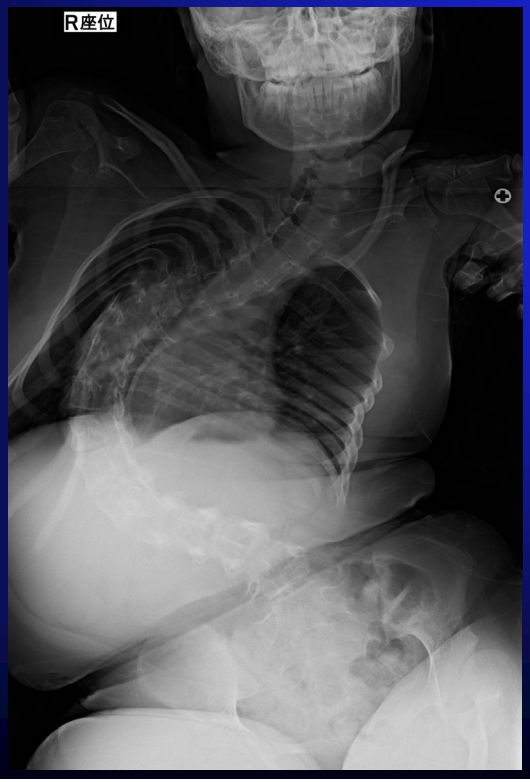
VEPTR (Vertical expandable titanium rib)

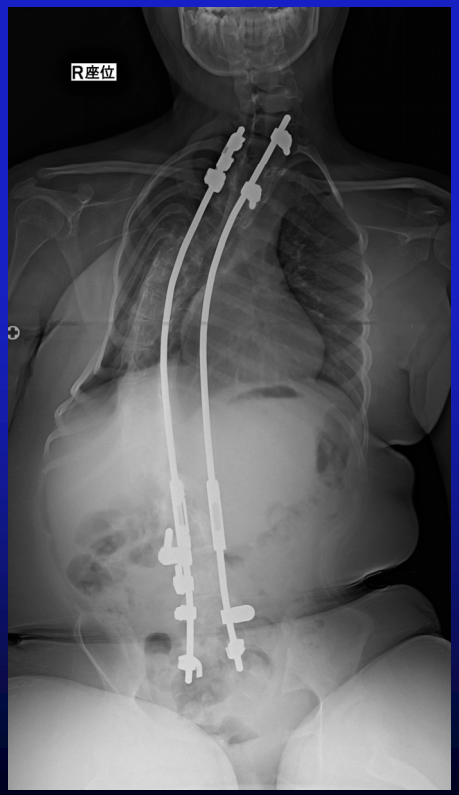
Shilla

Growing Rod

Purpose

Retrospetive case review of 12 children graduated dual growing rod at a single institution.



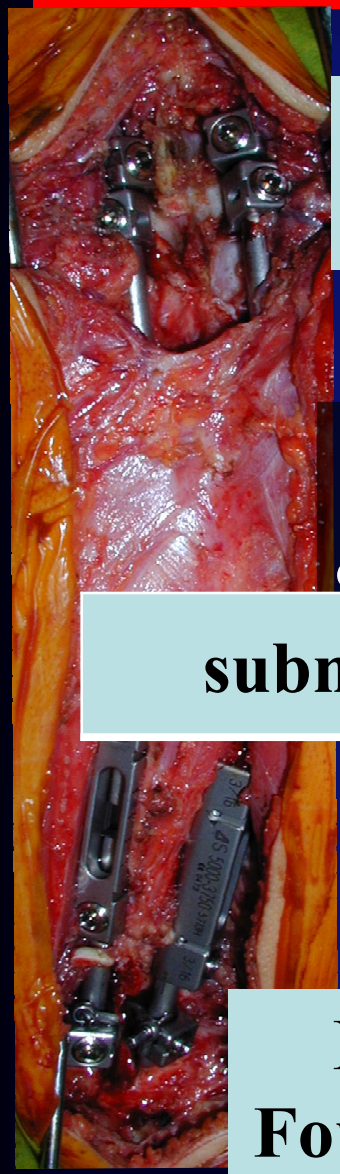


Objects

No. of patients	12
Gender (F:M)	8:4
Age at initial surgery	10.2±4.2y.o.
Duration between lengthenings	4.0±2.6yrs

Idiopathic	3
Congenital	3
Neuromuscular	3
Syndromic	3

Operative Tequnique



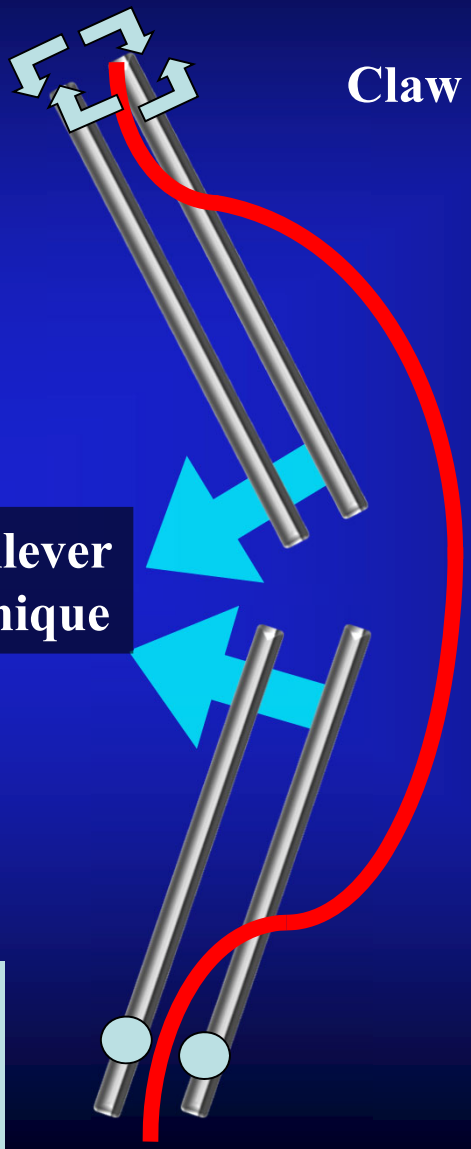
Upper Foundation **T1-3**

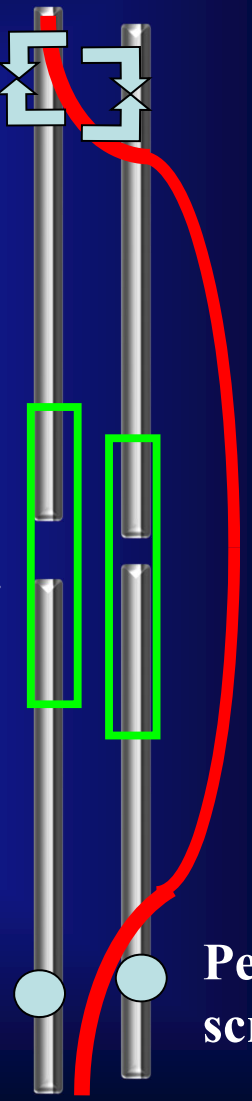
Extended Tandem connector

submuscular

Lower Foundation **T12-L3**

Cantilever Technique





Claw hook

Pedicle screw

Measurement

Preinitial ➡ Postinitial ➡ Prefinal ➡ Postfinal ➡ Final f/u

Major Curve

Kyphosis (T1-5 T5-12)

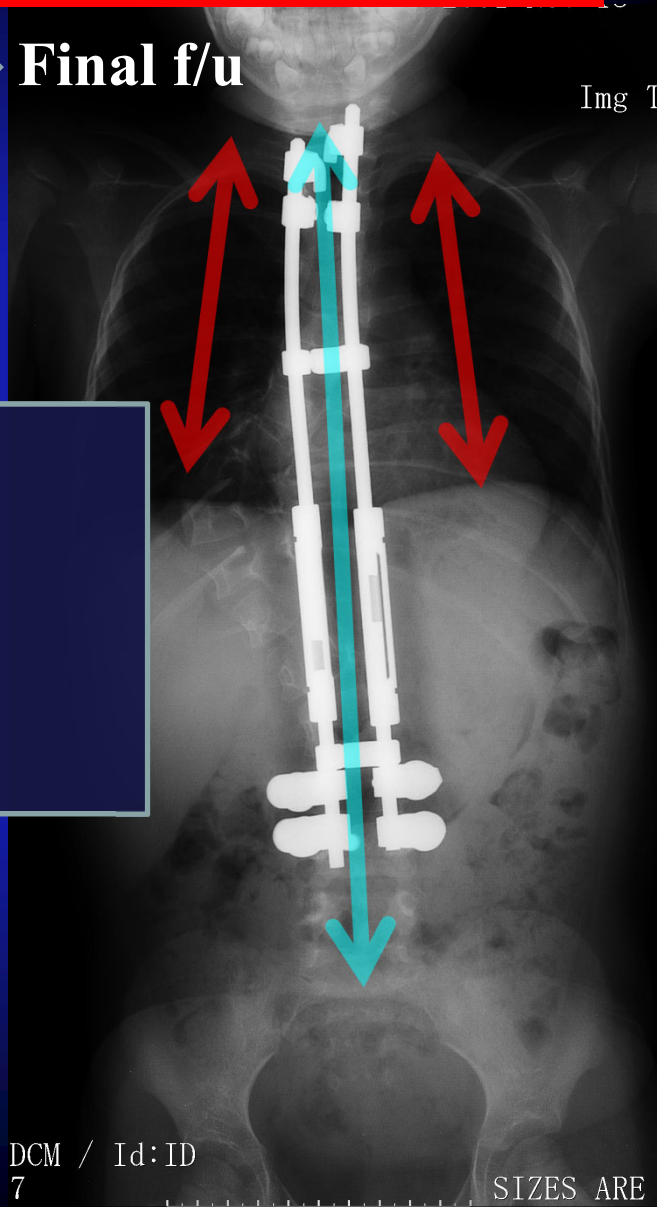
T1-S1 Length

Lung Space

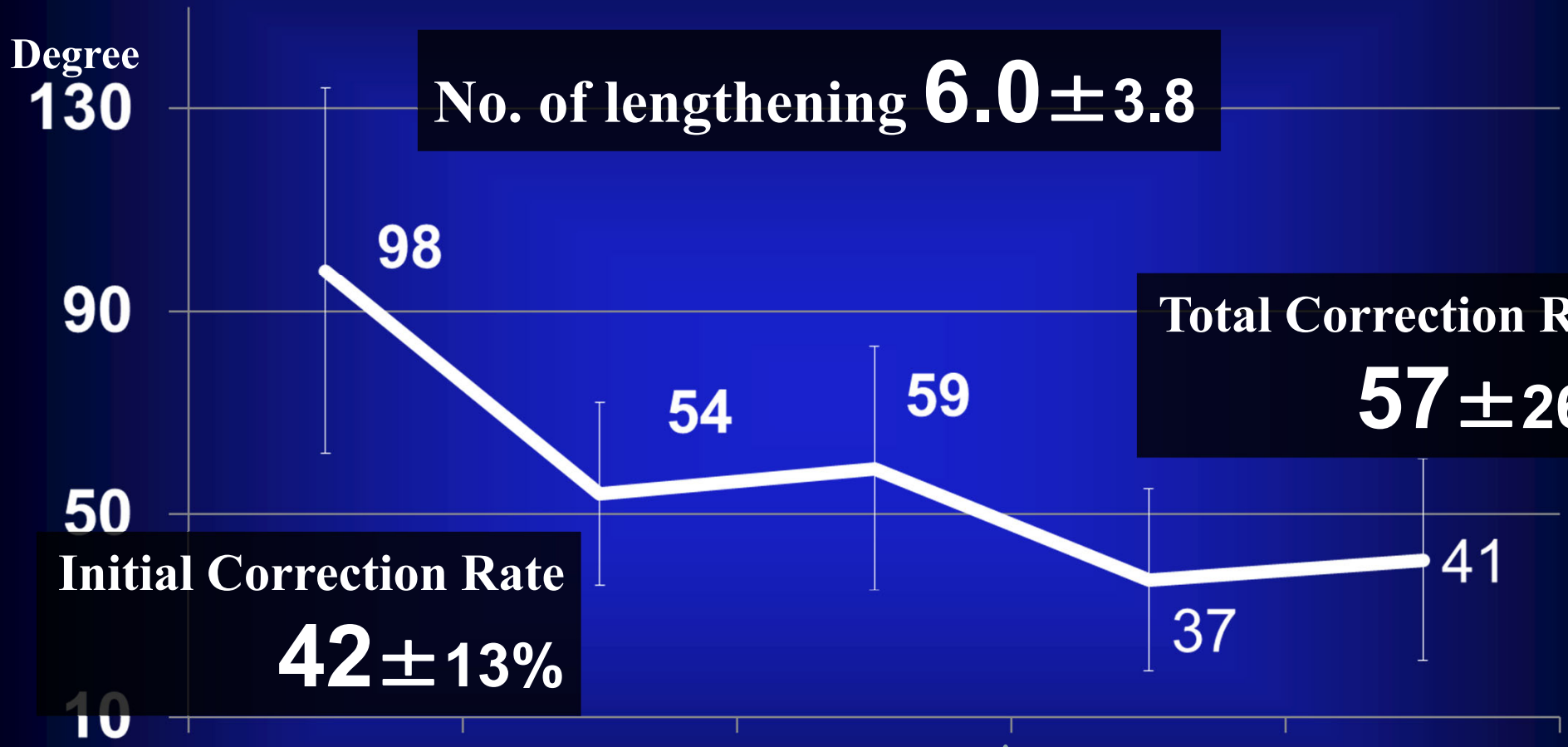
Concave & Convex

Complications

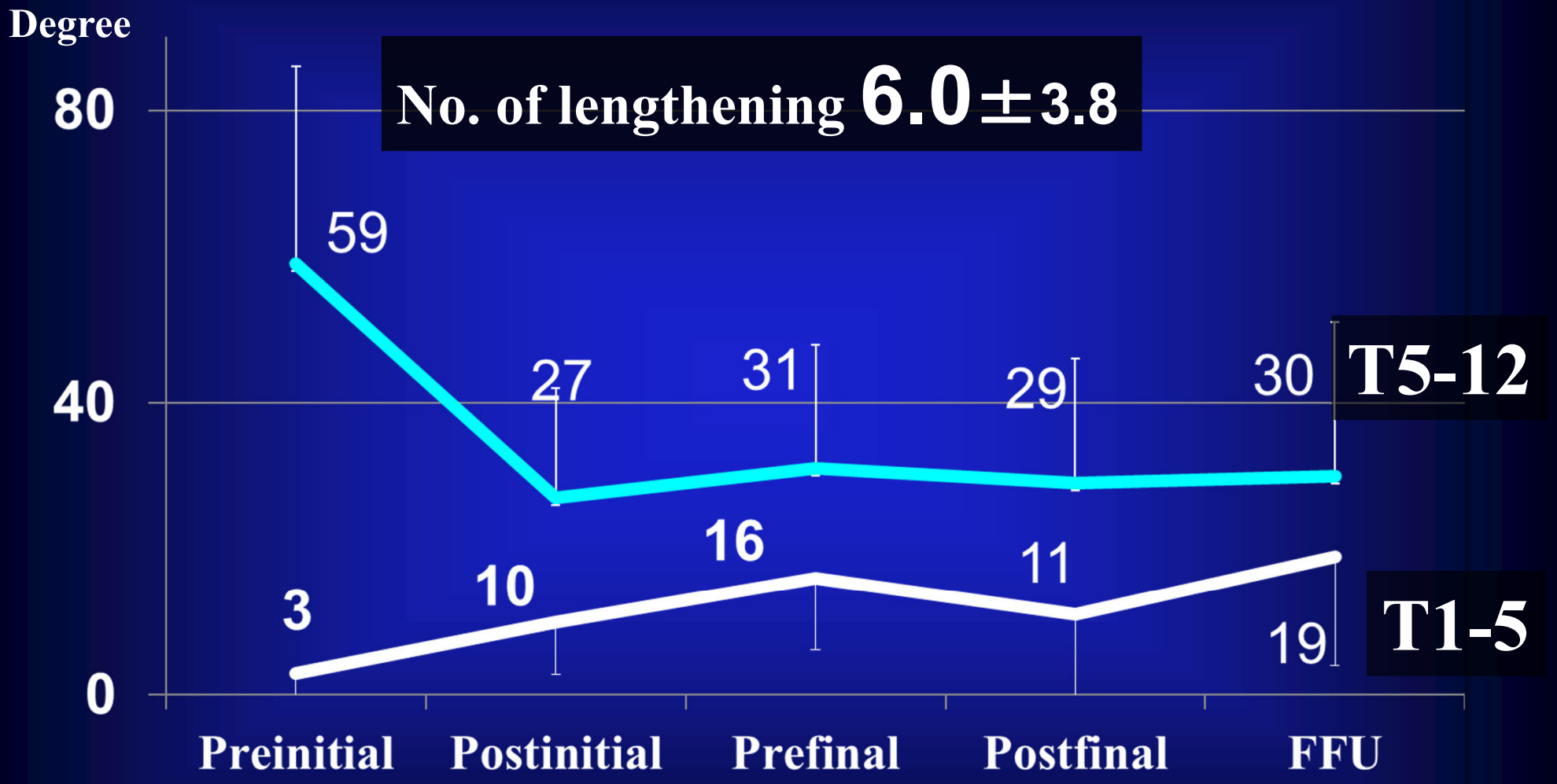
Autofusion



Main Curve

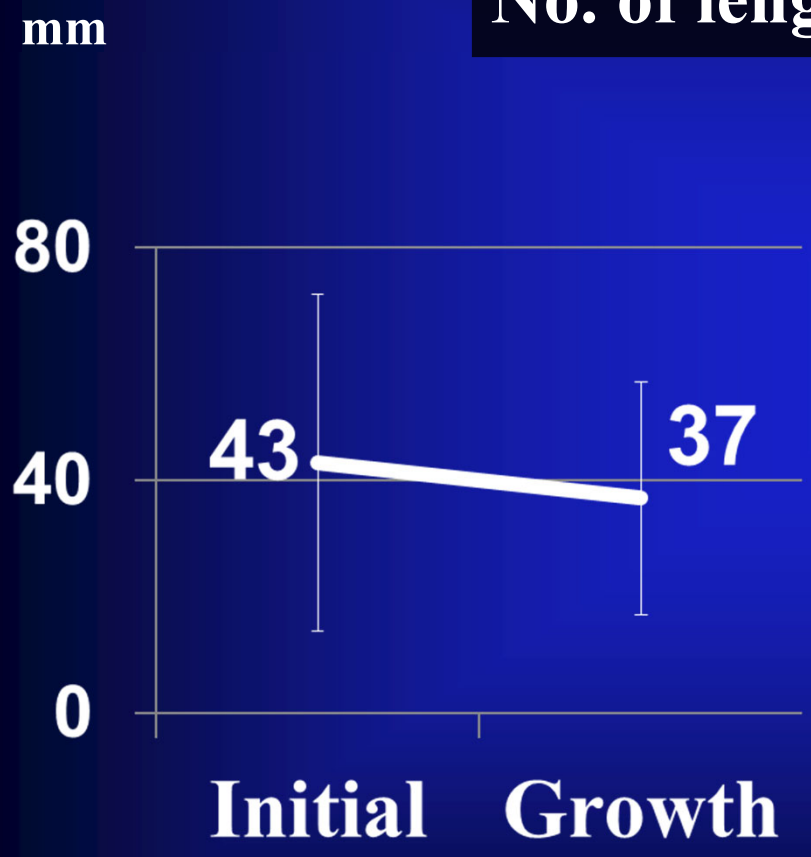

Degree
130
90
50
10
No. of lengthening 6.0±3.8
98
54
59
37
41
Total Correction Rate
57±26%
Initial Correction Rate
42±13%
Preinitial
Postinitial
Prefinal
Postfinal
FFU
GR
Final Fusion

Thoracic Kyphosis

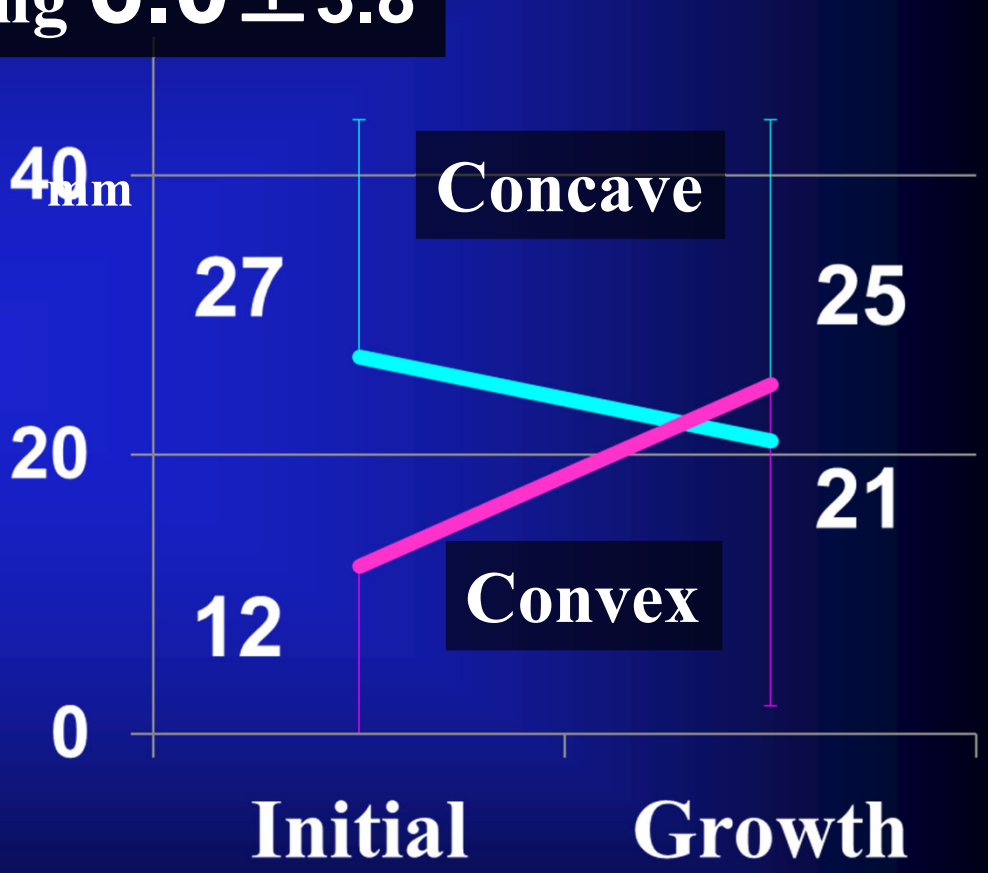


Length of Elongation

No. of lengthening 6.0±3.8



T1-S1 Length



Lung Space

The Detail of the Complications

19 complications

72 lengthenings

Hook Dislodgement	4
Rod Breakage	7
Screw Loosening / Pull-out	2
Superficial Infection	2
Deep infection	4
Neurological Deficit	0

The Detail of the Complications

With a minimum of **one** complication

8 patients (**67%**)

12 patients

Complication rate **per lengthening** in each patient

23.0±20%

Autofusion

Autofusion	Yes	No	P Value
No. of patients	7	5	
Age at initial op (y.o.)	9.6±4.2	11±0.7	N.S.
Interval (mo)	8.4±2.5	8.8±1.7	N.S.
Complication rate(%)	23±20	22±22	N.S.
Duration of the treatment (y)	5.3±2.5	2.3±0.6	0.02
No. of lengthening per patient	7.9±3.5	3.4±1.7	0.02
T1-S1 elongetion per year (mm)	8.0±1.8	13±4.8	0.03

Review (1)

	No of cases	Complication rate with min. 1	Complication rate Per Op
Our study			
Whole series	**39**	**77%**	**23%**
Graduates	**12**	**67%**	**23%**
Akbarnia,et al.; *Spine 2008, JBJS 2010*			
Whole series	**140**	**58%**	**18%**
Graduates	**13**	**46%**	
Emans,et al.; *Spine 2005*			
VEPTR	**31**	**55%**	

Review (2)

	No of cases	During between lengthening	Autofusion rate
Cahill; *Spine, 2010*			
Dual rod	9cases	9.6 ys	89%
This study			
Dual rod	12cases	4.1±3.0ys	58%

Longer duration of treatment

Increasing no. of lengthening

→ Shorter T1-S1 elongetion per year

Auto fusion?

Conclusion

- The dual growing rod maintains correction obtained at the initial surgery.
- Lengthening allowed the thoracic cage growth.
- Complication rate per lengthening was 23%.
- Autofusion rate was 58%.
- T1-S1 elongation was significantly shorter in the autofusion group.

References

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