

# SPINAL SURGERIES IN PATIENTS WHO HAVE NEUROFIBROMATOSIS AT 10 YEARS OLD OR YOUNGER

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# ***OBJECTIVE***

- **To examine the results of the spinal surgery at 10 yrs or earlier in patients who have neurofibromatosis (NF).**

# ***MATERIALS***

## *Subjects*

- Out of the operated 37 NF pts.  
14M, 23F:  $12.3 \pm 5.5$ y at 1<sup>st</sup> surgery
- **9 NF-1 pts. fulfilled the criteria**  
3M, 6F:  $7.6 \pm 2.1$ y at 1<sup>st</sup> surgery  
The F/U period was  $84.1 \pm 56.2$  months

## *Type of Operations*

- 4 dual growing rods
- 3 ant. and post. spinal fusion
- 1 ant. spinal fusion
- 1 post. spinal fusion

divided into 2 groups



# ***METHODS***

**Early Fusion  
group (n=5)**

**Growing Rods  
group (n=4)**

## ***Evaluation***

- **No. of operation**
- **Complications**
- **Scoliotic and kyphotic (Th5-12) angles**

$$\text{➤ Correction Rate} = \frac{\text{Pre op.} - \text{Last f/u}}{\text{Pre op.}} \times 100$$

# ***RESULTS (1)***

***Early Fusion group*** : 1M, 4F,  $8.2 \pm 1.6$ y at 1<sup>st</sup> surgery

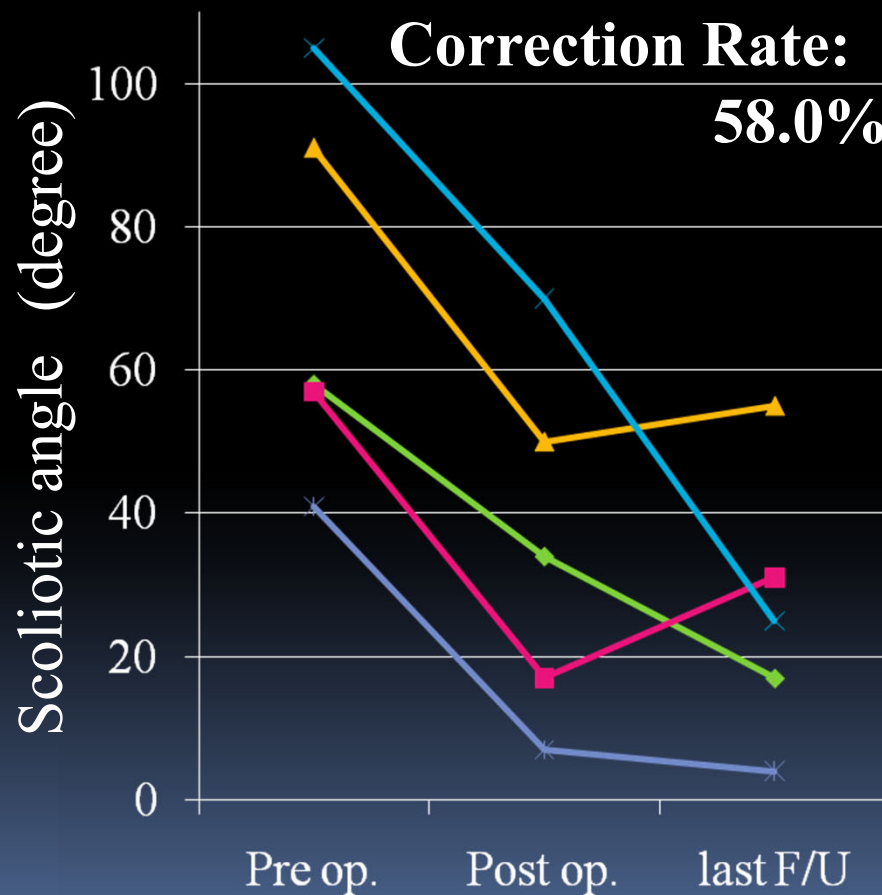
- Ave. No. of operation was  **$2.4 \pm 2.2$**  .
- **4** post-op. complications occurred.  
1 temporal paralysis, 1 loosening, 1 infection  
and 1 pneumonia were observed **in 1 pt.**
- Solid fusion was obtained in all pts.

***Growing Rods group***: 2M, 2F,  $6.8 \pm 2.5$ y at 1<sup>st</sup> surgery

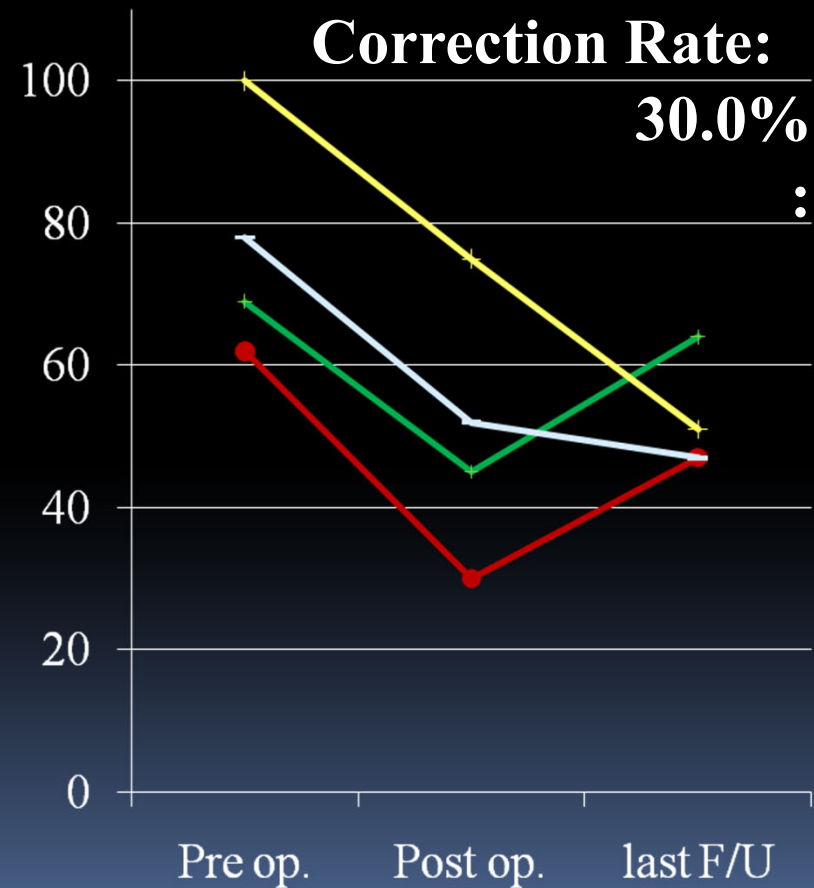
- Ave. No. of operation was  **$10.3 \pm 3.6$**  .
- **10** post-op. complications occurred.  
6 dislodgements, 3 infections, 1 loosening in 3 pts.
- 1 of 4 pts underwent final fusion.
- Curves were corrected and maintained  
except 1 pt.

# ***RESULTS (2)***

## ***Surgical Outcome - Scoliosis -***



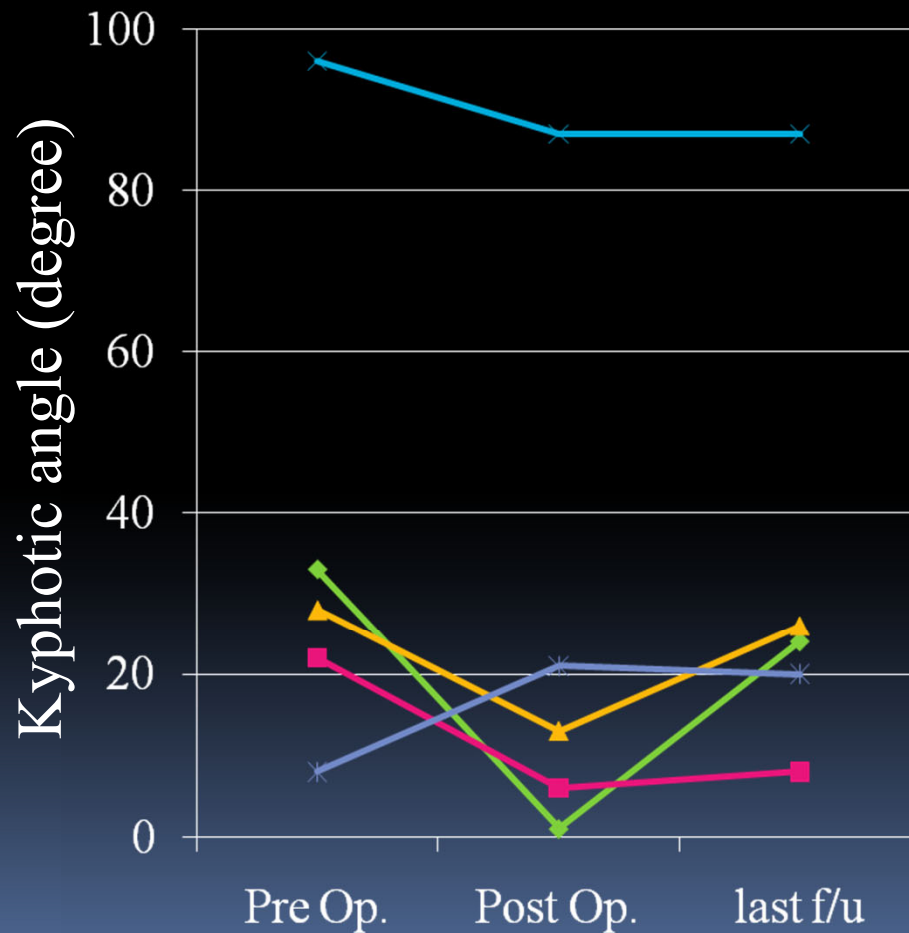
**Early Fusion**



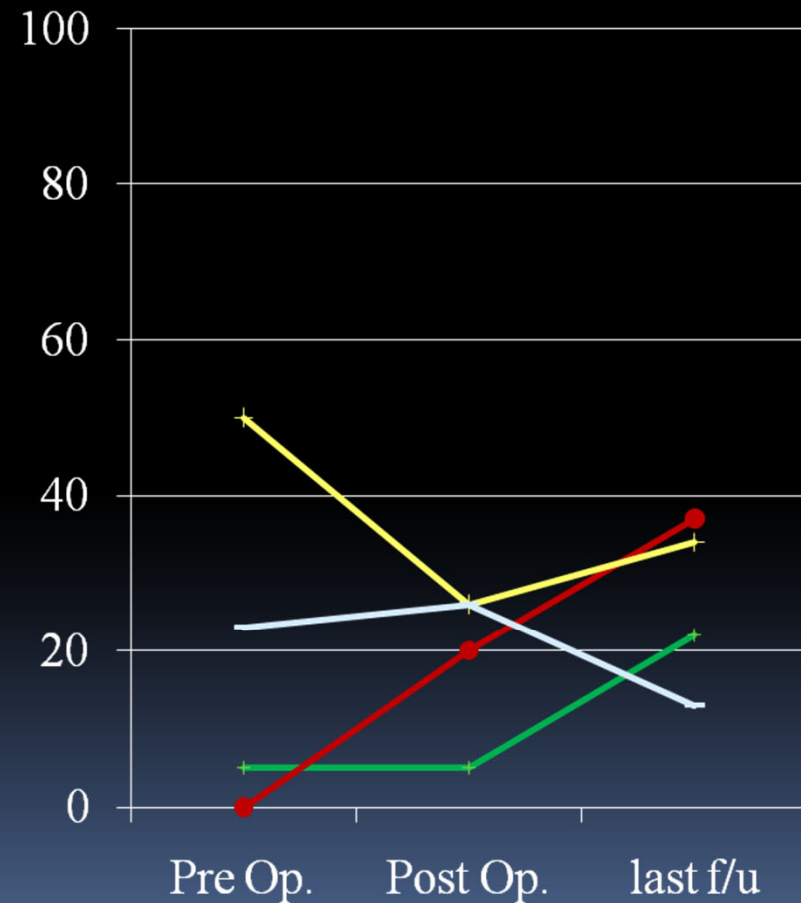
**Growing Rods**

# RESULTS (3)

## *Surgical Outcome - Kyphosis -*

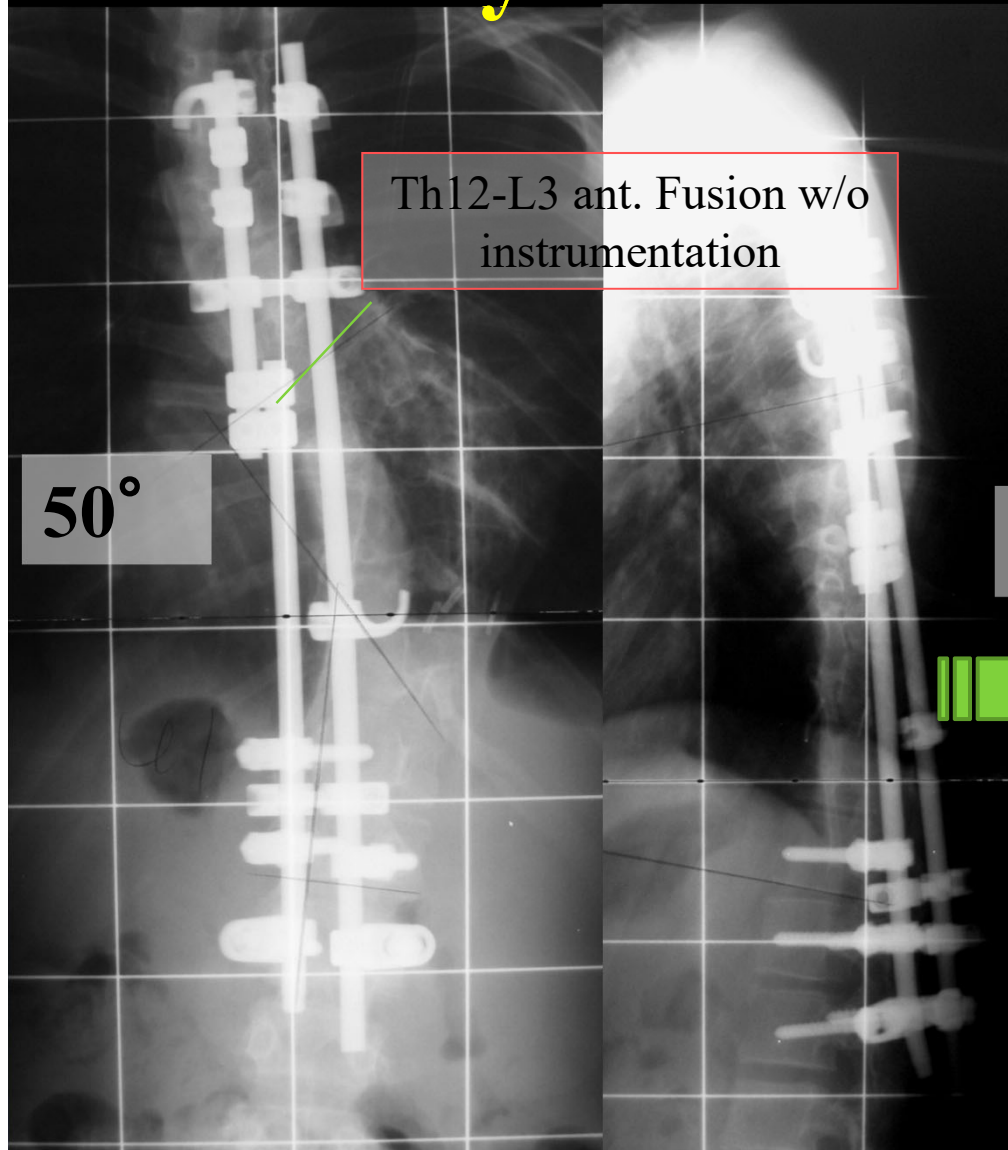


**Early Fusion**



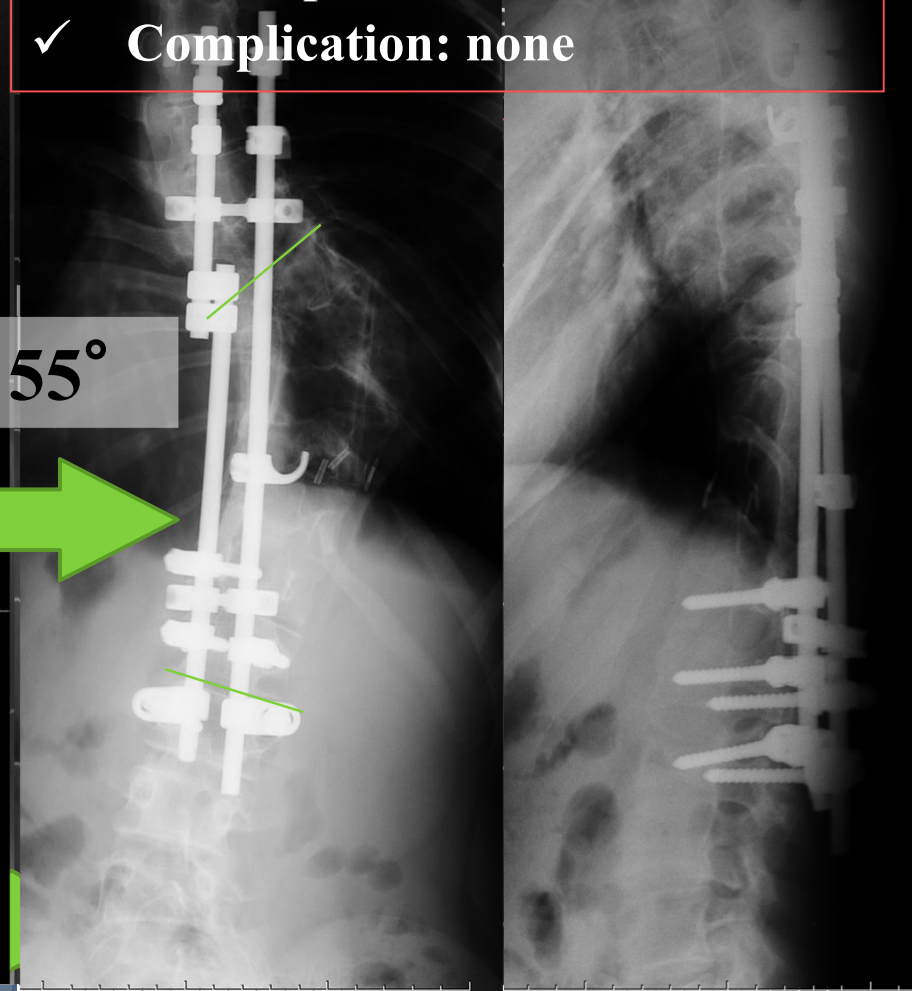
**Growing Rods**

# case1: 7y.o. Male



Ant. fusion (7y.o.)

- ✓ Scoliosis: 91° → 55°
- ✓ Kyphosis: 28° → 26°
- ✓ Operation: ant. & post. fusion
- ✓ No. of operation : 3
- ✓ Complication: none



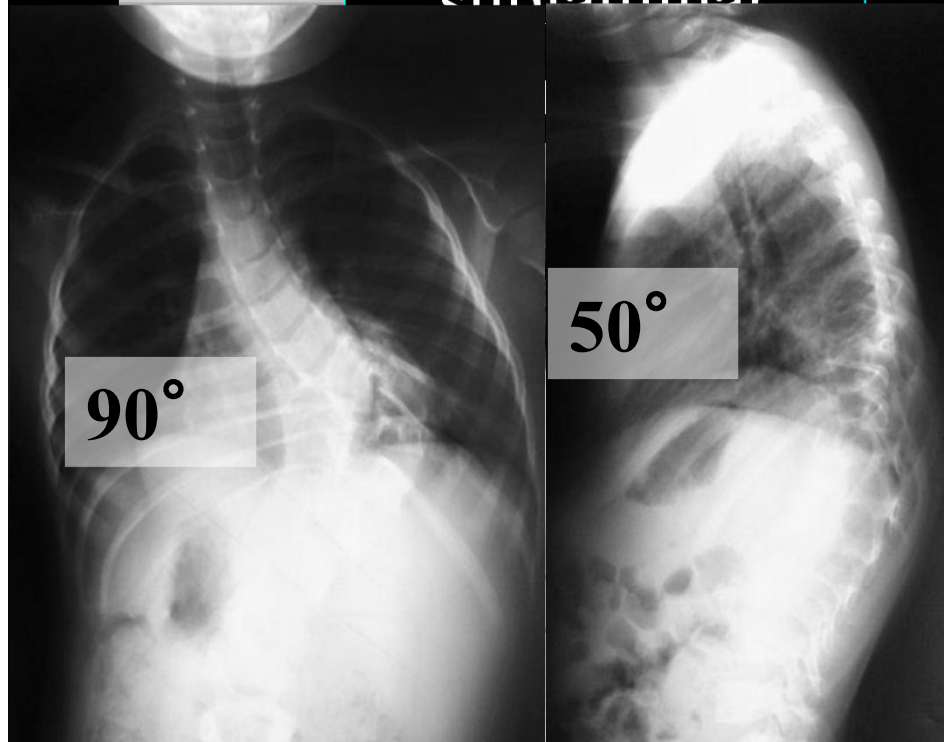
Final F/U (14y.o.)



**Pre op. (2y.o.)**

**Op. 4v (7y.o.)**

**Last F/U (9y.o.)**



- ✓ Operation: dual growing rods
- ✓ No. of operation: 11
- ✓ Scoliosis:  $90^\circ \rightarrow 50^\circ$
- ✓ Kyphosis:  $50^\circ \rightarrow 34^\circ$
- ✓ Complication: 4 dislodgements, 3 infections

**Pre op. (2y.o.)**

**Post op. (9y.o.)**

# ***DISCUSSION***

- **In treating spinal deformity in NF, early fusion has been recommended even for the pts who are skeletally immatured.**
- **However, growing rods surgery become the standards of care for children with early onset scoliosis (EOS). And it also reported that the use of growing rods in EOS associated with NF effectively controls the spinal deformity.**

# ***DISCUSSION***

- **In this study, early fusion was comparable to growing rods with regard to deformity correction.**
- **Taking multiple operations and high complication rate into consideration, early fusion still has a place in treating spinal deformity with NF .**

# ***CONCLUSION***

- In treating immature spine, dual growing rods is a trend. However, early fusion is still effective and can be a candidate of the treatment for this complex deformity.