

# Unilateral Thoracic Nerve Resection Causes Rib Cage Torsion and Idiopathic- Like Thoracic Scoliosis

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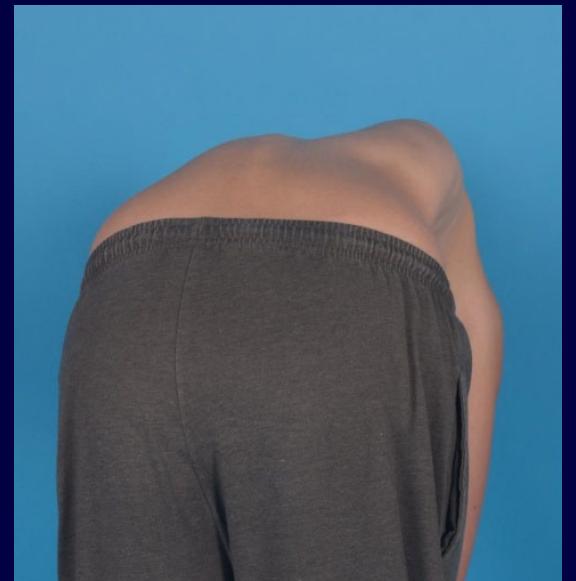
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# Introduction



- AIS: Thoracic apical rotational hypokyphosis

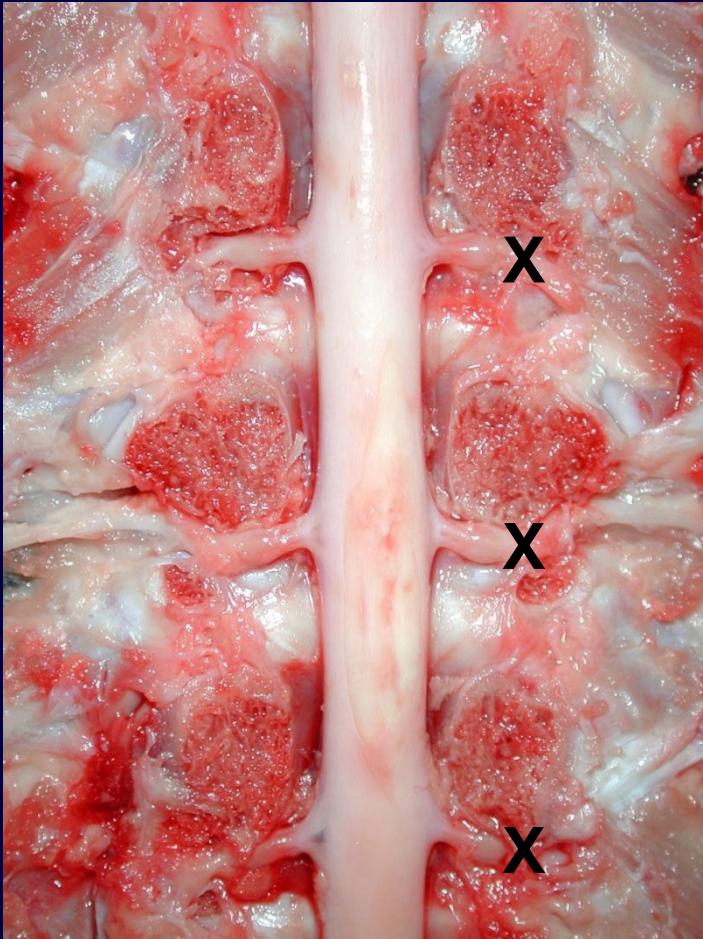
# Hypothesis

- The rib cage torsion causes the apical rotational hypokyphosis in AIS
- Neurogenic thorax imbalance is the initiating cause of idiopathic scoliosis

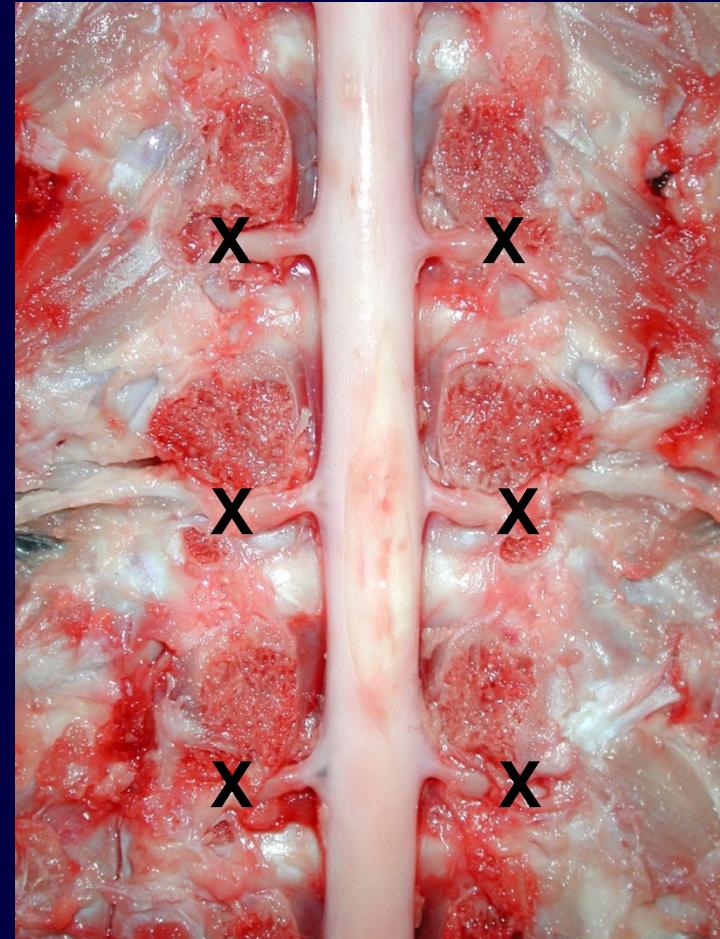
# Purposes

- To test whether the thoracic nerves resection can initially induce the rib cage torsion and cause apical rotational hypokyposis idiopathic-like scoliosis in immature pig model.

# Study Design

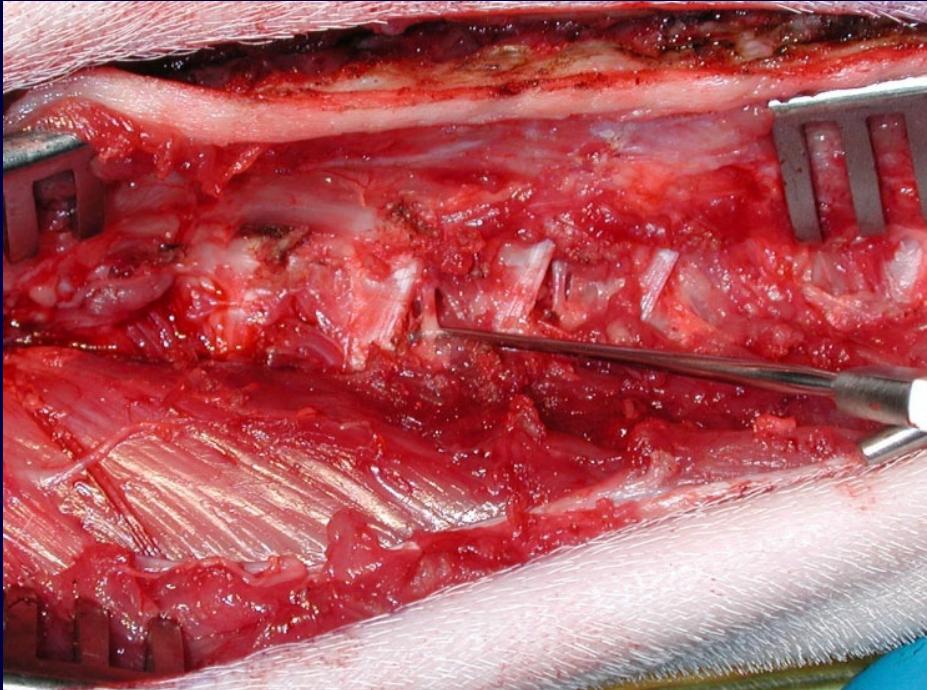


- Unilateral thoracic nerve root resection (n=6)
- Unilateral thoracic nerve root resection with unilateral muscle stripping (n=5)

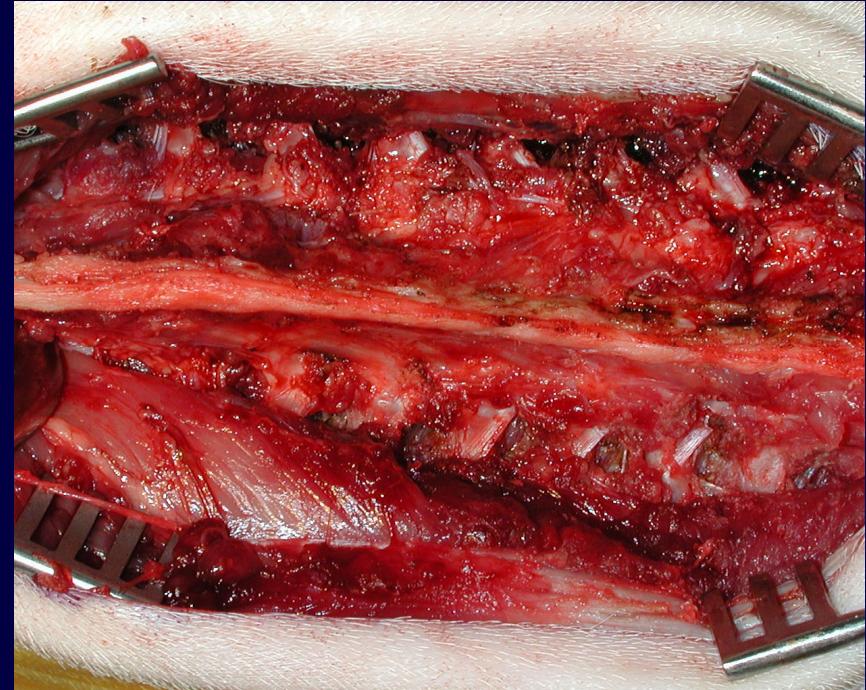


- Bilateral nerve root resection (n=6)

# Methods



8-level thoracic nerve resection  
from T7-T14 on the right side



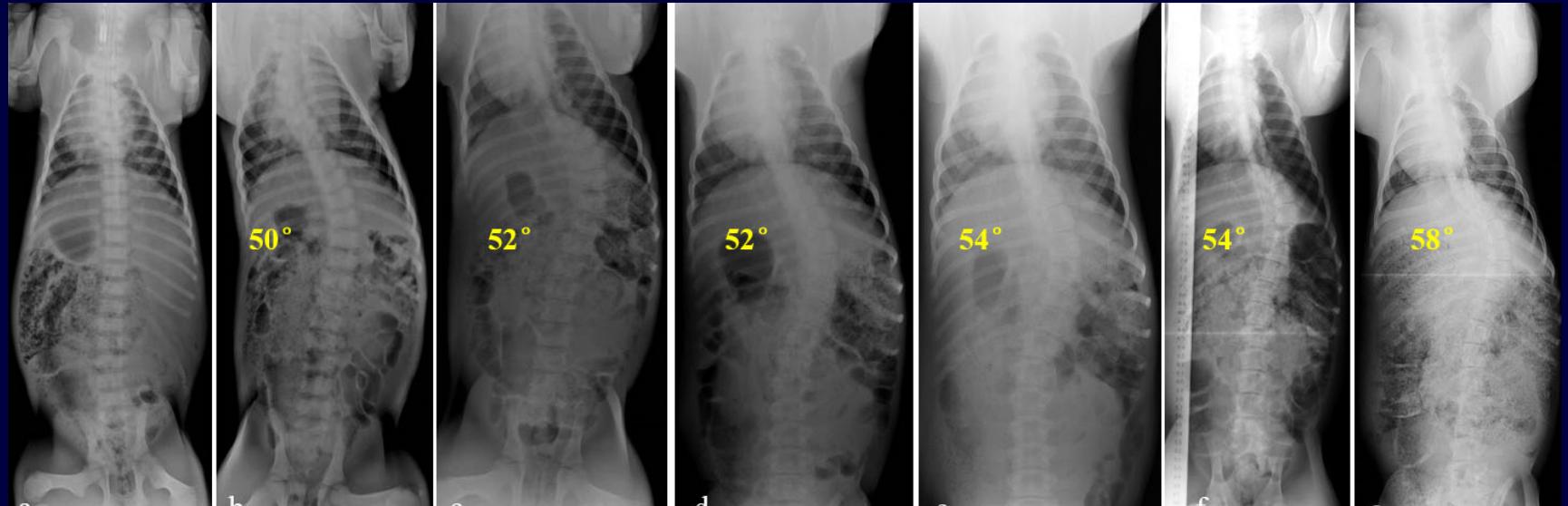
8-level thoracic nerve resection  
from T7-T14 on the both side

- Seventeen one-month-old pigs
- The animals were killed at 17 weeks
- The radiographs and axial CT images of the spine were obtained

# Methods

- |   |  |
|---|--|
| <p><b>Thoracic Deformity Parameters</b></p> | <ul style="list-style-type: none"><li>• RH: rib hump</li><li>• RVAD: rib vertebral angle difference</li><li>• ARSD: apical rib spread difference</li><li>• AVB-R: apical vertebral body-rib ratio</li><li>• RLD: rib length difference</li></ul> |
| <p><b>Spine Deformity Parameters</b></p>    | <ul style="list-style-type: none"><li>• Coronal Cobb</li><li>• Sagittal kyphosis</li><li>• Apical vertebral rotation</li></ul>   |

# Unilateral Thoracic Nerve Resection



Post op.

2 weeks

4 weeks

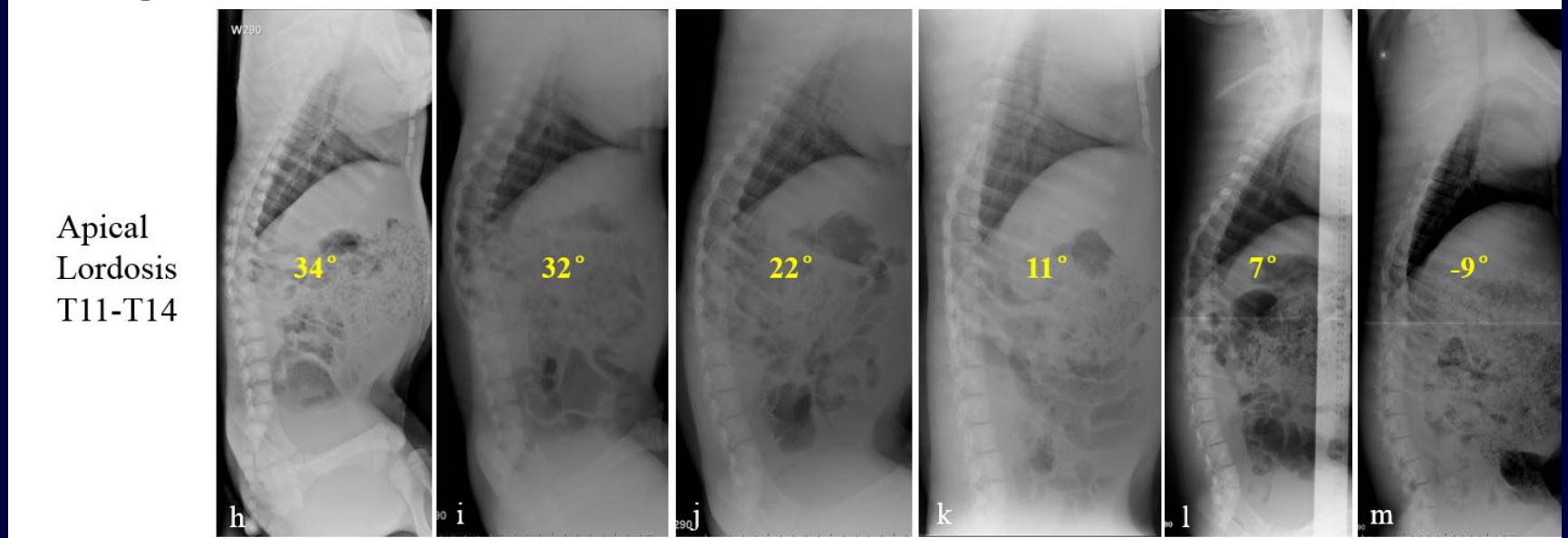
6 weeks

8 weeks

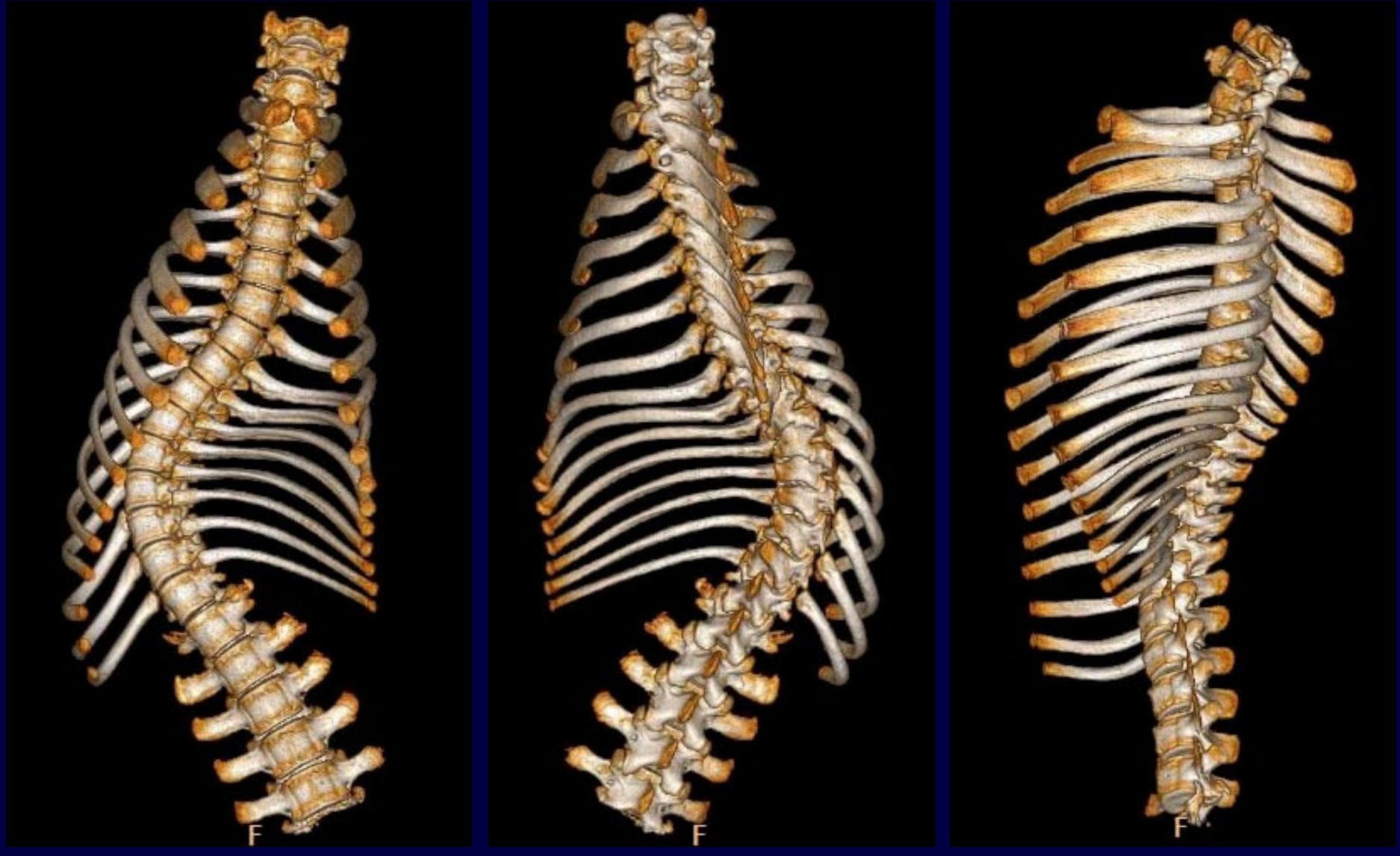
12 weeks

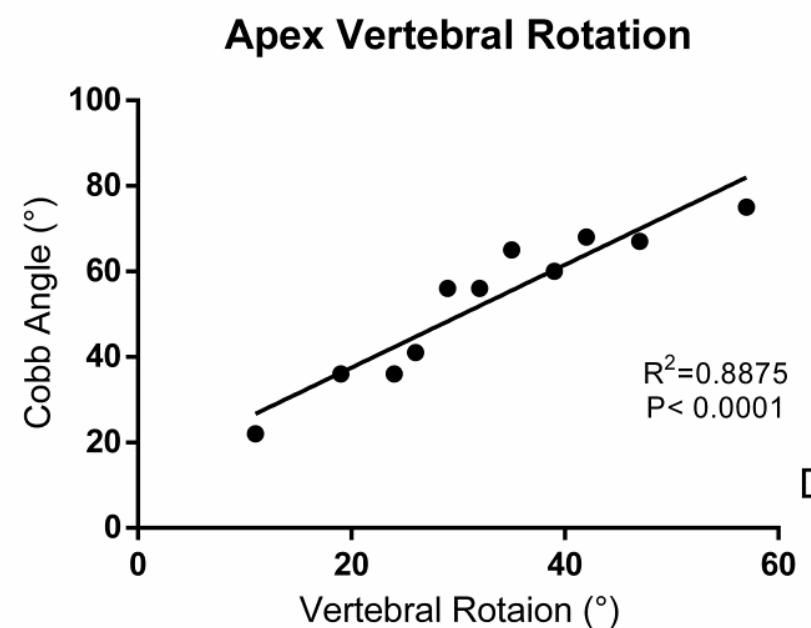
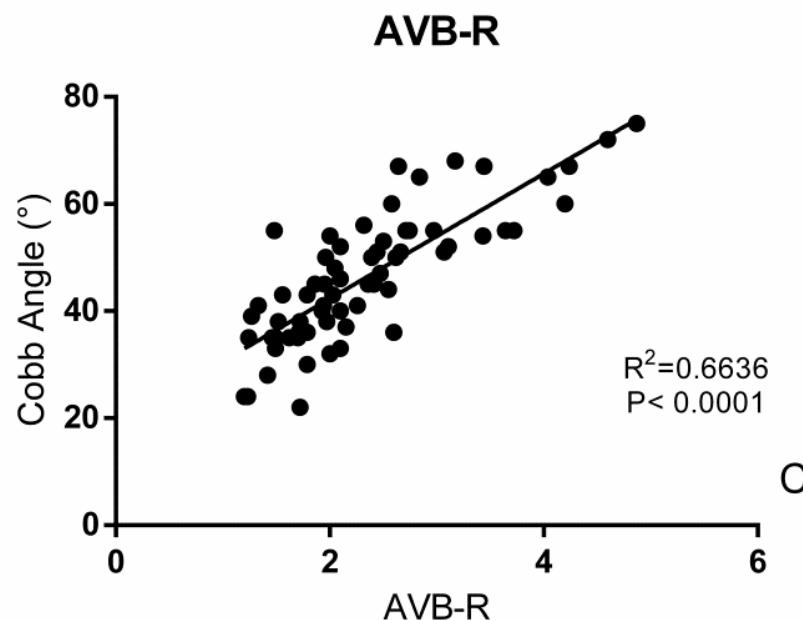
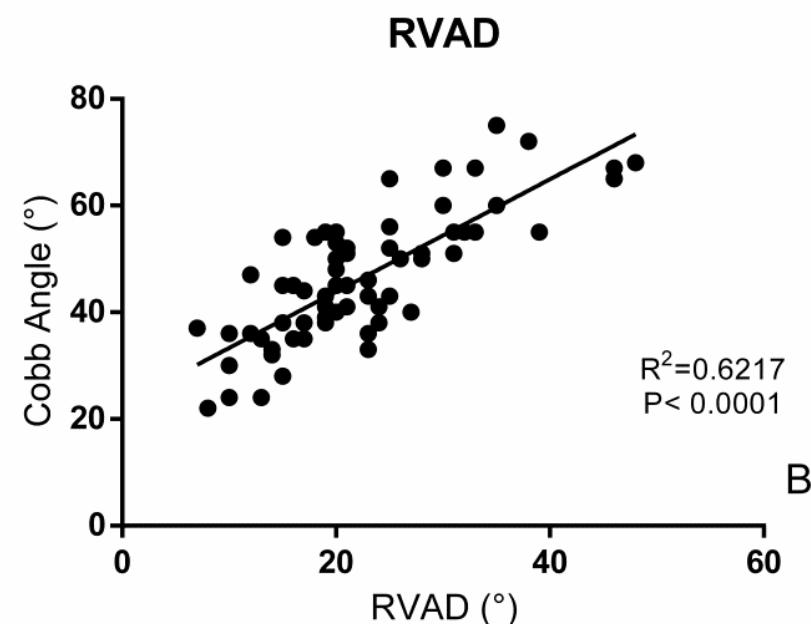
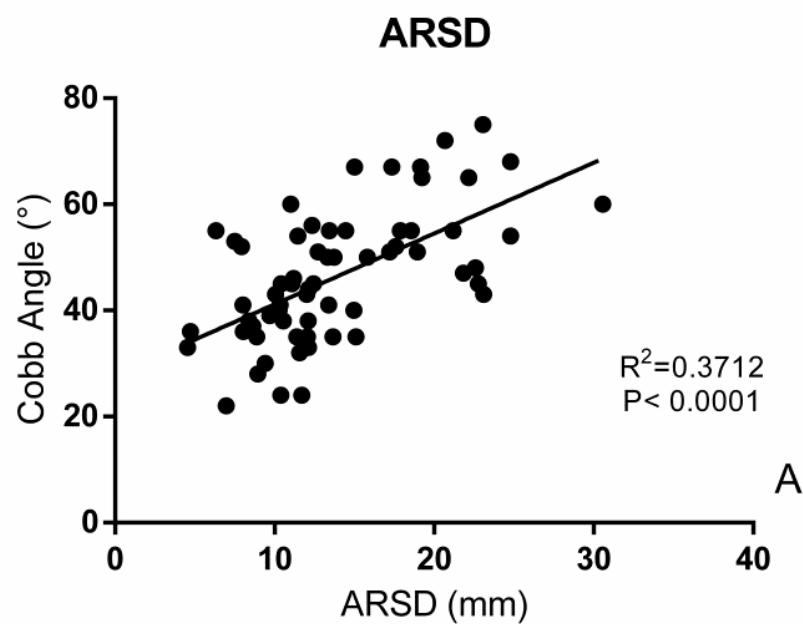
17 weeks

Apical  
Lordosis  
T11-T14

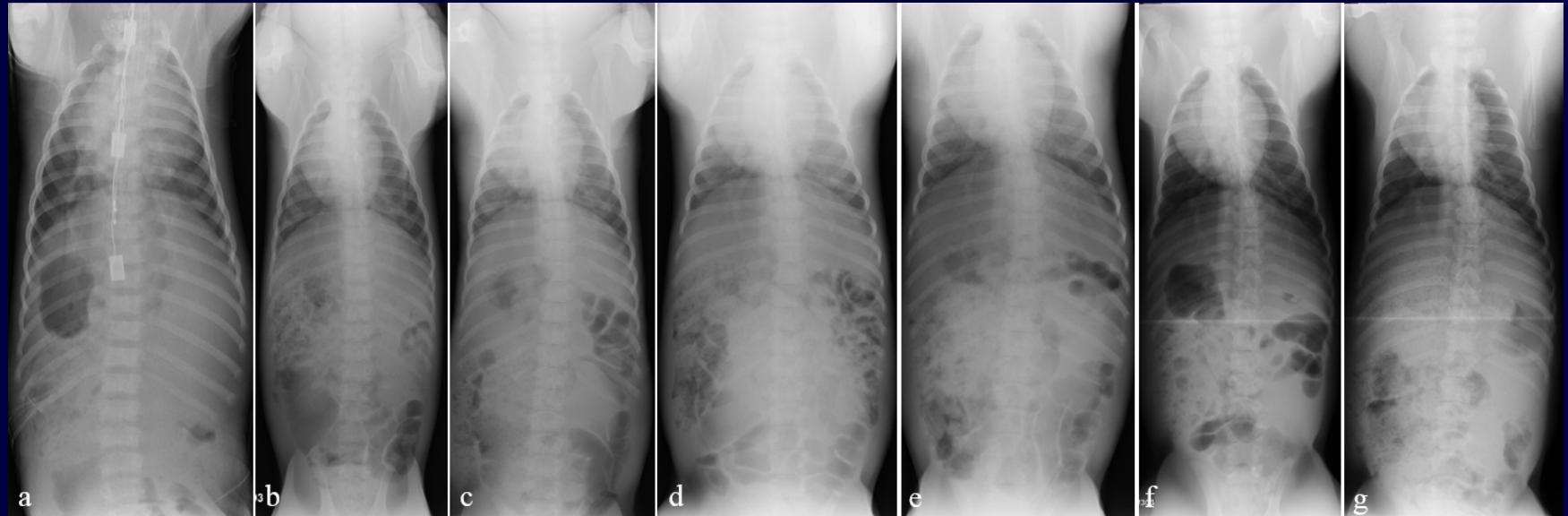


# Unilateral Thoracic Nerve Resection

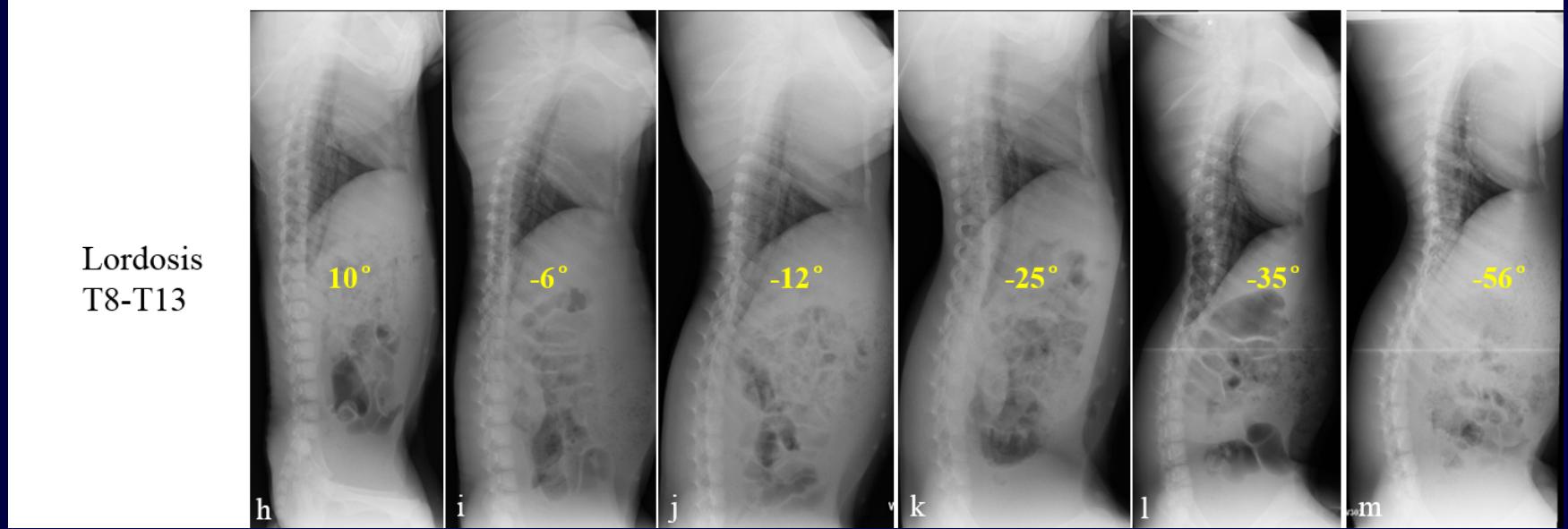




# Bilateral Thoracic Nerve Resection



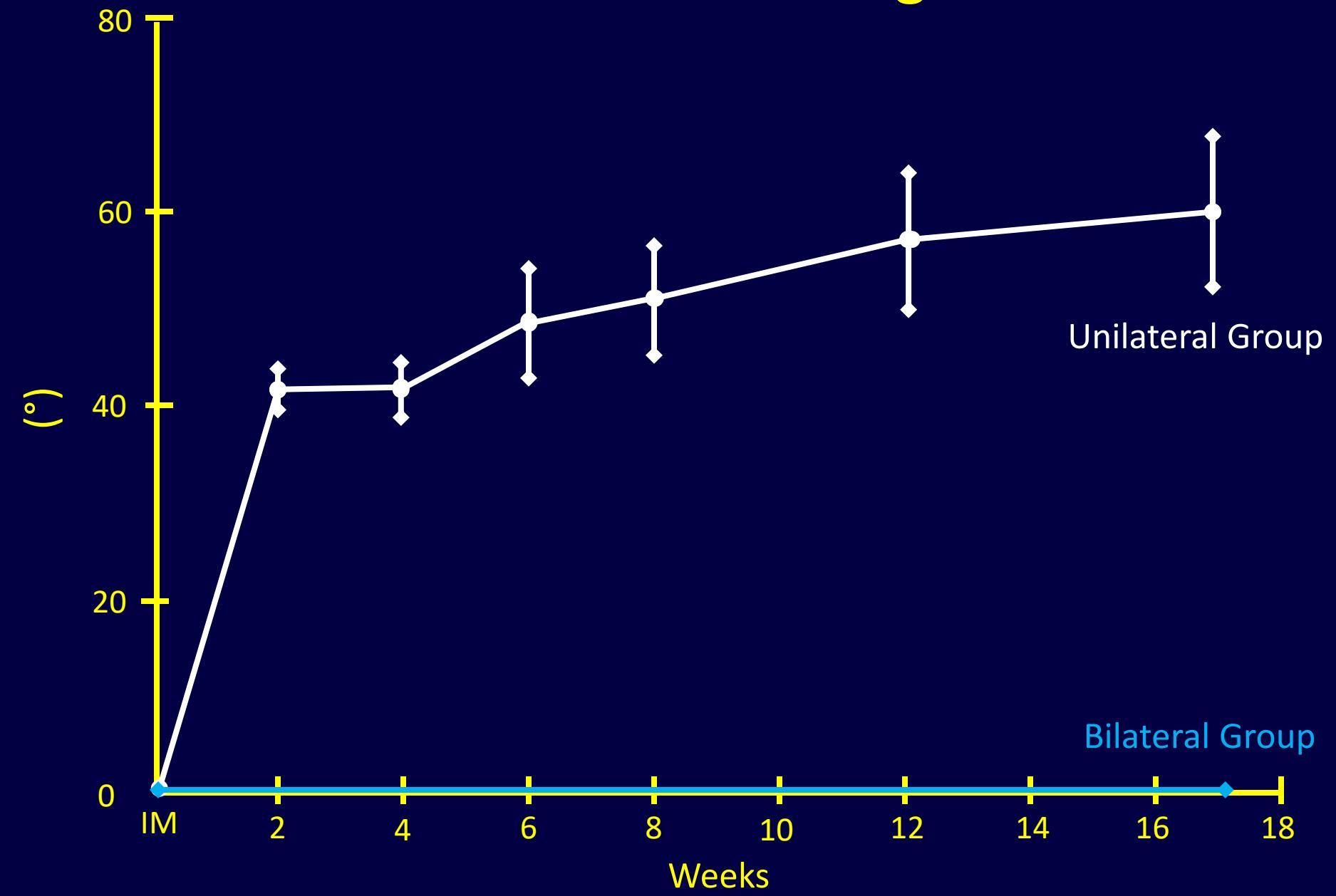
Post op.      2 weeks      4 weeks      6 weeks      8 weeks      12 weeks      17 weeks



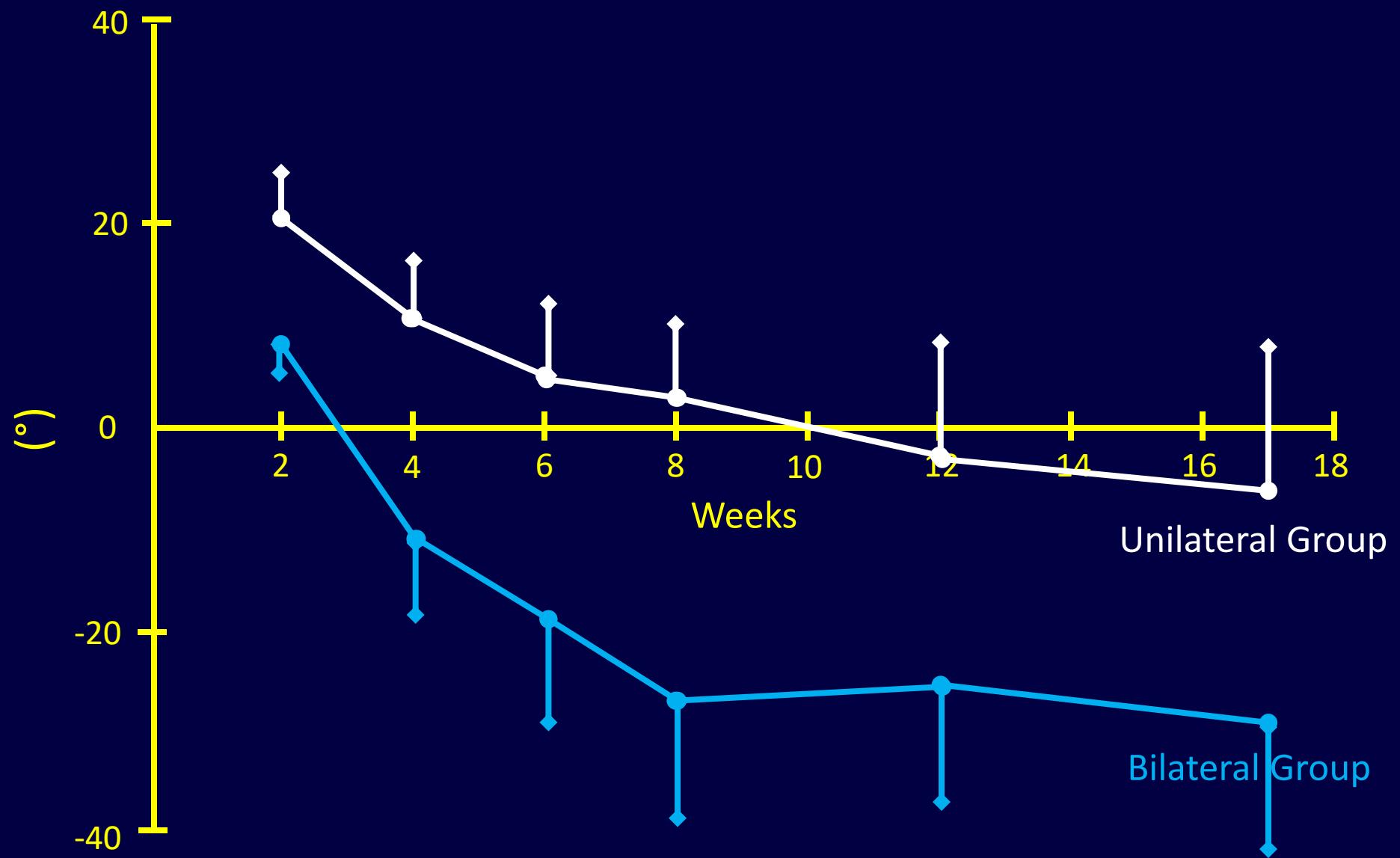
# Bilateral Thoracic Nerve Resection



# Scoliosis Cobb Angle



# Sagittal Kyphosis



# Conclusions

- Unilateral thoracic nerve resection induced rib cage torsion toward the operative side resulting in idiopathic-like thoracic hypokyphosis scoliosis in an immature pig model.
- Neurogenic thorax imbalance may be the initiating cause of the idiopathic scoliosis.



Thank You