Closure Pattern of the Neurocentral Junction and Pre-existent Rotation in the Normal Immature Spine

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Scoliosis is a complex 3D deformity of the spine and trunk (Nicoladoni 1904!)

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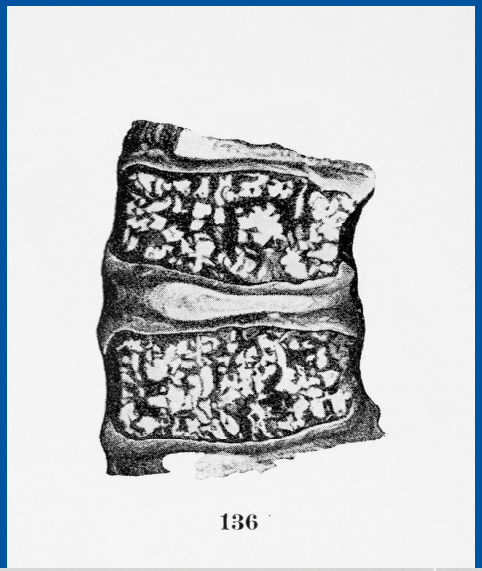

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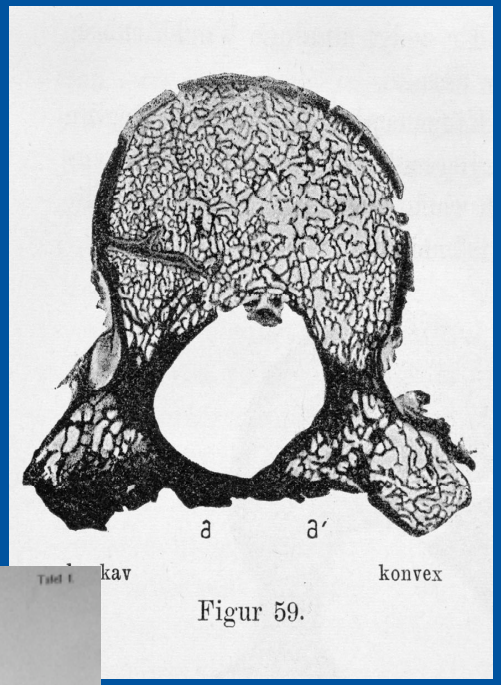
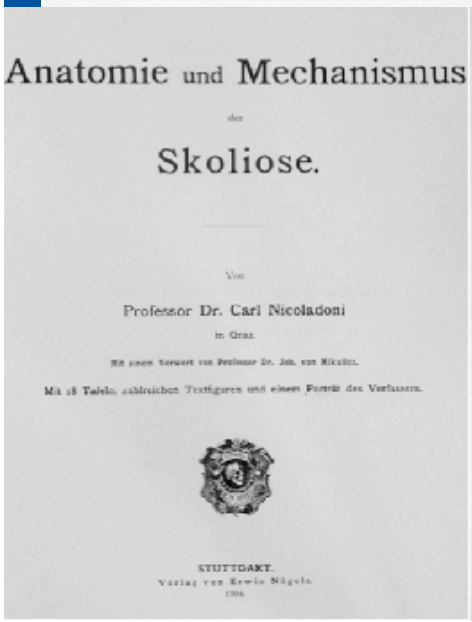


Figur 59.



Anatomie und Mechanismus

der

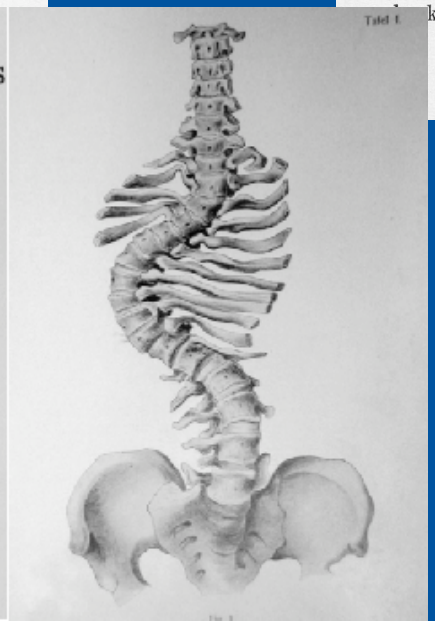
Skoliose.

Von

Professor Dr. Carl Nicoladoni

in Graz.

STUTTGART.



Tafel I.

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Purpose of the study:

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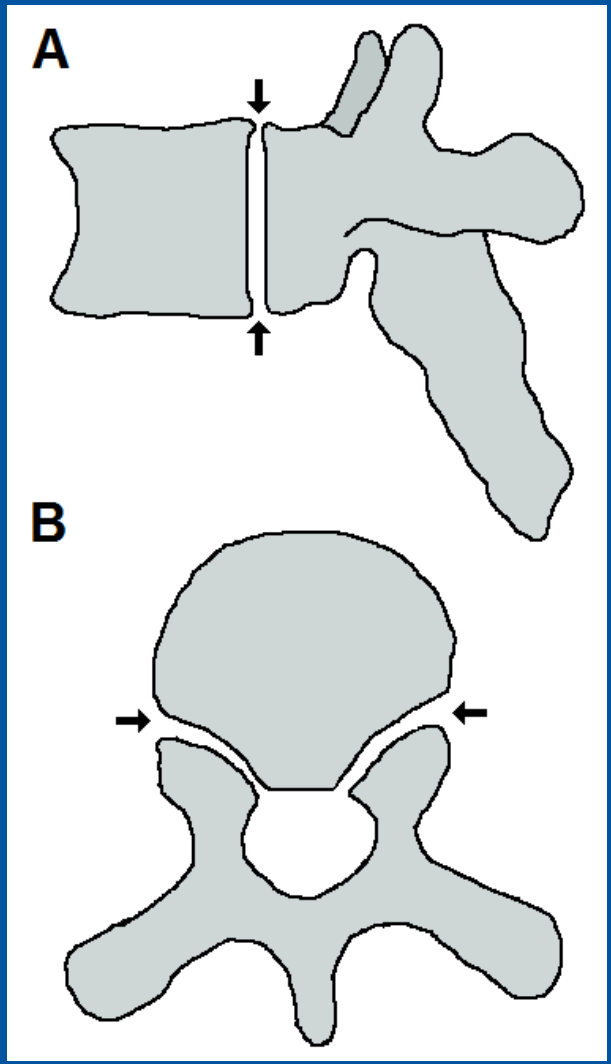

- NCJ closes asymmetrically in scoliosis
- Normal spine also has slight rotatory asymmetry
- What is the closure pattern of the NCJ in the non-scoliotic spine??
- How is this closure related to pre-existent rotation??

Methods: 199 normal children

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- CT-Thorax/abdomen of
  Infantiles (n=52), Juveniles (n=69), Adolescents (n=78)
- Inclusion:
  - *Scan indications: Recurrent pulmonary infections, malignancy, screening prior to bone marrow transplantation, immune disorders.*
- Exclusion:
  - *Spinal pathology*
  - *Disorders affecting growth*
  - *Abnormalities of internal organs*

Methods: Systematic, semi-automatic analysis on transverse CT-slices

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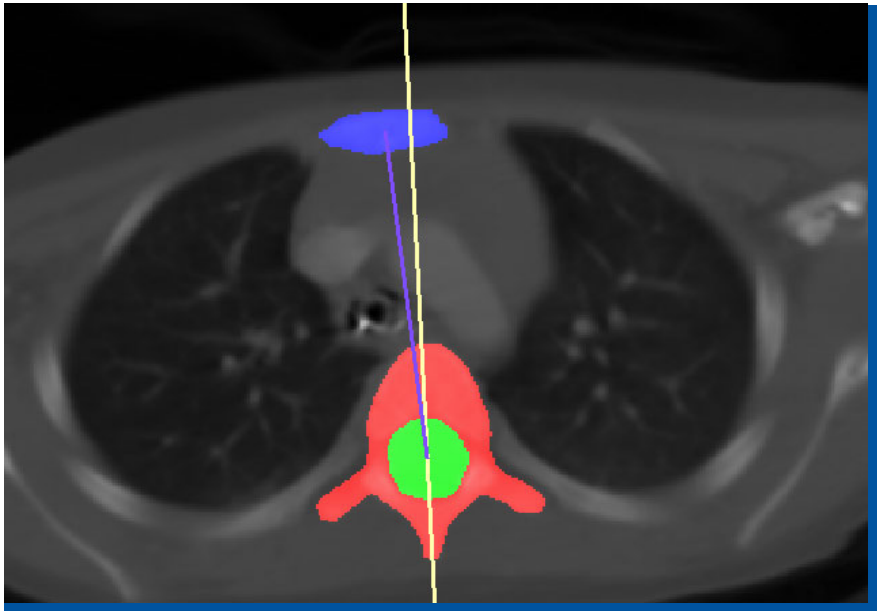
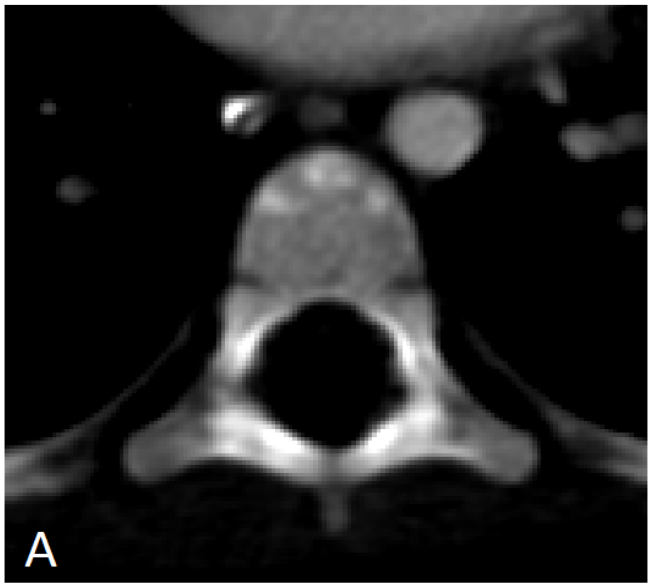
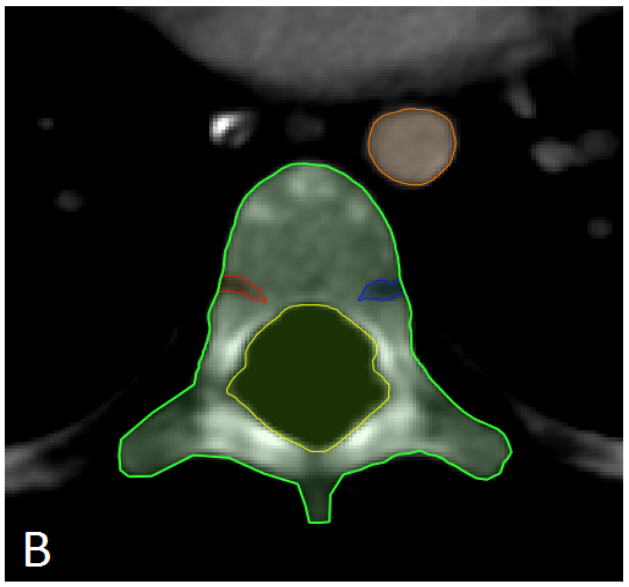
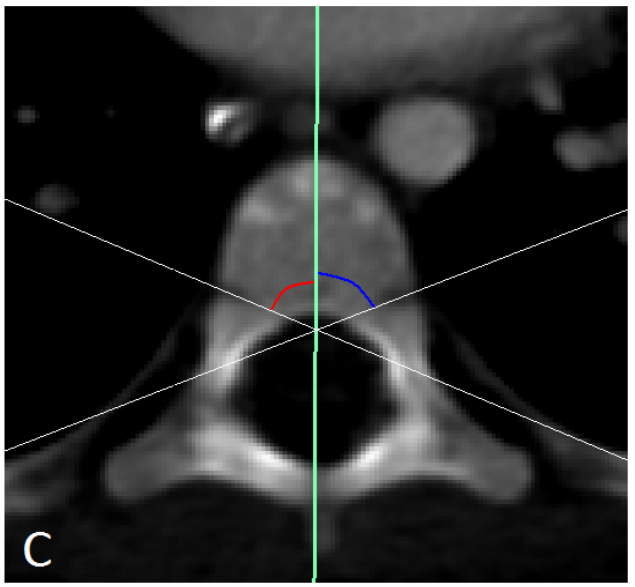


I. Pre-existent vertebral rotation

II. Closure, absolute surface area and orientation of the left and right NCJ







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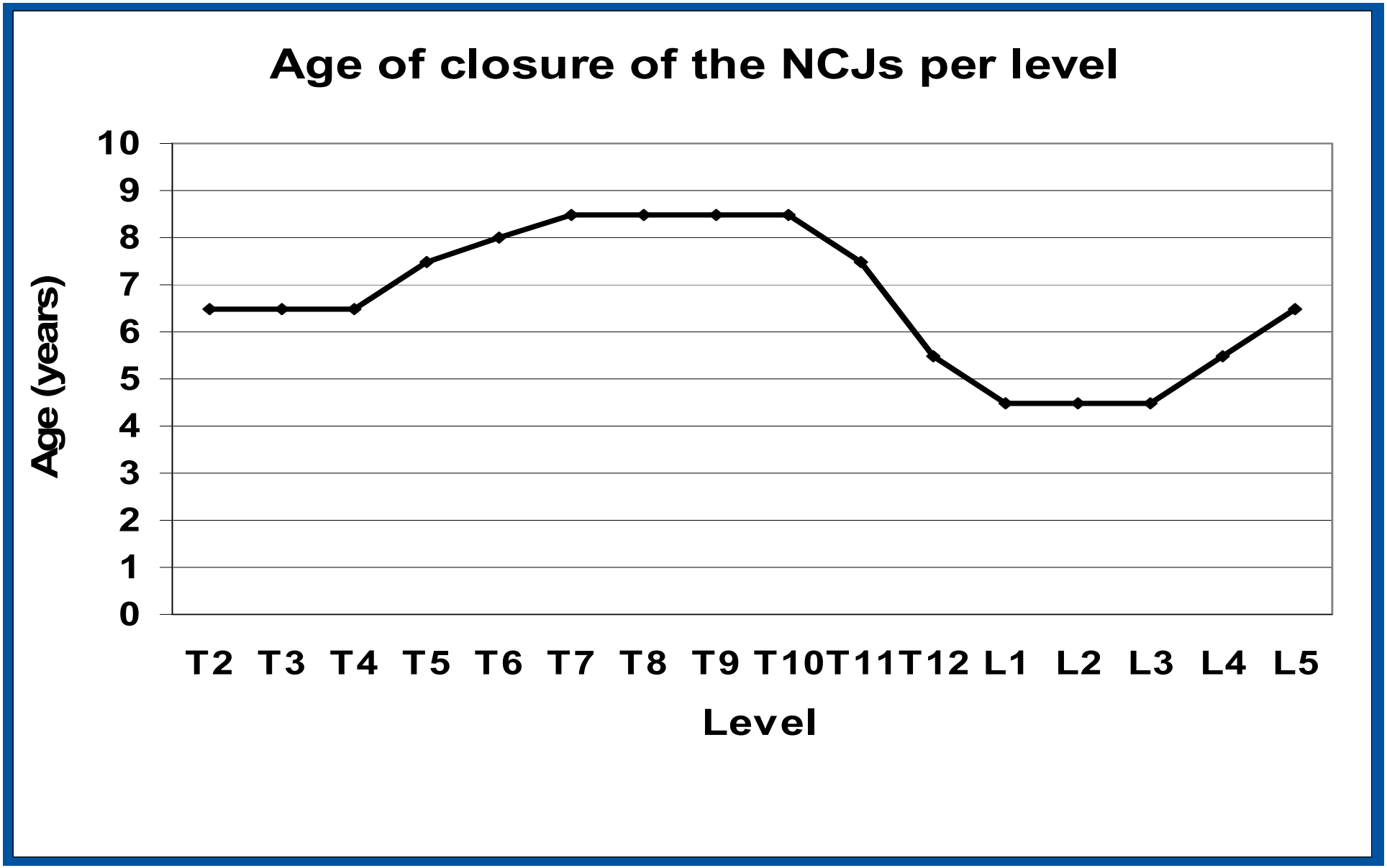

Surface Area

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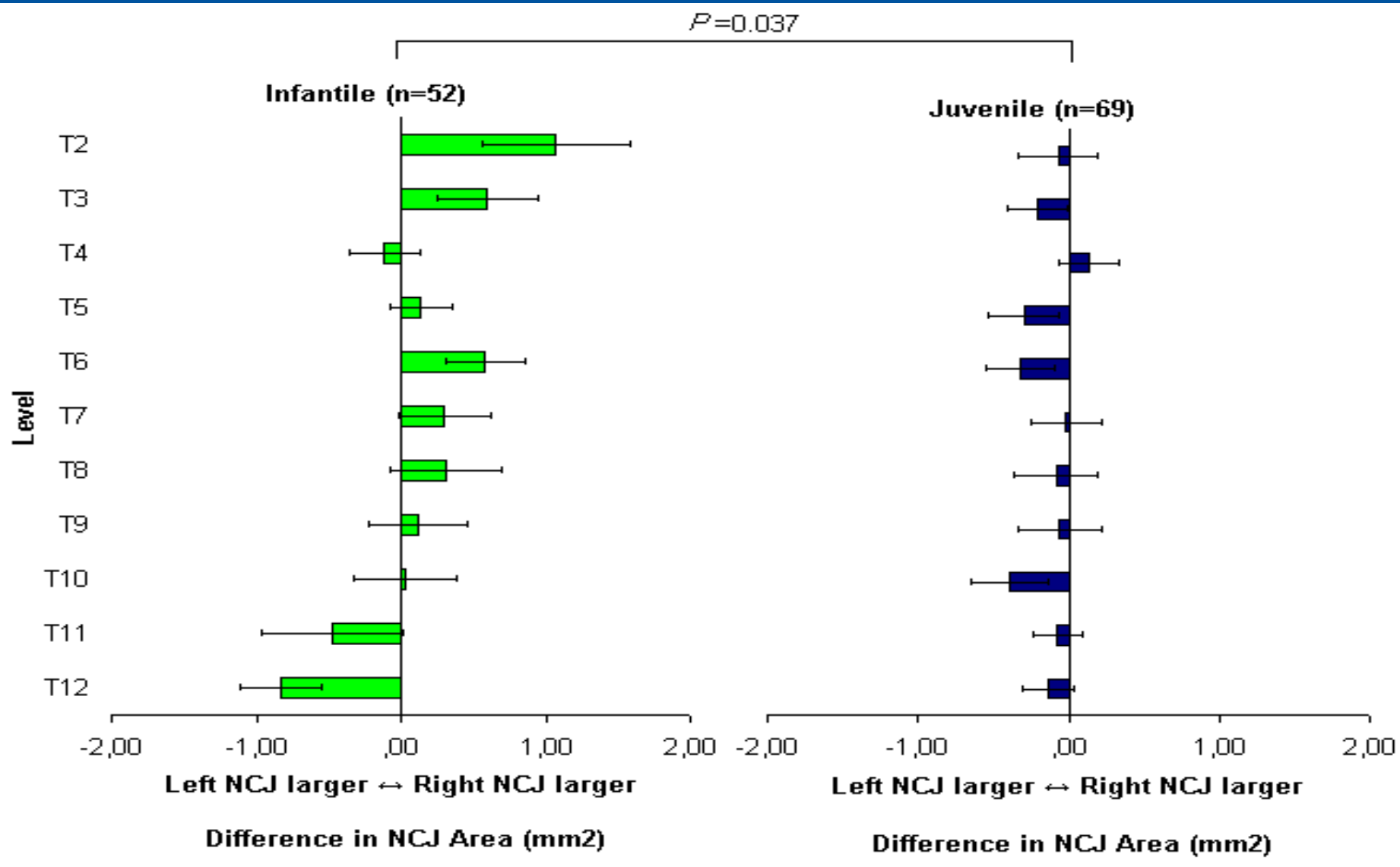

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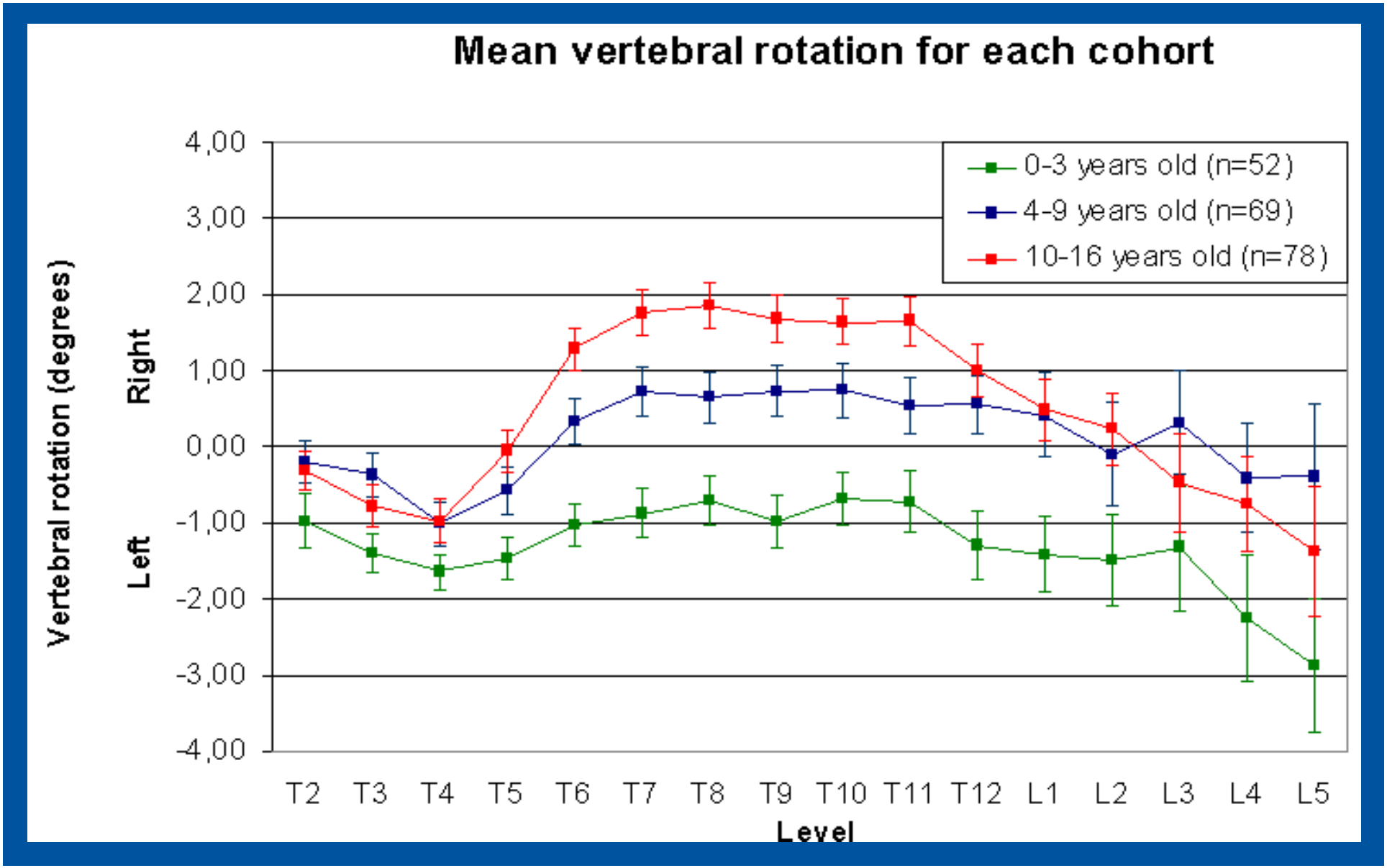

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Analysis of Preexistent Vertebral Rotation in the Normal Spine

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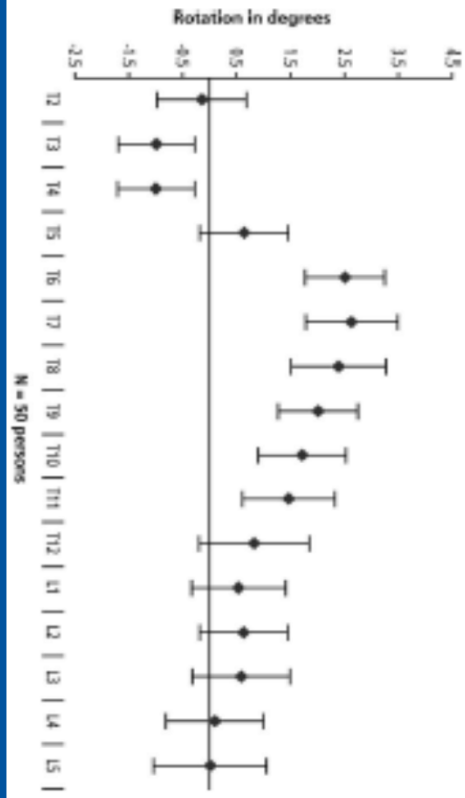

Conclusions:

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- Age of closure depends on site: high lumbar first, mid-low thoracic last
- NCJ asymmetry ↔ pre-existent rotation
- Pre-existent rotational patterns ↔ curve patterns in idiopathic scoliosis.