Don’t Fuse Spines in Young Kids

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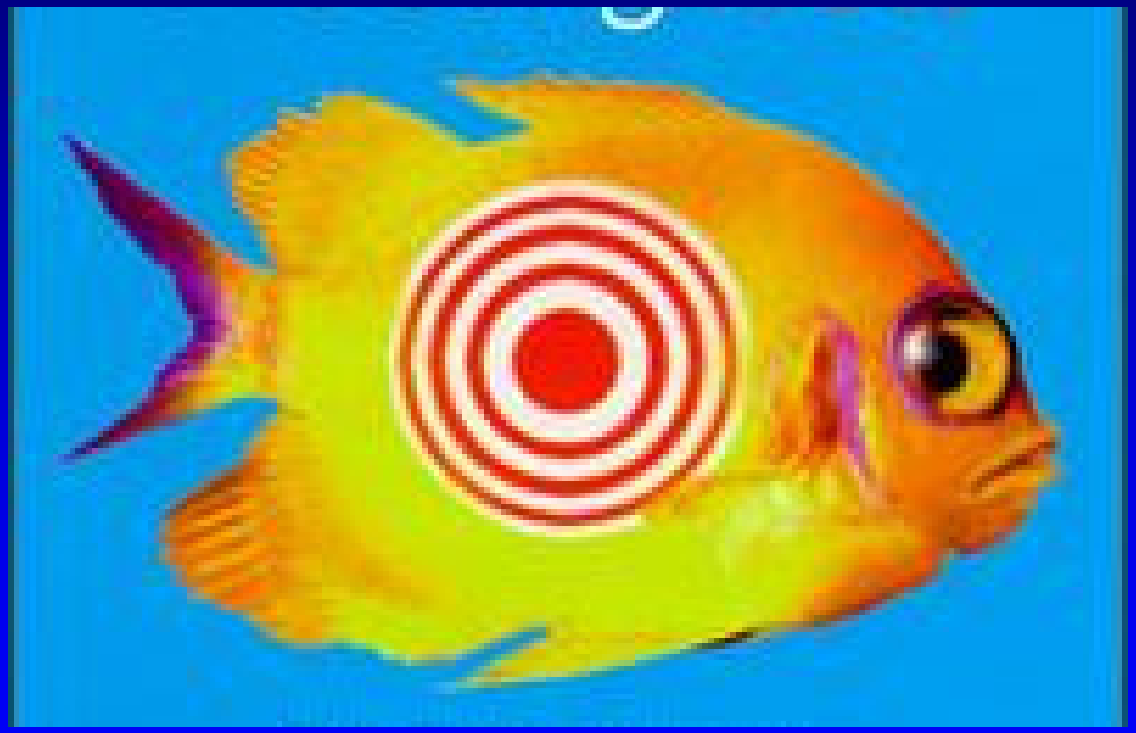
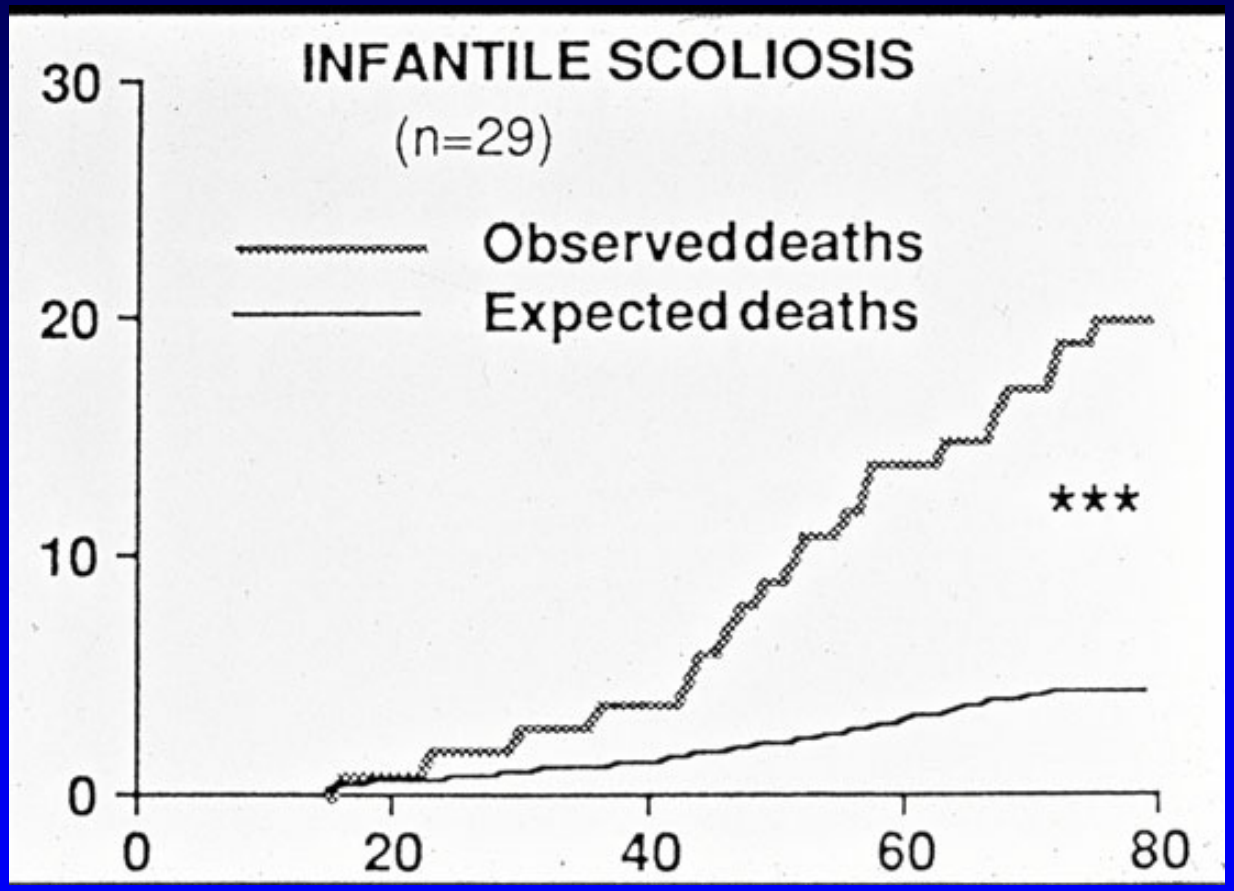
Shooting Fish in a Barrel



Natural History
Infantile Idiopathic

of Deaths



Pehrsson, Larssson, Oden & Nachemson, Spine, 1992

Thoracic spine fusions Diminished Pulmonary Function

- **≥ 4 Thoracic Spinal Segments**
- **Before Age 5**

Emans JB, et al. IMAST, Bermuda, 2004.

Goldberg CJ, et al. Respiratory function and cosmesis at maturity in infantile-onset scoliosis. Spine. 2003

- Surgery <10 yrs worst results
  - (mostly apical or total fusion)
  - FVC 41%

The Effect of Early Thoracic Fusion on Pulmonary Function

Lori Karol, M.D., Charles Johnston, M.D.,
Kiril Mladenov, M.D., Peter Schochet, M.D., and
Patricia Walters, RRT-NPS.
Texas Scottish Rite Hospital for Children
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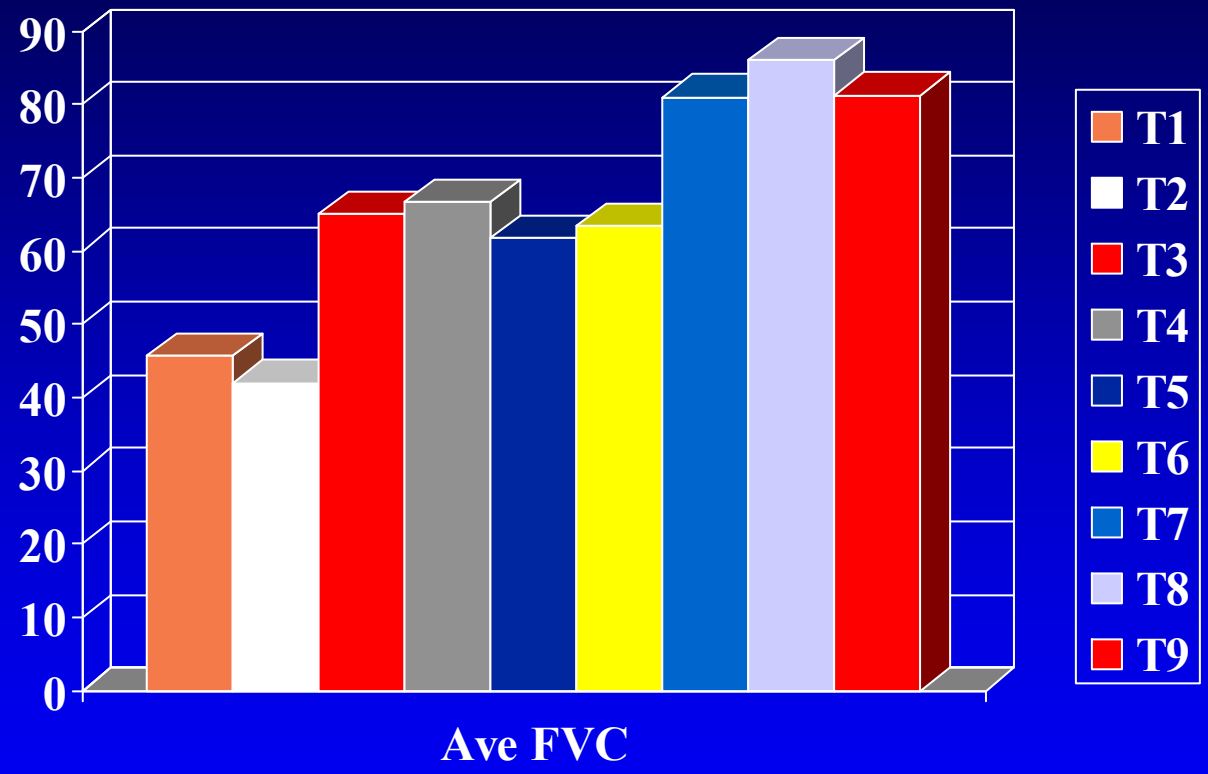
FVC VS. PROXIMAL LEVEL OF FUSION

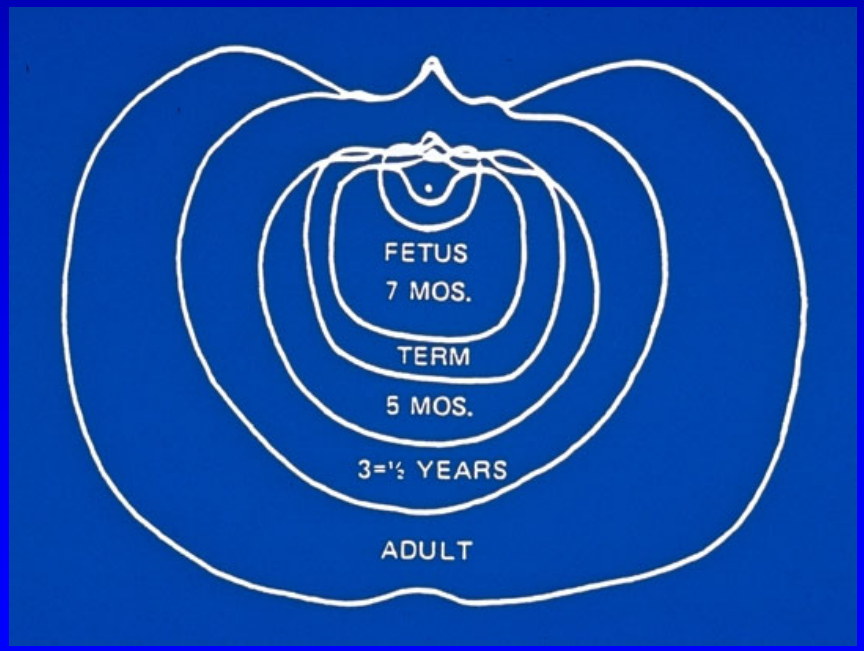


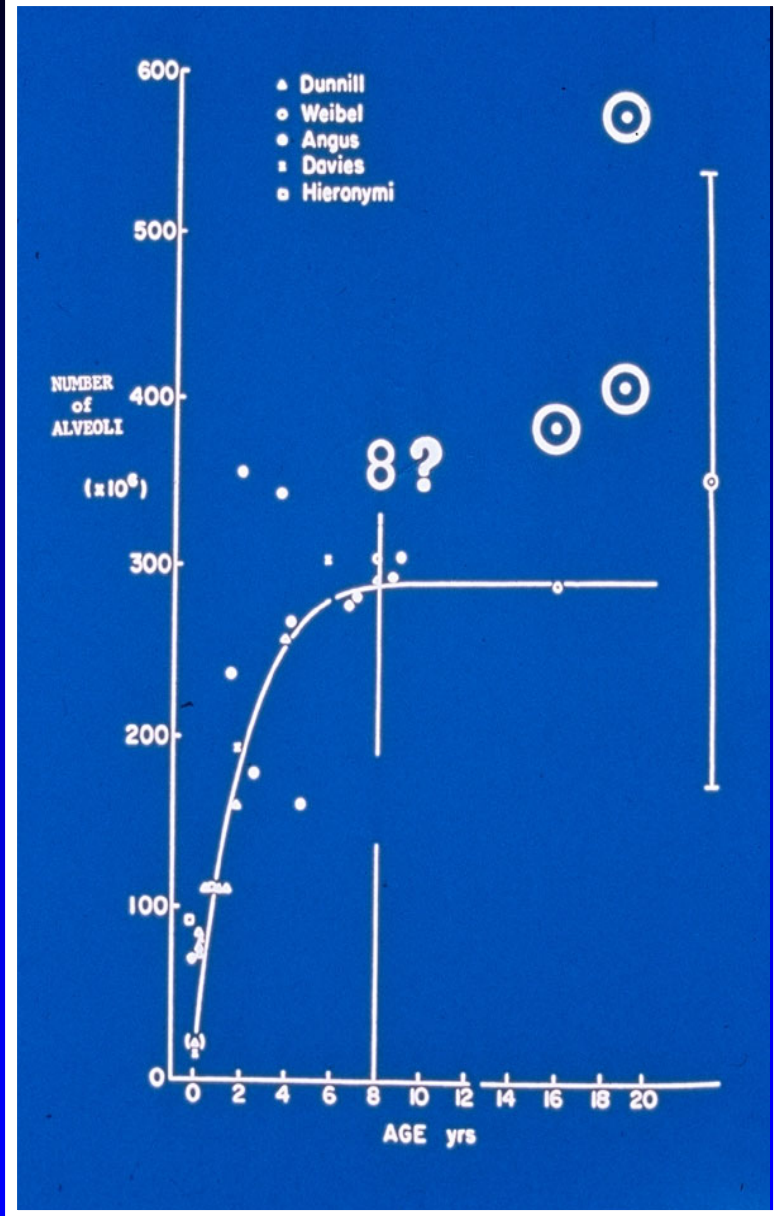
Dimeglio – Rabbit Model

- Posteior spine fusion in rabbits
- T1-T6 fusion decreases thoracic volume > T7-T12 fusion

- hypothesis
  - T1-T6 ribs articulate with the sternum
  - T7-T12 ribs do not

Alveoli multiply during first 7 years of life if thorax normal





An Evaluation of Patient Outcomes after Early Spinal Fusion

- 21 children with congenital scoliosis
- early fusion

Michael G. Vitale, MD MPH,
Hiroko Matsumoto, MA, Joshua E. Hyman, MD,
Jaime A. Gomez, MD, Whitney A. Booker, BS,
Michael R. Bye, MD, David P. Roye Jr., MD

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Pediatric Orthopaedic Surgery
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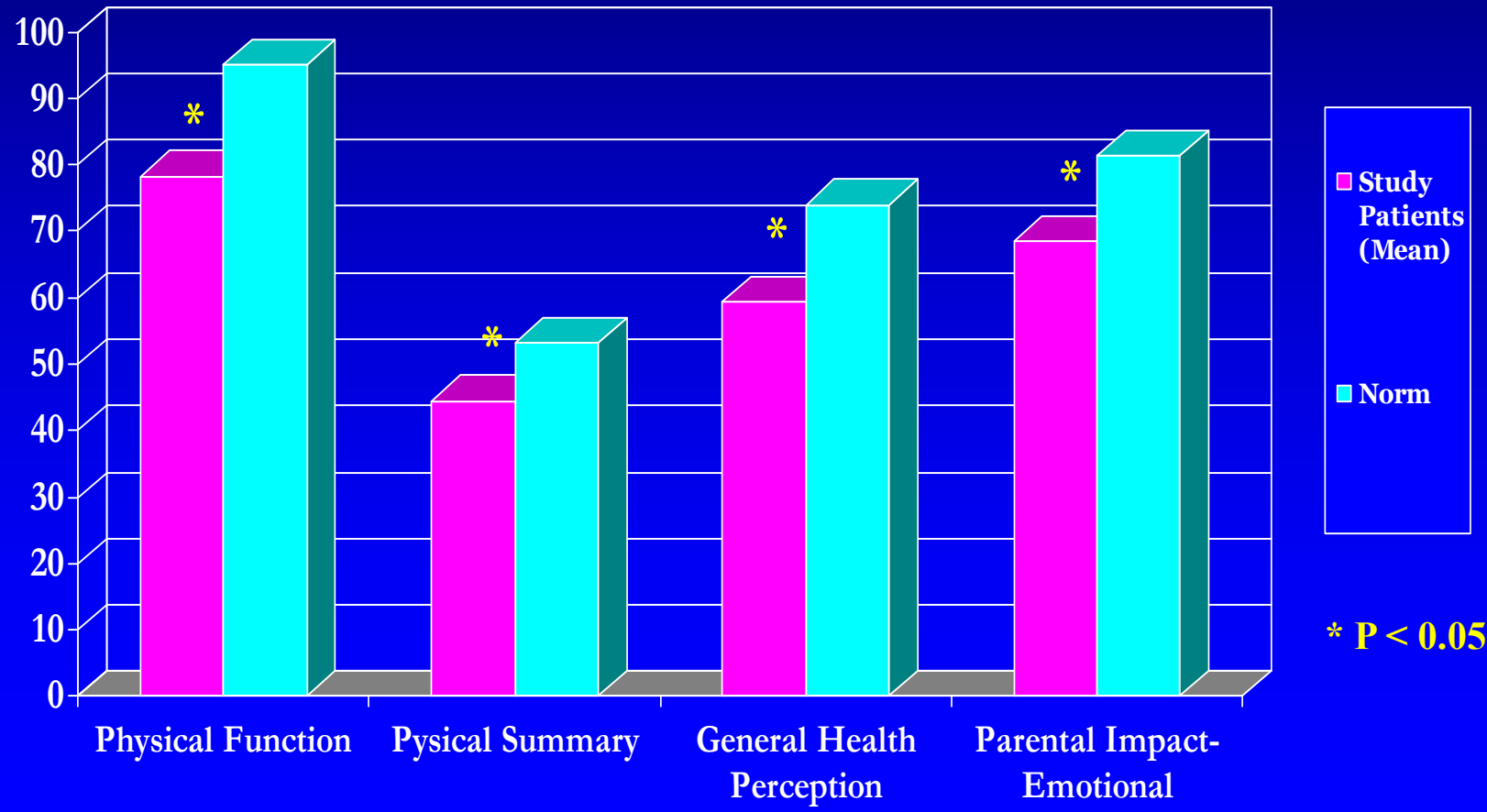
Results: Quality of Life

Physical scores were significantly lower but psychological scores were similar compared with healthy children.



Pulmonary Conclusions

- **patients with congenital scoliosis and early fusion**
  - **significantly worse pulmonary function**
  - **mean 7 years following initial surgery**
- **Patients with larger curves have lower PFT scores and quality of life results.**

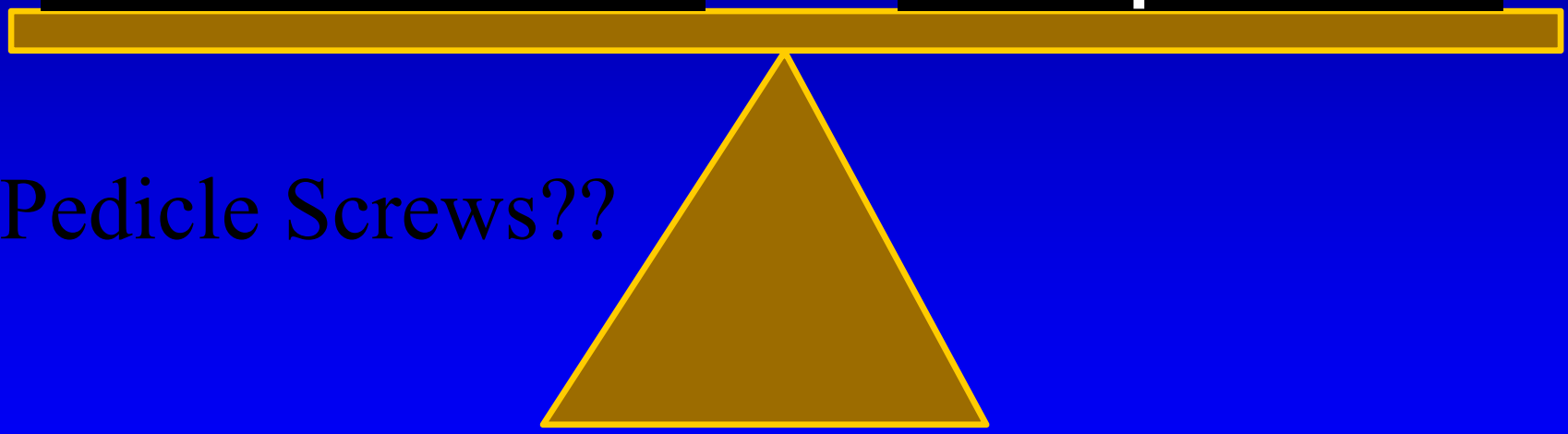
Early Fusion

Posterior Only

Crankshaft

Anterior and Posterior

Pulmonary compromise



Pedicle Screws??

Early Fusion

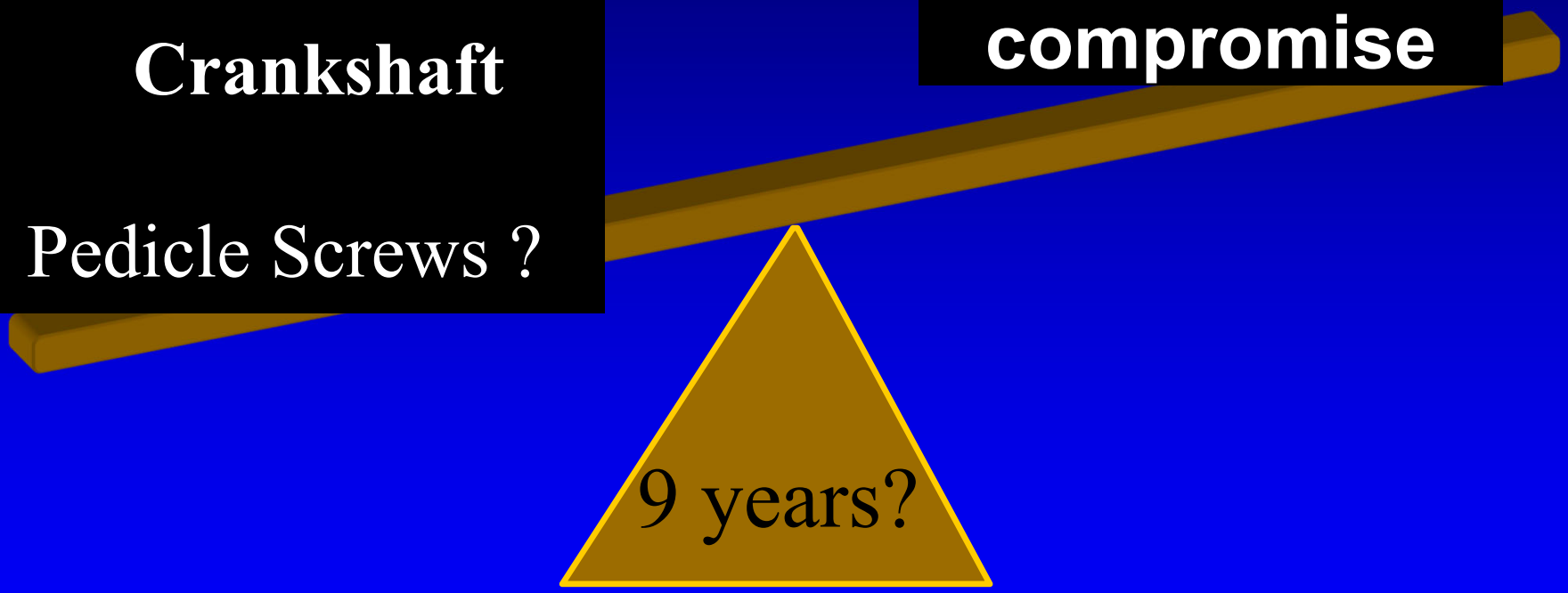
Anterior and Posterior

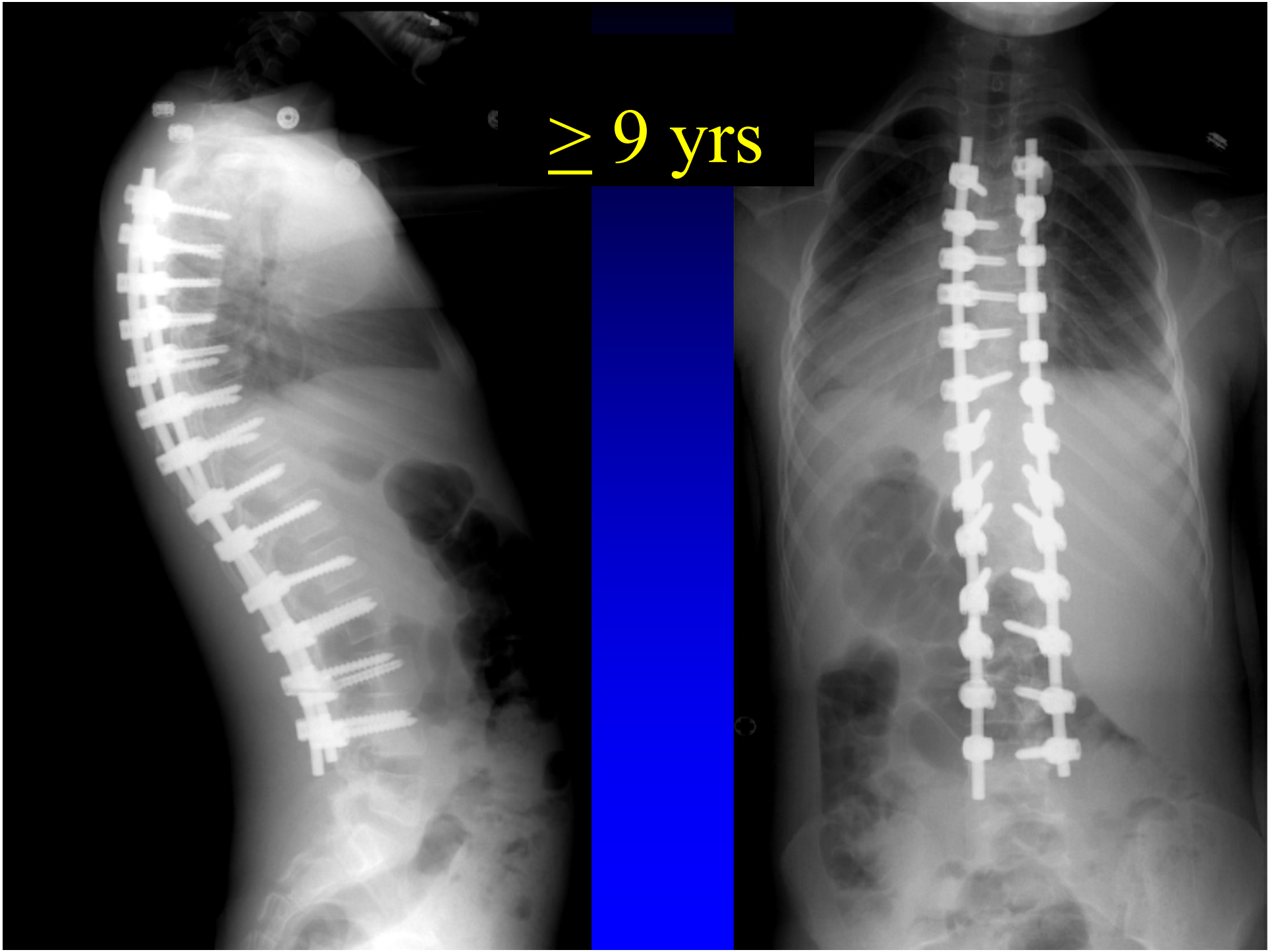
Pulmonary compromise

Posterior Only

Crankshaft

Pedicle Screws ?




≥ 9 yrs

Thank You

Risk for Early Death
56 Year Follow-Up - Sweeden

- Severity of curve - NOT SIGNIFICANT
- Age at onset ($P < 0.01$)

Pehrsson, Larssson, Oden & Nachemson, Spine, 1992

RESULTS

- 28 patients spinal fusions
- Age at surgery = 3 yrs (4 mos – 8 yrs)
- Ave f/u 11 years (6 – 20 yrs)
- 27/28 had anterior surgery

Cephlad Extent of Fusion More Important than # segments Fused

- FVC < 50%
  - 67% (8/12) top of fusion T1 or T2
  - 25% (4/16) top of fusion T3-T9
  - P=0.0004