Short Fusion with Vertebrectomy for Congenital Spinal Deformity (CSD) During Growth: Is Early Surgical Intervention Recommended?

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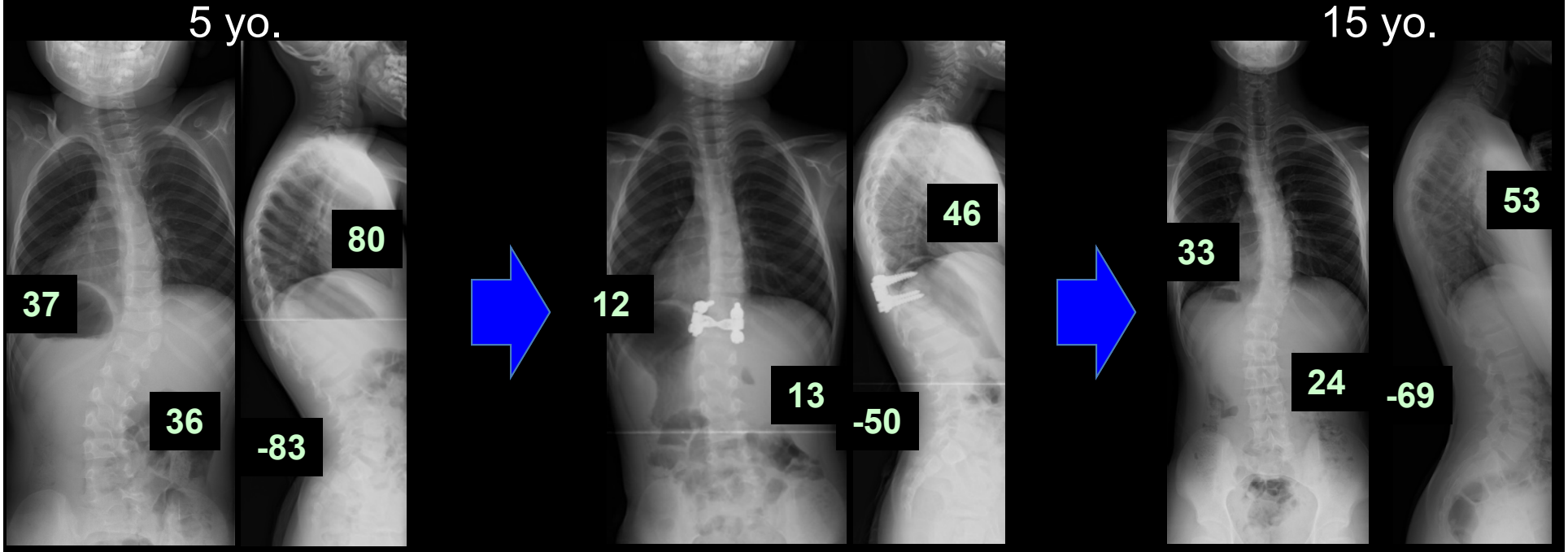
Short Fusion with Vertebrectomy
for CSD with Short Involvement of Vertebral Anomalies



- Greater growth of thoracic height
- 54%-73% curve correction
- Early intervention recommended

Harms 2009

Early?
Late ?

Ruf 2003, Jalanko 2010, Yaszay 2011, 、Crostelli 2014, Kawakami 2014,

Purpose of This Study

Early fusion vs Late fusion

To examine differences in postop. surgical outcomes between early- and late-fusion among patients with formation failure of CSD

Design and Participants

- Retrospective cohort study

  8 Orthopaedic Institutes in Japan

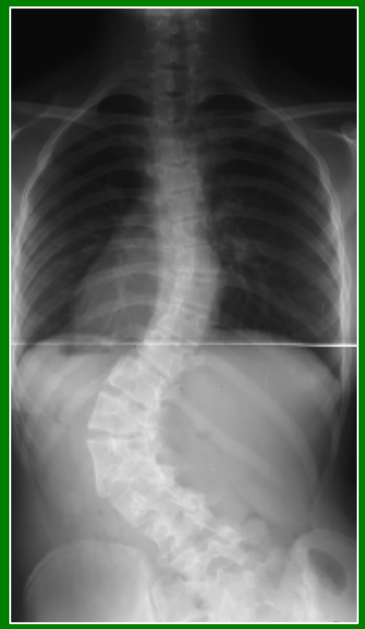
- Inclusion criteria for participants

  - CSD with formation failure
  - Scoliosis >10 degrees
  - Surgery <18 years
  - Short fusion with vertebrectomy ≤ 6
    (including osteotomized vertebrae)
  - Min. F/U 2 years (from 1991 to 2012)

Timing of Surgical Intervention

Early Fusion	Late Fusion
≤ 6 years	7 - 17 years
N=79	N=96

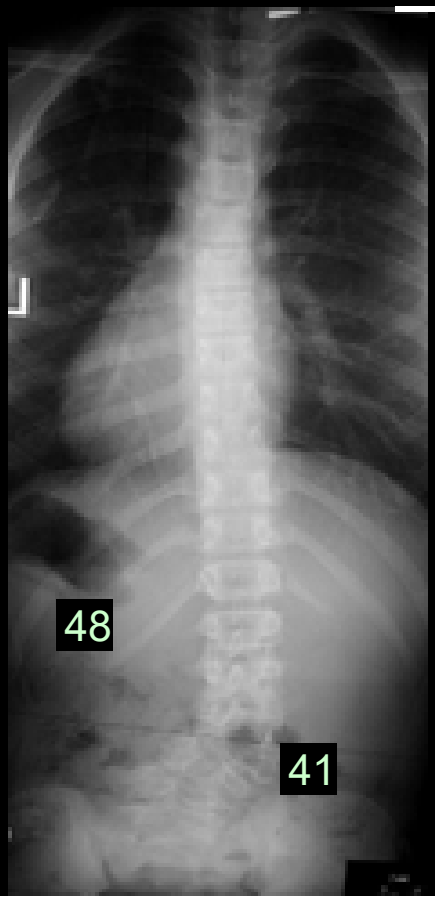


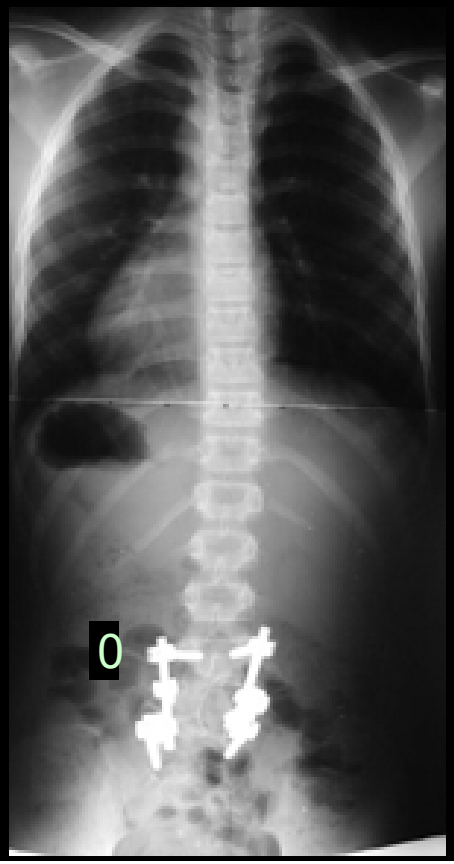



Primary Outcomes

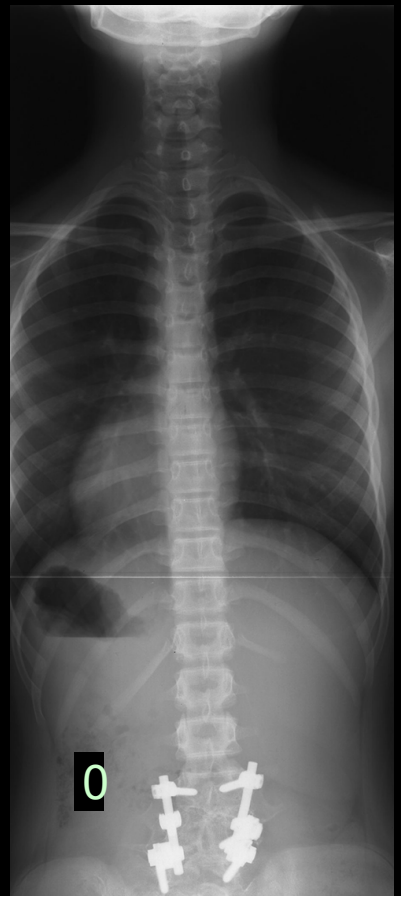
- Changes in Major Curve
  - Immediate correction
  - Correction at postop. 2 years
  - Loss of Correction

Preop. (10+0)





Postop. 2 years.
(12+1)



Complications & Reoperations

- Intraoperative complications
  (Rib fx. Screw pull-out, Dural tear, etc)
- Postop. complications
  - Short-term (≤ 3months)

    (device-related, neurological, pulmonary, skin, infection)

    - Major
    - Minor
  - Long-term (> 3months)

    (PJK, DJK, crankshaft)
- Unplanned Reoperations

Other Variable of Interests

- Sex: Male, Female
- Number of level fused
  - ≤ 3 segments
  - > 3 segments
- Surgeon ‘s experience
  - ≤ 20 cases Inexperienced
  - > 20 cases Experienced

Statistical Analyses

- Changes in Major Curve

  t tests and linear regressions

  Stratum-specific analyses

  Sex

  Level of fusion
- Complications and Reoperations

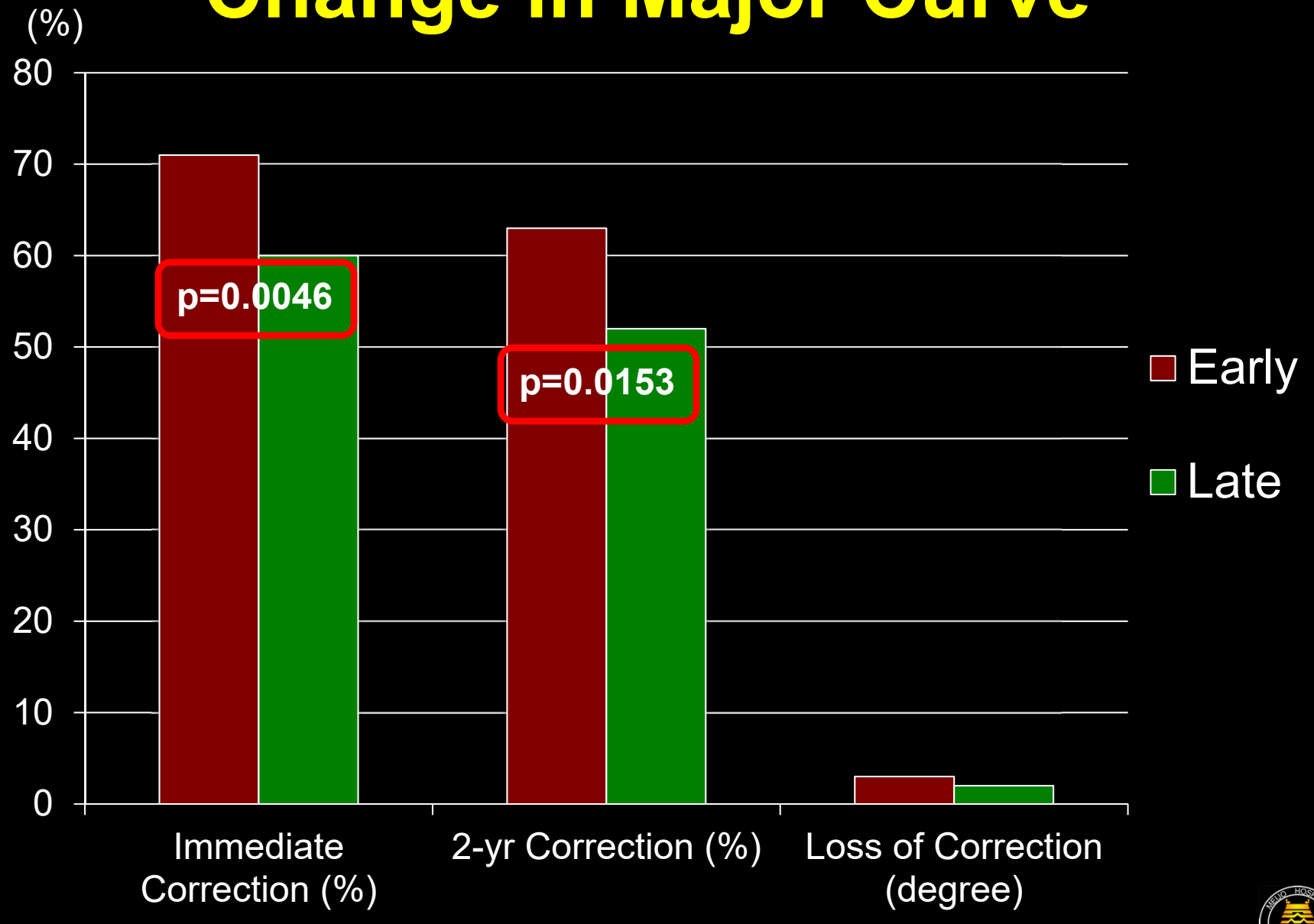
  Descriptive analyses

Results:
Patient and Surgical Characteristics

175 patients with all data and 0% attrition

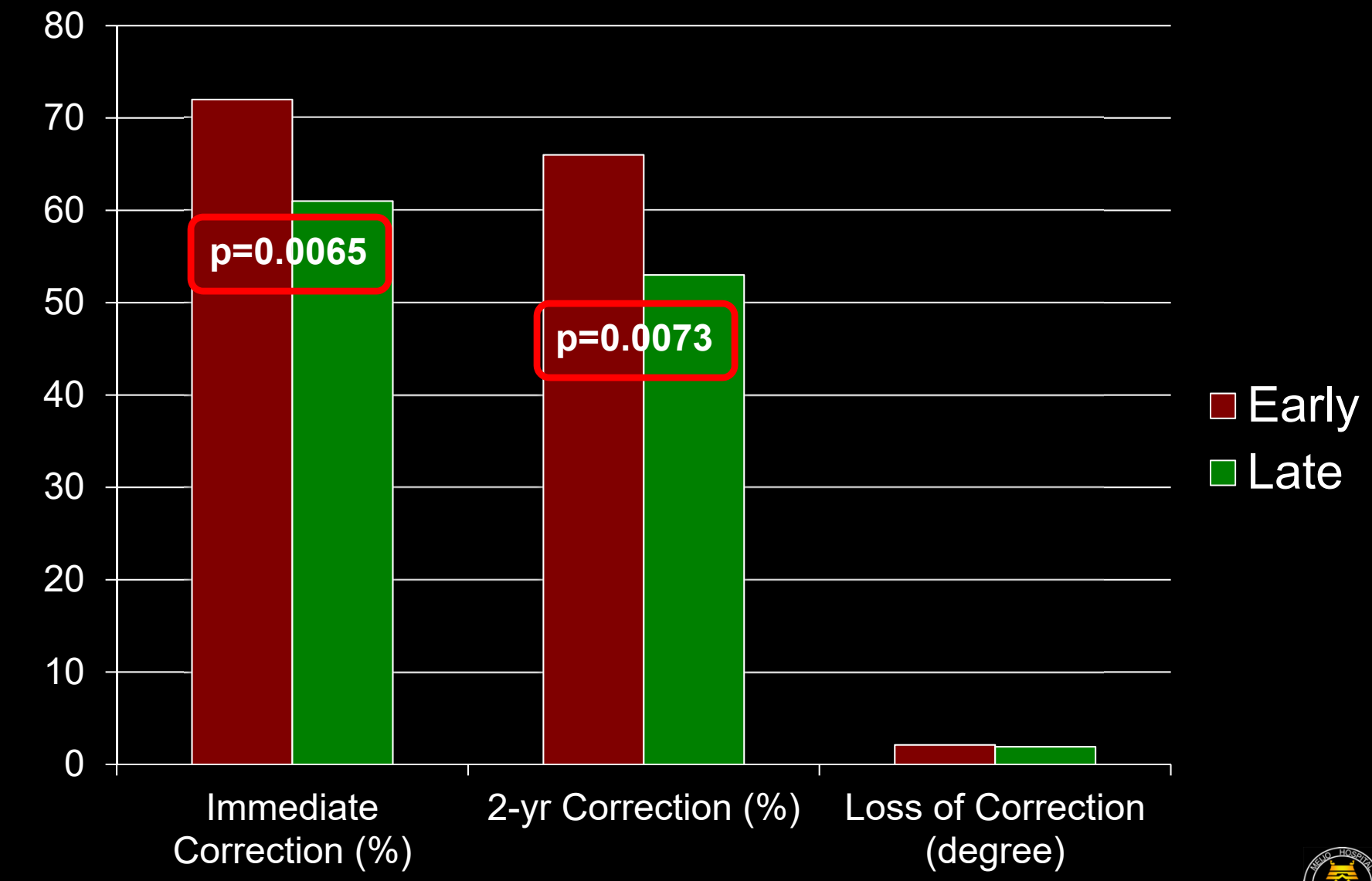
Variable	Timing of Fusion		p-value
	Early Fusion (N=79)	Late Fusion (N=96)	
Sex			
Male	36 (46%)	52 (54%)	0.2577
Female	43 (54%)	44 (46%)	
Number of Fused Segments			
3 segments	45 (57%)	50 (52%)	0.5191
4-6 segments	34 (43%)	46 (48%)	
Surgeon Experience			
Inexperienced	26 (33%)	57 (59%)	0.0005
Experienced	53 (67%)	39 (41%)	

Change in Major Curve



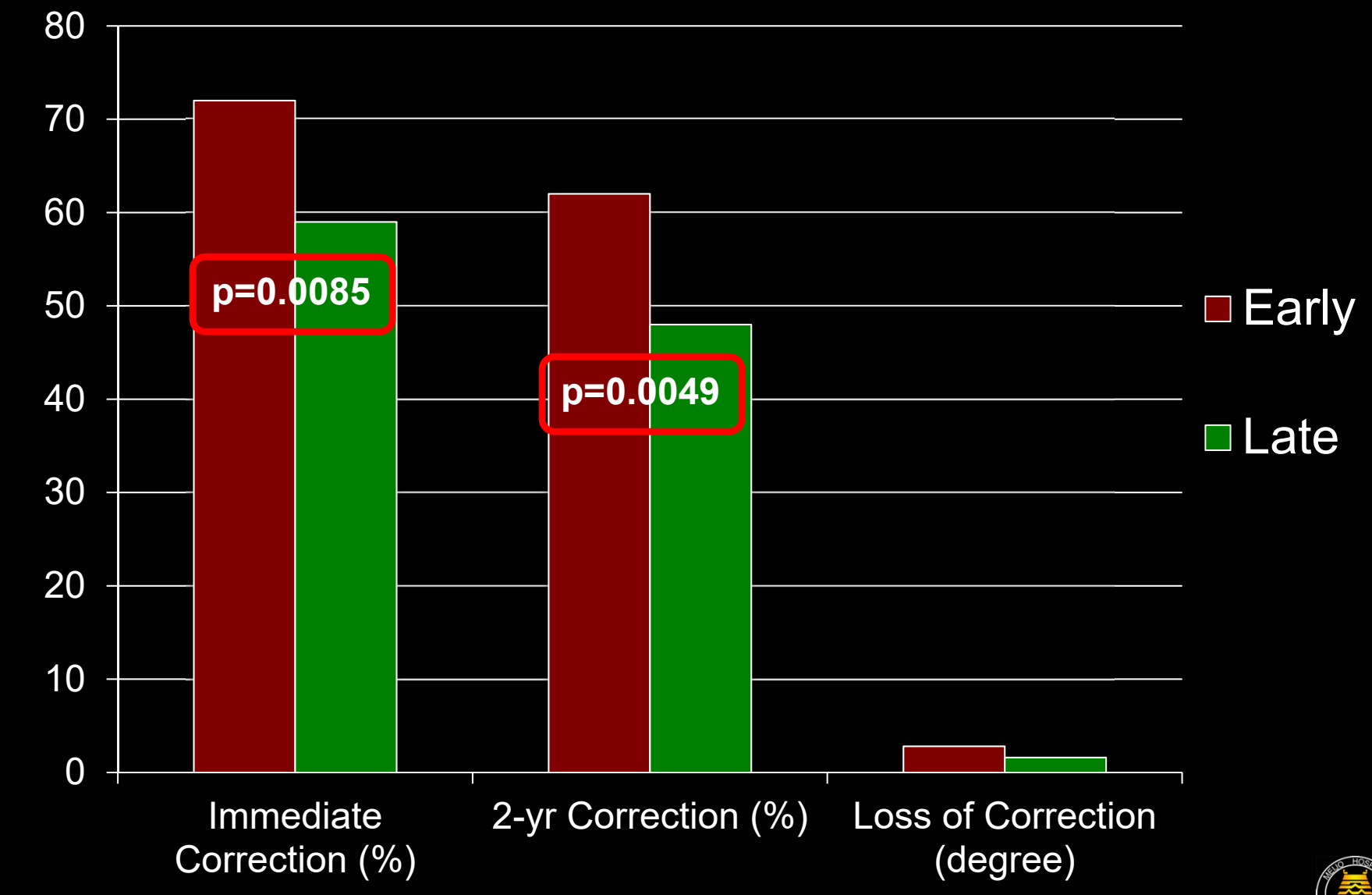
Adjusted for surgeon experience

Change of Main Curve in Male



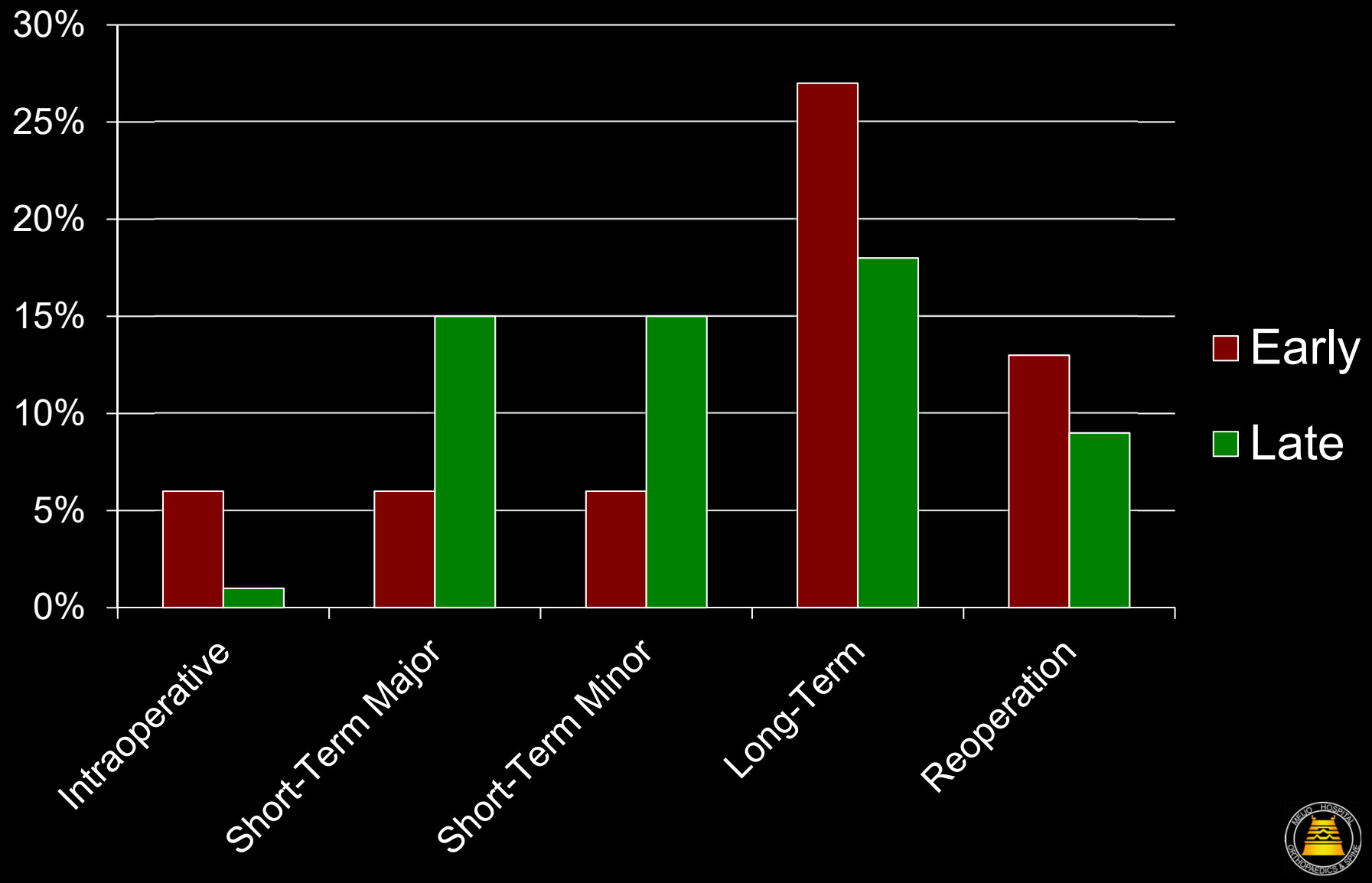
Adjusted for surgeon experience

Number of Level Fused: ≤3



Adjusted for surgeon experience

Complication & Reoperation



Discussion

- Early fusion achieved significantly more major curve correction with shorter fusion compared to late fusion

Late fusion

- More rigid curvature (esp. man)
- Secondary wedging on adj. vertebrae

- Possible increase in risk of complications and reoperation in early fusion.

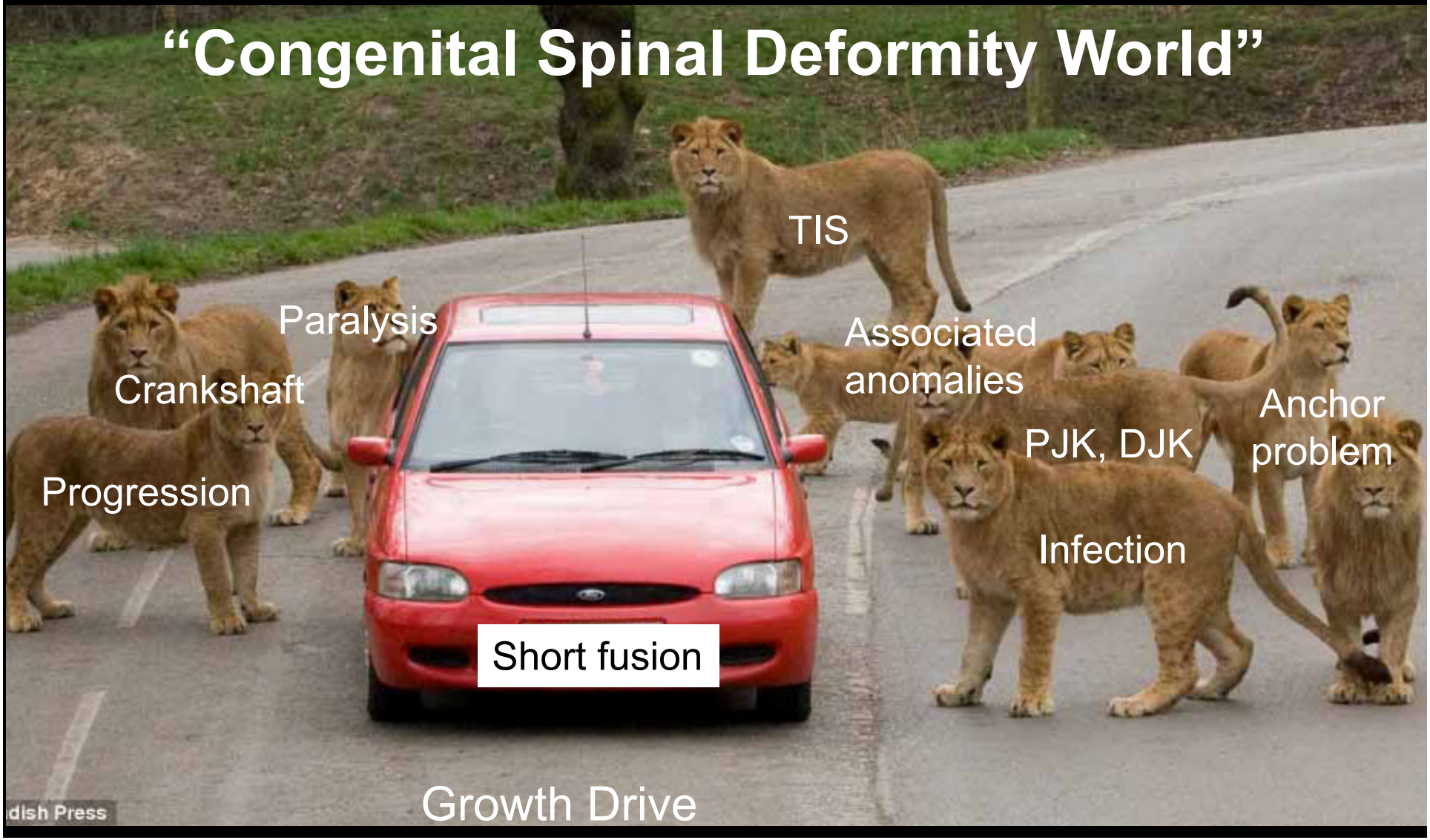
Limitation

- Multicenter study and different surgical strategy
- Inconsistent indication of reoperation
- Ambiguous definition of “experienced surgeon”
- Unmeasured confounders

Conclusion

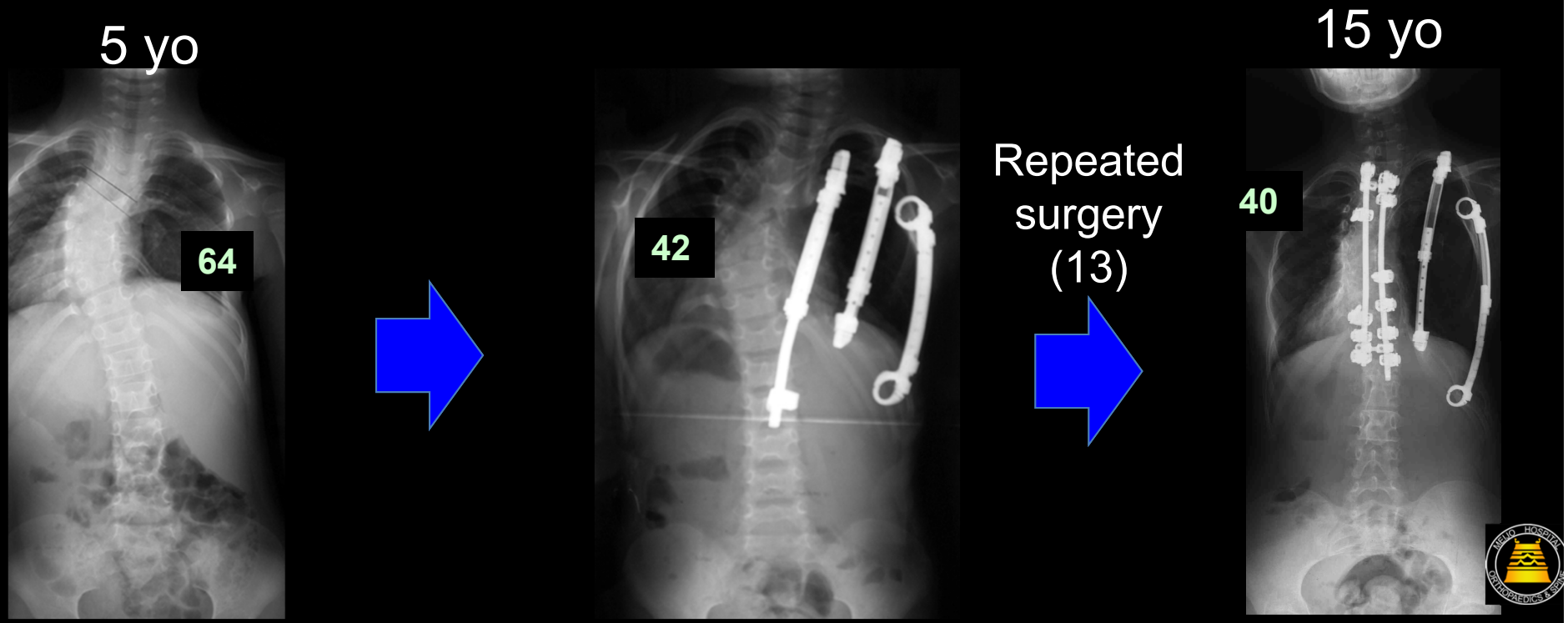
Early fusion for CSD with formation failure is recommended to achieve greater major curve correction with shorter fusion but needs special attention.

Thank you for your attention.



Surgical Treatment of CSD

Growth-Friendly Surgery



- HRQoL deterioration, higher rate of complications due to repetitive surgeries