Spondylolisthesis in adolescents

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Conflict of interest

I have **no** consultancy or commercial relationship to any commercial (implant) company

- in any way related to this lecture,
- nor to any of the implants shown in the slides,
- nor to my visit to Brasil.

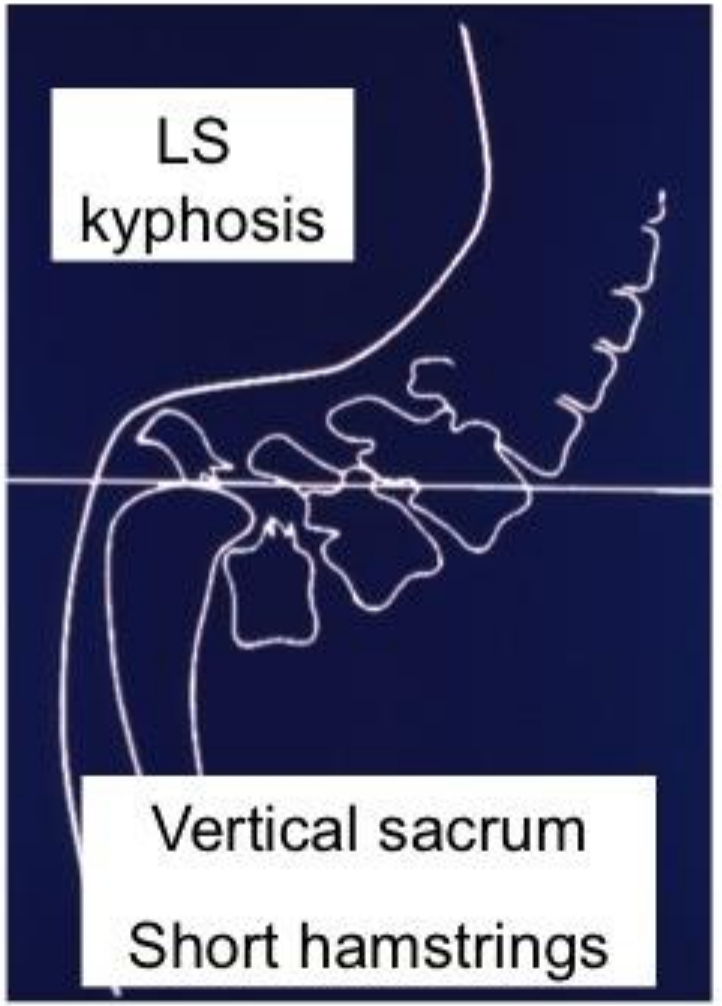
The travelcosts were paid by Congresso de Cirurgia.
I receive no speakers fee.

Presentation outline

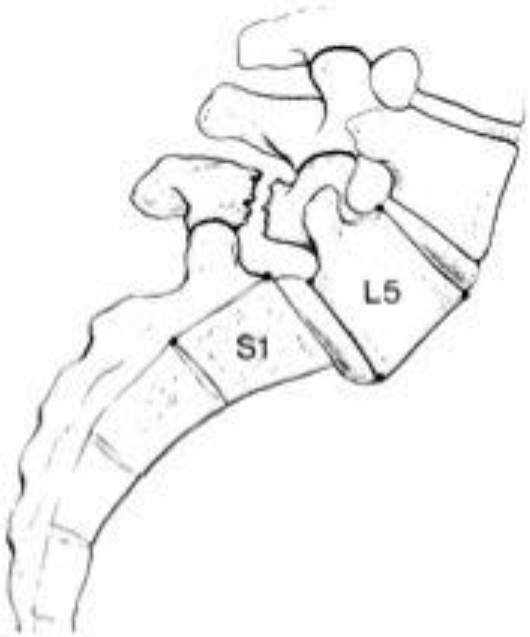
- Low grade slips
  - Direct repair
  - Fusion
  - My preference
- High grade slips
  - Background
  - Fusion techniques
  - My preference
- Conclusions

Low grade slip

High grade slip

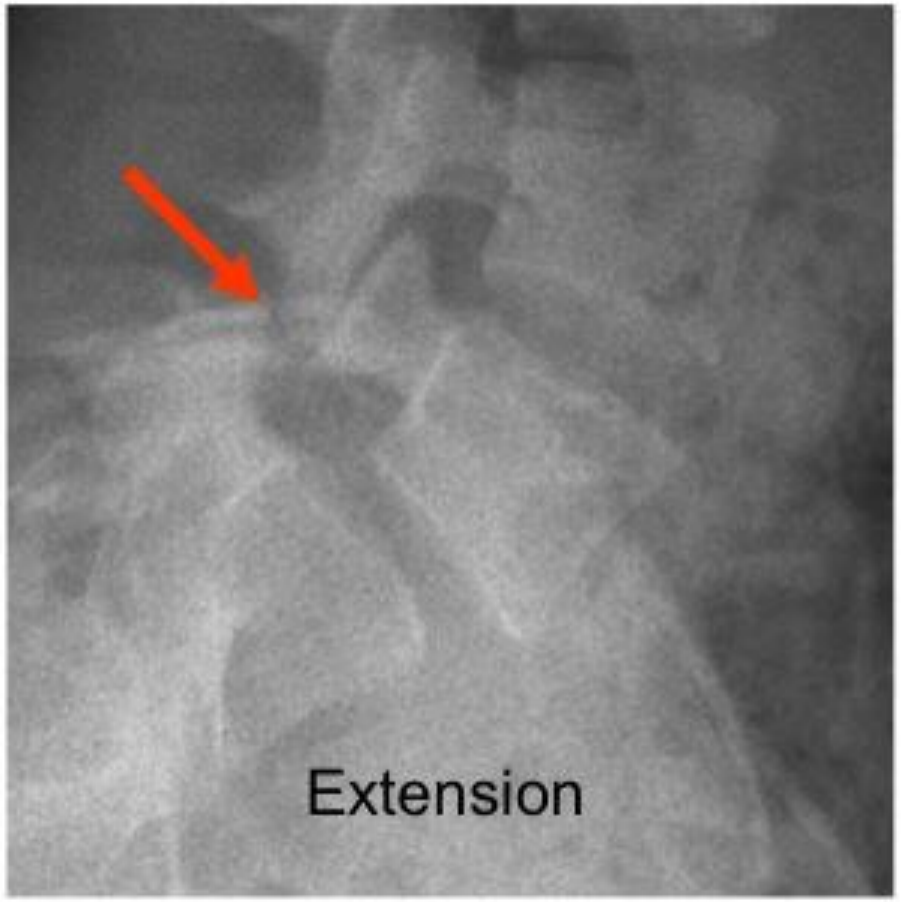


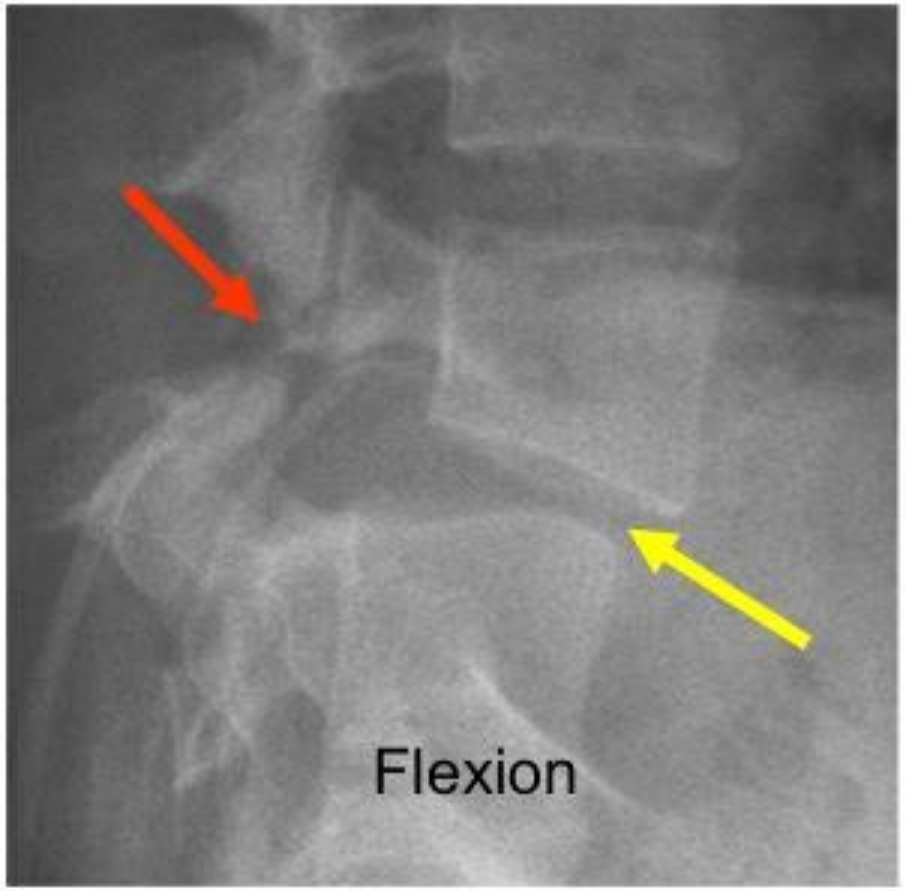
Incidence



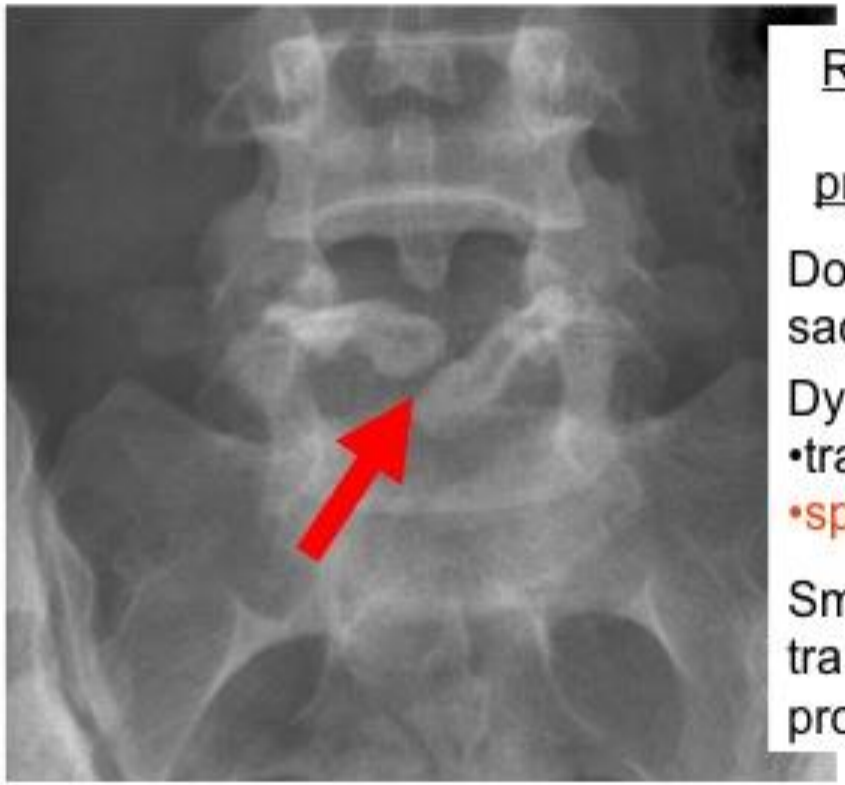
- general population 5 %
- scoliosis pts 5-10%
- high level gymnasts 10-15 %

Spondylisthesis with low grade slip





Progression of slip



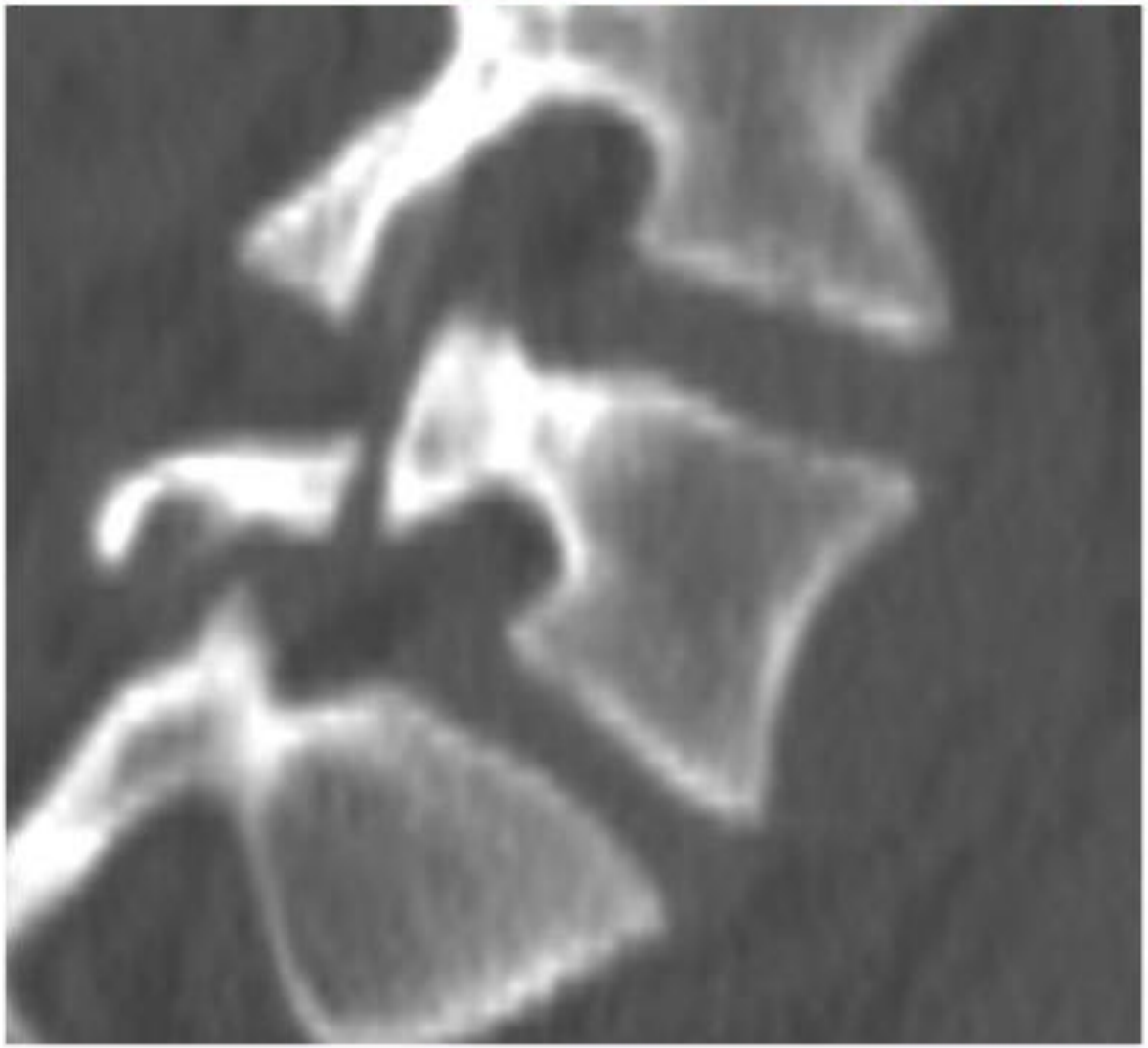
Risk factors for progression:

Dome shape sacrum

Dysplastic L5
•trapezoid L5,
•spina bifida

Small transverse proces

CT > oblique radiograph



Low grade slips:
If surgery in adolescents:

- Repair pars or fuse?
- If fuse:
  - How to reduce
  - How to fuse

Direct pars repair

1. Midline exposure
2. Remove 5 mm of inf. Art. proces L4
3. Excise pseudoarthrosis
4. Iliac crest graft
5. Compression

Benefits of direct repair?

- Restores anatomy
- Maintains mobility, beneficial for L4-L5 disc?
- Adjacent disc not important for decision making

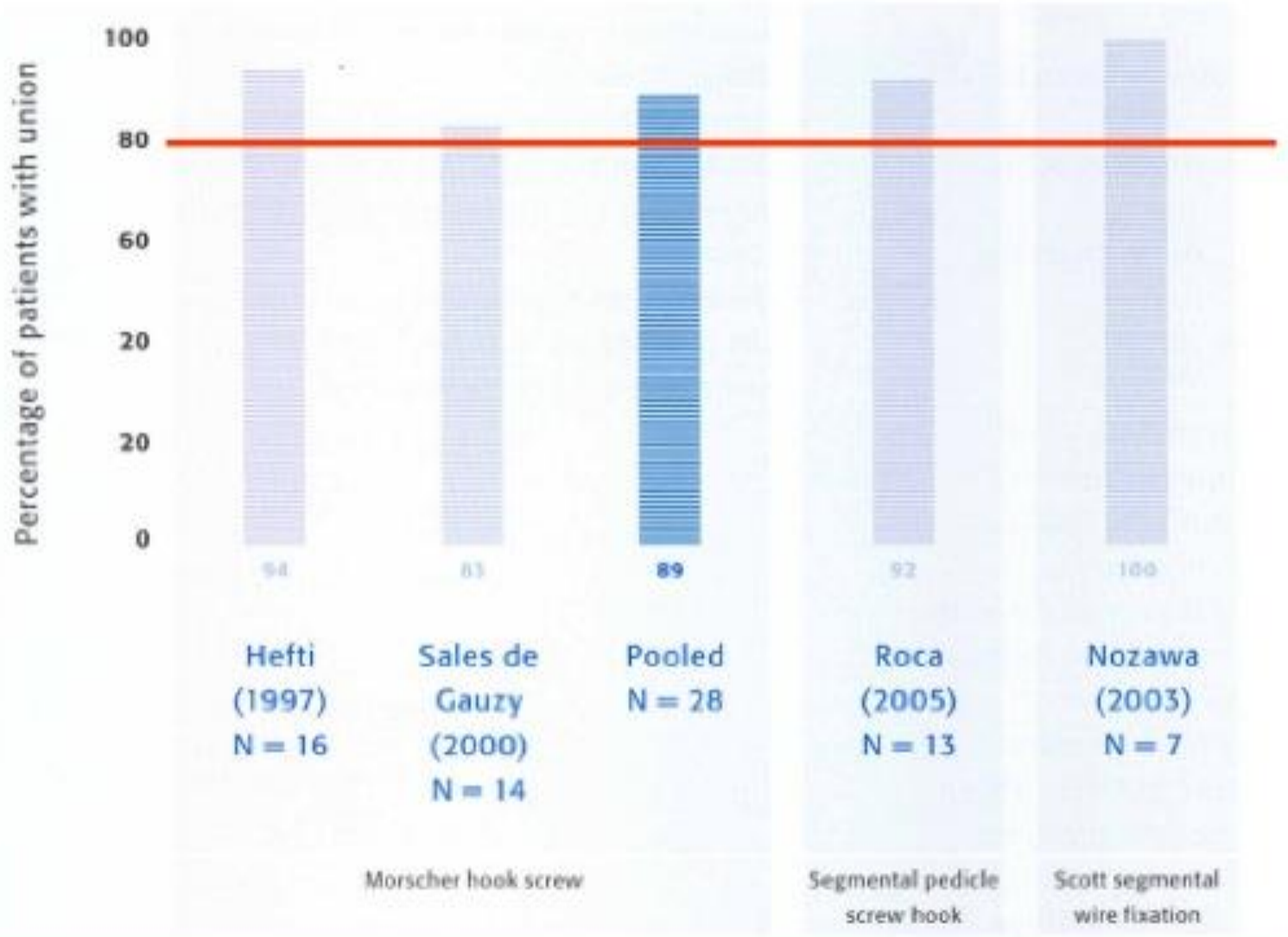
Results:

AOSPINE

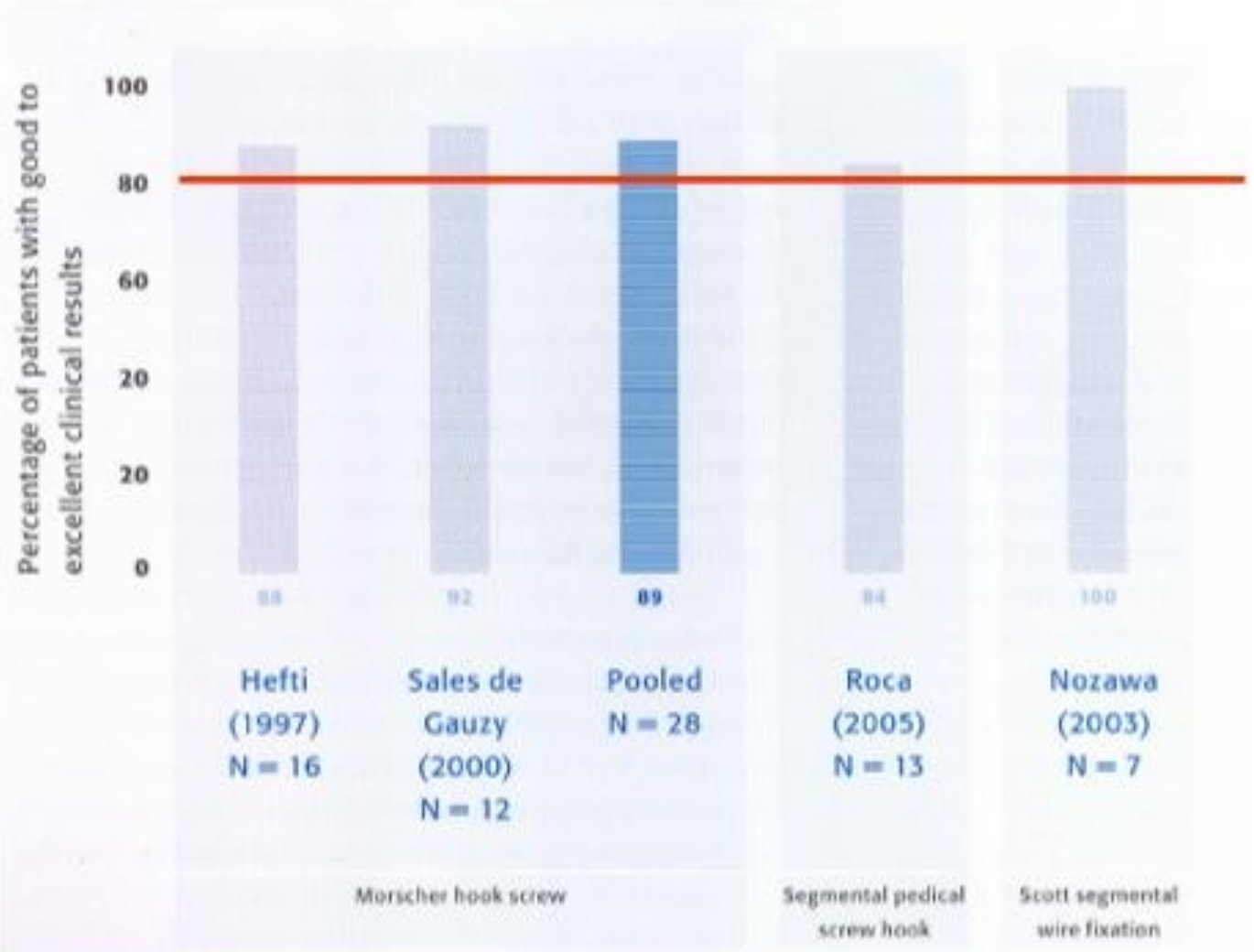
AOSpine assessment of current literature

Evidence-Based Spine Surgery

Rate of union > 80%



Good or excellent outcome >80%



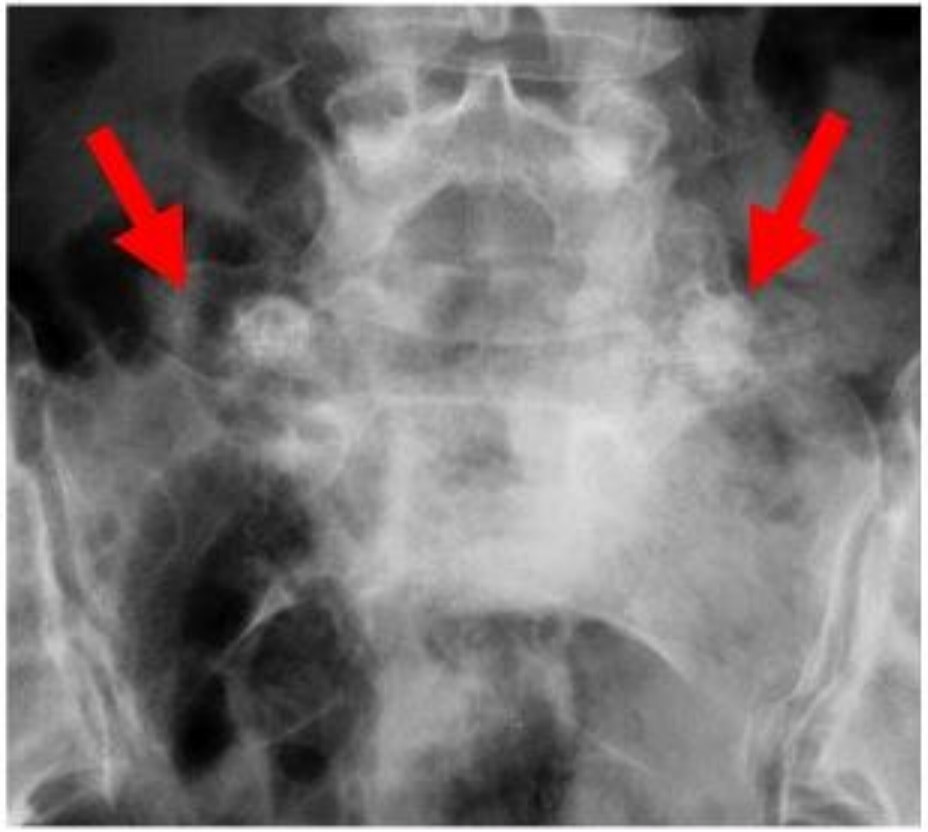
But compared to fusion?

- 15 year follow-up repair vs fusion:
  - Clinical outcome: Fusion better
  - Mobility at adjacent segment: Fusion better
  - MRI adjacent disc: Fusion = repair

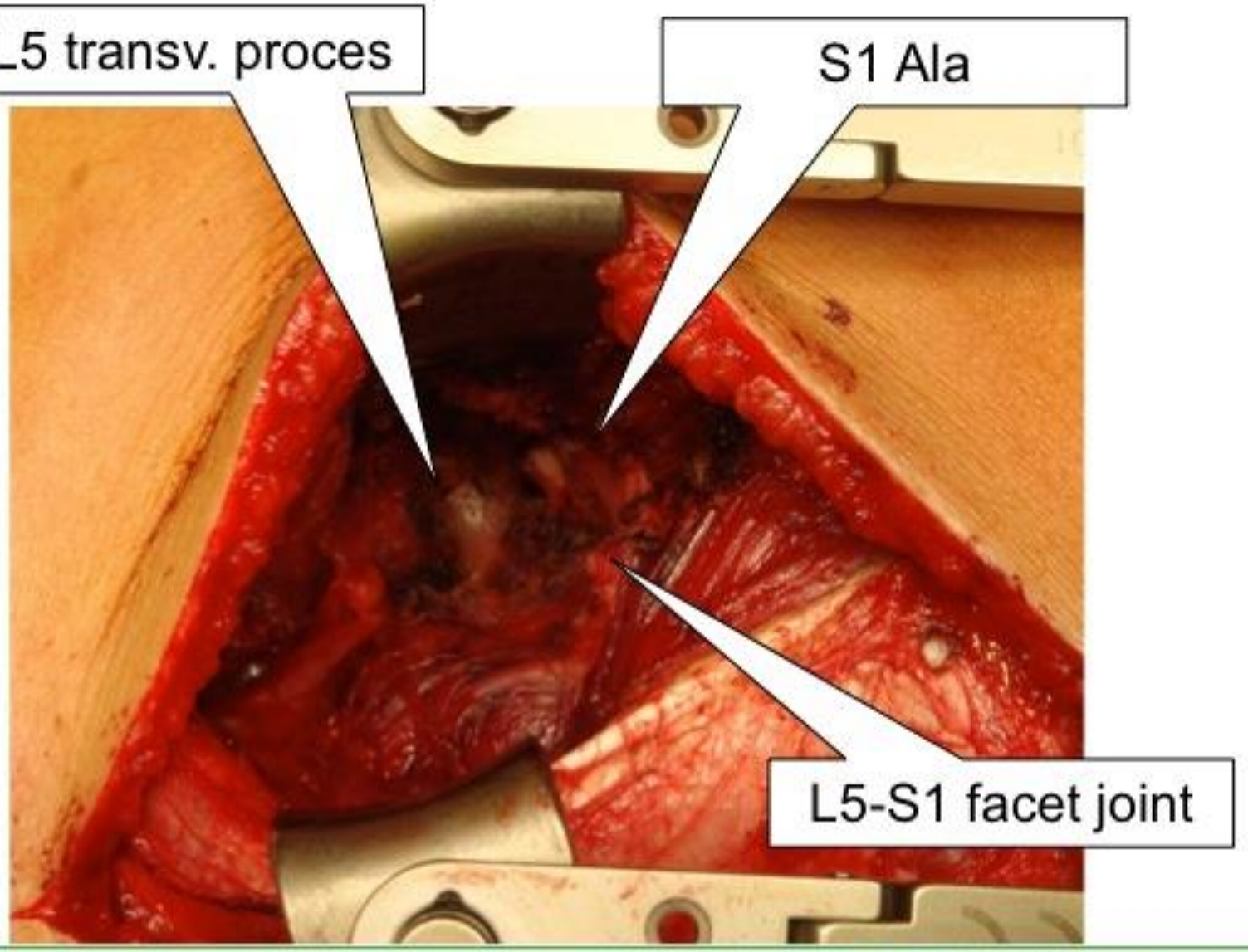
Schlenzka et al. ESJ 2006
Symptomatic lysis and low grade slips
14,8 year follow-up

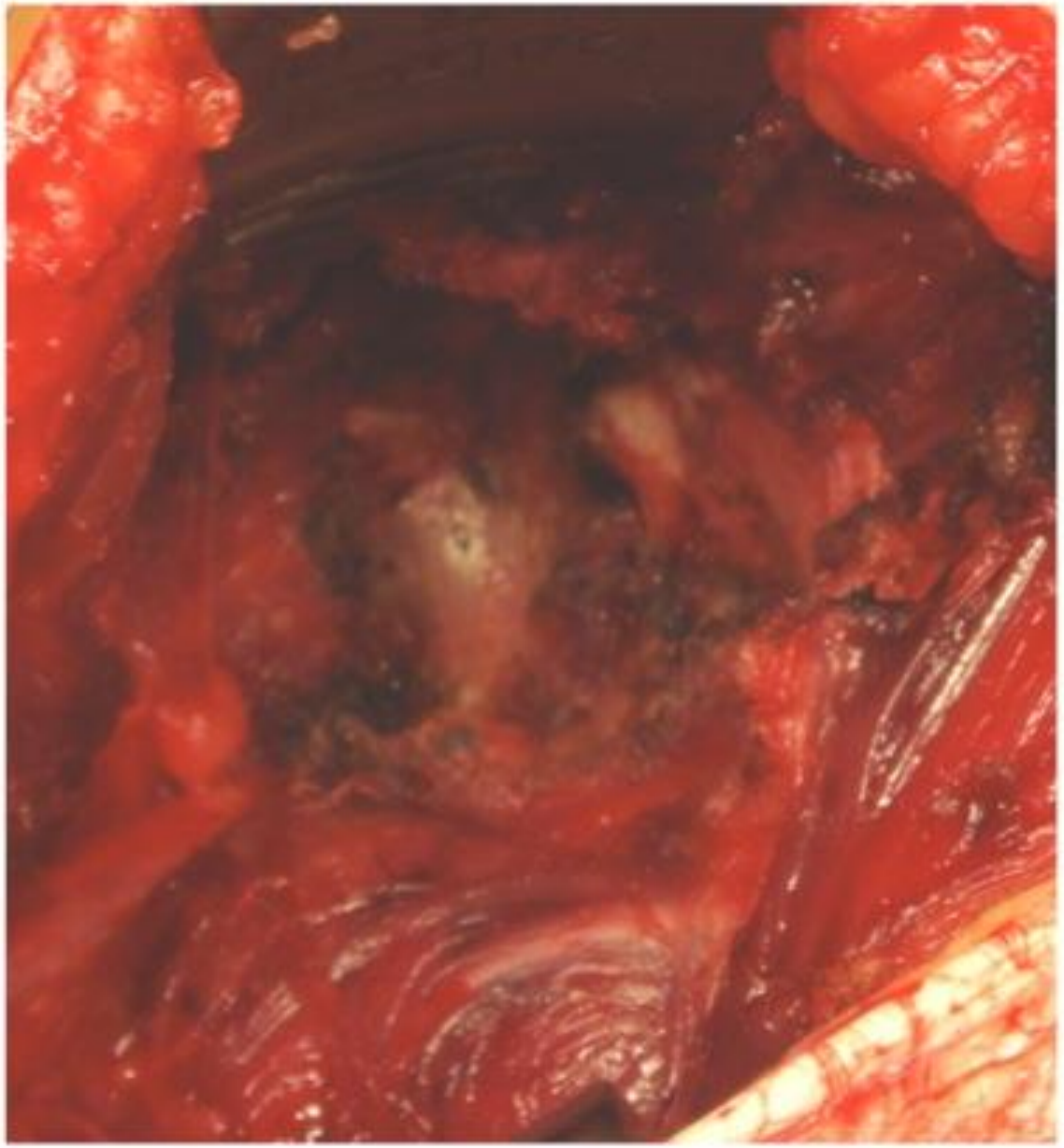
If fusion: +/- instrumention?

Uninstrumented posterolateral fusion



Wiltze,uninstrumented L5-S1





My preference

Symptomatic spondylolysis
- No slip
- < 20 yrs old

→ Direct pars repair
- Iliac crest bone
- Buck screws

Spondylolysis
- low grade slip
- < 16 yrs old

→ In situ fusion
- Iliac crest bone
- un-instrumented

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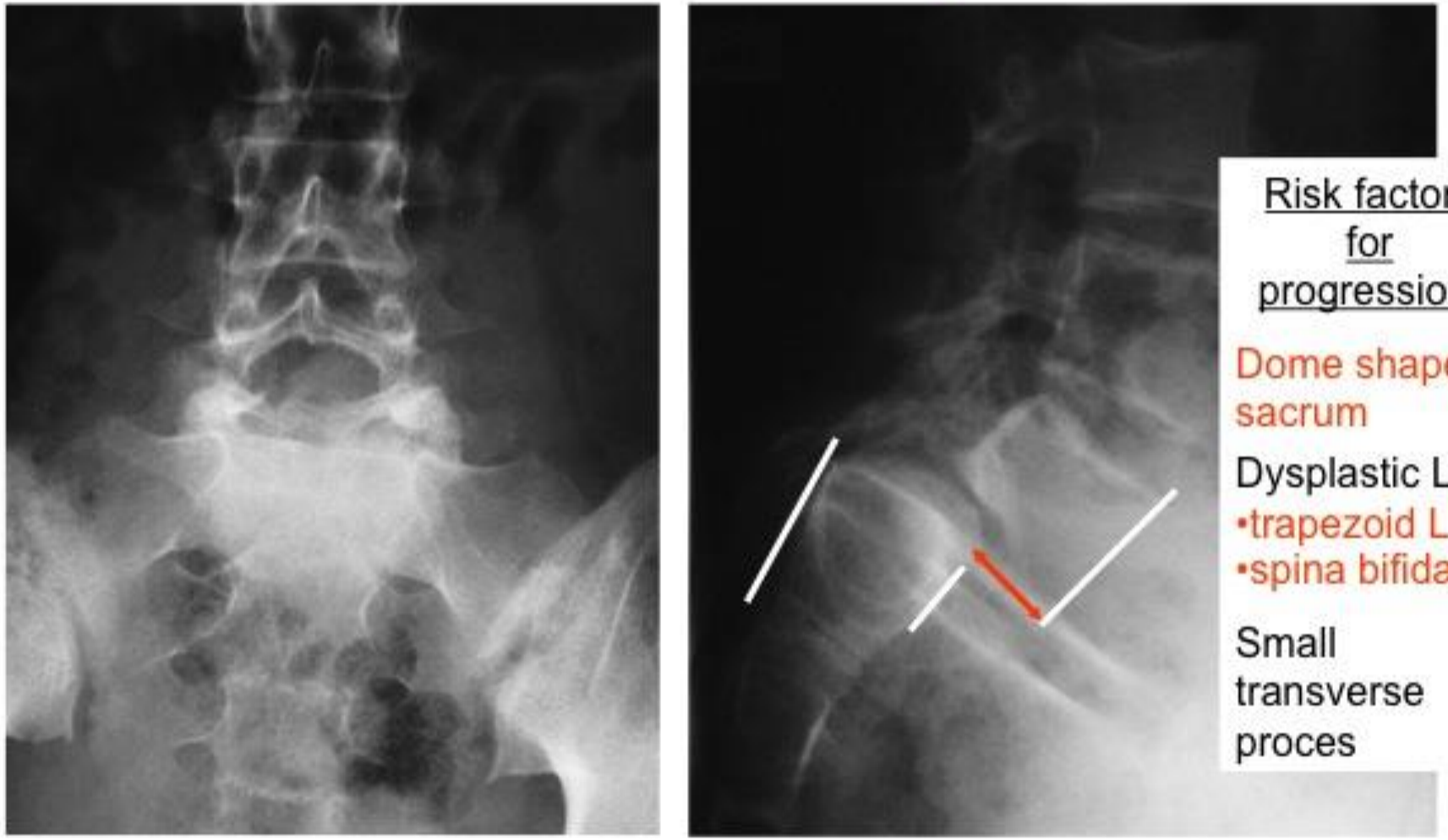
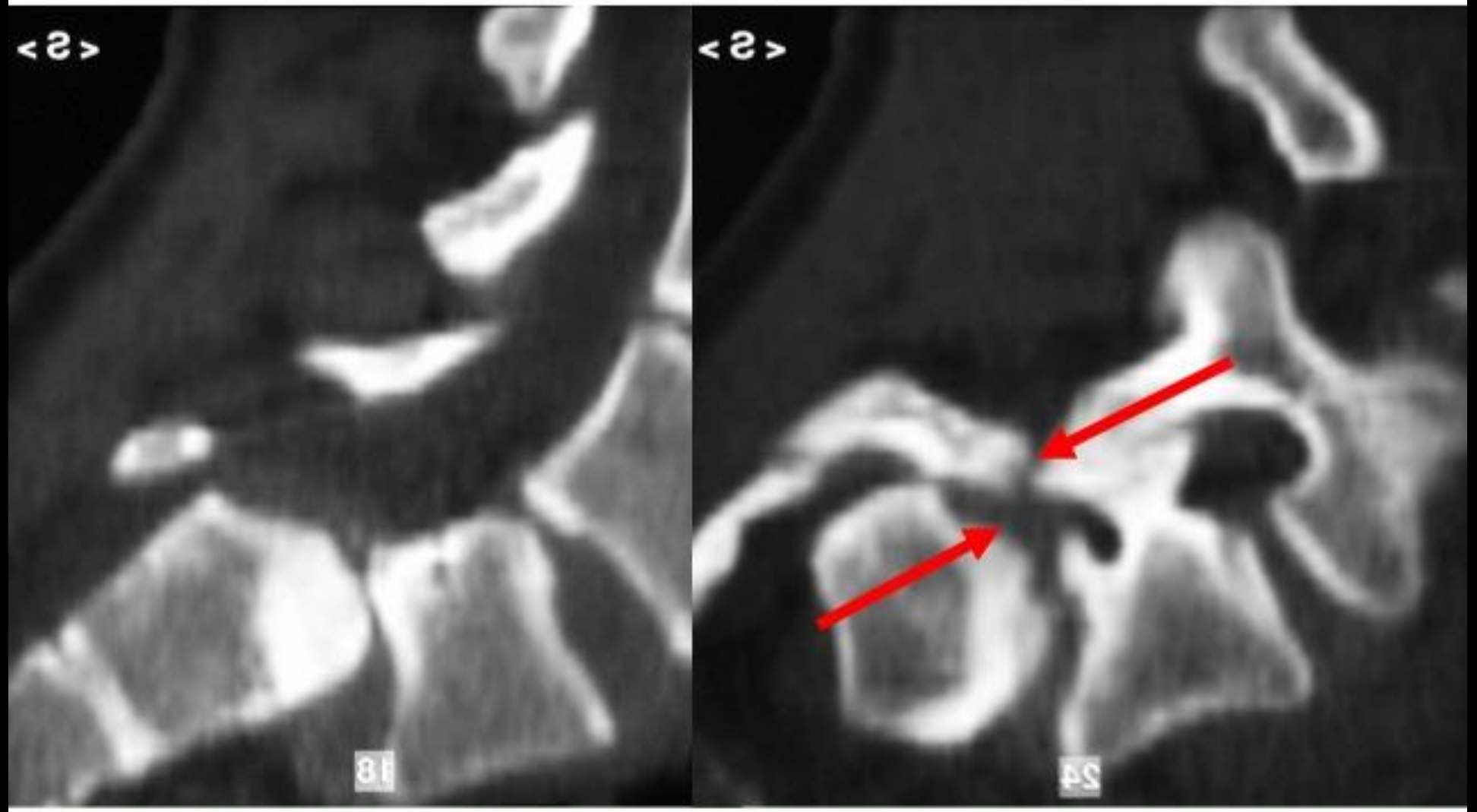
Grade 3 slip



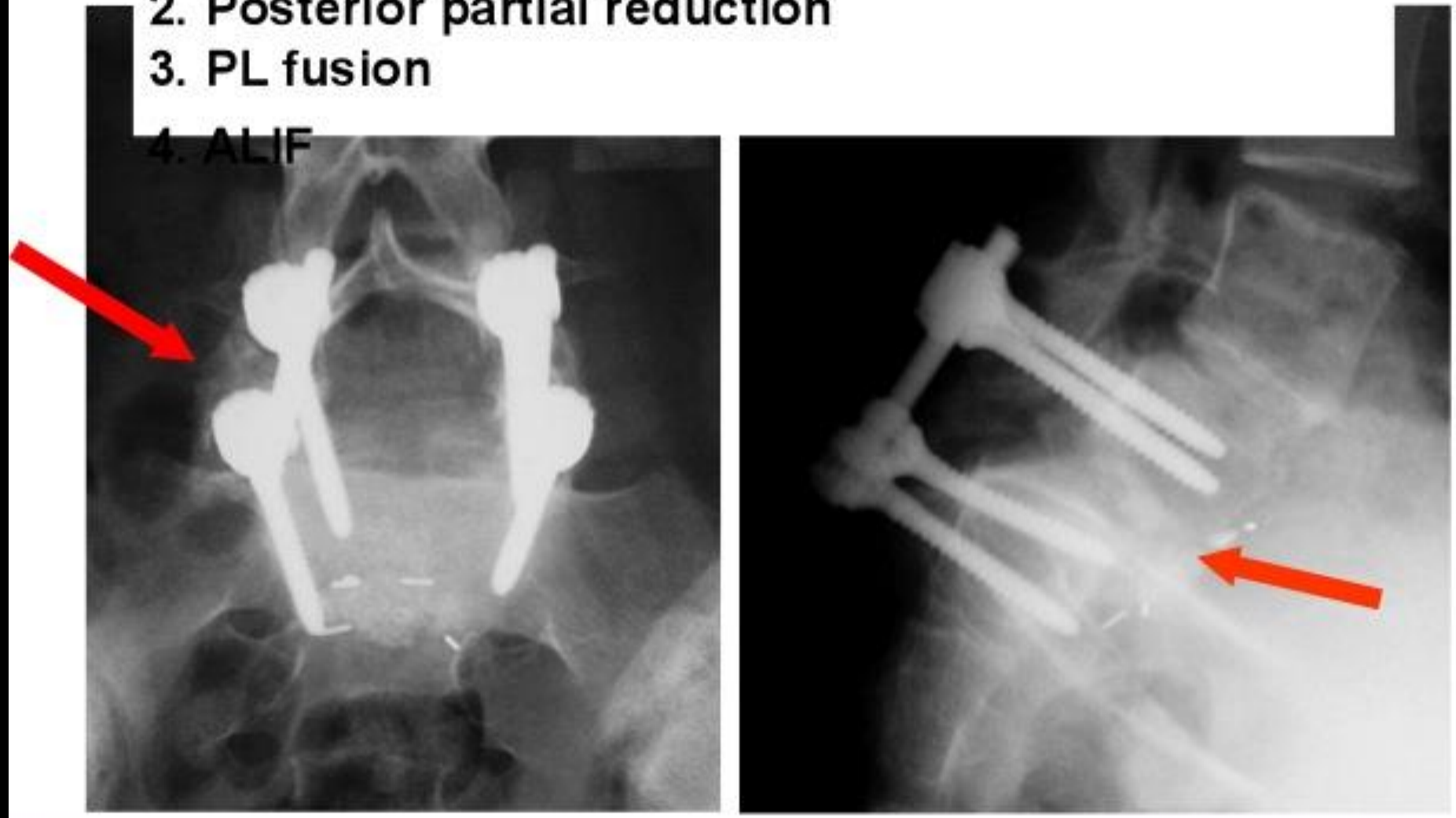
15YO girl, LBP and legpain

CT scan

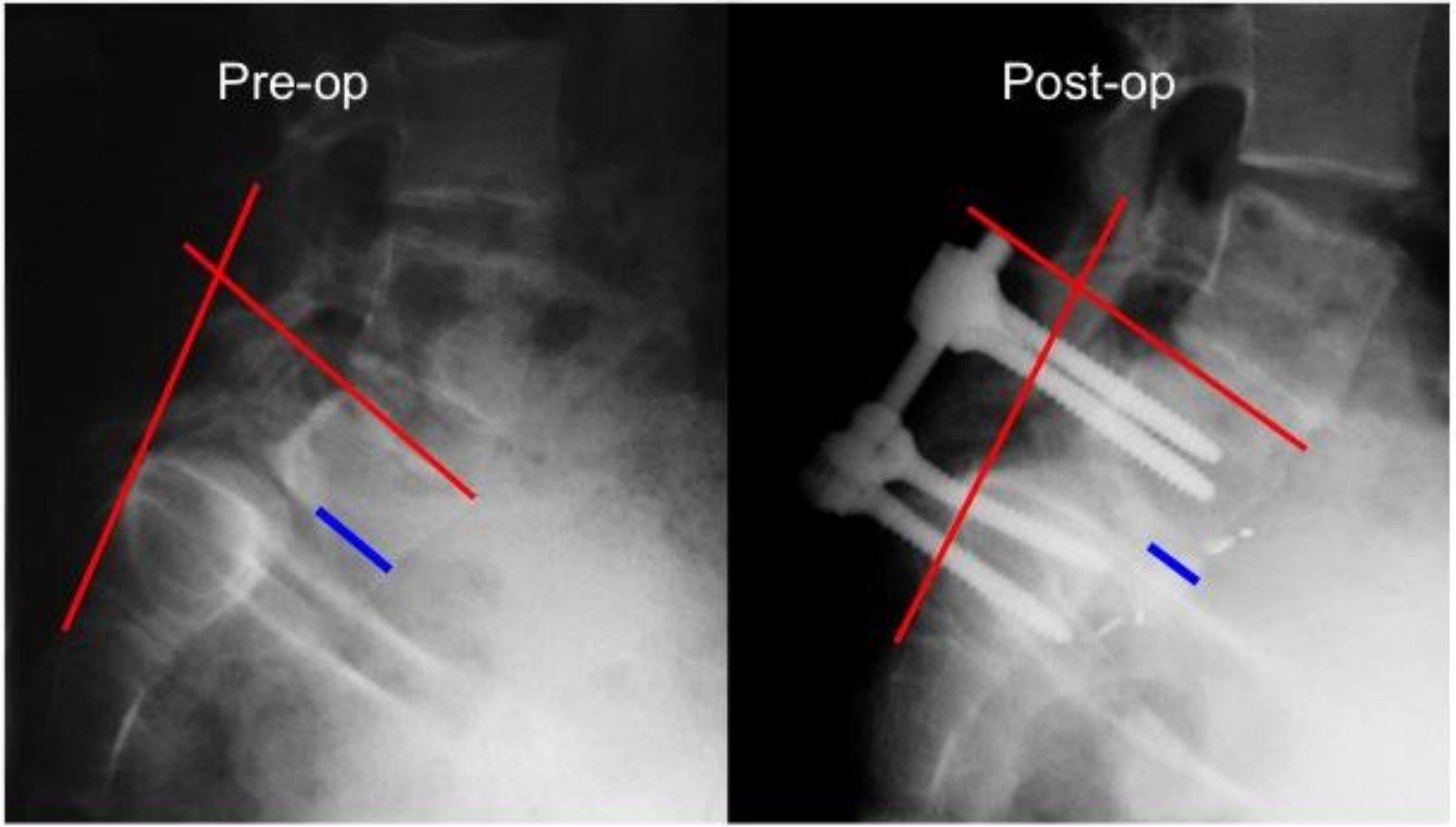


1 yr post-op:

1. Decompression, Gill procedure, resection pars
2. Posterior partial reduction
3. PL fusion
4. ALIF

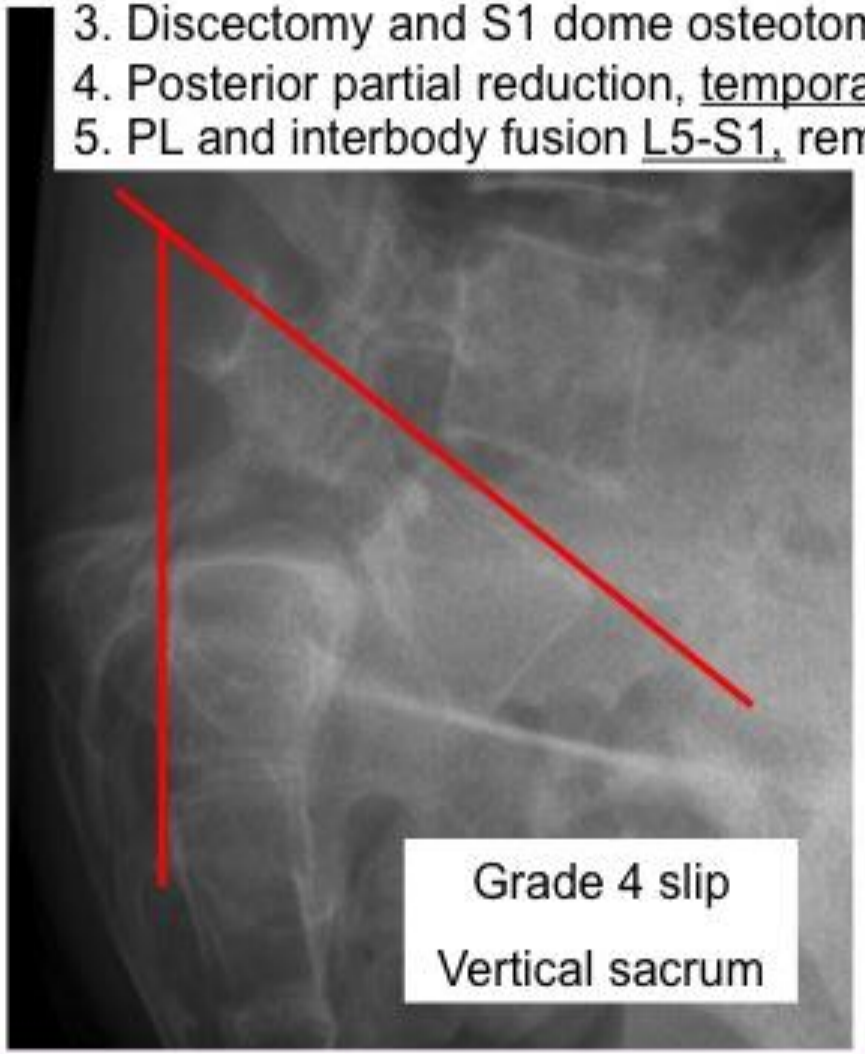


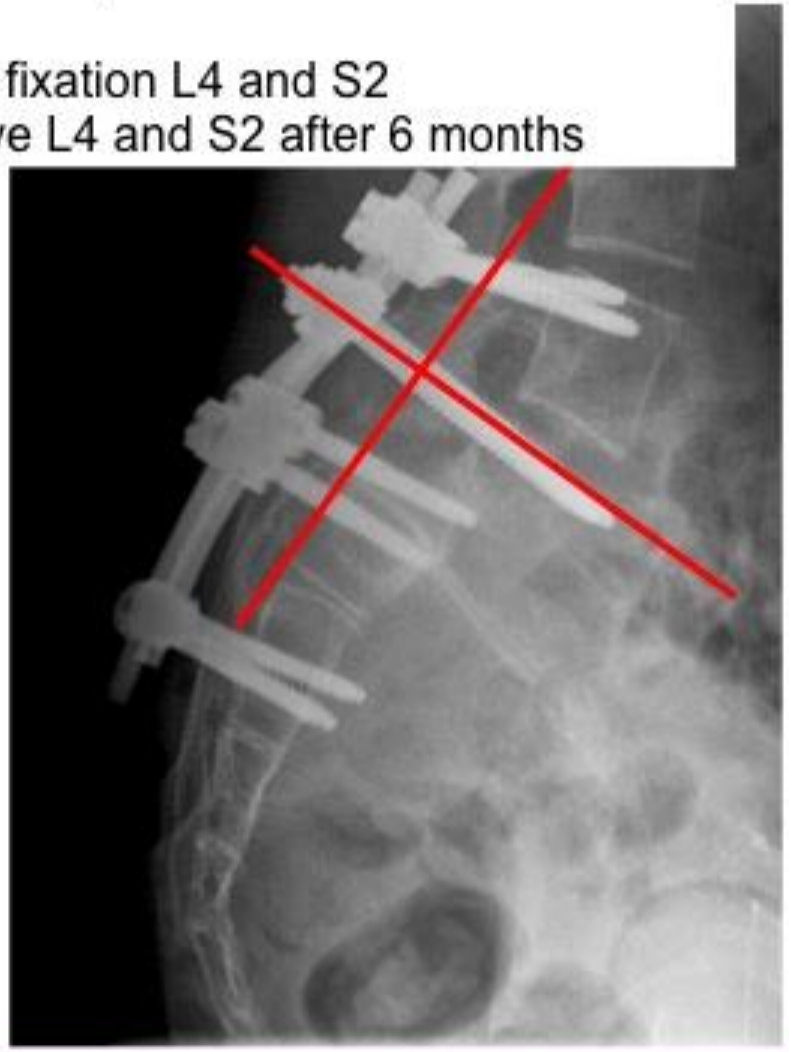
Change in slip and slip angle



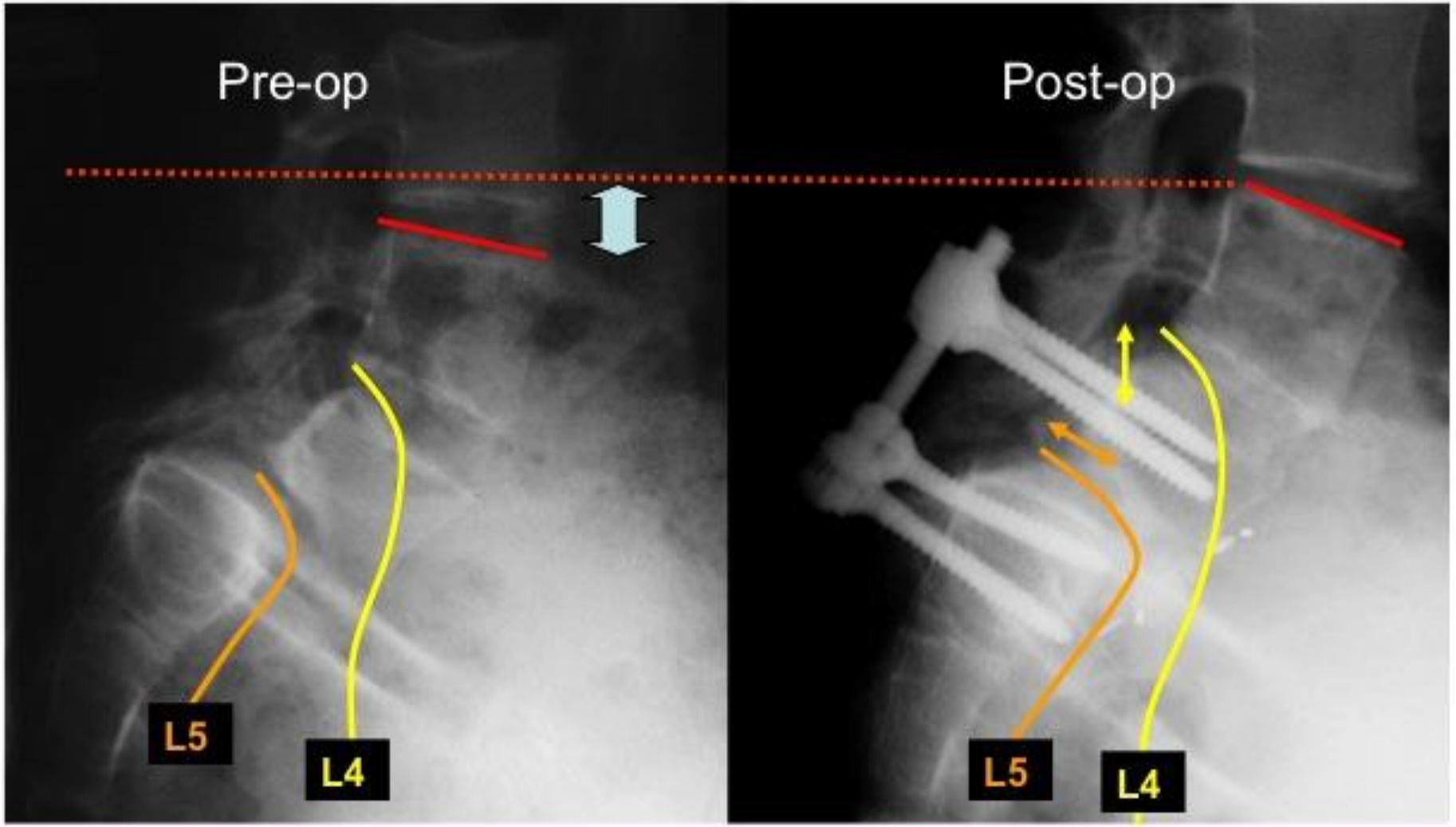
Grade 4 slips

1. Spinal cord monitoring
2. Decompression, Gill procedure, resection pars
3. Discectomy and S1 dome osteotomy
4. Posterior partial reduction, temporary fixation L4 and S2
5. PL and interbody fusion L5-S1, remove L4 and S2 after 6 months





L4 and L5 roots



Literature: in situ best

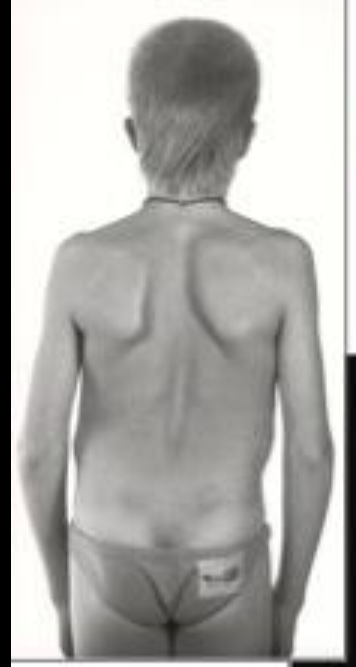
SPINE Volume 31, Number 5, pp 583–590

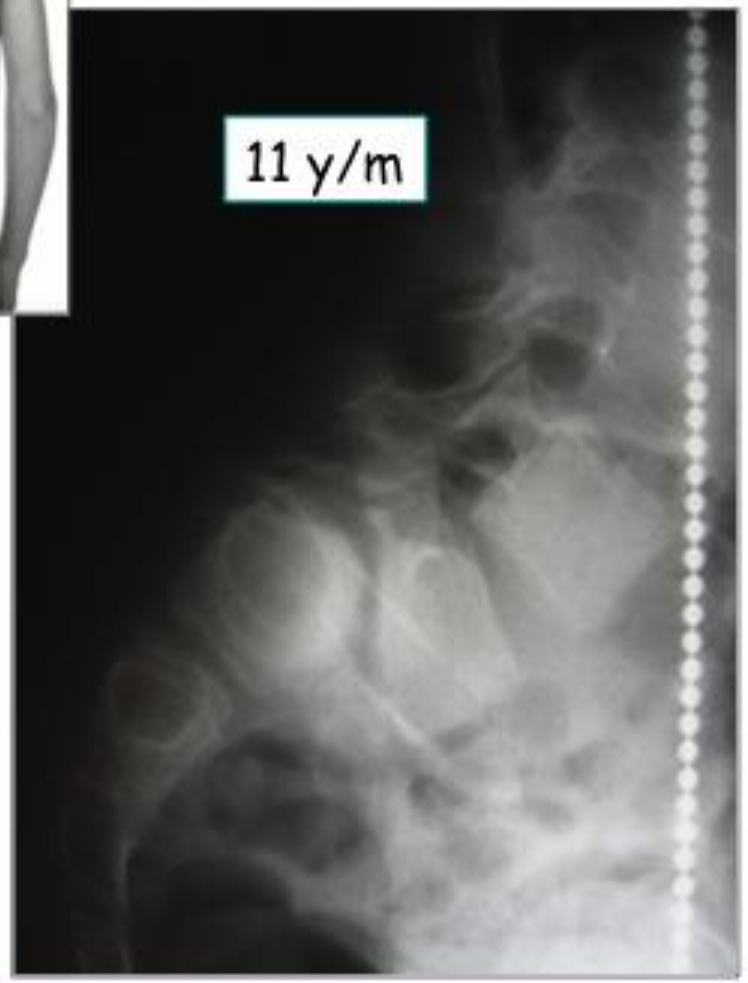
Treatment of Severe Spondylolisthesis in Adolescence With Reduction or Fusion *In Situ*: Long-term Clinical, Radiologic, and Functional Outcome

Mikko Poussa, MD, PhD,* Ville Remes, MD, PhD,*† Tommi Lamberg, MD, PhD,* Pekka Tervahartiala, MD, PhD,‡ Dietrich Schlenzka, MD, PhD,* Timo Yrjönen, MD, PhD,* Kalevi Österman, MD, PhD,* Seppo Seitsalo, MD, PhD,* and Ilkka Helenius, MD, PhD*§

"The fusion in situ group seems to perform better in almost all clinical parameters measured!"

In situ circumferential fusion





But fusion must be circumferential!

SPINE Volume 31, Number 2, pp 190–196

Posterolateral, Anterior, or Circumferential Fusion *In Situ* for High-Grade Spondylolisthesis in Young Patients: A Long-Term Evaluation Using The Scoliosis Research Society Questionnaire

Ilkka Helenius, MD, PhD,*† Tommi Lamberg, MD, PhD,* Kalevi Österman, MD, PhD,* Dietrich Schlenzka, MD, PhD,* Timo Yrjönen, MD, PhD,* Pekka Tervahartiala, MD, PhD,‡ Seppo Seitsalo, MD, PhD,* Mikko Poussa, MD, PhD,* and Ville Remes, MD, PhD*§

"Circumferential fusion (without reduction) provided significantly better long term outcome"

My preference

Grade 3 →

1. Anterior discectomy, remove inferior part L5
2. Posterior decompression
   - Partial reduction
   - Instrumentation L5-S1
   - PL fusion

Grade 4 →

- Spinal cord monitoring
- Decompression
- Posterior S1 dome osteotomy (= anterior fusion)
- Instrumentation L4-S2
- Partial reduction
- PL fusion L5-S1

Conclusion 1

- Adolescent low grade slip:
  - Natural history benign
  - Mostly isthmic/lytic slip
  - No slip: consider direct repair
  - Gr 1-2 slip: in situ uninstrumented fusion
- Different behaviour to adults
  - Degenerative problem with foramenstenosis

Conclusion 2:

- Adolescent high grade slip
  - Mostly combined isthmic and dysplastic
  - Poor natural history
  - Instrumented fusion (Gr 4: consider L4-S2)
  - Partial reduction
  - Circumferential fusion
  - Consider spinal cord monitoring (esp Gr 4)