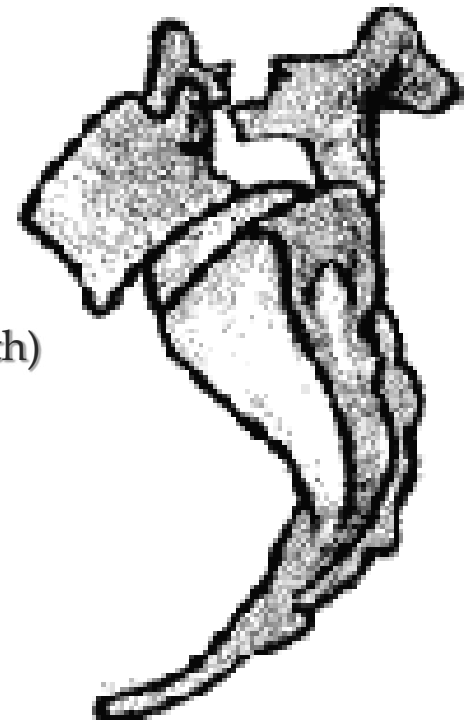


Gr III 'Lytic Spondylolisthesis: In situ fusion

Jwalant S. Mehta

MS (Orth); D (Orth); FRCS (Eng); MCh (Orth); FRCS (Tr & Orth)



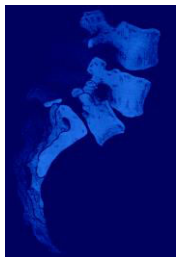
Low grade

2x in M



High grade

4x in F



Pathoanatomy of high grade slips

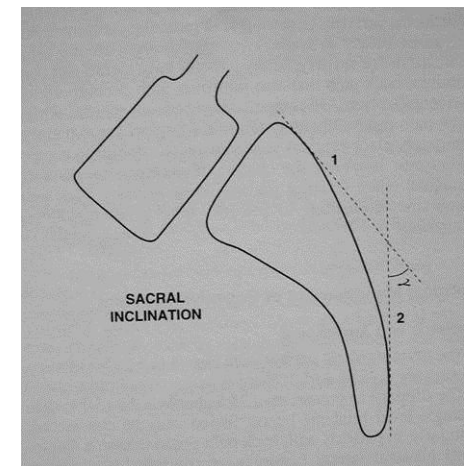
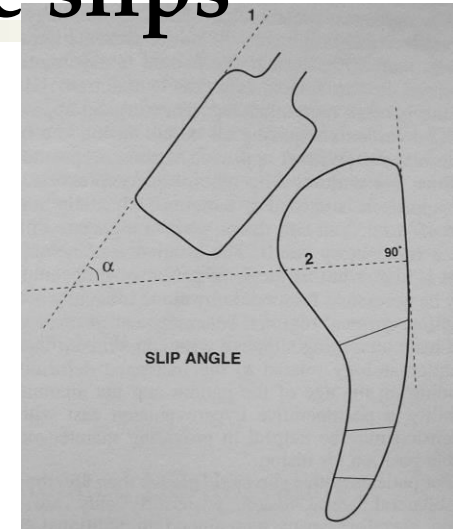
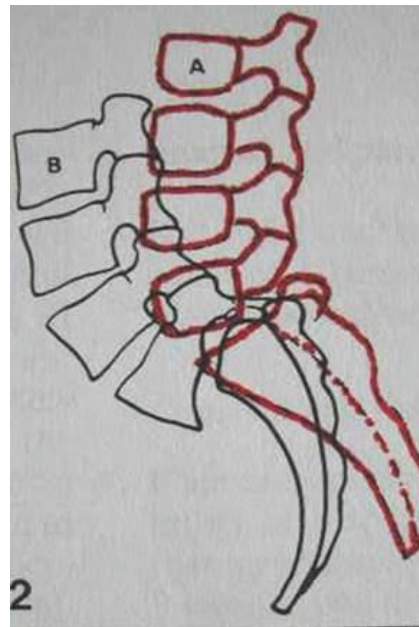
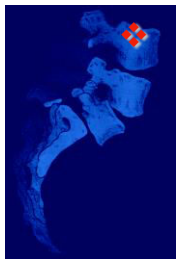
✦ > 50 % translation; rolls into kyphosis

✦ Alters biomechanics:

- ❖ Hyper-lordosis above
- ❖ Balance of trunk
- ❖ Vertical sacrum

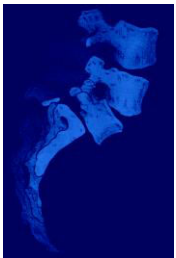
✦ Cosmetic effects:

- ❖ Flat buttock
- ❖ Transverse crease



Indications for surgery

- ✦ Persistent severe back \pm leg pain
- ✦ Failed non operative programme
- ✦ Deficits:
 - ❖ L5 root
 - ❖ Cauda equina syndrome
- ✦ Level:
 - ❖ L1 – L4
 - ❖ Rapid progression



Indications for surgery

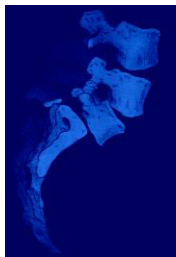
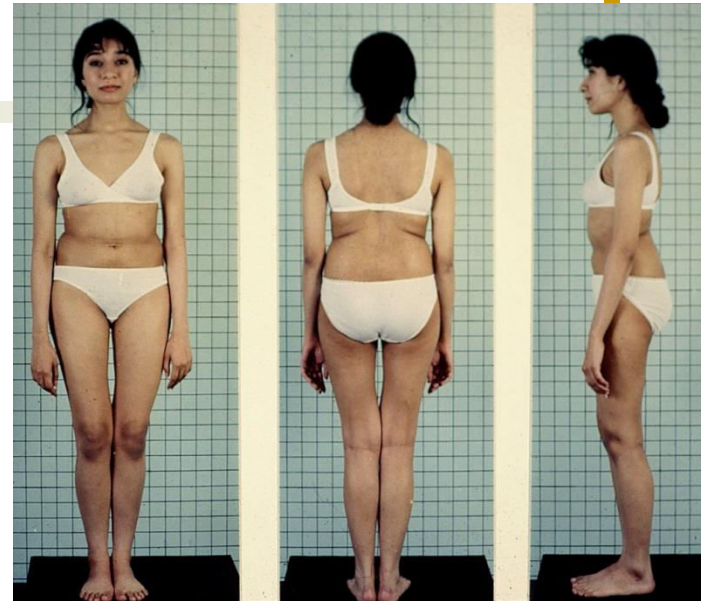
✦ Progression:

- ❖ Children / Adolescent over 50 %
- ❖ Documented progression 25 to 50 %

✦ Cosmesis:

- ❖ Sagittal imbalance
- ❖ Standing, walking difficulties

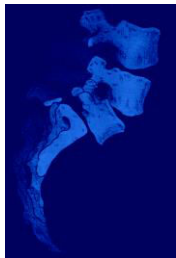
Dick Orthopade 1997



Goal of surgery

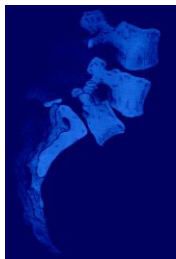
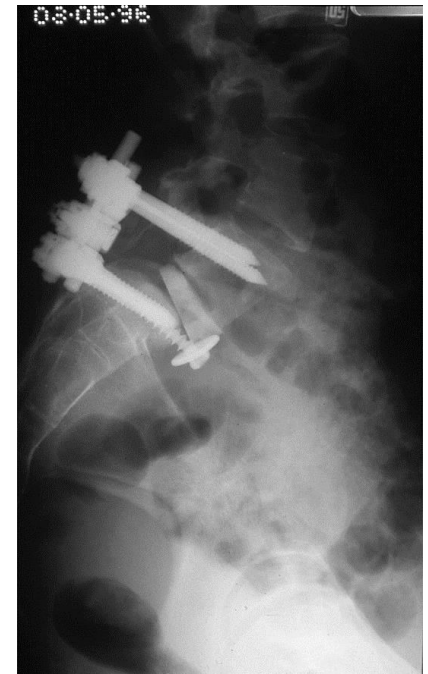
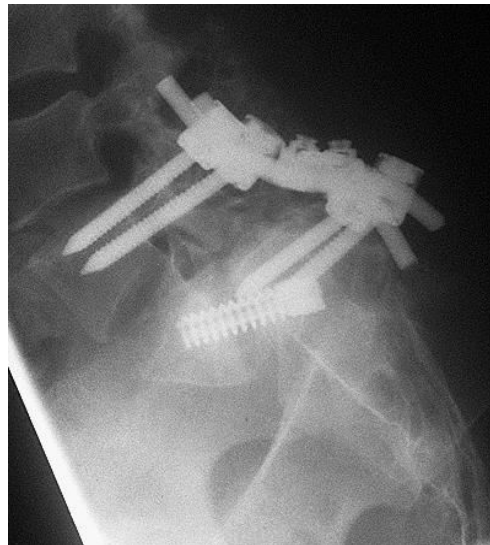
Decrease the kyphosis rather than correct the translation

**In-situ fusion
(partial reduction)**



In-situ fusion

- ⊕ Postero-lateral
- ⊕ 360°:
 - ❖ Posterior + Anterior
 - ❖ Posterior



Posterior: postero-lateral fusion

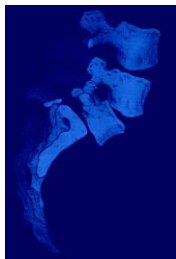
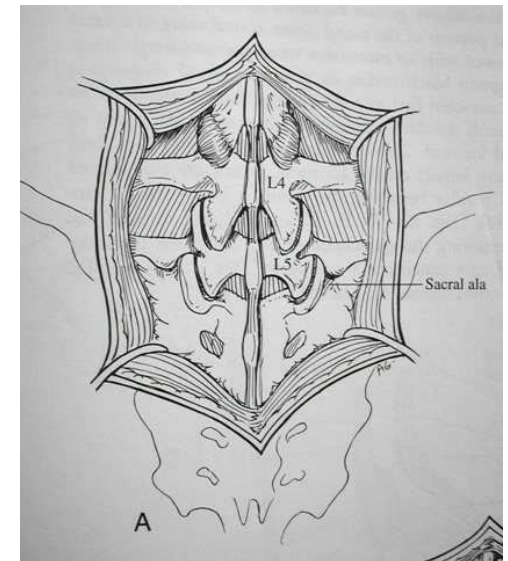
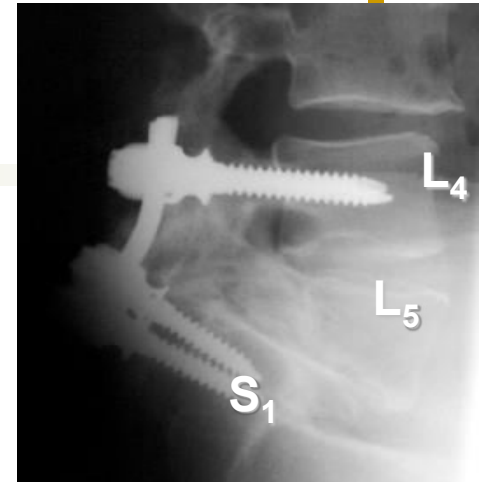
- ✦ L₄ - S₁ pedicular instrumentation
Fusion bed under compression

- ✦ Mechanical disadvantage of L₅:

- ❖ L₅ tp small surface
- ❖ Too far forward

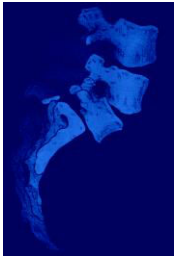
- ✦ Problems with PL fusion:

- ❖ Risk of pseudarthrosis
- ❖ Offset by 360° fusion



Sietsalo JBJS B 1990

- ⊕ 84 pts; Gr III+; 13.8 yr follow up
- ⊕ 82 % good – excellent
- ⊕ 13 % pseudarthrosis
- ⊕ 22 % progressed (>10 %)
- ⊕ 9 % complications (3 transient L5)



Johnson & Kirwan JBJS B 1983

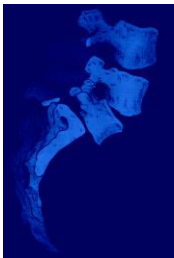
17 pts; Gr III +; 14 yr follow up

16 Excellent results

2 conscious of deformity

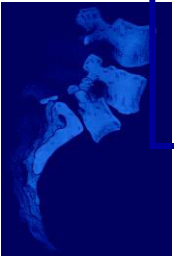
9 % progressed (1st two years)

All fused



Harris & Weinstein JBJS A 1987

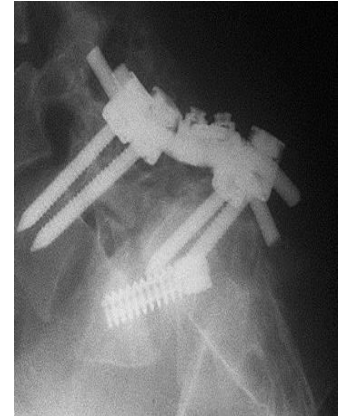
- 21 pts; Gr III +; 24 yr follow up
 - 95 % mild / asymptomatic
 - All happy with cosmesis
 - 1 pseudarthrosis
 - 3 progressed
- } No effect on outcome



360°: Posterior + Anterior

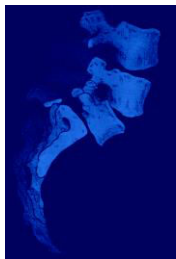
- ⊕ Risk factors for progression / pseudarthrosis
 - ❖ Diabetes
 - ❖ Post-transplant
 - ❖ Smoker
 - ❖ High grade slip

Heary Neurosurg Focus 2002



- ⊕ ‘.....if wide decompression has been performed’

Whitecloud Spine 1988



360°: Posterior + Anterior (in situ)

✦ 'Favourable' results:

Roca Spine 1999

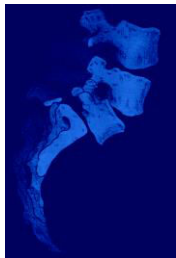
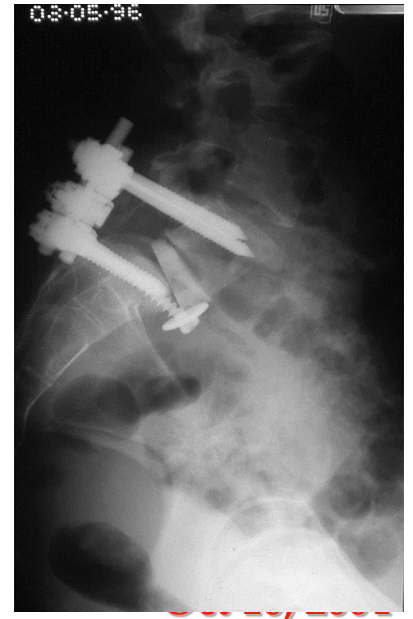
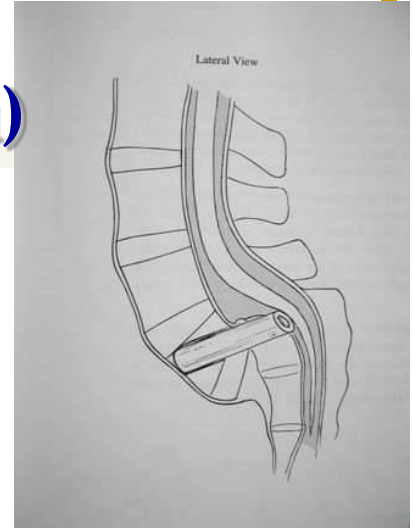
Smith JBJS A 1990

✦ 13 pts; 28.5 mo fu

12 better / unchanged

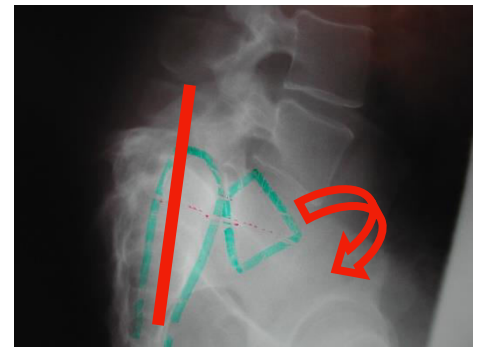
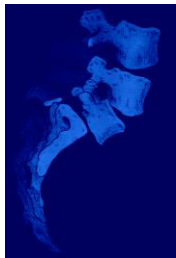
10 back to full time job

Laursen J Spinal Disorders 1999



Anterior: ALIF (stand alone)

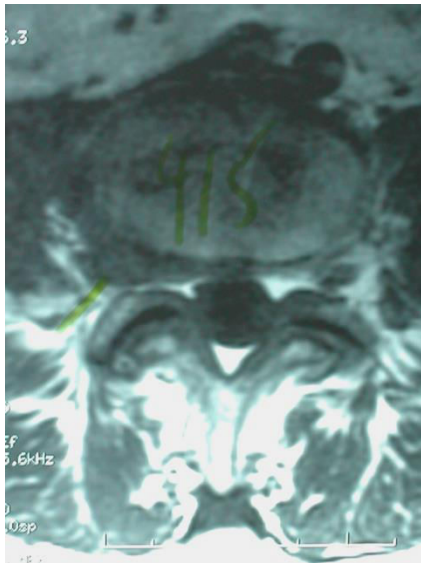
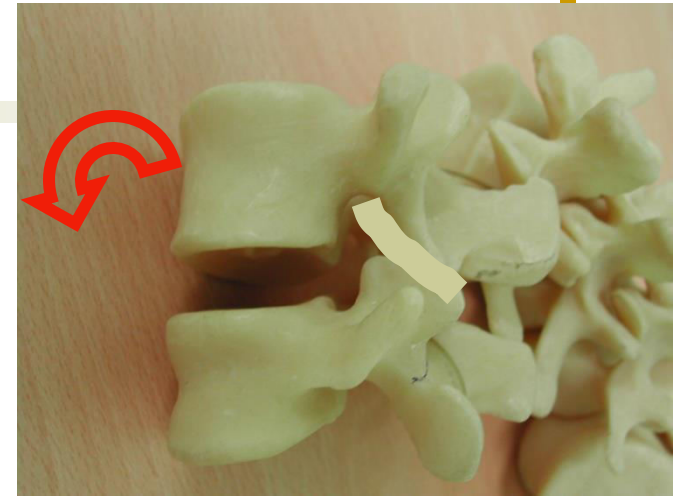
- ⊕ High rates of progression > 50 %
- ⊕ Small surface areas
- ⊕ High shear loads:
 - immobile sacrum
 - hyper-mobile lumbar spine
- ⊕ Cages not reported in literature



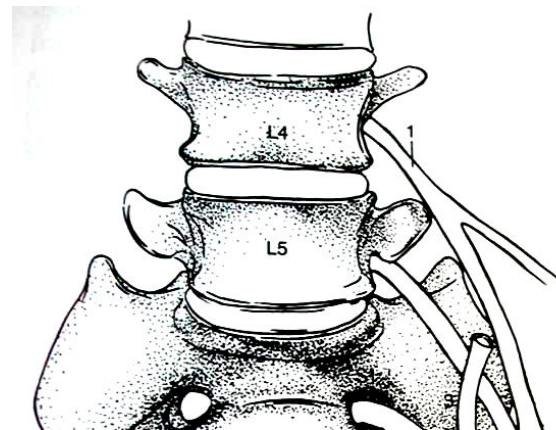
[Decompression

Only for severe deficits

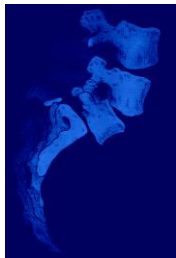
Carragee JBJS 1997



Disc at the level above



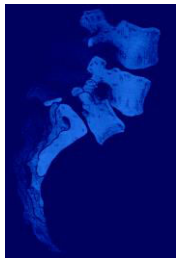
Traction on the root



[Peek et al JBJS A 1989

ISSN: 0021-9355
The Journal of
Bone and Joint Surgery

- ⊕ 8 adults, Gr III+, 5.5 yrs
- ⊕ All had severe sciatica + neuro deficit
- ⊕ Fusion *without decompression*
- ⊕ All solid fusions; pain and deficits relieved



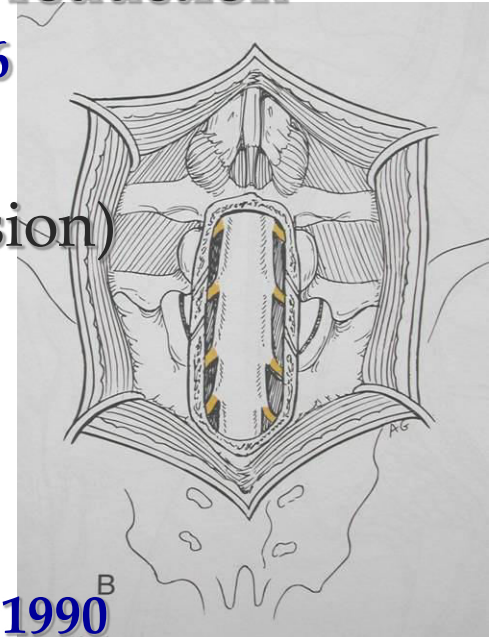
Neurological deficit



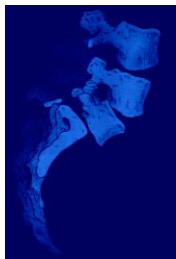
- ✦ Severe and permanent if reduction attempted
- ✦ L5 root at maximal risk in the last 50 % reduction

Petraco Spine 1996

- ✦ 6 % cauda equina in 189 pts (in-situ fusion)
 - ❖ 12 deficits; 7 permanent
 - ❖ Pre-op sacral root deficit is risk factor
 - ❖ Decompress cauda
 - ❖ Resect posterior dome



Schoenecker JBJS 1990

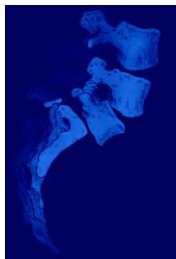


Sagittal imbalance

‘Even with no correction of the pelvic balance, **kinematics and temporal parameters of gait can be normalized by in-situ fusion**’

Meyers et al JPO 1999

Mechanical instability as a cause of gait disturbance in high grade spondylolisthesis: a pre and post-op 3D gait analysis



Advantages of in-situ fusion

Effective

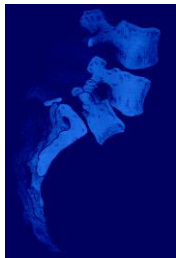
Pain relief 80-100%

Safe

Minimal complications

Reliable

Functional outcomes



Potential problems

360° if risk for progression:

- ⊕ Diabetes
- ⊕ Post-transplant
- ⊕ Smoker
- ⊕ High grade slip

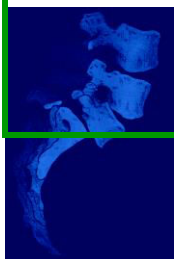
Pseudarthrosis:

- ❖ Bending of the fusion mass
- ❖ Implant failure
- ❖ 17 – 40 %

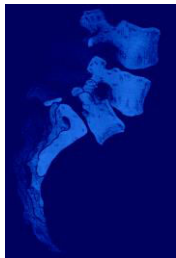
Cosmesis

Failure of fusion has no effect on outcome (24 yr fu)

Harris, Weinstein JBJS 1987



- ⊕ 22 / M
- ⊕ Semi professional rugby player
- ⊕ Severe back pain
- ⊕ No relief with non op measures



L₄ – S₁ Instrumented PL fusion spanning L₅

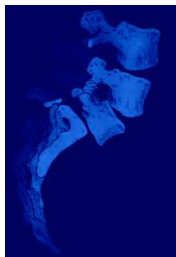


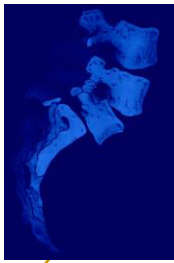
16 yr follow up:

N activites

Full time job

Painfree





Gr III lytic spondylolisthesis: in-situ fusion

**Do just enough to solve the problem !
Do no further harm !!**