Lumbar Spondylo Listhesis

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Non Physiological Translation

- Antero listhesis
- Spondylo listhesis
- Retro listhesis
- Lateral listhesis
38/F

Occasional short duration back pain

No neurological deficit

Spondyloptosis

No Surgical Intervention
16/M

Disabling back pain

Hamstring tightness

Approaching 50% slip

Dysplastic features

Reduction & inter body fusion
Spondylo Listhesis

- Varied clinical presentation
Classification

- Wiltse, Newman, MacNab
- Modified by Wiltse & Rothman
- Type 1&2 – Anatomic characteristics of the neural arch
- Type 3 to 6 - Acquired pathological conditions
Type-1-Congenital or Dysplastic Spondylolisthesis

- Subtype 1A,
- Horizontal facet joints
- Spina bifida of L5-S1
- Pars intact - Critical narrowing of spinal canal
- Pars hypoplastic, elongated or broken - No critical narrowing
Type-1-Congenital or Dysplastic Spondylolisthesis

- Subtype 1B
- Sagittal malorientation of the facet joints
- Intact neural arch
Type-1-Congenital or Dysplastic Spondylolisthesis

- Subtype 1C
- All other congenital malformation of the lumbosacral junction, including congenital kyphosis
Type-2: Isthmic Spondylolisthesis

- Subtype 2A
- Uni or bilateral spondylolysis
Type-2: Isthmic Spondylolisthesis

- Subtype 2B
- Elongation of pars
Type 3: Degenerative Spondylolisthesis
Type 4: Traumatic Spondylolisthesis
Type 5: Pathologic Spondylolisthesis

Polymyositis and Osteomalacia
Type 6: Post Surgical Spondylolisthesis

- Following extensive facet joint removal
- Stress fracture of weakened inferior articular process
Marchetti & Bartolozzi

- Developmental
  - Low Dysplastic
  - High Dysplastic
    - Lysis or Elongation

- Acquired
  - Exotic

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Wiltse classification

I. Dysplastic/congenital

II. Isthmic
   A. Lytic fatigue fracture
   B. Elongation
   C. Acute fracture

Marchetti-Bartolozzi

• Developmental
  – High dysplastic
    • With lysis
    • With elongation
  – Low dysplastic
    • With lysis
    • With elongation

• Acquired
  – Traumatic
    • Acute fracture
    • Stress fracture
20% - FDR

2:1 F to M

Never seen

Very high incidence
- Gymnastics,
- Throwing sports,
- Football,
- Wrestling,
- Dance,
- Swimming breast and butterfly strokes
Presentation – Lysis & Low Grade Listhesis

- Back pain – common
- Dull
- Back
- Buttock
- Posterior thigh
- Greater trochanter
- Pars defect
- Unstable vertebral segment
- Disc degeneration
- Radicular lower extremity pain
- Little or no back pain

- L5 or S1 root
- Paresthesia weakness (Isthmic)
Physical Signs

- Back tenderness – not specific
- Step sign – only in grade 3 or greater
- Painful limitation of extension
- Restricted SLR
- Neurological deficits
Female
Skeletal immaturity
High grade slip
Lumbo sacral kyphosis

Disc degeneration
Associated Conditions

- Spina bifida occulta
- Reactive sclerosis/fracture of contralateral pedicle
- Scoliosis
- Abnormal disc on MRI
- 20-70% - Isthmic
  - 40% - Dysplastic
- 5-7% of all patients
  - Long C shaped
  - Reflex spasm
  - Rarely structural – asymmetric slippage at LS junction, apex
Meyerding

Slip Angle

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Management

- Spondylolysis
- Low grade listhesis
- High grade listhesis
- Degenerative listhesis
Spondylolysis
Acute Pars Fracture

Rest

Bracing
Surgical Treatment

- Young individuals (16-30)
- No evidence of DDD
- Low back pain only
- Lesion at L4 or above

- Direct pars repair
Conservative treatment in Young Patients for LGSL

- 25 % slip – asymptomatic
- Radiographic evaluation
- Activity modification
Surgical indication in young patients

- Failure of conservative treatment – 1yr
- Tight hamstring with abnormal gait
- Sciatic scoliosis
- Progressive neurologic deficit
- Progressive slipping beyond 25-50% even when asymptomatic
Conservative treatment - adults

- Do not automatically assume that the patient's symptoms are due to the spondylo listhesis; look for other causes
  - Short period of rest with rapid return to activities
  - Pain medications
  - No scientific evidence for bracing
  - Exercise – Flexion, Stabilization, Stretching
Surgical Treatment

- Six months of conservative treatment fails to improve symptoms
- MRI
- Dynamic LS spine films
- Discography
- Selective nerve root block
- Facet/Pars block
Degenerative SL

- Neurogenic claudication
- Canal stenosis
- Back pain
- Decompression
- IT or IB fusion
High Grade Spondylolisthesis

Meyerding
3
4
5
Optosis

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High Dysplastic

- Lumbo Sacral Kyphosis
- Trapezoidal L5
- Dome shaped S1 UEP
- Pelvic retroversion
- Hyper lordosis
- Dysplastic posterior elements

High risk of slip progression
Lumbo Pelvic Parameters

Pelvic Incidence

PI = PT + SS
High SS/Low PT
Balanced Pelvis

Low SS/High PT
Retroverted Pelvis

Hresko, Labelle, Rousouly - 2005
Symptomatic HGS

Pediatric – Growing Years

Adult

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Symptomatic HGS – Growing Years

- Back pain
- Sagittal plane imbalance
- Phalen dixon sign
- Radicular pain
- Cauda equina

Surgical Intervention
High Dysplastic HGS – Growing Years

- 50% or greater slip
- Dysplastic features
- Lumbo sacral kyphosis
- With minimal or no symptoms

- Still an indication for fusion
High Grade Spondylo listhesis

- No one right way of management
Surgical Management

- In situ fusion
- Reduction and fusion
- Resection
- 360°
- Posterior approach
- Combined
- Complete
- Partial
In Situ Fusion

- Un instrumented
- Instrumented
- Postero lateral
- Trans vertebral
- 360°
In Situ – Trans Vertebral - Bohlman

Auto, Allo – Fibula
Hollow Modular Screw Cage

+ Pedicle screw instrumentation

24/25 extremely satisfied patients in SRS questionnaire, Rick. C.Sasso 2007
Reduction

- Correction of
- Pelvic retroversion
- Lumbosacral kyphosis (slip angle)
- Partial reduction

- Complete correction of translation not required

Improving the biomechanical milieu for fusion
Reduction

- Inter body & Postero lateral fusion
- Anterior column support – Cage
- Pedicle screw instrumentation
- Extension to L4
- Extension to S2
- Iliac screws
Successful Outcome

- Solid Fusion
L5 Vertebrectomy
Gaines & Nichols

- Spondyloptosis
- With severe symptomatic sagittal imbalance
- Spinal shortening surgery
Asymptomatic HGS In Adults

- Good sagittal balance
- Distorted posture
- Bony stabilization – spontaneous fusion
- Back pain or radicular pain – **Proximal lumbar pathology**
Symptomatic HGS in Adults

- Acceptable sagittal balance with 3, 4, 5
- Sagittal imbalance symptomatic
- Spondyloptosis

- In situ instrumented fusion – PL + Gill laminectomy
- Partial reduction and instrumented fusion – 360°, Gill + Sacral dome resection
- Bohlman transvertebral fusion, sacral dome resection + Gill & instrumentation

Do not be obsessed with radiological correction
Good decompression & Solid fusion
Summary - LGS

- Low dysplastic features
- Back pain, radicular pain
- Conservative or surgical
- In situ fusion, Reduction with Instrumented –IT or IB

Stenotic symptoms in DSL
Decompression and fusion
Summary - HGS

- High dysplastic features
- Symptomatic in growing years – risk of progression
- Need surgical intervention
- Reduction and inter body fusion with instrumentation
- Correction of *lumbosacral kyphosis* & pelvic retroversion
- L5 root injury
- Full reduction of anterior slip not required
- In situ trans vertebral fusion
- Gaines procedure
- In adults cause of pain may be elsewhere