Examination of the lumbosacral spine

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Diagnostic Algorithm

**Presenting symptoms**
- LOW BACK PAIN
  - +/-
- LEG PAIN

**Diagnostic decisions**
- Mechanical
- Non-mechanical

**Diagnostic triage**
- NON-SPECIFIC LBP
- POSSIBLE SERIOUS SPINAL PATHOLOGY

**RED FLAGS**

Is there any suspicion of serious spinal pathology?
Causes of acute low back pain

- Inflammatory: Ankylosing spondylitis 0.3 - 0.9%
- Cancer: < 0.7%
  (Age < 50 yrs p = 0.14%; > 50 yrs p = 0.56%)
- Infection: Discitis / osteomyelitis <0.01%
- LBP + Radicular pain: 5 - 12%
- Non-specific LBP: 85 - 90% (Subject to conjecture!)
Is any leg pain an indication of nerve root involvement or is it simply somatic referred pain?
Low Back Pain

Leg Pain

Neurological

Malalignment

Presenting symptoms

Diagnostic decisions

Diagnostic triage

Mechanical

Non-mechanical

Non-specific LBP

Possible serious spinal pathology

Nerve root problem

Is there a correctable pelvic obliquity or compensatory scoliosis?
Is it low back pain?

USE A PAIN DIAGRAM
Lumbar spinal pain

T12 spinous process
S1 spinous process
Lumbar erector spinae m.
Sacral spinal pain

- S1 spinous process
- Sacroccocygeal joint
- PSIS and PSIIS
Lumbosacral spine pain

L5/S1 segment
Lumbosacral spine surface anatomy

Subcostal margin / 12th ribs / L1 spinous process
Iliac crests / L4 spinous process
Count the spinous processes
Posterior superior iliac spines
Posterior inferior iliac spines
What is not low back pain?

- **Flank / loin pain**
  - Visceral / urinary tract

- **Gluteal pain**
  - Local causes

- **“Sciatica” (radicular pain)**
  - Not LBP
  - Lower limb pain
  - Causes different
  - Mechanisms of pain are different
The Purpose of Physical Examination of the Lumbosacral Spine

To identify:
- Serious pathology / other visceral cause for pain
- Radicular / neurogenic features
- SIJ pain / dysfunction
- Nonspecific lumbar pain

To foster rapport with the patient
To enhance the doctor-patient relationship
Examination - LOOK

- Pain behaviours; posture; gait
  - Gait (walking into your office)
  - Gross movements (sitting and getting up out of a chair; ease and comfort in the seated posture)
  - Grimacing and pain exclamation with movements
  - Static standing posture (Spinal alignment, Gross spinal deformity, Lateral trunk shift)
  - Pelvic alignment / obliquity
Spinal Coronal Alignment

Pelvic obliquity / muscle imbalance  

Fixed structural scoliosis
Spinal Coronal Alignment

A true leg length discrepancy
Pelvic Obliquity - Right innominate anteriorly nutated

- Anterior rotation of R innominate
- Posterior rotation of L innominate
- Sacral rotation around L oblique axis
- Rotation around symphysis pubis with step deformity

- Iliac crest
- PIIS
- ASIS
Examination - MOVE
Examination - FEEL

► In prone position
  - AP gentle thrust over each spinous process / Palpation over each Z joint
  - Palpation of tender trigger points in the quadratus lumborum muscles
  - Palpation of tender trigger points in the buttock muscles

► In supine position
  - Palpation of the abdomen (if required)
  - Palpation of tender trigger points in the iliopsoas muscles
Muscle trigger points

Quadratus lumborum

Iliopsoas
Examination of the lumbar spine - what have I found?

- **LOOK**
  - Posture; alignment of the spine; scoliosis (fixed or flexible?); leg length discrepancy
  - Pelvic obliquity / malalignment

- **MOVE**
  - Range of lumbar movement (forward flexion; extension; side flexion; rotation)
  - Pain at end range of movements; Restricted range on specific movements
  - On forward trunk flexion - ?rib humping

- **FEEL**
  - Springiness of AP movement of the spine
  - Tenderness on springing segments over the spinous processes / over the facet joints
  - Tender muscle trigger points
Case study

- 48 year sports female administrator and mother of three children
- She sustains a right ankle inversion injury resulting in a small crack fracture of the tip of her lateral malleolus 6 months prior. This is effectively treated conservatively
- She notices insidious onset thereafter of pain in her left lateral popliteal fossa and proximal tib/fib joint region
- She is investigated by her GP for a DVT with US scan of her left calf - her twin sister had recently had a DVT of her calf out of the blue
- Also seen by a varicose vein specialist just prior to a trip to the USA - given compression stockings to wear for her trip
- Still in pain and cannot exercise comfortably. Enjoys her boot camps, yoga and running regularly

1 - the problem could be further up the kinetic chain
2 - ask about LBP / tightness around the buttock pelvis region
SI joint dysfunction - Stork test
SI joint dysfunction - Sit and Reach test
Interpretation of sit and reach test

Right anterior right locked innominate

Left anterior, left locked innominate
SI Joint Pain Provocation Tests

- Compression test
- Thigh thrust test
- Sacral compression test
- FABERS test
- Gaenslen’s test

If three out of these five tests is positive then there is a high likelihood that the SI joint is a source of pain (Spec = 79%; Sens = 85%)

If none of these tests is positive the likelihood of the SI joint being a source of pain is very low
Treating SI joint dysfunction

For right ant innominate

For left ant innominate
IN SUMMARY

- Physical examination of the low back does not provide for exact diagnosis of cause of low back pain
  - BUT….we may be able to distinguish non-mechanical from mechanical pain
  - BUT….we can elucidate lower limb neurological signs and determine presence of radicular pain and radiculopathy

- The commonly used tests, and several more esoteric tests lack reliability, validity or both

- Centralisation of pain on McKenzie movements increases the likelihood of the disc as a source of the pain

- Combined tests for SIJ pain can be informative

- Correcting SI joint dysfunction and pelvic obliquity can be very helpful

- A neurological examination is not indicated in a patient who presents with back pain only and with no neurological symptoms