

### Lumbar causes

**Pitfalls:** Herpes Zoster  
Spinal Canal Stenosis  
Disorders of SIJ and hip joint  
Glut Med/Min TrP  
Hip pocket wallet syndrome  
Nerve Entrapments  
NR syndromes

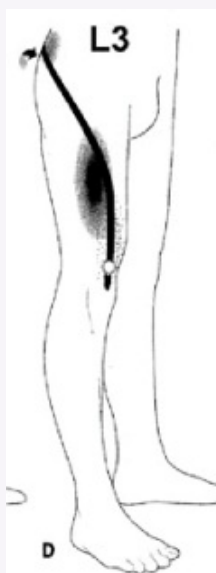
**Refer when:** Leg pain is severe and disabling  
Symptoms to Lx radioculopathy that persists without improvement or progression  
Clinical Evidence of significant motor deficit  
No significant response after 4 weeks of conservative care  
Incapacitating low back and leg pain

**Hx:** When the back pain and leg pain started - twisting/weight lifting at onset? , SOCRATES, Red Flags

### Red Flags

- Severe, new neurological deficits (Cauda Equina - severe lower extremity weakness/paralysis, saddle anaesthesia, limb sensory loss/numbness, rectal obstipation/incontinence, erectile dysfunction)
- Bilateral/Multiple root levels Neurological Deficits
- Recent Spinal anaesthesia/spinal tap/back procedures (surgery/injection)
- Ask about GI, Urinary and gynaecological symptoms

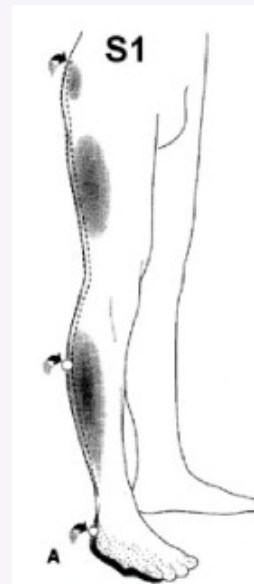
### L3 Radioculopathy



- Sensation loss in all or part of the areas above
- No reflex testing
- Weak Quads, Adductors and Iliopsoas

### L4 Radioculopathy

### S1 Radiculopathy



- Sensation loss in all or part of the areas above
- Hyporeflexia in Achilles reflex
- Muscle weakness in hip extensors + ankle plantarflexion

### Examination

- Observation
- AROM, PROM, RROM
- Passive accessory movement testing
- SMR
- Nerve Tension Testing
- Special Tests
- Pathological reflex testing
- Palpation

### Investigations

- X-ray - fractures + dislocations in trauma patients, multiple root levels
- CT - acute fractures, disc herniation
- MRI - be wary of asymptomatic abnormalities, cauda equina, abscess, tumour, haematoma
- EMG - NR dysfunction

### Sensitising Movements

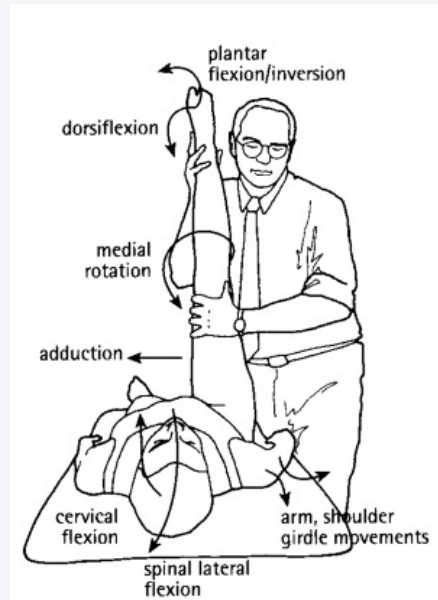


- Sensation loss in all or part of the areas above
- Hyporeflexia of Patella reflex
- Weak Quads

## L5



- Sensation loss in all or part of the areas above
- Hyporeflexia of hamstring reflex
- Weakness of Tib post + anterior + hip abductors



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### Signs

- **Fajersztajn's sign** = Pain on contralateral side when the non-painful side is flexed at the thigh with leg held in extension
- **Szabo's sign** = Loss of sensation on the lateral portion of the foot
- **Bonnet's sign** = Pain on adduction of the thigh
- **Turyan sign** = Pain in buttocks when great toe is hyperextended
- **Linder sign** = Pain in lower back/down the leg when the patient is supine
- **Braggard's sign** = An increase of pain when the straight leg is extended and foot is dorsiflexed

### Herniated Disc

- 90% of disc herniations occur at L4-5 & L5-S1
- L4 NR = L3-L4 Herniation
- L5 NR = L4-5 herniation
- S1 root = L5-S1 herniation
- Pain = tearing of pain sensitive outer annulus (nociceptive fibres innervated by recurrent meningeal nerve)
- Mechanical compression of discal + adjacent ligamentous tissue
- Secondary inflammation due to nuclear extrusion

### Hx

- Buttock + leg pain in affected NR distribution - leg pain usually worse
- Hx of flexion/rotation at onset
- May radiate to calf and foot in severe cases
- Pain is sharp and severe
- Leg numbness, pins and needles, weakness
- Aggravated by - trunk flexion, coughing, sneezing, sitting
- Relieving - supine with supported hip/knee flexion
- Hx of chronic/repetitive LBP

### Examination

- Antalgic posture - towards leg pain = posteromedial herniation
- away from leg pain = posterolateral herniation
- Lx Flexion decreased + painful - increases leg pain. Extension relieves but still restricted
- SLR +ve
- Femoral nerve tension tests provoke leg pain if herniation is at L3/L4
- +ve Valsalva
- +ve SMR findings (can be present without them)

### DDx

- MFPS - Glut med, Piriformis, Glut Min, TFL
- Dynamic lateral entrapment
- Central stenosis
- Peripheral entrapment neuropathy
- Lx facet syndrome
- SIJ syndrome

### Management

- NSAIDs
- Omega 3 fatty acids
- Manipulation/mobilisation/activator
- Flexion - distraction
- TrP therapy
- Interferential
- TENS
- McKenzie procedures

### Spinal Stenosis

- Can be central or lateral



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### Spinal Stenosis (cont)

#### Questionnaire:

**Q1:** Numbness/pain in the thighs down to the calves and shins

**Q2:** Numbness/pain increases in intensity after walking for a while but are relieved by taking a rest

**Q3:** Standing for a while brings on numbness and or pain in the thighs down to the calves and shins

**Q4:** Numbness/pain reduced by bending forward

4 mores on Q1-4 = LSS

4 points on Q1-4 and <1 on cauda equina questionnaire = radicular type of LSS

>1 on Q1-4 and >2 on cauda equina questions = cauda equina LSS

#### S&S

- Dominant symptoms below gluteal fold
- Hx of intermittent neurogenic claudication
- Centralisation not possible
- Symptoms improved when seated and walking with spine in flexion
- Symptoms worse with standing/walking

#### Hx

- Slow, gradual decreasing activity tolerance especially with walking and standing
- If occurs before 60 - check for diabetes/metabolic problems
- Numbness /pain in the thighs down to the calves/shins
- Numbness/pain increase in intensity after walking for a while but relieved by rest
- Standing for a long time brings on numbness/pain in the thighs down to the calves and shins
- Numbness/pain are reduced by bending

#### Exam

- Usually NAD
- SLR +ve, symmetrical weakness and atrophy + diminished reflexes
- Cycle test - cycling distance same in vascular intermittent claudication when spine is flexed/upright - extended spine limits distance in neurogenic claudication

### Management

- Flexion distraction
- Nerve mobilisation - Pt supine while dr dorsiflexes the ankle and flexes hip with the knee extended and raises the leg until a barrier is felt. Foot is moved into plantar flexion + dorsiflexion for several cycles
- Exercises - cat camel + nerve flossing
- 2-3 times per week for 3 weeks then reduce the time to 1 per week if improved

### Lateral Entrapment

- Bony encroachment from osteophytes/ ossified spinal ligaments/soft tissue changes - facet joint hypertrophy, PLL thickening, LF thickening and scar tissue from a repair of annulus fibrosus/extruded nucleus pulposus
- Fixed Lateral entrapment = reduced mobility around IVF is reduced and entrapped more - symptoms less related to movement

#### S&S

- Chronic LBP with radiation to buttock and leg - can radiate to foot , but distal leg pain is more common
- Pain is burning + tingling/numbness
- Distribution of leg symptoms are related to NR involved
- Dynamic lateral entrapment - flexion/extension increase pain, Rotation can peripheralise pain
- SMR present but can be absent or small
- Nerve tension tests can produce minor leg pain

### Management

- Dynamic entrapment associated with better prognosis than fixed
- SMT if there is no frank neurodeficit
- TrP therapy + myofascial therapy
- Ultrasound, electrical stimulation
- Flexion-distraction to increase canal and IVF diameter
- Chronic phase - rehab needed



### Epidural Compression Syndrome

- Should be considered if patient has neurological S&S of cauda equina/ above L2
- Caused by haematoma, infection/malignancy

### S&S

- LL sensorimotor neurological deficits
- Saddle Distribution sensory loss
- Bowel incontinence/unexplained loss of rectal sphincter tone
- Urinary retention/overflow urinary incontinence
- Impotence
- Soft neurological signs involving >1 dermatome
- Look for UMN signs (conus medullaris syndrome)

### Cauda Equina

**Hx:** Low back pain with acute/chronic radiating pain  
Unilateral/bilateral lower extremity motor/sensory abnormality (saddle anaesthesia)  
Bladder/bowel dysfunction (starting/stopping stream of urine, urinary incontinence)

#### Questionnaire:

- Q1:** Numbness present in both legs  
**Q2:** Numbness is present in the soles of both feet  
**Q3:** Numbness arises around the buttocks  
**Q4:** Numbness is present but pain is absent  
**Q5:** A burning sensation arising around buttocks  
**Q6:** Walking nearly causes urination

### Exam

- Pain localised to the low back, local tenderness to palpation/percussion
- Reflex abnormalities - loss of reflexes; hyperactive linked to spinal cord involvement - excludes CES
- Pain in the legs
- Sensory abnormality (perineal/lower extremities)
- Muscle weakness in affected roots - Quads, foot evectors + dorsiflexors, foot plantarflexion - muscle wasting can occur
- Poor anal sphincter tone

### Neurological bladder dysfunction Qs

- Have a sense of bladder filling no = neuro bladder
- Feel urine passing? no = neuro bladder
- Stop the urine passing? no = neuro bladder
- bladder leakage or suddenly releases? yes = neuro bladder
- associated rectal disorder? yes = neuro bladder
- Disorders of potency? (erectile dysfunction) yes = neuro bladder
- Numbness in perineum? yes = neuro bladder

Retention of urine - large "atonic" bladder  
Diminished/absent sensation of bladder fullness  
Considerable residual urine - high risk of infection  
Continual dribbling incontinence  
**Due to:** Loss of parasympathetic supply to the bladder - LMNL to bladder wall + sphincter  
Loss of motor control to the external sphincter  
- No/diminished afferent supply from the bladder

### Non-mechanical CES

- **Nerve Sheath Tumours:** Schwannoma, neurofibroma, ganglioma, neurofibrosarcoma  
Usually affects middle aged adults, in neurofibromatosis multiple lesions can occur
- **Imaging:** Enlarged IVF, post body erosions

### Synovial Cysts

- Facet Cysts
- Usually affects L4/5 & L5/S1
- Usually asymptomatic
- Presents with worsening LBP and leg pain as it expands
- MRI used



### Meningioma

- Common neoplasm
- Slow growing and benign
- Mainly in T<sub>x</sub> region - can occur in the c<sub>x</sub> spine
- Radicular pain, becoming worse as lesion expands
- MRI

### Perineural (Tarlov's cysts)

- Most are asymptomatic
- Involves sacral/coccygeal NRs
- Causes LBP, leg pain and sacrococcygeal pain
- Symptoms worsen as lesion expand
- MRI

### Mets

- More common in lumbar spine
- Can cause lateral mono-radulopathy
- Symptoms get worse as lesion grows
- Bony destruction + VB collapse occur
- Look for Hx of cancer, cancer risk factors, family hx

### VB Osteomyelitis

- Infection - look for fever, hx of recent infection/wound/surgery
- Destructive lesions cause an imaging "lag"
- Refer for FBC, ESR, CRP

### Infection (Herpes Zoster)

- Most common at T<sub>x</sub> + CN V - L<sub>x</sub> most common at L2-4
- Radicular pain + vesicular eruptions in the dermatome
- Post herpetic neuralgia in a small percentage of patients
- Aggressive early treatment - analgesia + retro-virals

### Diabetic Radiculo, polyradiculo, amotr

- Usually in L2, L3 or L4 NR
- Non-insulin dependent diabetic (males)
- Onset of excruciating pain down the front of the thigh to the medial leg
- Within a few days of onset, the pain gets better and a rapid wasting and weakness of quads occurs
- Weeks prior to onset, Hx of rapid weightloss + general ill health
- Often improves within 6 months - can take up to 2 years
- Tight diabetic control with insulin needed

### When to refer

- Sudden onset of Pain, pallor, pulselessness, paralysis, paraesthesia and coldness
- Worsening intermittent claudication
- Rest pain in foot
- Presence of popliteal aneurysm
- Evidence of DVT
- Worsening of hip pain
- Evidence of disease in bone
- Severe Sciatica with neurological deficit

### Hx

Acute or chronic pain?

If acute - trauma related or unusual activity? If not, consider vascular causes

Pain related to movement? If no consider soft tissue lesion

Postural pain? Postures that make the pain better or worse? Worse on sitting = disogenic/ischial bursitis, if worse on standing = instability or local problem, if worse lying down = vascular

Related to walking? No = what is the offending activity? Yes: If immediate - local cause. If delayed = vascular claudication/neurogenic claudication

Site of pain same site of trauma? If no = lesions in the spine, abdomen, hip and entrapment neuropathy

### Hx (cont)

Pain arising from bone? If yes, pain is very specific with deep and boring "bone" pain

Pain arising from joints? AROM + PROM

### Investigations

- FBC, ESR, D-dimer, CRP
- X-rays of spine, knee , hip
- Bone scan
- EMG
- Duplex ultrasound, ankle brachial index

### Ankle Brachial Pressure index (ABPI)

| ABPI value | Interpretation                                                                                                                          | Action                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| > 1.3      | Abnormal<br>Vessel hardening from PVD<br>(NB: value can falsely elevated in calcified vessels* e.g. DM, but refer anyway at this level) | Refer routinely                                              |
| 1.1 - 1.3  | Normal                                                                                                                                  | Correlate with history esp. DM                               |
| 0.97 - 1.0 | Normal                                                                                                                                  | None                                                         |
| 0.8 - 0.96 | Mild ischemia                                                                                                                           | Manage risk factors and monitor ABPI every <b>2-3 months</b> |
| 0.4 - 0.79 | Moderate to severe ischemia                                                                                                             | <b>Routine specialist referral</b>                           |
| < 0.4      | Severe ischemia (danger of limb loss)                                                                                                   | <b>Urgent specialist referral</b>                            |

<0.4 - 0.79 = pain at rest

### Leg pain in children

- Common soreness and muscular strains due to trauma or unaccustomed exercise
- Growing pains - usually in the evening in thighs and calves (both legs) lasts for minutes to an hour, most commonly at 9-12yo, massage of the area best treatment

### Leg pain in the elderly

- Arterial disease with intermittent claudication + neurogenic claudication
- Degenerative joint disease
- Muscle Cramps
- Herpes Zoster
- Paget's disease
- PMR
- Sciatica
- Retroperitoneal haemorrhage - anticoagulant therapy

### Hip Pocket Wallet Syndrome

- Wallet in back pocket compresses the sciatic nerve
- Presents with buttock and upper posterior thigh pain - without back pain

### Exam

- Watch patient walk and assess the nature of any limp
- Exam Lx
- Inspect patient's stance and note any asymmetry and other abnormalities - swelling, bruising, discolouration, ulcers, rashes, size and symmetry of legs and venous pattern, ischaemic changes in the foot/LL
- Palpate for local causes - ischial tuberosity, trochanteric area, hamstrings and tendon insertions, superficial lymphnodes, temperature of LL
- Palpate pulses of LL and look at the veins
- Auscultate abdomen and iliac, femoral and popliteal vessels for bruits
- SMR
- Exam of Hip and SIJs

### Piriformis syndrome

**Caused by:** Trauma

Hormonal changes (pregnancy, menstrual) ,therefore F:M = 6:1

Excessive manipulation

Prolonged external rotation of the thigh (driving)

**S&S:** Deep, boring, ill-defined pain in buttock, posterolateral thigh and calf (rarely to foot)

Burning sensation over greater trochanter

Unable to lie on involved side

Leg externally rotated and reduced internal rotation

Piriformis muscle test demonstrates unilateral shortness

Trigger points in Piriformis

Deep palpation of muscle belly is tender and may reproduce leg pain +ve Bonnet's test

SIJ Dysfunction often presents ipsilaterally

**DDx:** Lx Disc herniation

MFPS

SOL



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### Piriformis syndrome (cont)

**Management:** TrP

Spray and stretch

Manipulation of SIJ

Hip mobilisation (if both are stiff)

Ultrasound, electrical stimulation

PIR

Home stretching

### Arterial causes

PAD is the main cause - build up of plaque in arteries

Tight squeezing pain in the calf, foot, thigh or buttock during exercise, relieved by rest, decreased leg strength and function, poor balance when standing, cold and numb feet and toes, sores that are slow to heal

### Overuse injuries

- Medial tibial stress syndrome

- Stress fractures

- Exertional compartment syndrome

- Tibialis anterior tenosynovitis

- Chronic muscle strains

### Management

Rest

Myofascial therapy

Exercise program

Electrostimulation

Correction of predisposing factors - training errors, unsuitable footwear

Analgesics (NSAIDs)



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