



# Headaches

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We've all had them.

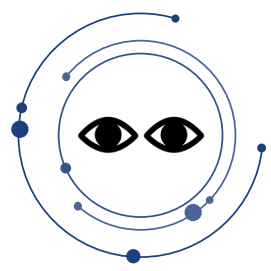
Headaches can be debilitating, and they occur when any of the pain-sensitive structures in the head and neck are stimulated. These include the meninges, blood vessels, nerves, and muscles.




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## SESSION OBJECTIVES



- Develop skills in taking a structured history in a patient presenting with a headache
- Define primary and secondary headaches.
- Recognise red flags and able to safety net or refer appropriately.
- Use a case study approach to explore current treatment options and differential diagnosis



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## KEY THINGS

Take a history

- Is it sudden in onset or gradual.
- If sudden in onset, did it come on to maximum intensity within a minute

Any nausea or vomiting  
Did you collapse  
Any photophobia or neck pain.  
Any double vision, floaters, zigzag lines.  
Any problems with your speech: talking, jumbled words, arm weakness, pins and needles  
Any head injury or trauma,



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Subarachnoid  
Raised Intracranial pressure  
Meningitis

## Primary Headaches vs Secondary Headaches

No structural or metabolic abnormality ——— Structural or metabolic abnormality

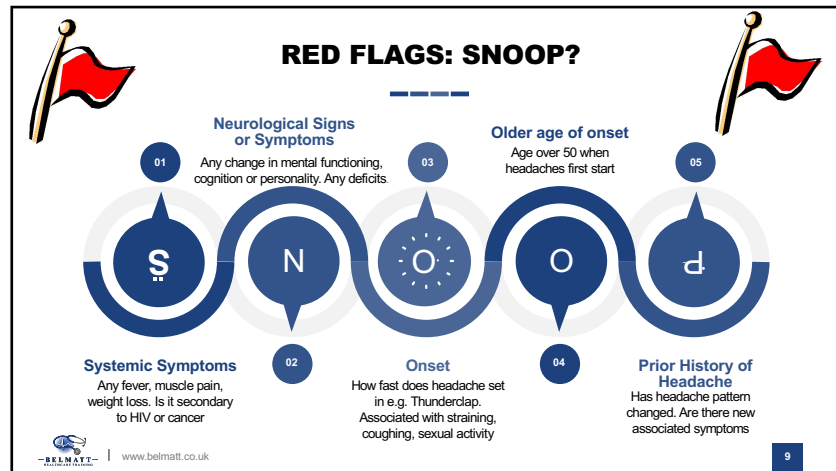


## Primary Headache

- Tension Type Headaches range between 50-80% of the population
- Migrain in 6 percent of children and adult males and rising to 18% in women in puberty. Most common onset in puberty until 4<sup>th</sup> decade.
- Cluster Headaches more common in men and symptom onset usually between 20-40 yrs of age.
- Chronic Daily Headache \_ 10% of consultations and describes a frequent headache on more than 15days a month for 3mnths or more.

## Secondary Headaches –

- CVS. : GCA, Aneurysm, TIA, Stroke, Tumour
- Respiratory : Due to hypoxia of carbon monoxide poisoning,
- HEENT. : Sinus headaches — due to inflammation and congestion in the sinus cavities
- EYES : Glaucoma, Eye strain, Eye infections
- ABDOMINAL : Dehydration
- SKIN : Shingles
- CNS : Spinal headaches — caused by low volume of pressure of cerebrospinal fluid, possibly due to a leak, a spinal tap, or spinal anesthesia
- MUSCULOSKELETAL : A cervicogenic headache — this is related to an underlying condition of the neck, such as degenerative disc disease. A post-traumatic headache — due to a traumatic event, such as being involved in an accident



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## RED FLAGS

- An unexplained headache in anyone **previously diagnosed with cancer**.
- A new-onset of **epileptic seizures**.
- **severe unilateral eye pain**, red eye, fixed and dilated pupil, hazy cornea, or diminished vision. If this occurs, suspect acute glaucoma.
- Is associated with nausea and impaired concentration in a person exposed to a potential **carbon monoxide source**.
- If symptoms of a serious cause of headache are excluded assess for [medication-overuse and other secondary causes of headache](#).

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## Headache History

- **Age of onset** of initial headache symptoms and clinical course of symptoms over time (e.g. headache beginning in adolescence or teenage years such as migraine; new onset headache at over 50 years of age, especially if progressive, may indicate the need to exclude secondary causes such as temporal arteritis, intracranial tumours and, less commonly, cerebrospinal fluid pressure or chronic meningitis).
- **Periodicity** Intermittent, e.g. migraine, TTH; daily, e.g. CH and migraine +/- MOH.
- **Duration of headache attacks** Short-lived (seconds/minutes to less than four hours) or prolonged (four hours to days).
- **Diurnal variation** Day and night, e.g. migraine and CH, or purely nocturnal, e.g. hypnic headache; worse on waking, e.g. raised intracranial pressure; headache-free on waking but worsening through the day, e.g. low intracranial pressure.

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## Headache History

- **Frequency of the headache** More than or less than 15 days per month.
- **Duration of headache symptoms** Individuals presenting with new onset headache symptoms potentially need closer assessment (NDPH).
- **Headache onset** Sudden vs insidious, tempo and time course, e.g. progressive worsening vs bouts lasting days to weeks/months.
- **Additional symptoms** Preceding (premonitory or aura symptoms) or associated non-headache symptomatology, e.g. cranial autonomic symptoms typically in CH, TAC, and, less commonly, migraine (i.e. ptosis, miosis, eye lacrimation, conjunctival injection, nasal blockage, rhinorrhea, and facial oedema).
- **Triggering factors** Valsalva activities (e.g. cough, sneeze, lifting) suggest possible headache related to change in intracranial pressure or structural intracranial posterior fossa pathology.

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consider a  
diagnosis of  
tension-type  
headache or  
migraine  
(common primary  
causes of  
headache).

**If symptoms of a  
secondary cause of  
headache have been  
excluded**

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yr old attends the surgery with her mum complaining of migraines. Pain starts at the back then spreads to temples and forehead. She feels tired when headache starts, gets blurry vision and very moody according to her mum. Headache for 14hrs now. no abnormal neurology. Complaining of seeing zigzaggy lines with blind spots. This happens when headache is worse and lasts about 30minutes then gets better.

**Differentials and how would u treat.**

- Which anti emetics can you give and why?
- Pt states that analgesia and triptans not working. Why should u not take a triptan when you are having an aura?
- Why do we monitor ECG in pts on amitriptyline?
- What is a tension type headache?



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## Case Study

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## Tension- type headache

**Most common headache and reason why most often  
analgesia is bought.**

**Diagnose tension-type headache** when there are recurrent episodes of headache, lasting between 30 minutes and 7 days; has at least two of the following characteristics:

- Bilateral.
- Pressing or tightening in character.
- Mild-to-moderate in intensity.
- Not aggravated by routine physical activity.
- Not associated with nausea or vomiting.
- Sometimes associated with photophobia or phonophobia, but not both
- Associated symptoms usually none.

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## What causes it?

The cause of tension-type headache (TTH) is **not fully understood**. It has been shown to be associated with the presence of myofascial trigger points, and abnormal central processing of pain (causing increased pain sensitivity)

↓

By definition, TTH is **not caused by other conditions** such as a pyrexial illness or medication overuse.

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TTH may be **triggered by stress** or other factors, such as sleep disruption

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## Management

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episodic severe headaches (commonly but not always unilateral, and often described as throbbing or pulsating), with associated symptoms such as photophobia (sensitivity to light), phonophobia (sensitivity to sound), and nausea and vomiting, **have a normal neurological examination**.

- six main migraine categories (together with a further 17 subcategories);
- The most frequently diagnosed are migraine without aura (previously called common migraine) and migraine with aura (previously called classic migraine, which has a further six subcategories).
- Others are childhood periodic syndromes that are commonly a precursor to migraine (three subcategories), retinal migraine, complications of migraine (five subcategories), and probable migraine (three subcategories)

## Migraine

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## MIGRAINE

70% of patient's will experience prodromal symptoms such as fatigue, impaired concentration and neck stiffness 24hrs before the headache.

May reflect activation of dopamine, brainstem-hypothalamic and trigeminocervical neuronal pathways.

Gradual onset, usually unilateral, crescendo type

Duration 4-72hrs

Associated symptoms, photophobia, phonophobia and aura.

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## MIGRAINE

Foods that potentially aggravate/trigger a migraine



Grapes



Cheeses and  
Wine

Contain tyramine



Processed meats

Contain nitrates



COFFEE

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## Migraine without Aura

- **Diagnose migraine without aura** when there are recurrent episodes of headache, lasting between 4 hours and 3 days, that are characteristically:
- Unilateral.
- Pulsating in character.
- Moderate-to-severe in intensity.
- Aggravated by routine physical activity.
- Associated with either nausea or vomiting, or photophobia and phonophobia, or both.

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## Migraine with Aura

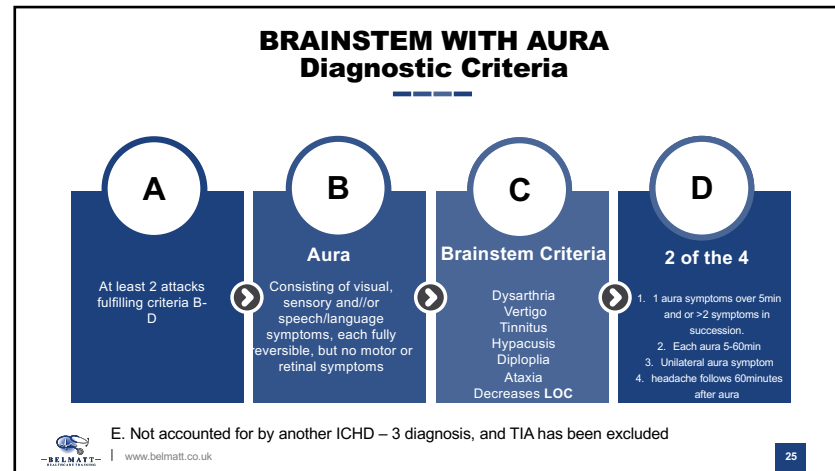


- Occurs in 30% of migraine sufferers.
- Gradual onset focal neurological signs. Aura tends to last 20-60 minutes
- Visual most common but may also have transient dysphasia, vertigo and confusion.
- **Diagnose migraine with aura** is preceded by the onset of an aura consisting of visual or sensory symptoms or dysphasia. Symptoms develop gradually and are fully reversed within 1 hour.
- Visual symptoms include flickering lights, spots, lines, loss of vision, shimmering or zigzags. Tends to be binocular.
- Loss of vision - scotomata.
- Sensory symptoms include pins and needles, or numbness.
- Risk factor for a stroke.

\*\*\* Aura without headache not uncommon in 40s and 50s. Distinguish from TIAs which are shorter than auras and tend to have more negative symptoms.

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**Assessment**

- The quality of attacks — the intensity and site of pain, whether the pain spreads, and associated symptoms.
- The timing and frequency of attacks — when the attacks started and the reason for the consultation now, how often attacks occur and whether there is any temporal pattern, and how long attacks last.
- The possible causes of attacks — suspected triggers, predisposing factors, and familial history.
- Relieving factors — the person's activity during attacks, use of over-the-counter medication.
- Other factors — what is the person's general health like between attacks, what level of anxiety and concern do attacks cause, is there more than one type of headache present?

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**MIGRAINE IN WOMEN**

Migraines 2-3 times more common in men than women

- 14% during first 3 days of menstrual cycle
- 10 times increase in risk in women on OCP
- Improvement in migraine during pregnancy
- Decreases in 2/3<sup>rd</sup> of women after menopause

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**SEVERITY LEVELS**

**MILD** – Patient is aware of a headache but can continue daily routine with minimal alteration

**MODERATE** – headache inhibits daily activities but is not incapacitating

**SEVERE** – Headache is incapacitating

**STATUS** – Severe headache that has lasted more than 72hrs

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# Treatment

Simple analgesia is recommended for the first three attacks of migraine

- Advise the person to lie down in a quiet darkened room (if this is possible and it helps), and take oral analgesia as soon as pain (or a sensation of impending pain) develops:
- Paracetamol or aspirin, both available in soluble forms, are suitable first-line analgesics, and are available over-the-counter (OTC).
- Ibuprofen is a suitable nonsteroidal anti-inflammatory drug (NSAID), and is available OTC. Tolfenamic acid, naproxen, and diclofenac can be prescribed.
- An oral anti-emetic, such as prochlorperazine, domperidone, or metoclopramide.
- Codeine, either alone or in combination products (e.g. co-codamol, Migrave®<sup>®</sup>, Nurofen Plus®<sup>®</sup>), or other opioids (such as dihydrocodeine, morphine, and pethidine), should be avoided.

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## Second-line treatment

- Consider prescribing a triptan if first-line treatment has proved ineffective (e.g. on three independent attacks of migraine, taking over-the-counter treatment into account). There is little to guide choice in the triptan-naïve person:
- Oral sumatriptan (50 mg or 100 mg) is suitable for most people. Zolmitriptan, naratriptan, rizatriptan, eletriptan, almotriptan, and frovatriptan are alternatives. Contraindicated in pregnancy, Cerebrovascular disease
- If vomiting restricts oral treatment, consider a non-oral formulation (e.g. zolmitriptan nasal spray or subcutaneous sumatriptan).
- Oral ergotamine is not recommended.

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## PROPHYLAXIS

Anti epileptics such as topiramate, gabapentin and valproic acid

Beta blockers such as propranolol

Tricyclic anti depressants such as amitriptyline

Oestrogen containing contraceptives are an absolute contraindication in women with aura as it increases risk of stroke



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## Treatment in pregnancy or breastfeeding

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## When should I refer a person with migraine?

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### CASESTUDY 4

Alan is a 33 year old man who presents with headaches that occur several times per month. He has had these headaches since he was 20 but has never sought treatment. The headache pain is sharp and severe, worse on the left side, causing burning, watery eyes, nausea and photophobia. He has a family history of hypertension and diabetes. He is married with two daughters. He denies alcohol and tobacco use. OTC analgesia is only mildly effective at controlling pain.

### EXAMINATION

Alan denies visual disturbances, weight gain or loss, insomnia or any muscle aches and pains. He has no weakness or numbness and no history of head trauma. Observations are normal. Lung, heart, abdominal and neurological examinations are normal.

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## Case Study

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### Cluster headache

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## Cluster Headache

One of the most severe headaches, also known as a suicide headache.

Usually in men

Occur in clusters, every day for 8-10 weeks /year then not the rest of the year

Occur in 'cluster bouts' lasting weeks to months before remission ( 4-12 weeks).

Excruciating stabbing like pain behind the eye

Shorter attack duration than migraine.

Agitation in Cluster Headache compared to migraine preference to avoid movement.

Ipsilateral cranial autonomic symptoms.

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## Diagnostic Criteria for Cluster Headache

Severe unilateral, periorbital, supraorbital and/or temporal pain lasting 15–180 minutes if untreated.

Attack frequency up to eight per day.

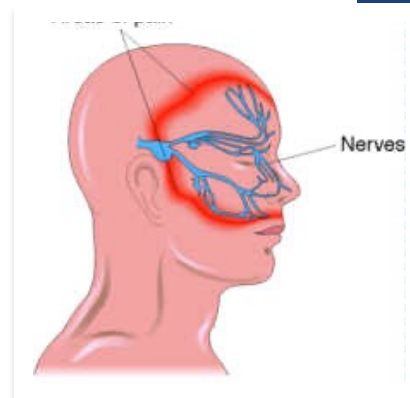
With at least **one** of the following ipsilateral autonomic symptoms:

- conjunctival injection +/- lacrimation; • nasal congestion +/- rhinorrhoea;
- eyelid oedema;
- forehead and facial sweating;
- miosis +/- ptosis;
- a sense of restlessness or agitation during headache

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## Cluster Headache-Cause

- The cause -not known.
- ?vasodilatation of blood vessels compresses surrounding tissues or obstructs venous outflow of the cavernous sinus.
- **During a cluster period, an attack can be triggered very quickly** by drinking alcohol, breathing in fumes from volatile substances, or being in a warm environment
- **Rarely, cluster headache develops secondary to pituitary adenomas and other space-occupying lesions**



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## Managing suspected cluster headache

- **100% oxygen therapy 10-12l with non rebreather mask**
- **CCB Verapamil**  
<https://pn.bmj.com/content/practneurol/19/6/521.full.pdf>
- **triptan to be taken when required for treatment of acute attacks** (Subcutaneous sumatriptan 6 mg/ Sumatriptan 20 mg nasal spray or zolmitriptan 5 mg nasal spray)
- **Advise the person to avoid drinking alcohol or inhaling volatile fumes from substances such as solvents or oil based products**, as these may trigger an attack during an active period of cluster headaches.
- Other treatments include topiramate, lithium or corticosteroids.
- **Patient information and support Urgently referred by GP (GP could consider a trial of indometacin to exclude paroxysmal hemicrania**

- <https://pn.bmj.com/content/19/6/521>

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#### Case study 5

35-year-old female presents to the surgery complaining of right-sided facial pain. She is complaining of/o stabbing electric shocks exacerbated by eating, brushing her teeth and a brisk breeze across her face. The pain lasts a few seconds and rarely up to a couple of minutes. Physical examination shows normal facial sensation, normal bulk in the masseters bilaterally, and intact extra-ocular muscles.

Which is the most appropriate treatment in this patient?

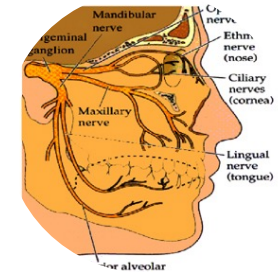
- A. Calcium Gluconate
- B. Carbamazepine
- C. Valproic acid
- D. Clonazepam
- E. Prednisone

What condition do you think she has?

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## Trigeminal neuralgia

- Episodic unilateral facial pain (in areas supplied by one or more divisions of the trigeminal nerve), lasting a few sec to 2 min
- Tic Douloureux
- it is sharp, stabbing, intense in character, and triggered by a trivial stimulus, such as light touch.
- It usually affects the cheek and chin.
- If Bilateral consider multiple sclerosis or a brainstem tumour



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## Trigeminal Neuralgia – Diagnostic criteria

<b>A</b>	Paroxysmal attacks of facial or frontal pain which lasts a few seconds to < 2 minutes
<b>B</b>	Pain has at least 4 of the following characteristics: <ul style="list-style-type: none"> <li>• Distribution along one or more divisions of the trigeminal nerve</li> <li>• Sudden intense, sharp, superficial, stabbing or burning pain in quality</li> <li>• Pain intensity severe</li> <li>• Precipitation from trigger areas, or by certain daily activities such as eating, talking, washing or shaving the face or cleaning the teeth.</li> <li>• Between paroxysms the patient is entirely symptomatic</li> </ul>
<b>C</b>	No neurological deficits
<b>D</b>	Attacks are stereotyped in the individual patient
<b>E</b>	Exclusion of other causes of facial pain by history, physical examination and special investigations

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## Trigeminal Neuralgia - Treatment

- Carbamazepine increased slowly to reach a blood level that will control the pain without inducing giddiness and ataxia.
- Relief with Tegretol diagnostic
- Blood tests required 3-6 monthly as causes leukopenia (decreased white cells). hyponataemia
- Baclofen and lamotrigine for those not responding to carbamazepine.
- Gabapentin if patient also has MS
- If continues , alcohol or glycerol injections may be used
- Surgical microvascular decompression of nerve is the last option

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## HYPNIC HEADACHE

Rare condition called alarm clock headaches.  
Occurs during sleep and wakes the individual.  
More common in women over age 50.  
Lasts 15min – 2hrs. Multiple attacks can occur at night.  
Nausea  
No daytime attacks.  
May requires imaging. Consider verapamil 60mg or caffeine 60mg at night or Lithium

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## Case Study

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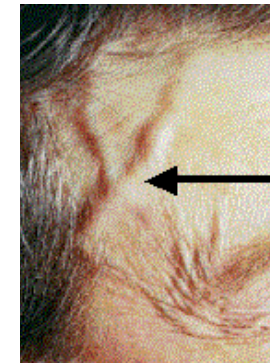
## Think SNOOP

- Any red flags?
- What are your differentials?
- Which tests would you order?
- What are your next steps?

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## Giant Cell (or temporal) Arteritis

- Rare as it is a preventable cause of blindness as ophthalmic artery affected.
- age over 55 years
- F:M ratio is 2:1
- Pain mostly temporal
- polymyalgia,
- fatigue,
- weight loss,
- depressed mood,
- temporal artery thickening causing diminished or absent pulse on palpation



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## MEDICATION OVERUSE HEADACHES

Need to stop abruptly rather than gradually.  
 Stop for at least one month  
 Advise that symptoms will worsen in short term with associated withdrawal symptoms.  
 Provide close follow up and support according to their needs.  
 Specialist referral may be needed for opiate withdrawal.  
 Review 4-6 weeks after withdrawal of medication

## EXAMINATION

- Cranial Nerve Exam
- Reflexes S1+2, L3+4, C5-8
- Power, Strength and Sensation in upper and lower limbs
- Blood Pressure and Pulse
- Temperature
- MMSE
- Cognitive Function

### Investigations

- Blood Tests
- MRI
- CT Scan

- \*\*\* I would recommend watching the following videos.

## SNOOP 10

Systemic symptoms including fever

Neoplasm history

Neurologic deficit

Onset : Sudden or abrupt onset

Older age (onset after 65 years)

- pattern change or recent onset of new headache
- positional headache
- precipitated by sneezing, coughing, or exercise;
- Papilledema
- progressive headache and atypical presentations
- pregnancy or puerperium
- painful eye with autonomic features
- posttraumatic onset of headache
- pathology of the immune system such as HIV
- painkiller overuse or new drug at onset of headache








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HEALTHCARE TRAINING

## Back pain in Primary Care

Dr Parmy Deol, A&E consultant

## SESSION OBJECTIVES




-  Develop skills in taking a structured history in a patient presenting with back pain
-  Recognise yellow flags and how to manage
-  Recognise red flags and able to safety net or refer appropriately.
-  Use a case study approach to explore current treatment options and differential diagnosis

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## Epidemiology



- 60 – 90% of adults experience back pain at some point in their life.
  - incidence age 35- 55 y.o.
  - 90% resolve in 6 weeks
  - 7% become chronic
  - M/ F equally affected
- 85% never given precise pathoanatomical disease
- 5<sup>th</sup> Leading reason for medical office visits
- 2<sup>nd</sup> to respiratory illness as reason for symptom-related GP visits

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## What elements of history and physical exam should clinicians incorporate into evaluation?

Key elements

- Sensory loss? Muscle weakness?
- Limited range of motion in the legs and feet?
- Characterize the pain level

3 categories of back pain

- Nonspecific low back pain
- Back pain associated with radiculopathy or spinal stenosis
- Other specific systemic or spinal causes of back pain

Identify any features indicating serious underlying cause

Identify radiculopathy (compressed nerve in the spine)

Identify any psychosocial factors

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## Uncomplicated Low Back Pain

A diagnosis based on exclusion of specific pathology

Generally classified by the duration of the pain

- Acute: < 1 month
- Subacute: 1-3 months
- Chronic: > 3 months

Majority (> 85%) of low back pain in primary care

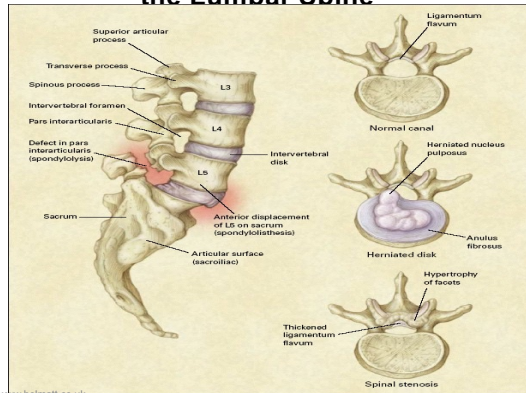
Acute low back pain

- Rapid improvement in the first month in most patients
- High recurrence rate up to 1/3
- **Chronic low back pain (7-10%)**

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## Common Pathoanatomical Conditions of the Lumbar Spine



## Examination

- Look at bending – any shoulder bending or hip movement
- Standing on tip toes and check dorsiflexion of foot and big toe
- Reflex achilles tendon L5 –S1
- Straight leg raise and hip motion
- Check knees and ankles
- Palpating the back: muscles, bones and ligaments

**When to consider imaging**  
**Neurological deficit**  
**Significant history of trauma**  
**Signs of cancer**  
**History of osteoporosis**  
**Age over 50**

## Back pain case studies

### Case study 1

An 82-year-old woman experienced sudden sharp low back pain while gardening that has persisted and worsened. The pain does not radiate. On exam: She is grimacing in pain; vital signs are normal; thoracic kyphosis, loss of lumbar lordosis, and palpable muscle spasm. What is the likely diagnosis and what tests would you perform.

### Discuss?

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## Case History

An obese 65-year-old man presents complaining of back pain that began 5 days ago while shoveling snow. The pain becomes worse when he stands

On exam: The spine is nontender, and pain increases with forward bending. Straight leg raising test is negative, and he has no neurologic deficits



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## Assessment of Function

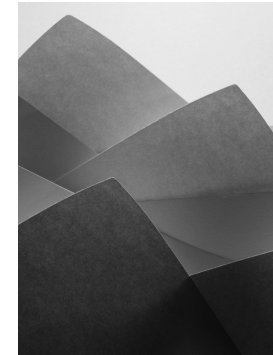


98% disc herniations: L4-S1



Impairment: Motor and Sensory L5-S1

L5: Weakness of ankle and great toe dorsiflexion  
S1: Decrease ankle reflex  
L5 & S1: Sensory loss in the feet



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## Low Back Pain



SECOND MOST COMMON CAUSE OF MISSED WORK DAYS



LEADING CAUSE OF DISABILITY BETWEEN AGES OF 19-45



NUMBER ONE IMPAIRMENT IN OCCUPATIONAL INJURIES



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## Low Back Pain



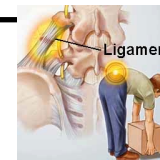
Most episodes of LBP are self limited

They can wear down or be forced out of position



These episodes become more frequent with age

absorbers that can bulge, rupture, or wear down



Ligament



LBP is usually due to repeated stress on the lumbar spine over many years ("degeneration"), although an acute injury may cause the initiation of pain

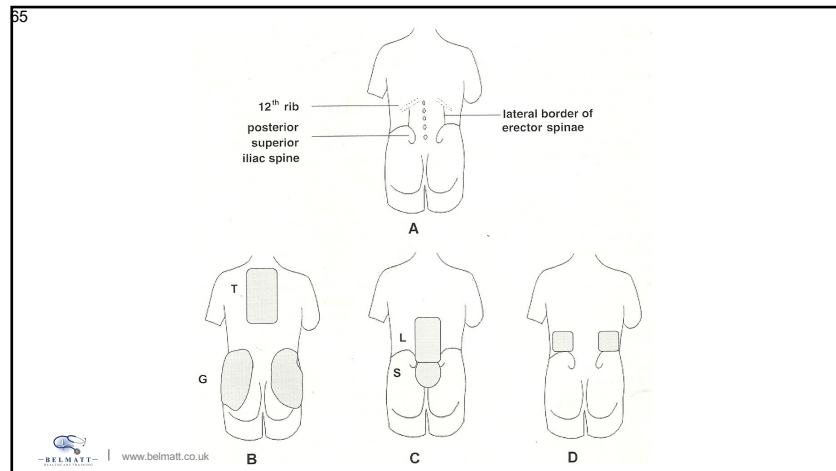


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## Management of Acute LBP: Watchful Waiting

- Patient education
  - Spontaneous recovery is the rule
  - Those who remain active despite acute pain have less future chronic pain
  - Exercise has Prevention Power: Muscle strengthening and endurance exercises
- Rest: 2 to 3 days or less
- Analgesics to permit activity: paracetamol, NSAIDs, ?codeine
- Reassess if pain worsens

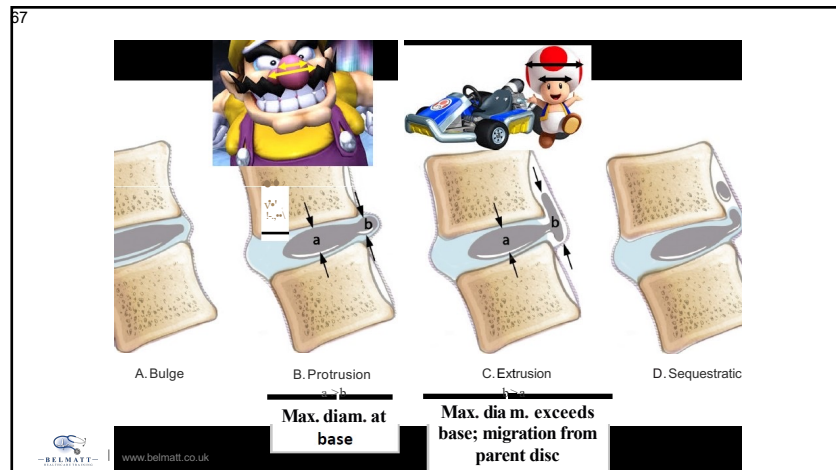
• [Eur Spine J](#) 2018 Nov;27(11):2791-2803. doi: 10.1007/s00586-018-5673-2. Epub 2018 Jul 3.

• Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview.

• [Olivieri CB, Maher CG, Pinto RZ, Toppin AC, Le CT, Chourot E, van Tulder M, Yessierli Z.](#)

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## Therapy: Non-specific LBP

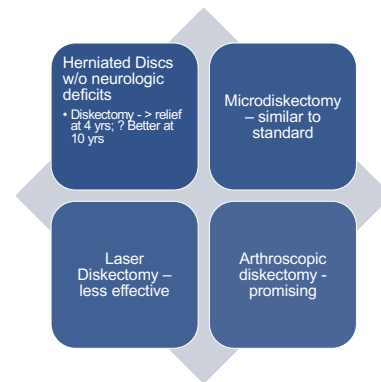
- NSAIDs
- Muscle relaxants
- Use on schedule than p.r.n.
- Spinal manipulation/ PT (effects limited)
- Delay referral until pain persists >3 weeks
  - 50% will improve b/f this time period
- Rapid return to normal activities
- Avoid heavy lifting, trunk twisting, vibrations
- Alternative Tx: acupuncture and massage
- Surgery- ineffective unless:
  - sciatica, pseudoclaudication, spondylolisthesis

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## Long Term Outcomes



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## What factors are associated with development of low back pain?

- Work that requires heavy lifting; bending and twisting; or whole-body vibration, such as truck driving
- Physical inactivity
- Obesity
- Arthritis or osteoporosis
- Pregnancy Ø Age >30 years Ø Bad posture
- Stress or depression
- Smoking

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## Should clinicians advise patients about preventing low back pain?

- Strategies to decrease risk for low back pain
  - Maintain normal body weight
  - Exercise
  - Avoid activities that can injure the back
- There's insufficient evidence to recommend routine preventive interventions in the primary care setting

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## CLINICAL BOTTOM LINE: Prevention...



Prevention may include

Regular exercise and maintenance of fitness  
Educational interventions  
Worksite prevention programs  
Mechanical supports.



But evidence is insufficient to support the use of specific preventive interventions

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## First Episode Acute LBP: Red Flags for Emergent Surgical Consultation

- Cauda equina syndrome
  - Bilateral sciatica, saddle anesthesia, bowel/bladder incontinence
- Abdominal aortic aneurysm
  - Pain pattern is variable
  - Bruits
  - +/- pulsatile abdominal mass
- Significant neurologic deficit
  - If they can't walk, they can't be sent home

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## LBP Recurrences: Key Points

- Goal of evaluation is to identify features that discriminate between "benign" cases and disorders that require further diagnostic studies
  - As before, recommend minimal rest, analgesics, and resumption of usual activity as soon as possible
  - Again, advise that most episodes resolve spontaneously
  - But if neurologic deficit develops, further evaluation mandatory

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## When the Patient Does Not Improve...

- The patient returns in 6 weeks because the pain has not decreased. His legs feel "heavy," and he has had some incontinence in the last week
- On exam: He now has bilateral weakness of ankle dorsiflexion, absent ankle jerks, and saddle anesthesia



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## RED FLAGS

- Fever, weight loss
- Intractable pain—no improvement in 4 to 6 weeks
- Nocturnal pain or increasing pain severity
- Morning back stiffness with pain onset before age 40
- Neurologic deficits



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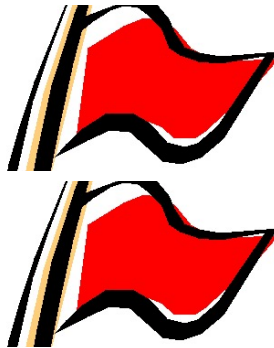
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## RED FLAGS

- Any acute trauma, may need x-rays
- Infections, consider fever chills. Secondary to infections. Meningeal
- Weakness, numbness and tingling
- If history of cancer, higher degree of alertness of metastatic



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## What Should I Be Worried About?

- Herniated disk
- Spinal stenosis
- Cauda equina syndrome
- Inflammatory spondyloarthritis
- Spinal infection
- Vertebral fracture
- Cancer
- Referred visceral pain, eg, abdominal aneurysm, pancreatic cancer, GU cancer

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## Disc Herniation – Physiology



Tears in the annulus



Herniation of nucleus pulposus



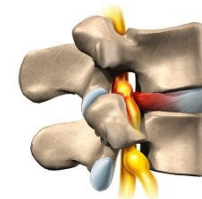
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## Disc Herniation – Physiology

Compression of the nerve root in the foramen leads to pain



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### Conservative Tx.

- Moderate bed rest
- Spinal manipulation
- Physical therapy
- Medication
  - NSAIDs
  - Muscle relaxants
  - Rarely narcotics

## Lumbar Disc Herniation – Treatment

**Microdiscectomy**  
 "Microdiscectomy"  
 Less than half of an inch incision  
 Go home the same or next day  
 Good results in up to 90% of cases




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## Lumbar Spinal Stenosis

- Insidious onset
- Chronic low back pain that progresses to buttock, thigh and leg pain.
- Fatigue, heaviness or pain in the legs with ambulation (Neurogenic claudication)




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## Neurogenic vs. Vascular Claudication

SYMPTOMS	NEUROGENIC	VASCULAR
Back Pain	Common	Uncommon
Pain Relief	Sitting or flexed posture	Not positional
	Standing and resting usually insufficient	Pain relief while standing
	Often slow (>5 mins)	Almost immediate
Ambulatory tolerance	Variable	Fixed
Uphill vs. Downhill	Downhill more painful (extended posture)	Uphill more painful
Bicycle ride	No pain	Pain




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## Lumbar Spinal Stenosis

### Most common exam findings

- Loss of lumbar lordosis with limited extension
- Trunk is flexed forward in standing and walking. ("Simian Posture")
- No significant tenderness to palpation
- Negative SLR
- Normal motor exam despite the report of weakness



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## Management of Spinal Stenosis: Controversial and Evolving

- Symptoms of pseudoclaudication without neurologic deficits:
  - Epidural corticosteroids
  - Progressive exercise program
  - Surgical decompression
    - May relieve leg symptoms
    - May not relieve back pain
- With neurologic deficits: Call the surgeon

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## Therapy: Herniated Disks

- If no evidence cauda equina or progressive neurologic deficit: Treat non-surgically minimum one month
- Treat similar to non-specific LBP. Limited narcotics
- Epidural steroids (helps in some)
- If severe pain or neuro deficits persist: CT/ MRI / consider for surgery
- Discectomy
- Improved relief vs. non-surgery at 4 yrs. / ? 10yrs. Percutaneous and laser less effective. Arthroscopic techniques comparable to surgery

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## Why Not to Get an Operation for a Herniated Disk?



Spontaneous recovery is the rule: 90% resolve over 6 weeks



Predominant symptoms usually leg pain and tingling with less severe or no back pain



Long-term outcome of pain relief no different with or without surgery

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## Case Study

- A32-year-old man complains of severe low back pain of gradual onset over the past few years. The pain is much worse in the morning and gradually decreases during the day. He denies fever or weight loss but does feel fatigued
- On exam: There is loss of lumbar lordosis but no focal tenderness or muscle spasm. Lumbar excursion on Schober test is 2 cm. No neurologic deficits



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## How to Diagnose Inflammatory Back Disease

- History
  - Insidious onset, duration >3 months
  - Symptoms begin before age 40
  - Morning stiffness >1 hour
  - Activity improves symptoms
  - Systemic features: Skin, eye, GI, and GU symptoms
  - Peripheral joint involvement
  - Infections

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## How to Diagnose Inflammatory Back Disease

- Physical examination
  - Limited axial motion in all planes
  - Look for signs of infection
    - Staph, Pseudomonas, Brucella, and TB
  - Systemic disease (AS, Reiter's, psoriasis, IBD)
    - Ocular inflammation
    - Mucosal ulcerations
    - Skin lesions

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## Ankylosing Spondylitis

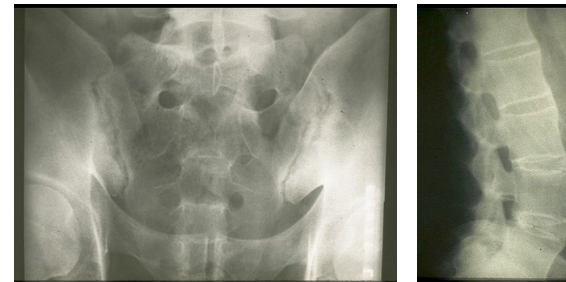
- The earliest clinical features
  - Gradual onset in males <30 years old
  - Morning stiffness
  - Improvement with exercise
  - Not relieved by bed rest
- Schober test
- Chest expansion <2.5 cm (late stage)
- Plain films typically normal in early stages
- 76% chance of ACS and 50% chance of VTE in these patients.
- Wang R, Ward MM. Epidemiology of axial spondyloarthritis: an update. Curr Opin Rheumatol. 2018 Mar;30(2):137-143.
- <https://www.ncbi.nlm.nih.gov/books/NBK539753/>



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## Ankylosing Spondylitis: X-Ray Changes



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- Stretching and strengthening exercises
- Conditioning exercises to improve cardiopulmonary status
- Avoid pillows
- NSAIDs
- Sulfasalazine
- Methotrexate
- New “biologics” under study

## Management of Inflammatory Back Pain

van der Heijde D, Ramiro S, Landewé R, Baraliakos X, Van den Bosch F, Sepriano A, Regel A, Ciurea A, Dagfinrud H, Dougados M, van Gaalen F, Gèhr P, van der Horst-Bruinsma MA, van Riel PL, Jongsma M, Kitz U, Kránz T, Machado PM, Marzo-Ortega H, Molto A, Navarro-Compán V, Ozzogomez S, Pimentel-Santos FM, Revellin J, Rudwaleit M, Sieper J, Sampaio-Barros P, Wiek D, Braun J. 2016 update of the ASAS-ELRA management recommendations for axial spondyloarthritis. Ann. Rheum. Dis. 2017 Jun;96(7):978-991

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## Disc Herniation – Physiology



### Tears in the annulus



Herniation of nucleus pulposus



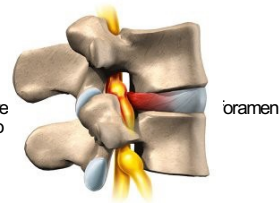
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# Disc Herniation – Physiology

- Compre leads to



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Conservative Tx.

- Moderate bed rest
- Spinal manipulation
- Physical therapy
- Medication
  - NSAIDs
  - Muscle relaxants
  - Rarely narcotics

## Lumbar Disc Herniation – Treatment

**Surgical.Tv**

**"Microdissection"**  
Less than half of an inch incision  
Go home the same or next day  
Good results in up to 90% of cases

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## Case Study



A 40-year-old woman complains of continuous and increasing back pain for 3 months that worsens with movement. She has noted nightly fevers and chills. She is in a methadone maintenance program.



On exam she is exquisitely tender over L4 and the right sacroiliac joint with paravertebral muscle spasm. No neurologic deficits. Old needle tracks in both arms.



Lab: Hb 11.5 mg%, WCC 9,000, ESR 80 mm/h

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## Red Flags for Spinal Infections



### Historical clues

Fever, rigors  
Source of infection: IV drug abuse, trauma, surgery, dialysis, GU, and skin infection



### Physical exam clues

Focal tenderness with muscle spasm  
Often cannot bear weight  
Needle tracks



### Lab clues: Mild anemia, elevated ESR, and/or CRP

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## Case Study

A 60-year-old man complains of the insidious onset of low back pain that worsens when he lies down, so he sleeps in a recliner. There is a remote history of back injury. He has lost 10kg in the past 6 months.

On exam he has lumbar spine tenderness but no neurologic deficits.

Laboratory: Hb 9 mg%, WCC 9,000,

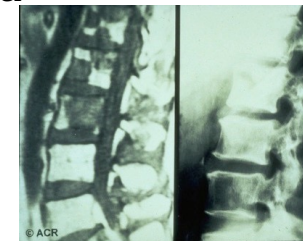
ESR 110 mm/h, monoclonal spike on serum protein electrophoresis.

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## Multiple Myeloma

- Red flags for spinal malignancy
- Pain worse at night
- Often associated local tenderness
- FBC, ESR, protein electrophoresis if ESR elevated



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## Follow-up

The patient improved markedly after chemotherapy and bone

marrow transplant.

Key point: Nocturnal back pain, weight loss, and ESR >100 mm/h suggests malignancy

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## Cancer

- Past history of cancer is by far the single strongest indicator of related low back pain.
  - Metastatic (Prostate, Lung, Breast)
  - Multiple myeloma
  - Lymphoma
- Increases post test probability from 0.7% to 9%
- Not including nonmelanoma skin CA



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## Case Study

- An 82-year-old woman experienced sudden sharp low back pain
- while gardening that has persisted and worsened. The pain does not radiate
- On exam: She is grimacing in pain; vital signs are normal; thoracic kyphosis, loss of lumbar lordosis, and palpable muscle spasm

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## Approach to Acute Back Pain in the Elderly



History and physical exam

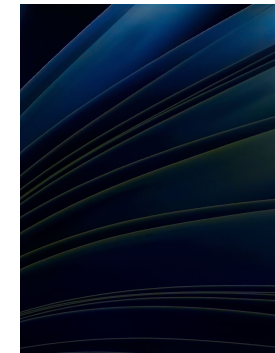


Immediate x-ray



Screening laboratory tests

FBC  
Sedimentation rate  
(protein electrophoresis if elevated)



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## Features of Acute Compression Fractures

- No early warning, often occurs with forward flexion during normal activity or with trivial trauma
- Severe spinal pain
- Marked muscle spasm
- Some relief with recumbency



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## Osteoporosis: Initial Evaluation

Universal: Hgb, ESR, calcium

Additional labs as indicated:

- TSH, PTH, 25-OH Vitamin D
- Serum protein electrophoresis
- Urine calcium
- Testosterone



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## Risk Factors for Osteoporosis

- Female sex, Caucasian, or Asian race
- Maternal hip fracture
- Estrogen or testosterone deficiency
- Corticosteroid excess
- Low body mass
- Life-long low calcium intake
- Sedentary life style or immobility
- Excessive alcohol intake
- Smoking

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## Osteoporosis: BMD Measures

- Indications
  - Establish baseline bone mineral density
  - Guide treatment decisions
  - Monitor therapy
- Methods
  - Dual energy x-ray absorptiometry (BEST IN CLASS)
  - Quantitative CT
  - Single energy x-ray absorptiometry
  - Quantitative ultrasound of bone



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## Long-Term Treatment of Osteoporosis

- Baseline: Measure bone mineral density and height
- Discuss hormone replacement or selective estrogen receptor modulator (SERM)
- Thiazide if hypercalciuric
- Begin calcium and vitamin D
- Recommend bisphosphonates
- Instruct on progressive walking and strengthening exercises

### Case study 3

40 year old fit and healthy male, attend surgery with an acute onset of severe lower back pain. He stated pain was constant, not relieved by paracetamol with shooting pain into the left leg from buttock to heel. He also has pins and needles in his heel. He could not get comfortable in any position in last 24 hrs and has not had much sleep. No alterations to bladder and bowel function, no sudden unexplained weight loss, no night-time fever/ malaise, no pins and needles/ numbness in groin region, no significant loss of leg strength. A sudden unexplained episode of lower back pain and leg pain, that started 8 weeks ago. He reported a history of 1-2 episodes of localised lower back pain and occasional low-grade leg pain, but nothing like this. He is a businessman, usually fit and well. Goes running twice a week. Local tenderness at the distal two joints of the Lumbar spine (L4/5), with widespread muscular spasm. Palpation of L4/5 elicited left leg symptoms.

**What other tests would u perform and what is the likely diagnosis?**

**Radiculopathy – nerve root**  
**Myelopathy –**  
**Heel is S1 and L4-5.**  
**Probably due to nerve pushing on it.**

**L1 upper thigh**  
**L3 symptoms on knee**  
**L4 Inner leg**  
**L5 outsid eof lower leg**  
**S1**

## What factors should lead clinicians to suspect nerve root involvement?



- Consider if patient presents with back & leg pain
- The more distal the pain radiation, the more specific the symptom for nerve root involvement
- Pain that radiates from the back through the buttocks to the legs (sciatica) is common
- Severe or progressive motor deficits warrant urgent evaluation (regardless of origin)
- Symptoms of vascular claudication (not stenosis): leg pain with exertion, rather than with changes in position

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## Treatment Sciatica

- Explain cause of the symptoms and reassure patients that symptoms usually diminish over time without specific measures. Usually resolves on its own.
- Advise to stay active and continue daily activities; a few hours of bed rest may provide some symptomatic relief but does not result in faster recovery
- Prescribe drugs, if necessary, according to four steps: paracetamol; non-steroidal anti-inflammatory drugs, tramadol, paracetamol, or non-steroidal anti-inflammatory drug in combination with codeine; and morphine
- Refer to neurosurgeon immediately in cases of cauda equina syndrome or acute severe paresis or progressive paresis (within a few days)
- Refer to neurologist, neurosurgeon, or orthopaedic surgeon for consideration of surgery in cases of intractable radicular pain (not responding to morphine) or if pain does not diminish after 6-8 weeks of conservative care

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## What factors should lead clinicians to suspect nerve root involvement?

- Symptoms of disk herniation
  - Weakness of the ankle and great toe dorsiflexors
  - Loss of ankle reflex (S1) or sensory loss in the feet (L4)
- Symptoms of nerve root compression. Leg pain is worse than back pain. Straight leg-raising test result is positive.
- Neurologic symptoms in the foot are unilateral
- Neurologic compromise at upper motor neuron
  - Causes: tumor or central disk herniation

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## What factors should lead clinicians to suspect nerve root involvement?



Spinal cord  
compression  
above conus  
medullaris

Weakness,  
decreased  
motor control,  
altered muscle  
tone, spasticity  
or clonus  
Requires  
urgent  
specialist  
consultation



Spinal cord  
compression  
below the conus  
medullaris

Cauda equina  
syndrome:  
bowel or  
bladder  
dysfunction,  
saddle  
anesthesia  
Requires  
immediate  
imaging and  
surgical  
evaluation

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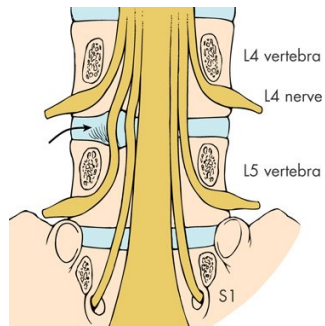
Do you feel your  
bladder is full  
and you can't  
pee.



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## Physical exam maneuvers that suggest herniated disk



**Straight-leg-raising test**

Passive lifting of the affected leg by the examiner to an angle <60 degrees reproduces pain radiating distal to knee



**Crossed straight-leg-raising test**

Passive lifting of the unaffected leg by the examiner reproduces pain in the affected (opposite) leg

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## Clues To Systemic Disease

- Age
- History of Cancer
- Fever
- Unexplained Weight Loss
- Injection Drug Use
- Chronic Infection Elsewhere
- Duration and Quality of Pain
  - -Infection and Cancer not relieved supine
- Response to previous therapy
- h/o inflammatory arthritis elsewhere

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- Compression fracture
  - Associated with older age, white race, trauma, prolonged corticosteroid use
- Nonskin cancer
  - q Hx cancer: strongest risk factor for cancer-related back pain
    - q Also: unexplained weight loss, no relief with bed rest, pain lasting >1 month, increased age
- Ankylosing spondylitis
  - q ≥4 of following: morning stiffness, decreased discomfort with exercise, onset of back pain before age 40, slow symptom onset, pain persisting >3 months
- Osteomyelitis
  - q History of IV drug use, recent infection, fever

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**What serious underlying systemic conditions should clinicians consider?**

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## Is the classification by duration of symptoms clinically useful?

- Acute: Lasts <4 weeks
  - Often cause can't be determined
  - May be related to trauma or muscololigamentous strain
  - Usually resolves within 4 weeks with self care
- Subacute: Lasts 4–12 weeks
  - Transition period between acute and chronic back pain
  - Improvement is not as pronounced as in the acute phase
- Chronic: Lasts >12 weeks
  - Patients at risk for long-term pain or functional disability
  - Episodes of pain may recur ("acute-on-chronic" symptoms)

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## Do standardized assessment instruments have a role in evaluation?



### Use to measure the impact of low back pain

Pain severity doesn't always correlate with effects on function



### Pain

10-point numerical rating scale



### Function

Modified Roland-Morris scale  
Oswestry Disability Index  
STarT Back Screening Tool


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## When should clinicians consider imaging?

- If history or physical suggests specific underlying cause
  - Neurologic deficits are severe or progressive
  - Serious underlying conditions are suspected
- If patients are candidates for surgery or epidural injection
  - Persistent low back pain
  - Signs or symptoms of radiculopathy or spinal stenosis
  - Use MRI (preferred) or CT

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## Imaging

- Plain Radiography limited to patients with:
  - -findings suggestive of systemic disease
  - -trauma
- Failure to improve after 4 to 6 weeks
- CT and MRI more sensitive for cancer and infections
  - – also reveal herniation and stenosis
- Reserve for suspected malignancy, infection or persistent neurologic deficit

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## X ray



Asymptomatic degenerative changes



Finding of degenerative disc disease, spondylolisthesis or pars defect does not establish the cause of low back pain.

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## What are reasonable goals for clinicians and patients for treatment of low back pain?

### Acute, nonspecific low back pain

- Control pain + maintain function
- Symptoms often diminish without treatment
- Most cases resolve within 4 to 6 weeks

### Chronic low back pain

- Maintain function, even if complete resolution not possible
- Address psychosocial factors associated with chronicity
- Focus more on interventions that increase activity than on medical treatments

Most patients don't need surgery, even with herniated disks

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## How should clinicians follow patients with low back pain?

- Follow-up needed after 3 to 4 weeks if no improvement
- If recovery is delayed
  - Address patient response to treatment, any complications
  - Assess probability of transition to subacute / chronic pain
  - Reevaluate for possible underlying causes of back pain
  - Ensure that psychosocial factors are addressed
- Symptoms of neurologic dysfunction or systemic disease should prompt additional evaluation
- Reinforce healthy lifestyle messages (staying active)
- Patient education helps prevent recurrence



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## CLINICAL BOTTOM LINE: Treatment...

- Most acute nonspecific pain resolves w/o medical intervention. Maintain normal activities as much as possible
- If symptoms persist, consider nondrug interventions: Exercise, spinal manipulation, acupuncture, massage. Psychological therapies
- If analgesia needed
  - First-line therapy: paracetamol or NSAIDs
  - Muscle relaxants / opiates: short course only, cautiously. Antidepressants: may be helpful for chronic symptoms
- Urgent surgical referral indicated: if infection, cancer, acute nerve compression, or cauda equina syndrome suspected
- Nonurgent surgical referral: if back pain persists + symptoms suggest nonacute nerve compression or spinal stenosis

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## “Yellow Flags”

- Previous history of disability
- Inconsistent findings
- Abnormal pain behavior
- Litigation
- Work dissatisfaction
- Attention seeking
- Preference for prolonged bed rest
- Depression
- Chemical dependency
- History of abuse
- Family history of chronic pain



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## Key Points About Acute Back Pain

- 90% of cases due to mechanical causes and will resolve spontaneously within 6 weeks to 6 months
- Pursue diagnostic work-up if any red flags found during initial evaluation
- If ESR elevated, evaluate for malignancy or infection
- In older patients initial x-ray useful to diagnose compression fracture or tumor\*

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36yr old male comes to the surgery complaining of pain in both legs that has been progressively worsening for 2 years. He states that the pain is especially debilitating when he walks but is still present at rest and when he awakes in the morning. No numbness or paraesthesia. Pain improves when he leans forward.

**What could he possibly have?**

- vascular claudication
- Spinal stenosis
- Neurogenic claudication
- Sciatica
- Osteoarthritis



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3. A 22-year-old female attends the surgery complaining of urinary incontinence. She tells you that she had 'spine problems' as a child, including scoliosis. She has a history of recurrent lower back pain. She was at her physiotherapist today when she suddenly developed weakness and incontinence. She says the back pain radiates to her legs and perineum and she feels a bit numb in her genitalia. Her friend helped her to get to the surgery which was next to physiotherapy.

**Which of the following is the most likely diagnosis?**

- spinal stenosis
- cauda equina
- cerebrovascular accident
- Impaired ability of the detrusor muscle to contract
- Lumbago



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A 70-year-old man comes to the internal medicine outpatient clinic for regular follow-up. 10-years ago, he underwent a surgery for stomach cancer. He reports that he has been feeling fatigued for the past 3 months. He also notes a tingling sensation in his toes and fingers. Physical examination shows bilateral brisk knee reflexes and loss of proprioception. bilaterally.

Which of the following is the most likely diagnosis?

- a. Diabetes mellitus
- b. **Vitamin B12 deficiency**
- c. Colon cancer
- d. Folate deficiency
- e. Lumbar stenosis

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A 42 yr. old male come to the out of hours complaining of increasing fevers and episodes of urinary incontinence for past 2 days. He says he feels unwell, has malaise and no energy. He thought he had the flu. He recently returned from working in Pakistan as an interpreter in the forces. His T: 39.2 P:120 and BP: 140/90 P: 120. He has neck stiffness and weakness in his lower extremities which are more pronounced on the right. Reduced tone and reflexes in both legs. Sensation is normal.

Which of the following is a likely diagnosis?

- a. Meningitis
- b. Spinal cord compression
- c. **Polio Myelitis**
- d. Multiple Sclerosis
- e. Stroke

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## Summary – Low Back Pain

- Be aware of "Red Flags."
- Identify specific diagnosis.
- Uncomplicated LBP is a diagnosis of exclusion.
- MRI for complicated and specific diagnosis.
- MRI for uncomplicated?
- Diagnostic Injections
- Don't forget the "Yellow Flags."

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