

## Back Pain

### Definition / Supporting Information

Back pain is pain or discomfort in the region from the neck, thoracic, lumbar, and lumbosacral areas or surrounding musculature.

### Essential History

#### Ask about:

- **Site** (eg, midline / paraspinal, lower back / buttock)
- **Onset** / precipitating event (eg, trauma)
  - Note specific activities, especially those that require spinal extension (eg, gymnastics, football, and cricket bowling)
- **Characteristics**, nature, or quality
  - Continuous or intermittent
- **Radiation**
  - Pins and needles / nerve root symptoms
- **Associated factors**
  - Cough impulse or morning stiffness suggestive of inflammatory pain
  - Changes in activities, such as walking, play, sports activities
- **Timing** /duration
  - Night pains or pain on awakening from sleep
- **Exacerbating and alleviating factors** that worsen (eg, activity, coughing, sneezing, straining) or improve pain
- **Severity** of pain
- **Exposures to infectious agents** (eg, tuberculosis, brucellosis)

Growth patterns and / or recent growth spurt

**Keywords / also known as:** lower back pain, lumbago, lumbar pain, neck pain

### Red Flag' Symptoms and Signs

In case of trauma, evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed and stabilisation of the cervical spine, ribs, and pelvis achieved.

#### Ask about:

- Changes in urination or defaecation
  - Tethered cord

- Other related neurological findings suggestive of spinal cord compression
  - Lower limb weakness and / or difficulty or refusal to walk or stand
  - Pins and needles
  - Cough impulse
- Fever
  - Consider infectious, inflammatory, or neoplastic process
- Signs of systemic illness
  - Weight loss
  - Bone pain in other locations (see Extremity Pain)
  - Bruising (see Petechiae and Purpura)

**Look for:**

- ‘Step-offs’ (from vertebral fracture / dislocation)
  - Palpate for these
- Midline or paraspinal tenderness
- Abnormalities in motor function (including symmetry, strength, gait, coordination), sensation, reflexes, rectal sphincter tone
  - Lumbar disc herniation or other nerve compression
- Evidence of nerve root compression
  - Positive straight leg-raising test highly suggestive of this
    - Cervical flexion to accentuate symptoms may add to the sensitivity
  - Any reproduction of the patient’s usual symptoms during testing before 60° of hip flexion, or marked asymmetry, should be considered a positive result.
    - Pain after 60° flexion, or limited to the posterior thigh, is more likely to be caused by hamstring tightness.
- Scoliosis
  - Isolated idiopathic scoliosis does not usually cause pain in children; a painful scoliosis is therefore a red flag
    - Consider spinal malignancy, osteoid osteoma
- Limited lumbar flexion, tenderness over sacroiliac joints, features of enthesitis elsewhere
- Peripheral arthritis typical of enthesitis-related arthritis (a form of juvenile idiopathic arthritis, JIA)
  - Ankylosing spondylitis
- Leg-length discrepancy
  - Check for scoliosis
- Evidence of bruising or trauma
- Organomegaly (hepatomegaly / splenomegaly) or lymphadenopathy
- Sacral dimple of unclear depth, hairy patch, or discolouration
  - Tethered cord

## Differential Diagnosis / Conditions

- Discitis
  - Most common in children < 10 years (including babies)
  - Characterised by:
    - Unexplained fever or toxicity, and
    - Refusal to walk or stand and / or discomfort in an upright posture
- Vaso-occlusive crisis in a child with sickle cell disease
- Vertebral osteomyelitis or epidural abscess
- Trauma (especially intentional injury)
- Pyelonephritis
- Tethered cord
- Ankylosing spondylitis
  - Back pain is a late feature
  - Consider with a family history of:
    - Inflammatory joint disease
    - Ankylosing spondylitis
    - Spondyloarthropathy
    - Inflammatory bowel disease
    - Psoriatic arthritis
  - Tenderness over sacroiliac joints
  - Limited lumbar flexion tenderness at entheses
    - Origin or insertion of plantar fascia, or base of the 5th metatarsal, Achilles tendon insertion, around patella
- Leukaemia, lymphoma
- Primary vertebral tumours
  - Ewing's sarcoma
  - Aneurysmal bone cyst
  - Benign osteoblastoma
  - Osteoid osteoma
- Spinal tuberculosis (Pott's disease)
- Urinary tract infection or pyelonephritis
  - Consider with:
    - Fever
    - Costovertebral angle tenderness
    - Dysuria
    - Polyuria
    - Urinary urgency
    - Cloudy, dark, or pink / red-tinged urine

**In addition, adolescents may have:**

- Acute pain (< 3 weeks)
  - Lumbar disc disease
  - Apophyseal ring fractures
  - Muscular or ligamentous strain
    - Lower back pain exacerbated by lifting, stooping, exercise
- Chronic pain (≥ 3 weeks)
  - Spondylolysis
    - A defect, most commonly a stress fracture, of the pars interarticularis
    - One of the most common causes of low-back pain in this age group
    - Athletes (gymnasts and cricketers) and individuals with benign hypermobility syndrome may be at risk
  - Spondylolisthesis
    - Anterior movement of one vertebral body on top of another, usually L5 on S1
      - A result of bilateral spondylolysis
      - One of the most common identifiable causes of low-back pain in this age group
  - Scheuermann's kyphosis
    - Thoracolumbar spinal deformity with localised vertebral body changes
    - Often picked up coincidentally as it does not always cause pain
  - Facet or vertebral dysfunction
    - Mechanical pain
    - Trauma related
  - Sacroiliac dysfunction
    - Mechanical pain
    - Trauma related
    - Consider inflammatory joint disease
  - Spinal stenosis
    - Consider underlying pathology (eg, achondroplasia)
  - Prolonged muscular or ligamentous strain
  - Functional (nonorganic) pain

## Investigations

In case of trauma, investigations should progress only after the ABCs of resuscitation have been addressed and stabilisation of the cervical spine, ribs and pelvis achieved.

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team), or specialist practitioners (eg, Emergency Department / Orthopaedic Surgery / Paediatric / Paediatric Rheumatology Team(s)) if not already done:

- Depending on results of clinical evaluation:
  - Full blood count / film
  - Erythrocyte sedimentation rate
  - Urinalysis and culture
  - Blood culture and C-reactive protein if evidence of fever
  - Human leucocyte antigen-B27 (HLA-B27)
    - Increased risk of ankylosing spondylitis if positive family history
    - More likely to get acute uveitis (red eye) if HLA-B27 positive
- Imaging
  - Discuss most appropriate option with radiologist on the basis of clinical assessment
- Radiographs of the spine (anteroposterior, lateral, oblique views) may identify:
  - Compression fracture
  - Discitis
  - Osteoid osteoma or osteoblastoma
  - Scheuermann's disease (lateral)
    - Diagnosis is confirmed by anterior wedging of  $\geq 3$  contiguous vertebrae, by  $\geq 5^\circ$
  - Spondylolysis
    - 'Scotty dog with a collar' can be seen on the oblique view
    - Normal radiography may not rule out the diagnosis
  - Spondylolisthesis (lateral)
- Computed tomography (CT)
  - Osteoid osteoma or osteoblastoma
- Magnetic resonance imaging (MRI)
  - Ankylosing spondylitis
    - With gadolinium of the sacroiliac joints and ultrasound of entheses can confirm local inflammation
  - Discitis
  - Sacroiliitis (gadolinium needed)
  - Spinal cord compression
- Nuclear medicine imaging (bone scans)
- Single-photon emission computed tomography (SPECT)
- Spondylolysis

## Treatment Approach

To be undertaken by non-specialist practitioners (eg, GP Team), or specialist practitioners (eg, Emergency Department / Orthopaedic Surgery / Paediatric / Paediatric Rheumatology Team(s)):

- Acute (< 3 weeks') pain, especially with a history of musculoskeletal injury, may be managed conservatively
  - Unless accompanied by red flag signs/symptoms
- Chronic (> 3 weeks') pain requires further investigation
- Musculoskeletal back pain:
  - For acute pain, think PRICEMMMS
    - **P**rotection
    - **R**est
    - **I**ce
    - **C**ompression
    - **E**levation
    - **M**edication
    - **M**otion
    - **M**odalities
    - **S**trength
  - For chronic pain
    - Best managed with multidisciplinary team approach
      - Physiotherapy
      - Analgesia
      - Rehabilitation programme
      - Heat may be helpful
      - Psychology may also be helpful
    - Discourage bed rest, as this may delay recovery
    - Pain-free activity may be resumed gradually
    - Exercises may be helpful
      - Stretch after warming the muscles by gentle exercise
      - Strengthen core musculature (abdomen, hips, and back).
      - Abdominal muscle strengthening reduces pelvic tilt and decreases the tendency toward lordosis
      - Strengthen spinal extensor muscles (eg, by raising the torso and head off the floor / exercise ball while lying prone)
      - May use an exercise ball, yoga, or Pilates instruction
      - Full sit-ups with fixed feet and bent knees should be discouraged
      - Continuous-frequency ultrasonography, massage, and acupuncture may be helpful

- In leg-length discrepancy, a heel lift and physical therapy to reduce flexion contractures at knee and hip and genu valgus may be of benefit

## When to Refer

Refer urgently to specialist practitioners (eg, Emergency Department / Orthopaedic Surgery / Paediatric / Paediatric Rheumatology / Oncology Team(s)) if:

- Back pain is accompanied by any red flag signs or symptoms

## ‘Safety Netting’ Advice

- Advise patients, parents and carers to seek medical advice if any red flag symptoms develop
- Prevention
  - Muscular low back pain prevention measures:
    - Teach proper posture
      - eg, bend the knees, not the back, when picking up objects off the floor
    - Backpack should not exceed 10–20% of body weight
      - Wear over both shoulders
    - Stretches to improve flexibility of lower back and hamstrings
    - Exercise to strengthen core musculature (abdomen, hips, and back)

## Patient / Carer Information

***\*Please note: whilst these resources have been developed to a high standard they may not be specific to children.***

- [Back Pain](#) (Web page), the NHS website
- [Back Pain in children](#) (Web page), Patient
- [Back Pain](#) (Web page), Together for short lives (website for families of children with life-limiting conditions)

## Resources

### Medical Decision Support

[Sports Injuries](#) (Web page) HealthyChildren.org, American Academy of Pediatrics

### Suggested Resources

***\*Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

[Pain Management](#) (eLearning - requires log-in), RCPCH Compass

[Paediatric Musculoskeletal Matters](#) (Website), Newcastle University and Northumbria University.

[Performing a regional examination of the musculoskeletal system \('REMS'\)](#) (Web page), Arthritis Research UK.

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## Acknowledgements

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