Clinical Guideline

ACUTE LIMP IN CHILDREN

SETTING
Children’s Emergency Department or Primary Care settings

FOR STAFF
Doctors, Emergency Nurse Practitioners

PATIENTS
Children presenting to the department with acute painful limp

GUIDANCE

This guideline is intended as a reference tool to aid clinicians diagnose and manage children presenting to the Children’s Emergency Department with acute painful limp. It is aimed particularly at clinicians assessing children whose symptoms have not yet been diagnosed.

Limp can be a challenging presentation to diagnose and manage, particularly in small children who may poorly localise their symptoms and be unable to articulate what they are experiencing. Children may limp because they have well-localised pain in a specific joint e.g. transient synovitis (“irritable hip”), septic arthritis or a toddler’s fracture or may have poorly localised symptoms such as referred pain or pain from a bony malignancy or spinal problem. In addition, a limp may be caused by a non-musculoskeletal cause such as abdominal tumour, urinary tract infection or appendicitis.

A handful of conditions account for the majority of presentations to ED, however the list of differential diagnoses is long and clinicians must be vigilant to avoid missing serious pathology on both history and examination which should include a thorough systemic evaluation (including spinal, abdominal and inguinal examination).

Thorough safety-netting must be done if discharging a child from ED, including use of the department’s patient information leaflet.
**Child with Acute Painful Limp**

- Pain-score +/- analgesia

**Unwell child?**

- Yes: Discuss with ED registrar or consultant. Consider blood tests & imaging to aid diagnosis & management
- No:

**History**

- Systemic and musculoskeletal examination

**Differential Diagnosis**

- Consider allowing child & family home with follow-up in 5-7 days
- Are symptoms mild or improving with analgesia?

**Red Flags**

- Yes: Investigate & manage appropriately
- No:

**Are symptoms mild or improving with analgesia?**

- Yes: Consider allowing child & family home with follow-up in 5-7 days
- No:

**Most common causes of acute limp seen in Bristol CED**

- Transient Synovitis (Irritable Hip)
- Septic Arthritis
- Trauma
- Toddler’s fracture

**History of acute, significant trauma**

- Yes: Investigate & manage appropriately
- No:

**Is diagnosis clear?**

- Yes:
- No:

**Unwell child?**

- Yes:
- No:
History

Useful points to elicit from history (adapted from Phillips 1) looking in particular for red flags:

- Site of pain (if present)
- Analgesia
- Pain severity (using FACES or numeric scale on admission sheet) and response to analgesia
- Duration & severity of symptoms
- Presence of fever
- Relationship to time of day and activities
- Bowel & bladder symptoms
- Preceding illnesses
- History of trauma
- Interference with daily activities
- Past medical history
- Developmental stage of child
- Family history of connective tissue disorders

Identifying the acutely unwell child

(adapted from NICE cg160)

Children who are acutely unwell are more likely to have an infective or pathological cause for their limp. Signs and symptoms of an acutely unwell child include:

- Pallor/mottled skin
- Reduced activity or irritability; Poor feeding in infants
- Tachypnoea
- Tachycardia, poor perfusion, dehydration
- Systemic upset
- Fever

Examining the limping child

Tips:

- Try and relax the child by engaging with their carer
- Encourage the child to mobilise by using toys or getting them to walk to their carer
- Simple analgesia on arrival to ED may result in a dramatic improvement by the time they are assessed by a clinician.
- Observe the child in the waiting room: is the child happy and playful or sitting quietly on a parent’s lap? Will they walk into the main department or must they be carried?

Specific examination findings:

- Gait (including running)
- Inspect bones, joints and skin for deformity/swelling/erythema/rash
- Active joint movement (by child)
- Passive joint movement (by clinician) including internal/external rotation of hips
- Examination of joints adjacent to (above and below) site of pain including spine.
- Palpation over limbs & joints for specific sites of pain
- Feet for foreign bodies/verrucae
- Abdomen & genitalia: pain/masses
• Lymphadenopathy: groin/axillae/neck
• Consider paediatric Gait Arms Legs Spine (pGALS) screen

Investigations

• Blood tests (consider senior review before performing blood tests)
  o Full blood count, CRP, ESR
  o Blood culture (if history of fever)
• Urine culture
• Imaging
  Not every limping child requires imaging, but x-rays and ultrasound scans are useful in some situations.

X-rays may help identify:
  • Fractures
  • Perthes disease (though early x-rays may be normal)
  • Slipped Upper Femoral Epiphysis
  • Osteomyelitis
  • Some bony tumours

X-rays are not routinely indicated for diagnosis of Transient Synovitis

Hip ultrasound may help identify:
  • Fluid in joint space e.g. in transient synovitis or septic arthritis
  • Developmental Dysplasia of the Hip

Hip ultrasound is not good at distinguishing between Transient Synovitis and Septic Arthritis and is not routinely used as a first line investigation in the management of transient synovitis.

Red Flags

Red flag symptoms indicate that a child may have a significant underlying condition causing their limp:
• Child acutely unwell
• Fever >38C
• Severe pain/spasm/restriction of movement
• Poor response to simple analgesia
• Non-weight-bearing
• Erythema/swelling over joint
• Pain worse at night
• Multiple attendances (hospital or GP) – if 3 or more attendances with same problem requires a consultant review.
• Social concerns
• Back pain/neurological abnormality
• Loss of motor milestones or developmental regression
• Abnormal blood tests (if performed)
  o white blood cells >12,000
  o CRP > 20
  o ESR >40
## Differential Diagnoses

<table>
<thead>
<tr>
<th>Common</th>
<th>Less common</th>
<th>Rare</th>
<th>Non-musculo-skeletal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient synovitis</td>
<td>Septic arthritis</td>
<td>Malignancy</td>
<td>Haematological malignancy</td>
</tr>
<tr>
<td>Toddler’s fracture</td>
<td>Osteomyelitis</td>
<td>Discitis</td>
<td>Lymphadenitis</td>
</tr>
<tr>
<td>Other bony trauma</td>
<td>Perthes</td>
<td>Neuropathic pain</td>
<td>Urinary tract guideline</td>
</tr>
<tr>
<td>Soft tissue injury</td>
<td>Slipped Upper Femoral Epiphysis</td>
<td>Spondylolysis</td>
<td>Abdominal mass</td>
</tr>
<tr>
<td></td>
<td>Juvenile Rheumatoid arthritis / Juvenile Idiopathic Arthritis</td>
<td></td>
<td>Appendicitis</td>
</tr>
<tr>
<td></td>
<td>Physical abuse/Non-accidental injury</td>
<td></td>
<td>Constipation</td>
</tr>
<tr>
<td></td>
<td>Myositis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freiburg disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kohler disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sever disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Osgood-Sclatters disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sinding-Larsen-Johansson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Transient Synovitis ("Irritable Hip") – see pathway below
- blood tests & imaging usually unnecessary unless red flag features
- self-limiting inflammatory condition affecting knee or hip
- associated with a viral respiratory tract illness in 50% of cases
- child usually afebrile and well-looking
- may have restriction of internal rotation of the hip on examination
- hip may be held in position of comfort: slightly flexed & externally rotated
- often has good response to simple analgesia/NSAIDs
- should resolve completely within 1-2 weeks
- persistent pain suggests alternative pathology and should prompt re-evaluation of the patient

### Septic arthritis
- Bacterial infection most commonly affecting the hip or knee
- Kocher’s criteria\(^2\) may be used to predict likelihood of septic arthritis:
  - inability to weight-bear
  - fever >38.5
  - white blood cells >12,000
  - raised inflammatory markers (ESR >40 or CRP >20)
- Likelihood of septic arthritis using Kocher’s criteria
  - 2 risk factors: 40%
  - 3 risk factors: 93%
  - 4 risk factors: 99%
- Suspected cases of septic arthritis must be should be discussed with the CED consultant
if present and referred immediately to the oncall orthopaedic team: joint destruction can rapidly occur if treatment is delayed.

- Ultrasound may identify a joint effusion but does not distinguish from transient synovitis; diagnosis of septic arthritis confirmed by culture of aspirated fluid performed in theatre

**Physical abuse/Non-accidental injury**

- Consider a diagnosis physical abuse in any child presenting with a potential injury, particularly children under the age of 3 years
- Red flags for physical abuse include:
  - Delayed presentation
  - Unexplained injury
  - Non-mobile child with bruising or fracture
  - Injury not in keeping with developmental stage of the child or the stated cause
  - Changing account of injury happened/different account from different members of the family
  - Signs of neglect
  - Regular ED attendances
  - Recurrent injuries or ingestions
  - Child, sibling or parents known to have support from Social Services
Toddler’s Fracture
- Spiral fracture of the distal tibia caused by a trip, fall or twisting of the lower leg
- Most commonly seen in children who are learning to walk
- Injury is accompanied by limp/failure to weight-bear and point tenderness over the fracture site.
- Seek to exclude/identify risk factors for physical abuse in any child with a fracture
- X-rays may show a spiral fracture to the tibia (see image) or may initially be normal
- Management should be by a short cast or boot and referral to orthopaedic fracture clinic (or hot clinic?)

Toddler Fracture extending through physis (3yr old; jumped off sofa)
Perthes disease

- Idiopathic avascular necrosis of the femoral epiphysis
- Insidious onset; typically affects children 3–10 years
- Presents with hip, knee or groin pain
- More common in boys
- May be limited internal rotation and hip abduction
- 10-20% bilateral
- Disease can be staged by x-ray appearance (Catterall Classification) though imaging may be normal in the early stage
- Children with acute painful limp due to suspected Perthes disease should be referred to the oncall orthopaedic team

Perthes disease of the left hip

![Perthes disease of the left hip](image)
Slipped Upper Femoral Epiphysis (SUFE)

- Also known as Slipped Capital Femoral Epiphysis (SCFE)
- Typically seen in early-mid adolescence & associated with obesity
- More common in boys
- Symptoms may follow trauma or have a gradual onset
- Usually present with hip, knee or groin pain
- Examination may reveal loss of internal rotation of the hip
  - Leg may be rotated externally when supine, and will rotate externally on flexion
- Complications include avascular necrosis
- Early surgical management improves prognosis
- Requires referral to on-call orthopaedic team

X-ray features of SUFE:

- **Both antero-posterior and ‘frog-leg’ lateral** views are necessary
- A line drawn along the margin of the femoral neck (Klein’s line) normally intersects the edge of the femoral epiphysis. If it does not, then suspect SUFE (see figure below)
- There may be widening of the physis

![](image)

SUFE of the right hip

Juvenile Rheumatoid Arthritis/Juvenile idiopathic arthritis

- May affect a single joint or be part of a systemic multi-joint illness
- Wrists, knees and ankles commonly affected but hips may be involved
- Fever and rash may accompany articular symptoms
- Paediatric Gait Arms Legs and Spine (pGALS) screening examination may be useful in identifying joints involved
Other causes of acute painful limp in childhood

**Osteomyelitis**: may have non-specific symptoms such as fever but can be accompanied by localised pain, erythema or swelling

**Malignancy** e.g. Ewings sarcoma; osteosarcoma; often accompanied by non-specific symptoms but a history of persistent pain that is worse at night may indicate bone malignancy or metastases. Abdominal and spinal malignancy may also cause limp.

**Myositis**: tenderness over major muscle groups, often in context of viral illness; blood tests show elevated muscle enzymes; usually self-limiting

**Discitis**: infection or inflammation to the intervertebral discs; child may be less active/unwilling to mobilise; fever not always present

**Sever’s disease**: heel pain (often bilateral) at the insertion of the Achilles tendon

**Freiburg disease**: pain over plantar surface of metatarsal heads due to osteochondrosis of the second, third, or fourth metatarsal

**Kohler disease**: Osteochondrosis of the tarsal navicular; most commonly in boys aged two to nine years of age; unilateral foot pain and tenderness to palpation over the tarsal navicular

**Osgood-Schlatters disease**: pain localised to insertion of patella tendon at tibial tuberosity

**Sinding-Larsen-Johansson syndrome**: pain localised to inferior pole of patella due to avulsion of the bony apophysis

References


3 https://radiopaedia.org/cases/toddlers-fracture

4 https://radiopaedia.org/cases/legg-calve-perthes-disease-16

5 https://radiopaedia.org/cases/slipped-upper-femoral-epiphysis-3
Bibliography


RELATED DOCUMENTS None

AUTHORISING BODY Children’s Emergency Department Governance Group

SAFETY None

QUERIES Dr David Hanna or Dr Nicholas Sargant, Children’s Emergency Department, Bristol Royal Hospital for Children Ext 28187 / 21015