

# Limp – Emergency management in children

## Purpose

This document provides clinical guidance for all staff involved in the care and management of a child presenting to an Emergency Department (ED) with an unexplained limp in Queensland. This guideline does not cover the management of all conditions that can present with limp but focuses on identifying the more common serious conditions (including septic arthritis) that require timely specialist referral.

This guideline has been developed by senior ED clinicians across Queensland, with input from Orthopaedic and Rheumatology specialists, Lady Cilento Children's Hospital, Brisbane. It has been endorsed for use across Queensland by the Statewide Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Division.

## Key points

- Transient synovitis is a benign condition and the most common cause of an acute limp in children.
- Careful assessment (history and examination) can identify red flags suggestive of more serious pathology (which require investigation and specialist referral).
- Septic arthritis is an orthopaedic emergency and should be suspected in any limping child with severe, localised joint pain and fever.

## Introduction

Children present to the ED with a wide spectrum of possible causes for a limp ranging from benign conditions to serious underlying pathology. Common conditions are discussed within this guideline, including an approach to initial assessment and management. A broader range of conditions may need to be considered, especially if the limp has persisted for more than 1 week.



Broader range of diagnostic differentials for acute and persistent limp	
Category	Conditions
<b>Post-infection</b>	Transient synovitis (post-viral) Post- streptococcal infection (including rheumatic fever) Serum sickness Myositis
<b>Infection</b>	Septic arthritis Osteomyelitis Psoas abscess Discitis
<b>Trauma</b>	Toddler's fracture Sprains Non-accidental injury (NAI)
<b>Primary bone disease</b>	Slipped Upper Femoral Epiphysis (SUFE) Perthes disease Apophysitis Developmental dysplasia of the hip (DDH)
<b>Referred pain</b>	Appendicitis Psoas abscess Discitis Testicular torsion
<b>Other</b>	Including neoplastic, inflammatory, non-inflammatory (mechanical or anatomical) conditions, chronic pain syndrome or psychogenic disorders.

Common causes of acute limp in children listed in order of incidence by age group in the table below.

**Septic arthritis can present at any age and must be considered in every child with joint pain and fever.**

Common causes of acute limp by age and decreasing order of incidence			
Infants (<1 year)	Young children (1-4 years)	School-aged children (5 -10 years)	Older children/adolescents (> 10 years)
Trauma including NAI	Transient synovitis	Trauma	Trauma
Septic arthritis/osteomyelitis	Trauma including NAI and toddlers fracture	Transient synovitis	Septic arthritis/osteomyelitis
DDH	Septic arthritis/osteomyelitis	Septic arthritis/osteomyelitis	SUFE
	DDH	Perthes disease	Inflammatory arthritis
	Perthes disease	Psychogenic pain less common	Psychogenic pain



## Common ED presentation

### Transient Synovitis

- most common cause of limp in the pre-school age group
- male to female ratio is 2:1
- recent history of upper respiratory or gastrointestinal viral infection is common<sup>1</sup>
- child may have normal temperature or low-grade pyrexia (< 38.5°C)
- diagnosis is usually by exclusion, with a careful history and examination (blood tests not routinely required though may be needed to exclude other diagnoses)
- child usually able to walk and weight bear with mild pain or discomfort
- most recover with rest and anti-inflammatory medication within 2 weeks, though usually shorter
- careful clinical assessment is needed to differentiate transient synovitis from an early presentation of septic arthritis in the younger age group<sup>2</sup>

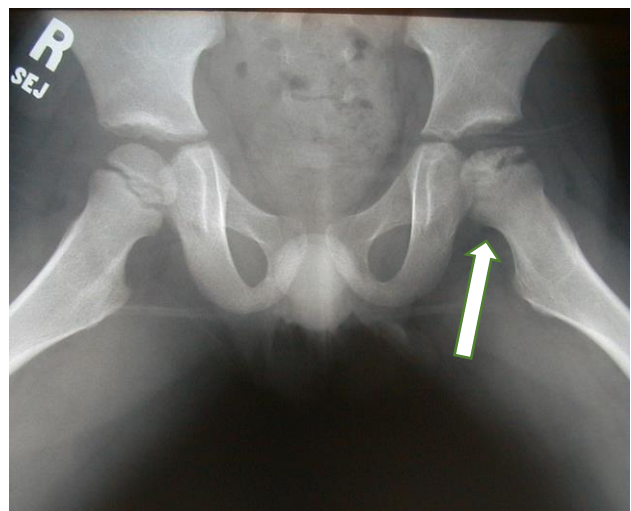
## Less common but serious ED presentations

### Septic Arthritis

- an orthopaedic emergency – potential for joint destruction with delayed antibiotic treatment
- affects all age groups but most common in younger children (peak age < 3 years)
- usually acute onset, with fever ( $\geq 38.5^\circ\text{C}$ ) and toxaemia
- most synovial fluid isolates from confirmed cases are *S. aureus* or *Streptococcus sp.*
- severe pain may occur with passive motion, with child reluctant/unable to move the joint or weight bear
- treatment is with parenteral antibiotics once cultures (blood and ideally synovial) have been obtained
- if suspected and > 4 hour delay for synovial fluid aspiration in OT, antibiotics IV must be given in consultation with orthopaedic staff (see [Paediatric Bone and Joint Infection Management Guideline](#))
- if diagnosis is suspected seek senior advice early

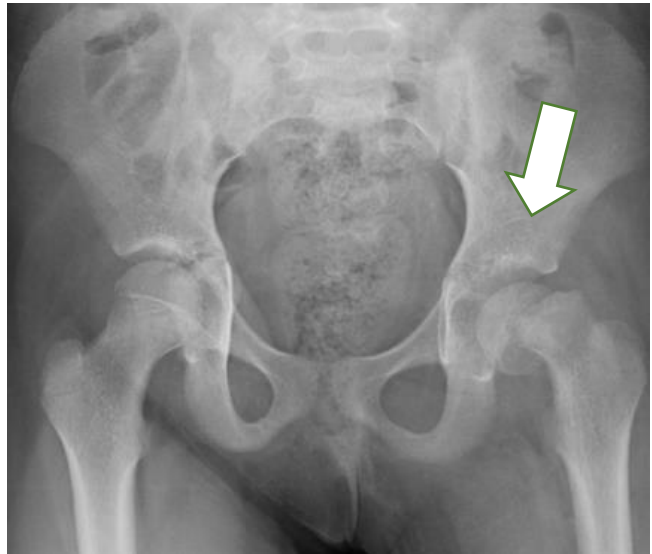
### Perthes disease

- idiopathic avascular necrosis of the proximal femoral epiphysis
- commonly between 4-10 years of age<sup>3</sup>
- male to female ratio is 5:1, 20% bilateral
- discomfort and limp may fluctuate potentially delaying diagnosis
- hip stiffness may be present on examination with loss of internal rotation and abduction
- X-rays can be normal in the early stages, with later changes of joint effusion, epiphyseal fragmentation or loss of femoral head height
- maintain a high index of suspicion and consider orthopaedic referral in males aged 5-10 years with persistent limp, even if X-rays are normal
- management may be supportive and/or surgical



## Slipped Upper Femoral Epiphysis (SUFE)

- most common hip disorder affecting adolescents
- greatest risk factor is weight > 90th percentile
- more common in children with endocrine disorders / disturbances (puberty)
- male to female ratio 3:1, 20% cases bilateral<sup>4</sup>
- may present with groin/ thigh/ knee pain, abnormal gait, weakness and/or thigh atrophy
- limp often present for weeks or months, and may have been preceded by minor trauma
- slipped epiphysis demonstrated on X-ray of pelvis (including frog leg view) – may be normal or only minor slip in early stages
- maintain a high index of suspicion in overweight adolescents with persistent limp
- high risk of avascular necrosis
- requires operative management



## Other ED presentation

### Toddler's Fracture



- occurs in young ambulatory children (9 months to 3 years)
- results from twisting injury
- can be spiral or oblique, undisplaced fracture of the distal shaft of the tibia with an intact fibula
- often subtle and may not be initially apparent (repeat X-ray 1-2 weeks post-injury may reveal fracture)
- treatment is supportive with consideration of immobilisation in a cast (if pain cannot be managed with simple analgesia, or to protect against further injury)

## Assessment

The aim of a thorough clinical assessment (history and examination) is to distinguish between the children who have serious underlying pathology from the larger group of children who do not have a serious cause for their limp.



**ALERT** – Septic arthritis is an orthopaedic emergency. Delay in diagnosis increases the risk of joint destruction.

## History

History taking should include specific information on:

- onset and course of limp
- history of trauma
- pain history - including localisation, magnitude, pain migration, number of joints involved, exacerbating/ relieving factors
- constitutional symptoms such as fevers, malaise, anorexia, weight loss, night sweats
- preceding illness
- previous or recurrent injuries (should raise suspicion of NAI especially in infants and younger children)
- social history
- developmental delay

## Examination

Clinical examination should include:

- general examination with attention to vital signs and appearance, bruising and lymphadenopathy
- neurological examination - symmetry of limbs, muscle atrophy, power, tone, reflexes and coordination, including ataxia
- joint examination (including joint above and below) assessing swelling, tenderness, warmth, active and passive mobility
- point bony tenderness (may indicate osteomyelitis)
- abdomen, scrotum and spine examination to exclude referred pain from other possible causes

## Keep in mind

- physical examination can be challenging in younger children – observation of how they move, weight bear, crawl, walk, run, jump and squat will be very helpful in terms of localising potential pathology
- neurological weakness can present as a limp

### Red flags to suggest serious pathology for a child with a limp

- fever  $\geq 38.5^{\circ}\text{C}$
- age < 4 years
- inability to weight bear or severe, localised joint pain
- bony pain
- systemic symptoms such as weight loss, night sweats
- possible unwitnessed trauma/NAI
- overweight adolescent



If suspect septic arthritis (e.g. child with acute onset of limp who has a fever  $> 38.5^{\circ}\text{C}$  and severe, localised joint pain) seek prompt senior emergency/orthopaedic advice as per local escalation protocols



## Investigations

Investigations required will depend on the assessment. Children presenting within a few days of onset of the limp and with no red flags may not require any investigations. Clinicians must ascertain the benefits before ordering tests and clarify what a specific test will add to the evaluation of the limping child.

Investigations for a child with a limp	
Investigation type	Utility
<b>Plain X-rays</b>	Exclude fractures primarily but also Perthes disease, SUFE, DDH and bony lesions. A normal plain X-ray does not exclude early septic arthritis or osteomyelitis.
<b>Full blood count (FBC)</b>	Exclude malignancy. Assists in determining the risk of septic arthritis or osteomyelitis.
<b>C reactive protein (CRP)</b>	Assists in determining risk of septic arthritis or osteomyelitis.
<b>Erythrocyte sedimentation rate (ESR)</b>	Assists in determining risk of septic arthritis, osteomyelitis or other inflammatory causes of limp.
<b>Blood cultures</b>	Essential if diagnosis of septic arthritis or osteomyelitis is considered.
<b>Joint ultrasound</b>	Identifies the presence/absence of effusion but does not discriminate between exudate and transudate. Absence of effusion on formal USS can be used to exclude septic arthritis. Negative bedside ultrasound should always be confirmed by formal radiology especially if high index of suspicion for septic arthritis. 5
<b>Specialised imaging (CT scan/MRI/bone scan)</b>	Only ordered on specialist advice.
<b>Synovial fluid culture</b>	Gold standard for diagnosis of septic arthritis. Performed by orthopaedic surgeon in theatre.

### Diagnosing septic arthritis

Definitive diagnosis is confirmed on positive joint aspirate by orthopaedic surgeons in theatre. In the ED, Kocher's criteria<sup>6-8</sup> can assist in determining the likelihood of septic arthritis.

Predictors	Probability of septic arthritis	
	Number of predictors	Probability of septic arthritis
<ul style="list-style-type: none"> <li>fever &gt;38.5 °C</li> <li>non-weight bearing</li> <li>leukocytosis &gt;12,000/mm<sup>3</sup></li> <li>ESR &gt;40 mm/hr</li> </ul>	0	0.2%
	1	3%
	2	40.0%
	3	93.1%
	4	99.6%



## Management

Refer to the flowchart in Appendix 1 for a summary of the recommended assessment and investigation for a child presenting to ED with an unexplained limp.

The appropriate management will be guided by the outcome of the assessment.



Urgent referral to orthopaedic team as per local protocols is required for all children with suspected septic arthritis.

A child with septic arthritis who is critically unwell or septic for whom there is a delay to theatre may require resuscitation including empirical antibiotics after blood cultures have been obtained. This should be done on orthopaedic advice.



Prompt referral to orthopaedic team as per local protocols is required for all children with serious underlying pathology.



Consider seeking orthopaedic advice as per local protocols for a child with a persistent limp (> 1 week) and a normal X-ray.

## When to escalate care

Follow your local facility escalation protocols for children of concern. Transfer is recommended if the child requires care beyond the level of comfort of the treating hospital. Clinicians can contact the services outlined below to escalate the care of a paediatric patient.

Service	Reason for contact by clinician	Contact
<b>Local Paediatric/Orthopaedic service</b>	For paediatric/orthopaedic advice and assistance with local transfers as per local arrangements.	As per local arrangements
<b>Children's Advice and Transport Coordination Hub (CATCH)</b>	For access to specialist paediatric advice and assistance with inter-hospital transfer of non-critical patients into and out of Lady Cilento Children's Hospital.  For assistance with decision making regarding safe and appropriate inter-hospital transfer of children in Queensland.  For QH staff, <a href="#">click here</a> for further information including the QH Inter-hospital transfer request form (access via intranet).	(07) 3068 4510 24 hours  <a href="#">CATCH website</a>
<b>Telehealth Emergency Management Support Unit (TEMSU)</b>	For access to generalist and specialist acute support and advice via videoconferencing, as per locally agreed pathways, in regional, rural and remote areas in Queensland.	<a href="#">TEMSU QHEPS website</a> 24 hours
<b>Retrieval Services Queensland (RSQ)</b>	For access to telehealth support for, and to notify of, critically unwell patients requiring retrieval in Queensland.  For any patients potentially requiring aeromedical retrieval or transfer in Queensland.	<a href="#">RSQ QHEPS website</a> 24 hours



## When to consider discharge

Most children who do not have serious underlying pathology can be managed supportively at home, with appropriate advice around when to represent for review at either their GP or the ED.

Parents should be advised to represent for medical review if the child develops a fever or the pain is increasing or not improving.

### Follow-up

Recommended follow up is based on the outcome of the assessment. Children in whom no serious underlying pathology is suspected should not require any specific follow up, however, if symptoms persist or worsen, should follow up with either their GP or present to their hospital ED.

## When to consider admission

Children with suspected septic arthritis or osteomyelitis require specialist referral and usually admission for further investigation and treatment. Any child who cannot weight bear and is no longer mobile should be considered for admission.

## References

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## Guideline approval

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<b>Accreditation references</b>	NSQHS Standards (1-10): 1,9

### Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect. The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

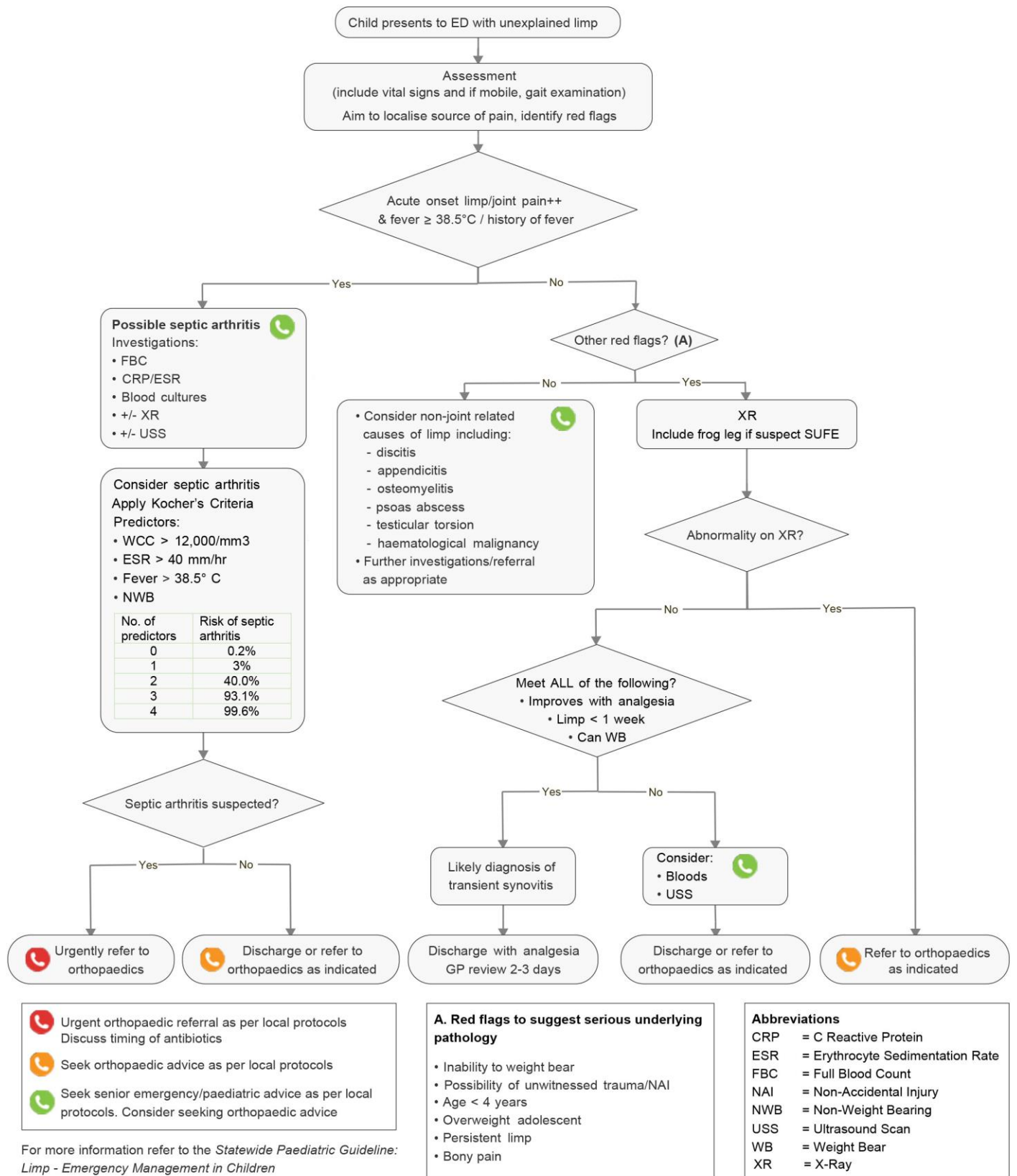
This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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Limp - Emergency Management in Children - Flowchart



## Possible diagnoses for a child presenting to ED with a limp

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- greatest risk factor is weight above 90th percentile
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