

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, Queensland Children's Hospital, Brisbane. It has been endorsed for use across Queensland by the Queensland Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Queensland.

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 one week.



Broader range of diagnostic differentials for acute and persistent limp	
Category	Conditions
Infection	<ul style="list-style-type: none"> • septic arthritis • osteomyelitis
Post-infection	<ul style="list-style-type: none"> • transient synovitis (post-viral) • post- streptococcal infection (including rheumatic fever) • serum sickness • myositis
Trauma (accidental or non-accidental)	<ul style="list-style-type: none"> • Toddler's fracture • sprains
Primary bone disease	<ul style="list-style-type: none"> • slipped upper femoral epiphysis (SUFE) • Perthes disease • apophysitis • developmental dysplasia of the hip (DDH)
Referred pain	<ul style="list-style-type: none"> • appendicitis • psoas abscess • discitis • testicular torsion (refer to Acute scrotal pain guideline)
Other	Neoplastic, inflammatory, non-inflammatory (mechanical or anatomical) conditions, chronic pain syndrome or psychogenic disorders.

Septic arthritis commonly occurs in children aged less than three years but can occur at any age. **Consider septic arthritis in any child with joint pain and fever.**

Common causes of acute limp by age and order of incidence				
Frequency	Less than 1 year	1- 4 years	5 -10 years	Over 10 years
<p>Most common</p>  <p>Least common</p>	<ul style="list-style-type: none"> • trauma including non-accidental injury (NAI) • septic arthritis/ osteomyelitis • DDH 	<ul style="list-style-type: none"> • transient synovitis (2:1 male to female) • trauma including NAI and toddler's fracture • septic arthritis/ osteomyelitis • DDH • Perthes disease 	<ul style="list-style-type: none"> • trauma • transient synovitis • septic arthritis/ osteomyelitis • Perthes disease (5:1 male to female) • psychogenic pain 	<ul style="list-style-type: none"> • trauma • septic arthritis/ osteomyelitis • SUFE (3:1 male to female) • inflammatory arthritis • psychogenic pain



Common ED presentation

Transient synovitis	
History	<ul style="list-style-type: none"> recent report of upper respiratory or gastrointestinal viral infection is common¹
Examination	<ul style="list-style-type: none"> normal temperature or low-grade pyrexia (less than 38.5°C) usually able to walk and weight bear with mild pain or discomfort
Diagnosis	<ul style="list-style-type: none"> usually by exclusion, with a careful history and examination (blood tests not routinely required though may be needed to exclude other diagnoses) careful clinical assessment is needed to differentiate transient synovitis from an early presentation of septic arthritis in the younger age group²
Management	<ul style="list-style-type: none"> most recover with rest and anti-inflammatory medication within two weeks, though usually shorter

Less common but serious ED presentations

Septic arthritis	
History	<ul style="list-style-type: none"> usually acute onset of fever (greater than or equal to 38.5° C) and toxaemia
Examination	<ul style="list-style-type: none"> severe pain may occur with passive motion child reluctant/unable to move the joint or weight bear
Diagnosis	<ul style="list-style-type: none"> urgent blood and synovial cultures are required to confirm diagnosis synovial fluid aspiration in children must always occur in a sterile environment in the operating theatre if suspected and greater than four 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) synovial fluid isolates are commonly <i>S. aureus</i> or <i>Streptococcus sp.</i>
Management	<ul style="list-style-type: none"> an orthopaedic emergency – urgent antibiotics IV (after obtaining samples for culture) is required to avoid joint destruction

Osteomyelitis	
History	<ul style="list-style-type: none"> subtle onset of symptoms including limp, reluctance to weight bear or reduced movement can affect any bone but more commonly the lower limb is affected
Examination	<ul style="list-style-type: none"> pain may be localised with tenderness redness and swelling are usually late signs
Diagnosis	<ul style="list-style-type: none"> requires index of clinical suspicion bloods usually show raised inflammatory markers imaging can show changes on plain film though MRI more reliable
Management	<ul style="list-style-type: none"> guided by orthopaedic surgeons - IV antibiotics +/- operative management



Perthes disease

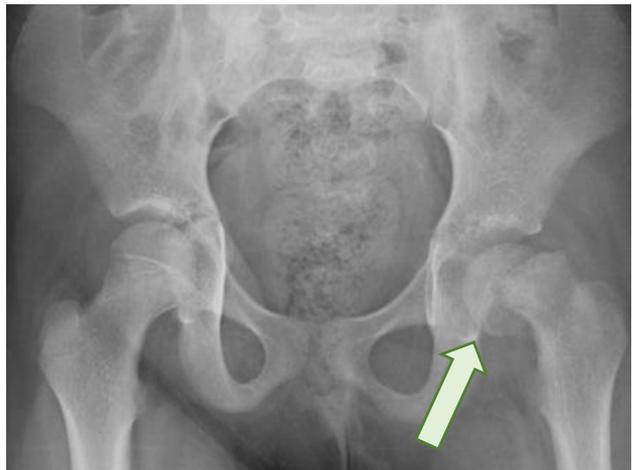
- idiopathic avascular necrosis of the proximal femoral epiphysis
- 20% of cases are bilateral
- diagnosis may be delayed due to fluctuating symptoms and potential for normal X-ray in early stages



Perthes disease	
History	<ul style="list-style-type: none"> • hip discomfort and limp that may fluctuate
Examination	<ul style="list-style-type: none"> • loss of hip internal rotation and abduction
Diagnosis	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • supportive and/or surgical

Slipped upper femoral epiphysis (SUFE)

- greatest risk factor is weight greater than 90th percentile
- 20% of cases are bilateral⁴
- diagnosis may be delayed as symptoms may be subtle
- more common in children with endocrine disorders / disturbances (puberty)
- high risk of avascular necrosis



Slipped upper femoral epiphysis (SUFE)	
History	<ul style="list-style-type: none"> • limp often present for weeks or months, and may have been preceded by minor trauma
Examination	<ul style="list-style-type: none"> • may present with groin/ thigh/ knee pain, abnormal gait, weakness and/or thigh atrophy
Diagnosis	<ul style="list-style-type: none"> • demonstrated on X-ray of pelvis (including frog leg view) • X-ray may be normal or only minor slip in early stages • maintain a high index of suspicion in overweight adolescents with persistent limp
Management	<ul style="list-style-type: none"> • prompt operative treatment required



Assessment

The aim of the assessment is to differentiate the children who have serious underlying pathology from the larger group of children who do not have a serious cause for their limp.

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

Considerations in children

- 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



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



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

- fever greater than or equal to 38.5°C
- age less than four 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

Suspect septic arthritis in child with a fever greater than 38.5°C, acute onset of severe, localised joint pain and difficulty weight bearing.



Seek urgent senior emergency/orthopaedic advice as per local practice if septic arthritis is suspected.

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
Plain X-rays	<ul style="list-style-type: none"> • identify fractures Perthes disease, SUFE, DDH and bony lesions • a normal X-ray does NOT exclude early septic arthritis or osteomyelitis
Full blood count	<ul style="list-style-type: none"> • exclude malignancy • assist in assessing the risk of septic arthritis or osteomyelitis
C reactive protein	<ul style="list-style-type: none"> • assist in assessing the risk of septic arthritis or osteomyelitis
Erythrocyte sedimentation rate	<ul style="list-style-type: none"> • assist in assessing the risk of septic arthritis, osteomyelitis or other inflammatory causes of limp
Blood cultures	<ul style="list-style-type: none"> • essential if suspect septic arthritis or osteomyelitis
Joint ultrasound	<ul style="list-style-type: none"> • identify 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 arthritis⁵
Specialised imaging	<ul style="list-style-type: none"> • imaging including CT scan, MRI and bone scan should only be requested on specialist advice



Diagnosing septic arthritis

Definitive diagnosis is confirmed on positive joint aspirate by orthopaedic surgeons in theatre. In the ED, Kocher's criteria⁶⁻⁸ 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"> fever greater than 38.5 °C non-weight bearing leukocytosis greater than 12,000/mm³ ESR greater than 40 mm/hr 	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 practice 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 service as per local practice is required for all children with serious underlying pathology



Consider seeking orthopaedic advice as per local practice for a child with a persistent limp (greater than one week) and a normal X-ray

Escalation and advice outside of ED

Clinicians can contact the services below if escalation of care outside of senior clinicians within the ED is needed, as per local practices. Transfer is recommended if the child requires a higher level of care.



ALERT – Septic arthritis is an orthopaedic emergency. Suspect in any limping child with severe, localised joint pain and fever.





Child with septic arthritis (requires time-critical care)

Reason for contact	Contact
For urgent advice and referral of child with suspected septic arthritis	Contact the onsite/local orthopaedic service. The onsite/local paediatric service may assist with emergency management.



Non-critical child

May include children with:

- serious pathology identified on X-ray
- X-ray NAD but persistent limp
- unable to walk due to inability to weight bear

Reason for contact	Who to contact
Advice (including management, disposition or follow-up)	Follow local practice. Options: <ul style="list-style-type: none"> • onsite/local orthopaedic service • Queensland Children's Hospital experts via Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) (24-hour service) • local and regional paediatric videoconference support via Telehealth Emergency Management Support Unit TEMSU (access via QH intranet) on 1800 11 44 14 (24-hour service)
Referral	First point of call is the onsite/local orthopaedic service

Inter-hospital transfers

Do I need a critical transfer?	<ul style="list-style-type: none"> • discuss with onsite/local orthopaedic service • view Queensland Paediatric Transport Triage Tool
Request a non-critical inter-hospital transfer	<ul style="list-style-type: none"> • contact onsite/local orthopaedic service • contact RSQ on 1300 799 127 for aeromedical transfers • contact Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) for transfers to Queensland Children's Hospital
Non-critical transfer forms	<ul style="list-style-type: none"> • QH Inter-hospital transfer request form (access via QH intranet) • aeromedical stepdown (access via QH intranet) • commercial aeromedical transfers: <ul style="list-style-type: none"> ○ Qantas ○ Virgin ○ Jetstar



When to consider discharge from ED

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 (GP or ED) if the child develops a fever or symptoms persist or worsen.

Follow-up

Recommended follow-up is based on the outcome of the assessment. Follow-up is not routinely required for children for whom no serious underlying pathology is suspected.

When to consider admission

As per advice for children requiring specialist referral.

Consider admission for any child who cannot weight bear and is no longer mobile.

References

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Guideline approval

Document ID	CHQ-GDL-60007	Version no.	2.0	Approval date	26/09/2019
Executive sponsor	Executive Director Medical Services			Effective date	26/09/2019
Author/custodian	Queensland Emergency Care Children Working Group	Review date	26/09/2022		
Supersedes	1.0				
Applicable to	Queensland Health Medical and nursing staff				
Document source	Internal (QHEPS) + External				
Authorisation	Executive Director Clinical Services (QCH)				
Keywords	Limp, septic arthritis, Perthes, SUFE, Toddler's fracture, 00733, paediatric, emergency, guideline, children, CHQ-GDL-60007				
Accreditation references	NSQHS Standards (1-8): 1, 8				



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. We recommend hospitals follow their usual practice for endorsement locally including presenting it to their local Medicines Advisory Committee (or equivalent) prior to use.

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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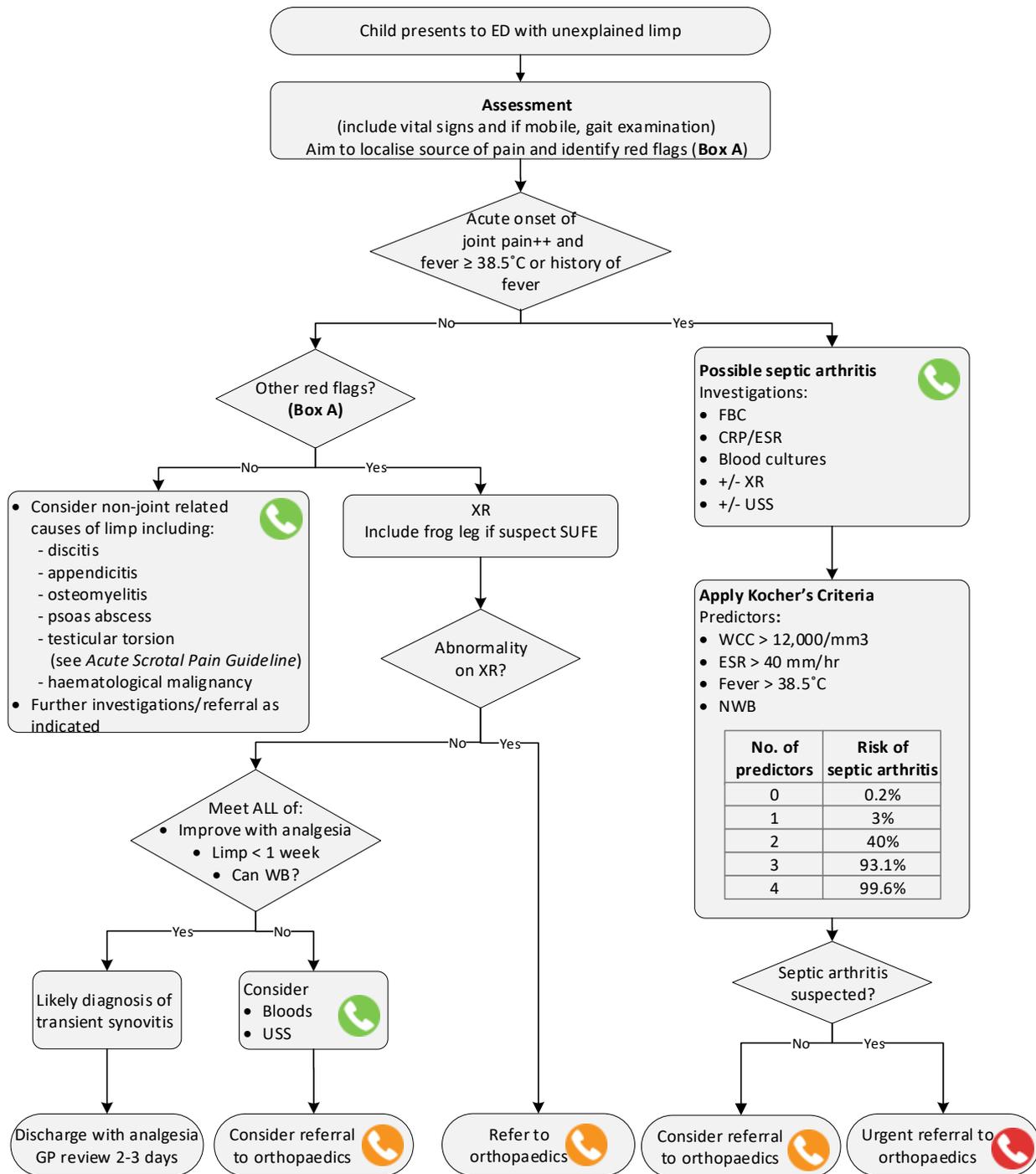
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Appendix 1



Box A: Red flags to suggest serious underlying pathology

- Acute onset of severe localised joint pain and fever
- Inability to WB
- Possibility of unwitnessed trauma/NAI
- Age < 4 years
- Overweight adolescent
- Persistent limp
- Bony pain

Abbreviations

- CRP = C reactive protein
- ESR = Erythrocyte sedimentation rate
- FBC = Full blood count
- NAI = Non-accidental injury
- NWB = Non-weight bearing
- USS = Ultrasound scan
- WB = Weight bear
- XR = X-Ray

- Seek senior emergency/paediatric advice as per local practices. Consider seeking orthopaedic advice.
- Seek orthopaedic advice as per local practices.
- Urgent orthopaedic referral as per local practices. Discuss timing of antibiotics.

CHQ-GDL-60007-Appendix 1 V2.0



Common ED presentation

Transient synovitis	
History	<ul style="list-style-type: none"> recent report of upper respiratory or gastrointestinal viral infection is common¹
Examination	<ul style="list-style-type: none"> normal temperature or low-grade pyrexia (less than 38.5°C) usually able to walk and weight bear with mild pain or discomfort
Diagnosis	<ul style="list-style-type: none"> usually by exclusion, with a careful history and examination (blood tests not routinely required though may be needed to exclude other diagnoses) careful clinical assessment is needed to differentiate transient synovitis from an early presentation of septic arthritis in the younger age group²
Management	<ul style="list-style-type: none"> most recover with rest and anti-inflammatory medication within two weeks or less

Less common but serious ED presentations

Septic arthritis	
History	<ul style="list-style-type: none"> usually acute onset of fever (greater than or equal to 38.5° C) and toxaemia
Examination	<ul style="list-style-type: none"> severe pain may occur with passive motion with child reluctant/unable to weight bear
Diagnosis	<ul style="list-style-type: none"> urgent blood and synovial cultures are required to confirm diagnosis synovial fluid aspiration in children must always occur in the operating theatre
Management	<ul style="list-style-type: none"> an orthopaedic emergency

Perthes disease	
History	<ul style="list-style-type: none"> hip discomfort and limp that may fluctuate
Examination	<ul style="list-style-type: none"> loss of hip internal rotation and abduction
Diagnosis	<ul style="list-style-type: none"> early X-rays can be normal, 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	<ul style="list-style-type: none"> supportive and/or surgical

Slipped upper femoral epiphysis (SUFE)	
History	<ul style="list-style-type: none"> limp often present for weeks or months, and may have been preceded by minor trauma
Examination	<ul style="list-style-type: none"> may present with groin/ thigh/ knee pain, abnormal gait, weakness and/or thigh atrophy
Diagnosis	<ul style="list-style-type: none"> demonstrated on X-ray of pelvis (including frog leg view) X-ray may be normal or only minor slip in early stages maintain a high index of suspicion in overweight adolescents with persistent limp
Management	<ul style="list-style-type: none"> prompt operative treatment required

