

LIMPING CHILD

Facilitators Guide

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Duration **Up to 2 hrs**

Facilitator level **Senior trainee/Advanced Nurse Practitioner (ANP) and above**

Learner level **Junior trainee/Staff nurse and Senior trainee/ANP**

Equipment required: **Examination couch (if planning to demonstrate joint examination)**

OUTLINE (USE THE SECTIONS THAT ARE RELEVANT FOR YOUR LEARNERS)

- Basics (10 mins)
- Main session: (2 x 15 minute) case discussions covering the key points and evidence
- Advanced session: (2 x 20 minutes) case discussions covering grey areas, diagnostic dilemmas; advanced management and escalation
- Quiz (10 mins)
- Infographic sharing (5 mins): 5 take home learning points

We also recommend printing/sharing a copy of your local guideline for sharing admission criteria.

PRE-READING FOR LEARNERS

Expectation is for the learners to have understood the basics before the session.

Basic joint anatomy with diagrams of lower limb joints:(2 min video)

<https://chw.org/medical-care/rheumatology/conditions/anatomy-of-a-joint>

DFTB: Fever and Limp

DFTB: The child with a Limp

Short, basic introduction to the limping child and common differentials:

<https://www.nhs.uk/conditions/limp-in-children/>

Ideally they should have listened to the PEM Playbook Podcast too.

<https://pemplaybook.org/podcast/please-just-stop-limping/>

Clinical Guidelines:

Royal Children's Hospital Melbourne (2012) The limping or non-weight bearing child. Royal Children's Hospital Melbourne.

www.rch.org.au/clinicalguide/guideline_index/Child_with_limp/

NICE Guidelines:

<https://cks.nice.org.uk/acute-childhood-limp#!topicSummary>

Acute childhood limp: Summary

- The term limp refers to an abnormal gait pattern usually caused by pain, weakness, or deformity.
- Parents or carers may use the term 'limping' to describe any abnormality of gait.
- Limp is not a diagnosis but a clinical presentation.

- Acute limp in childhood has a wide variety of causes ranging from mild self-limiting conditions, such as transient synovitis, to severe and potentially life-threatening conditions, such as septic arthritis and malignancy.
- The underlying cause varies between age-groups because children become susceptible to specific conditions as they progress through childhood.

Cause	Age	Onset of Symptoms	Fever	Pain	Swelling	Loss of Range of Motion
Trauma/Injury	Any age	Sudden	No	Yes	Sometimes	Sometimes
Infection	Younger children	Gradual	Yes	Yes	Sometimes	Sometimes
Inflammatory	Older than 2	Gradual	Sometimes	Yes	Yes	Yes
Tumor	Any age	Gradual	Sometimes	Yes	Sometimes	Sometimes
Legg-Perthes	Ages 4-10	Gradual	No	Yes	No	Yes
Slipped Capital Femoral Epiphysis	Ages 9-15	Gradual or Sudden	No	Yes	No	Yes
Congenital Hip Dysplasia	Ages 1-18	Gradual	No	Sometimes	No	Yes
Neurologic	Any age	Gradual	No	No	No	Yes
Diskitis	Any age	Gradual	Sometimes	Sometimes	No	No

Table from <https://orthoinfo.aaos.org/en/diseases--conditions/the-limping-child/>

Assessment of a child presenting with acute limp involves:

- Excluding red flags which may indicate an underlying serious disease or condition, such as nocturnal pain; redness, swelling, or stiffness of the joint or limb; weight loss or anorexia; and fever or night sweats.
- Identifying precipitating factors, such as trauma or preceding illness.
- Examining the child, including checking for fever and other signs of systemic illness; checking the spine, pelvis, lower limbs, abdomen, and testicles, if appropriate (testicular torsion can present as acute limp). Ensure that the hip joint is assessed in children presenting with knee pain to exclude referred pain from hip pathology such as slipped upper femoral epiphysis.
- Considering the possibility of child maltreatment.

Referral for urgent assessment in secondary care should be considered if the child is:

- Younger than 3 years of age.
- Has painful or restricted movements of any joints.
- Unable to weight-bear.
- Febrile and/or systemically unwell.
- Presenting with a red, hot, swollen joint.
- Suspected of being maltreated.

If there is any history of trauma or focal bony tenderness on examination, x-ray(s) should be arranged.

Referral to paediatric orthopaedics or a paediatric rheumatology department should be arranged (the urgency depending on clinical judgement) if:

- A well child has a working diagnosis of transient synovitis, and symptoms have either worsened or failed to resolve completely within a week of onset.
- A child presents with limp on several different occasions.
- There is uncertainty about the diagnosis.
- An underlying rheumatological condition such as juvenile idiopathic arthritis is suspected.

Children aged 3–9 years who are well, afebrile, mobile but limping, and have a working diagnosis of transient synovitis can be observed in primary care.

- The child should be reviewed at 48 hours after the onset of symptoms and parents/carers should be advised to take the child to an Accident and Emergency department immediately if symptoms worsen, a fever develops, or the child becomes unable to weight bear or unwell in the interim.

- Advice about rest and simple analgesia should be given.
- If symptoms are improving within 48 hours, arrange follow-up one week from symptom onset to ensure complete resolution of symptoms.
- If symptoms worsen, fail to resolve, or there is any doubt about the diagnosis, urgent hospital assessment should be arranged.

A child with a persistent limp and normal initial x-ray(s) should be referred to paediatric orthopaedics or paediatric rheumatology department (the urgency depending on clinical judgement) for further investigation.

Specific conditions that may be covered in more detail, depending on time available:

Transient synovitis – <https://bestpractice.bmj.com/topics/en-gb/761/pdf/761.pdf>

Perthes Disease – <https://orthoinfo.aaos.org/en/diseases--conditions/perthes-disease>

Septic arthritis – www.orthobullets.com/pediatrics/4032/hip-septic-arthritis--pediatric

Kocher's criteria – <https://www.mdcalc.com/kocher-criteria-septic-arthritis>

Slipped upper femoral epiphysis –

<https://radiopaedia.org/articles/slipped-upper-femoral-epiphysis?lang=gb>

CASE 1 (15 MINS)

A 10 year old boy is brought to ED by his dad who is concerned that his son is limping and has left knee pain. He has complained of pain a few times before - especially after sports (which he dislikes) but seems to be in much more discomfort since coming home from school yesterday.

Discussion points:

Some questions to further discussion:

What are the differential diagnoses in this case? How would you refine your diagnosis further?

- The differential is broad at this stage - it includes benign self-limiting conditions such as a minor traumatic soft tissue injury through to more serious conditions such as Perthes disease and Slipped Capital Femoral Epiphysis.
- A detailed history should be elicited to rule out the presence of any red flag symptoms that might suggest systemic illness

- Night pain
- Weight loss
- Night sweats
- Anorexia/general malaise
- The child requires a thorough examination including abdomen, groin and the whole of the lower limb to establish the location of the pathology - remember that hip pain can be referred to the knee.
- X-rays including a pelvis and frog-leg lateral are essential to look for evidence of hip joint integrity.

A thorough history establishes that the child is systemically well but overweight. He has restricted movement in his left hip. You notice that he externally rotates his hip when you try to flex it. This is his x-ray:



What do you tell the boy and his father about the diagnosis? What is likely to happen next?

- The x-ray findings suggest a slipped capital femoral epiphysis on the left hand side.
- It is a Type I Salter Harris injury affecting the growth plate of the upper femur.
- Triggers include growth spurt (i.e. puberty), obesity and trauma.
- Initial management involves referral to an orthopaedic specialist

- Must be kept non-weight bearing
- Likely to need surgery involve pinning of epiphysis
- Will need ongoing monitoring due to risk of long term problems e.g.
 - Osteoarthritis
 - Avascular necrosis of the femoral head
 - Slipping of the contralateral side (~20% of cases)

CASE 2 (15 MINS)

A four year old boy is brought to ED as he is unable to weight-bear. He woke up with a slight limp this morning which has got steadily worse throughout the day and he is now unable to walk at all. He has no recent medical history of note. Examination is unremarkable other than a moderately restricted range of movement in his right hip. Despite the fact he is systemically well and has had good doses of analgesia he remains unable to weight-bear.

Discussion points:

Some questions to further discussion:

What investigations (if any) would be appropriate at this stage and why?

- X-ray - mandatory to look for evidence of e.g. Perthes
- Bloods - could be considered as he is still not weight bearing after analgesia.
- He is afebrile and systemically well so will likely be normal
- May be useful for looking for rare causes of limp eg initial presentation of leukaemia
- US - depending on availability may be useful to look for a joint effusion. In transient synovitis expect to see a simple joint effusion +/- evidence of thickened and inflamed synovium.

X-ray and baseline bloods including inflammatory markers are normal.

What is the most likely diagnosis? Can this child go home today? If so, what information would you give to parents and what follow up (if any) would you arrange?

- Most likely to be a transient synovitis
- Although transient synovitis is more common after a viral illness, it does still occur in children who have been otherwise well recently.

- As long as you are reasonably confident that this child has transient synovitis it may be possible to discharge him with careful safety-netting advice.
- If his pain gets worse or he develops a fever his parents should bring him back to ED promptly for further assessment.
- Some form of review is almost certainly going to be advisable as he is not weight bearing. Depending on local hospital protocol this may be an ED clinic or a paediatric rapid access clinic.

Do you know how to do a good joint examination?

(watch video or demonstrate):

- **A basic, all purpose video of hip examination (Duration 3 mins)**

www.versusarthritis.org/about-arthritis/healthcare-professionals/useful-resources/regional-examination-of-the-musculoskeletal-system/examination-of-the-hip-video/

- **A more specific, detailed paediatric hip examination if time allows (Duration 9 mins)**

www.posnacademy.org/media/Hip+Paediatric+Orthopedic+Exam/1_dkxsjh7w/19140072

ADVANCED DISCUSSION

This is an opportunity to cover grey areas, diagnostic dilemmas and advanced management and escalation if there are more experienced trainees or senior registrars in your group.

ADVANCED CASE 1

You see a 3 year old child with a two day history of fever. He has woken up with a right sided limp. On examination he is febrile with large, pus covered tonsils, cervical lymphadenopathy and discomfort in the right hip – especially on internal/external rotation. You decide to do bloods and the inflammatory markers come back as raised.

Discussion points:

Some questions to further discussion:

What is the role of tonsillitis in this presentation?

- Tonsillitis gives a source for the fever and the raised infection markers
- It can also act as a source for haematogenous spread of osteomyelitis/septic arthritis

- Staph aureus is one of the most common causes of both tonsillitis and septic arthritis/osteomyelitis

How might you distinguish between a transient synovitis and a septic arthritis in this case?

- Children with septic arthritis are likely to be in more pain and have a more limited range of movement and are unlikely to weight -bear.
- They may be systemically unwell.
- Kocher's criteria may help clarify your level of suspicion
 - A point is given for each of the four following criteria:
- Non-weight-bearing on affected side
- Erythrocyte sedimentation rate >40
- Fever > 38.5°C
- White blood cell count >12,000

Score	Likelihood of septic arthritis
1	3%
2	40%
3	93%
4	99%

- Ultrasound of the hip joint may reveal a complicated effusion.
- The only certain way to know the difference is joint aspiration

ADVANCED CASE 2

A 1 year old girl with a background of sickle cell anaemia attends ED with a history of fevers up to 39°C and diarrhea for the last two days. Two other family members also have diarrhoea. This morning she is distressed and seems to be in a lot of pain. She is not weight bearing and the family are concerned this could be her first painful crisis.

Discussion points:

Some questions to further discussion:

What are the concerning features in this child - what makes her a high risk patient and why?

- Children with sickle cell disease are functionally asplenic due to recurrent micro-infarcts of their spleens.

- Children with sickle cell disease are functionally asplenic due to recurrent micro-infarcts of their spleens.
- This leaves them at high risk of infection from encapsulated bacteria such as pneumococcus and salmonella.
- Diarrhoea could leave her dehydrated and provoke a painful crisis - as the family fear.
- A history of fever and diarrhoea however, must make the clinician suspicious of salmonella infection with the risk of haematogenous spread.

What are your next steps in managing this child?

- She is high risk for systemic bacterial infection so, given her presentation, needs assessing for features of sepsis and shock
- Meticulous examination of her musculoskeletal system to find a focus for the pain.
- Initial management is likely to involve fluids, antibiotics and analgesia.

Examination reveals a painful, hot left ankle with some mild swelling.

The child screams in pain when you attempt to move it.

Who needs to know about this child now?

- Paediatricians
- Haematologists
- Radiologists
- Microbiologists
- Orthopaedic surgeons
- Anaesthetists
- (Critical Care - depending on how unwell she is)

ADVANCED CASE 3

Discussion points:

- Non specific symptoms, challenging history taking and examination
- The basic musculoskeletal examination – pGALS
- Limping children must always have a holistic assessment

A 10 year old young man, James, with profound learning difficulties presents to the Emergency Department with reduced mobility, a poor appetite and altered behaviour. His mum says he hasn't fallen or hurt himself recently, but she thinks he is in pain and claims that "my son is not himself". He is afebrile and systemically well. You notice that James has an abnormal gait as he walks in from the waiting room. You offer him analgesia.

There is a wide-range of aetiologies but most are benign and self limiting. However nestled among these varied presentations are limb and life-threatening infections and non-accidental injuries. Getting a detailed history from an older child with learning difficulties is going to be challenging, as is getting a history from a preverbal child. One should always approach a scenario with a detailed history; and in this case the main aim would be to tease out red flags with the assistance of the parent/caregiver followed by an examination.

History

A systematic structure to history taking is the **SOCRATES** mnemonic for a pain focused history.

S: Site. Ask the child where it hurts. Children are more likely than adults to experience referred pain. Remember: knee pain emanates from the hip (in 35% of cases). Also pain from the spine can refer to the lateral thigh.

James rubs his right hip region when you ask him where it hurts.

O: Onset. Is the pain acute or chronic? Acute onset tends to be more concerning and suggests joint/bone infection, trauma, or with acute deterioration of a chronic problem. Chronic pain is more suggestive of an inflammatory process, overuse syndromes or an osseous cause such as SUFE or Legg-Calve-Perthes disease. Malignancy often has a delayed presentation with mild dull pain that may not be activity limiting in the initial stages. Nocturnal pain is a red flag and should always be asked about.

James is unable to answer your questions. Mum thinks James has been unwell since Monday (3 days ago), and says he doesn't have problems sleeping.

C: Character. Dull ache (deep tissue pathology) or sharp sting (cutaneous involvement) can be helpful.

James is unable to answer both questions to character and radiation.

R: Radiation. Can be difficult to elicit exact origin of pain and radiation, especially in the younger child. Be aware of bilateral limb involvement as this may suggest a more central cause, such as cauda equina.

A: Associations.

Weight-bearing: non-weightbearing can suggest more serious pathology

Mono or polyarticular: polyarticular is generally less concerning and suggests an underlying systemic disease process. However, 8% of septic arthritis cases involve more than one joint and leukaemic infiltrates typically affect multiple joints.

Systemic illness: chronic features such as malaise, fatigue, weight loss could suggest underlying increase in catabolism from a systemic disease such as SLE, JIA, or anaemia from malignancy.

Dermatology: extra-articular features of inflammatory bowel disease (IBD) (eye pain, pyoderma gangrenosum, erythema nodosum, aphthous ulcers). Ask the parents about any new marks on the body and later during the examination look for a Salmon patch of juvenile idiopathic arthritis (JIA). Consider whether this presentation is associated with a recent upper respiratory infection or viral gastroenteritis which may be suggestive of reactive arthritis.

Mum says James is off his food but he hasn't lost weight.

T: Time course. Note the pain progression over time and response to analgesics. Mum says James is more comfortable after Ibuprofen which she started giving him 2 days ago.

E: Exacerbating or Relieving factors. Trauma and infection aggravate pain after activity and are relieved by rest. The presence of pain that is relieved by activity is more suggestive of an underlying inflammatory cause. Pain relieved with rest is pain from osteochondrosis in the adolescent experiencing growth spurts.

S: Severity. Severity is subjective but a surrogate of severity is the inability to walk or to tolerate examination with distraction.

Finish off the SOCRATES pain history with a **FAST** history:

F: Family history for autoimmune disease (IBD, psoriatic arthritis)

A: Adolescent screen. The sexually active teenager could present with joint infection due to gonococcus or joint inflammation due to chlamydia. Similarly ask about IV drug use as this increases the chance for infectious arthritis.

S: Safeguarding. Due attention should be maintained for a history that is not in keeping with the presentation or the child's developmental age.

T: Travel history

Examination

Look. Inspection is non-invasive, interactive and can be used to establish rapport.

Feel for temperature changes, tender areas, effusions.

Move actively and passively with the aim of gently stressing the ligaments of which the joint is comprised.

It is always important to complete a comprehensive general examination especially in the presence of red flags or suspicion of a multisystem disease.

What is pGALS?

pGALS is a standardised musculoskeletal (MSK) basic examination.

Free educational resources to demonstrate pGALS are available online.

www.pmmonline.org

pGALS screen has the benefit of quickly assessing all joints, this is important given the sometimes vague presentation of MSK problems and the difficulty of localising the site of joint pathology from the history alone. Frequent practice of pGALS, especially on healthy children, is important to appreciate normal ranges of movement as joint 'restriction' – a common finding in JIA can be easily missed especially with symmetrical joint disease.

Here is a summary of pGALS (courtesy of Paediatrics and Child Health 25:12 Diagnosing arthritis in children)

The paediatric Gait Arms Legs Spine (pGALS) screen

Screening questions

- Do you (or does your child) have any pain or stiffness in your (their) joints, muscles or back?
- Do you (or does your child) have any difficulty getting yourself (him/herself) dressed without any help?
- Do you (or does your child) have any problem going up and down stairs?

Figure	Screening manoeuvres	What is being assessed?
	Observe the child standing (from front, back and sides)	Posture and habitus, skin rashes, deformity such as leg length inequality, leg alignment (valgus, varus), scoliosis, joint swelling, muscle wasting, flat feet
	Observe the child walking and 'Walk on your tip-toes' and then 'Walk on your heels'	Ankles, subtalar, midtarsal, and small joints of feet and toes Foot posture and presence of longitudinal arches of feet
	'Hold your hands out straight in front of you'	Shoulders forward flexion, elbow extension, wrist extension and extension of small joints of fingers
	'Turn your hands over and make a fist'	Supination of wrists and elbows, flexion of small joints of fingers
	'Pinch your index finger and thumb together'	Manual dexterity and coordination of small joints, index finger and thumb
	'Touch the tips of your fingers'	Manual dexterity and coordination of small joints of fingers and thumbs
	Squeeze the metacarpophalangeal joints for tenderness	Metacarpophalangeal joints
	'Put your hands together palm to palm' and 'Put your hands together back to back'	Extension of small joints of fingers, extension of wrists, flexion of elbows

The paediatric Gait Arms Legs Spine (pGALS) screen. This material is reproduced by kind permission of Arthritis Research UK (www.arthritisresearchuk.org) from: Foster HE, Jandial S. pGALS A Screening Examination of the Musculoskeletal System in School-Aged Children. Reports on the Rheumatic Diseases (Series 5), Hands On 15. Arthritis Research Campaign; 2008 June. Note: manoeuvres in bold are additional to the adult GALS.

	'Reach up, "touch the sky" and "Look at the ceiling"	Extension of elbows and wrists, abduction of shoulders and extension of neck.
	'Put your hands behind your neck'	Abduction and external rotation of shoulders, flexion of elbows
	Feel for effusion at the knee (patella tap, or cross fluctuation)	Knee effusion
	Active movement of knees and feel for crepitus	Knee flexion and extension
	Passive movement (full flexion, internal rotation of hip)	Hip
	'Open wide and put 3 (child's own) fingers in your mouth'	Temporomandibular joints
	'Try to touch your shoulder with your ear'	Cervical spine
	'Bend forwards and touch your toes'	Thoraco-lumbar spine

James' diagnosis and management plan

The X-ray is diagnostic and demonstrates a large pelvic Ewing's sarcoma. The blood tests (which were very difficult to obtain from James) reveal an anaemia and leukocytosis. A marginally elevated ESR and LDH may also be evident in Ewing's sarcoma.

Ewing's sarcoma typically presents with more systemic disease at presentation and localised pain. At diagnosis, the median duration of symptoms is 9-3months.

Any child or adolescent who's pain involves any of these characteristics should be investigated to exclude a malignant pathology with at least a plain film X-ray.

- A painful 'injury' which fails to resolve over a reasonable time (over 1 month)
- Intermittent or persistent localised pain for one month with no history of trauma
- Night pain that wakes you up from sleep or prevents adequate sleep
- Fracture where history of force resulting in injury seems insufficient

Ewing's sarcoma occur more commonly in the pelvic bones, diaphysis of the long bones of the leg, and bones of the chest wall.

At presentation %25 will have metastatic disease to the lung, bone or bone marrow or a combination of these.

Plain X-ray in 2 planes of the painful area remains the first line investigation of choice and is readily available to most clinicians. Ewing's (as well as an osteosarcoma) can lead to a radiologically significant sign – the Codman triangle. It is a triangular area of new subperiosteal bone that is created when a lesion, often a tumor, raises the periosteum away from the bone. Ewing's sarcoma traditionally demonstrates osteolysis, detachment of the periosteum and occasional calcification in any associated soft tissue mass.

There are no peripheral blood tests or tumor markers which are diagnostic of bone tumors.

Further imaging of the affected bone is required to adequately determine the true extent of the disease and staging.

Biopsy is the gold standard for histological diagnosis.

Whole body technetium99-m bone scans and CT chest are performed to assess metastatic disease at presentation.

Bone marrow aspirates and trephines are required for Ewing's sarcoma patients as marrow involvement is a part of the disease process and for some high dose procedures requiring harvest of stem cells from the patient may be part of the treatment.

Referrals to a specialist orthopaedic sarcoma surgeon, paediatric oncologist, radiology services, paediatric surgeon, rehabilitative specialists and physiotherapists to name a few are required.

Important to note that although malignancy is rare, it should be actively excluded. Also, blood tests may be normal even in cases of inflammatory, infectious and neoplastic joint pain and peripheral blood films may not show blast cells in children with leukaemia cells.

QUIZ QUESTIONS (10 MINS)

Question 1.

Which of the following is NOT part of Kocher's criteria for assessing the risk of septic arthritis in a limping child?

A
ESR >40

B
Range of movement <50% normal

C
WCC > 12x10⁹

D
Fever >38.5°C

E
Inability to weight bear

Answer: b) Although range of movement can be a useful part of the assessment, it is not part of the official Kocher criteria.

Question 2.

Which of these statements about SCFE/SUFE is TRUE?

A

It is most common in underweight children between the ages of 6-10. It can be a cause of chronic hip pain and is bilateral in approximately 10% of cases.

B

It is a cause of both acute and chronic hip pain, is rarely bilateral and typically occurs in overweight adolescents.

C

It is caused by avascular necrosis of the femoral epiphysis and usually presents as a chronic problem. Radiological detection is improved by requesting a 'frog-leg lateral' view.

D

It is most common in children over the age of 10 and can present with acute or chronic pain. It is bilateral in around 20% of cases and radiological detection is improved by a 'frog-leg lateral' view.

E

It is a common cause of limp and pain in underweight adolescents and is bilateral in one third of cases. Early detection and referral improves prognosis.

Answer: d) SCFE is most common in boys between the ages of 17-10 with a median age of 13. It is the most common cause of serious hip pathology in adolescents. %50 of them are >95th centile for weight and knee pain is a common initial presentation. Pain and limp may be entirely acute but often presents with an acute on chronic picture with long term low level pain suddenly becoming more acute with a large epiphyseal slip.

Question 3.

In a classical antalgic gait, which phase of walking is affected?

A

Strike

B

Contact

C

Stance

D

Propulsion

E

Swing

Answer: c) The stance phase is shortened in an antalgic gait as the patient tries to minimise the amount of time that weight is placed through the painful leg. <https://pemplaybook.org/podcast/please-just-stop-limping/> for diagram of phases of gait and fuller explanation

Question 4.

Which of the following bacteria is the most likely to cause septic arthritis?

- A**
E. Coli
- B**
Streptococcus pneumoniae
- C**
Haemophilus Influenza B
- D**
Staphylococcus aureus
- E**
Salmonella

Answer: d) Although all of the organisms above can cause joint pathology, the most common is Staph aureus. Previous studies suggest it is responsible for over half of all cases of septic arthritis.

Question 5.

Which of the following statements about Perthes disease is **FALSE**

- A**
It is more common in boys than girls
- B**
It is bilateral in 10% of cases
- C**
It is defined by avascular necrosis of the femoral head
- D**
An older age at diagnosis is associated with a more favourable prognosis
- E**
Physiotherapy, casting and surgery may all form part of the treatment regimen

Answer: Perthes disease is five times more common in boys than girls although damage is often more severe in affected girls. It may be bilateral in around %10 of cases and is defined by avascular necrosis of the femoral head. The younger a child is diagnosed the more favourable the prognosis owing to a greater potential for bone remodelling. Children under the age of 6 do especially well. Management is multidisciplinary and physio, casting and surgery may contribute at various stages of the disease process.

Question 6.

A 10 year old presents with an acute onset of right hip and wrist pain following a very minor trip and fall onto the ground. Since the incident she has been unable to bear weight. On examination the right hip and wrist showed no obvious deformity and range of movement were normal after her pain was addressed. During the last 2 years she had not presented to the GP but recently she had complained of poor sleep, leading to daytime somnolence, palpitations, anxiety and sweating. A fall in her weight growth curve was noted after plotting her on a growth chart.

Which statements are **FALSE**?

A

This is a 'red herring' injury commonly reported by patients and their parents and will not require further investigations.

B

For children over the age of 8 years or limping > 7 days an X-ray is an adequate imaging modality as it has a relatively low dose of radiation but is also very likely to show the pathology causing the pain.

C

Blood tests are indicated including thyroid functions because the minor fall is not in proportion to the severity of her symptoms and her unexplained weight loss is of concern

D

Transient synovitis is most common in this age group so cooling, rest and pain relief are adequate therapy.

Answers a and d)

The most common cause for hip pain (in children aged 3-10years) is transient synovitis. Even though this is a benign cause not requiring further treatment, other more severe differential diagnoses need to be considered. A 'red herring' injury is commonly reported by patients and their parents but in this case the minor fall was not in proportion to the severity of her symptoms. Similarly, X-ray and blood tests including thyroid functions are indicated due to the red flags of not weight bearing, disproportionate severity of her pain and unexplained weight loss. The indications for a CT scan are limited in this context. In this case, she had a pathological fracture due to endocrine abnormalities. Hyperthyroidism is rare but a severe disease in children and mostly autoimmune.

Finish - infographic of the take home tips (5 mins)

- 1 Age is key in forming your differential diagnosis.
- 2 The majority of children presenting with a limp will have a benign and self-limiting condition.
- 3 Any child with fever and limp warrants further investigation.
- 4 Consider non musculoskeletal causes for limp e.g. referred pain from abdominal or testicular issues.
- 5 Don't forget to ask about systemic symptoms suggestive of serious underlying disease.

REFERENCES

<https://chw.org/medical-care/rheumatology/conditions/anatomy-of-a-joint>

<https://pemploybook.org/podcast/please-just-stop-limping/>

<https://www.nhs.uk/conditions/limp-in-children/>

Clinical Guidelines -

https://www.rch.org.au/clinicalguide/guideline_index/Child_with_limp/

<https://cks.nice.org.uk/acute-childhood-limp#!topicSummary>

[Transient Synovitis](#)

[Perthes Disease](#)

[Septic arthritis](#)

[Kocher's criteria](#)

[Slipped upper femoral epiphysis](#)

KEY PAPERS

[Kocher MS et al. Differentiating between septic arthritis and transient synovitis of the hip in children: an evidence-based clinical prediction algorithm. J Bone Joint Surg Am. 1999 Dec;81\(12\):1662-70.](#)

[Kocher MS et al. Validation of a clinical prediction rule for the differentiation between septic arthritis and transient synovitis of the hip in children. J Bone Joint Surg Am. 2004 Aug;86-A\(8\):1629-35.](#)

Perry, D. and Bruce, C. (2010) Evaluating the child who presents with an acute limp. BMJ 341, c4250.

Herman, M. and Martinek, M. (2015) The limping child. Pediatrics in Review 36(5), 184-197. [\[Abstract\]](#)