FACULTY OF MEDICINE AND HEALTH SCIENCES

The Limping Child

Kinderreumatologie: tips en tricks voor de dagelijkse praktijk

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European Reference Networks

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Introduction

- A Limp: common reason for a child to present to the GP/paediatrician/ED
- Long list of differential diagnoses, some of which require urgent treatment

Case 1

3 year old boy

- unable to weight-bear
- woke up with a slight limp, got steadily worse throughout the day, now unable to walk at all
- systemically well, good doses of analgesia, remains unable to weight-bear

Case 1: history

What would you focus on in the history?

- Trauma? ✉Toddler’s fracture, contusions, non-accidental injury
- Coryzal symptoms? ✉transient synovitis
- Fever? ✉Septic arthritis/osteomyelitis/malignancy
- Red flag symptoms: night pain, weight loss, easy bruising, e bleeding? ✉neoplasm, haemarthrosis
- Leg length discrepancy ? ✉arthritis, hemihypertrophy



Case 1: history

- Pain in his left leg, no temperature, coryzal illness for a few days
- Term baby, no previous hospital attendances. Fit and thriving. No recent weight loss, loss of appetite or changes in behaviour
- Immunisations: up to date
- No regular medications, mum has given paracetamol & ibuprofen

Case 1:
What would you focus on during the examination?



referred pain:

- knee pain can be referred from the hip,
- hip pain can be referred from testis/abdomen

- Well looking, playful, no lymphadenopathy, heart and chest sounds normal, no hepatomegaly or splenomegaly, no rashes or bruises were seen

- Left leg hip: decreased range of movement on external rotation, due to pain

Case 1:
What investigations (if any) would be appropriate at this stage and why?

- X-ray: Legg-Calvé-Perthes, fracture
- 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

Case 1:
What investigations (if any) would be appropriate at this stage and why?

- X-ray and baseline bloods (inflammatory markers): 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?

Case 1: diagnosis

Most likely to be a transient synovitis

- more common after a viral illness, it does still occur in children who have been otherwise well recently

Discharge with careful safety-netting advice

- worsening pain, fever
- some form of review is almost certainly going to be advisable as he is not weight bearing

Case 2

3 year old boy

- with a 2 day history of fever
- right sided limp
- examination: febrile, large, pus covered tonsils, cervical lymphadenopathy and discomfort in the right hip
  > internal/external rotation
- bloods: ESR 60 mm/h, CRP 55 mg/L, WCC 13200/µL

Case 2:
3 year old boy: fever, tonsillitis, right sided limp

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

Case 2:
3 year old boy: fever, tonsillitis, right sided limp

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
- Ultrasound of the hip joint may reveal a complicated effusion

Case 2:
3 year old boy: fever, tonsillitis, right sided limp

Kocher's criteria[1] may help clarify your level of suspicion

Kocher criteria to determine risk for paediatric septic arthritis[5]	
Non-weight bearing on affected side	Probability dependent on number of findings:
Erythrocyte sedimentation rate >40 mm/hour	1 = 3%
Temperature >38.5°C	2 = 40%
White cell count >12 000 cells/ml	3 = 93%
	4 = 99%

- The only certain way to know the difference is **joint aspiration**

1. Kocher et al. J Bone Joint Surg Am1999

Case 2: septic arthritis = emergency

- Septic arthritis and osteomyelitis: haematogenous spread of pathogens ✉if untreated they could lead to septic shock
- Local infection can lead to joint destruction, joint fusion, fistula formation or chronic infection
- If the growth plate is damaged ✉ limb asymmetry

✉**urgent orthopaedic assessment** with potential arthroscopy/arthrotomy with a washout

Case 3

10 year old boy

- limping and left knee pain
- complained of pain a few times before, especially after sports (which he dislikes), seems to be in much more discomfort since coming home from school yesterday

Case 3

What are the differential diagnoses in this case?

How would you refine your diagnosis further?

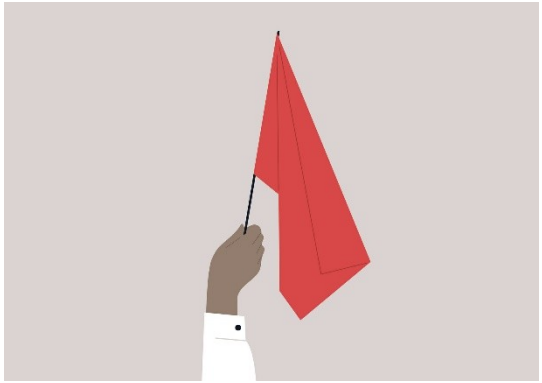
Case 3:
differential diagnoses/ refining diagnosis

The differential is broad at this stage

- minor traumatic soft tissue injury ✉Perthes disease and Slipped Capital Femoral Epiphysis (SCFE)

Detailed history: red flag symptoms?

- night pain
- weight loss
- night sweats
- anorexia/general malaise



Case 3:
differential diagnoses/ refining diagnosis

- thorough examination including abdomen, groin and the whole of the lower limb : location of the pathology (hip pain can be referred to the knee)

- X-rays including a pelvis and frog-leg

Case 3:
differential diagnoses/ refining diagnosis

- child is systemically well but overweight
- restricted movement in his left hip: he externally rotates his hip when you try to flex it
- x-ray

Case 3:
differential diagnoses/ refining diagnosis



Case 3:diagnosis

Slipped Capital Femoral Epiphysis (SCFE)

- injury affecting the growth plate of the upper femur
- triggers: growth spurt (i.e. puberty), obesity and trauma
- referral to an orthopaedic specialist
- non-weight bearing
- likely to need surgery involve pinning of epiphysis
- risk of long term problems e.g.
  - osteoarthritis
  - avascular necrosis of the femoral head
  - slipping of the contralateral side (~20% of cases)

Case 4

2-year-old girl

- right limping since 8 weeks, no pain, morning stiffness ++
- past medical and family history: unremarkable
- physical examination: swollen, warm right knee with a limitation of ROM
- bloods: ESR 40 mm/h, normal CRP, CBC, liver and renal function, ANA 1:1280

Case 4

Diagnosis: oligoarticular Juvenile Idiopathic Arthritis (JIA)

- clinical remission after intra articular (IA) corticosteroid(CS) injection

- relapse of arthritis in the following months: left ankle + left knee

IA CS injection + methotrexate clinical remission

Case 4: JIA

- most common rheumatologic disease in children
- prevalence: 3.8 to 400/100,000
- joint pain, swelling, stiffness, local warmth, limited ROM > 6 weeks + no detectable cause
- systemic symptoms: lethargy and loss of appetite, joint stiffness in the morning
- diagnosis of exclusion (rule out traumatic and infectious causes) ✉ delayed diagnosis

Case 4: JIA

- Imaging:
  - RX: normal early in the disease course
  - US: effusion, synovial proliferation, increased blood flow
  - MRI characteristic synovitis of the affected joint, significant enhancement after contrast injection
- Laboratory studies: depending on the subtype of JIA
  - ESR and CRP may be elevated
  - ANA may be normal, uveitis risk stratification
  - rheumatoid factor is negative in most patients with polyarticular disease

✉referral to paediatric rheumatologist

Case 5

6 year old boy

- pain in his right hip after activity
- slowly worsening pain & intermittent limping the same hip for the past 3 months
- no other symptoms are present, no fever
- no history of trauma, no recent infections
- medical, surgical, drug and allergic histories: unremarkable

Case 5: clinical exam

- R hip joint: active/passive movements: restricted & painfull
- no local signs of inflammation, all other joints normal
- afebrile
- rest exam: normal

Case 5: XR



The R hip has severe flattening of the femoral epifyse with sclerosis consisent with advanced **Legg-Calvé-Perthes disease**

Common conditions to consider when assessing a limping child, with age relevance

All ages	
Fracture/soft-tissue injury	Cellulitis
Non-accidental injury (NAI)	Neoplasm
Septic arthritis	Neuromuscular
Osteomyelitis	

Age 1–3 years	Age 4–10 years	Age 11–16 years
Septic hip	Perthes' disease	Slipped capital femoral epiphysis (SCFE)
Developmental dysplasia of the hip (DDH)	Transient synovitis	Juvenile rheumatoid arthritis
Toddler's fracture		Osteochondritis dissecans
		Osgood–Schlatter disease

Khan et al. Br J Gen Pract. 2020 Aug

Red-flag symptoms for a limping child



Symptom	Potential cause
Pain waking the child at night	Malignancy
Signs of redness, swelling, or stiffness of the joint or limb	Infection or inflammatory joint disease
Weight loss, anorexia, fever, night sweats, or fatigue	Malignancy, infection, or inflammation
Unexplained rash or bruising	Haematological or inflammatory joint disease, or non-accidental injury
Limp and stiffness worse in the morning	Inflammatory joint disease
Severe pain, anxiety, and agitation after a traumatic injury	An evolving compartment syndrome

Khan et al. Br J Gen Pract. 2020 Aug

Causes of Acute Limp

- Puncture Wounds and Retained Foreign Bodies
- Trauma:
  - ligament strains, muscle strains, contusions, and fractures
  - apophysitis usually presents subacutely or is chronic
  - avulsion fractures
  - compartment syndrome
- Septic arthritis
- Osteomyelitis
- Transient Synovitis

Causes of chronic limp

- Juvenile Idiopathic Arthritis

- Lyme Arthritis:
  - arthralgia in early phase of disease; arthritis may be delayed by months to years
  - diagnosis: lyme cultures or PCR in the blood, synovial fluid, or synovial tissue

- Legg-Calve-Perthes:
  - idiopathic avascular necrosis of the femoral head epiphysis, interruption of blood supply in the lateral epiphyseal vessels
  - 5-7 year olds, boys > girls

Causes of chronic limp

- Slipped Capital Femoral Epiphysis (SCFE):
  - displacement of capital femoral epiphysis from the metaphysis of the femur
  - obese older child or adolescent 10-14 years old, boys > girls
  - orthopedic emergency

- Osgood Schlatter Disease (OSD): apophysitis of the tibial tuberosity

- Benign Joint Hypermobility Syndrome (BJHS)

Take Home Points - Limping



1 CONSIDER THE AGE

Age is key in forming your differential diagnosis.



2 MOST ARE OK

The majority of children presenting with a limp will have a benign and self-limiting condition.



3 INVESTIGATE FEVER

Any child with fever and limp warrants further investigation.



4 CONSIDER REFERRED PAIN

Consider non musculoskeletal causes for limp e.g. referred pain from abdominal or testicular issues .



5 ASK ABOUT SYSTEMIC SYMPTOMS

Don't forget to ask about systemic symptoms suggestive of serious underlying disease.