Approach to joint pain in children

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Abstract

The child with joint pain is a common presenting complaint in the acute setting. It has a variety of causes from the benign to the life-threatening which can be difficult to tease apart. In this article, we give an overview of some of the more common and concerning causes. We also provide a structured approach to history, examination and investigation for the clinician faced with the undifferentiated atraumatic joint pain in children of different ages.

Keywords bone tumour; children; joint pain; limp; septic arthritis

Introduction

A child with atraumatic joint pain is a common presentation to the emergency department. However, with such a wide-ranging aetiology, picking apart the diagnoses can be a challenge. Most cases of joint pain are benign and self-limiting in nature. However, nestled among these varied presentations are children with neoplasms, life and limb-threatening infections and non-accidental injuries. This paper casts an overview on the underlying causes and offers a structured approach to the identification, investigation and management of patients with apparent joint pain.

History

In approaching the history, we can broadly stratify the more common underlying causes of joint pain based on the child's age (Table 1), and tailor our history accordingly. However, lest we cast too small a net, for every patient we must also be mindful of the 'red flag' features that suggest more concerning pathology (Table 2).

As with many cases in the emergency department, the reason for attendance tends to be pain. Therefore, a sensible and systematic structure to history taking is that of the SOCRATES mnemonic as a pain-focused history. This, of course, is tailored based on clinical suspicion and a sense of pre-test probability based on the age of the patient.

SOCRATES approach to atraumatic joint pain

S: Site

Begin by asking the child where it hurts or, if pre-verbal, where the parent/guardian believe the pain is. Children are more likely than adults to experience referred pain. Be wary of knee pain, 35% of which emanates from the hip. Also, note that pain from the spine can refer to the lateral thigh.

O: Onset

Is the pain acute of chronic? In general, acute pain is more concerning. It is consistent with joint/bone infection or trauma or with acute deterioration of a chronic problem.

Chronic pain tends to be more suggestive of an inflammatory process, overuse syndrome, or osseous cause such as SUFE or Legg–Calvé–Perthes disease. However, malignancy often has a delayed presentation due to a mild dull pain that may not be activity limiting in the initial stages. Nocturnal pain in these children is a noted red flag and should be always be asked about.

C: Character

The character of pain can be helpful, but usually with the older child or adolescent who can describe the dull ache of a deep tissue pathology or sharp sting of cutaneous involvement.

R: Radiation

Trying to pin down where exactly the pain originates from can be challenging, especially in the younger child, let alone, where it radiates. However, in the older child a radiculopathy, such as sciatica, may present with sharp shooting pain down a limb. Be mindful of bilateral limb involvement, that can suggest a more central cause, such as cauda equina.

A: Association

Weight-bearing: broadly, it is important to determine if the pain is associated with an inability to weight bear. This is one of our red flags and suggests a more serious underlying pathology (Table 2).

Mono or polyarticular: is this a monoarticular or polyarticular problem? The latter is generally less concerning and often more suggestive of an underlying systemic disease process. However, polyarticular disease is not always benign. 8% of septic arthritis cases involve more than one joint and leukaemic infiltrates typically affect multiple joints.

Systemic effect: similarly, are there more chronic features of underlying malaise, fatigue and weight loss which could also suggest an underlying increase in catabolism from a systemic disease such as SLE, JIA or anaemia from underlying malignancy.

Dermatology: ensure to ask about other extra-articular features of inflammatory bowel disease such as eye pain, and dermatological manifestations, such as pyoderma gangrenosum, erythema nodosum and even aphthous ulcers. Ask if parents have noticed any new marks, and later look for the Salmon patch of juvenile idiopathic arthritis (JIA).

Consider whether this presentation is associated with a recent upper respiratory tract infection or viral gastroenteritis, which may be suggestive of a reactive arthritis.

It is not uncommon to see a viral exanthema with such presentations.

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Differential diagnosis of joint pain based on age

All ages

- Trauma
- Infection
- Secondary to various viral illnesses
- Tumour
- Sickle cell disease
- Serum sickness

Common causes of joint pain in children

Toddler (1–3 years)

- Transient synovitis
- Toddler's fracture
- Child abuse
- Developmental dysplasia of hip
- Juvenile arthritis (pauciarthcular)
- Neuromuscular disease
- Haemophilia
- Henoch- Schönlein Purpura

Child (4–10 years)

- Transient synovitis
- Juvenile arthritis (pauciarticular)
- Perthes' disease
- Rheumatic fever
- Haemophilia
- Henoch-Schönlein Purpura

Adolescent (11–16 years)

- Slipped upper femoral epiphysis
- Overuse syndromes
- Osteochondritis dissecans
- Biomechanical pain (hypermobility)

Table 1

Similarly, note any psoriasis, associated with an underlying seronegative arthropathy, though more commonly seen in the older child. Ensure to enquire about the vasculitic rash of Henoch-Schönlein Purpura and any associated abdominal pain.

It is also noteworthy to mention that in the early stages of meningococcemia, a child may complain of bilateral lower limb joint pain, also reactive in nature, but can herald the onset of a devastating cascade, even prior to the onset of purpura.

Note a propensity to easy bruising in one presenting with joint swelling and pain after a relatively innocuous injury. This may suggest underlying clotting disorder, such as haemophilia.

T: Time course

Note the progression of pain over time and its response to basic analgesia. It occurrence during weekends, nocturnally or prior to school.

It is worth exploring whether there is a temporal relation between any recent viral illnesses or sick contacts, suggestive of a reactive arthritis. Also, note any recent vaccinations (e.g. rubella), or antibiotic use (e.g. cefaclor) suggestive of serum sickness.

Red flags

Red flag symptoms suggestive of serious condition

- Fever
- Malaise
- Morning joint stiffness or pain
- Nocturnal pain refractory to simple analgesia and symptomatic during daytime
- Joint swelling
- Bony tenderness
- Muscle weakness
- Fall in height or weight growing curve

Table 2

E: Exacerbating or relieving factors

Trauma and infection lead to pain aggravated by activity and relieved by rest. The presence of pain that is relieved by activity is more suggestive of an underlying inflammatory condition.

A history of increased levels of activity in the older child or adolescent who is a keen sportsperson can suggest a traction apophysites which tends to present at certain characteristic sites (Table 3). This pain is also relieved with rest as are pains from osteochondrosis in the adolescent experiencing growth spurts.

S: Severity

Though listed last, this should be considered first, with appropriate analgesia offered. Severity is subjective but a surrogate of severity is the inability to walk or to tolerate examination with distraction.

Once an appropriate review of a SOCRATES pain history has been conducted, it is worth considering a *FAST review* to complete the history: Family History, Adolescent screen, Safeguarding, and Travel.

Common sites of Apophysitis and Osteochondrosis

Name	Site
Apophysitis	
Osgood-Schlatter disease	Tibial tuberosity
Sinding-Larsen-Johansson disease	Inferior aspect of patella
Sever disease	Insertion of achilles tendon
Iselin disease	Base of 5th metatarsal
Osteochondrosis	
Freiberg disease	2nd – 4th metatarsal heads
Köhler disease	Navicular bone
Kienböck disease	Lunate in the wrist
Scheuermann's disease	Thoracic spine
Legg–Calvé–Perthes disease	Femoral head

Table 3

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