Joint pain in children

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Abstract

Joint pain is a common complaint in children and occasionally — although rarely — a symptom of serious disease. It can affect up to 20% of children at any one time. We have attempted to present important points in the history, examination and investigation to help the clinician dealing with a child presenting with non-traumatic joint pain to distinguish those at risk of serious pathology from those children with a benign cause. We also present a management plan in the form of a flow chart for the children who present to the emergency department with a painful joint.

Keywords arthritis; children; joint pain; limp

Introduction

Joint pain and swelling are common manifestations of many musculoskeletal, rheumatologic and other systemic diseases in children. As a result the differential diagnosis of childhood joint pain and swelling is large and includes both benign and serious conditions. The majority of these children will have a benign diagnosis however important and serious conditions like the septic joint, non-accidental injury and cancer should always be considered.

This article provides an overview of the important medical and surgical causes of acute non-traumatic joint pain in children. We also aim to provide a framework to the clinician for the clinical assessment of a child with joint pain to help ensure that serious conditions are not missed.

History

Trauma is the commonest cause of joint pain in children presenting to emergency department but it usually poses little diagnostic challenge. It is often difficult to determine the underlying process when there is no associated traumatic incident. A comprehensive history is the most important factor in determining whether the symptoms are a result of a benign condition or a more serious underlying process. This can be challenging as there is often a 'red herring' report of a preceding trauma offered by the parents. The younger the child, the more important it is to obtain a comprehensive social history in order to explore potential risk factors for inflicted injury due to child abuse.

The age and sex of the patient can narrow the spectrum of diagnoses that need to be considered (Table 1). Also the mode of onset whether acute or insidious can help to pinpoint a specific disease pattern. If the child has had previous episodes of joint pain, a chronic disease process is a more likely cause than injury or infection. As already pointed out, a history of injury cannot necessarily be relied on as diagnostic and the clinician needs to maintain a high level of suspicion of the possibility of another non-traumatic cause. A preceding or concurrent illness manifested by a sore throat or viral symptoms may support the diagnosis of reactive arthritis. A recent vaccination (e.g. for rubella) may also be significant (serum sickness) as can be a positive travel history, exposure to tick bites and other features of illness; skin rashes (psoriasis, lupus erythematodes), gastrointestinal symptoms (inflammatory bowel disease) and chronic fevers may suggest a systemic process, whereas lack of physical changes often indicates a more benign condition.

The location of the pain helps to decide whether its origin is intra-articular or extra-articular. The timely pattern of the pain can help to distinguish inflammatory from mechanical conditions. Inflammatory pain is usually worse in the morning and improves with activity, whereas mechanical pain worsens with activity. If the pain comes and goes in a few minutes or hours, it is less likely to be significant than if it persists for days or weeks. A summary of important points to consider in history taking is shown in Table 2.

Differential diagnosis based on the age of a child

Common causes of joint pain in children
All ages

- Trauma (fracture, haemarthrosis, soft tissue)
- Infection (septic arthritis, osteomyelitis, discitis)
- Secondary to various viral illnesses
- Tumour
- Sickle cell disease
- Serum sickness

Toddler (1—3 years)	Child (4—10 years)	Adolescent (11—16 years)
• Transient synovitis • Toddlers' fracture • Child abuse • Developmental dysplasia of the hip • Juvenile arthritis (pauciarticular) • Neuromuscular disease • Haemophilia • Henoch—Schoenlein purpura	• Transient synovitis • Juvenile arthritis (pauciarticular) • Perthes' disease • Rheumatic fever • Haemophilia • Henoch—Schoenlein purpura	• Slipped upper femoral epiphysis • Overuse syndromes • Osteochondritis dissecans

Table 1

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Important points to consider while taking history

- Age
- Sex
- Mode of onset (acute or insidious)
- Any previous episodes of joint pain
- Current or preceding illness or injury
- Recent vaccination
- Location, pattern, and duration of pain
- Joint swelling, rash, or fever
- Recent travel
- Contact with infectious disease

Table 2

Examination

Effective and thorough musculoskeletal examination will reduce the number of investigations required. It should start with general physical examination of the patient. Pain score and level of discomfort before and after the administration of analgesia should be recorded. Vital signs should be measured and recorded. Thereafter a quick musculoskeletal screening assessment can be performed using pGALS (paediatric Gait, Arms, Legs and Spine) before making a full regional assessment of the affected limb.

This assessment should include inspection, palpation (check for temperature difference), passive and active movement and appropriate functional assessment. A joint above and below should also be examined. Distal neurovascular status should be assessed and recorded. A full systemic examination may be indicated.

Below is a list of some benign and red flag symptoms and signs for the patients presenting with joint pain. It can be used as a guide to distinguish between benign and serious conditions.

Benign symptoms

- Worse with activity and better with rest
- Worse at the end of the day
- If night pain, relieved with simple analgesia/rubbing by parent, fully resolved by the next morning

Summary of investigations which may be required in case of a child presenting with joint pain

Test	Diagnostic value of the test
FBC	A normal WCC is present in 24%—74% of septic arthritis cases. Sensitivity and specificity of raised white cell count for septic arthritis are 75% and 55% respectively.
ESR	ESR becomes elevated up to 48 hours after the start of inflammatory process. It can be normal in 25% of septic arthritis cases. The sensitivity of ESR on admission in picking up osteoarticular infections is 94%.
CRP	CRP becomes elevated within 6 hours of inflammatory process. Sensitivity of elevated CRP on admission is 95%.
Blood Film	A normal blood film does not exclude malignancy and bone marrow aspirate may be required.
Blood Culture	Blood cultures are positive in 46%—80% of patients with osteomyelitis and 22%—50% of patients with septic arthritis.
Antistreptolysin O titre (ASOT)/anti-DNAse-B	Raised ASOT suggests current or recent streptococcal infection and is present in up to 80% of patients with acute rheumatic fever. Sensitivity can be further increased by testing for additional antibodies such as anti-DNAse-B. Throat swab also indicated but often negative.
Lactate dehydrogenase (LDH)	Raised levels can suggest malignancy (especially lymphoma) but sensitivity and specificity is low.
Plain radiography	Diagnostic yield is low in young children (1—5 years) who have an otherwise normal examination. May be normal even with significant pathology (e.g. sepsis, early Perthes' disease, transient synovitis, malignancy, juvenile idiopathic arthritis). Repeat radiographs after a period of review may be useful (e.g. detecting periosteal reaction in Toddler's fracture or evolving Perthes' disease). Anterior—posterior and 'frog leg lateral' hip X-rays should be undertaken in all children to detect early slipped upper femoral epiphysis (SUFE).
Ultrasonography	Very sensitive in detecting hip and joint effusions. Operator-dependent. Absence of effusion on hip USS makes septic arthritis very unlikely.
MRI	Very sensitive in identifying early sepsis, Perthes' disease, inflammatory disease and tumours when the pathological area is localized on clinical examination. May not always be able to differentiate infection from inflammation. Sedation/anaesthesia may be required in younger patients.
Bone scan	Very sensitive in identifying early osteomyelitis when an obvious focus of infection cannot be localized. May also detect early Perthe's disease, tumours, Toddler's fractures.
CT	Useful to detect early bone changes of sepsis and tumours and may detect occult fractures, but significant exposure to ionizing radiation.

Table 3