PGALS: Approach to Child with Arthritis

Prof Chris Scott
Paediatric Rheumatology
Introduction

• In a prospective study from The Royal Hospital for Sick Children, Edinburgh, every 58th child presented with an acute atraumatic limp.

• A survey of adolescents in British Columbia revealed that musculoskeletal complaints were perceived as the 2\textsuperscript{nd} most common health concern after acne. Juvenile Arthritis is the most common cause of musculoskeletal disability in children.

• Musculoskeletal pain can be the presenting feature of many different conditions, including life threatening conditions

Fischer SU..1999
Foster & Cabral, 2006
Poor training of Paediatricians and GP’s in PR

Lack of resources → Poor training → Under-diagnosis → Poor exposure → Perception of rarity → Lack of resources
Case Presentation

- 14 month girl
- Presents with toe walking
- 5 week history
Differential diagnosis by disease type

Mechanical
- Soft tissue injury including bruising, strains and foreign body
- Skeletal fracture—including stress/overuse fracture
- Toddler’s fracture
- Apophysitis of tibial tuberosity (Osgood-Schlatter disease) or calcaneum (Sever’s disease)
- Chondromalacia patellae
- Spondylolisthesis and spondylolysis

Inflammatory
- Reactive arthritis including transient synovitis of the hip
- Juvenile idiopathic arthritis
- Myositis
- Other connective tissue disease (e.g. systemic vasculitis, systemic lupus)
- Chronic recurrent multifocal osteomyelitis (CRMO)
- Synovitis Acne Pustulosis Hyperostosis Ostearthropathy Syndrome (SAPHO)

Infection
- Skeletal including osteomyelitis and septic arthritis
- Discitis
- Soft tissue infection
- Abdominal sepsis including psoas abscess, appendicitis, peritonitis
- Inguinal lymphadenitis

Specific hip disorders
- Perthe’s disease
- Slipped upper femoral epiphysis
- Idiopathic chondrolysis

Congenital
- Developmental dysplasia of the hip (DDH)
- Congenital talipes equinovarus (CTEV)
- Congenital short femur
- Skeletal dysplasias
- Multiple hereditary osteochondromata

Malignant disease
- Leukaemia
- Bone neoplasia (e.g. osteoid osteoma, osteoblastoma and osteosarcoma)
- Spinal cord tumour
- Langerhan’s cell histiocytosis

Metabolic
- Rickets (A)

Others
- Neurological and neuromuscular disease
- Haematological disease (e.g. haemophilia, sickle cell disease)
- Tarsal coalitions
- Osteochondritis dissecans (knee, talus, metatarsal)
- Chronic pain syndromes (chronic regional pain syndrome Type I)
- Idiopathic/conversion disorder (usually bizarre gait)
### Age appropriate differential diagnoses

<table>
<thead>
<tr>
<th>Any age</th>
<th>Trauma</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Septic arthritis</td>
</tr>
<tr>
<td></td>
<td>Reactive arthritis</td>
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<tr>
<td></td>
<td>Juvenile idiopathic arthritis (JIA)</td>
</tr>
<tr>
<td></td>
<td>Malignancy</td>
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<tr>
<td>Age 0-4 yrs</td>
<td>Developmental dysplasia of the hip</td>
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<tr>
<td></td>
<td>Transient synovitis</td>
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<tr>
<td></td>
<td>Non-accidental injury</td>
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<tr>
<td>Age 4-10 yrs</td>
<td>Perthe’s</td>
</tr>
<tr>
<td></td>
<td>Transient synovitis</td>
</tr>
<tr>
<td>Age 11-16 yrs</td>
<td>Slipped upper femoral epiphysis (SUFE)</td>
</tr>
</tbody>
</table>
Onset Pain:
• Sudden (injury, Septic) vs indolent (JIA)

Timing Pain:
• EMS
• Nocturnal Pain
• Bone Pain

Intensity Pain:
• JIA not severe
• Enthesitis can be
• Severe septic, malignancy or amplified pain

Disability:
• Severe not common in early JIA

Response to Meds:
• JIA, reactive and Osteoid Osteoma
• Malignancy and septic not

Family:
• Psoriasis, Ank spond, crohns, Lupus?

Social, infectious contacts, immunisations, Growth etc
## RED FLAGS
(Raise concern about infection, malignancy or non-accidental injury)

- Fever, malaise, systemic upset (reduced appetite, weight loss, sweats)
- Bone or joint pain with fever
- Refractory or unremitting pain, persistent night-waking
- Incongruence between history and presentation (such as the pattern of the physical findings and a previous history of neglect)
**SEPSIS**

Complete non-weight bearing
Any attempt to move the limb causes extreme distress
Constant severe pain
Night pain and waking
Fever
Immunocompromised child
- due to primary disease or medications

**RED FLAGS**

**MALIGNANCY**

Night pain
Severe and non-remitting pain
Pallor, bruising, anaemia, thrombocytopenia
Lymphadenopathy
Hepatosplenomegaly
Systemic symptoms
- lethargy, weight loss, night sweats, fever
Back pain in the unwell child

**JUVENILE IDIOPATHIC ARTHRITIS**

Joint swelling lasting > 6 weeks
Stiffness / slowness in the mornings
Joint pain may not be verbalised in the very young child and may manifest as being grumpy, clumsy or avoiding activities
Regression of achieved milestones
Leg length discrepancy and muscle wasting suggest chronicity (many months)

**NON ACCIDENTAL INJURY**

Delay in seeking medical attention
Changeable history inconsistent with pattern of injury or developmental stage of the child
Repeated presentations
Un-witnessed injury
Complete non-weight bearing with occult fracture
Case Presentation

- 14 month girl
- Presents with toe walking
- Left side only
- 5 week history
  - Timing: initially only in morning
  - Cries often when taken out of bed and refuses to walk? pain
  - Now most of the time
  - No weight loss, no fever, no systemic features
  - Previously well
  - Development normal
  - Milestones appropriate, walked “normally” from 11-13 months.
O/E

- First full general and systems based on excluding differential
- Then MSK screen (PGALS)
- If any abnormality: Full joint exam
- Look for features specific suspected autoimmune diseases
pGALS — A SCREENING EXAMINATION OF THE MUSCULOSKELETAL SYSTEM IN SCHOOL-AGED CHILDREN

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Sharmila Jandial, MBChB, MRCPCH, CertMedEd, arc Educational Research Fellow
Musculoskeletal Research Group, Newcastle University, Newcastle upon Tyne
Observe the child standing (from front, back and sides)

- Posture and habitus
- Skin rashes – e.g. psoriasis
- Deformity – e.g. leg length inequality, leg alignment (valgus, varus at the knee or ankle), scoliosis, joint swelling, muscle wasting, flat feet

Observe the child walking and ‘Walk on your heels’ and ‘Walk on your tiptoes’

- Ankles, subtalar, midtarsal and small joints of feet and toes
- Foot posture (note if presence of normal longitudinal arches of feet when on tiptoes)
<table>
<thead>
<tr>
<th>Image</th>
<th>Textual Description</th>
<th>Movement Description</th>
</tr>
</thead>
</table>
| ![Image](image1.png) | ‘Hold your hands out straight in front of you’ | - Forward flexion of shoulders  
- Elbow extension  
- Wrist extension  
- Extension of small joints of fingers |
| ![Image](image2.png) | ‘Turn your hands over and make a fist’ | - Wrist supination  
- Elbow supination  
- Flexion of small joints of fingers |
| ![Image](image3.png) | ‘Pinch your index finger and thumb together’ | - Manual dexterity  
- Coordination of small joints of index finger and thumb and functional key grip |
| ![Image](image4.png) | ‘Touch the tips of your fingers’ | - Manual dexterity  
- Coordination of small joints of fingers and thumbs |
<table>
<thead>
<tr>
<th>Squeeze the metacarpophalangeal joints for tenderness</th>
<th>• Metacarpophalangeal joints</th>
</tr>
</thead>
</table>
| ‘Put your hands together palm to palm’ and ‘Put your hands together back to back’ | • Extension of small joints of fingers  
• Wrist extension  
• Elbow flexion |
<table>
<thead>
<tr>
<th>Action</th>
<th>Movements</th>
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<tbody>
<tr>
<td>Reach up, “touch the sky” and Look at the ceiling</td>
<td>Elbow extension</td>
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<tr>
<td></td>
<td>Wrist extension</td>
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<tr>
<td></td>
<td>Shoulder abduction</td>
</tr>
<tr>
<td></td>
<td>Neck extension</td>
</tr>
<tr>
<td>Put your hands behind your neck</td>
<td>Shoulder abduction</td>
</tr>
<tr>
<td></td>
<td>External rotation of shoulders</td>
</tr>
<tr>
<td></td>
<td>Elbow flexion</td>
</tr>
<tr>
<td>'Try and touch your shoulder with your ear'</td>
<td>• Cervical spine lateral flexion</td>
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<td>-------------------------------------------</td>
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</tr>
<tr>
<td>'Open wide and put three (child’s own) fingers in your mouth'</td>
<td>• Temporomandibular joints (and check for deviation of jaw movement)</td>
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<tr>
<td>Feel for effusion at the knee (patella tap, or cross-fluctuation)</td>
<td>Knee effusion (small effusion may be missed by patella tap alone)</td>
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<td>---------------------------------------------------------------</td>
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</tbody>
</table>
| Active movement of knees (flexion and extension) and feel for crepitus | Knee flexion  
Knee extension |
<table>
<thead>
<tr>
<th>Passive movement of hip (knee flexed to 90°, and internal rotation of hip)</th>
<th>Hip flexion and internal rotation</th>
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<tr>
<td>‘Bend forwards and touch your toes?’</td>
<td>Forward flexion of thoraco-lumbar spine (and check for scoliosis)</td>
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</tbody>
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## Specific Features: Skin

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
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<tbody>
<tr>
<td>Psoriasis</td>
<td>White scaly plaques</td>
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<tr>
<td>Vasculitis:</td>
<td></td>
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<tr>
<td>Henoch Schonlein Purpura</td>
<td>Palpable purpura on the lower limbs</td>
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<tr>
<td>Kawasaki Disease</td>
<td>Polymorphous erythematous macules over trunk. Can be variable. Later peeling of the fingers and toes is characteristic.</td>
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<tr>
<td>Bechets</td>
<td>Oral or genital ulcers, papulopustular lesions, erythema nodosum</td>
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<tr>
<td>Polyarteritis Nodosa</td>
<td>Variable, erythema multiforme, skin nodules, livedo reticularis</td>
</tr>
<tr>
<td>SLE</td>
<td>Malar rash, discoid lupus, vasculitis rash, photosensitivity</td>
</tr>
<tr>
<td>sjIA</td>
<td>Salmon patches</td>
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<tr>
<td>Juvenile Dermatomyositis</td>
<td>Heliotrope rash around the eyes, gottrons papules over extensor surfaces, skin ulceration, calcinosis, periungual erythema</td>
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<tr>
<td>Sarcoidosis/Blau's disease</td>
<td>Erythematous/tan coloured maculopapular rash, Panniculitis</td>
</tr>
<tr>
<td>Inflammatory Bowel Disease</td>
<td>Erythema nodosum, pyoderma gangernosum</td>
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<tr>
<td>Scleroderma</td>
<td>Oedema, sclerosis,</td>
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Eyes

<table>
<thead>
<tr>
<th>Juvenile Idiopathic Arthritis</th>
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<tbody>
<tr>
<td>• Oligoarthritis</td>
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<tr>
<td>• Psoriatic Arthritis</td>
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<tr>
<td>• RF negative Polyarthritis</td>
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<tr>
<td>• Enthesitis Related Arthritis</td>
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<thead>
<tr>
<th>Paediatric Sarcoidosis/Blau’s Disease</th>
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<th>Reiters Syndrome</th>
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Understand | diagnose | change

Whether you are looking to learn more or diagnose paediatric musculoskeletal problems, pmm can help you change your practices for the better and improve early diagnosis.

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