NOTES
JOINT PATHOLOGY

GENERALLY, WHAT IS IT?

PATHOLOGY & CAUSES

- Disorders affecting joints
- Most commonly caused by trauma

SIGNS & SYMPTOMS

- Asymptomatic or pain during rest/movement

DIAGNOSIS

DIAGNOSTIC IMAGING
- Radiography
- MRI

LAB RESULTS
- Synovial fluid analysis

TREATMENT

- Treat symptoms pharmacologically
- Surgical procedures

BAKER'S CYST

osms.it/bakers-cyst

PATHOLOGY & CAUSES

- Synovial fluid accumulates in popliteal bursa (between medial head of gastrocnemius, semimembranosus muscles) → swelling
- *Adults*: popliteal bursa communicates with synovial sac; underlying knee joint disease main cause
  - Knee joint disease → ↑ synovial fluid production → synovial fluid squeezes through valve-like formation into bursa → fluid unable to flow backward → bursa enlarges → lump-like structure in the popliteal fossa
- *Children*: noncommunicating cyst; usually arises as primary process

CAUSES
- Chronic knee joint trauma
- Osteoarthritis
- Rheumatoid arthritis
- Meniscal tears

COMPLICATIONS
- Cyst enlargement
  - In popliteal space → obstruction of veins → lower leg swelling
  - Extension to calf → swelling, redness, bruising, positive Homan's sign (calf pain during dorsiflexion of the foot) → similar to deep-vein blood clot
- Rupture

SIGNS & SYMPTOMS

- May be asymptomatic
- Stiffness and pain in the knee → worse with prolonged standing

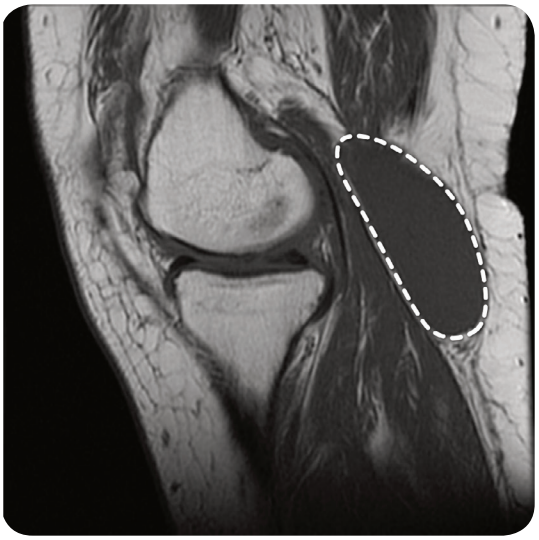

Figure 114.1 An MRI scan of the knee joint in the sagittal plane demonstrating a Baker's cyst in the popliteal fossa.

DIAGNOSIS

DIAGNOSTIC IMAGING

Ultrasound and MRI

- Fluid-filled cyst; differentiation between cyst, blood clot

X-ray

- Bone, joint pathology associated with cyst

OTHER DIAGNOSTICS

- Physical examination
  - Lump in the back of the knee

TREATMENT

SURGERY

- Surgical excision

OTHER INTERVENTIONS

- Fluid aspiration, glucocorticoid intra-articular injection → ↓ size and inflammation
- Treat complications
  - Leg elevation, resting, analgesics

BURSITIS

osms.it/bursitis

PATHOLOGY & CAUSES

- Inflammation of bursa (small sac located between muscles, tendons, bone structures)
- Inflammation of bursa → ↑ production of synovial fluid → enlargement of bursa → ↑ friction during movement → symptomatology
- Most commonly affected bursas
  - Subacromial, olecranon, trochanteric, prepatellar, infrapatellar

CAUSES

- Autoimmune disorders
  - Rheumatoid arthritis, ankylosing spondylitis, scleroderma, systemic lupus erythematosus → chronic course
- Overuse/trauma, gout, bacterial infections (septic bursitis) → acute course

SIGNS & SYMPTOMS

- Joint pain; stiffness of joints; surrounding skin red
- Acute bursitis
  - Tenderness, pain during activation of muscles adjacent to inflamed bursa
- Chronic bursitis
  - Swelling with minimal pain

Figure 114.2 An individual with olecranon bursitis.

DIAGNOSIS

DIAGNOSTIC IMAGING

Ultrasound

- Differentiation from Baker's cyst

LAB RESULTS

- Aspiration and analysis of synovial fluid
  - *Infection*: ↑ polymorphonuclear leukocytes, proteins, ↓ glucose
  - *Gout*: ↑ monosodium urate crystals

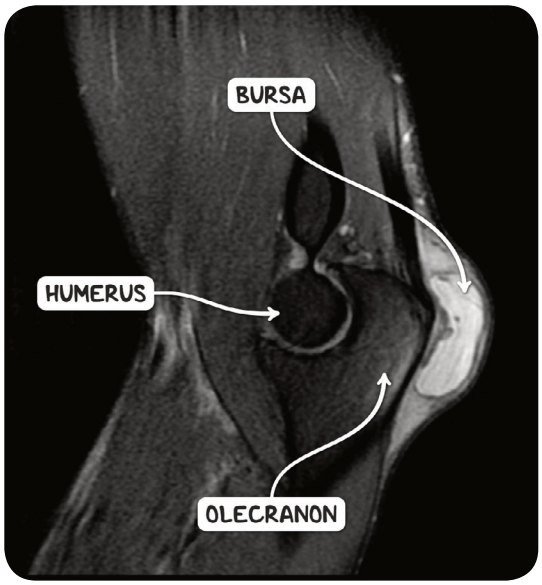

Figure 114.3 An MRI scan of the elbow demonstrating a high signal fluid collection in the olecranon bursa in an individual with olecranon bursitis.

TREATMENT

MEDICATION

- Non-steroidal inflammatory drugs (NSAIDs)
- Injection of steroids, local anesthetics
- Septic bursitis
  - Antibiotics

SURGERY

- Surgical excision
  - Chronic or recurrent bursitis

OTHER INTERVENTIONS

- Resting, elevation

OSTEOARTHRITIS

osms.it/osteoarthritis

PATHOLOGY & CAUSES

- Progressive loss of articular cartilage, underlying bone of synovial joints
- Articular cartilage damage → chondrocytes replace type II collagen with type I, ↓ proteoglycans → eventual exhaustion, apoptosis of chondrocytes → ↓ elasticity, ↑ cartilage breakdown → clefts in articular surface (fibrillations), "joint mice" in synovial space with inflammation of synovium → bone exposition → rubbing other bone → eburnation (polished ivory look)
- Due to damage/inflammation, new bone formation on edges of bone with outward growth → osteophyte (enlargement of the joint with a knob-like look)
  - *Bouchard nodes*: proximal interphalangeal finger joints affected
  - *Heberden nodes*: distal interphalangeal finger joints affected
- Most commonly affected joints
  - Lower spine, hip, knee, foot and hand joints

CLASSIFICATION

- Primary
  - Usually idiopathic
- Secondary
  - Caused by some other condition (e.g. diabetes, alkaptonuria, hemochromatosis, chronic joint injury)

RISK FACTORS

- Aging
  - Cartilage thinning with ↓ hydratation → protein accumulation, collagen crosslinking → cartilage is more breakable; ↑ calcification of meniscus, cartilage
- Inflammation → ↑ proinflammatory cytokines
  - IL1, IL6, TNF → ↑catabolism/↓ anabolism of cartilage
- Obesity
  - Excessive load, metabolic disorders affect joints
- Genetic disorders
  - Mutations in cartilage building collagens (types II, IX and XI)
- Biological sex
  - Biologically female more prone
- Previous joint injuries
- Infection
- Neurologic disorders

COMPLICATIONS

- Cystic degeneration of subchondral bone
- Surrounding ligaments, neuromuscular abnormalities

SIGNS & SYMPTOMS

- Sharp pain/burning sensation worsened by prolonged activity
- Limited range of motion
- Morning stiffness > one hour
- No swelling

Figure 114.4 Heberden's node on the distal interphalangeal joint of the right index finger in an individual with osteoarthritis.

DIAGNOSIS

DIAGNOSTIC IMAGING

Radiography

- Loss of joint space
- Subchondral bone sclerosis

MRI

- Loss of joint space
- Subchondral bone sclerosis
- Osteophytes
- Visualisation of articular cartilage, surrounding soft tissues

CT scan

- Displacement of foot, ankle, patellofemoral joint

Bone scan

- Detect abnormalities

LAB RESULTS

- Arthrocentesis

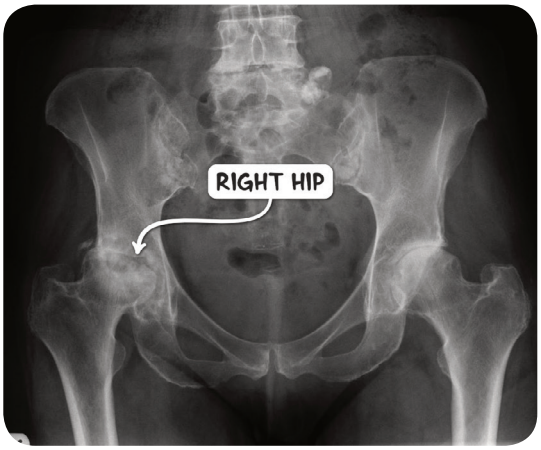

Figure 114.5 An X-ray image of the pelvis demonstrating osteoarthritis of the right hip joint. The femoral head is malformed, there is marked loss of joint space and there are numerous subchondral bone cysts.

TREATMENT

MEDICATIONS

- Pain management
  - Acetaminophen, tramadol, topical and oral non-steroidal anti-inflammatory drugs (NSAIDs)
- Intra-articular injections
  - Corticosteroids
  - Sodium hyaluronate

SURGERY

- Osteotomy
  - Individuals < 60 years with malalignment of hip, knee joint
- Arthroplasty
- Stem-cell therapy

OTHER INTERVENTIONS

- Exercise
- Weight loss
- Physical therapy
- Electromagnetic field stimulation for individuals with knee osteoarthritis

SLIPPED CAPITAL FEMORAL EPIPHYSIS

osms.it/slipped-capital-femoral-epiphysis

PATHOLOGY & CAUSES

- Anterior displacement of femoral head metaphysis, with epiphysis remaining in hip acetabulum
- Caused by growth plate (physis) fracture
- Example of type I Salter–Harris fracture usually affecting one hip
- Hypertrophy of growth plate → abnormal endochondral ossification, cartilage maturation → growth plate weakness → if too much force generated across growth plate → slippage

CLASSIFICATION

- Based on disease course
  - *Acute*: > three weeks
  - *Chronic*: < three weeks
  - *Acute on chronic*: chronic with acute exacerbations
- Based on lesion stability
  - *Stable*: walking possible with/without crutches
  - *Unstable*: walking impossible, even with crutches
- Displacement of the femoral head from neck; seen on radiography
  - *Type I*: slippage < 33%
  - *Type II*: 33–50%
  - *Type III*: > 50%

RISK FACTORS

- Obesity
- ↓ thyroid, growth hormone
- Osteodystrophy
- Down syndrome
- Demographics
  - Adolescent black males of African descent most commonly affected

COMPLICATIONS

- Osteoarthritis
- Metaphysis slippage → ↓ blood flow → avascular necrosis
- Secondary SCFP affecting other hip; usually within a year of first SCFP
- *Unstable displacement*: ↑ complication rate

SIGNS & SYMPTOMS

- Hip, groin, knee pain
- Duck-like gait
- Hip in external rotation, flexion

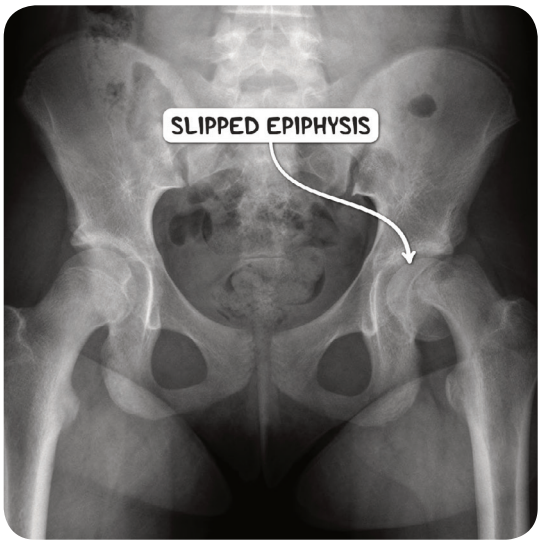

Figure 114.6 An X-ray image of the pelvis demonstrating a slipped capital femoral epiphysis on the left side.

DIAGNOSIS

DIAGNOSTIC IMAGING

X-ray

- Anteroposterior X-ray
  - Melting ice cream cone appearance visible through line of Klein (virtual line parallel to femoral neck's upper edge)
- Frog-leg X-ray
  - Straight line through center of femoral neck anterior to epiphysis (rather than central)

MRI, CT scan

- Accurate measurements of displacement degree

TREATMENT

SURGERY

- Fixation with a cannulated screw
- Preventive fixation of the other hip
  - Children with SCFP before the age of 10
  - Persons with endocrinopathies
- Osteotomy

TRANSIENT SYNOVITIS

osms.it/transient-synovitis

PATHOLOGY & CAUSES

- Inflammation of hip joint synovial membrane
- Cause relatively unknown, but may be preceded by upper respiratory tract infection
- Most commonly seen in male children 3–10 years
- Most commonly limited to one side

SIGNS & SYMPTOMS

- May be asymptomatic
- Tenderness/pain during passive movement
- One-sided pain in the hip, groin, thigh, knee
- Antalgic limping

DIAGNOSIS

- Diagnosis of exclusion

DIAGNOSTIC IMAGING

Ultrasound

- Fluids in joint capsule

LAB RESULTS

- Slightly ↑ white blood cell count
- ↑ Erythrocyte sedimentation rate
- ↑ C-reactive protein
- Needle aspiration
  - Differentiation between transient synovitis and septic arthritis

OTHER DIAGNOSTICS

- Limited abduction and internal rotation

TREATMENT

MEDICATIONS

- NSAIDs

OTHER INTERVENTIONS

- Massage
- Rest