COMMONWEALTH OF AUSTRALIA

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Osteoarthritis

Geoff McColl and Andrea Bendrups
Learning objectives

By the end of this session, students should be able to
- list the joints commonly affected by osteoarthritis
- describe the risk factors for osteoarthritis including overweight, joint injury and genetic predisposition
- describe the common features on medical interview and physical examination that would suggest an osteoarthritis diagnosis
- demonstrate the appropriate application of imaging and other investigations in the assessment of a patient with osteoarthritis
- describe the principles of osteoarthritis management including the use of pharmacological and non-pharmacological therapy
- describe the role of surgery in the management of osteoarthritis in particular the use of knee and hip arthroplasty.
Hip: History and examination

Mr Raphael Hau
MBBS FRACS FAOrthoA
Director of Orthopaedics, Northern Health
Clinical Senior Lecturer, University of Melbourne
Why take a history and exam?

• List differentials
• Define severity of disease ie staging
• Previous management
• Concurrent problems
• Help formulate management plan
• Monitor effect of treatment
• Detection of side effects
Orthopaedic History

- **C** Complaint
- **A** Associated symptoms
- **F** Functional assessment
- **T** Treatment already tried
- Co-morbidities, medications, allergies etc
Hip History

- C  Complaint
- A  Associated symptoms
- F  Functional assessment
- T  Treatment already tried
Complaint

• Pain most common
  • Location, radiation, character, onset, exacerbating and relieving factors, night pain etc

• Location
  • Groin: hip joint
  • Lateral: Greater trochanteric bursa
  • Buttock: Lower lumbar spine, sacro-iliac joint
  • Anterior thigh: hip joint, upper lower spine
Hip associated symptoms

- Limp
- Stiffness
- Clicking, painful catching
- Leg length discrepancy (LLD)
- Numbness / weakness
Hip function

- Walking distance
  - No aid, SPS, crutches, frame
- Reach toes
- In and out of cars
- Driving
- Public transport

- Occupation
- Sports
- Hobbies
Non-operative orthopaedic treatment

- E Education
- L Life style modification
- P Pharmacy
- O Orthotics
- P Physiotherapy
- I Injection
Education

- Diagnosis
- Etiology
- Natural history
- Treatment options
- Preferred option
- Details of treatment
- Expected outcome
- Risks and benefits
- Questions
Life Style modification

- Modify weight
- Modify work
- Modify sports
- Modify expectations
Pharmacy

- Paracetamol
- Narcotic
  - Short acting
  - Long acting
- NSAIDs
  - Cox 2 selective
- Cortico-steriod
- DMARDs
- Tramadol
  - μ opioid agonist
Orthotic

- Orthotic
  - Enhances function of body part

- Prosthetic
  - Replaces body part
Orthotic

• Gait aids
  – Stick: single point (SPS), 4 prong stick
  – Crutches: elbow, axillary, gutter
  – Frames: pick up frame (PUF), 2 wheel frame (2WF), 4 wheel frame (4WF)
Orthotic

- Bracing
  - Zimmer knee splint (ZKS)
  - Hinge knee brace (HKB)
  - Soft knee brace

- Weight bearing
  - Non weight bearing
  - Touch WB
  - Partial WB
  - NWB / TWB / PWB
Physiotherapy

• To maintain or improve range of movement of a joint
• To maintain or improve muscle strength
• To improve balance
• Gait training
Injection

• What anatomical structures?
  – Synovial joints
  – Bursae
  – Ligaments
  – Nerve roots

• What substances?
  • Local anaesthetic
  • Cortico-steroid
  • Radio-isotopes
  • Yttrium
Causes of early hip OA

- Developmental Dysplasia of the Hip (DDH)
- Slipped Upper Femoral Epiphysis (SUFE)
- Perthes’ disease (childhood femoral head AVN)
- Septic arthritis of the hip
- Inflammatory arthropathy
Causes of AVN of femoral head

- Cortico-steroid
- Alcohol
- Idiopathic
- Post traumatic – NOF#, hip dislocation
  - Caisson’s disease, decompression sickness, bends
  - Haemoglobinopathies
Orthopaedic examinations

• Look
• Feel
• Move
• Special tests
Hip examination

• Look – gait aid; alignment: AP, Lat, PA; gait, spine

• Feel – Pelvis, Trendelenburg, GT, Sacro-iliac joint, lumbar spine

• Movement – Thomas test, ROM, impingement

• Special test – LLD
Inspection - AP/Lateral

- AP: Scar, sinuses, quadriceps wasting
- Lateral:
  - Increased lumbar lordosis in hip with LLD
  - Decreased lumbar lordosis in spinal OA
Increased lumbar lordosis in hip FFD
Inspection - posterior

- PA: Gluteal wasting, hamstring wasting
- Spinal deformity – scoliosis
- Stigmata of spina bifida:
  - Lipoma, sinus, hairy patch
Inspection - posterior

• Functional leg length discrepancy
  – Thumbs on PSIS
  – Check knees are extended
  – Check if pelvis is level
  – If LLD present, Block test
Trendelenburg test

- Steady pelvis, thumbs on iliac crest
- Lift knee up on the bad side
- NWB side of pelvis rises normally
- Positive test when NWB pelvis drops or if trunk sways away NWB leg to lift pelvis
- Immediate or delayed (30sec)
The significance of the Trendelenburg test.
Positive Trendelenburg test

• Motor: Abductor weakness
  » iatrogenic, post surgical, CVA, spina bifida, GT mal-union

• Lever: Short neck of femur
  » Old NOF #, Perthes,

• Fulcrum: Hip joint
  » OA, AVN, RA, SUFE, Perthes, DDH
Inspection - Gait

• Trendelenburg gait:
  • trunk sways towards the affected WB side to lift pelvis
  • shoulder dips on the affected WB side

• Antalgic gait:
  • Painful short stance phase

• Short leg gait:
  • Mimics Trendelenburg gait
Doctor of Medicine
Palpation - Standing

• Greater trochanter: bursitis

• Gluteus minimus/medius:
  » Tendonitis
  » Medial and posterior to tip of GT

• Sacro-iliac joint: inflammation
Move - Supine

• Ensure pelvis square

• Thomas’ test for Fixed flexion deformity (FFD)
  – Flex both hips to full extent, note flexion range
  – Ask patient to hold one knee with both hands to fix the pelvis
  – Put palm to palpate lumbar spine to ensure it is not lordotic
  – Ask patient to extend the other knee
  – Note the angle the thigh forms with the couch - FFD
Move - supine

• Normal flexion: 90° with knee extended
• Normal flexion: 110° with knee flexed
• Abduction/adduction:
  • hook contralateral ankle over the edge of the couch
  • Abduct and adduct limb
  • Normal abduction 45°, normal adduction 30°
Move - supine

• Rotation
  – Flex hip and knee to 90°
  – Rotate externally then internally
  – IR decreases first in OA
  – Normal IR 35°, ER 45°
  – Pain on rotation – irritability - inflammation
Move - supine

• Extension
  – Not usually tested
  – Test extension in lateral decubitus or prone position
  – Normal extension 20-30°
Special tests

• Apparent LLD
  • Measure leg length difference between umbilicus and medial malleolus

• True LLD
  • Correct fixed deformity eg FFD, Adduction contracture
  • Measure leg length difference between ASIS and medial malleolus
Special tests

- Impingement test
  - Flex, adduct, internal rotate (FADIR)
  - Pain indicates a positive test
  - Positive test indicates labral or other intra-articular pathology
Special tests

• Bryant’s triangle for LLD
• Ober’s test for ilio-tibial band tightness
• Faber test for sacro-iliac joint irritability
  – Flex, abduct, external rotate (FABER)
Special tests

• Neuro-vascular status
• Examine Lumbo-sacral spine
• Examine Knee
Back Pain

Mr Raphael Hau  
MBBS FRACS FAOrthoA  
Director of Orthopaedics, Northern Health  
Clinical Senior Lecturer, University of Melbourne
Epidemiology

• Common
  – 80% will have LBP at some stage
  – Self limiting

• Important to differentiate the ones with red flags and investigate
Causes of low back pain

• Degenerative
  • Facet joint osteoarthritis
  • Disc degeneration
  • Disc herniation
    – central (can cause canal stenosis) or
    – posterolateral (can cause radicular impingement)

• Muscle spasm
Causes of low back pain 2

- Inflammatory back pain
  - Ankylosing spondylitis, Psoriatic arthritis, Reactive arthritis / Reiter’s syndrome
- Fractures
  - Osteoporosis, trauma, stress
- Malignancy
  - Eg. breast, lung, prostate
- Infection
  - Discitis, osteomyelitis, epidural abscess
- Intra-abdominal pathology
  - AAA, renal, pelvic
• The summation shadows of 2 overlapping lumbar vertebrae in the oblique view plain Xray are said to resemble the outline of a “scotty dog”.
• This example shows some facet joint OA (aka degenerative) changes – joint space narrowing and sclerosis.
(c) Cauda equina, posterior view

- Conus medullaris of spinal cord
- Cauda equina
- Dura mater
- Dorsal root ganglia of L₂ and L₃
- 1st sacral nerve root
- Sacrum (cut)
- Filum terminale
Examples of Disc Problems

- Normal Disc
- Degenerated Disc
- Bulging Disc
- Herniated Disc
- Thinning Disc
- Disc Degeneration with Osteophyte Formation

Massive L5-S1 Lumbar Disc Herniation with Spinal Nerve Root Impingement
Spinal canal stenosis

- **Spinal canal stenosis**

  - Anatomically is usually caused by a combination of facet joint OA + ligamentum flavum hypertrophy + disc herniation

  - May cause the clinical syndrome of *lumbar claudication*, ie. Lumbar, buttock or thigh pain usually uni- but may be bilateral that is NOT present at rest but comes on with exercise, at a reproducible walking distance

  - Nerve roots become compressed
Back History

• C  Complaint
• A  Associated symptoms
• F  Functional assessment
• T  Treatment already tried
Complaint

• Pain most common
  • Location, radiation, character, onset, exacerbating and relieving factors, night pain etc
  • Back vs leg
  • Red flags symptoms
    – What is the significance?
Back History

- C Complaint
- A Associated symptoms
- F Functional assessment
- T Treatment already tried
Back associated symptoms

- Swelling
- Stiffness
- Neurological symptoms
  - Numbness, weakness
- Incontinence
Back function

• Walking distance
  – No aid, SPS, crutches, frame

• Occupation
• Sports
• Hobbies
Non-operative orthopaedic treatment

- E  Education
- L  Life style modification
- P  Pharmacy
- O  Orthotics
- P  Physiotherapy
- I  Injection
Lumbar spine examination

- Undress the patient.
- Patient standing -
  - Gait - normal, tip toes - post, heels - ant.
  - Fatigue test, up and down on toes 5X (S1)
  - Assess leg length discrepancy
  - Assess wasting.
  - Assess deformity - Scoliosis, kyphosis, lumbar lordosis lost
Scoliosis
Surface anatomy
Lumbar spine examination

• ROM Spine Forward flexion - distance from floor
• Schober’s test – lumbar flexion excursion, min 15cm
• Lateral flexion - distance from knee. This is normal.
  Lateral rotation (thoracic) - head should rotate past pelvis
Figure 19. With the patient seated on the couch to fix the pelvis, assess thoracic rotation.
Lumbar spine examination

- Lie down
- Test power while supine
- SLR & Cross over
- Test knee and ankle clonus
- Babinski
- Test hip ROM
Lumbar spine examination

• Test for abdominal reflex, stroke the skin of the four abdominal quadrant towards the umbilicus, twitching of rectus abdominis may occur; symmetrical presence or complete absence is normal, asymmetry is abnormal and may be due to cord problems.
Lumbar spine examination

• **Lie on side** - femoral nerve stretch
Lumbar spine examination

• Lie prone
• Palpate spinous processes & paraspinal muscles.
• Test buttock sensation & posterior thigh sensation.
Lumbar spine examination

- Sit the patient.
- Assess sensation L2 - S1 with lateral calf and medial foot for L5
- Test reflexes
- Test pulses
- SLR while sitting - Waddell sign
Lumbar spine examination

- Waddell signs
- Non-anatomic motor or sensory symptoms
- Over-reaction
- Distraction signs – seated SLR
- Simulation signs – rotation, axial compression, occiput tap
- Skin hypersensitivity
- 4 out of 5 correlates with poor surgical results
When to investigate

- Red flags
- Symptoms persist more than 6 weeks
- How?
  - Xray
  - MRI
  - Bloods
MRI Changes in the Lumbar Spine
