Musculoskeletal and Soft Tissue Disorders

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- Clinical interests include utilizing ultrasound in musculoskeletal medicine.
Musculoskeletal and Soft Tissue Disorders
Online Curriculum

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Disclosures

• Financial-None
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Objectives

• Identify common musculoskeletal disorders
• Know the management options for common musculoskeletal disorders
Outline

• Spine
• Upper Extremity
• Lower Extremity
• Myofascial Pain
• Arthroplasty Rehabilitation
Spine Disorders-General Principles

• Anatomy
Spine Disorders-General Principles
Spine Disorders-General Principles

• Red Flags
  • gait disorder
  • weakness
  • bowel/bladder changes
  • night pain
  • unintentional weight loss
  • fever/chills
  • night sweats

Cuccurullo, S. 2004
Spine Disorders-General Principles

• “Yellow Flags”—indicators of potential disability
  • Fear-avoidance behavior
  • Medico-legal issues
  • Waddell’s (TORDS)
  • Mood disorder
  • History of abuse
  • Work-related disability—unhappy with supervisor or job, missed time from work
Spine Disorders-Cervical Radiculopathy

- Pain radiating from the neck into upper limb or medial scapula region
- Paresthesias and/or weakness
- C6, C7

- Etiology: disc herniation, degenerative changes resulting in foraminal narrowing

- Management: medications, physical therapy, epidural corticosteroid injections, surgery

Radharkrishnan, 1994
Spine Disorders-Cervical Stenosis

- Most common cervical cord lesion after middle age (Wilkinson, 1960)
- Degenerative changes narrow the spinal canal diameter (> 1/3) (Penning, 1986)
- Insidious weakness (LE>UE), gait disorder, bowel/bladder changes, may have UE radicular symptoms
- UMN findings on exam
- Treatment: monitor/education, maximize balance, surgery
Spine Disorders- Cervical Facet Syndrome

• Facet joints are true synovial joints

• Pain from arthritis, injury

• Clinical: primarily axial pain, exacerbated by extension, tenderness, decreased ROM

• (Cooper, 2007)
Spine Disorders-Cervical Facet Syndrome

• Imaging: degenerative changes, MRI with periarticular edema or fluid within joint

• Treatment:
  • Medications
  • Manual medicine
  • Exercise program to promote proper posture
  • Injections
  • MBB/RFA
Spine Disorders-Scheuermann’s Kyphosis

- Progressive thoracic kyphosis in adolescents
- Disorder of vertebral endplates and apophysis
- Kyphosis is fixed on exam
- X-rays: Schmorl’s nodes and anterior wedging of vertebral bodies
- Treatment: spine stabilization, symptom management
  - (Brown, 2004)
Spine Disorders-Vertebral Body Fractures

• Compression fractures, typically thoracic
• Etiology: osteoporosis, trauma, neoplasm
• Severe localized pain, often sudden
• Focal tenderness on exam
• X-ray: vertebral body compression
• MRI: vertebral body compression +/- edema
• Treatment: pain medications, bracing, hyperextension exercises, vertebroplasty/kyphoplasty, rarely surgery
  • (Brown, 2004)
Spine Disorders-Lumbar Facet Syndrome

- Facet joints are true synovial joints
- Pain from arthritis, injury
- Clinical: primarily axial pain, exacerbated by extension, tenderness, decreased ROM
- Referral patterns vary
Spine Disorders-Lumbar Facet Syndrome

- Imaging: degenerative changes, MRI with periarticular edema or fluid within joint

- Treatment:
  - Medications
  - manual medicine
  - lumbar stabilization program
  - Injections
  - MBB/RFA
Spine Disorders-Lumbar Disc Disorders

• Discogenic Pain: internal disc disruption, disc degeneration

• Lumbosacral pain, may radiate to buttock or proximal LE

• Exacerbated by increasing disc pressure
  • sitting
  • cough/strain/sneeze
  • flexion

• Treatment: medications, lumbar stabilization, epidural?

• Controversial treatments: disc replacement, lumbar fusion, IDET
Spine Disorders-Lumbar Radiculopathy

• Nerve root pain related to the lumbar spine
• Mechanical compression or chemical irritation
• Rare causes: infection, malignancy, fracture
• L5 and S1 radiculopathies most common
• Treatments: time, medications, relative rest, exercise, epidural corticosteroid injections, surgery
  • (Vad, 2002)
Spine Disorders-Lumbar Stenosis

• Central canal narrowing + neurologic symptoms
• Neurogenic claudication: Lower extremity pain, paresthesias, and/or weakness with standing/walking/extension
• Majority remain stable  (Johnsson, 1992)
• Neurologic decline rare, no harm waiting for surgery (Amundson, 2000)
• Treatments: walker w/ seat, medications, ESI, surgery
Spine Disorders-Cauda Equina Syndrome

• Rare condition affecting the nerve roots of the cauda equina
• Usually due to large disc herniation
• Less likely caused by trauma, infection, tumor, hematoma
• Saddle anesthesia, bowel/bladder dysfunction, LE pain/paresthesias/weakness
• Treatment: Emergent surgery
Spine Disorders-Sacroiliac Joint Pain

- Low back, buttock, or LE pain
- No consistent history or exam findings
- Etiology: degenerative, traumatic, hypermobile, hypomobile, pregnancy, spondyloarthropathy
- Treatment: Manual medicine, medications, physical therapy, injections
  - Surgery is controversial
Spine Disorders-Infections

- Osteomyelitis, discitis, epidural space, facet joint
- Typically presents with insidious back pain
- Risks: immunocompromised, IV drug use, DM, hemodialysis

“Rule of 50” (Tali, 2004)
  - >50 y/o
  - 50% have nl WBC, fever, sx > 3 months
  - 50% lumbar
  - 50% originate in urinary tract

- Treatments: IV antibiotics 4-6 weeks
Shoulder Disorders-Glenohumeral Joint Osteoarthritis

• Painful and reduced ROM
• Risks: prior dislocations, trauma, fractures
• ROM globally reduced and pain with movement in all directions
• Diagnosis: imaging and clinical
• Treatments: medications, injections, TSA, reverse arthroplasty with RTC deficiency
Shoulder Disorders-Rotator Cuff Disorders

- Supraspinatus
- Infraspinatus
- Teres minor
- Subscapularis
Shoulder Disorders-Rotator Cuff Disorders

- Tendinopathy, SA/SD bursopathy, partial tendon tears, complete tears, calcific tendonitis

- Etiology: trauma, repetitive microtrauma, external impingement, internal impingement
Shoulder Disorders - Rotator Cuff Disorders

• Acromion Types
  • Type I: flat
  • Type II: curved
  • Type III: hooked
    • Risk of RTC tendon tears increases from I-III
      • (Bigliani, 1986)
Shoulder Disorders-Rotator Cuff Disorders

• Anterolateral shoulder pain at night, with abduction, internal rotation, overhead activities

• **PE:** painful arc, Hawkin’s, Neer’s, Drop Arm Test

• **Xrays, MRI**

• **Treatments:** medications, activity modifications, subacromial corticosteroid injection, physical therapy, surgery
  - Acute, full-thickness tears should receive surgery consult
Shoulder Disorders-Adhesive Capsulitis

- “Frozen Shoulder”
- Painful restriction of shoulder ROM, fibrocartilaginous proliferation
- Decreased internal/external rotation on exam
- 2-5% of general population
- 2-4 x more likely in females
- DM
- 40-60 y/o

(Bunker 1995, Connolly 1998)
Shoulder Disorders-Adhesive Capsulitis

• Four Stages
  • I: 1-3 months, painful movement but minimally restricted
  • II: 3-9 months, painful movement with loss of motion
  • III: 9-15 months, reduced pain but severely limited motion
  • IV: 15-24 months, minimal pain and gradual improvement in ROM
    • (Hannafin 2000)
Shoulder Disorders-Adhesive Capsulitis

• Treatment:
  • Medications
  • Intraarticular Corticosteroid Injection
  • AAROM
  • Surgery
    • Manipulation under anesthesia
    • Arthroscopic capsular release
    • Open release
Elbow Disorders-Olecranon Bursopathy

- Swollen olecranon bursa
- Etiology: trauma, inflammatory disorder
- Redness, warmth may suggest infection
- Treatment: protection, ice, aspiration to rule out infection if clinically indicated
Elbow Disorders-Osteoarthritis

• Painful, decreased ROM
• H/o trauma
• Osteoarthritis on xray

• Treatment:
  • Physical therapy
  • Medication
  • Injections
  • Surgical referral
Hand and Wrist Disorders-Ganglion Cysts

• Cystic structure arising from synovium
• Often painless
• Dorsum of the wrist, “snuff box”
• Treatment:
  • monitor
  • aspiration (recurrence common)
  • surgical resection
Hand and Wrist Disorders-DeQuervain’s Tenosynovitis

- Stenosing tenosynovitis of the first dorsal compartment (APL, EPB)
- Most common tenosynovitis of the wrist
- Repetitive gripping
- Tenderness to palpation, edema, Finkelstein’s test
  - (Conklin et al, 1960)
Hand and Wrist Disorders-DeQuervain’s Tenosynovitis

• Finkelstein’s test
Hand and Wrist Disorders-DeQuervain’s Tenosynovitis

• Treatment: activity modification, ice, NSAIDS, physical therapy, corticosteroid injection
• Injections 62-100% improved
  • (Wood, 1986)
Hand and Wrist Disorders-Osteonecrosis of the Lunate

- Kienbock disease
  - Vascular compromise of the lunate progressing to avascular necrosis
  - Pain and stiffness
- Diagnose:
  - X-ray—sclerosis→collapse
  - Bone scan, MRI
- Treatment: immobilization early, surgical referral
  - (Stahl, 1947)
Hand and Wrist Disorders-Stenosing Tenosynovitis

• “Trigger Finger”

• Catching/locking of the finger in flexion

• Repetitive trauma, DM, inflammatory arthritis

• Nodule forms on flexor tendon → nodule passes under A1 pulley upon flexion → caught upon extension → finger locked in flexion

• Treatment: corticosteroid injection, surgery
Hand and Wrist Disorders-Carpal Tunnel Syndrome

DoPhotoShop/Wikimedia Commons
Hand and Wrist Disorders-Carpal Tunnel Syndrome

• Pain
• Paresthesias in median innervated digits
• Associations: pregnancy, DM, inflammatory arthritis
• Symptoms worse at night, wrist flexion
• PE: Tinel’s, Phalen’s, Carpal Compression, weakness/atrophy in advanced cases
Hand and Wrist Disorders-Carpal Tunnel Syndrome

• Diagnose: Clinically, EMG, US

• Treatment: wrist splints, corticosteroid injection, surgery
Hand and Wrist Disorders-Osteoarthritis

- 1st CMC joint
  - Common
  - Female
  - Pain, stiffness, tenderness
  - Diagnose: xray
  - Treatment: NSAIDs, acetaminophen, thumb spica, corticosteroid injection, surgical referral
    - (Peter, 1968)
Hip Disorders-General Principles

- Location
  - Buttock, groin, anterior thigh

- Gait
  - Compensated Trendelenburg

- Aggravators
  - Crossing legs
Hip Disorders-Trochanteric Pain Syndrome

• Gluteus medius syndrome, Trochanteric bursitis

• History:
  • Pain in lateral thigh with hip flexion and lying on the affected side
  • Location: greater trochanter, ITB
  • Causes: trauma, weakness, pes planus
Hip Disorders-Trochanteric Pain Syndrome

• Physical Examination
  • Tenderness to palpation
  • Pain with ER>IR of the hip
  • Tight ITB
  • Pain associated weakness; compensated trendelenburg
  • Pes planus
Hip Disorders-Trochanteric Pain Syndrome

• Management
  • US
  • Stretch ITB
  • Ice
  • Arch supports
  • Cane
  • NSAIDS
  • Injection
Hip Disorders-Avascular Necrosis of the Femoral Head

• 15000-20000 new cases in U.S. per year
• 10% of THA
• 40-60% bilateral
• Late 30s to 50s
• Not likely in the elderly due to marrow changes--gelatinous marrow
  • (Lavernia, 1999)
Hip Disorders-Avascular Necrosis of the Femoral Head

• Etiology:
  • Trauma
  • Alcoholism
  • Corticosteroid
  • Caisson Disease
  • Pancreatic Disease
  • Radiation
  • Dialysis
  • Hyperlipidemia

• Hemodialysis
• Gaucher disease
• Hemophilia
• Hemoglobinopathies
• Hypercoaguable state
• Collagen vascular disease/SLE
• Smoking
• Pregnancy
  • (Mont, 1995)
Hip Disorders-Avascular Necrosis of the Femoral Head

• Radiography
  - Femoral head lucency, subchondral sclerosis
  - Subchondral collapse (crescent sign), femoral head flattening
  - Femoral head collapse, joint space narrowing

• MRI
  - Most sensitive, most specific
  - Diffuse edema early (low T1, high T2)
  - Edema becomes more focal
  - Serpiginous line of low signal intensity
  - SE T2: peripheral band of low signal, inner aspect of band with high signal; “double-line sign”
Hip Disorders-Avascular Necrosis of the Femoral Head

• Management
  • Non-weight bearing
  • Core decompression
    • Bone grafting
    • Vascularized fibular graft
  • Resurfacing, bipolar arthroplasty
  • Total Hip Arthroplasty
Hip Disorders-Osteoarthritis

History

• pain in groin, buttock, lateral thigh and/or anterior thigh

• pain worse with weight bearing and rotation (crossing legs, donning/doffing shoes)

• <15 minute stiffness after immobilization

• Risks: age, trauma, developmental abnormalities, repetitive heavy lifting/farming, obesity
Hip Disorders-Osteoarthritis

- Physical Examination
  - Compensated Trendelenburg gait
  - Pain reproduced with IR>ER
  - Positive Stinchfield and FABER
  - Reduced ROM
  - Weak hip abductors

- Imaging
  - Osteophytes
  - Subchondral sclerosis
  - Subchondral cysts
  - Intra-articular loose bodies
Hip Disorders-Osteoarthritis

• Management:
  • Education
  • Cane
  • Medications
  • Physical therapy
  • Injection
    • Corticosteroid
      • Decrease pain, stiffness, and impairment up to 3 months
    • Viscosupplementation
      • Studies suggest variable, modest outcomes
  • Surgery
Hip Disorders-Fractures

- History
  - Repetitive stress/overuse
  - Osteoporosis
  - Groin and or thigh pain with weight bearing

- Physical Examination
  - Hip joint provocative tests positive
  - Fulcrum test
  - Pound test
Hip Disorders-Fractures

• Compression type
  • Most common
  • Inferior neck of femur
  • Can treat with non-weightbearing (4-6 weeks) and progress weightbearing as tolerated

• Tension Type
  • Superior neck of femur
  • Treated with internal fixation
Hip Disorders—Piriformis Syndrome

- **History**
  - Buttock and/or posterior thigh pain
  - +/- paresthesias
  - Symptoms usually worse with sitting; +/- walking and standing

- **Physical Examination**
  - Palpatory tenderness over the piriformis, sciatic notch
  - Pain with stretching
  - Imaging
Hip Disorders - Piriformis Syndrome

• Management
  • Stretch piriformis
  • US
  • Myofascial release
  • Manual medicine
  • Injections
    • Corticosteroid
    • Botulinum toxin
Knee Disorders-Patellofemoral Pain

• History
  • Anterior knee pain
  • Squatting, kneeling

• Physical Exam
  • Patellofemoral grind
  • patella alta, tight ITB, increased Q angle

• Risk Factors: female, tight lateral retinaculum, VMO dysfunction, hip abductor weakness
Knee Disorders-Patellofemoral pain

• Treatment:
  • Medications
  • Taping
  • Bracing
  • Strengthen VMO and hip abductors
  • Stretch ITB, hip adductors, hamstring
Knee Disorders-Patellofemoral Pain

• Chondromalacia patella
  • Cartilage damage
  • Longstanding mal-tracking? Trauma?
• Treatment:
  • patellofemoral pain plus:
    • corticosteroid injections
    • viscosupplementation
Knee Disorders-Osteoarthritis

- **History**
  - Pain
  - Swelling
  - Stiffness
  - Exacerbated by weight bearing and after prolonged immobilization

- **Exam**
  - Joint line tenderness
  - Effusion
  - Pseudo-laxity
  - Varus/valgus deformities
Knee Disorders-Osteoarthritis

• Risk Factor
  • Age
  • Weight
  • Female gender
  • Trauma
  • Infection
  • Genetic
  • Metabolic disorders
    • Ex. Hemosiderosis, acromegaly
Knee Disorders-Osteoarthritis

• Treatment
  • Weight loss
  • Exercise
  • Acetaminophen
  • NSAIDs
  • Capsaicin
  • Glucosamine
  • Injections
    • Corticosteroid, viscosupplementation, PRP, stem cells
  • Surgery
Foot and Ankle Disorders-Plantar Fasciitis

- **History**
  - Medial plantar heel pain
  - Morning
  - After immobilization

- **Exam**
  - Tenderness-medial plantar calcaneous
  - Pain with plantar fascia stretching
  - Pes planus?
  - Pes cavus?
  - Tight GS complex?
Foot and Ankle Disorders-Plantar Fasciitis

• Treatment
  • Ice
  • NSAIDS
  • Modalities
  • Orthotic
  • Stretch GS complex and plantar fascia
  • Night splint
  • Injection
  • Surgery
Foot and Ankle Disorders- Osteoarthritis

- Tibiotalar, subtalar, midfoot, forefoot
- Pain, swelling, tenderness
- Risks: trauma
- Diagnose: clinically, x-ray
- Treatment: acetaminophen, NSAIDS, bracing, injections, surgery
Foot and Ankle Disorders-Morton’s Neuroma

- Interdigital nerve irritation in the foot
- Most common—between 3rd-4th MT
- Insidious pain in MT head region
- Paresthesias
- Exam: tenderness, “click”

Treatment:
- unload the forefoot
- distribute forces via orthotics
- shoes with wide toe box
- injection
- surgery (Fitzgibbons, 1996)
Myofascial Pain

- Localized vs Diffuse
- Diffuse, muscular pain, and tenderness
  - Trigger Points
- Fibromyalgia
- Central Sensitization Syndrome
Myofascial Pain

- Fibromyalgia
  - 2-4% of population
  - 80-90% female
- Diagnostic criteria, modified ACR 2010
  - 19 painful/tender areas in the last week plus a patient reported score for—difficulty sleeping, fatigue, poor cognition, headaches, abdominal pain, depression
  - > 3 months duration
  - No other explanation for symptoms
    - (Bennett, 2014)
Myofascial Pain

- Fibromyalgia
  - Treatment
    - Behavioral
    - Exercise
    - Tai Chi
    - Yoga
    - Antidepressants
    - Acupuncture
    - Gabapentin
    - Pregabalin
    - Duloxetine
Myofascial Pain

• Central Sensitization Syndrome
  • Appears to play role in FM and other chronic pain syndromes
  • Repeated noxious stimuli in the dorsal horn of spinal cord → sensitization or increased responsiveness → hyperalgesia & allodynia
  • Altered function of pain inhibitory/facilitory centers in the brainstem
    • (Staud R, 2002 and Eriksen, 2004)
Joint Arthroplasty Rehabilitation

• Knee
  • Rehabilitation protocols vary
  • Rehabilitation Effectiveness
    • Improves early function and ROM
    • Does not improve early QOL or walking
    • No difference in therapy vs no-therapy for any category at one year
      • (Minns Lowe, 2007)
Joint Arthroplasty Rehabilitation

• Knee
  • Complications
    • Thromboembolic
      • 2.1%
        • (White, 1998)
    • Aseptic loosening
    • Knee stiffness
    • Neurologic injury (7.7%)
      • peroneal, tibial
      • longer tourniquet time
        • (Horlocker, 2006)
Joint Arthroplasty Rehabilitation

• Knee
  • Long term exercise
    • Recommended: cycling, golfing, swimming, walking, hiking, bowling
    • Allowed with experience: low-impact aerobics, horseback riding, cross-country skiing, doubles tennis
    • Not recommended: basketball, jogging, soccer, volleyball
      • (Healey, 2008)
Joint Arthroplasty Rehabilitation

• Hip
  • Rehabilitation protocols vary
  • Complications
    • Dislocation 3-10%
      • Avoid flexion, adduction, IR
    • Infection 0.2%
    • Thromboembolic
    • Nerve injury 0-3%
      • Peroneal division of sciatic
    • Leg-length discrepancy
      • Most often functional and resolves
        • (Barrack, 2004) (Soong, 2004)
Joint Arthroplasty Rehabilitation

• Hip
  • Long term exercise
    • Hip group musculature weaker on involved side
  • Recommended: cycling, golfing, swimming, walking, hiking, bowling
  • Allowed with experience: low-impact aerobics, horseback riding, cross-country skiing, downhill skiing, doubles tennis
  • Not recommended: basketball, jogging, soccer, volleyball
    • (Healey, 2008)
References


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