Musculoskeletal review

HEIDI OLSON-FITZGERALD PA
5/2014

Objectives - review the following common problems presenting in Family Medicine:

- Common shoulder problems
- Differentiate shoulder from cervical spine problems
- Common knee problems
- Additional

Common Shoulder Pain Diagnoses

- Instability
- Impingement
- Rotator cuff tear
- AC joint injury
- Adhesive capsulitis
- Osteoarthritis
Anatomy

- Deltoid
- Rotator cuff
- Teres major
- Latissimus dorsi
- Biceps
- Pectoralis muscles

Evaluation

1. HISTORY
   1. Ask the right questions
   2. Listen to the patient
   3. Formulate a diagnosis

2. EXAMINATION
   1. To confirm your diagnosis, not to make diagnosis

3. ORDERING ADDITIONAL TESTS
   1. Again, to confirm or r/o diagnosis
History
What to ask: What to know

<table>
<thead>
<tr>
<th>Is there:</th>
<th>Injury - Single event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain?</td>
<td>Repetitive overload</td>
</tr>
<tr>
<td>Acute</td>
<td>Instability</td>
</tr>
<tr>
<td>Chronic</td>
<td>Catching/Locking</td>
</tr>
<tr>
<td>Weakness</td>
<td>Limitation in motion</td>
</tr>
<tr>
<td>Deformity</td>
<td>Night-time pain</td>
</tr>
</tbody>
</table>

Physical Exam:

- Inspection
- Palpation
- Range of Motion
- Strength
- Neurovascular
- Special Tests

Laxity vs Instability

- **Laxity** – underlying condition, age, sex,
  - **Asymptomatic**

- **Instability** – underlying condition + traumatic or overuse
  - **Symptomatic**
  - MDI – Multidirectional Instability
Shoulder instability - Predisposition

- Age
- Hypermobility – Ehlers Danlos, Marfan Syndrome, Osteogenesis Imperfecta, JRA
- Activity
- Overuse/repetitive trauma
- Trauma

One of the most common causes of shoulder pain in young, active individuals is underlying instability - a common disorder in throwing athletes, weight lifters, football players and swimmers.

Instability sx

- Sensation of the “shoulder” going out and coming back in - unstable
- Pain (mild to severe)
- Weakness
- ? Numbness
- Clicking or Snapping?

Apprehension test

The anterior apprehension test, or crank test, is also used to evaluate shoulder instability. With the patient in a sitting position, the examiner applies abduction and external rotation stress on the joint. The test is positive for anterior instability if the patient experiences apprehension during the test and fears the shoulder is going to slip out of place.

Relocation test: apply pressure over the anterior aspect of the shoulder and repeat the exam. (upright or supine based on pt comfort – or to confirm test)
Additional Instability Tests

The sulcus test is an important maneuver for evaluating the possibility of multidirectional instability. In this test, the patient sits while the examiner applies caudal traction on the humerus in an attempt to displace the humerus inferiorly. If inferior displacement occurs, the sulcus test is positive, and multidirectional instability is present.

The drawer test is similar to the sulcus test and shift test. In this maneuver, the patient sits while the examiner pushes the humeral head against the glenoid fossa and then moves it anteriorly and posteriorly. Anterior displacement of the joint is a positive response.

Shoulder Instability Treatment

**Nonsurgical Treatment**
- Activity modification.
- Non-steroidal anti-inflammatory medication.
- Physical therapy.

**Surgical Treatment**
- Arthroscopy vs Open

Anterior Shoulder Subluxation/Dislocation

**Mechanism of injury:**
Shoulder slips out of joint (subluxation) when arm is abducted and externally rotated
Fall (outstretched arm/hand: FOOSH/FOOSA) or forceful throwing (may have symptoms by positioning arm overhead)

Incidence: 24 per 100,000
Highest injury rate: Males age 15-25
85-90% = anterior dislocation
Subluxation vs Dislocation
Subluxation - Humeral head reduces or relocates before “coming out” (dislocating)
Dislocation - humeral head completely out of the glenoid fossa – “dead arm”
   more force with injury and typically most be relocated with help
Chronic Dislocation –

Traumatic Shoulder instability:
Shoulder Dislocation/Anterior Instability
Humeral head dislocates from glenoid fossa
Almost always anterior (95%)
Possible injury to:
   capsule-labrum complex
   Humeral head or glenoid
   Axillary nerve

Shoulder dislocation
Shoulder Dislocation/Anterior Instability

Treatment
- X-rays – axillary view may show bony defect on glenoid rim (ant or post)
- Reduction of dislocation,
- Watch for Axillary nerve injury
- Protection & rehab, rehab, rehab
- Most will have future dislocations and/or instability
  - Up to 70% (young)
  - May require surgical tightening/repair of the capsule/labrum complex also at risk for RC tear assess by arthrogram or MRI

Shoulder Instability- Dislocation Complications

Hill-Sachs Lesion - posterior lateral humeral head indentation FX as the humeral head impacts the glenoid rim
Bankart Lesion - avulsion of the anterior inferior glenoid labrum at the attachment to the capsule and ligament complex
Bony Bankart – above plus avulsion fracture of the glenoid
SLAP lesion/tear - superior labrum anterior to posterior: involves injury to the superior glenoid labrum and the biceps anchor complex
Nerve injury – Brachial plexus, axillary, radial
Rotator Cuff Tear
Recurent Dislocations

Hill-Sachs Lesion
Compression fx of posterior humeral head created when head is pressed against anterior edge of the glenoid
SLAP
SLAP lesion – superior labrum anterior to posterior: involves injury to the superior glenoid labrum and the biceps anchor complex.
Surgical Treatment - Bankart

Shoulder arthritis
Degeneration of the articular cartilage

- Age
- Trauma/previous injury
- Genetics, Co-morbidities, Hx Infection
Shoulder arthritis

Signs and symptoms:
- Pain
- Stiffness
- Catching/grinding sensation in the joint

Clinical Exam:
- Decreased ROM
- Swelling, tenderness to palpation and with movement
- Crepitus
- Limited strength

Activity Modification/rest

Analgesics/medications

Exercise and PT

Injections

Surgical options:
- Partial Hemiarthroplasty
- Total arthroplasty
Adhesive Capsulitis
Frozen shoulder – idiopathic loss of both active and passive motion
SX: pain and stiffness
Affects 2% of population
Ages 40-60 –female>male
More common in type I DM, prolonged immobilization
Other diseases: hypo/hyperthyroidism, Parkinson’s

Adhesive Capsulitis Exam
Significant (at least 50%) reduction in AROM and PROM with comparison
Painful motion especially at the extremes
Diffuse tenderness about the shoulder
Dx – Based on Sx and presentation
Xray: not helpful
MRI maybe helpful but not usually necessary.

Adhesive Capsulitis Stages
3 stages:
“Freezing” – worsening pain and progressive loss of motion. 6wks-9mo
“Frozen” – pain improves, stiffness remains 4-6mo
“Thawing” motion improves, progress to improved strength. 6mo-2 yrs
Adhesive Capsulitis Treatment

- NSAIDs
- Analgesic (non-narcotic)
- Moist heat
- Gentle stretching (Ice post-stretch)
- PT – critical for success
- Surgical: Manipulation under anesthesia, Arthroscopy for debridement and further evaluation

Rotator Cuff Tendonitis ~ Impingement Syndrome

Clinal Symptoms:
- Gradual onset of anterior and lateral shoulder pain exacerbated by overhead activity
- Pain with lifting
- As condition progresses: Night pain / difficulty sleeping on affected side.
- Loss of strength and motion

Impingement Stages

- Stage 1: Swelling and inflammation
- Stage 2: Weakening of the tendons (tendinopathy)
- Stage 3: Microscopic to full thickness tearing of the rotator cuff tendons

Degenerative changes to the rotator cuff tendons predisposes to tearing – Rope analogy

Weakening of the tendons: decreased integrity and strength increased risk of tearing (With trauma or degeneration)
Impingement – Acromium morphology

Shoulder Pain
Physical Exam
Jobe’s Positive
Hawkin’s positive
Neer’s positive

IMPINGEMENT??

Jobes Test

Jobes test –
Isolate the supraspinatus tendon

Abduct the arm to 90 degrees, forward flexed to 30 degrees, thumb down

Pt lifts against resistance

Positive test= pain along lateral deltidoid
Impingement test: Neer’s Test

Arm at side with elbow extended and pronated
Examiner stabilizes the scapula and passively forward
Moves the shoulder overhead to 180 degrees
Positive test = pain

Impingement Testing - Hawkins

Mnemonic: Hawk trainees hold test
Arm in the starting position for this test
Examiner passively internally rotates the shoulder to impinge the supraspinatus, teres minor and infraspinatus
Alternatively externally rotates the arnoulder to impinge the subscapularis against the coracoclavicular

Hawkins Test

Impingement Treatment

NSAIDs
Rest – avoid causative mech of injury
PT: Stretching and strengthening
Corticosteroid injection
Surgical – Arthroscopy, decompression and debridement
Rotator Cuff Tear

May occur from acute injury, but most are age related degeneration, chronic impingement.

Common - 40-60 year old

Supraspinatus most common tendon involved – may be combination of tendons

Clinical Symptoms of RC Tear

Clinical Symptoms
- Recurrent shoulder pain for several months
- Specific injury that triggered the onset of pain
- Traumatic injury resulting in loss of active motion
- Night pain / difficulty sleeping on affected side
- Weakness, catching, grating

SHOULDER PAIN

Physical Exam
- Tenderness to palpation anterior shoulder
- Pain with abduction starting around 90 degrees
- Unable to lift arm past 120 degrees
- Pain with forward flexion at 90-120 degrees
- Special Tests??- same as impingement

Diagnosis???
Shoulder MRI

Supraspinatus tear

Rotator Cuff Tear

Evaluation

1. HISTORY
   1. Ask the right questions
   2. Listen to the patient
   3. Formulate a diagnosis

2. EXAMINATION
   1. To confirm your diagnosis, not to make diagnosis

3. ORDERING ADDITIONAL TESTS
   1. Again, to confirm or rule out diagnosis.
So how do you differentiate Shoulder problems from Neck problems?

History
Ask the right questions

Critical questions
1. Pain location
   - Central/Axial/Paraspinal
   - Refer HA or Arm Sx
   - True Radicular
2. Pain quality
   - Dull ache
   - Sharp shooting – neck, occiput, arm
   - Burning vs. dysesthesia
3. Pain Pattern – Diffuse Discrete
4. Numbness – pattern, location
5. Deficit – pattern/distribution

Additional questions
1. Pain onset/inciting event
2. Pain provocation
3. Pain diminuation

History
Diagnosis formulation

“shoulder pain”
Discrete arm/shoulder pain, not much neck pain, discrete deficit –
radiculopathy (C5-6 = most confused with shoulder problems)
Diffuse neck pain, HA, skin burning, TP – myofascial pain.
Radicular sx and entrapment sx -
Hand numbness in median or ulnar pattern- CTS or cubital Sx
Examination
to confirm your diagnosis

Radicular distribution deficit – radicular

- C5: deltoid, infra/supraspinatus
- C6: bicep, dorsal forearm, thumb, index finger
- C7: triceps, index, middle finger, finger, wrist extension
- C8: 4th, 5th fingers, solar of forearm, grip weakness
- T1: under arm, finger extension.

Peripheral entrapment
- CTS: thumb, index, middle, 4th – radial aspect, grip weakness,
- Cubital Sx: ulnar half of 4th and 5th digit,
Myofascial pain: Trigger points (supraspinatus, rhomboid, teres), no deficit

Cervicogenic Pain (Neck Pain)

Spondylosis: “degeneration”
- Ache into shoulders
- Pain reproduced with ROM

Radiculopathy (weakness)
- C 4-5: 5 root, pain to shoulder (deltoid)
- C 5-6: 6 root, forearm, thumb (biceps)
- C 6-7: 7 root, middle finger (triceps)
- C 7-8: 8 root, small finger (finger flexion)
- C8-T1: T1 root, medial arm (finger abduction)

Sparing Compression Test

Additional Tests
to confirm your diagnosis

- Plain x-ray: static, flexion/extension
- CAT scan: fractures, bone pathology
- MRI (recommended to evaluate discs, spinal cord, nerve roots)
- EMG/nerve conduction studies – peripheral nerve entrapment, myofasial pain
- Serology (if above imaging studies suggest possible infection or tumor)
- Injections – diagnostic/therapeutic
Knee Anatomy

Knee Alignment – Normal, Varus, Valgus
Patellofemoral pain

Diffuse aching anterior knee pain that increases with load activities (running, stairs, kneeling, squatting)

Sense of instability

If developing chondromalacia (softening of the articular cartilage) may experience swelling

Synonyms: PFS, Patellar malalignment, anterior knee pain, chondromalacia patella

Patellofemoral pain

Diff Dx:
- Meniscal tear (joint line tenderness, locking)
- Patellar OA (effusion, crepitus, x-ray)
- Patellar/Quad tendinitis (localized tenderness)

Tx:
- Quad stretching/strengthening (isometric)
- Compression sleeve
- NSAIDs
- Weight loss
Evaluation and testing

Measure Q angle

Q angle = ASIS through center of patella to tibial tubercle

In extension:

Women < 22 degrees
Men < 18 degrees

Patellar grind and patellar apprehension tests

Evaluate patellar tracking - Sunrise X-ray

Patellofemoral Pain Syndrome
Chondromalacia
Treatment —
Strengthening program – Quads – esp VMO, and hamstring balance
Weight modification
Activity modification
Taping, bracing +/-
Surgical options –
  • Arthroscopy with lateral retinaculum release
  • Chondroplasty
  • Tibial osteotomy for re-alignment

Surgical Treatment – Lateral Tracking Patella
Lateral retinacular release
Others:
VMO Advancement
Tibial Osteomy

Popliteal Cysts (Baker cyst)
Synovial cyst in popliteal bursa with communication to knee joint
Associated with degenerative meniscal tears and systemic inflammatory conditions (RA)
Present with swelling and pain in popliteal fossa without trauma history
**Popliteal Cysts (Baker cyst)**

**DIFF Dx:**
- DVT (U/S or venogram)
- Soft tissue tumor (MRI)
- Inflammatory arthritis (serologic studies)

**Tx:**
- Aspiration (many neuro structures) – cyst will return
- Cause of cyst?
- Knee arthroscopy – meniscal tear??

**Knee Effusions**

**Meniscus Tear**

- **Mechanism of injury** — twisting or degenerative changes

- **Presentation**
  - acutely or with progressive stiffness, and mechanical sx

- **Pain**
  - Giving way
  - Locking
  - Clicking
  - Swelling +/−
Meniscal Tear Diff Dx & Tx

Diff Dx:
- ACL tear (hemarthrosis, Lachman's test)
- Crystal disease (aspirate)
- Loose body (x-ray)
- MCL tear (valgus stress/pain/instability)
- OA (joint space on weight bearing films)

Tx:
- Degenerative tear: RICE
- Traumatic tear: surgical debridement/repair

Meniscal injury tests

McMurry's
Bounce home
Hyperflexion

Meniscus tears
Meniscus Tear

Normal meniscus  Torn meniscus

Meniscus tears

Pes anserine bursitis (medial knee under semitendinosus and sartorius insertion)
Pre-patellar bursitis
Bursitis
Thickening of bursal synovial lining with subsequent fluid formation caused by overuse and leading to localized swelling and pain.
May be inflammed or infectious.
Presests similarly to olecranon bursitis as discussed earlier.

Bursitis – Diff Dx & Tx

**DIFF Dx:**
- Inflammatory arthritis (multiple joints)
- Medial meniscal tear (locking, catching, effusion)
- Knee OA (x-ray – osteophytes)
- Patellar fx (hx of trauma, x-ray)
- Patellar tendinitis (tenderness at inferior pole of patella)

**Tx:** NSAIDs; ice; activity modification; flexibility exercises to prevent atrophy/maintain strength; injection; aspiration; alee; surgery - rare.

Knee Osteoarthritis
Progressive disease that slowly wears away joint cartilage.
Most likely to occur after middle age.
Secondary knee arthritis – with hx of trauma, fractures, meniscus tears and/or menisectomy, chronic ligament insufficiency.
Symptoms
Gradual onset
Stiffness – decreased ROM –
Effusion
Crepitus, locking or buckling
Pain
Xray: asymmetric joint narrowing, sclerosis, osteophytes, periarticular/subcondral bone cysts

Knee OA

Knee osteoarthritis
Treatment

Exercise
Weight loss
Bracing
Medication / Supplements– NSAIDS Cox1 vs Cox2, Acetaminophen, ++
Other
Surgical options

Treatment

Medications – NSAIDS Cox1 vs Cox2, Acetaminophen, analgesics
Nutritional supplementation – glucosamine, chondroitin sulfate, DMSO, MSM, SAMe
- Oral, topical options
Injection: Viscosupplementation: Hyaluronic acid – adds elasticity and viscosity to synovial fluid HA binds with proteoglycans to stabilise the structure of articular cartilage
Corticosteroids – Bethamethasone, Triamcinolone, Methyprednisolone
Mind body approaches: Acupuncture, Massage Therapy, Magnet therapy, Tai chi, Yoga, Qigong

Surgical options

Arthroscopy + Chondroplasty
Arthroscopy + Abrasion / Microfracture
OATS Procedure –Autograft or Allograft transplant for areas of full thickness cartilage loss (3-6 + wks NWB)
Meniscus transplant
Osteotomy – Tibial or Femoral
Artificial Joint Resurfacing/ Total Joint replacement
Chondroplasty and Microfracture

OATS Procedure

Artificial resurfacing - Total Knee
Moving on if we have time

Ankle Anatomy

Do ankle sprains need x-rays?

Ottowa Ankle Rules: if any of the 5 positive, get x-rays
- Inability to bear wt initially and in ER
- TTP over posterior Medial Malleolus
- TTP over posterior Lateral Malleolus
- TTP over 5th MT base
- TTP over Navicular bone
Ottawa Ankle Rules

1. Or inability to bear weight

Ankle Radiographs

AP
Lateral
Mortise

Inspection:
Swelling, Ecchymosis, Deformity
Inversion Stress (ATFL/CFL)  
Anterior Drawer Test (ATFL)

Anterior Drawer Test

Grade I Ankle Sprains - Treatment

- Control swelling
- Weight bearing as tolerated
- Early ROM
- Return to activities when goals met
Grade II Ankle Sprains - Treatment

- Control swelling
- Protected WB until swelling decreases
- Early ROM and strengthening
- Return to activities 3-4 weeks

Grade III Ankle Sprains - Treatment

- Immobilization
  - Crutches – protected WB
  - Begin PT 3wks post injury
  - Return to activities when goals met (8-12 wks)
- Long-term concerns

Ankle Sprain Treatment

- RICE
  - NSAID short course may speed recovery
  - Crutches prn, weight bearing as tolerated
  - Protect ankle ligaments (brace)
  - Consider cast/boot if severe pain
- Early referral to Physical Therapy
  - Early ROM
  - Strength exercises
  - Proprioception exercises
  - Sports-specific drills
  - Sports/Duty
Syndesmosis Injury / High Ankle Sprain

Squeeze Test

External Rotation Test

Tib-Fib Syndesmosis Injuries
“High Ankle Sprains”

If ANY widening of mortise, refer to Ortho
If any fibular tenderness, r/o fx (Maisonneuve)
  · Refer to Ortho
If none of the above, (grades 1-2), IMMobilize, CRUTChES
  · 2-4 weeks in cast
  · CAM boot until no pain walking
  · Refer to PT for rehab

Radiographic Ankle Stress
Chronic Pain after Ankle Sprain

Inadequate Rehab (Top 3)
Slow Rehab
Instability
Talar Dome OCD
Peroneal Tendon Injury
Synovial Impingement
Complex Regional Pain Syndrome

Axioms in Ankle Fractures

Nondisplaced avulsions of medial or lateral malleolus: treat as grade 3 ankle sprains
+/- cast/boot, early mobilization

Combinations of medial and lateral fracture/sprain: UNSTABLE; refer to Ortho

Displaced >2mm: refer

Mortise widening: refer

Plantar Fasciitis

Provides support to foot and toes
Most common cause of heel pain in adults
Focal pain over medial calcaneal tuberosity and 1-2cm distally along plantar fascia
Most intense in morning after sleeping with foot in plantar flexion
Pain due to micro-tearing of the plantar fascia
Plantar Fasciitis - Treatment

- Warm up well before sports or activities
- Ice heel, 20-30 minutes after sports or stretching
- Anti-inflammatories
- Massage
- Stretching
- Night splint
- Orthotics
- Injection
- Surgery

Plantar Fasciitis - Prevention

- Prepare before running, exercise, activity
- Wear good, supportive shoes
- Arch support
- Avoid activities that cause heel pain
- Work surface
- Weight reduction

Mallet Finger

**M/N:**
Blow to tip of finger, jamming it and avulsing the extensor tendon from its insertion at the distal phalanx
Can cause an avulsion fracture as well
S/N:
- Pain
- Point of tenderness over dorsum of distal phalanx
- Deformity
- Unable to extend finger at DIP joint
- Avulsed bone may be palpable
Mallet finger

Mallet Finger TX
Splint in extension – Stack splint, alumifoam, or whatever you have!

Distal Radius Fractures
MOI: Fall on an outstretched hand
Most common Adult fracture
Clinical SX:
Acute pain/pressure
Swelling
Deformity
Ecchymosis/bruising
Colle’s Fracture
Most common type of distal radius fracture
Silver fork deformity

Treatment Wrist Fractures
Closed reduction
Casting
Pinning
ORIF
External Fixation

Colles/ Distal Radius Fracture
Visible deformity—“silver fork”
Swelling
Pain
POT

Splint - Reduce?
Xray
Monitor for nerve/hendon associated complication
Ice
Cast when swelling allows
6-8 weeks recovery time
**Wrist Fracture – Cast Care**

**Signs of trouble:**
- Increased pain & feeling cast is too tight
- Numbness or tingling in the hand
- Burning or stinging
- Excessive swelling in the hands and fingers
- Loss of active movement of fingers
- Loosening

---

**Wrist Fractures and Treatment**

---

**Wrist Fractures**

**Adverse outcomes:**
- Malunion
- Loss of motion
- Deformity
- CRPS
- Decreased grip strength
- Post-traumatic arthritis
- Compartment syndrome
Subungual Hematoma

M/N: direct blow to the fingernail
S/S: throbbing pain due to accumulation of blood under the nail
T/X: ice (water) to numb, release pressure under nail by drilling/burning a hole in the nail

Questions