History of Present Illness:

The Importance of a Good History in Caring for Musculoskeletal Injury

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Disclosures

Jessie Fudge, MD

No Relationships to Disclose


DOCTOR
PENGUIN
SAYS:
GET
WELL
SOON!

History of Injury

- 47 yo Fall Rock Climbing
  - 3 hours prior to arrival
  - Lost Footing
  - Landed on Crash Pad
  - Rolled ankle, multiple past sprains
  - Xray order notes non weightbearing status

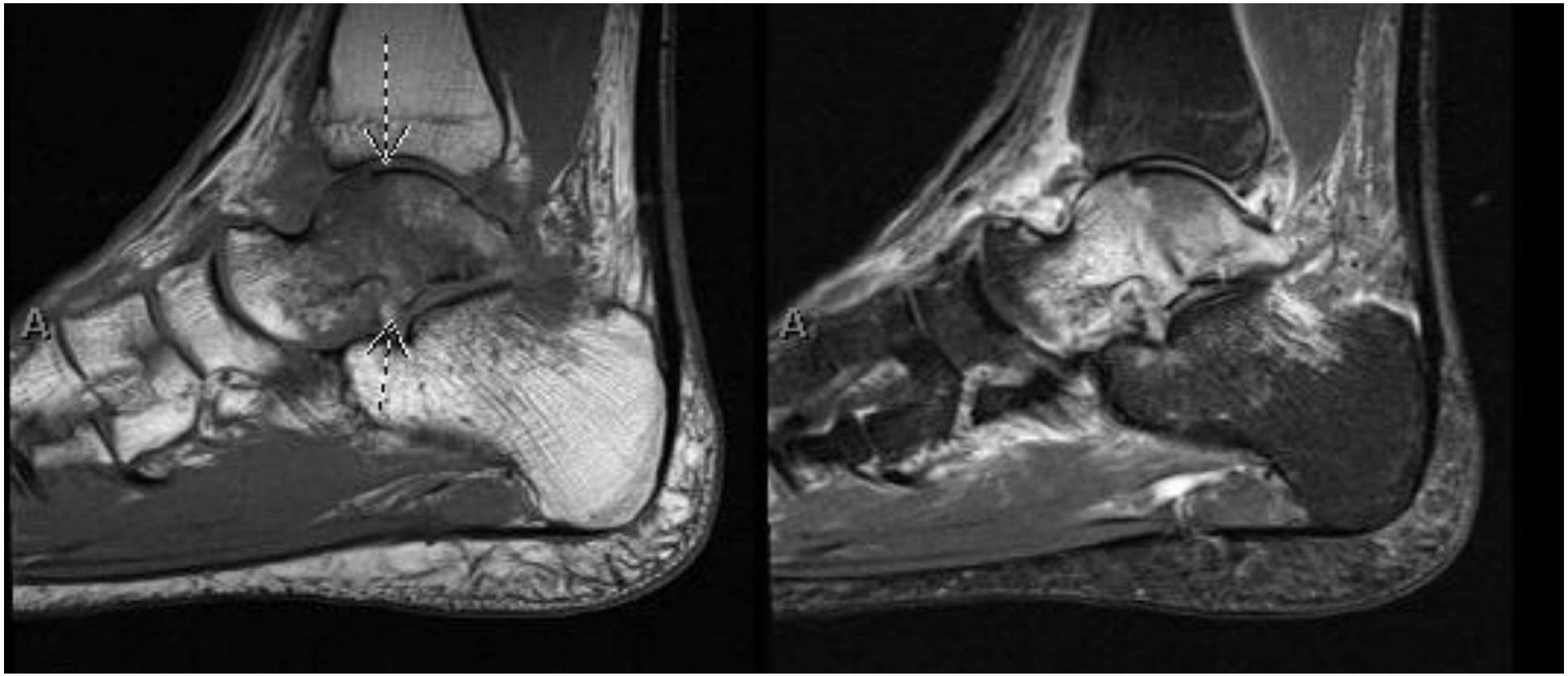
Radiology Read: Multiple age indeterminate fractures identified at the level the ankle, primarily along the medial, non-weightbearing surface of the talus.

- Consult Ortho for a “Rolled Ankle while landing on crash pad while rock climbing.”
  - Likely Sprain (avulsions old)
  - RICE
  - Walking Boot as needed
  - Weight Bear as Tolerated
  - Follow up Sports Med 3 weeks

NEW History of Injury → one month later

- Fall Rock Climbing
  - Fell twice his height
  - Landed on Crash Pad
  - Bounced off Crash Pad and landed one level below
  - Not sure where in the fall the ankle took the impact
  - Could not weight bear
  - Immediate swelling
  - Stopped boot/crutches because “just a sprain,” but really struggling with walking and pain level

- **Does the change in history change your xray interpretation?**



1. Comminuted nondisplaced intra-articular fracture of the talus, with the fracture plane extending to the talar dome and along the posterior subtalar facet.

2. Additional bone contusion versus nondisplaced fracture in the distal tibia and the posteromedial calcaneus.

3. Intermediate grade sprain and partial tear of the anterior inferior syndesmotic ligament. Intermediate grade sprain of the deltoid ligament complex and the calcaneonavicular spring ligament.

4. High-grade sprain and partial tear of the anterior talofibular and calcaneofibular ligaments.

5. Focal longitudinal split tear in the peroneus brevis tendon just distal to the lateral malleolus.

6. Type II accessory navicular with mild pseudarthrosis.

7. Moderate ankle joint effusion with several small intra-articular fracture fragments.

“My virtual recommendations are only as good as the history provided to me.”

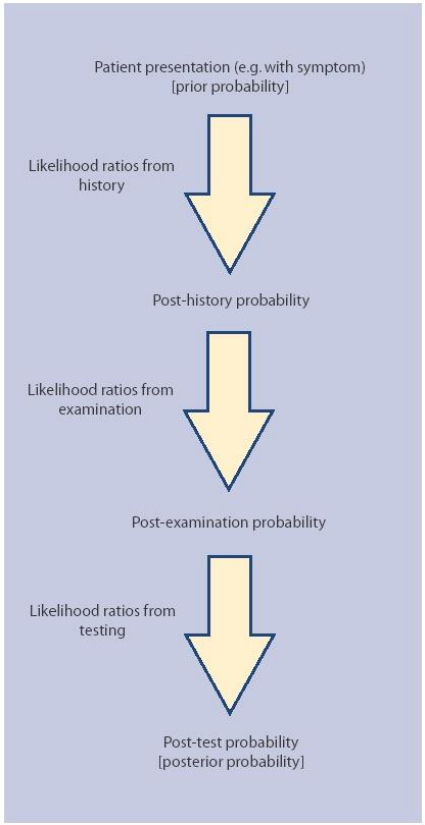
— Orthopedic Surgeon

Medical History

Diagnostic Tool

- Historically history determined 83% of diagnosis in medical outpatient clinics (published in 1975)
- Has this changed?
  - Less focus on history taking in medical training
  - Rapid growth in available diagnostic technologies
  - Time Constraints
  - Shift toward investigating over listening
  - Smart text in the electronic medical record

Start of the Diagnostic Processing Pathway



Medical History

Statistics Review

Pre-Test Probability	• Clinician's estimate of the likelihood of a diagnosis based on history and exam
Likelihood Ratios	• Change of probability of a disease after a positive or negative test result relative to the pre-test probability • Magnitude depends on tests sensitivity and specificity
Post Test probability	• Updated probability based on new evidence • Drives next step in diagnostic testing

MSK Example #1

Pre-Test Probability	• Patient that *rolls ankle and has history of recurrent ankle sprains* has a lower pretest probability of acute fracture on x-ray
Likelihood Ratios	• Positive x-ray increases probability of more severe injury • Negative x-ray would suggest that the diagnosis is less likely

Post Test probability	• Most likely ankle sprain in setting of old avulsion fracture
	  • Treat as ankle sprain
	  • No immediate advanced imaging

Medical History

Statistics Review

Pre-Test Probability	• Clinician's estimate of the likelihood of a diagnosis based on history and exam
Likelihood Ratios	• Change of probability of a disease after a positive or negative test result relative to the pre-test probability • Magnitude depends on tests sensitivity and specificity
Post Test probability	• Updated probability based on new evidence • Drives next step in diagnostic testing

MSK Example #2

Pre-Test Probability	• Patient that falls 12 feet has higher pre-test probability of acute fracture on xray compared to someone who rolls their ankle at ground level
Likelihood Ratios	• Positive x-ray increases probability of more severe injury • Negative x-ray would suggest that the diagnosis is less likely

Post Test probability	• Acute Fracture Likely
	  • Treat as Fracture
	  • Further work up recommended

Musculoskeletal History

Mechanism of Injury

- Open Ended
- Patient's story in their own words

Timing

- Acute
- Chronic
- Temporal Pattern
  - Morning Stiffness
  - Worse after activity

Associated Signs and Symptoms

- Severity of Pain
- Effusion
  - Timing
- Bruising
  - Timing
  - Severity
- Weight bearing

Other

- Recurrence
- Gait pattern
- Change in activity level
- Worries
- Impacts

KNEE PAIN

Medical History for Knee Pain

- Mechanism of Injury
- Acuity
- Location and Severity of Pain
- Effusion
- Mechanical Symptoms

Mechanism Of Injury

Three different ski injuries

Acutely Injured

- Ski caught turning in thick snow, knee twisted, I fell.
- Felt a pop
- Ski Patrol Assist down
- Knee swollen
- Feels unstable

Delayed Onset Pain

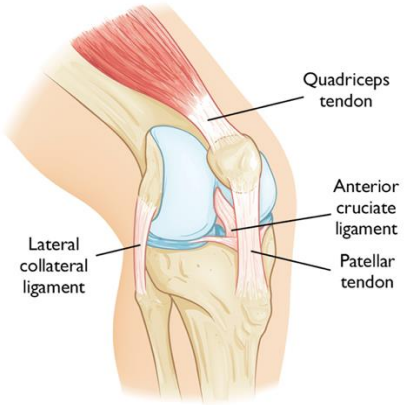
- Knee started hurting while skiing
- Injury not too memorable
- Swelling the next morning
- Feels stable, but hurts to walk

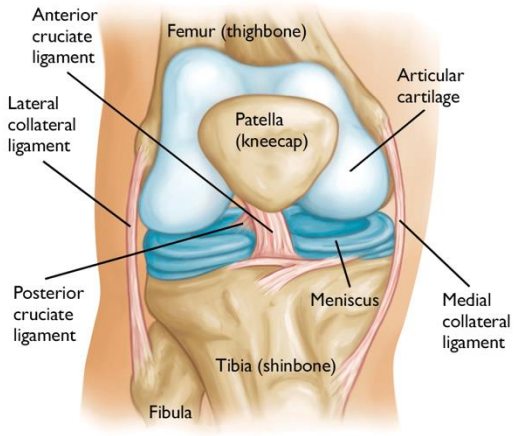
Chronic and Recurrent

- Every time I ski the anterior or medial part of my knee hurts
- Hurts more the next day
- Slight swelling
- Feels better with ice, activity modification until I ski again

Acuity

Narrowing the differential





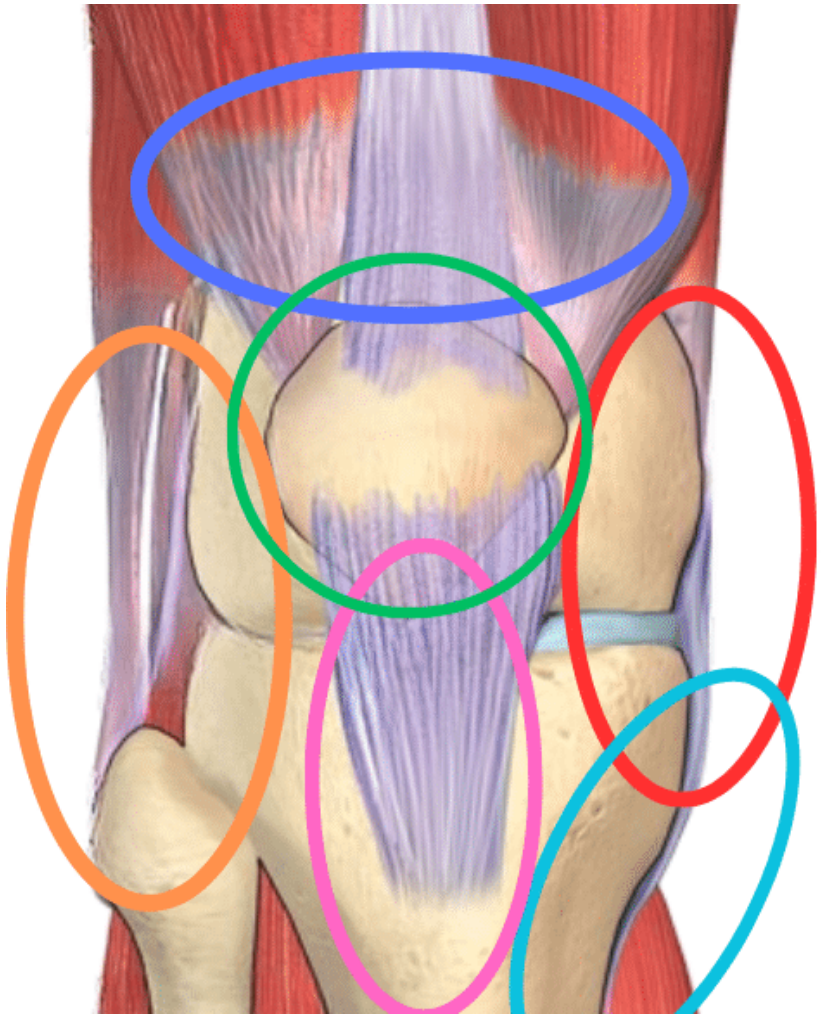
Acute/Subacute

- Ligament Injury
  - ACL – non-contact twisting injury
  - MCL, LCL – varus or valgus stress
  - PCL – impact to the anterior tibia
- Meniscus Injury
- Muscle Strain/Tear

Subacute/Chronic/Recurrent

- Degenerative Arthritis
- Meniscus Tears
- Mechanical Dysfunction
  - Patellofemoral pain syndrome
  - IT band Syndrome
- Inflammatory Arthritis

Location of Pain



Inner Knee Pain

Medial Collateral Ligament
Medial Knee Arthritis
Medial Meniscus Tear

Pain On Kneecap

Chondromalacia Patella
Patellofemoral Pain
Runner's Knee
Patellofemoral Arthritis
Prepatellar Bursities

Pain Below Kneecap

Patellar Tendinopathy
Jumper's Knee

Pain Below Inner Knee

Pes anserine bursitis / tendinopathy

Outer Knee Pain

Knee Effusion

Timing narrows the differential

- The timing and severity of a knee effusion provides clues to a diagnosis
  - Acute < 2 hours = bone or ligament
  - Slower Onset (24-36 hours) = meniscus injury, ligament sprain
  - Chronic and Recurrent
    - Meniscal Injury
    - Degenerative Arthritis
    - Patellofemoral Pain Syndrome
    - Inflammatory Arthritis

Knee Effusion

Timing narrows the differential

- A history of knee effusion in a patient with an acute injury correlates with internal derangement of the knee on MRI (study population age 18-65)
  - PPV 0.4; NPV 0.83
  - Likelihood Ration (LR) +1.5 for self-noticed swelling of the knee
  - LR increased with addition of an exam for effusion.

ELSEVIER

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Original article

Diagnostic Value of History Taking and Physical Examination to Assess Effusion of the Knee in Traumatic Knee Patients in General Practice

Marlous Kastelein MD, Pim A. Luijsterburg PhD, Harry P. Wagemakers MSc, Santusha C. Bansraj MD, Marjolein Y. Berger MD, PhD, Bart W. Koes PhD, Sita M. Bierma-Zeinstra PhD

Table 4. Diagnostic Values (and 95% CI) of Isolated Symptoms and Signs, and Combinations of Symptoms and Signs, With Knee Joint Effusion (Prevalence=0.31/n=42)

Variable	n*	SE	SP	PVP	PVN	LR+	LR−
Isolated symptoms and signs							
Self-noticed swelling	72	0.80 (0.68–0.92)	0.45 (0.35–0.39)	0.40 (0.29–0.51)	0.83 (0.73–0.94)	1.5 (1.1–1.9)	0.4† (0.2–0.9)
Ballottement test	78	0.83 (0.71–0.94)	0.49 (0.39–0.59)	0.43 (0.32–0.53)	0.86 (0.77–0.96)	1.6 (1.3–2.1)	0.3† (0.2–0.7)
Combination							
Self-noticed swelling plus ballottement test	42	0.67 (0.52–0.81)	0.82 (0.73–0.90)	0.62 (0.47–0.77)	0.85 (0.77–0.92)	3.6† (2.2–5.9)	0.4† (0.3–0.6)

Abbreviations: SE, sensitivity; SP, specificity.

* n=prevalence of the determinant or combination.

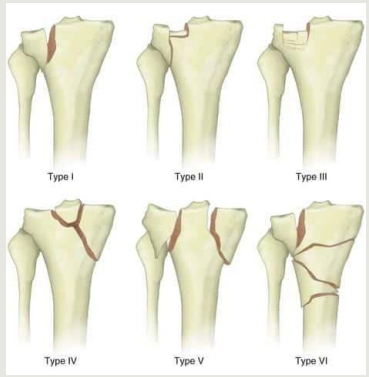
† Clinically important LR.

Knee Effusion

Narrowing the differential of acute knee injury on the ski hill

Effusion when patrol arrives on scene

- Tibial Plateau Fracture

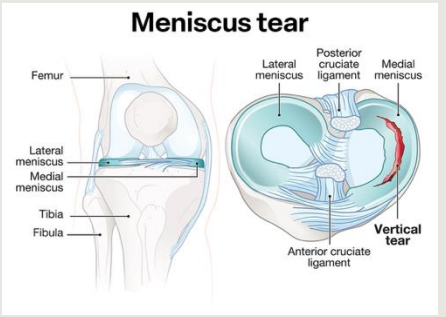


Effusion on arrival to the Aid room

- ACL Tear
- Patella Dislocation

Effusion after the drive home

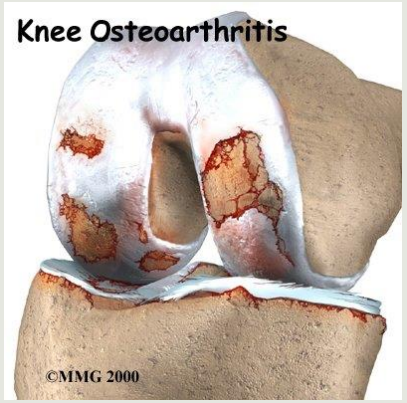
- Meniscus Injury

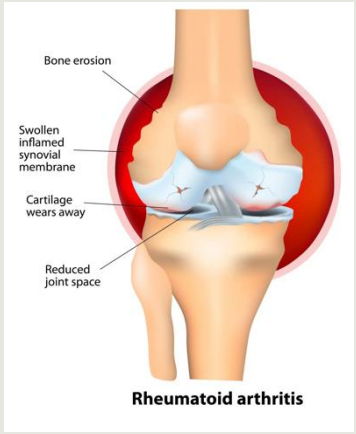


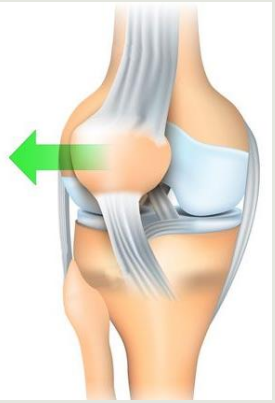
Knee Effusion

Chronic/Recurrent Swelling

Worse After Activity Age Over 50	Morning Stiffness Feels Better with Activity	After stairs or hills With anterior knee pain
▪ Degenerative Arthritis	▪ Inflammatory Arthritis	▪ Patellofemoral Tracking Issues

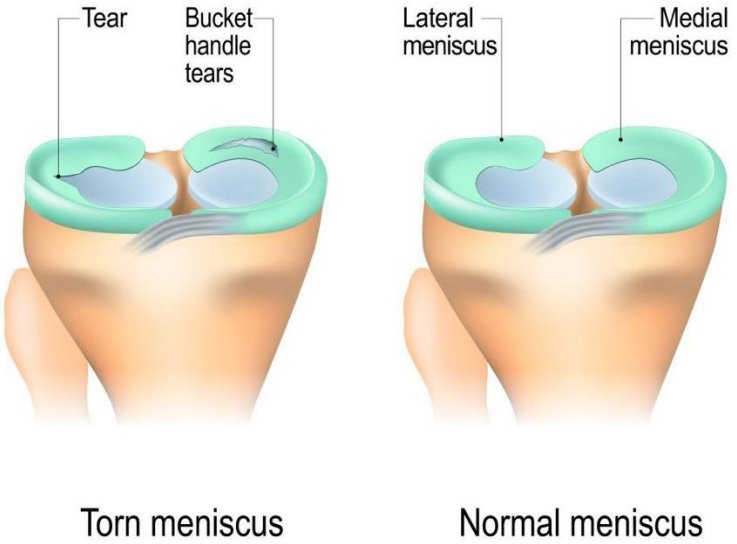






Mechanical Symptoms

- Popping at time of Injury
  - Ligament Tear/Tendon Rupture
- Clicking, Catching or Locking (joint line) post injury
  - Associated with meniscus injuries
    - Could signal surgical vs non-surgical injury
    - Truly Locked Knee suggests a bucket handle meniscus tear or flap
      - Physically cannot straight/bend the knee
- Clicking/Catching Anterior Knee
  - Patellofemoral Tracking Issues



Referral for Knee Pain

Referral: Acute Knee injury skiing; rule out ACL tear

What's your pre-history probability For the ? of ACL tear

Pretty High

Referral for Knee Pain

Referral: Knee injury skiing; rule out ACL tear

- Mechanism of Injury
  - No definite moment in time
  - Onset of pain after skiing
  - Tried to play hockey the next day with increased pain (no instability)
- Acute Onset
- Location: Anterior Knee Pain
- Effusion: Small, resolved quickly
- No mechanical Symptoms
- Knee feels stable

Referral for Knee Pain

Referral: Acute Knee injury skiing; rule out ACL tear

History: Acute onset of knee pain while skiing without acute trauma, no mechanical symptoms, minimal effusion and no instability

What's your post-history probability For the ? of ACL tear

LOW!!

Referral for Knee Pain

Referral: Knee injury skiing; rule out ACL tear

- Mechanism of Injury
  - No definite moment in time
  - Onset of pain after skiing
  - Tried to play hockey the next day with increased pain (no instability)
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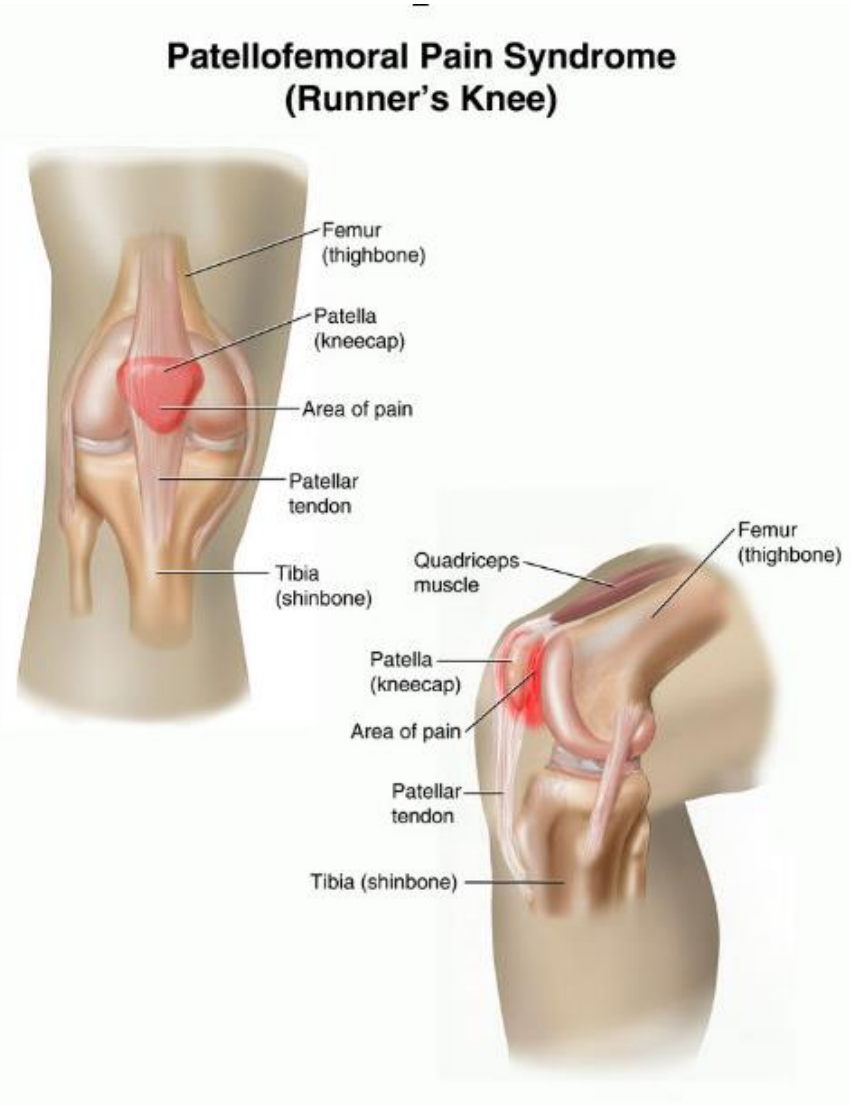
- Knee feels stable



SHOULDER PAIN

Medical History for Shoulder Pain

- Mechanism of Injury
- Acuity
- Location and Severity of Pain
- Bruising/Ecchymosis
- Subjective Range of Motion and Strength

Mechanism Of Injury

Three different injuries

Acutely Injured

- Fall onto outstretched hand
- Felt a pop
- Ecchymosis over 7 hours
- Weakness with lifting
- Normal Passive Range of Motion
- Does not think it dislocated

Insidious Onset

- Woke up with acute pain
- No acute injury
- No new activities or sports
- Gradual loss of range of motion since onset of pain
- Pain worse at night

Chronic and Recurrent

- Pain with certain motions after starting a new lifting routine
- Can’t reach back to hook a bra or put sunscreen on
- Painful to bring arm out to the side
- Catch/pop at times
- No acute injury

Mechanism Of Injury

What's the Differential?

Acute Fall Onto Out-Stretched Hand

- Acute Rotator Cuff Tear
- Fracture

Acute Fall onto shoulder with arm tucked

- AC Separation
- AC Joint Sprain
- Clavicle Fracture
- Contusion

Insidious Onset

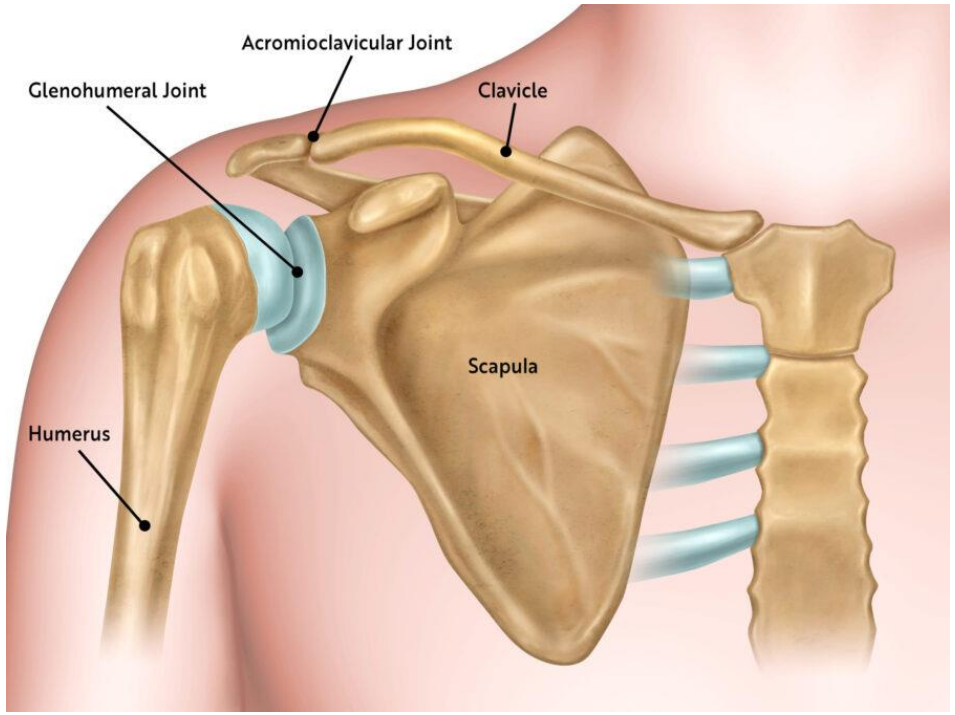
- Frozen Shoulder
- Calcific Tendonitis
- Impingement Syndrome
- Subacromial Bursitis
- Tendonitis

Chronic and Recurrent

- Arthritis
  - Glenohumeral
  - AcromioClavicular (AC)
- Impingement Syndrome
- Subacromial Bursitis
- Chronic Rotator Cuff Tear
- Tendonitis

Acuity

Narrowing the differential



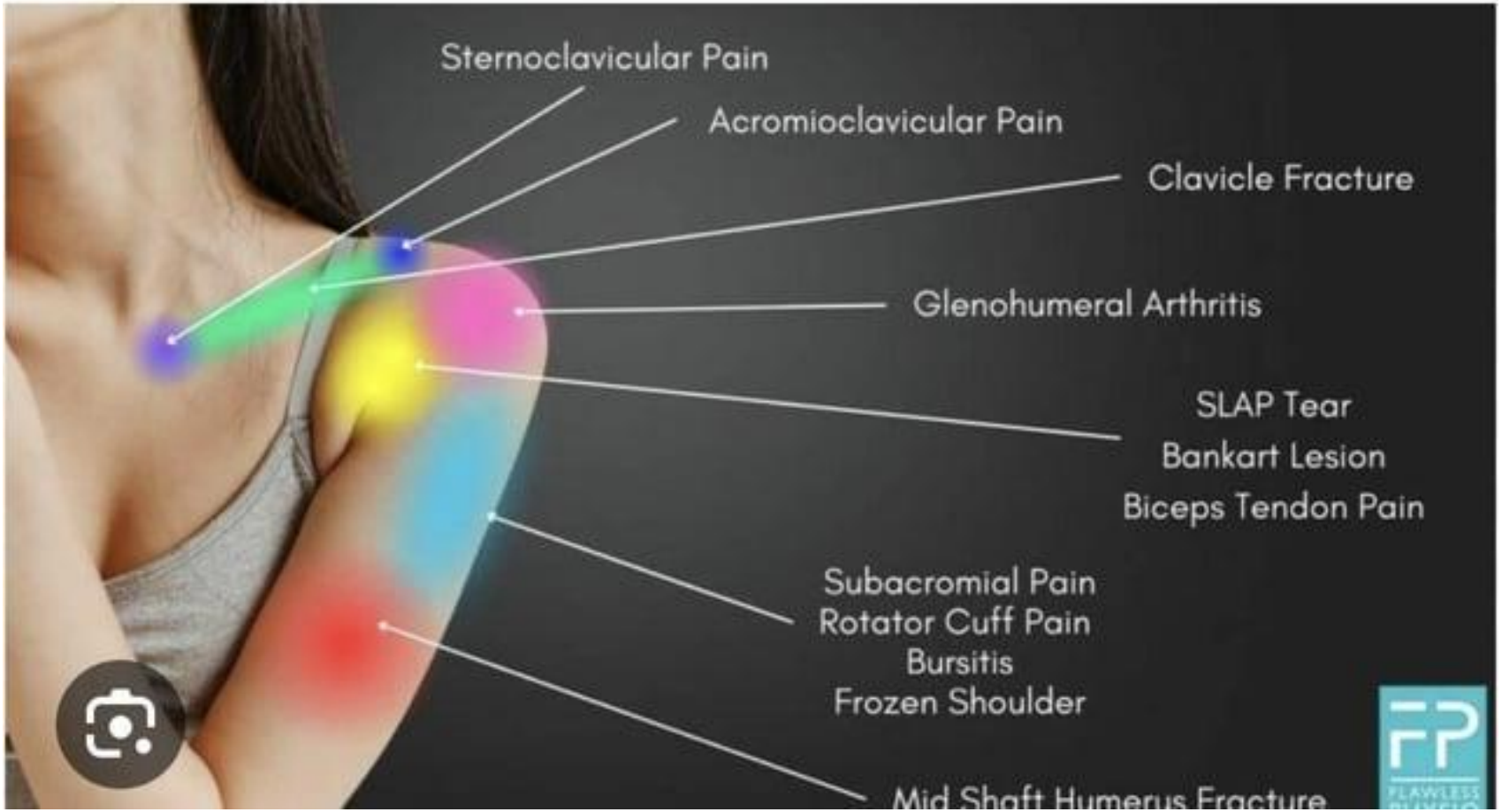
Acute

- Rotator Cuff Tear/Rupture
- AC Separation
- Clavicle Fracture
- Shoulder Dislocation

Subacute/Chronic/Recurrent

- Impingement Syndrome/Bursitis
- Adhesive Capsulitis (Frozen Shoulder)
- Glenohumeral Arthritis
- AC Joint Arthropathy
- Nerve Entrapment

Location of Pain

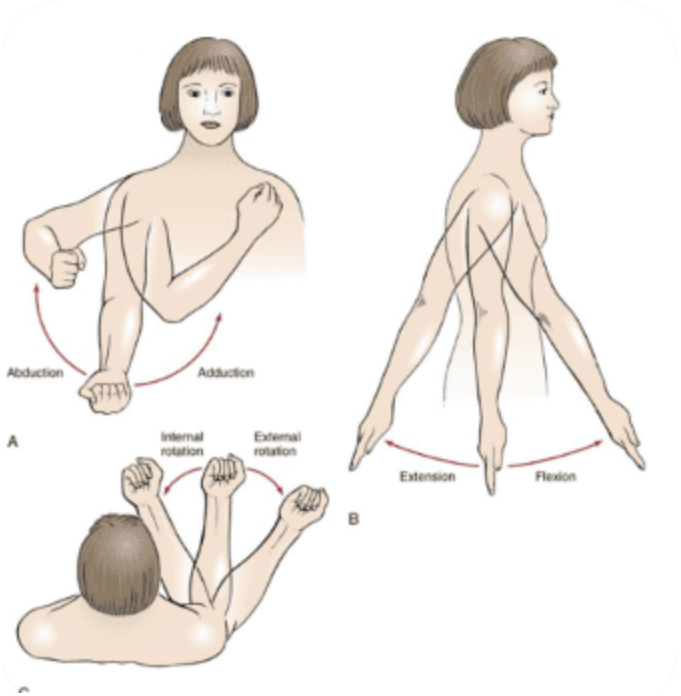


Swelling and Ecchymosis

- Tendon or Muscle Injury or Tear
  - Fall onto outstretched hand with bruising of the shoulder (no impact) → Rotator Cuff Tear
- Contusion
  - Bruising at location of direct impact

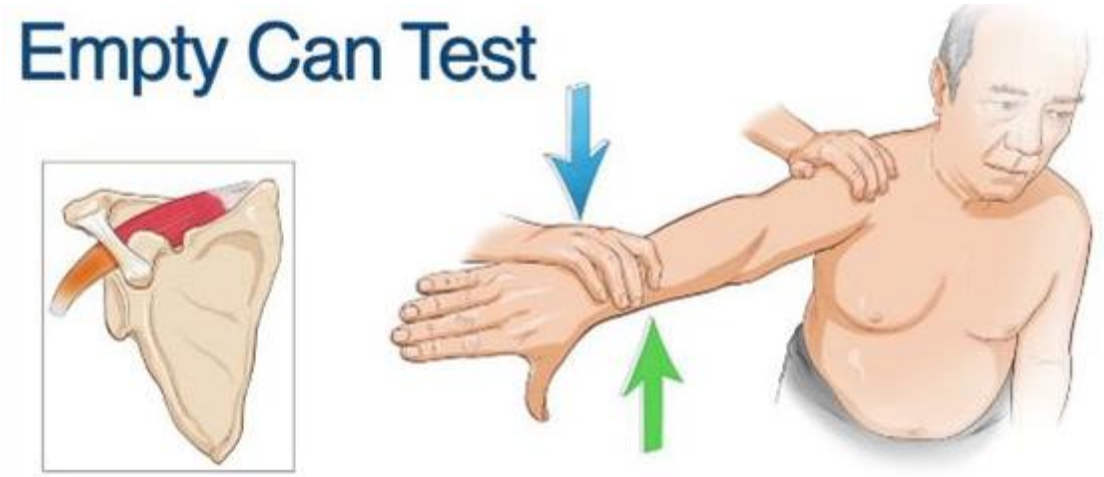
Range of Motion

- Loss of range of motion
  - Loss of Active Range of Motion with Normal Passive ROM
    - Rotator Cuff
      - Impingement
      - Tear
      - Strain
  - Loss of Passive and Active Range of Motion (External Rotation)
    - Arthritis
    - Adhesive Capsulitis (Frozen Shoulder)



Strength

- History of loss of strength is difficult to use to narrow the differential
  - Pain inhibition
  - True loss of strength
- Any loss of strength requires a good physical exam to evaluate the rotator cuff!!



Referral for Shoulder Pain

Referral: Acute Shoulder Pain, Fall Mountain Biking; ? MRI to Rule Out Rotator Cuff Tear

What's your pre-history probability For the ? of Rotator Cuff Tear

Pretty High

Referral for Shoulder Pain

Referral: Acute Shoulder Pain, Fall Hiking; ? MRI to Rule Out Rotator Cuff Tear

- Mechanism of Injury
  - Flip over handle bars while biking
  - Immediate onset of pain
  - Landed directly onto the tip of the shoulder (with arm tucked)
- Acute Onset
- Location: Top of the shoulder
- Range of Motion: Limited (patient thinks by pain)
- Strength: Not sure, too painful to use
- Notes a new bump at the top of the shoulder

Referral for Shoulder Pain

Referral: Acute Shoulder Pain, Fall Hiking; ? MRI to Rule Out Rotator Cuff Tear

History: Acute onset of shoulder pain, from fall directly onto shoulder, with AC deformity. No FOOSH. Difficult to assess weakness, ROM on history alone.

What's your post-history probability For the ? of Rotator Cuff Tear

LOW!!

Referral for Shoulder Pain

Referral: Acute Shoulder Pain, Fall Biking; ? MRI to Rule Out Rotator Cuff Tear

- Mechanism of Injury
  - Flip over handle-bars while biking
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  - Landed with arm tucked directly onto the tip of the shoulder
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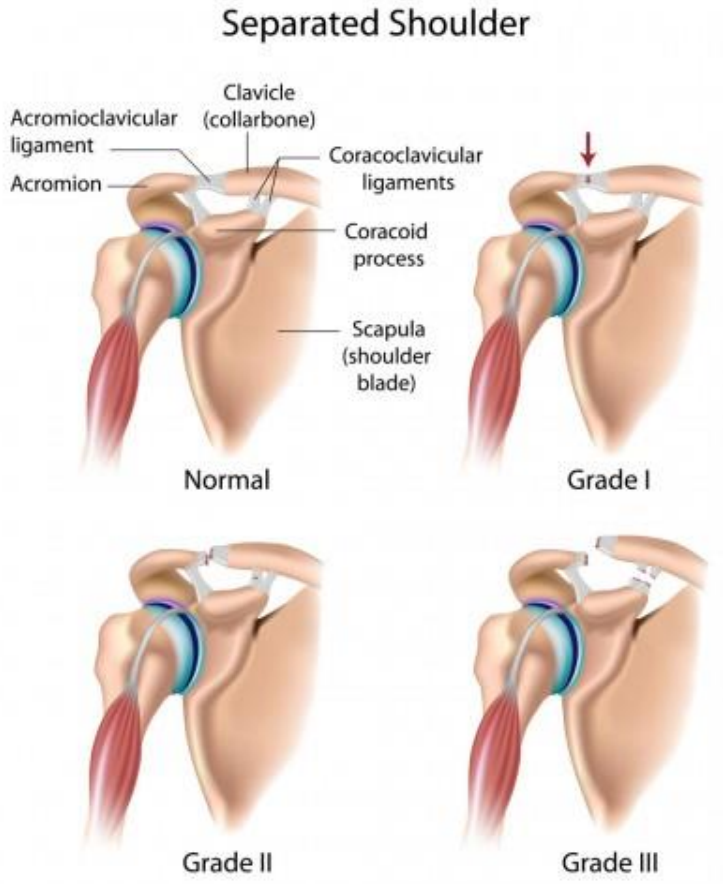

Thank You

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