Common orthopedic pathologies in general practice

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Objectives

topics of discussion

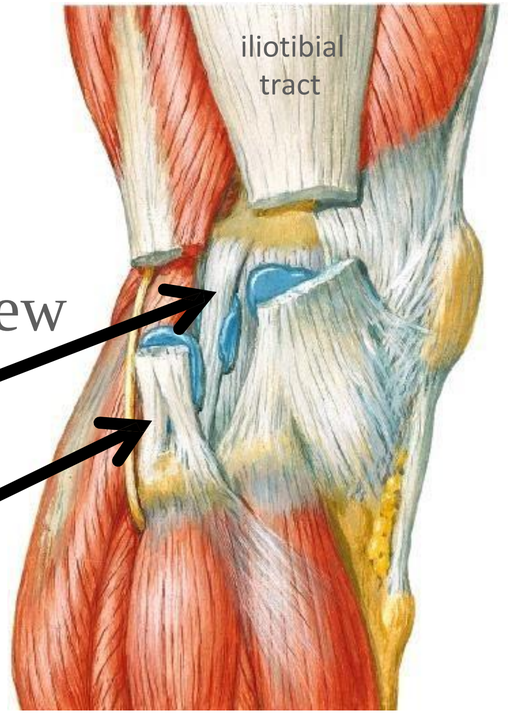
- Common knee sport injuries
- Foot and ankle injuries
- Shoulder pathologies
- Tendinitis
- Neck pain (fibromyalgia vs disc)

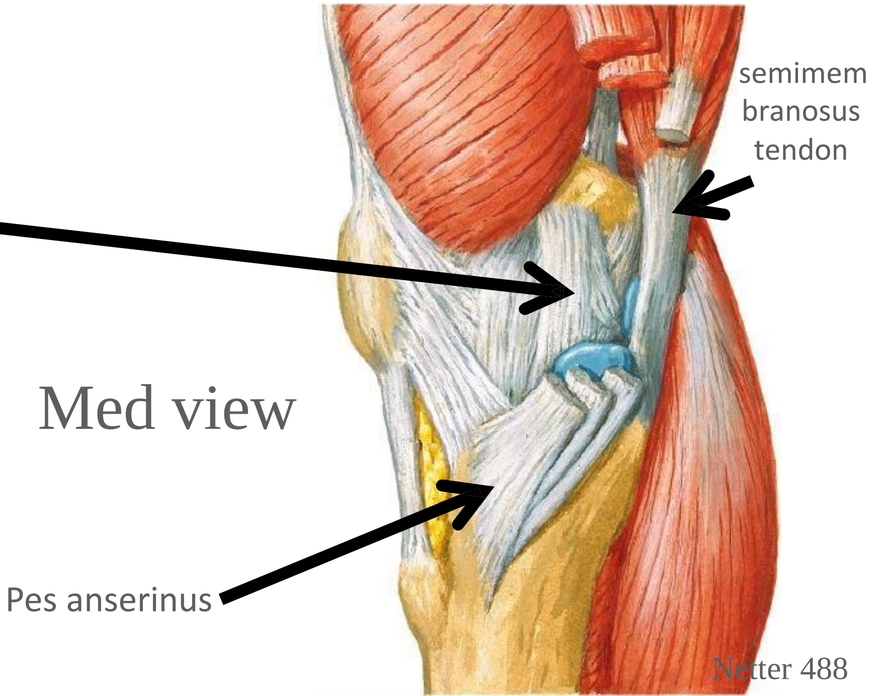
Collateral Structures

Laterally and medially, reinforced by several structures:

- **Laterally:** the fibular collateral ligament, the iliotibial tract and the expansion from the biceps femoris

- **Medially:** the tibial collateral ligament, the pes anserinus tendon (see later) and the semimembranosus tendon (postero-medial)





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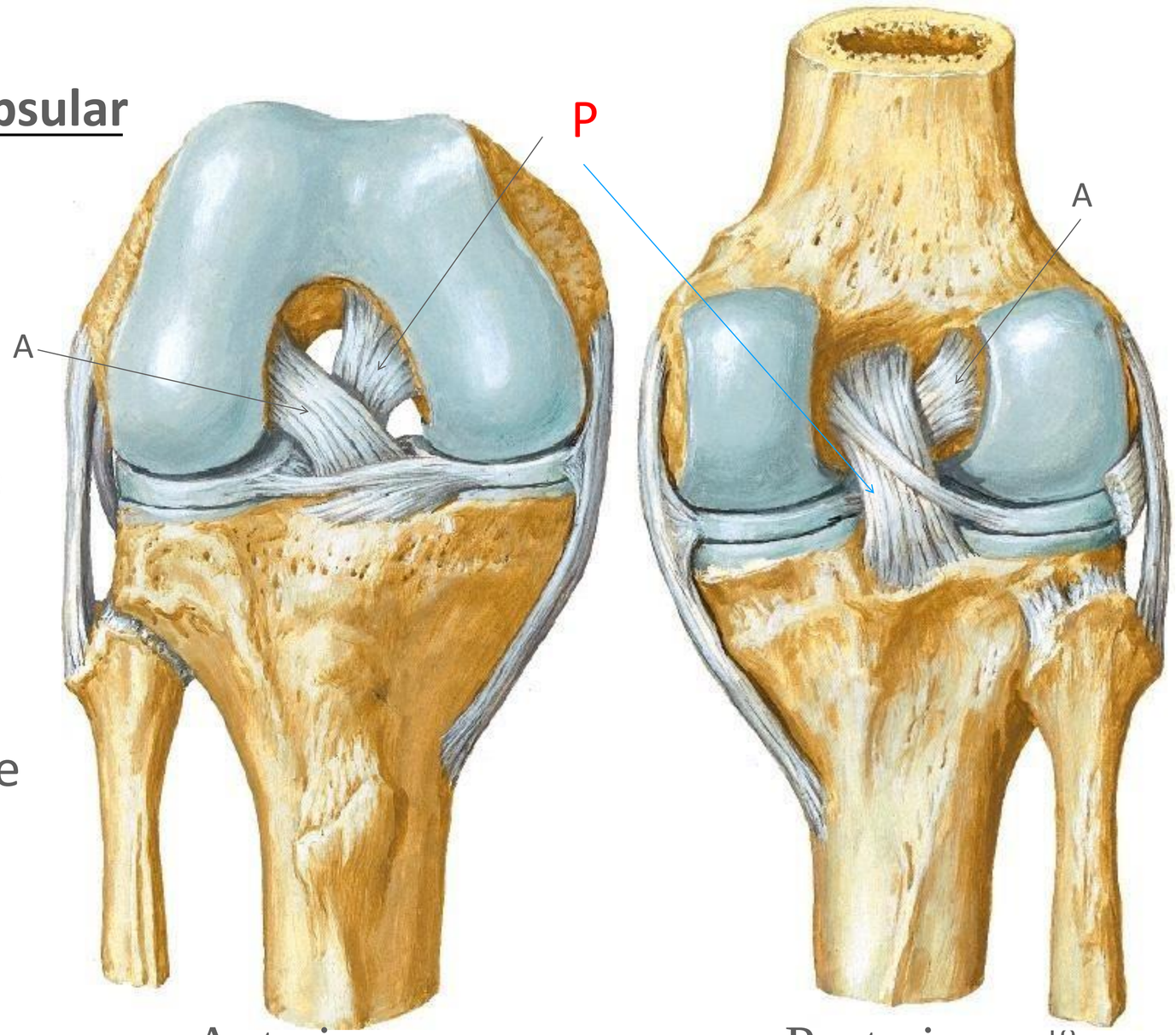
Cruciate Ligaments

2 important intracapsular ligaments:

- Anterior cruciate ligament
- Posterior cruciate ligaments.
- Called cruciate ligaments because they cross one another

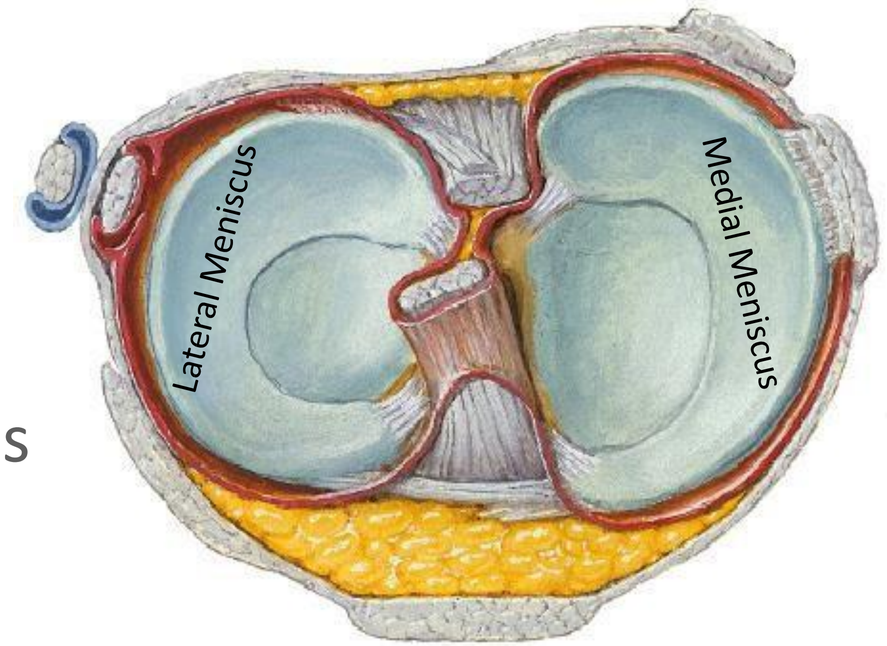


Ant view

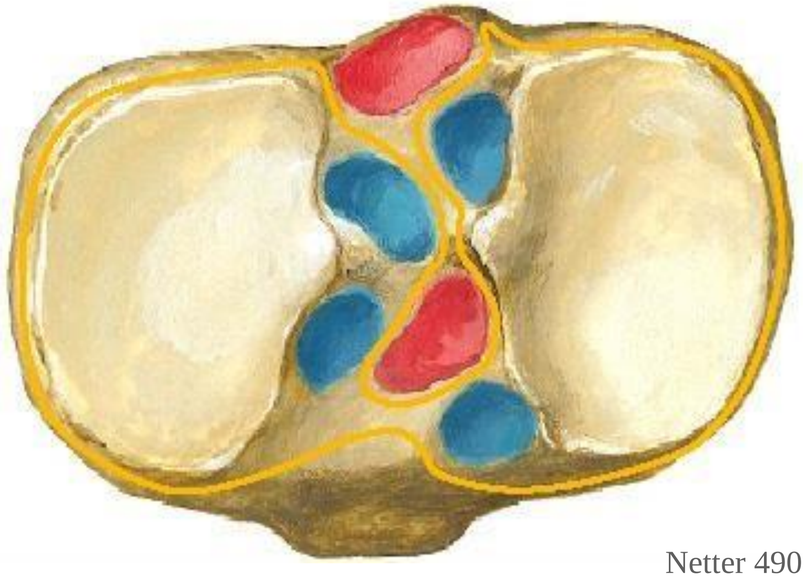
Post view

Menisci

- Are semilunar fibrocartilages
  - Peripheral border is thick, attached to the capsule
  - Inner border is thin and forms a free edge



- Femoral surface is smooth and concave and their tibial surface flat

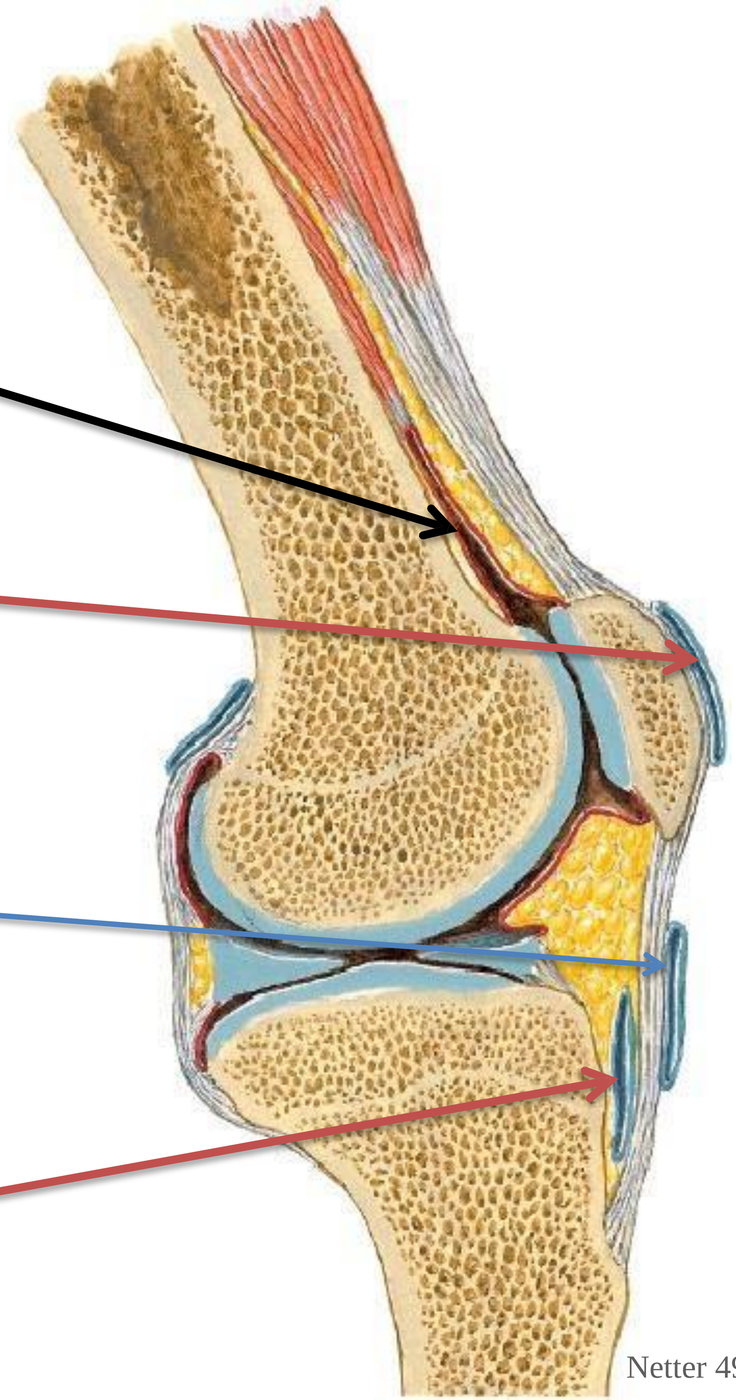


- Thought to compensate for the incongruity between the tibia and femur

Netter 490

Bursae

- The suprapatellar (synovial) bursa (articularis genus muscle)
- The (subcutaneous) prepatellar bursa: between the skin and t patella
- The (subcutaneous) infrapatella bursa: superficial below the patella
- The deep infrapatellar bursa: deep below the patella



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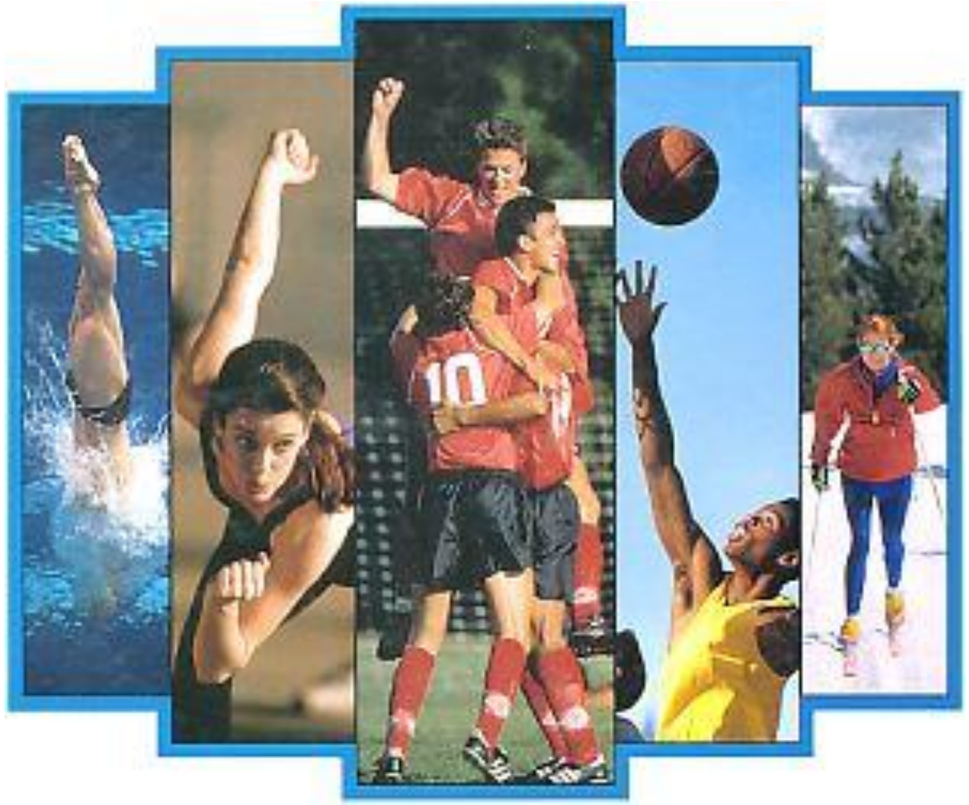
Common Sports Injures Associated with the Knee

Knee overview

- Knee pain ~ 33% of MSK problems seen in primary care clinics
- Up to 55% of athletes complain of knee pain /year



As usual, a thorough, complete history is crucial

- Pain
  - Onset rapid or insidious
  - Where is it located
  - How long has it been present
  - What is the severity & quality
  - Aggravating & alleviating factors
  - Bear weight immediately or not

History

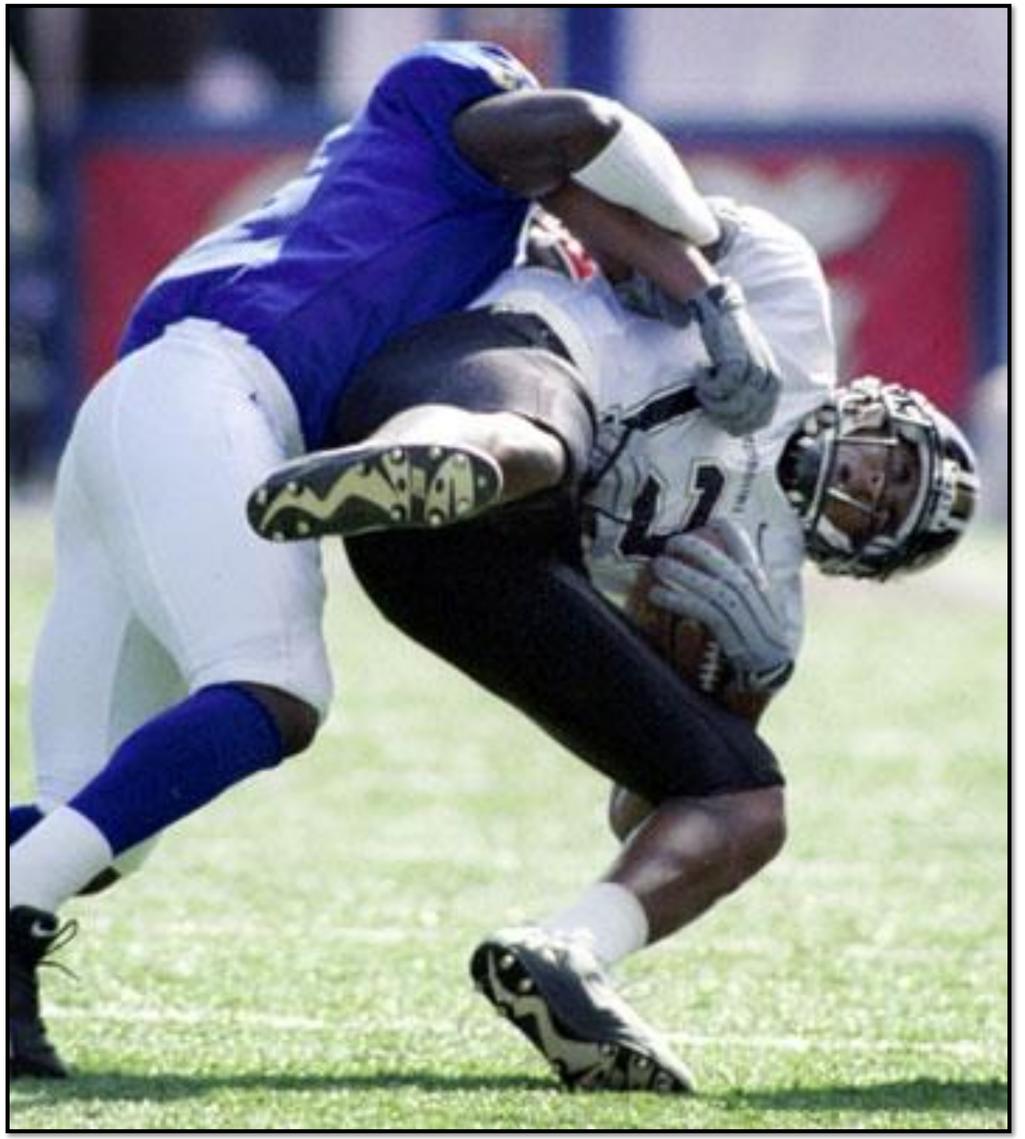
- Mechanical symptoms
  - Locking or catching
  - Popping (at injury and/or now)
  - Giving way

History

- Effusion
  - Is there/was there one
  - Rapid (< 1 hour)
  - Delayed (24-36 hours)

History

- Mechanism of Injury
  - Direct blow & location
  - Twisting, landing, cutting, decelerating
  - Planted foot
  - Unknown



Anterior cruciate ligament (ACL) injury

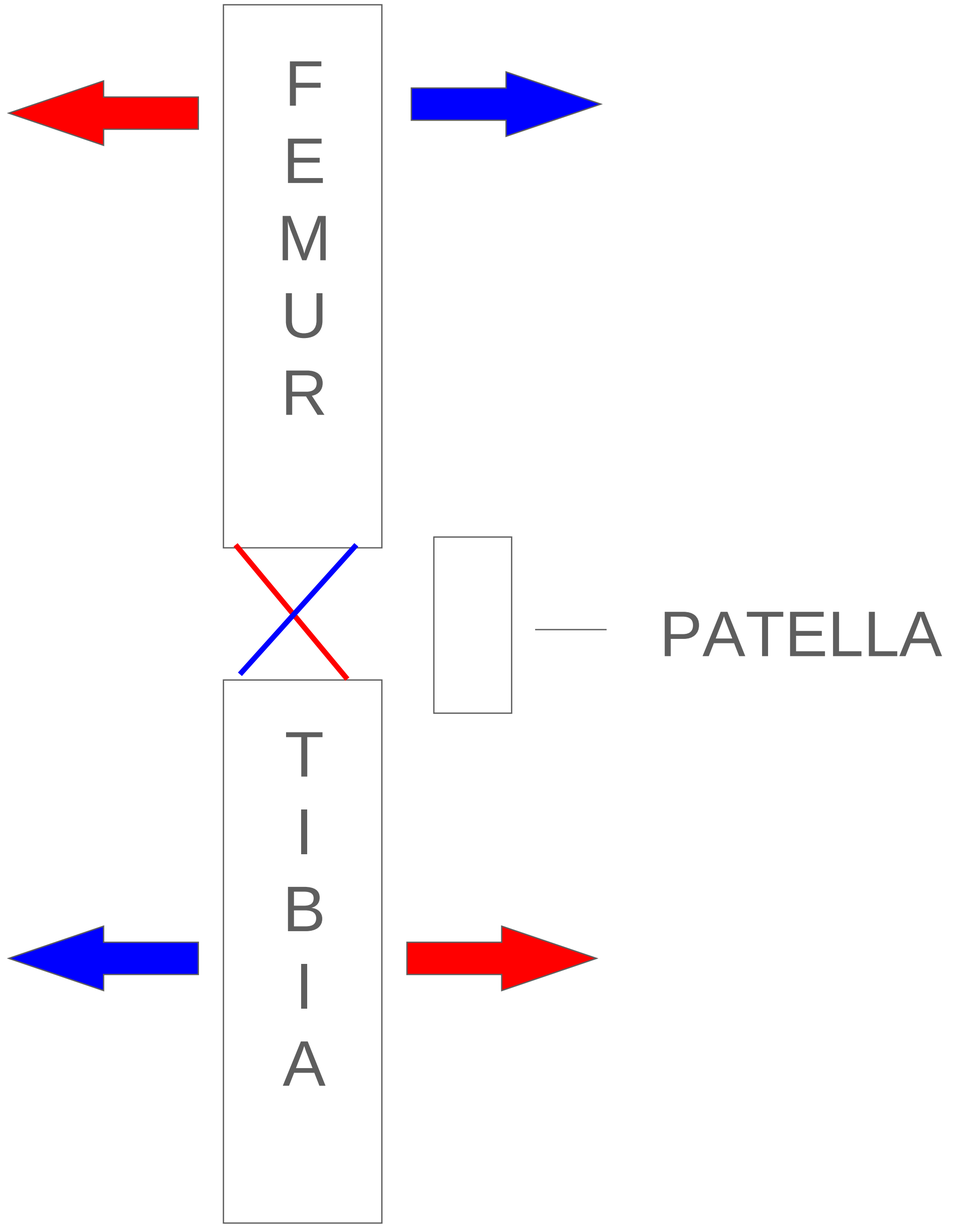
- Most are non-contact injury, secondary to deceleration forces or hyperextension
- Planted foot & sharply rotating
- If 2° to contact, may have associated injury (MCL, meniscus)

Anterior cruciate ligament (ACL) injury

- Playing soccer, gymnastics and basketball are at highest risk
- Risk of injury 2 – 8 times ↑ in women
- ~250,000 injuries/year in general population
- Gender difference not clear
  - Joint laxity, limb alignment
  - Neuromuscular activation

The **ACL** prevents the femur from sliding posteriorly on the tibia or the tibia from sliding anteriorly on the femur.

The **PCL** prevents the femur from sliding anteriorly on the tibia or the tibia from sliding posteriorly on the femur.



ACL rupture

- Mechanism:
  - fixed foot and external rotation of femur
  - knee in valgus position
  - hyperextension

ACL rupture: Signs/symptoms

- “pop”,
- knee gives out
- instability of knee joint
- swelling within knee joint—hemarthrosis
- intense pain initially but still able to walk
- “+” Lachman’s test
- “+” anterior drawer test

Anterior cruciate ligament (ACL) injury

- PE:
  - Large effusion, ↓ ROM
  - Difficult to bear weight
  - Positive anterior drawer
  - Positive Lachman's

Ligament testing

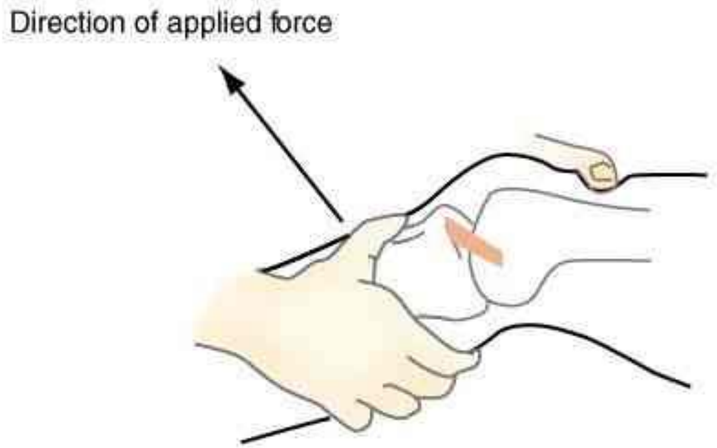
- ACL testing
  - Lachman's - 30° flexion
  - Anterior Drawer - 90° flexion

Lachman's

Anterior drawer

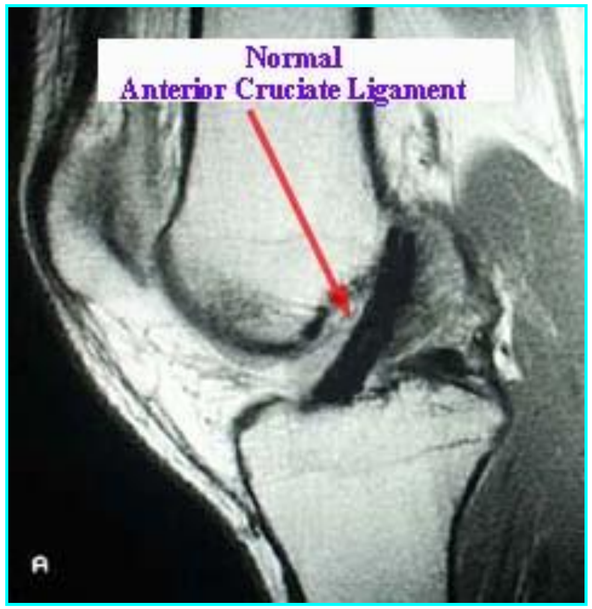
Lachman’s test

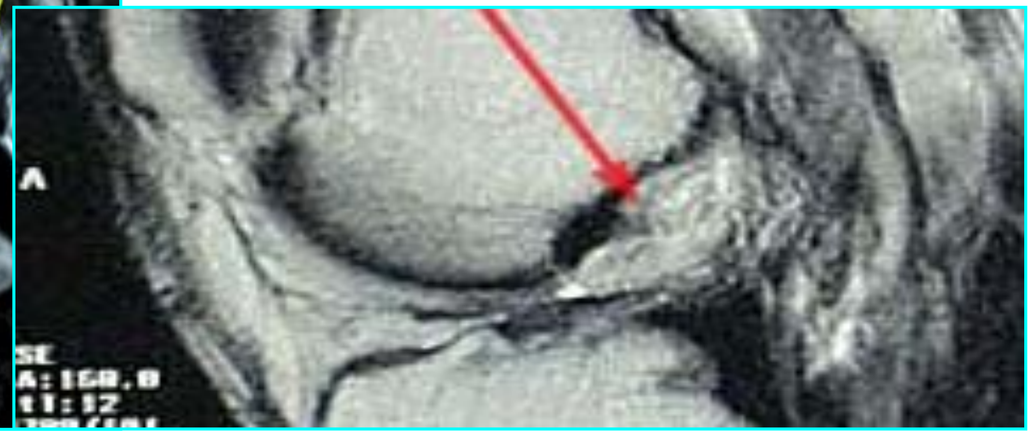
- Femur stabilized with knee slightly flexed
- Ant. Force applied to tibia
- Hands placed at tibial tuberosity and proximal to femoral condyles
- Heel remains on table/ground
- PCL sprain may lead to false (+) Lachman's



The Lachman test is conducted at 30° flexion

Anterior cruciate ligament (ACL) injury





MRI

Inside the knee joint

- The ACL intact

The ACL torn

Initial Treatment

- ✓ Surgery ***NOT INDICATED***
  - ✓ Immediate surgery leads to an unacceptable incidence of arthrofibrosis (loss of ROM)
- ✓ RICE
- ✓ Range of Motion exercises
- ✓ Gait reeducation
- ✓ Cold/compression
- ✓ Strengthening and flexibility program for ***hamstrings*** and quadriceps
- ✓ Emphasize extension equal to the other leg
- ✓ Cycling

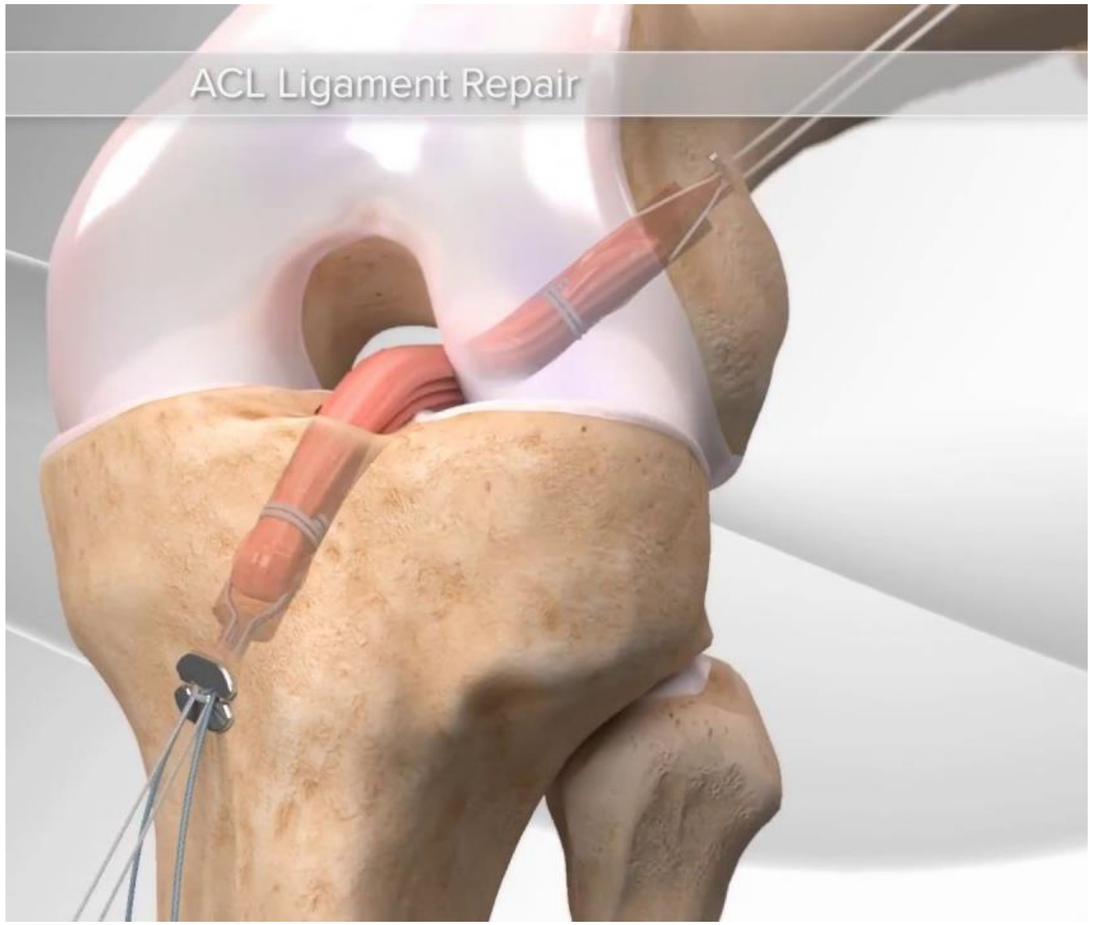
Options?

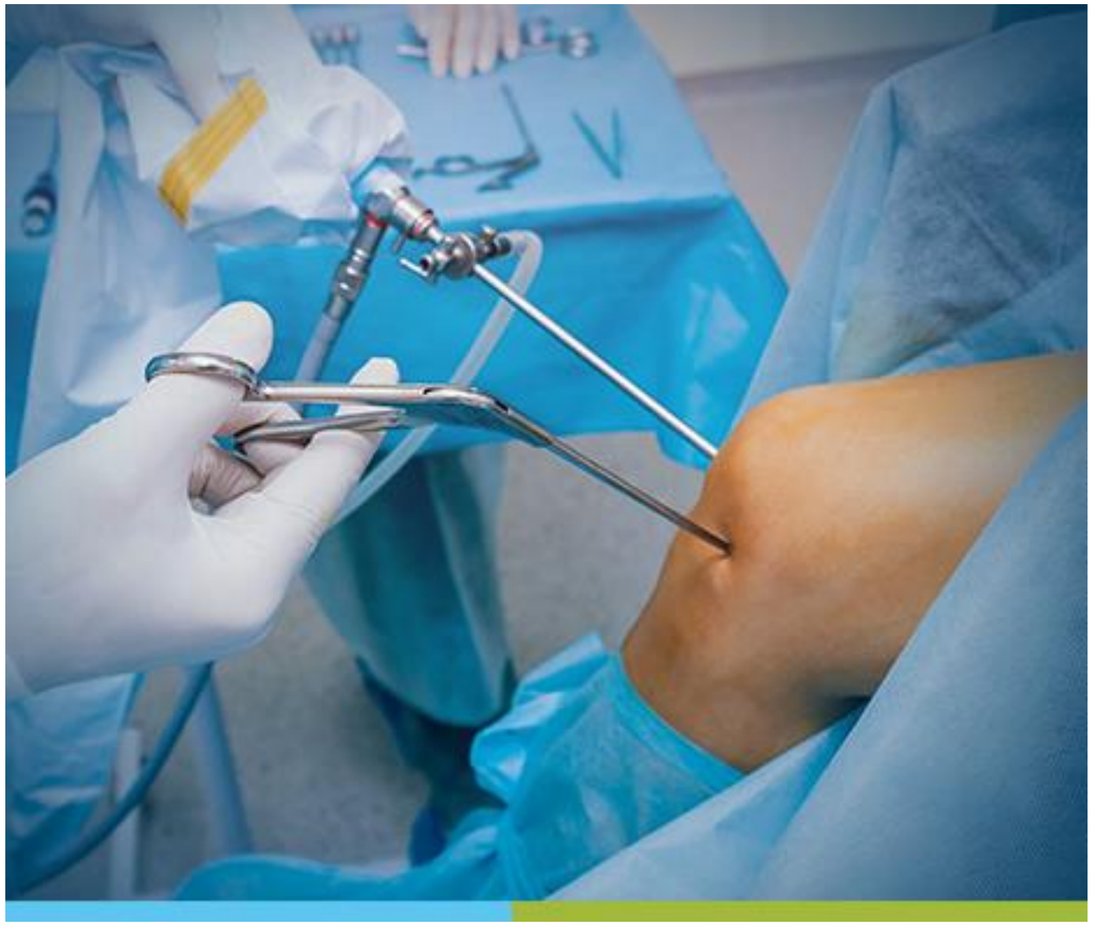
- Non-surgical
  - Must be willing to give up sports with exception of cycling and activities in a health club
    - Strength and conditioning program
- Surgical
  - For people that want to return to sports and need the stability (athletes)

ACL Rupture

- surgical reconstruction
  - Timing of surgery decided by athlete, parents, doctor
  - Grafts used are patellar tendon, hamstring tendon, cadaver graft, allograft
  - 3-5 weeks in brace, 6-9 months return to activity

ACL surgery





PCL Injuries

Mechanism: knee is forcefully twisted or hyperextended (associated other ligament tears)

Most common mechanism for PCL alone to be injured is from a **direct blow to the front of the knee while the knee is bent**.

Automobile accident

1. Automobile strikes another and stops suddenly
2. Front passenger or driver slides forward.
3. Bent knee hits the dashboard just below the knee cap forcing tibia backwards on the femur tearing PCL.

The same force can occur during a fall on the bent knee, where the force of the fall on the tibia pushes it back against the femur and tears the posterior cruciate ligament (PCL).

PCL Rupture

- Mechanism:
  - hyperflexion
  - falling on bent knee with foot plantar flexed
  - Hit on fixed anterior tibia
- S/S:
  - “pop” at the back of knee
  - Swelling in popliteal fossa
  - + posterior sag test, + posterior drawer test

Stress tests

- Posterior sag

PCL rupture

- Tx:
  - RICE
  - Immobilization
  - Crutches
  - Physician referral
  - 6-8 weeks rest/rehab
  - If surgery is elected, 6 weeks immobilization

MCL Sprain

- Mxn:
  - Blow to the lateral side of knee (valgus stress)
  - External rotation of tibia

MCL sprain

- S/S:
- 1st degree
  - Tenderness over MCL, stable but pain with valgus stress, mild joint effusion, mild joint stiffness, full ROM
- 2nd degree
  - Partial tearing-superficial portion, Tenderness over MCL, some instability with valgus stress but solid endpoint, moderate joint effusion, joint stiffness, limited ROM, unable to fully extend knee joint

MCL Sprain

- S/S:
- 3rd degree
  - Complete tear—superficial and deep portions
  - Tenderness over MCL
  - Moderate to severe effusion
  - Severe pain
  - Loss of motion due to pain, effusion, muscle guarding
  - “+” valgus stress in 0 and 30 degrees, no endpoint

Stress tests for MCL

- Valgus stress test @ 0 Valgus stress @ 30

MCL Sprain

- Tx:
- RICE
- Crutches
- Knee immobilizer/brace
  - 1st degree 1-2 weeks
  - 2nd degree 2-4 weeks
  - 3rd degree 4-6 weeks
- Physician referral for 2nd degree or greater

Common Association

- The terrible triad or unhappy triad
  - Torn ACL
  - Torn MCL
  - Torn Medial meniscus

LCL sprain

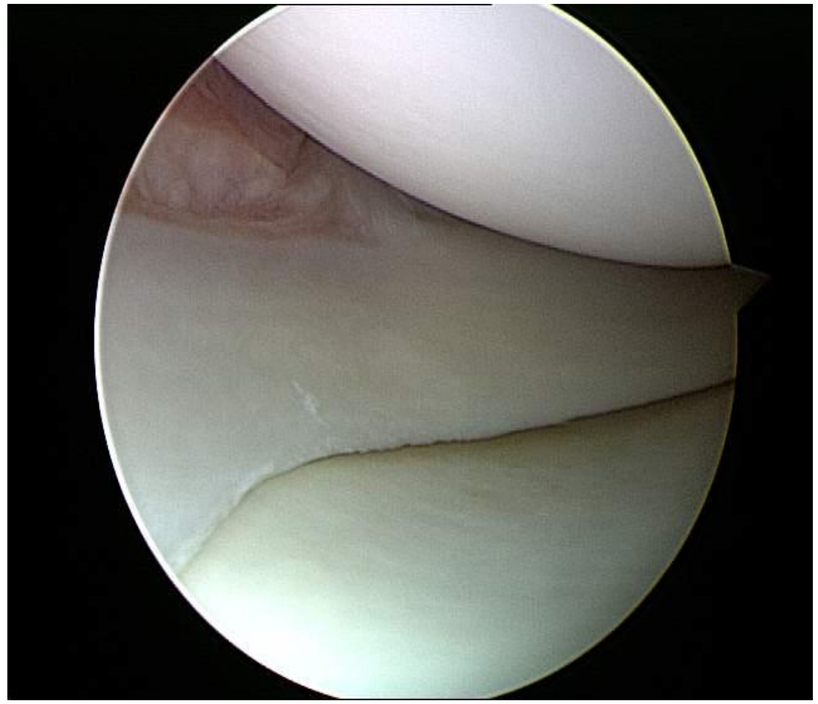
- Mechanism:
  - Varus force to medial aspect of knee
  - internal rotation of tibia
- S/S:
  - Tenderness over LCL,
  - pain,
  - swelling,
  - loss of motion,
  - “+” varus stress at 30 degrees

LCL sprain

- Tx:
  - RICE
  - Crutches
  - Knee immobilizer
  - Physician referral with 2nd or 3rd degree

The Menisci

- Shock absorbers
- Stabilizers
- “Spacer washers” of the knee
- Mobile, yet attached to tibial plateau
- Vascular/ Avascular zones
- MM attached to MCL

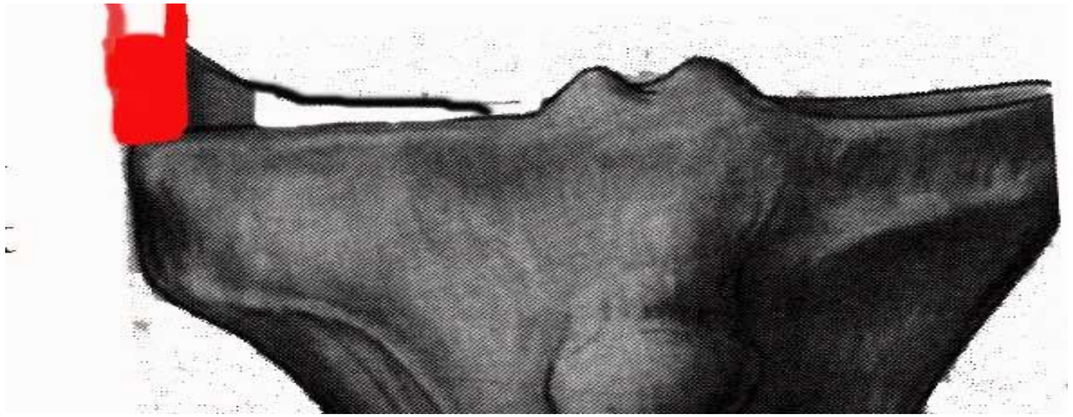


Meniscus tear

- Medial: more often torn than later due to attachment to MCL
- Lateral: doesn’t attach to joint capsule making it more mobile, less prone to injury
- Mechanism:
  - Weight bearing with rotational force while extending or flexing the knee

Meniscal Tears—

- Acute onset
- Tender at joint line
- Usually a rotational mechanism
- Often feels a “pop” or “click”
- Symptoms my disappear/recur
- Suspect meniscus tear with all cruciate tears



- Tears my be horizontal, radial, or bucket handle

Meniscus Testing

- McMurray's Test

- 3 passes with knee in neutral, IR, and ER
- Valgus stress applied as knee extended
- Varus stress applied as knee is flexed
- (+)= pain at jointline or clicking/popping felt at jointline

Meniscus Testing

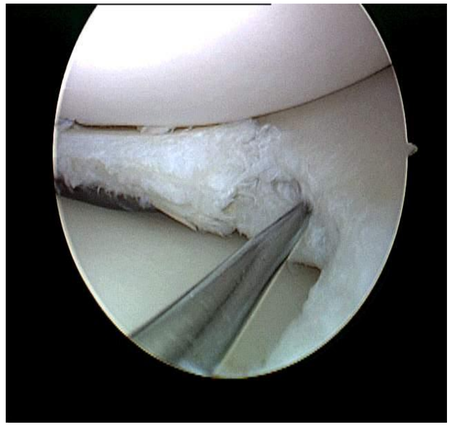
- Apley’s Compression Test
- Knee flexed with axial loading of tibia into femur while tibia is rotated
- (+)= pain or popping at jointline

Fig. 62. Apley's compression test for meniscal tear.

Fig. 63. Apley's distraction test for ligamentous damage.

5 Signs of Meniscal Injury

- (+) McMurray’s test
- Pain in Full Flexion
- Popping/Clicking
- (+) Apley’s test
- Pain in Weightbearing



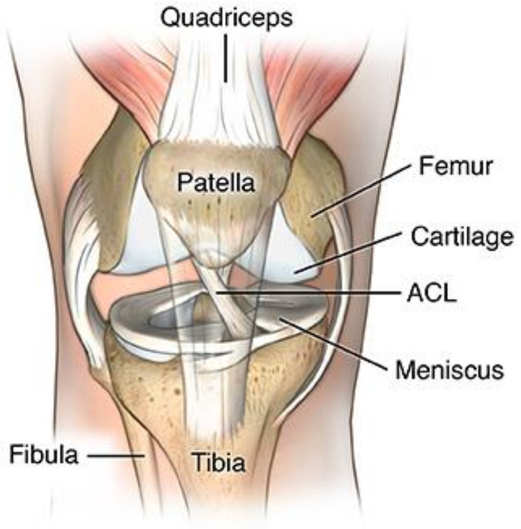
Meniscus tear

- S/S:
  - Effusion w/in 48-72 hours
  - Tenderness over joint line
  - Loss of motion
  - “locking”
  - Giving out
  - Pain with deep knee flexion--squatting

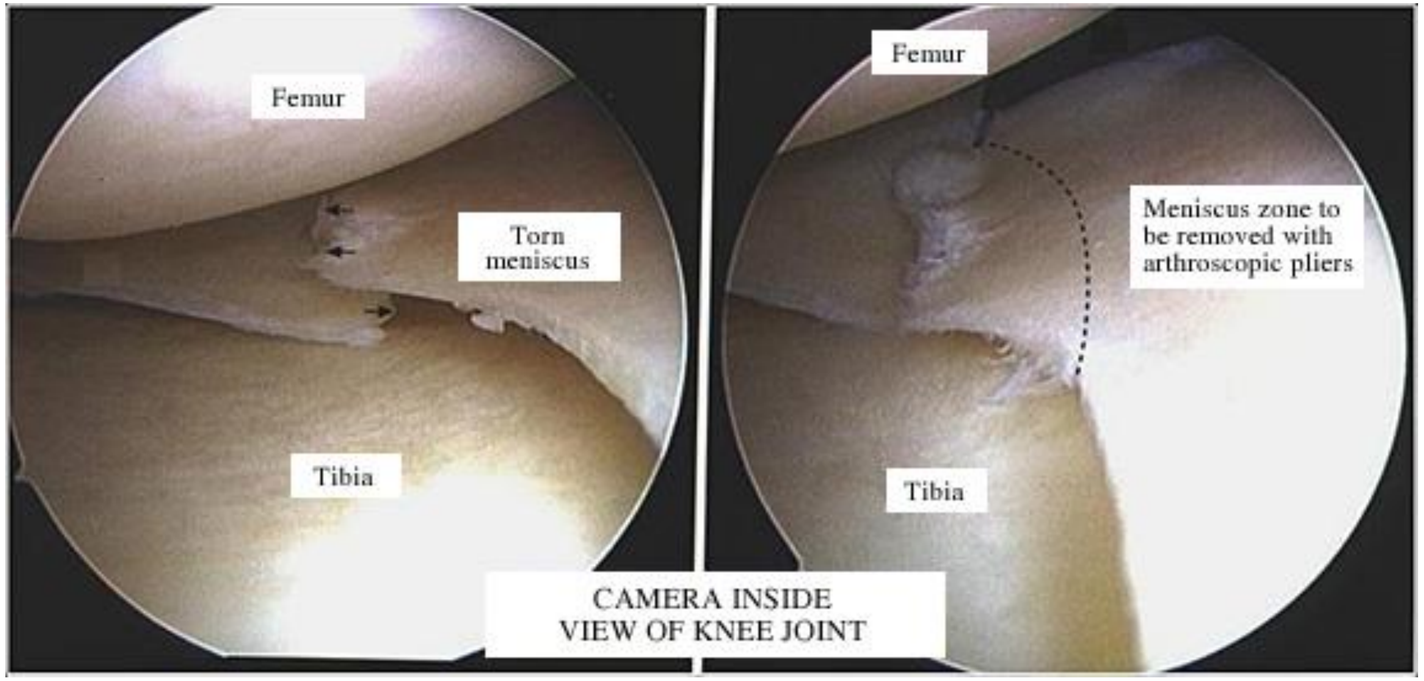
Meniscus tears

- Tx:
- RICE
- Crutches if necessary
- Physician referral
- If knee is “locked” by displaced meniscus, go to ER
- Arthroscopic surgery to fix

Meniscal injury



Normal knee and meniscus



Patellar dislocation

- Dislocation of the patella occurs when the patella moves or is moved to the outside of patellofemoral groove and onto the bony head of the femur (lateral femoral condyle).
- The event: acute blow or twisting action of the knee (In most cases the patella will relocate)

presentation

- Pain
- Swelling
- Obvious patella dislocation
- may briefly dislocated and then return to its normal position, although pain and swelling will usually be present.

Patellar dislocation

- Risk factors:
- The vastus medialis obliqus VMO weakness.
- The Q-angle of the knee which is the angle between quadriceps bulk and patella tendon, and people with an increased Q ankle are often
- Geno valgum
- hyperlaxity.

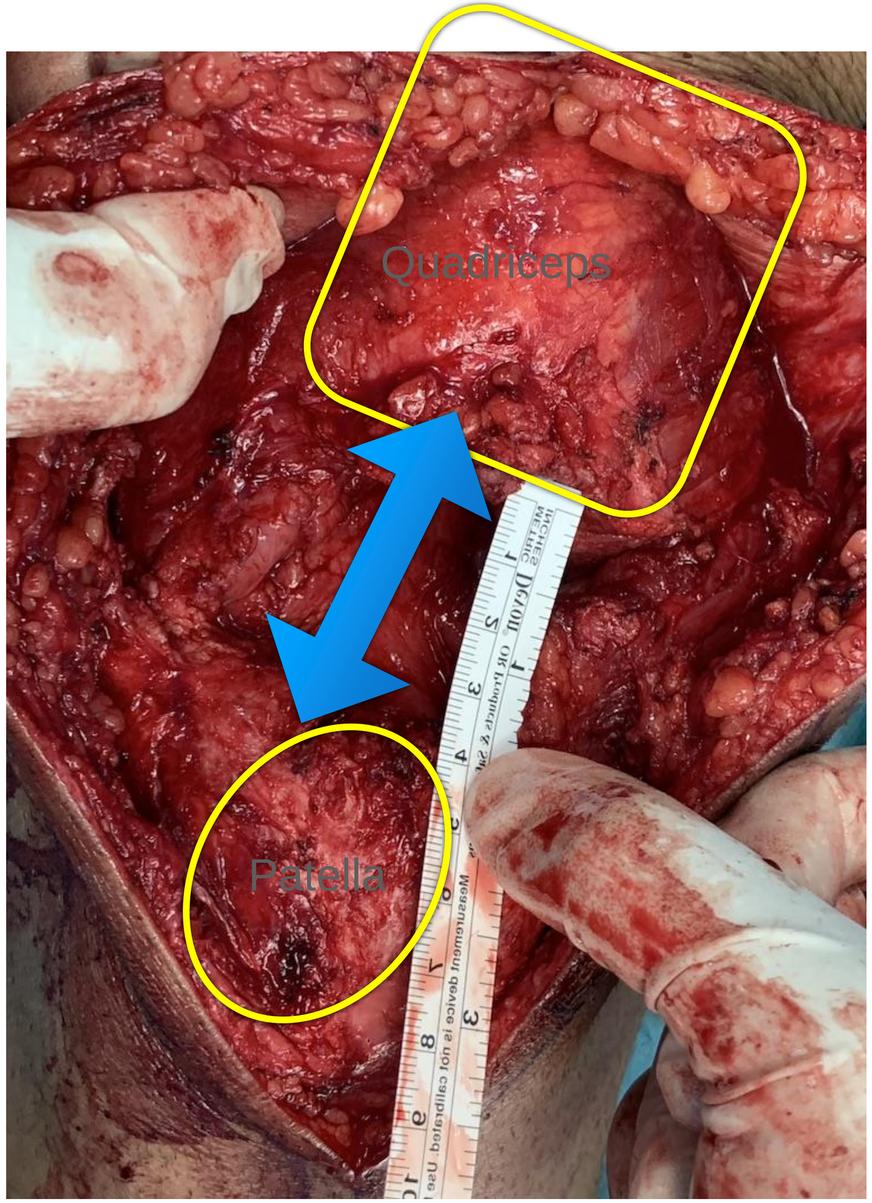
How to manage…

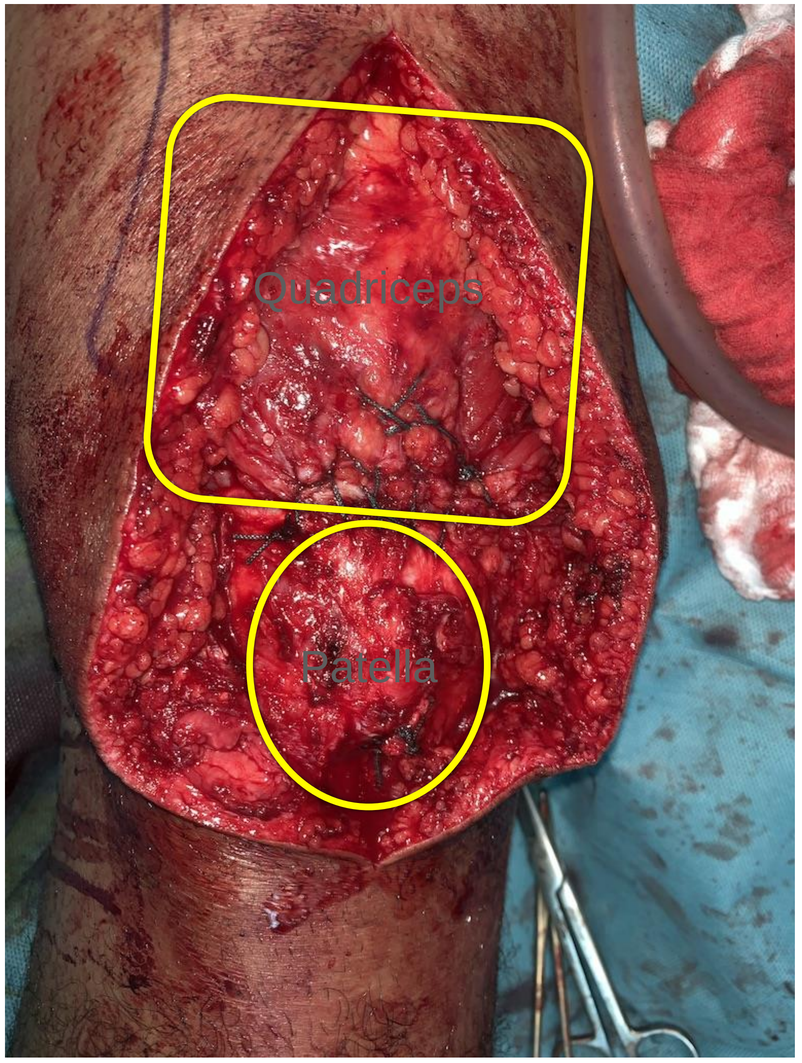
- What can patient do:
- RICE principle (reduce swelling and pain)
- Rest
- Patella stabilizing braces (knee support)
- Join rehabilitation program is required to help avoid future recurrance

How to manage..

- What can doctors do:
- Diagnose it (have similar symptoms to an anterior cruciate ligament injury due to an audible crack or pop and the feeling of the knee giving way)
- Prescribe pain killers (NSAIDS) to reduce pain and swelling
- An X-ray and / or arthroscopy will help evaluate the extent of the injury
- Surgery may be necessary if there are loose fragments of bone or other major structural damage.

44 American soldier present with pain and instability of knee. He hear loud pop after trauma. He can’t extend his knee

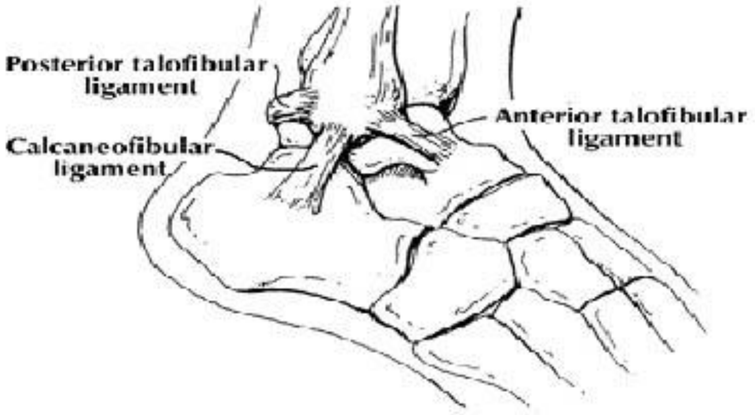

Quadriceps
Patella


Quadriceps
Patella

The Ankle

Ligaments

- Lateral Side
  - ATF-Anterior Talofibular Ligament
  - CF-Calcaneofibular Ligament
  - PTF-Posterior Talofibular



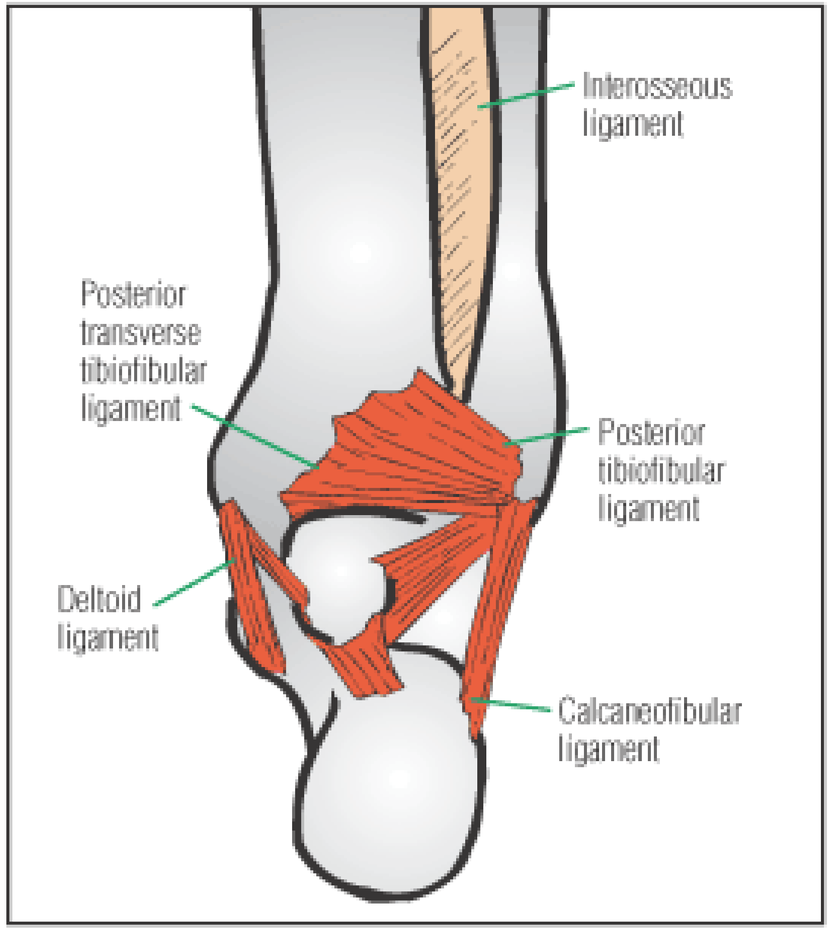


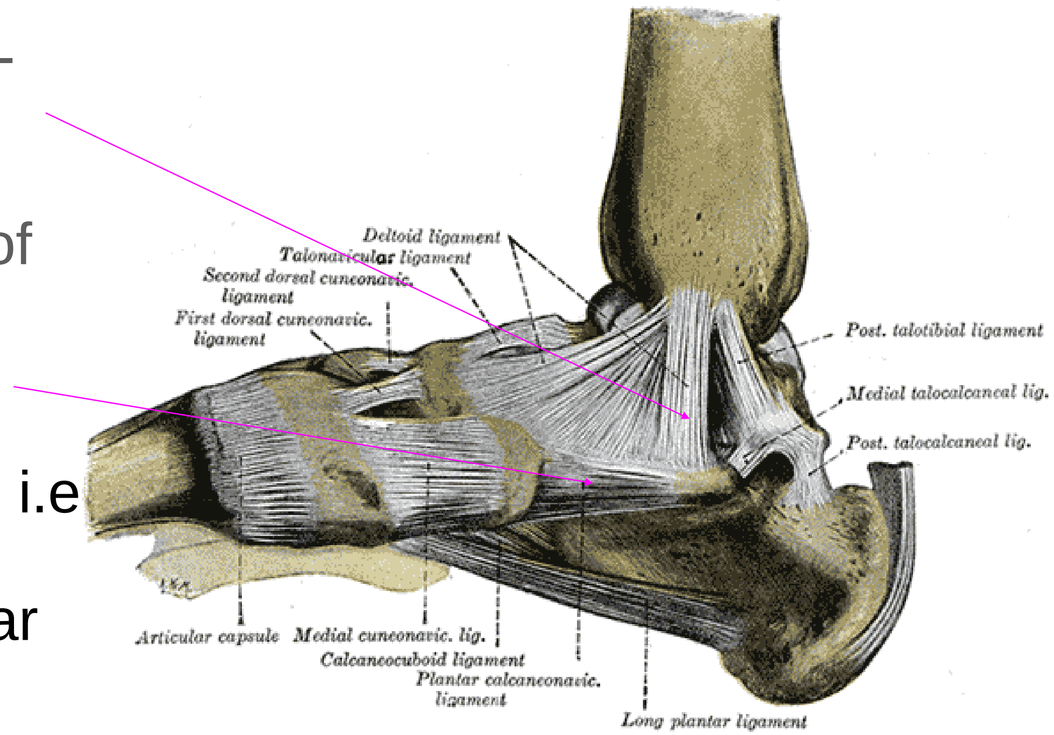
FIGURE 2. Posterior view of the major ligaments of the ankle. Any of these ligaments may be injured in conjunction with a syndesmotic injury.

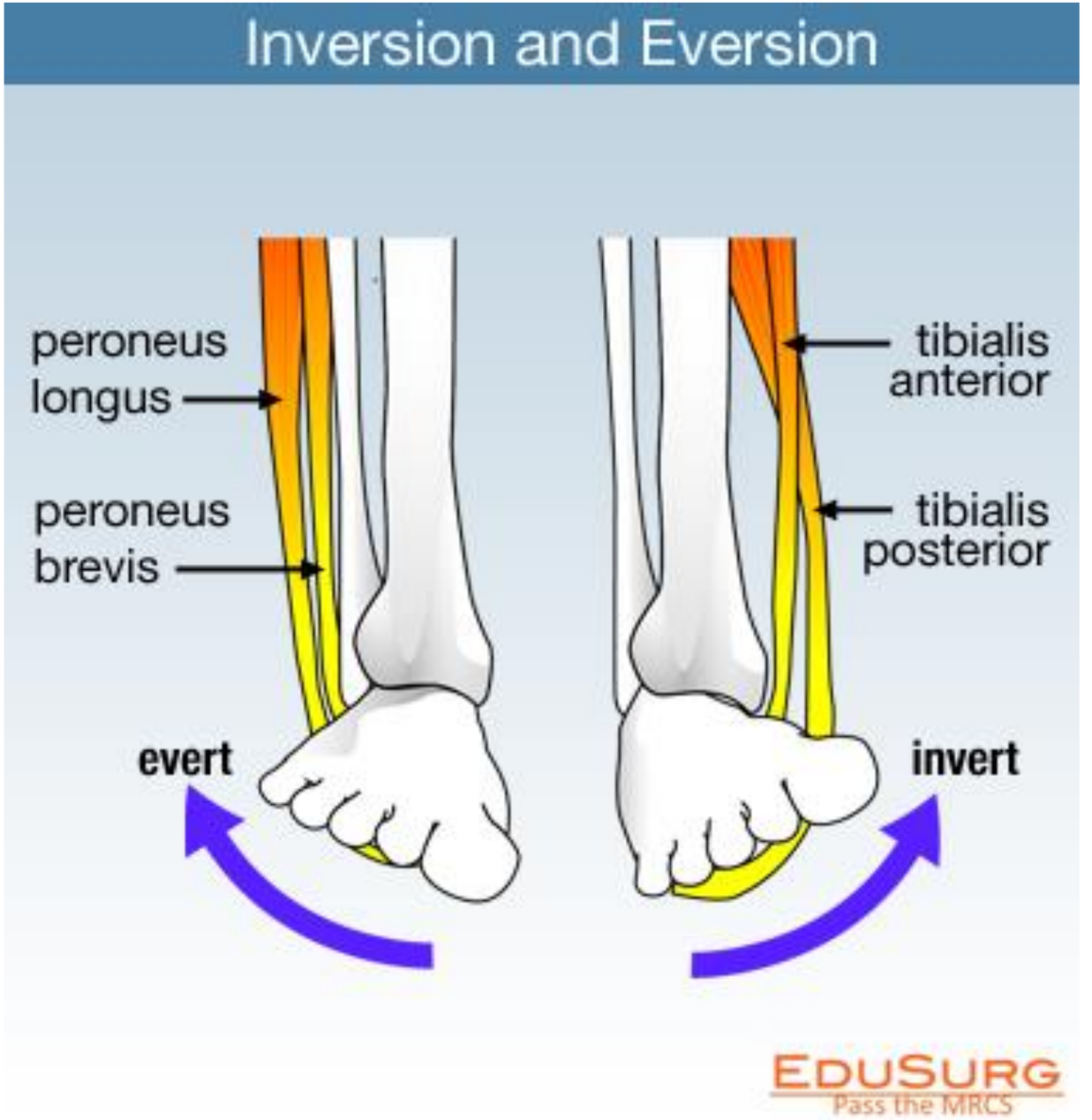
Ligaments

- Medial Side
  - Deltoid Ligament- support ligament

    on medial side of

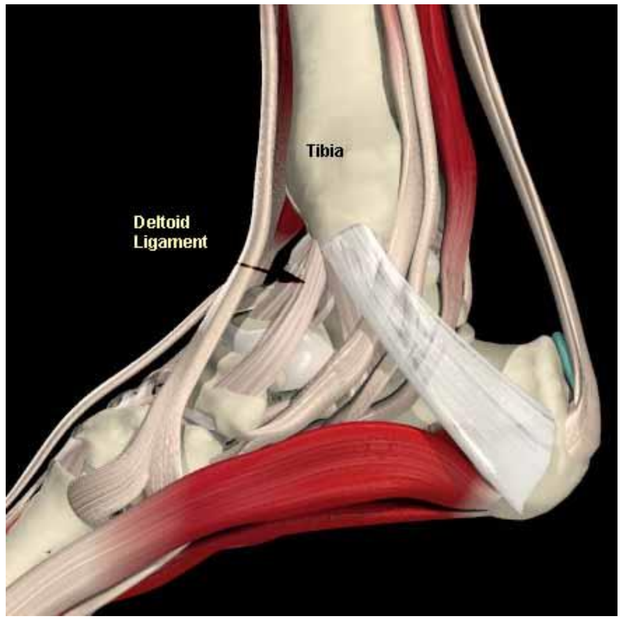
    foot.
  - Spring Ligament- i.e Plantar Calcaneonavicular ligament.




Inversion and Eversion
peroneus longus
peroneus brevis
tibialis anterior
tibialis posterior
evert
invert
EDUSURG
Pass the MRCS

Ankle Soft Tissue Anatomy

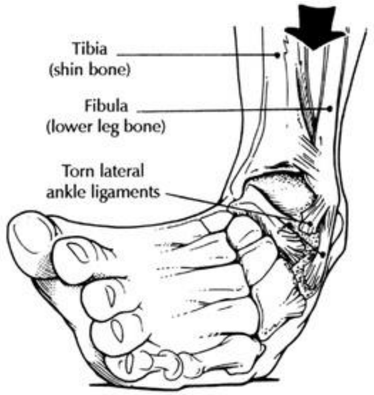
Lateral View



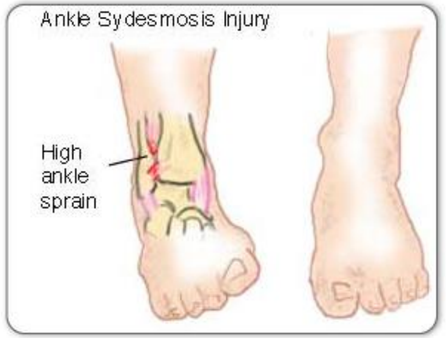
Medial View

Different Kinds of Ankle Sprains

- Lateral (Inversion) Sprains



- High (Syndesmosis) Sprains



- Medial (Eversion) Sprains

Ankle Injuries

- The most common direction to sprain the ankle is inversion
- Injury to the lateral ligament, (Anterior Talofibular Ligament ATFL).

Causes of Lateral Ankle Sprains

- The foot is placed in forced inversion and plantar flexion
- It can be from an unstable/irregular surface
- Also caused by forced trauma

Different Grades of Ankle Sprains

- Grade I- minimal swelling, discoloration, instability, and minimal impaired gait. ATFL.

- Grade II- moderate swelling, discoloration, instability, and moderate impaired gait. The anterior talofibular and calcaneofibular ligaments are injured.

- Grade III- Severe swelling, discoloration, instability, and inability to walk with proper gait. The anterior talofibular, calcaneofibular, and posterior talofibular ligaments are injured.

Symptoms

- Swelling*
- Pain*
- Discoloration*
- Redness
- Warmth
- Inability to walk
- Ankle Instability

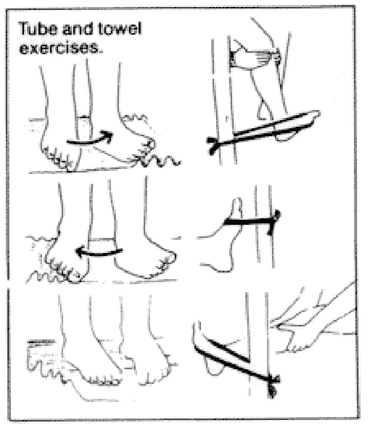
*The most common symptoms

Treatment

- R.I.C.E- Rest, Ice, Compression, Elevation

- Performing therapeutic exercises
- Taping techniques

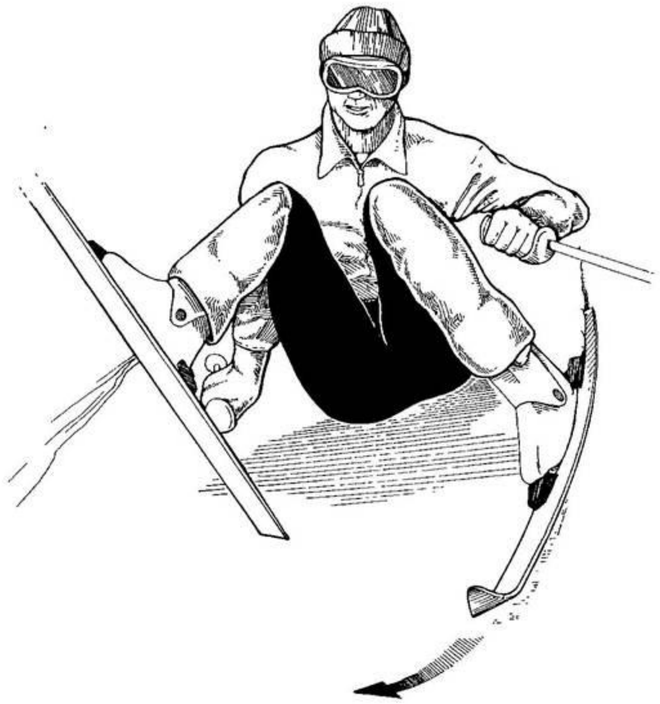
- Ankle Braces



Inversion injury can lead to

- Dista fibular fracture
- ATFL
- Base 5th metatarsal
- Lateral talar process

High Ankle Sprain



High Ankle Sprain Anatomy

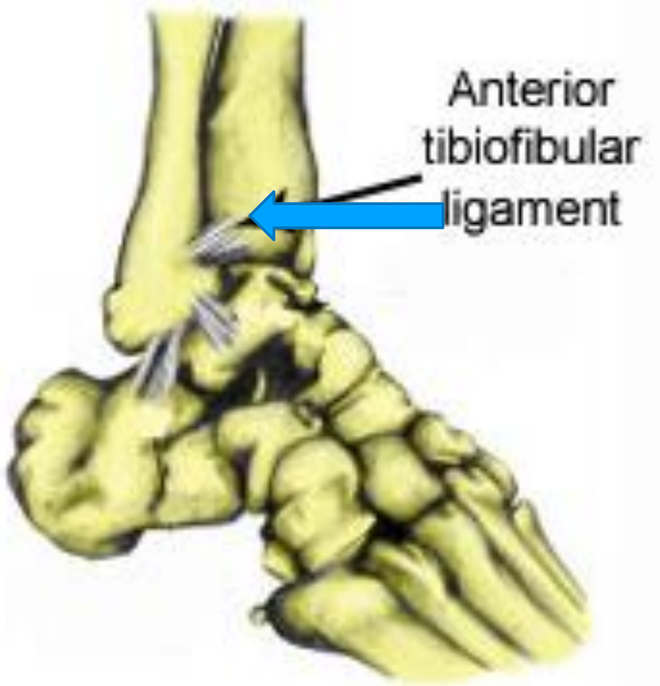
- Occurs to syndesmosis joint

- Anterior Tibiofibular

Ligament (Anterior TibFib)

- Posterior Tibiofibular

  Ligament (Posterior TibFib)



The posterior TibFib ligament is not shown here, but it would be in the same spot just on the posterior aspect of the leg.

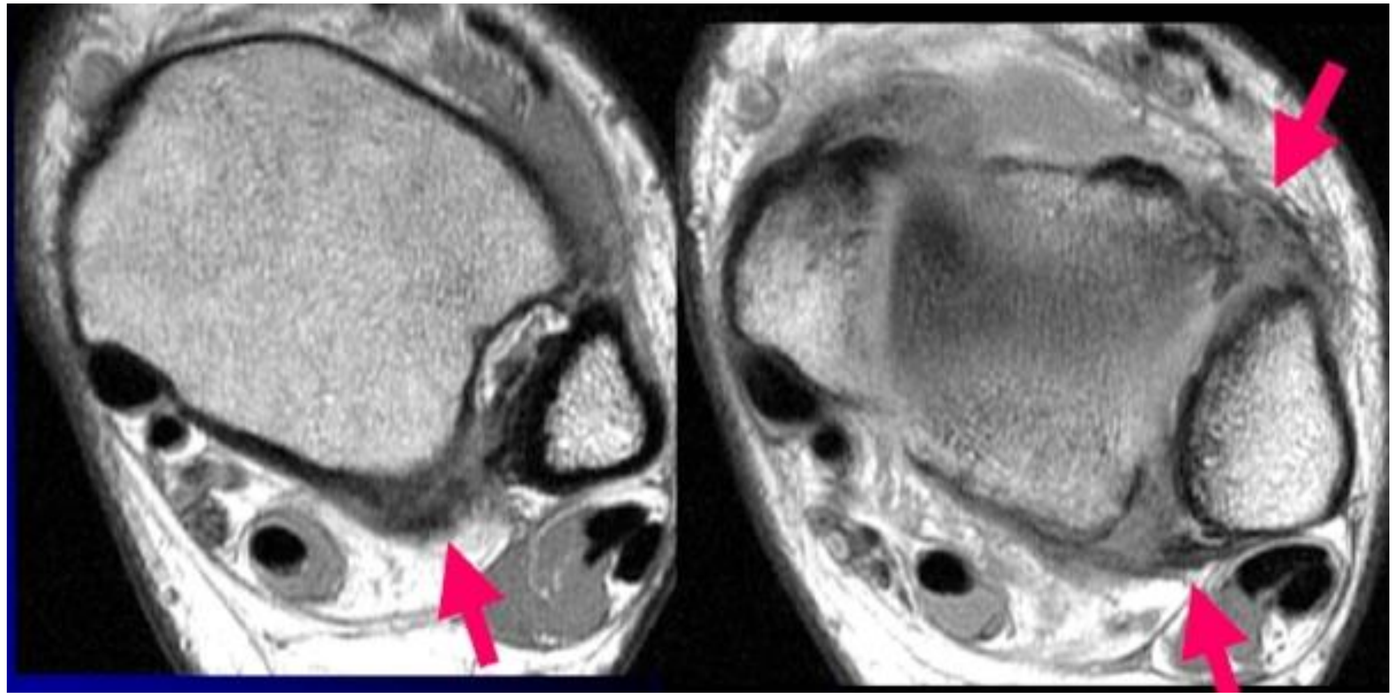
Causes of High Ankle Sprains

- The foot is placed in extreme eversion and dorsal flexion
- Opposite what a typical ankle sprain
- Usually from landing on another players foot

Symptoms

- Pain on the syndesmosis joint
- Swelling (over the joint)*
- Discoloration*
- Deformity
- Redness
- Inability to walk
- **Pain in eversion and dorsal flexion**

MRI



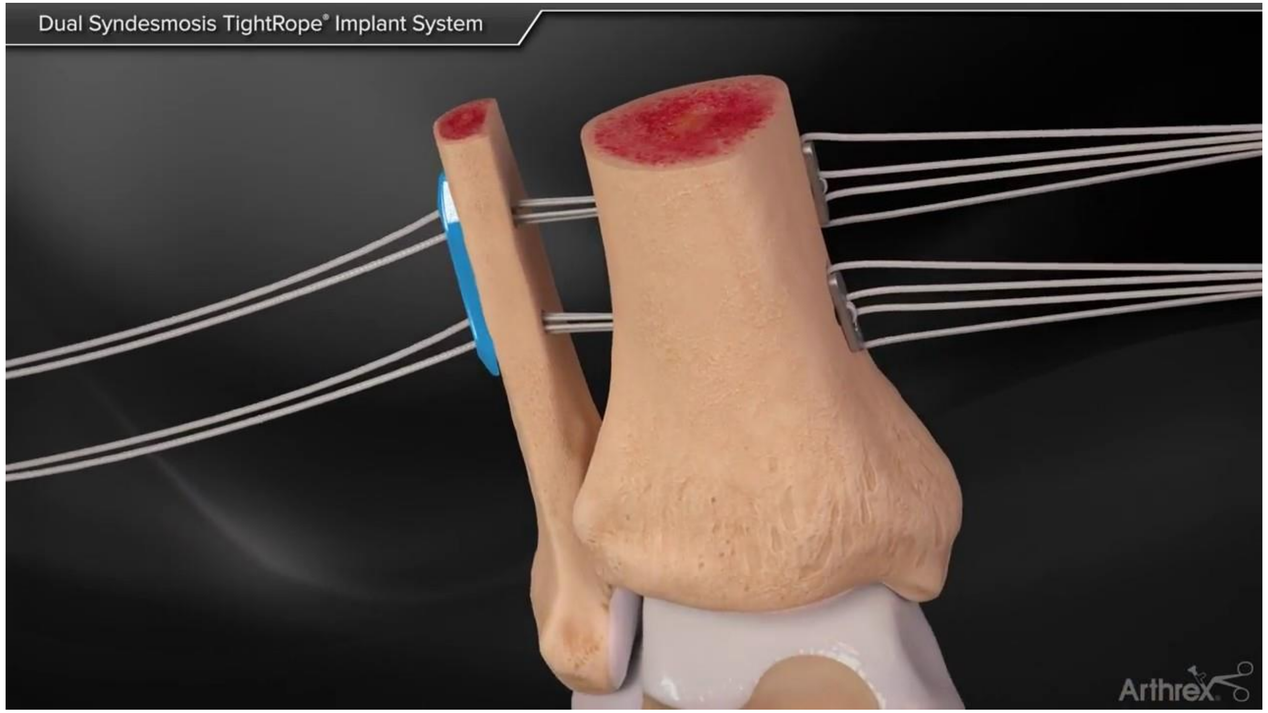
Treatment

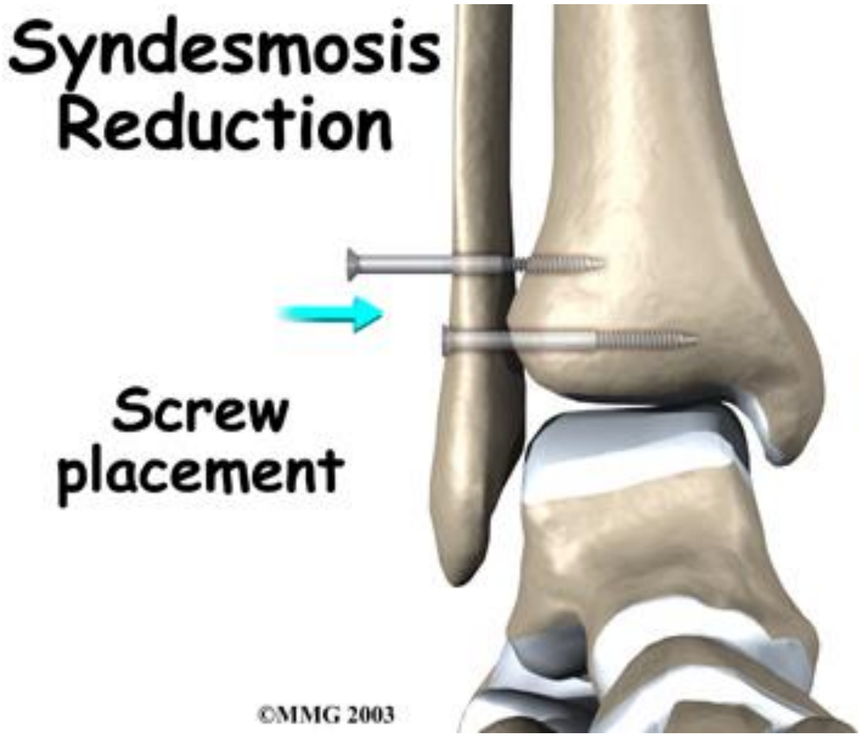
- R.I.C.E.

- Therapeutic exercises- differ from lateral ankle exercises because one wants to avoid eversion and dorsal flexion exercises.

- Tape Application

Surgery


Dual Syndesmosis TightRope® Implant System
Arthrex


Syndesmosis Reduction
Screw placement
©MMG 2003

Medial (Eversion) Ankle Sprain

Causes of Medial Ankle Sprains

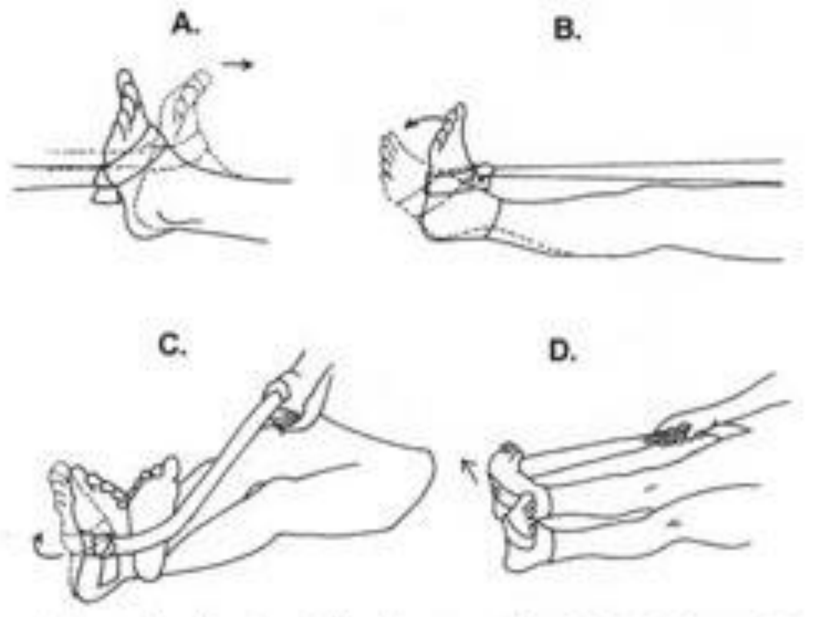
- The foot is placed in extreme eversion
- Usually occurs with a high ankle sprain
- Generally more serious than a lateral ankle sprain

Symptoms

- Swelling*
- Discoloration*
- Pain*
- Redness
- Warmth
- Inability to walk*

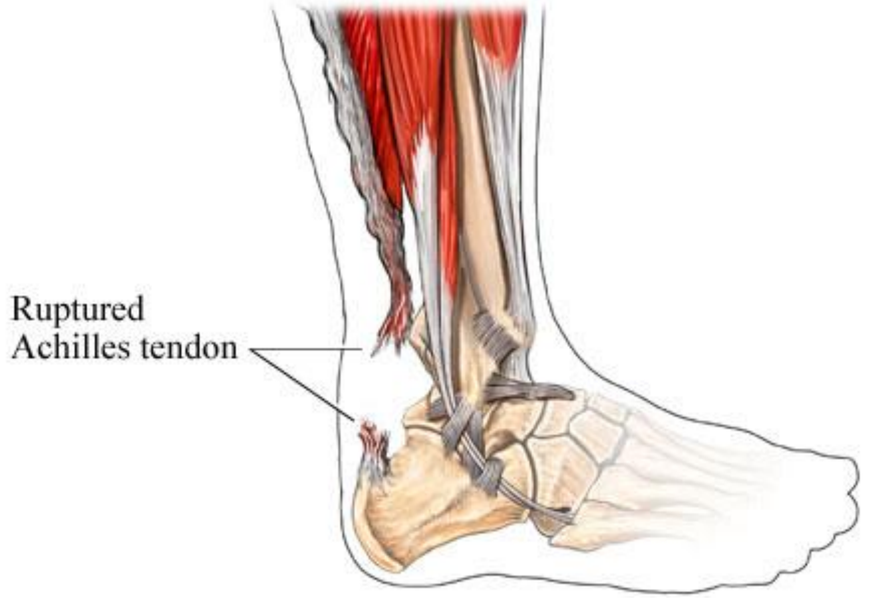
Treatment

- R.I.C.E.
- Therapeutic exercise- Avoiding eversion exercises
- This injury is usually serious



Thera-Band strengthening exercises for the lower leg

Achilles Tendon Rupture



Background

- Largest, most powerful tendon in body
- Formed by gastrocnemius and soleus
- Incidence of rupture 18:100,000
  - Incidence is increasing
    - As demonstrated by population based studies in Finland, Canada, Scotland and Sweden

Presentation

- Adults 40-50 y.o. primarily affected (M>F)
- Athletic activities, usually with sudden starting or stopping
- “Snap” in heel with pain, which may subside quickly

Diagnosis

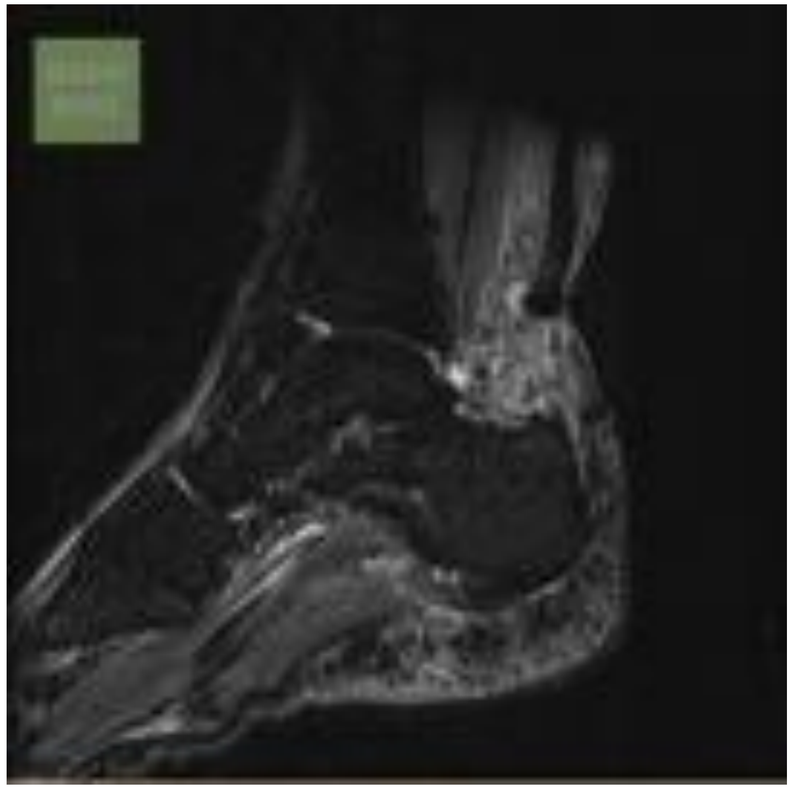
- Weakness in plantarflexion
- Gap in tendon
- Positive Thompson test

Imaging

- X-rays
  - Indicated if fracture or avulsion fracture suspected
- Ultrasound or MRI
  - Reveal tendon degeneration, if present

Treatment

- Non-operative versus operative treatment controversial
  - Several methods described for each



Non-operative

- Cast immobilization
  - Traditional recommendation is 8 weeks of immobilization
  - Wallace recommended patellar tendon bearing orthosis for weeks 4-8
  - Functional brace with semi-rigid tape and polypropylene orthoses for duration of treatment also described
- Rerupture rate 8-39% reported

Operative

- Open repair
  - Locking stitch, +/- augmentation with plantaris or mesh
  - Post-op care = Casting for 6-8 weeks
  - Risks: Infection (4-21%), Rerupture (1-5%)

Operative

- Percutaneous
  - Bunnell stitch
  - Weaker than open repair (Rerupture 0-17%)
  - Risk of sural nerve injury (0-13%)
  - Decreased infection risk

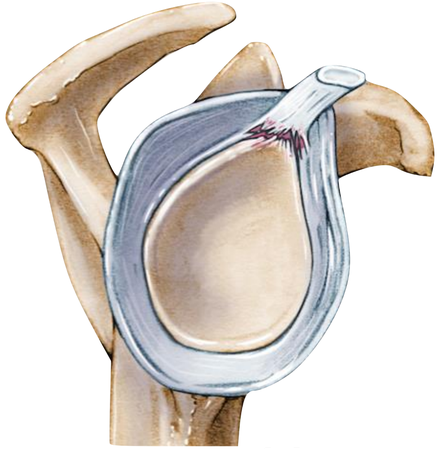
Op vs. Non-op

- Wong et al Am J Sports Med 2002
  - Metanalysis 125 articles, 5370 patients
  - Wound complication (14.6 vs 0.5%)
  - Rerupture (1.5 perc,1.4 open vs 10.7%)
  - Complication rates lowest in open repair and early mobilization, highest in percutaneous repair and early mobilization

Shoulder :sport related injuries

- Labrum injury /instability
- Impingement syndrome
- Rotator cuff disease
- AC joint dislocation

Labrum injury

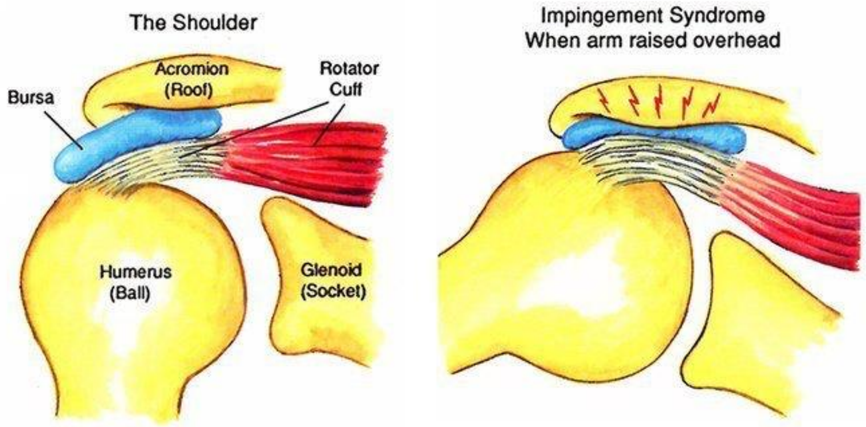


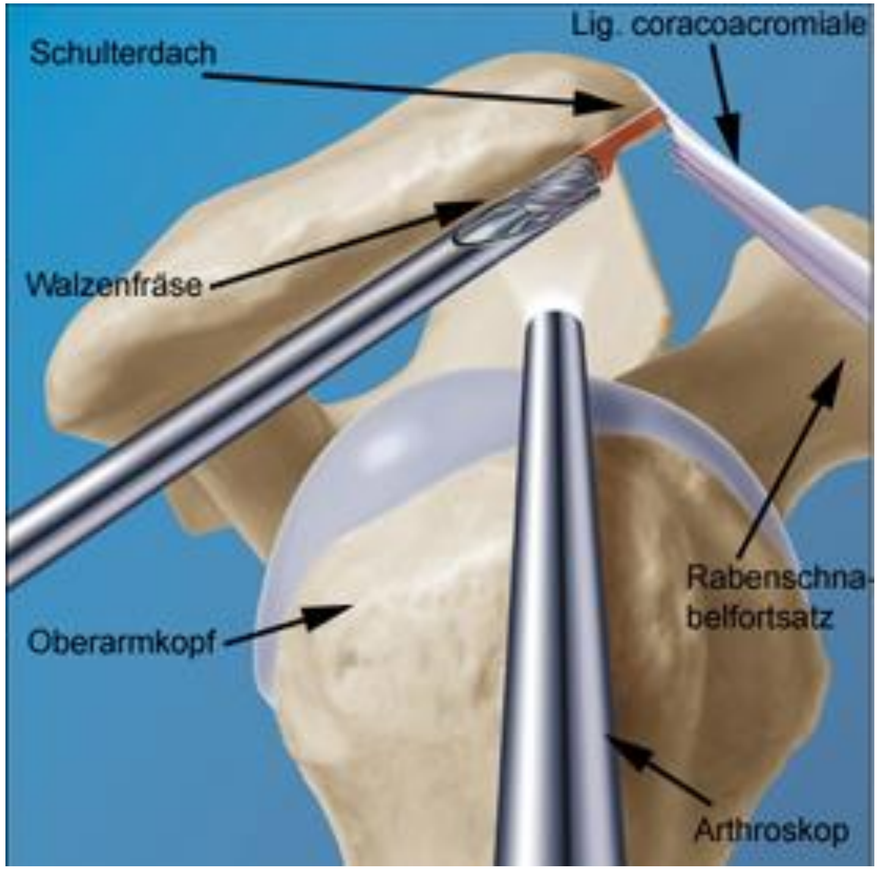
- Causes: trauma: anterior shoulder dislocation or repetitive stress (throwers, weight lifters)
- Symptoms: anterior pain, instability, clicking
- Examination: + apprehension relocation test
- Treatment: small tears for conservative , large tear with instability for arthroscopic repair

Shoulder impingement

Subacromial bursitis / supraspinatous tendinitis

- Most common shoulder complain
- History: pain with arm elevation, night pain, radiate to arm
- P.E: positive painful arc test and empty can test
- Differential: cervical radiculopathy, Cardiac
- Tx:
  - NSAIDS , physiotherapy
  - Steroid subacromial injection / US guided
  - Shoulder arthroscopy (persistent cases)



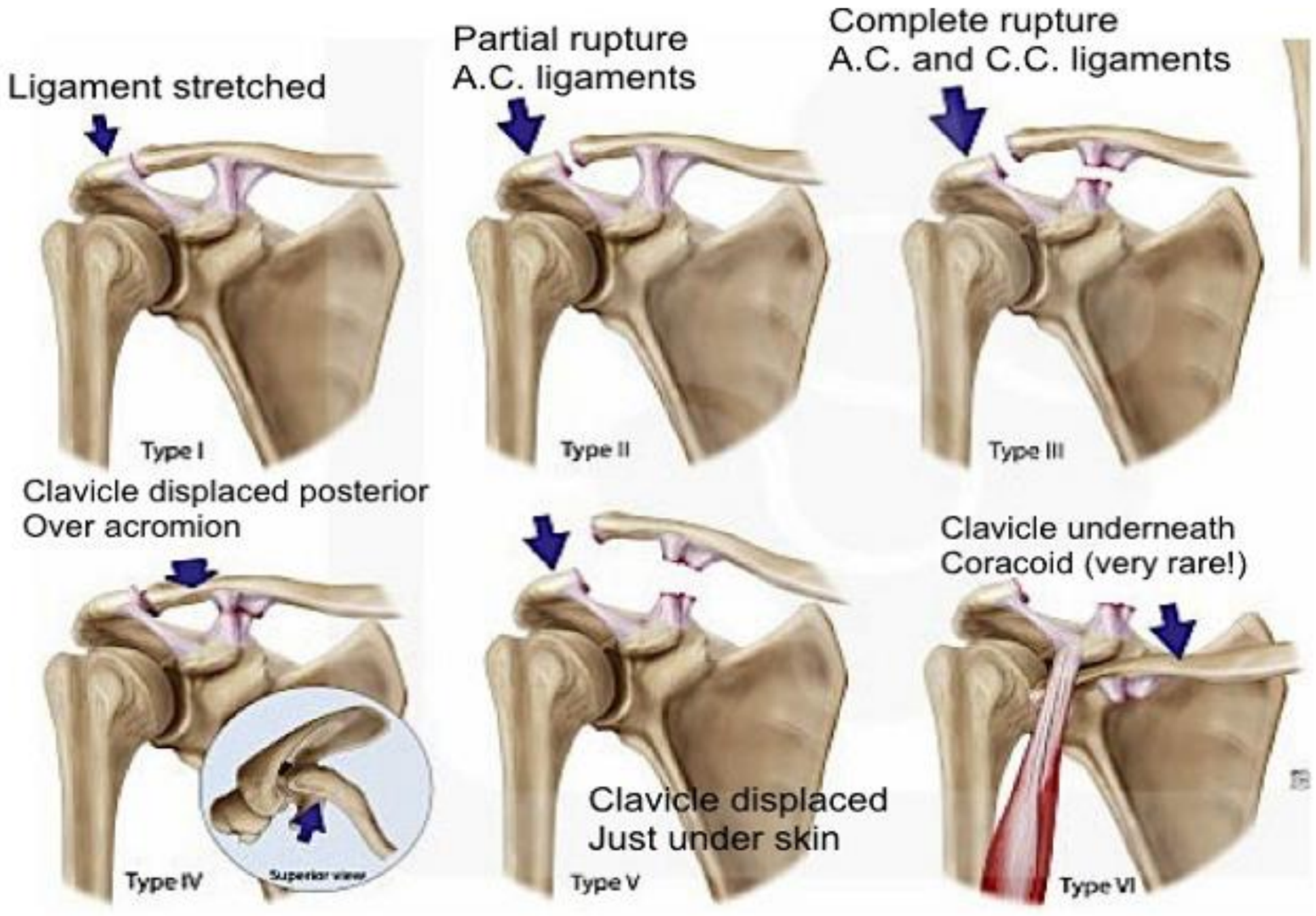

Schulterdach
Lig. coracoacromiale
Walzenfräse
Oberarmkopf
Rabenschna-
belfortsatz
Arthroskop

Rotator cuff disease

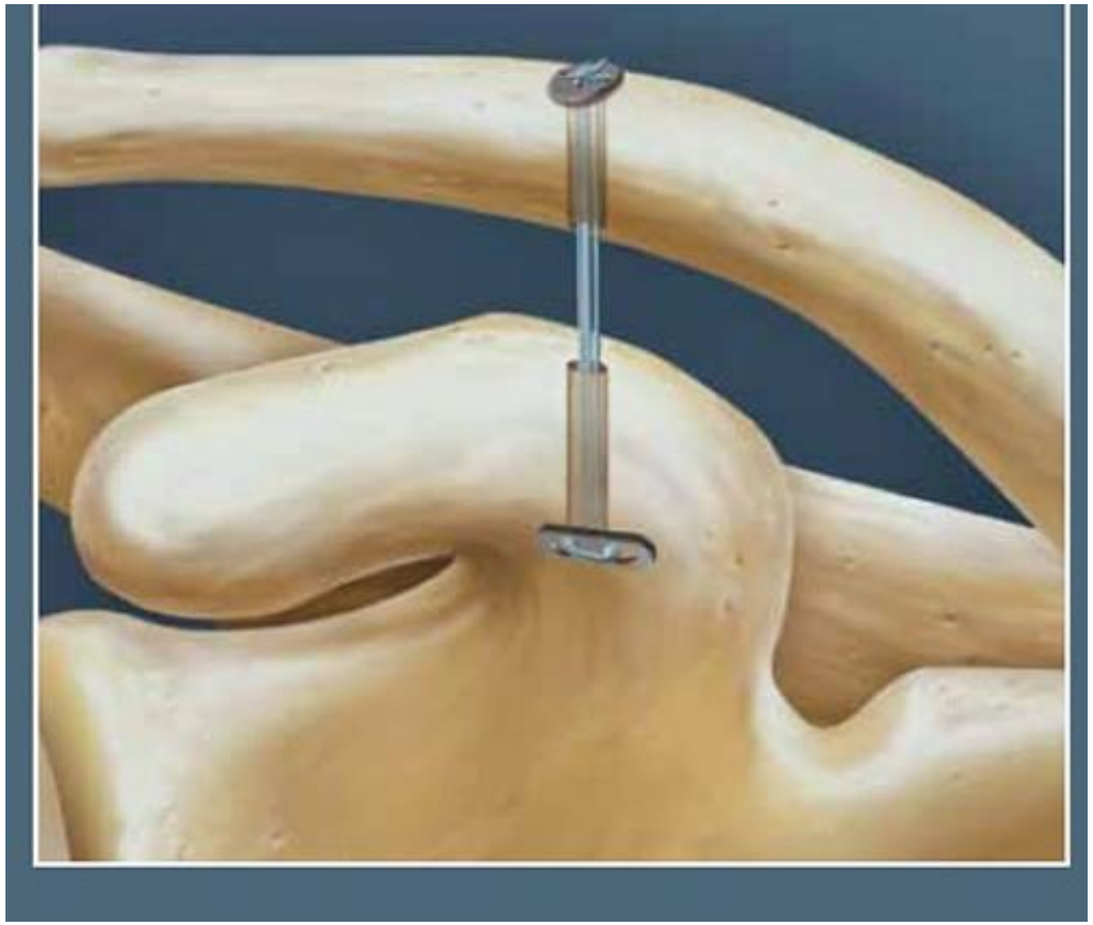
- Causes: traumatic, degenerative, age, repeated stress sport or certain jobs
- Symptoms: pain, weakness, reduced ROM, affect ADL’s
- Examination: anterolateral pain+ ext rotation weakness or lag
- Treatment: NSAIDS, and physiotherapy.
- Surgical: failed conservative or associated large tear

AC joint dislocation

- Causes: Trauma direct and indirect
- Symptoms: pain, popping sensation
- Examination: anterolateral tenderness, instability, + cross over test
- Treatment: grades 1-3 conservative, however grades 4-6 surgical

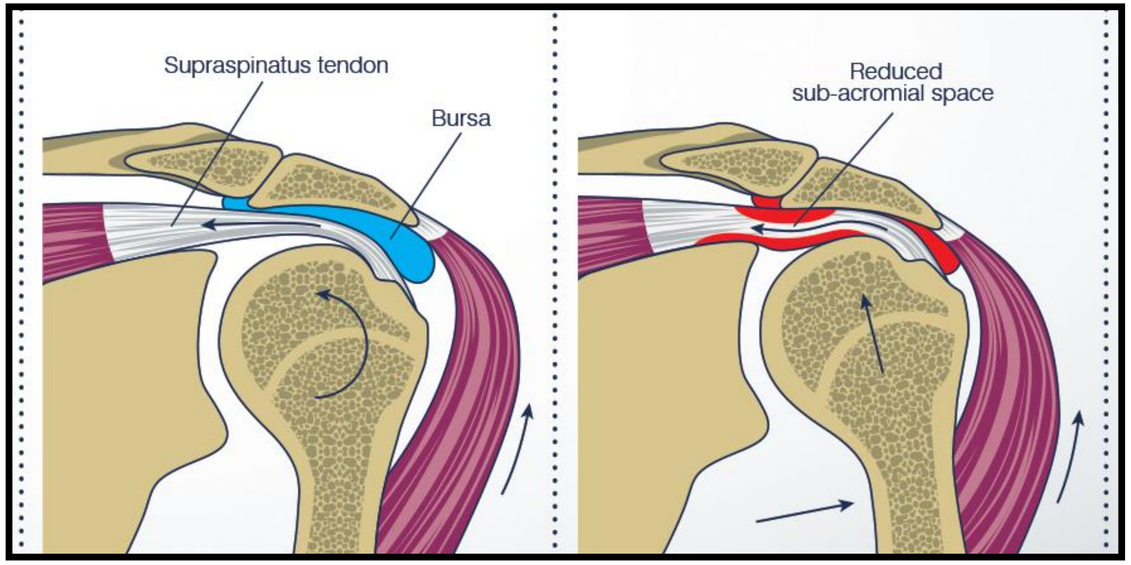

Ligament stretched
Type I
Partial rupture
A.C. ligaments
Type II
Complete rupture
A.C. and C.C. ligaments
Type III
Clavicle displaced posterior
Over acromion
Type IV
Superior view
Clavicle displaced
Just under skin
Type V
Clavicle underneath
Coracoid (very rare!)
Type VI

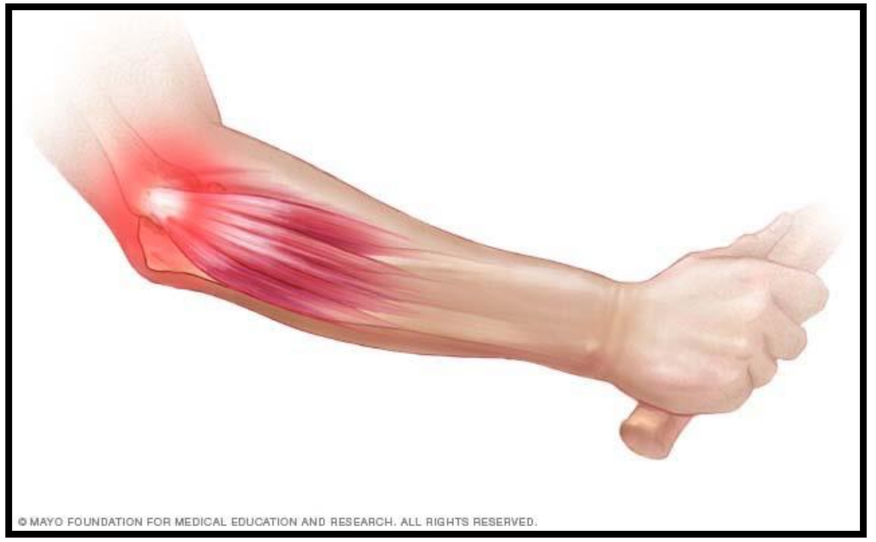
Arthroscopic repair



Common tendinitis in DM / hypothyroid cases

- Shoulder impingement (subacromial bursitis)
- Tennis elbow(lateral epicondylitis)
- Trigger finger (flexor tenosynovitis)
- carpal tunnel syndrome
- Greater trochanter bursitis
- Plantar fasciitis


Supraspinatus tendon
Bursa
Reduced
sub-acromial space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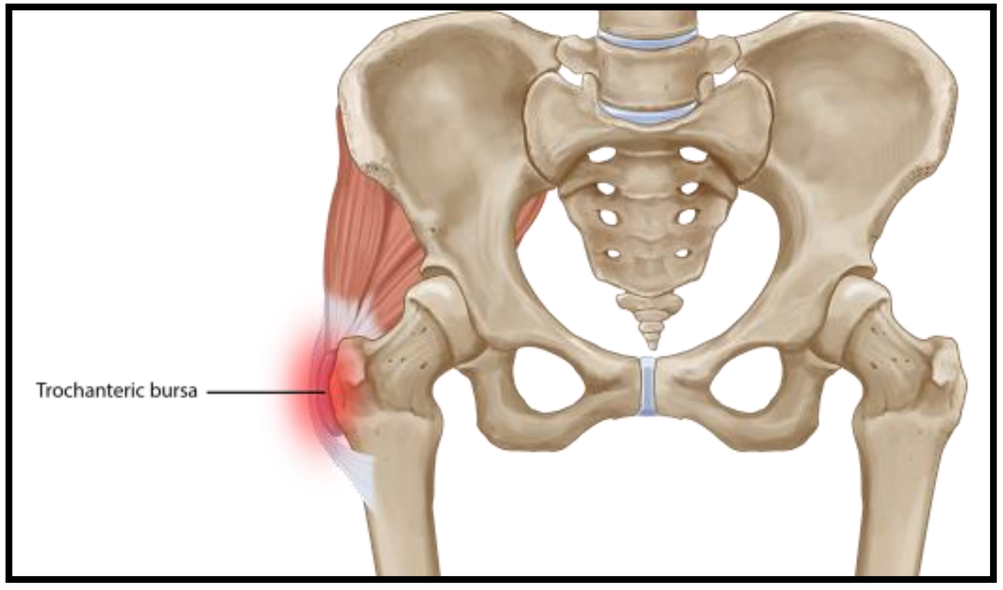
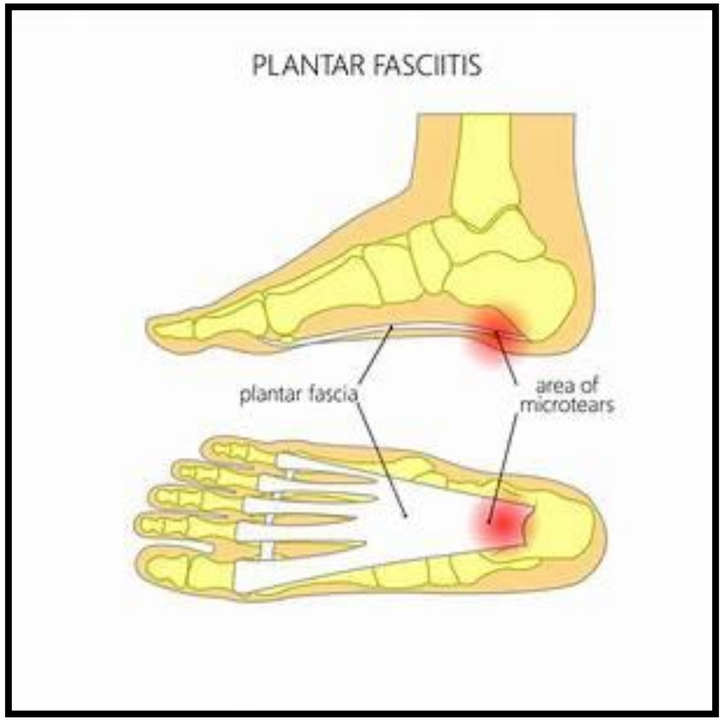

Trochanteric bursa


PLANTAR FASCIITIS
plantar fascia
area of
microtears

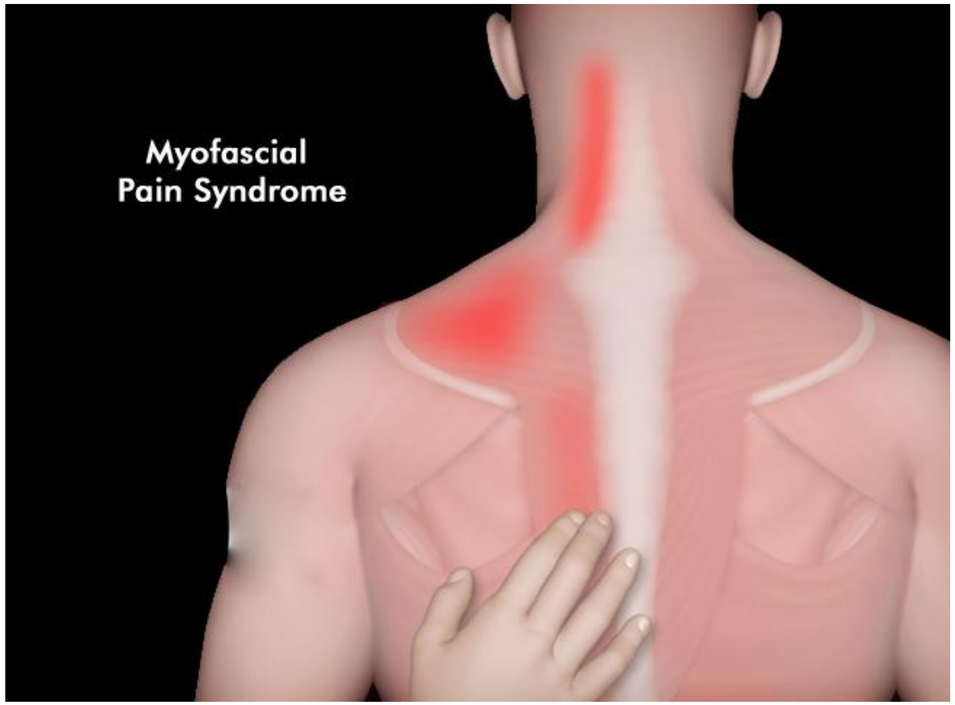
Principle of tendinitis treatment

Specially in Diabetic

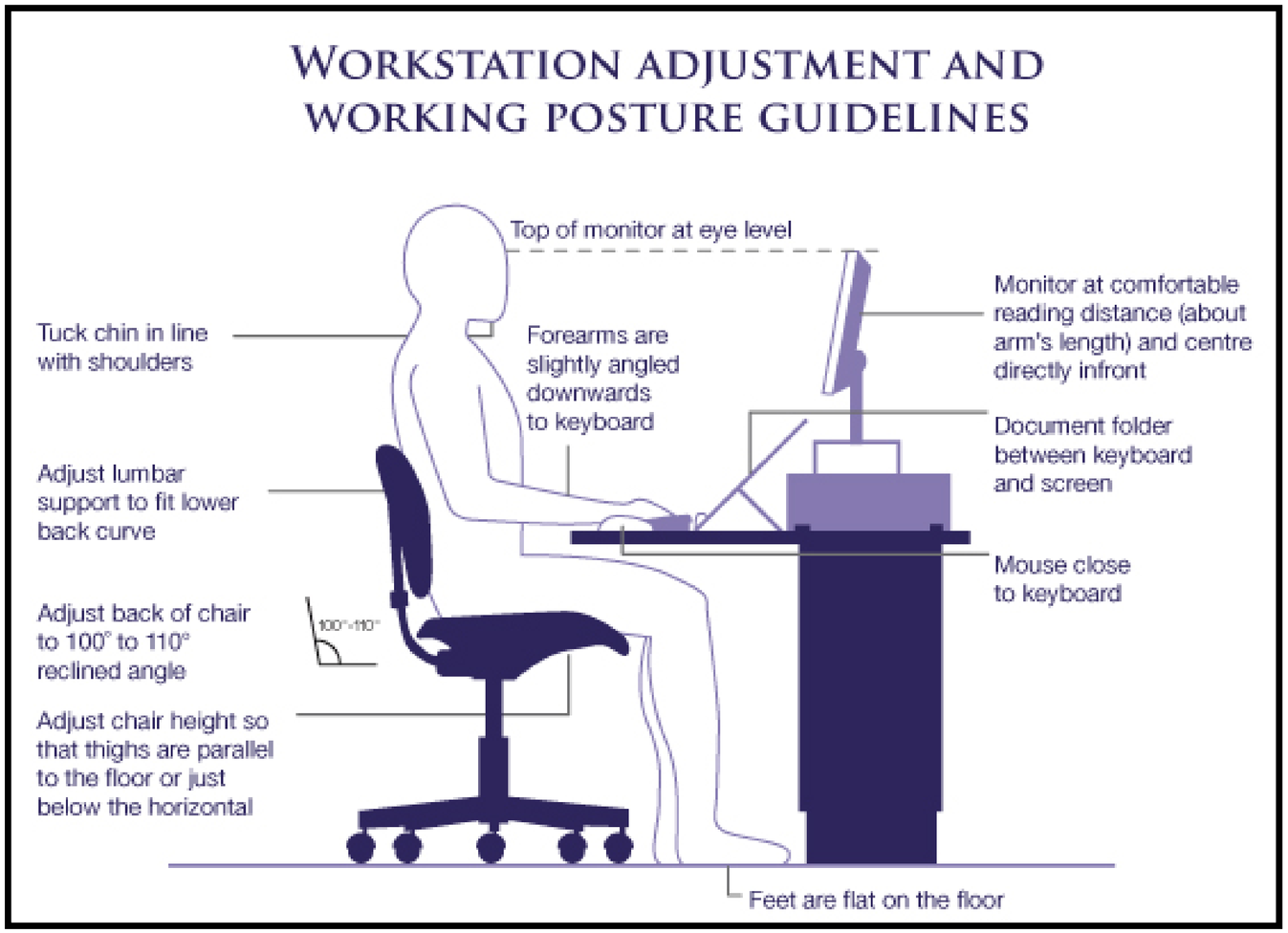
- 1. Control blood glucose level
- 2. Short period NSAIDS (cox2) + local gel NSAIDS
- 3.Physiotherapy / bracing / insole
- 4. Local steroid injection
- 5. Plasma injections
- 6. Surgical treatment (removal of inflamed bursae)

Myofascial syndrome /trigger points, FM

- Bad posture + lack of exersice
- Missed as cervical disc
- Palpable nodule along the myofascia
- Affect sleep
- lead depression
- Usually chronic in nature
- Associated with headache



Posture education



Treatment

Mainly patient education

- Stretching exercise (rubber band)
- Heat compression
- Deep tissue massage
- Physiotherapy (shock wave sessions)
- Dry needles
- Botox (for sever cases or if associated with Migraine)

Thank you