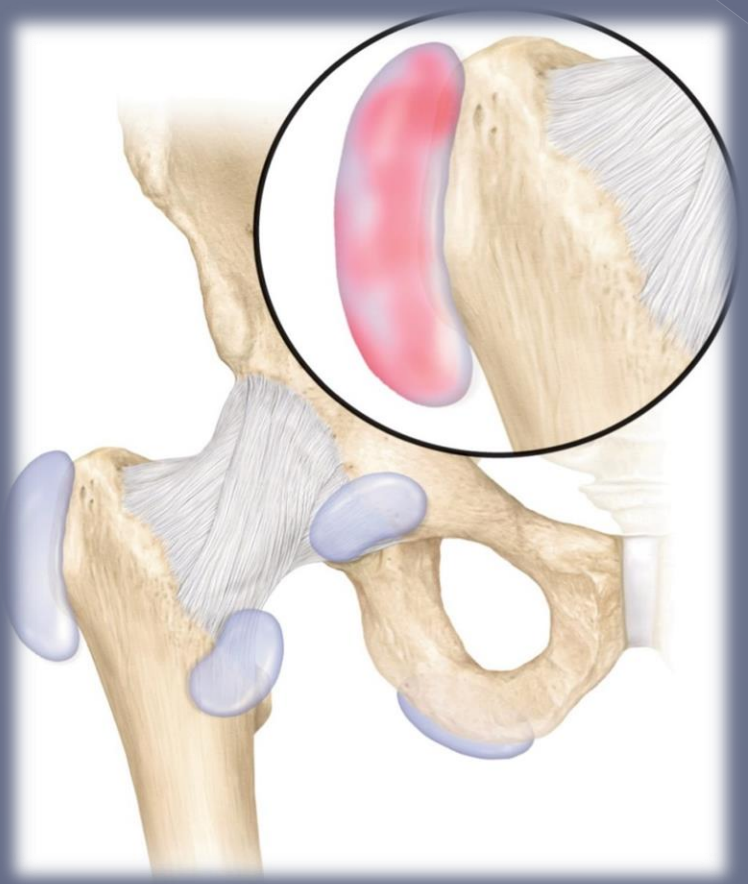
"SPECIAL TESTS" IN THE QME EXAMINATION – LOWER EXTREMITIES



PERRY J CARPENTER DC, QME
DWC Provider #1280

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- Welcome to Today's Program – "Special Tests" in the QME Examination – Lower Extremities. Today's focus is going to be on the Lower Extremities. This Program is Approved by the Division of Worker's Compensation for 6 Hours of QME Home Study Continuing Education Credits. For Chiropractors, this Program is also Approved for 6 hours of Board of Chiropractic Examiners Credits under Category A (mandatory category for "Physical Examination")
- This is a narrated PowerPoint Presentation. It is presented just as if you were at a live lecture.
- Your Course Materials also contain copies of the PowerPoint slides with space provided for note taking. Grab those now to get ready.



PRESENTED BY:

Perry J. Carpenter DC QME

Diplomate, Academy of Chiropractic Orthopedists (DACO)

Board Eligible, Chiropractic Neurology

Board Eligible, Chiropractic Sports

Certified Chiropractic Sports Physician (CCSP)

Certified Chiropractic Extremity Practitioner (CCEP)

Certified Strength & Conditioning Specialist (CSCS*D)



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- WE HAVE A GROWING LIBRARY OF TOPICS RELATING TO DAY TO DAY PROCEDURES INVOLVED WITH PERFORMING QME EXAMINATIONS AND PREPARING REPORTS THAT ARE CREDIBLE AND THAT QUALIFY AS SUBSTANTIAL MEDICAL EVIDENCE.
- CHECK OUR WEBSITE OFTEN FOR NEW PROGRAM RELEASES
- IF THERE IS A TOPIC THAT INTERESTS YOU THAT YOU WOULD LIKE EXPANDED ON, LEAVE A SUGGESTION ON THE WEBSITE AND WE WILL DO IT!



Additional Programs Available from EZQMECEU.COM:

- **Medical-Legal Report Writing and Technique of the QME Examination (6 hours)**
- **Gait Disturbance & Assistive Devices (3 hours)**
- **The Non-Physiologic Examination (3 hours)**
- **The Deposition Matrix (6 hours)**
- **21 Secrets of the Most Persuasive QME's (6 hours)**
- **Upper Extremity Impairments – Entrapment Neuropathies (6 hours)**
- **Lower Extremity Impairments due to Peripheral Nerve Lesions (6 hours)**
- **The Importance of the Neurologic Examination (6 hours)**
- **Manual Muscle Testing and the AMA Guides 5th Edition (6 hours)**
- **Special Tests in the QME Examination – The Spine (6 hours)**
- **Special Tests in the QME Examination – The Upper Extremities (6 hours)**



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Medical-Legal Report Writing and Technique of the QME Examination (6 hours)

Topics Include:

- Section 1 - Medical Legal Report Writing
- Section 2 – The QME Panel Process
- Section 3 – Technique of the QME Examination



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Gait Disturbance & Assistive Devices (3 hours):

Topics:

- AMA Guides - Descriptions of Gait Disturbances in AMA Guides Chapters 13 and Chapters 17
- Procedure for the Gait Analysis and Observation
- Description of the Phases of "Normal" Gait and "Pathologic" Gait
- Causes of Deviations from the Normal Gait
- Named Gait Signs
- Assistive Devices – canes, crutches, pick up frames, ankle foot orthosis, knee ankle foot orthosis
- Gait Conclusions



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The Non-Physiologic Examination (3 hours)

Topics Include:

- Practical Considerations for the Quantification of Pain
- Activities of Daily Living Assessments – a Practical Method
- Malingering – Waddell's Signs and DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) Criteria
- Medical Records, and Interview Findings of Inconsistency
- Physical Examination Findings of Inconsistency



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The "Deposition Matrix" (6 Hours):

Philosophy: Reasons <u>why</u> Depositions are called – Applicant Attorney vs. Defense Attorney

- Rules for Deposition: Combination of tips and suggestions from 1) my own experience plus 2) communication tips from a Certified Court Reporter
- Case Examples:
  - Mechanism of Injury:
  - Clinical Course:
  - Permanent Impairment/Apportionment Opinions
  - Deposition Questions and the responses



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21 Secrets of the Most Persuasive QME's (6 Hours)

Topics:

- Preparatory Secrets (3)
- Interview/Exam Secrets (10)
- Report Writing Secrets (4)
- Deposition Secrets (4)



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UPPER EXTREMITY IMPAIRMENTS – PERIPHERAL NEUROPATHIES

Topics Include:

- Neurology 101
- Entrapment Neuropathies
- Exam Procedures
- Impairment Calculations
- Case Examples



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Lower Extremity Impairments – Peripheral Nerve Lesions

Topics Include:

- Neurology 101
- Entrapment Neuropathies
- Exam Procedures
- Impairment Calculations
- Case Examples



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The Importance of the Neurologic Examination (6 hours)

- Part 1
- AMA Guides references to "Neurology"
- Neurology 101:
  - Development of CNS & PNS
  - Spinal Cord, Spinal Nerves, and the Plexuses (4)
  - Named Peripheral Nerves of the Upper & Lower Extremities



Manual Muscle Testing (MMT) and the AMA Guides 5th Edition

PART 1&2

- AMA GUIDES REFERENCES TO MMT
- Myology 101 – Development of the Muscular System
- MMT General Principles and Procedures
- MMT OF NERVE ROOT INNVERVATED MUSCLES (Focus on MMT of "Specific Muscles")
- MMT OF PERIPHERAL NERVE INNERVATED MUSCLES (Focus on MMT of "Specific Motions")



"Special Tests" in the QME Examination – The Spine

2 Parts:

- Physical Examination:
- Radiographic Examination



- For a brief video introduction to each of the above Programs, click the link below:
- Gait Disturbance & Assistive Devices
- The Non-Physiologic Examination
- The Deposition Matrix
- 21 Secrets of the Most Persuasive QME's
- Upper Extremity Impairments – Entrapment Neuropathies
- Lower Extremity Impairments due to Peripheral Nerve Lesions
- The Importance of the Neurologic Examination
- Manual Muscle Testing & the AMA Guides
- Special Tests in the QME Examination – The Spine
- Special Tests in the QME Examination – Upper Extremities





Today's Program – "Special Tests" in the QME Examination

Lower Extremities

- Physical Examination – Painful Conditions of the Hip, The Knee, and the Ankle/Foot



REFERENCES

- AMA GUIDES 5TH EDITION
- ACOEM GUIDELINES – 2ND EDITION
- FUNDAMENTALS OF MUSCULOSKELETAL ASSESSMENT TECHNIQUES – 2ND EDITION BY PALMER & EPLER
- LIPPINCOTT'S PRIMARY CARE ORTHOPEDICS – 2ND EDITION
- DEMEYER – TECHNIQUE OF THE NEUROLOGIC EXAMINATION – FIFTH EDITION
- ESSENTIALS OF SKELETAL RADIOLOGY – 3RD EDITION BY YOCHUM & ROWE

- Williams BS and Cohen SP (2009) "Greater Trochanteric Pain Syndrome: A Review of Anatomy, Diagnosis, and Treatment. *Anesthesia & Analgesia* **108** (5): 1662–1670.
- Hensler, et al (2014) "Medial patellofemoral ligament: Anatomy, injury, and treatment in the adolsecent knee" Current Opinion in Pediatrics Volume 26, Issue 1 pages 70-78

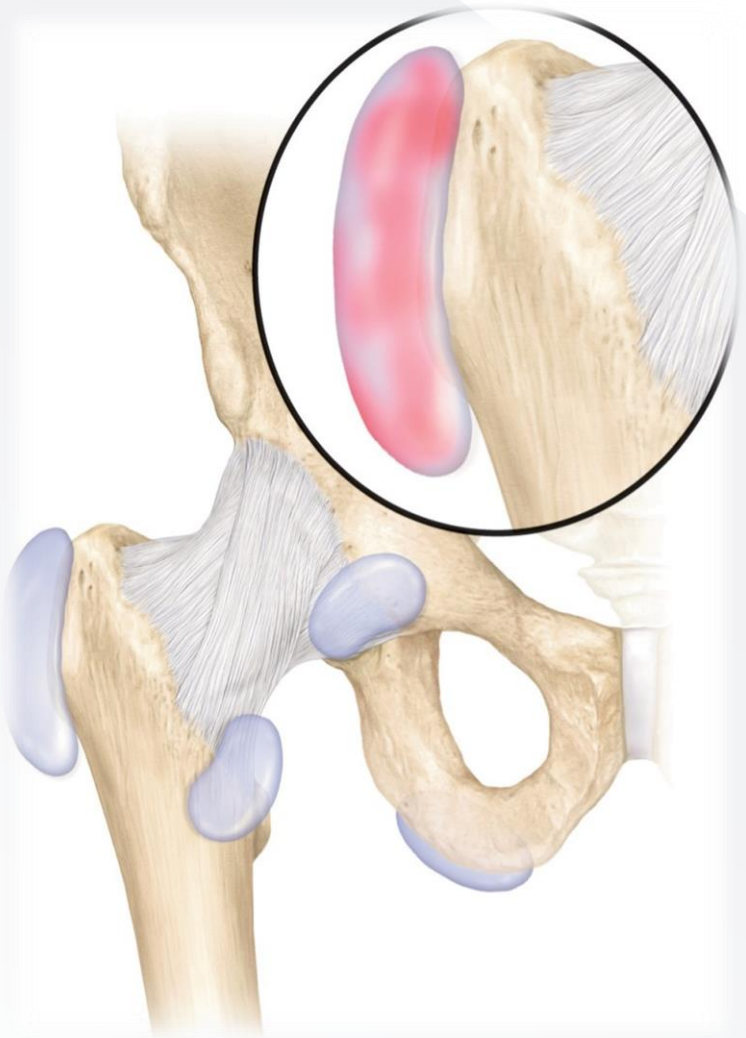


"SPECIAL TESTS" IN THE PHYSICAL EXAMINATION

- Chapter 17 – THE LOWER EXTREMITIES:
  - Hip Conditions - Trochanteric Bursitis
  - Knee Conditions:
    - Patellar Subluxation/Dislocation/Instability
    - Ligament Injury - ACL/PCL, MCL/LCL
    - Chondromalacia Patella:
  - Lower Extremity Peripheral Nerve Lesions



TROCHANTERIC BURSITIS

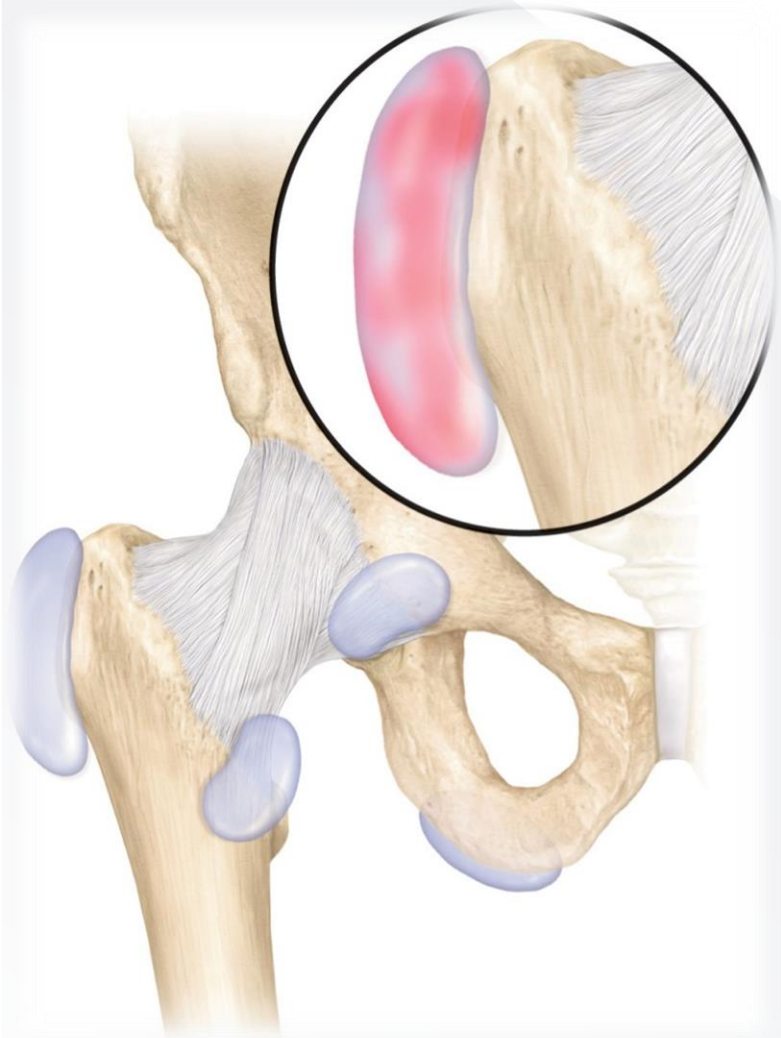


- "TB" describes chronic, intermittent pain accompanied by **tenderness to palpation overlying the lateral aspect of the hip.**
- Frequently mistaken for other conditions.
- GTPS refers to pain in the lateral hip, buttock or lateral thigh, which may be associated with tendinitis, muscle tears, trigger points, iliotibial band disorders, and general or localized pathology in surrounding tissues.
- Regional pain syndrome that often **mimics** pain generated from other sources, including, but not limited to, myofascial pain, degenerative joint disease, and spinal pathology.

CONDITIONS ASSOCIATED with GREATER TROCHANTERIC PAIN SYNDROME
Ipsilateral and/or contralateral hip arthritis
Lumbar spine degenerative osteoarthritis
Lumbar spine degenerative disc disease
Chronic mechanical low back pain
Rheumatoid arthritis
Leg length discrepancy
Postsurgical lumbar disc disease
Radiculopathy or other neurologic sequelae
Obesity
Fibromyalgia
Iliotibial band (snapping hip) syndrome
Total hip arthroplasty
Lower limb amputation
Pes planus



TROCHANTERIC BURSITIS



- Higher reported incidence in women, in patients with leg length discrepancies, low back pain, and knee pain, suggest that altered lower limb biomechanics and abnormal force vectors across the hip may predispose patients to GTPS

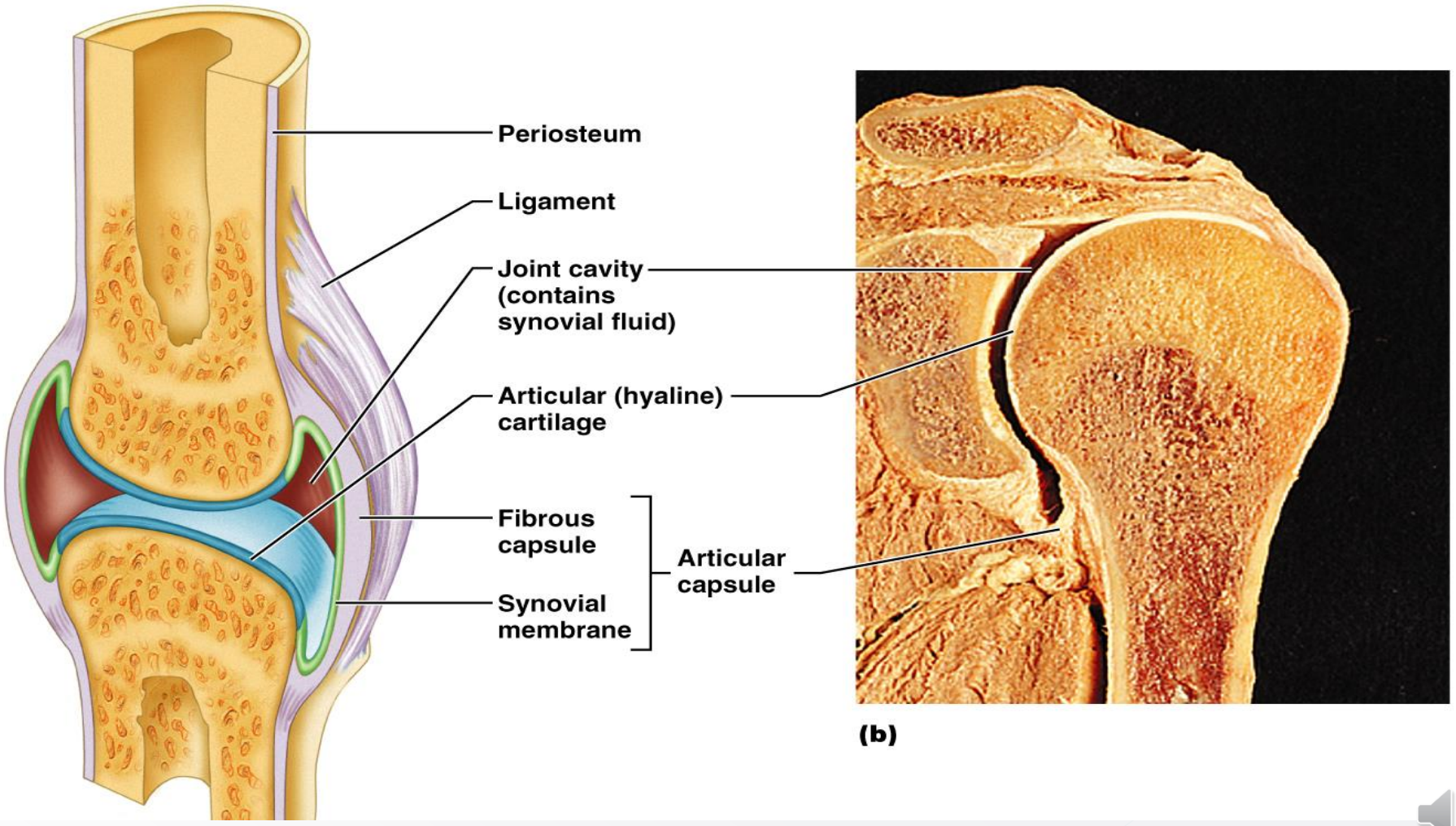
- Signs & Symptoms:
- Pain over the area of the lateral hip
- Presence of pain radiating down the lateral thigh
- Focal tenderness in the area overlying the greater trochanter
- **Pain with passive hip rotation, abduction, or adduction**
- **Pain with resisted hip abduction/external rotation**
- **Positive FABERE test**

SYNOVIAL JOINTS

Synovial joints all have the following 5 features:

1. Articular cartilage
2. Joint (synovial) cavity
3. Articular capsule
4. Synovial fluid
5. Reinforcing ligaments

Synovial Joints: General Structure

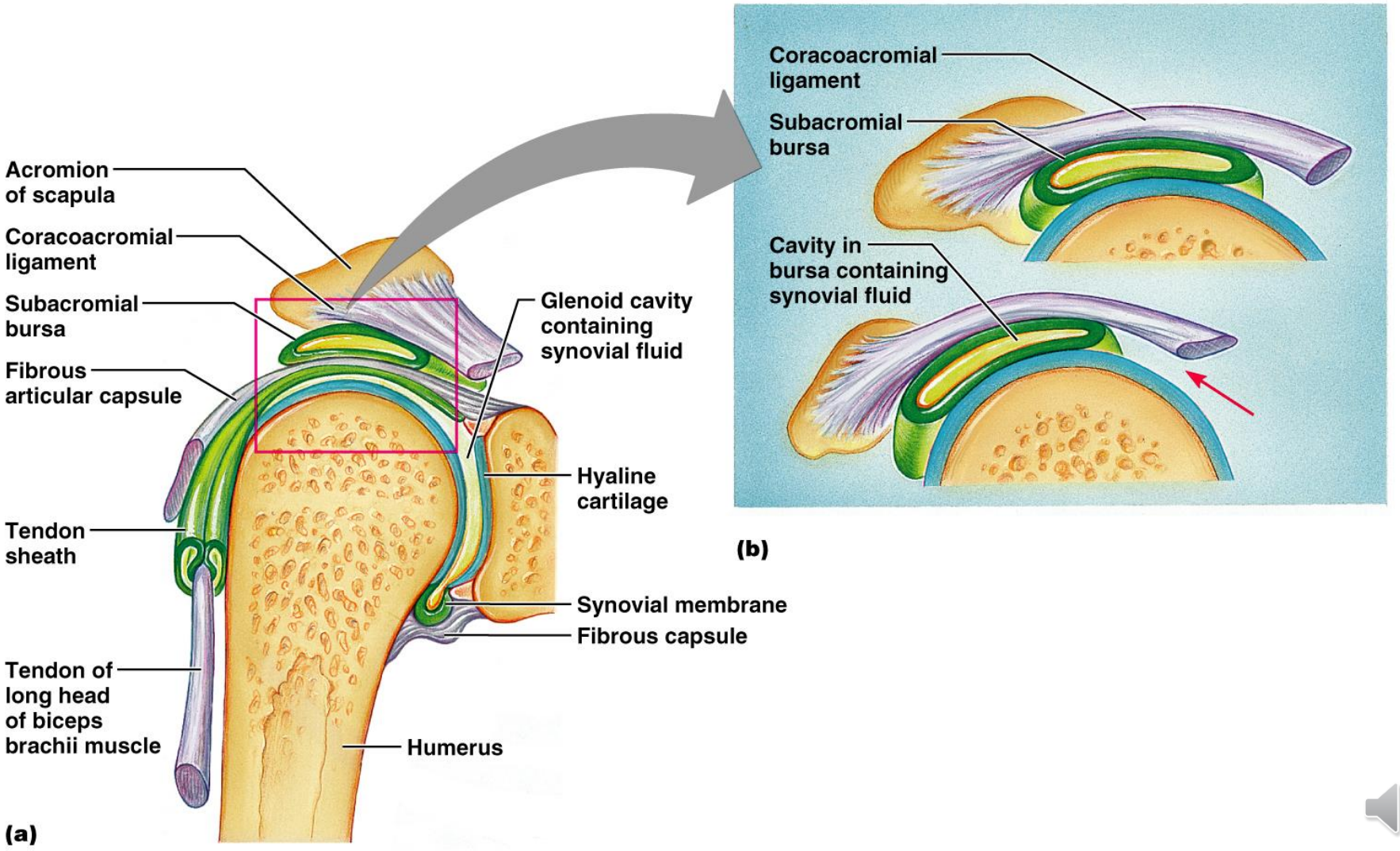


Synovial Joints: Friction-Reducing Structures

- Bursae – flattened, fibrous sacs lined with synovial membranes and containing synovial fluid
- Common where ligaments, muscles, skin, tendons, or bones rub together

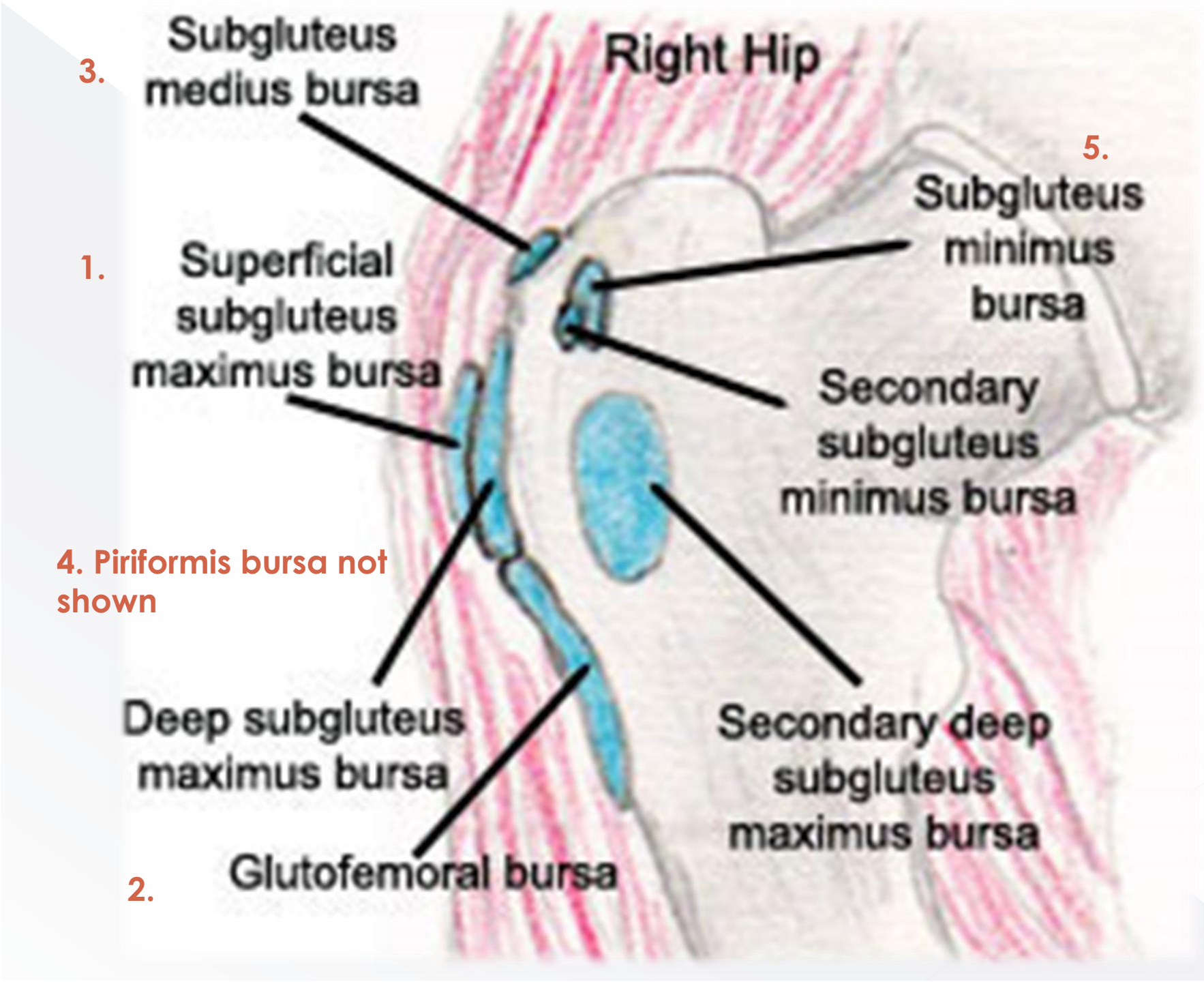
- Tendon sheath – flattened, fibrous sacs (bursa) around tendons.
- Common in hands and feet.

Synovial Joints: Friction-Reducing Structures

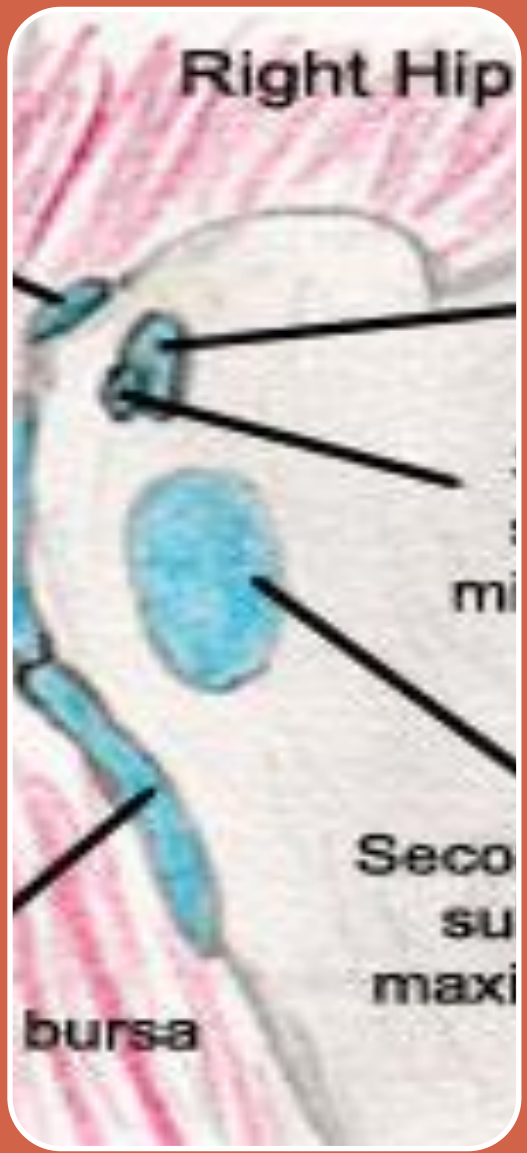


Hip Joint – Bursae

Subgluteus Maximus Bursae (3)	Centered over the greater trochanter
Gluteofem-oral (1)	Inferolateral to the greater trochanter
Subgluteus medius bursa (1)	Anterosuperior to the greater trochanter
Piriformis bursa	Located posterosuperior to the greater trochanter
Sub gluteus minimus bursa	Located anterolateral to the greater trochanter


Right Hip
3.
Subgluteus medius bursa
5.
Subgluteus minimus bursa
1.
Superficial subgluteus maximus bursa
Secondary subgluteus minimus bursa
4. Piriformis bursa not shown
Deep subgluteus maximus bursa
Secondary deep subgluteus maximus bursa
2.
Glutofemoral bursa

Signs & Symptoms:



- Pain over the area of the lateral hip – "cannot lie on it"
- Presence of pain radiating down the lateral thigh – even to the knee and sometimes below the knee
- Focal tenderness in the area overlying the greater trochanter = "Jump Sign"
- Pain with passive hip rotation, abduction, or adduction
- Pain with resisted hip abduction and external rotation (gluteus medius

Criteria for Diagnosis of Trochanteric Bursitis

Lateral hip pain

Distinct tenderness about the greater trochanter

Pain at the extreme of rotation, abduction, or ad duction, especially positive Patrick (FABERE) test

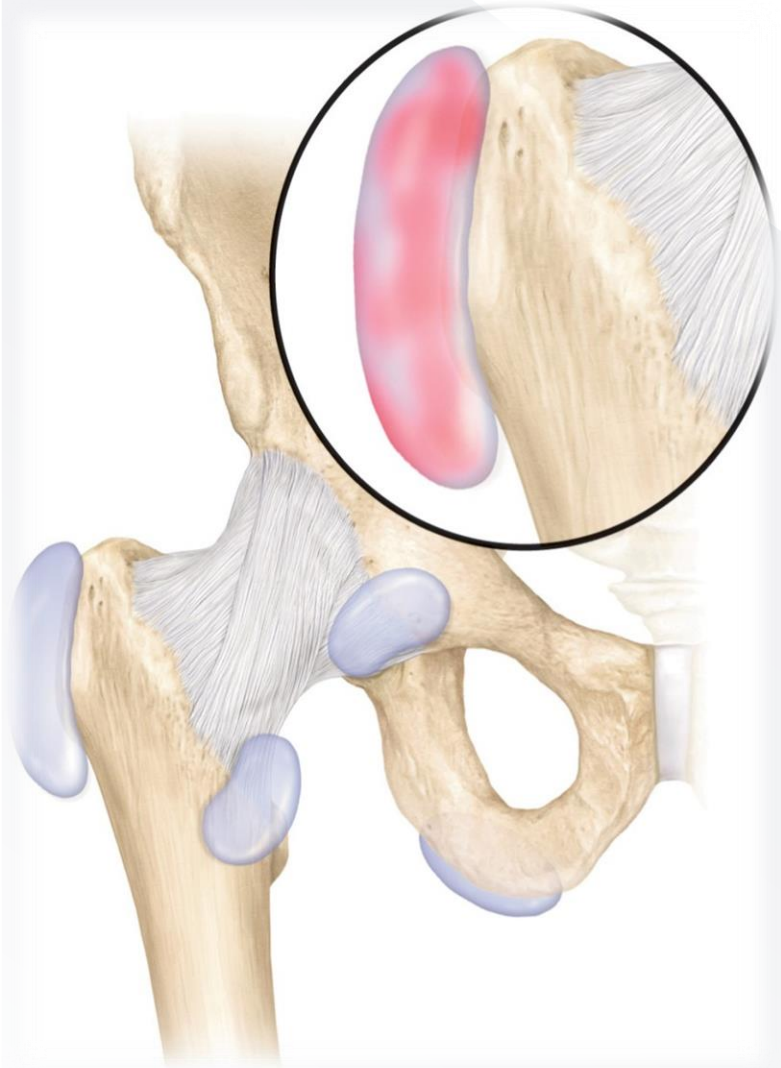
Pain on hip abduction against resistance

Pseudo-radiculopathy – pain radiating down the lateral aspect of the thigh

Positive Patrick FABERE) Test – Flexion, abduction, external rotation, extension



TROCHANTERIC BURSITIS



- Signs & Symptoms:
- Localized tenderness to palpation over the tip of the lateral or posterior aspects of the greater trochanter.
- Extreme sensitivity is usually found near the gluteus medius insertion site on the greater trochanter.
- Symptoms exacerbated with specific hip maneuvers such as extreme hip abduction, and external rotation.
- AMA Guides Table 17-33 – to qualify for Permanent Impairment also requires "abnormal gait" – i.e. Trendelenberg gait, or antalgic gait

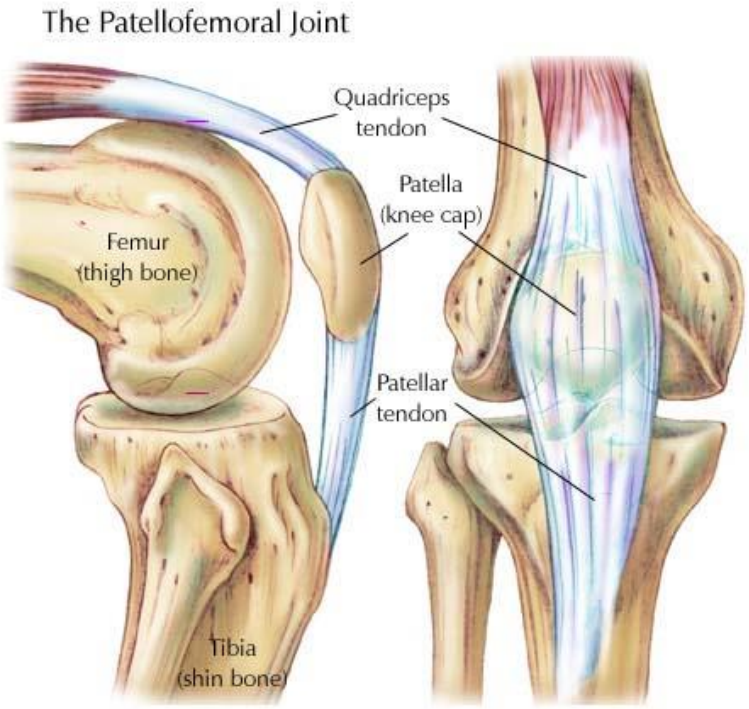
VIDEOS

- Examination Manuevers for trochanteric bursitis

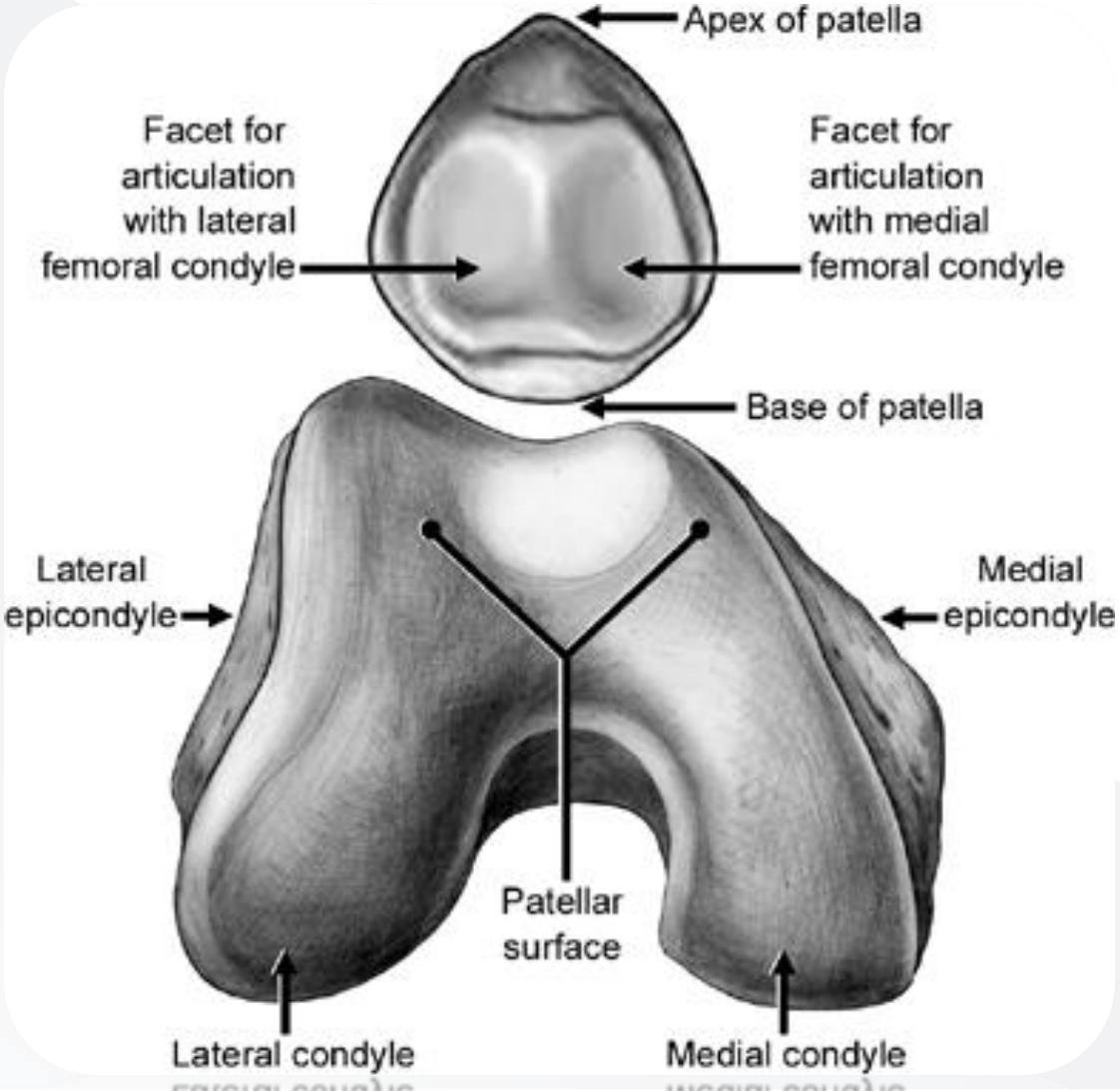


PATELLAR INSTABILITY

- Table 17-33 AMA Guides provides for Permanent Impairment due to "Patellar subluxation or dislocation with residual instability"
- A.K.A. – "Unstable kneecap"
- The patella repetitively subluxates and places 1) strain on the medial restraints, and 2) excessive stress/tension on the patellofemoral joint.



PATELLOFEMORAL ANATOMY



PATELLAR INSTABILITY - CAUSES

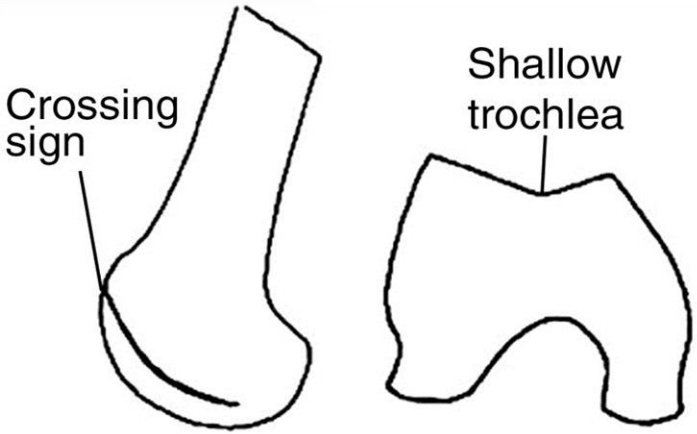
Osseous Abnormalities

- Incorrect articulation of the femoral groove with the patella
- Cochlear dysplasia
- Patella alta – distance of greater than 20 mm between the tibial tubercle and the trochlear groove.

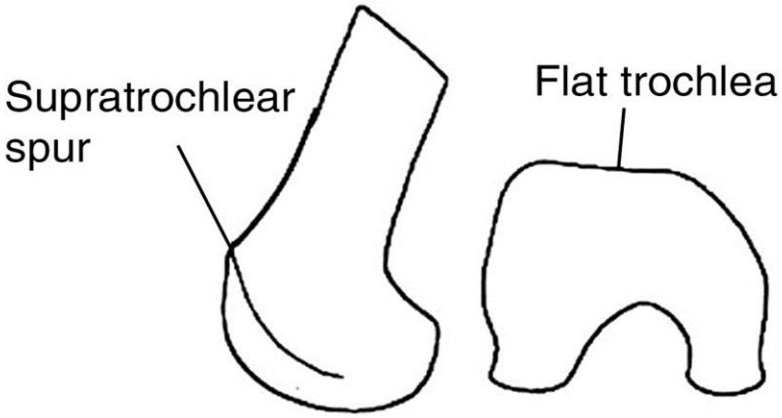
Soft Tissue Abnormalities

- Torn Medial Patellofemoral ligament
- Weakened vastus medialis obliquus

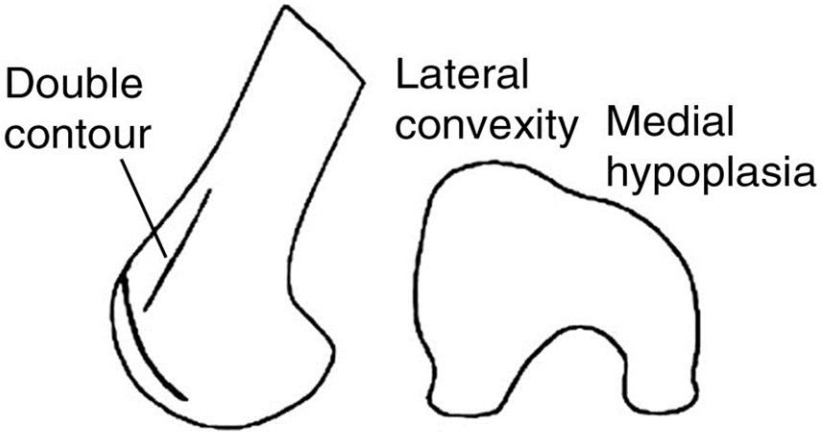
TROCHLEAR DYSPLASIA



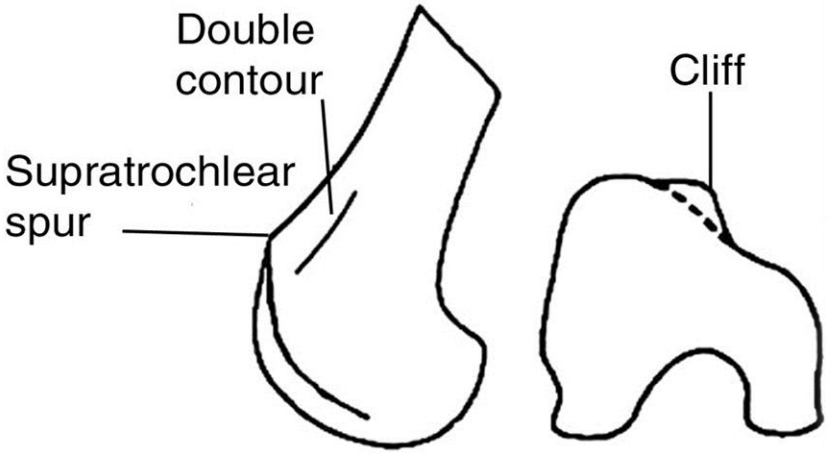
Type A



Type B



Type C

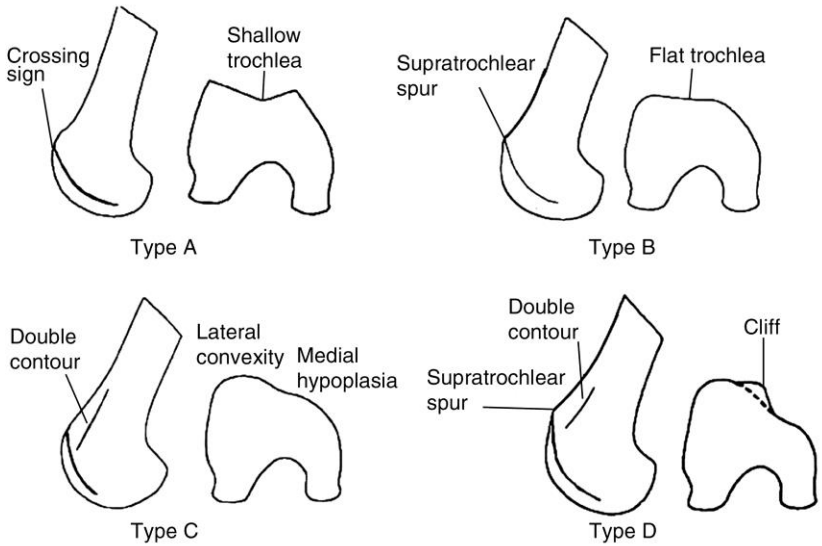


Type D

Classification of trochlear dysplasia.

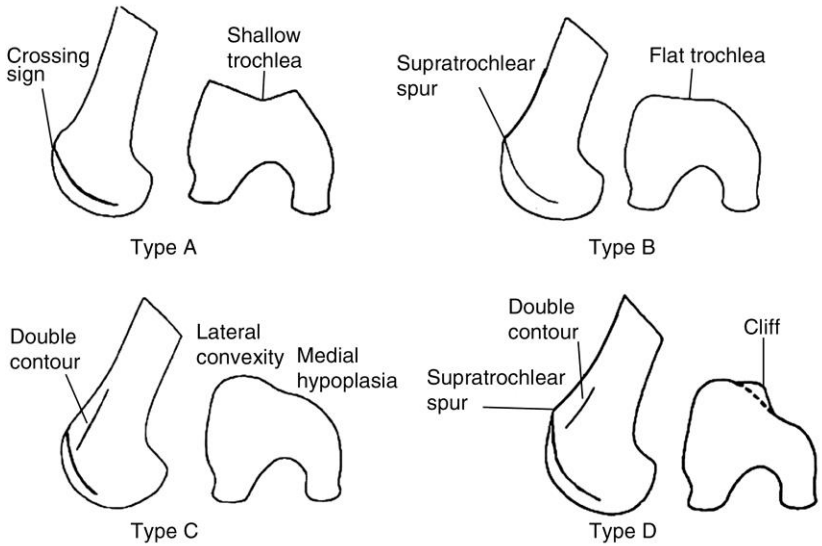
- **A,** Type A is characterized by the crossing sign on the lateral view (left) and by a shallow trochlea (sulcus angle >145°) on the axial view (right).
- **B,** Type B is characterized by the crossing sign and supratrochlear prominence, or spur, on the lateral view (left) and by a flattened trochlea on the axial view (right).

"Normal Sulcus Angle" = 138 +/- 6 degrees



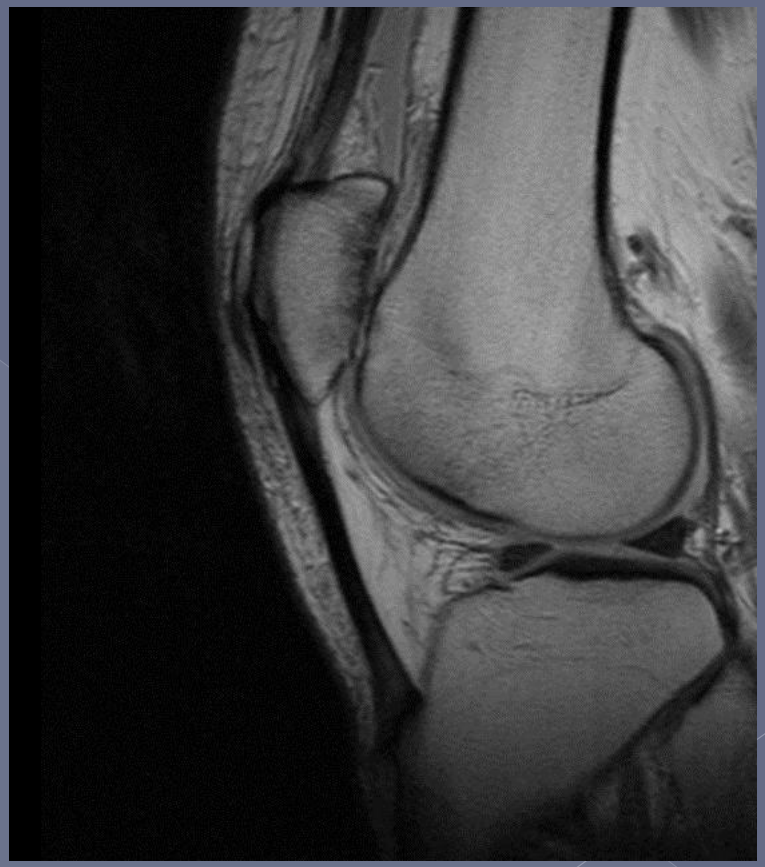
Classification of trochlear dysplasia.

- **C,** In type C, the lateral view shows the crossing sign with double contour (left). On the axial view (right), the trochlea demonstrates lateral convexity and medial hypoplasia.
- **D,** In type D, the crossing sign, double contour, and supratrochlear spur are seen on the lateral view (left), and asymmetry of the trochlear facets is seen on the axial view (right).
- Dejour D, LeCoultre B: Osteotomies in patello-femoral instabilities. *Sports Med Arthrosc* 2007;15:39-46.)



PATELLA ALTA

- Can occur as the result of a sports injury, though the large majority of the time it is a congenital/developmental condition that is unrelated to trauma. A kneecap in an "alta" position sits above the "trochlear groove" and therefore is less stable. The "patellar tendon/ligament" that connects the kneecap to the tibia is elongated.



Discussion:

- in normal knees, constant relationship exists between **length of patella (LP)** and length of the **patella tendon (LT)**;

- **length of tendon (LT)** is measured on its post surface from the lower pole of patella to its insertion on top of tibial tubercle;

- **length of patella** by definition is greatest diagonal length measured;

- ratio of **LP to LT is 1:0**, with less than 20% variation;

- hence, length of Patellar Tendon is approx. = to length of the patella;

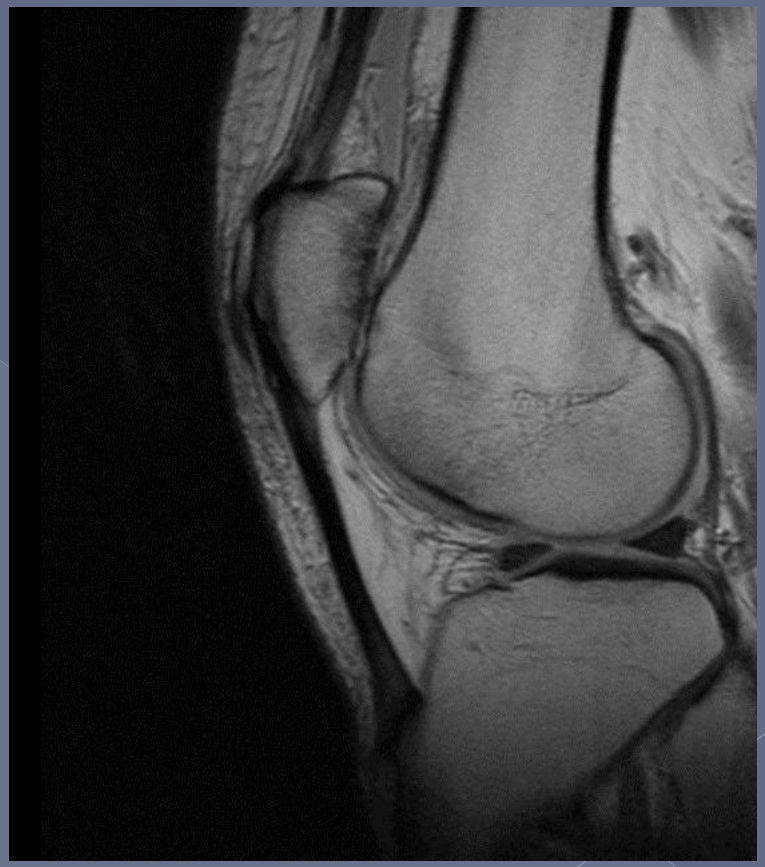
- avg. ratio (LT/LP) = 1.02 w/ SD of 0.13;

- LP to LT ratio of **less than 1:0** indicates possible Patella Alta;

- describes normal patellar ht. in relationship to Patellar Tendon;

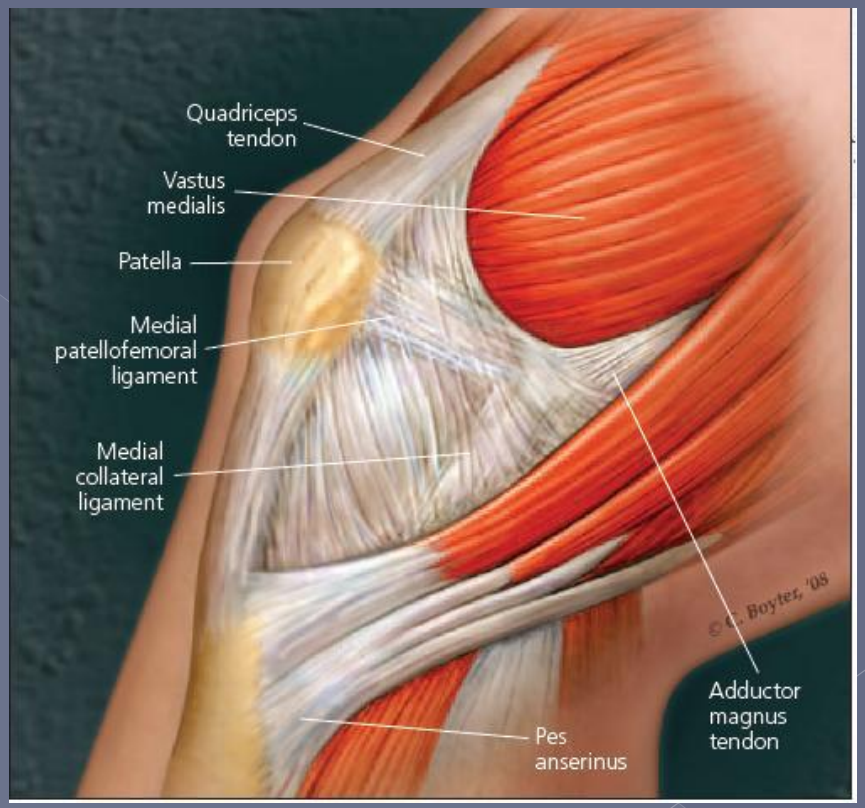
PATELLA ALTA

- **Insall Ratio**: This ratio is calculated with the knee flexed to 30 degrees. It is the ratio of the length of the patella (LP) to the length of the patellar tendon (LT). Normally this ratio is 1:1 but 20% variation represents patella alta or patella infera.
- i.e. LP/LT = .8 = patella alta
- i.e. LP/LT = 1.2 = patella infera



MEDIAL PATELLOFEMORAL LIGAMENT

- Anatomy of the trochlear groove is the most important factor stabilizing the patellofemoral joint (a dysplastic trochlea is found in more than 90% of patients)
- With acute traumatic dislocation, at least one medial structure must fail – usually the medial patellofemoral ligament



RISK FACTORS FOR PATELLAR INSTABILITY

- Patella Alta (most important)
- Generalized ligamentous laxity (more common with atraumatic instability)
- Genu valgum
- Increased femoral anteversion w/ compensatory external tibial torsion
- Increased Q Angle
- Loss of dynamic stability: Weak distal oblique portion of vastus medialis
- Loss of static stability:
  - hypoplastic lateral condyle:
  - flat lateral femoral condyle will permit patella to sublux laterally;
  - tear of medial patellofemoral ligament

PATELLAR INSTABILITY

- AMA Guides (Table 17-33):
  - "Patellar subluxation or dislocation with residual instability":
  - Exam Findings:
    - **Generalized ligamentous laxity -** persons at risk for patellar instability may exhibit generalized ligamentous laxity & poorly developed vastus medialis
    - **"Sage Sign" for patellar displacement -** the patella can normally be manually displaced both medially and laterally between 25% and 50% of width of the patella - greater movement indicates loose patellar restraints, a finding frequently seen in adolescent females
    - **Palpation** of medial patellofemoral ligament - look for tenderness at the femoral origin and patellar origins of the MPFL - lateral glide greater than 75% of the patellar width is abnormal suggestive of laxity of MPFL



PATELLAR INSTABILITY

- AMA Guides (Table 17-33):
  - "Patellar subluxation or dislocation with residual instability":
  - Patellar Apprehension Test:
    - The subject lies supine with the knee in a slightly flexed posture of approximately 30°. With the knee relaxed, the examiner places the thumbs along the medial patellar border and applies a laterally directed force.
    - If the subject feels as though the knee is beginning to dislocate, the quadriceps will suddenly contract to pull the patella back in line, and the subject will look apprehensive. **These findings constitute a positive result**

PATELLAR INSTABILITY

“Apprehension Sign”



VIDEOS

- PHYSICAL EXAMINATION MANEUVERS FOR PATELLAR INSTABILITY

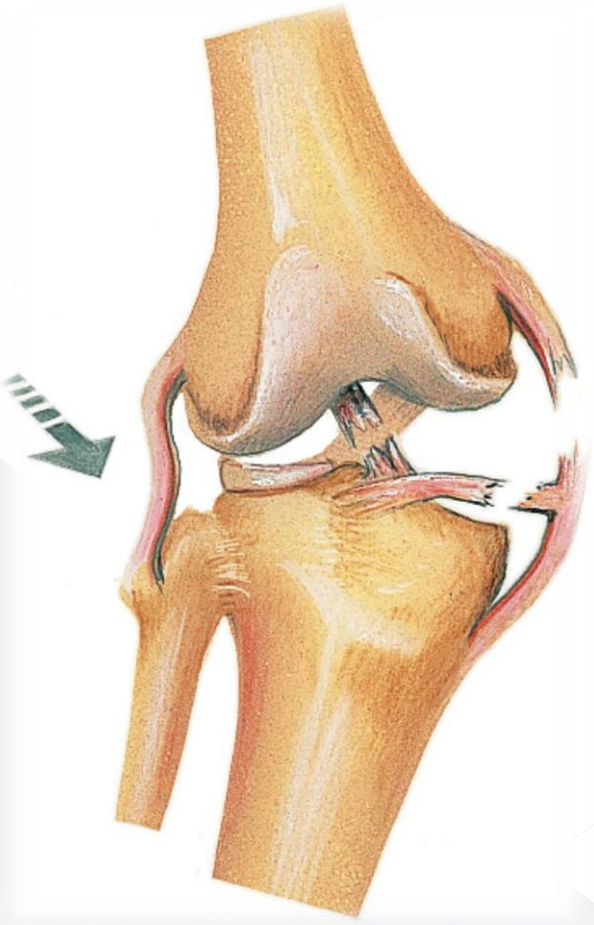
KNEE LIGAMENT INJURY

- AMA Guides Table 17-33:
- "Cruciate or Collateral Ligament Laxity – Mild (3%), Moderate (7%), or Severe (10%)
- "Cruciate and Collateral Ligament Laxity – Moderate (10%), or Severe (15%)
  - Cruciate Ligaments – Ant./Post.
  - Collateral Ligaments – Medial/Lateral



KNEE LIGAMENT INJURY

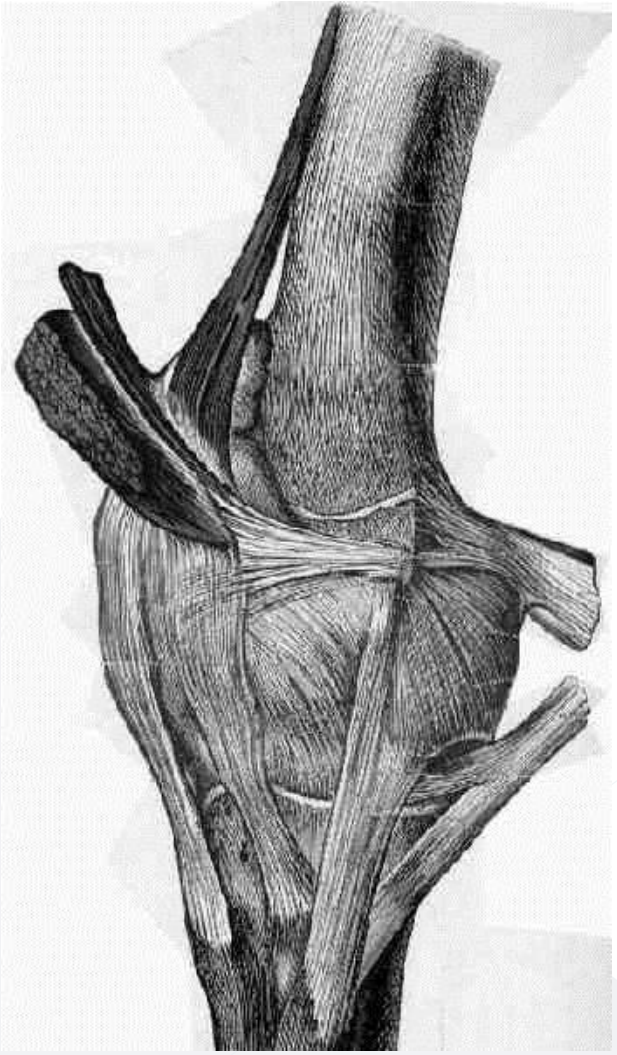
- Medial Collateral Ligament:
- History: Trauma to lateral side of knee, or, fall with a **valgus moment**, twisting injury with “pop” or “snap” heard.
- Symptoms: Medial knee pain, worse with weight bearing, effusion may or may not be present. Sense of knee instability or "giving way."



MEDIAL COLLATERAL LIGAMENT

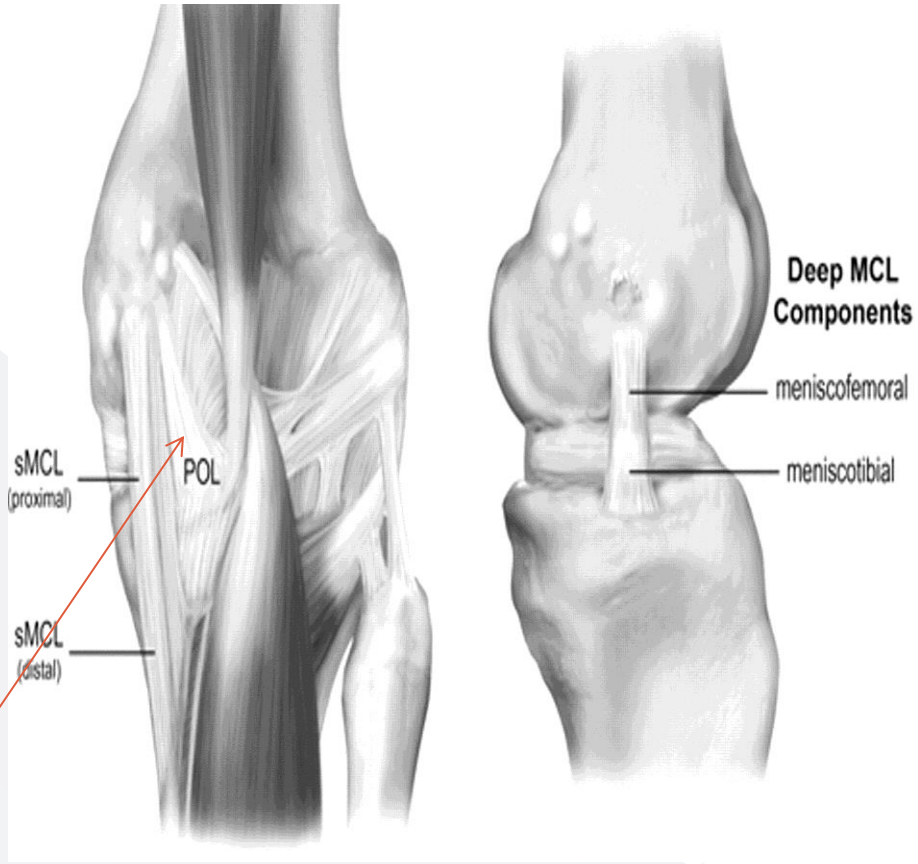
- **Superficial MCL:**
  - Proximal attachment: posterior aspect of medial femoral condyle - 3.2 mm proximal and 4.8 mm posterior to the medial epicondyle
  - Distal attachment: metaphyseal region of the tibia, up to 4-5 cm distal to the joint, lying beneath the pes anserinus;
- **Superficial MCL - anterior & posterior portions;**
  - anterior fibers appear to tighten w/ knee flexion of 70 to 105 deg;
  - posterior fibers form the posterior oblique ligament

- **Function: provides primary restraint to valgus at knee - providing from > 60-70% of restraining force depending on knee flexion angle;**
  - at 25° of flexion, the MCL provides 78% of the support to valgus stress;
  - at 5° of flexion, it contributes 57% of the support against valgus stress;



MEDIAL COLLATERAL LIGAMENT

- **Deep MCL:**
- This is the third (deep) layer of the medial compartment,
- Separated from the superficial MCL (layer II) by a bursa (which allows sliding of the tissues during flexion);
- Divided into 1) meniscofemoral and 2) meniscotibial ligaments;
- Inserts directly into edge of tibial plateau & medial meniscus - firmly attaches to the meniscus but does not provide significant resistance to valgus force;



"P.O.L." = Posterior Oblique Ligament

KNEE LIGAMENT INJURY

- Medial Collateral Ligament:
- Physical Findings:
  - Tenderness to palpation of the medial side of the knee extending from the medial femoral condyle to the proximal tibia. Effusion and ecchymosis may be present.
  - Pain elicited when a valgus stress is applied to the knee.
  - Medial knee laxity with a valgus stress is most apparent at 20 to 30° of flexion.
  - Always compare bilaterally!


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KNEE LIGAMENT INJURY

- Medial Collateral Ligament – Exam Findings for "Laxity":
- Mild Laxity:
  - Medial knee tenderness, minimal swelling and ecchymosis, and no medial gapping when valgus stress is applied to the knee in slight flexion.
- Moderate Laxity:
  - More pain and tenderness to palpation that can be localized either to the tibial or femoral insertion of the medial collateral ligament or along its fibers. Medial knee opening with valgus stress, usually gapping between 5 and 10 mm.
- Severe Laxity:
  - Usually due to complete rupture of the medial collateral ligament. Effusion may be minimal. Pronounced medial gapping greater than 10 mm with valgus stress at 30° of flexion.



KNEE LIGAMENT INJURY

- Pelligrini-Steida Lesion:
- Calcification at the medial distal femur at the origin of the MCL – indicative of chronic MCL injury that has undergone some healing with calcification



VALGUS STRESS TESTING

- Subject Lies Supine with the limb in a relaxed position.
- Tests should be performed in full extension, and then in an unlocked position of about 20 to 30° of flexion to allow testing of both the primary and secondary restraints.
- In the position of flexion, the posterior capsule is relaxed, thereby allowing for isolated testing of the medial collateral ligament.
- Examiner applies a valgus force to the knee by pulling the leg away from the midline of the body.



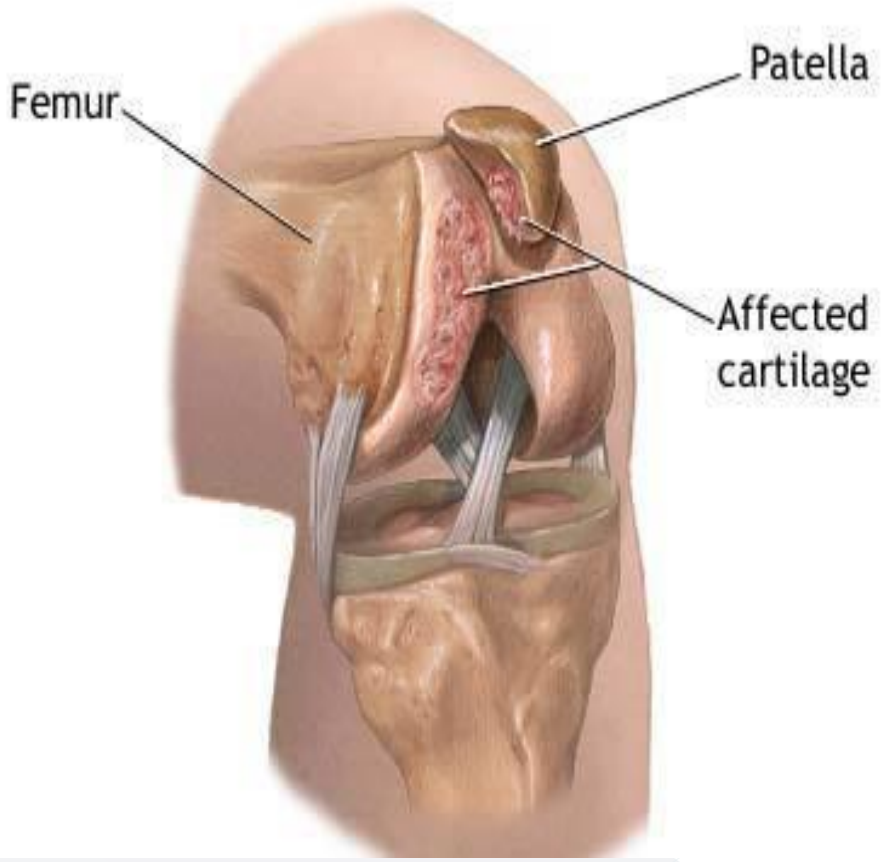
CHONDROMALACIA PATELLA

- AMA Guides - Table 17-31Arthritis:
  - Patellofemoral cartilage interval should be > 2 mm. (2 mm. or less qualifies for Permanent Impairment w/ 2 mm. = 4% Whole Person Impairment)
  - "In an individual with a history of direct trauma, a complaint of patellofemoral pain, and **crepitation on physical examination**. but without joint space narrowing on x-rays, a 2% Whole Person or 5% lower extremity impairment is given.



CHONDROMALACIA PATELLA

- **4 Stages:**
  - **Stage 1:** Swelling and softening of the cartilage
  - **Stage 2**: Fissuring w/in the softened areas
  - **Stage 3**: Fasiculations of articular cartilage almost to level of subchondral bone
  - **Stage 4**: Destruction of cartilage w/ subchondral bone exposed; histologically virtually indistinguishable from DJD;



CHONDROMALACIA PATELLA

Anterior knee pain due to softening and degeneration of the articular cartilage of the patella.

Symptoms: Anterior knee pain with maneuvers such as 1) deep knee flexion, 2) stair and hill ascent and descent, and 3) prolonged sitting.

Physical Exam Findings: Small knee effusion may be present. Tenderness on the undersurface of the patella. Patellar **crepitation**. Hypermobility of the patella with medial or lateral subluxation may be seen. Pain with patellar apprehension testing (see below).



CHONDROMALACIA PATELLA

- Physical Exam is based on reproduction of crepitus:
  - Patellar Grind (Clarke's Test): Examiner places the web space of the hand around the superior pole of the patella. The subject is then asked to do a "quad set" (isometric quadriceps contraction) while the examiner resists the tendency of the patella to glide superiorly.
  - A positive result is manifested as retro patellar pain and the subject's inability to maintain the contraction due to reflex inhibition. Always compare bilaterally!



Apply force tangentially – not posteriorly!!

CHONDROMALACIA PATELLA

- Waldron's Test: Examiner palpates the patella. The subject is instructed to do several deep knee bends or squats in a slow, controlled manner.
- While palpating the patella, the examiner notes where in the range of motion pain is felt and where crepitus is detected. For this test to be positive for chondromalacia, the pain and crepitus must occur simultaneously. Reflex inhibition and quadriceps weakness may accompany this finding.



ENTRAPMENT NEUROPATHY

- Entrapment of the posterior tibial nerve at the medial malleolus of the ankle – a.k.a. "tarsal tunnel syndrome"
- Video of "Anatomy Review" of 1) posterior tibial nerve, 2) tarsal tunnel, 3) nerve distribution into the foot.
- "Quick Response" Code

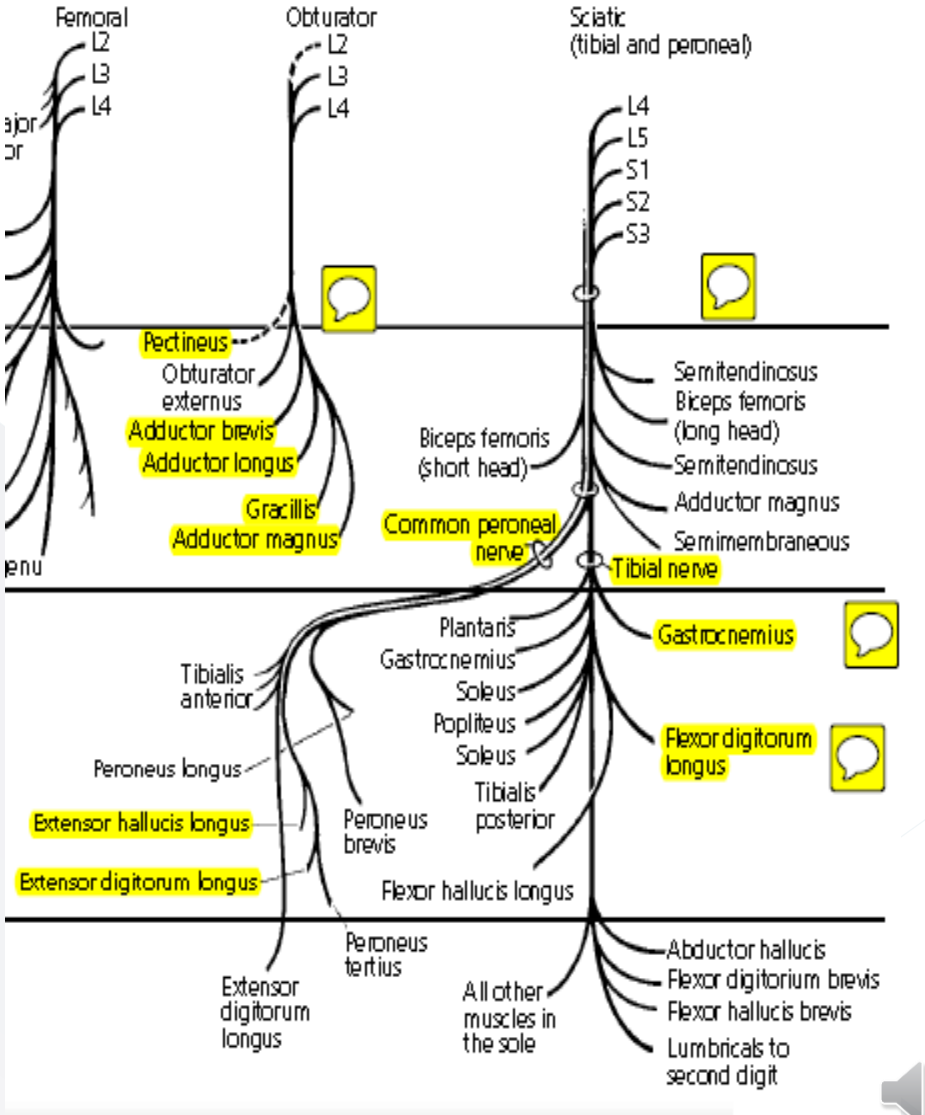
TARSAL TUNNEL SYNDROME

- AKA – "**posterior tibial neuralgia**"
- Compression neuropathy and painful foot condition in which the tibial nerve is compressed as it travels through the tarsal tunnel - behind the medial malleolus.
- The posterior tibial artery (and vein), tibial nerve, and tendons of the 1) tibialis posterior, 2) flexor digitorum longus, and 3) flexor hallucis longus muscles travel in a bundle through the tarsal tunnel. Inside the tunnel, the nerve splits into three different segments:
  - Calcaneal nerve – goes to heel
  - Medial and Lateral Plantar Nerves - continue on to the bottom of the foot.
- The tarsal tunnel is a "fibro-osseous tunnel" delineated by bone on the inside and the flexor retinaculum on the outside.



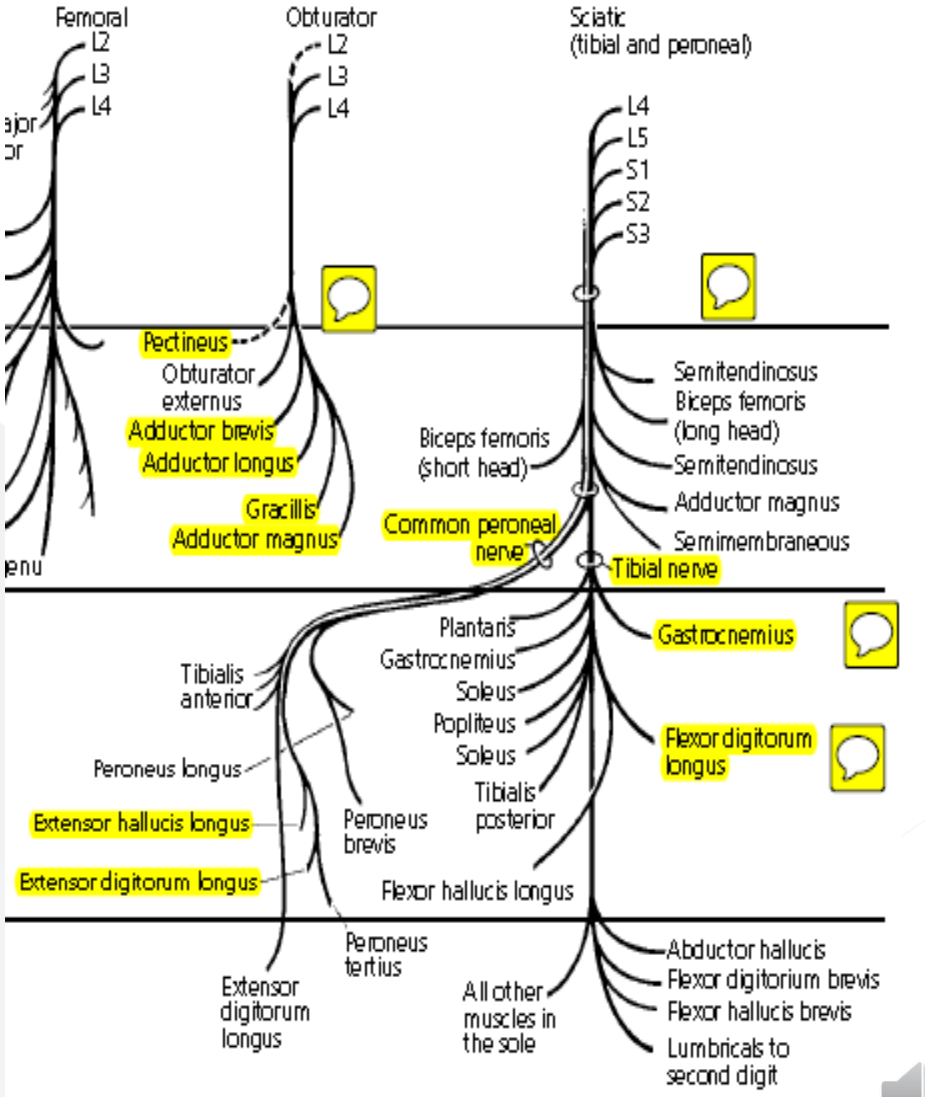
SCIATIC NERVE

- Muscular Branch:
- Just above the knee, the muscular branch divides out into the **tibial nerve** and the **common peroneal nerve**. These two innervate all muscles of the lower leg. The **tibial nerve** goes on to innervate all intrinsic muscles of the foot except the extensor digitorum brevis and the extensor hallucis brevis (which are innervated by the deep fibular nerve).



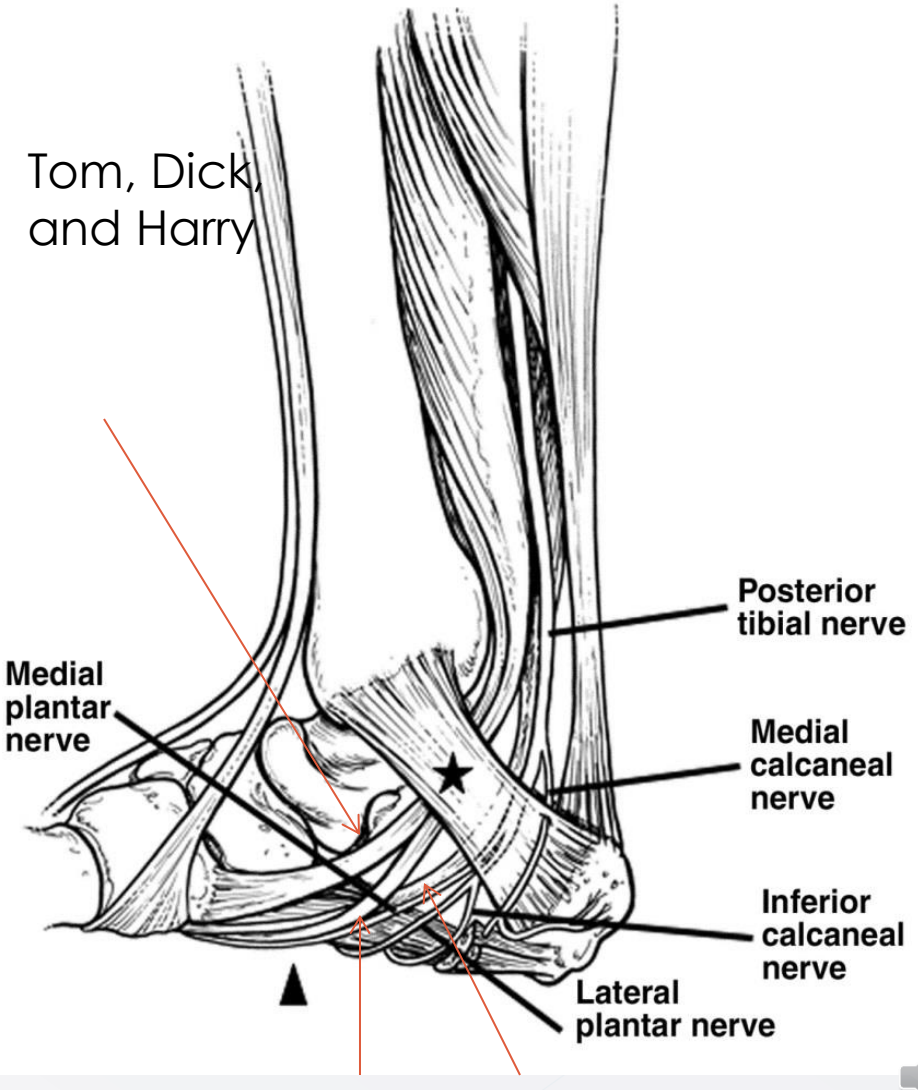
SCIATIC NERVE

- Below Knee:
  - Tibial Nerve: Passes between the tibialis posterior and the FDL, and then between the FDL and FHL. Travels behind the medial malleolus where it is bound down with the posterior tibial artery (proximal tarsal tunnel) and then divides into terminal branches – the **medial and lateral plantar nerves**.



SCIATIC NERVE

- Tarsal Tunnel:
  - Formed by medial surface of the talus, the inferomedial navicular, the sustentaculum tali, and the curved medial surface of the calcaneus. The fibrous portion of the canal is the flexor retinaculum – which is formed by the deep and superficial aponeurosis of the leg and is attached closely to the sheaths of the tibialis posterior (Tom), FDL (Dick), and FHL (Harry) tendons.



POSTERIOR TIBIAL NERVE COMPRESSION/IRRITATION

- Most common location is distal to ankle due to **intrinsic neural abnormalities** and/or **external compression** (fibrosis, neurilemomas, ganglion cysts, lipomas, tight tarsal canal, hypertrophic abductor hallucis, anomalous artery, tenosynovitis, partial or complete rupture of the medial tendons.
- Other risk factors include diabetes, rheumatoid arthritis, heel varus or valgus, varicose posterior tibial veins (common)

Location of Entrapment	Physical Exam Finding	Explanation
Tarsal Tunnel	Diffuse, vague discomfort – or pain Burning/tingling/numbness of plantar foot Possible proximal radiation of pain to the medial leg Worse with prolonged standing and walking Night Pain Pain with extreme dorsiflexion Pain unrelated to weight bearing (differentiates it from plantar fasciitis) Symptoms may correlate with onset of use of orthotics Exam: Possible hindfoot varus/valgus Possible varicosities, swelling, skin changes-	



Location of Entrapment	Physical Exam Finding	Explanation
Tarsal Tunnel	Pulses – may be involved due to compression of posterior tibial artery Patchy numbness in distribution of medial or lateral plantar nerves, or of calcaneal nerve(s) Increased pain with dorsiflexion, inversion, or eversion Possible weakness of ADM or Abductor Hallucis Palpable ganglia, tenosynovitis (or other space occupying lesion) in tarsal tunnel. **Positive Tinel's or Durkan's**	These movements increase tarsal compartment pressure Innervated by lateral plantar nerve and medial plantar nerve respectively



EXAMINATION MANEUVERS

- VIDEOTAPE OF LIVE SUBJECT TO ASSESS FOR TARSAL TUNNEL SYNDROME
- Scan "Quick Response" code –



CONCLUSION

- Hmmmm……. It looks like we are out of time……..(shucks!!)



FINAL REMINDER

- This is Dr. Perry Carpenter. I want to thank you for joining me. I hope you enjoyed the course and I look forward to being with you again for a future course. If ever our paths shall met, I look forward to speaking with you about all things QME. For now, I have 2 final instructions:
- 1. When you are done with your Course Examination, fax (530-295-9196) or email (admin@ezqmeceu.com) your Examination. Y our credit for the course will be immediately processed.
- 2. Remember to visit www.ezqmeceu.com for products designed to make your QME Reports more powerful and persuasive.

