



# Lower Extremity Complaints in Sports Medicine

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**LMU**

Lincoln Memorial University

HARROGATE, TENNESSEE

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# Disclosures

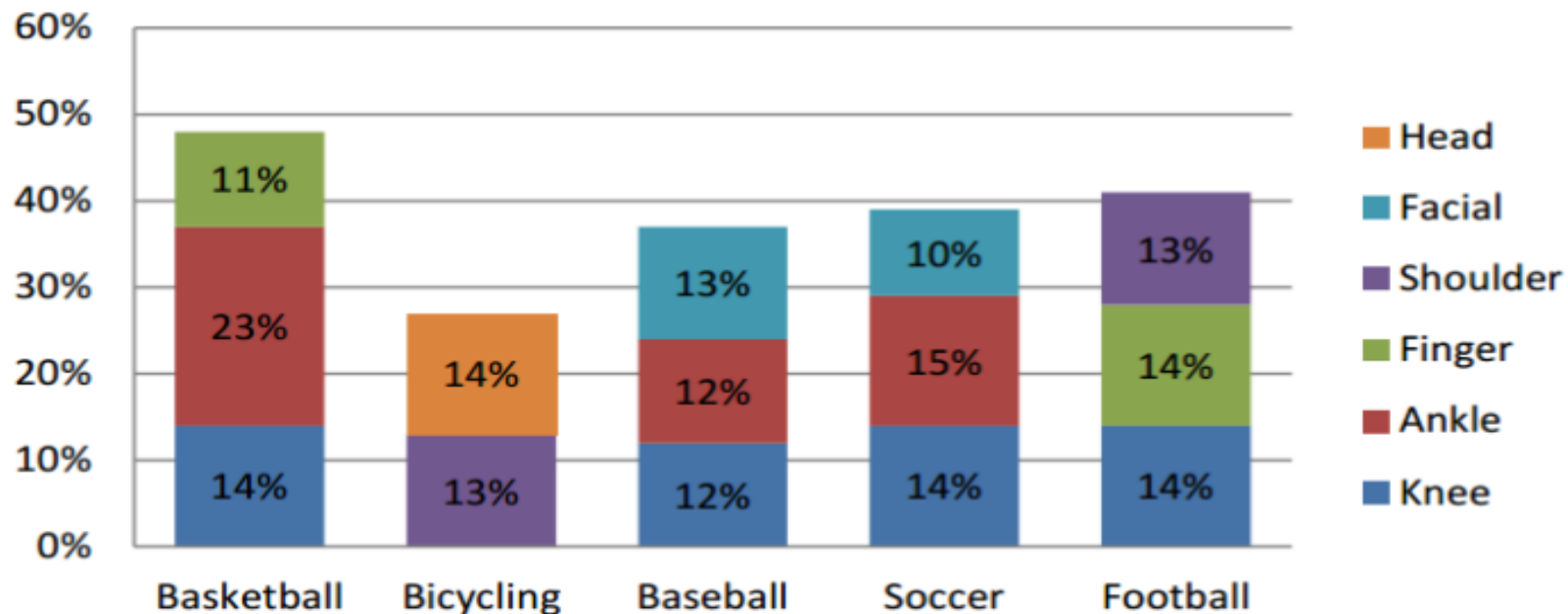
- Dean and Chief Academic Officer
  - Lincoln Memorial University-DeBusk College of Osteopathic Medicine
- Professor of Family Medicine



# Objectives

- Review basic components of a sports injury/illness focused exam.
- Evaluate common sports related injuries of the lower extremity related to athletic activity.
- Articulate important considerations in the diagnosis and treatment of these conditions.

## Common type of injury by sport among individual age 25 to 40 years



**Source:** ASPE computations from U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System for 2012

## Case #1

- 15-year-old presents with left knee pain.
- Currently participating in high school cross country.
- Began experiencing knee pain approximately two weeks ago and pain is increasing.
- Denies history of trauma.
- Worse with running, jumping and climbing steps, pain is present at rest.

## Case #1

- No significant past medical or surgical history.
- This is their first year running track/cross country.
- Physical Exam:
  - Knee grossly unremarkable.
  - Tenderness to palpation over tibial tubercle and proximal tibia (anteriorly).
  - No effusion.
  - Knee exam is unremarkable except for discomfort to exam and swelling over the anterior tibial plateau.

## Case #1

- Differential Diagnosis:
  - Osgood-Schlatter's
  - Patello-Femoral Syndrome
  - Occult Fracture
  - Infra-patellar Bursitis
  - Meniscal Issue
  - Tendonitis
  - Tumor
  - Medial Tibial Stress Syndrome



## Case #1

Diagnosis

Disposition

Key take aways



# Ockham's Razor

# Radiographs

# Common Lower Extremity Diagnoses in Sports Medicine

- Ankle Sprain
- Patello-Femoral Syndrome
- Iliotibial Band Syndrome
- Plantar Fasciitis
- Foot Sprain/Metatarsalgia
- Trochanteric Bursitis
- Achilles Tendonitis/Bursitis
- Medial Tibial Stress Syndrome

## Case #2

- 42-year-old runner complaining of right lateral knee pain when running.
- Worse running down hill.
- No pain at rest or with light activity
- Currently training for a marathon.
- Cannot train due to severity of pain.
- No history of trauma.
- No significant past medical or surgical history.

## Case #2

- Physical Examination
  - Right knee is grossly unremarkable without swelling, ecchymosis or erythema.
  - Manual evaluation of ligamentous and meniscal structures is unremarkable.
  - Palpation fibular head is positive for tenderness.
  - Right knee ROM intact.
  - Neural/Vascular/Motor intact to distal right lower extremity.

## Case #2

- Differential
  - PFS
  - Meniscal Injury
  - ITB Syndrome
  - Fibular Head Dysfunction
  - Tumor
  - Arthritis
  - Occult Fracture

## Case #2

- X-ray?
- Diagnosis
- Disposition
- Key Take Aways



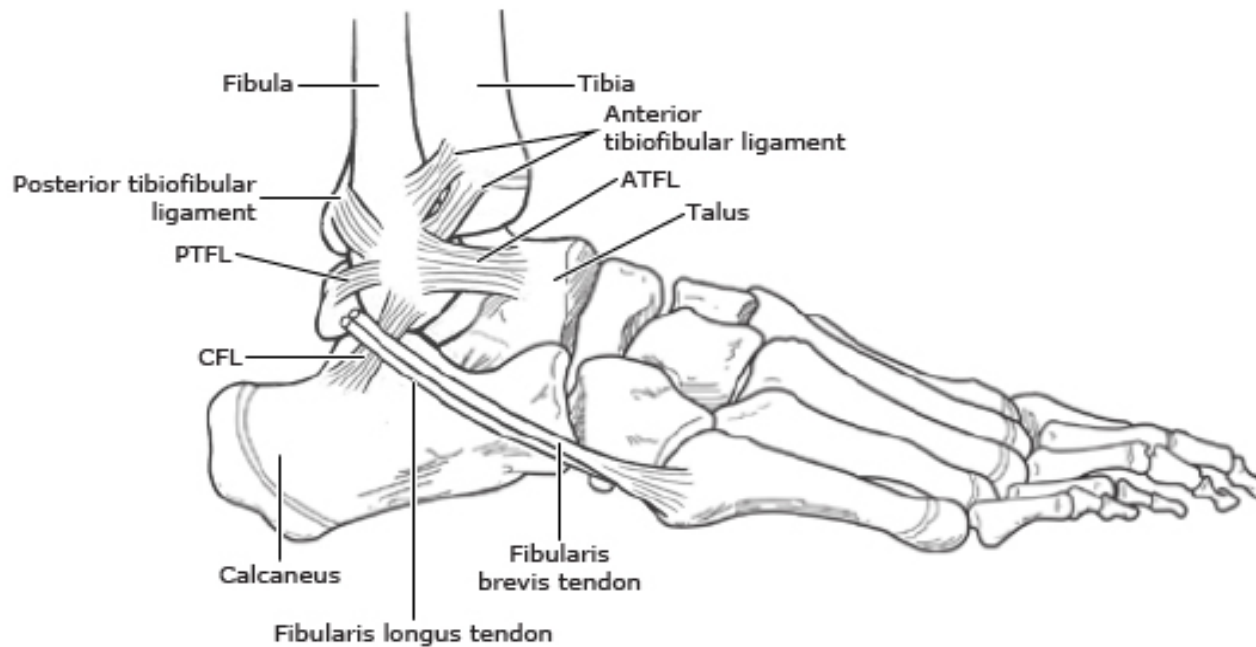
## Case #3

- 18-year-old presents after “twisting” left ankle playing volleyball 5 days ago.
- Pain is limited to the left ankle.
- Patient denies any other injury or complaint(s).
- Patient denies any significant medical or surgical history.
- Patient currently takes an oral contraceptive agent.

## Case #3

- Physical Examination
  - Minimal swelling left lateral ankle.
  - Ecchymosis lateral aspect of left foot.
  - Negative drawer.
  - Palpation of ankle demonstrates tenderness over ATF ligament.
  - Fifth metatarsal base is negative to palpation.
  - N/V/M intact distally.

## Lateral ankle ligaments



ATFL: anterior talofibular ligament; PTFL: posterior talofibular ligament; CFL: calcaneofibular ligament.

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## Case #3

- Differential
  - Sprain
    - Grade
  - Fracture
  - Tumor
  - DVT
  - Tendonitis
  - Bursitis

## Case #3

- X-ray?
  - Ottawa rules
- Diagnosis
- Disposition
- Take aways

## Case #4

- 30-year-old runner complaining of right foot pain while running.
- Does not hurt at rest.
- Denies trauma.
- Denies other complaints.
- No significant past medical or surgical history.

## Case #4

- Physical Exam:
  - Examination of foot unremarkable; no swelling or erythema.
  - Tenderness to palpation noted over the 2<sup>nd</sup> and 3<sup>rd</sup> metatarsal head.
  - N/V/M intact distally.
  - Remainder of exam unremarkable.

## Case #4

- Differential
  - Fracture
  - Tumor
  - Gout
  - Foreign Body
  - Neuroma
  - Metatarsalgia
  - Sprain



## Case #4

- X-ray?
- Diagnosis
- Disposition
- Take aways

## Bonus Case #5

- 52-year-old complaining of chest pain during runs.
- Elite tri-athlete, competes on US National Triathlon Team.
- No risk factors for ASCVD.
- Chest pain occurs at 5-6 miles into tempo runs, resolves with rest/stopping.
- No other chest pain; does not occur during bike, swim or other activities.
- Chest pain causes athlete to stop running.

## Bonus Case #5

- Physical Exam:
  - Essentially unremarkable
  - 98/60, 98, 98%, 12, 56
  - HRRR nl S1, S2
  - Lung CTA
  - Palpation anterior chest negative
- EKG: Sinus bradycardia, otherwise normal

## Bonus Case #5

- Differential
  - Costochondritis
  - Pulmonary embolism
  - Coronary Syndrome
  - Tumor
  - GERD
  - Thoracic dysfunction
  - Aortic Dissection

## Bonus Case #5

- X-ray?
- Diagnosis
- Disposition
- Take aways

## Case #6

- 20-year-old complaining of right knee pain.
- Plays Division II Volleyball, outside hitter.
- Present for past few months, getting worse.
- Denies any remarkable trauma.
- Pain worse with jumping, climbing stairs, deep knee bends.
- No significant past medical or surgical history.

## Case #6

- Physical Exam:
  - No swelling of knee
  - Full ROM active and passive with mild pain reproduced on max flexion.
  - Squatting in office reproduces pain.
  - Palpation of kneecap demonstrates mild tenderness.
  - N/V/M intact to extremity.
  - Remainder of exam normal.

## Case #6

- Differential
  - Fracture/Subluxation
  - Patellofemoral syndrome
  - Internal Derangement
    - Meniscal, Plica, etc.
  - Arthritis
    - Inflammatory
  - Tumor
  - Tendonitis
  - Bursitis

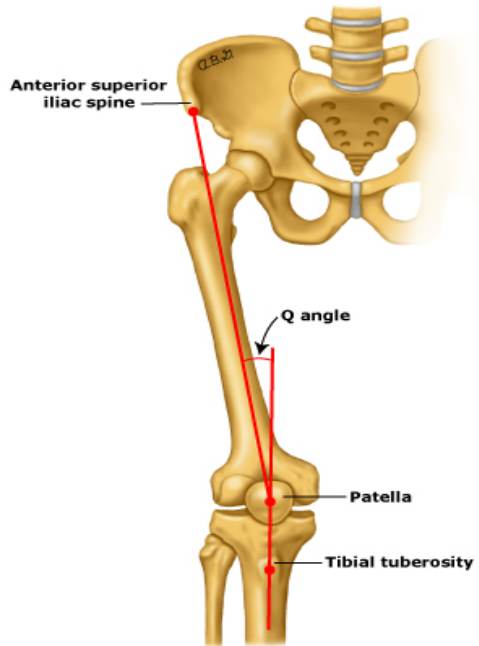


## Case #6

- X-ray?
- Diagnosis
- Disposition
- Take away

# Case #6

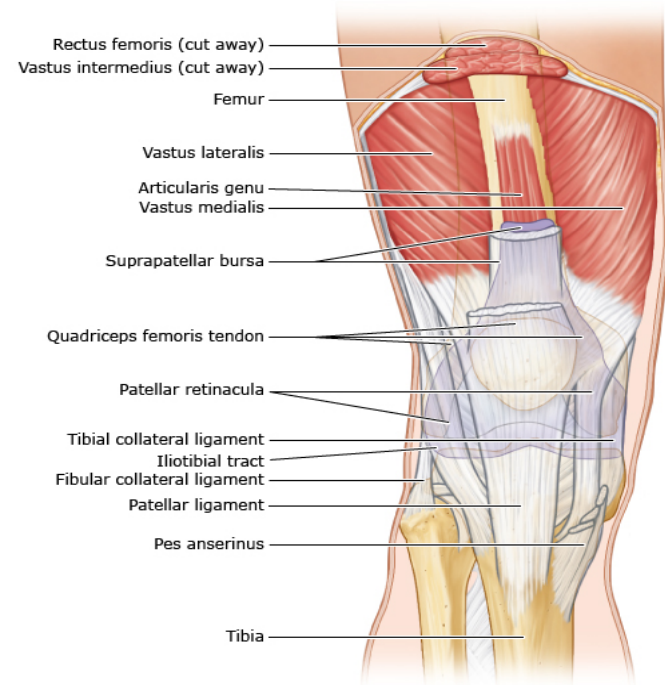
## Q angle



Although the Q angle is often mentioned, research suggests its role in conditions such as patellofemoral pain syndrome and patellar instability is of little importance.

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## Knee musculoskeletal anatomy: Anterior view



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## Case #7

- 45-year-old complaining of bilateral heel pain left>right for 3 weeks with running.
- Resumed running 12 weeks ago after being largely sedentary for years.
- Mileage recently increased.
- Pain is worse upon getting out of bed in am. Gets better with walking, worsens with running.
- Denies trauma.
- Denies significant medical or surgical history.

## Case #7

- Physical Examination:
  - Bilateral foot exam grossly unremarkable.
  - Plantar surface clear bilateral without evidence of trauma.
  - Palpation of center of left heel demonstrates point tenderness.
  - “Squeezing” bilateral heels reproduces pain.
  - N/V/M intact to extremities bilaterally.

## Case #7

- Differential
  - Heel spurs
  - Fracture
  - Tumor
  - Infection
  - Foreign Body
  - Plantar Fasciitis
  - Arthritis
  - Neuroma

## Case #7

- X-Ray?
- Diagnosis
- Disposition
- Take away

## Case #8

- 13-year-old complaining of left groin pain.
- Playing youth contact football.
- Lifting weights with older siblings.
- Hurts to run, minimal pain with walking.
- Hurts to “push off” with left foot.
- Denies significant past medical or surgical history.
- Denies taking any medication.

## Case #8

- Physical Examination
  - Overweight.
  - Antalgic gait.
  - Abdominal exam is unremarkable except form mild pain to palpation over left inguinal region.
  - N/V/M intact to lower extremity.
  - Internal/external rotation of left lower extremity is limited/painful relative to right.



## Case #8

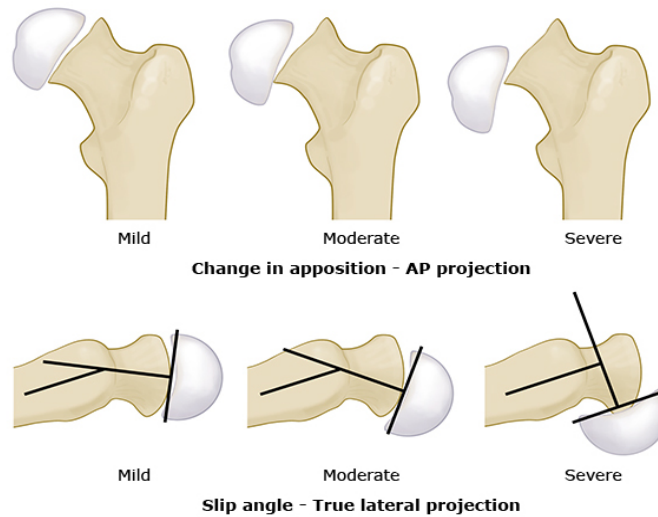
- Differential
  - Hernia
  - Appendicitis
  - Arthritis
  - Infection
  - Fracture
  - Tendonitis
  - Bursitis

## Case #8

- X-ray?
- Diagnosis
- Disposition
- Take away

# Case #8

## SCFE severity



Classification of severity of slipped capital femoral epiphysis:

- Mild: Displacement of epiphysis  $<1/3$  of the diameter of the femoral neck on anteroposterior (AP) projection or  $<30$  degrees of displaced on true lateral projection
- Moderate: Displacement of epiphysis  $>1/3$  but  $<1/2$  of diameter of femoral neck on AP projection or 30 to 50 degrees displaced on true lateral projection
- Severe: Displacement of epiphysis  $>1/2$  of diameter of femoral neck on AP projection or  $>50$  degrees displaced on true lateral projection

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# Questions?

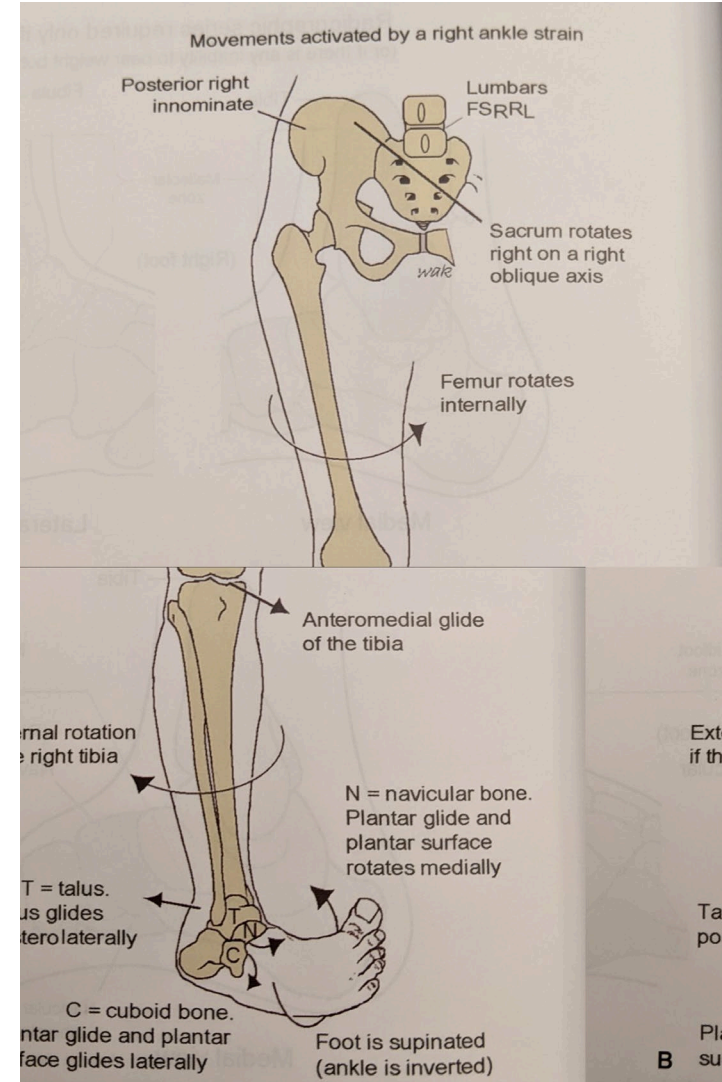
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# Addendum- Osteopathic Techniques for Lower Extremity Pain/Injury

# Osteopathic Considerations with Lower Extremity Pain/Injury

- Consider the following regions
  - Lumbosacral fascia
  - Sacrum
  - Innominates
  - Hamstrings, Piriformis, ITB, Quadriceps, Psoas
  - Tibia
  - Fibula
  - Feet
- SEE ADDENDUM FOR TREATMENTS





## Position 1: Pelvis Muscle Energy Treatment

Diagnosis- Somatic dysfunction pelvis and pubic symphysis

1. Physician grabs knees and holds while patient actively pushes hip abduction
2. Hold isometric for 3 secs
3. Repeat 3-5 times.

## Position 2: Pelvis Muscle Energy Treatment

Diagnosis- Somatic dysfunction pelvis and pubic symphysis

1. Physician grabs knees and holds while patient actively pushes hip adduction
2. Hold isometric for 3 secs
3. Repeat 3-5 times.





# Piriformis Diagnosing

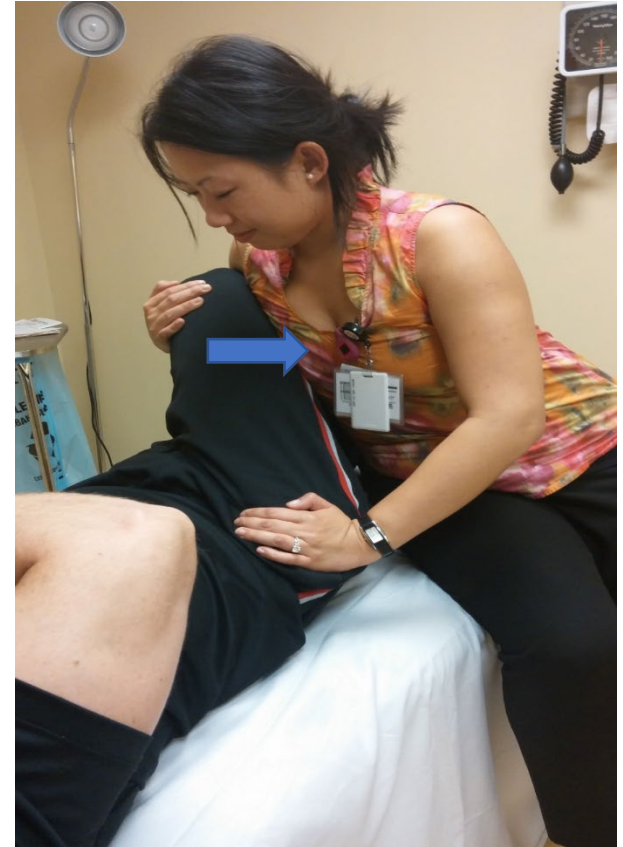


- 1) Lift patient legs approximately 6in off table.
- 2) Internally rotate the hip on the right and left
- 3) The leg that doesn't internally rotated as well is leg of the tight piriformis

# Position 1-Piriformis Muscle Energy Treatment

- 1) Doctor internally rotates the hip with knee flexed approx 60 degrees, with patient foot on table, support ipsilateral right ASIS
- 2) Patient externally rotates the hip for 3 secs and the doctor resists
- 3) Doctor internally rotates the hip further and patient externally rotates hip for 3 secs and the doctor resists
- 4) Repeat step 4 for a total of 3-5 times
- 5) Doctor internally rotates and adducts the hip further

Arrow: Direction patient pushes



## Position 2- Piriformis Muscle Energy Treatment



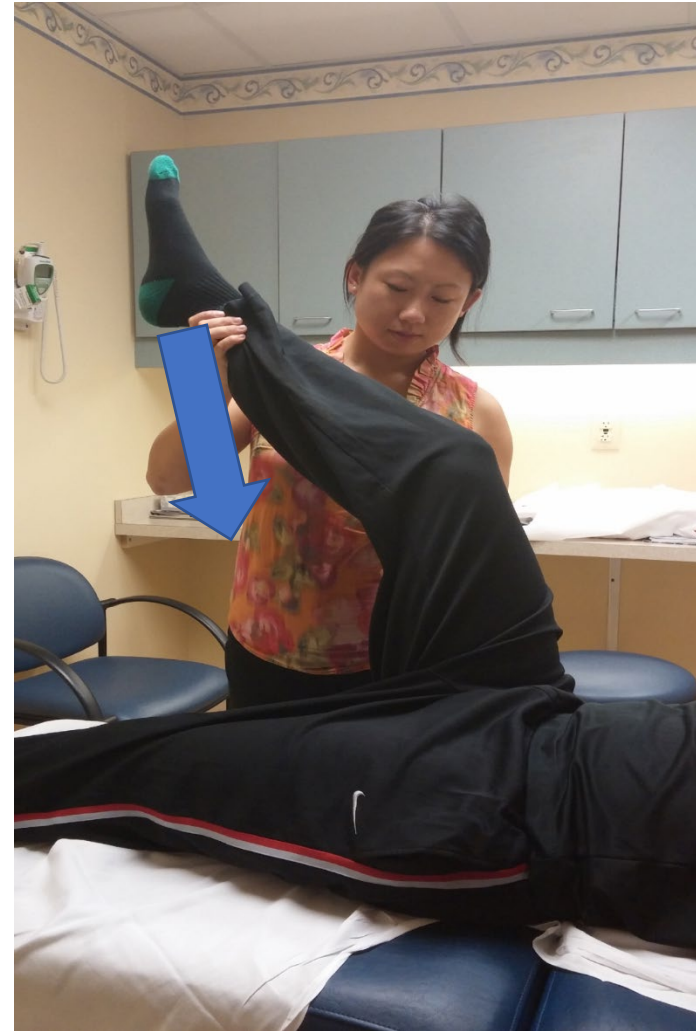
- 1) Doctor internally rotates the hip with knee flexed approx 90 degrees or more
- 2) Patient externally rotates the hip for 3 secs and the doctor resists
- 3) Doctor internally rotates the hip further and patient externally rotates hip for 3 secs and the doctor resists
- 4) Repeat step 4 for a total of 3-5 times
- 5) Doctor internally rotates the hip further
- 6) **Contraindicated with total hip arthroplasty**

Arrow: Direction patient pushes

# Hamstring Muscle Energy Treatment

- 1) Patient is supine and doctor treats from the side of dysfunction
- 2) With hip and knee at 90 degrees flexion , doctor slowly extends knee until doctor feels resistance
- 3) Patient instructed to bend at knee against doctor for 3 secs
- 4) Patient relaxes and doctor extends knee further and patient bends at knee against doctor resistance for 3 secs
- 5) Repeat Step 4, for a total of 3-5 times
- 6) Doctor takes the knee into extension with patient relaxed

Arrow: Direction Patient pushes



# Iliotibial Band Muscle Energy

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- Physician extends affected hip and adduct posterior off table
- Physician hand cranially is supporting hips, so patient doesn't roll posterior.
- Patient is instructed to lift leg into abduction with physician resisting for 3-5 secs.
- Physician moves to next barrier of extend and adduction
- Repeat for a total of 3-5 times



## Fibular Head-LVMA



- Diagnosis- Ankle sprain, gastrocnemius strain, distal hamstring strain
- Thumb and 2<sup>nd</sup> finger at grasping the fibular head
- Gentle motion of proximal fibula combined posterior and medial motion then combined anterior and lateral

# ATFL Counterstrain Treatment



- Diagnosis- lateral ankle sprain
- Location (Top picture): 3 o'clock position from lateral malleolus
- “Fold and hold” technique
- Compress forefoot toward TP, then dorsiflex and evert ankle
- Hold for 90 secs or feel a release, warmth or softening then recheck