

# **HARMELING**

# **PHYSICAL THERAPY**

*FALL SPORTS INJURIES*

*PREVENTION, RECOGNITION, AND MANAGEMENT*

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# SHIN SPLINTS

## ANTERIOR SHIN SPLINTS

### ANATOMY INVOLVED

TIBIALIS ANTERIOR

EXT DIGITORUM LONGUS,

EXT HALLUCIS LONGUS

Tibialis anterior —



# SHIN SPLINTS

## POSTERIOR SHIN SPLINTS

### ANATOMY INVOLVED

TIBIALIS POSTERIOR



# SHIN SPLINTS

## *Common Causes*

- Overuse Injury
- Aggressive Running, Jumping Activities
  - Increase mileage or intensity too quickly
  - Change of surfaces
- Weakness / Over Worked Anterior Shin Muscles
  - Tight Calf Muscles
- Weakness / Over Worked Post Tib Muscle
  - Over Pronation (Flat Feet)

# SHIN SPLINTS

## *Symptoms*

*Pain over front medial lower leg (anterior)*

*Pain over inner surface of tibia (posterior)*

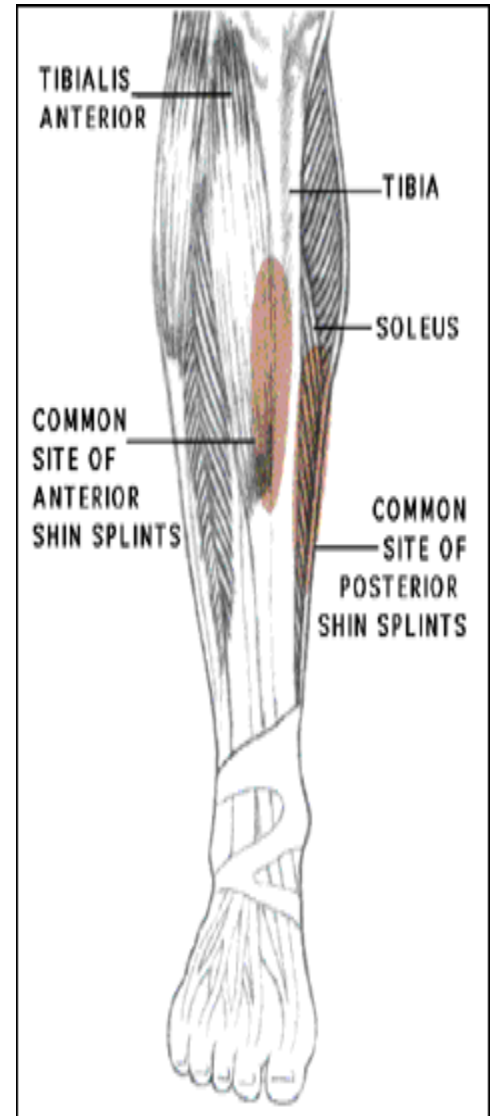
*Pain with toes / feet bent downward (anterior)*

*Pain with heel raises (posterior)*

*May have tenderness to touch over both areas*

*Pain decreases after warm up but returns*

*Pain after running at rest*



# SHIN SPLINTS

## PREVENTION

- *Shoes that fit your foot type*
  - *Change training surfaces*

- *Controlled Downhill Running to work anterior muscles*
- *Strengthen and Stretch both Anterior and Posterior lower leg*
  - *Heel walking, Toe extensions, Ankle stabilization*

# STRESS FRACTURES

## HAIRLINE FRACTURES

### *Common Causes*

- Overuse Injury
- Caused by repeated stress to bone
- Weightbearing bones such as tibia and metatarsals
- Muscle fatigue can lead to stress fx

# STRESS FRACTURES

## Stress Fractures of the Leg and Foot





# STRESS FRACTURES

## Symptoms

*Main symptom is a general area of pain and / or tenderness associated with weightbearing*

*Running will usually cause increased pain*

*Could have swelling / bruising / tenderness to touch*

# STRESS FRACTURES PREVENTION

- *Bones get stronger under stress, too much stress = fracture*
  - *Increase distance by no more than 10% per week*
    - *Rotate shoes*
  - *Stay flexible and Strong*

# PLANTAR FASCITIS

## ANATOMY INVOLVED

### PLANTAR FASCIA



# PLANTAR FASCITIS

## *Common Causes*

- One of most common causes of heel pain
- Common in runners due to pounding
- Faulty foot mechanics
  - Flat footed / high arches
- Poor or Inadequate Footwear
- Tight Calf Muscles

# PLANTAR FASCITIS

## *Common Causes*

### **TIGHT CALF MUSCLES**



# PLANTAR FASCITIS

## Symptoms

*Gradual onset of pain*

*Local tenderness in heel but can spread to arch*

*Worst in AM or when standing up initially*

*Sometimes eases as we walk*

*No Pain at rest*

# PLANTAR FASCITIS

## PREVENTION

- *Change your shoes*
- *Stretch your calfs*
- *Stretch out fascia*
- *Toe crunches, Ankle stabilization*

# ACHILLES TENDONITIS

## ANATOMY INVOLVED





# ACHILLES TENDONITIS

## *Common Causes*

- Overuse
- Tight Calf Muscles
- Sudden Increase in Training Intensity
- Flat Feet
- May Tear with Aggressive Jumping, Sprinting

# ACHILLES TENDONITIS

## Symptoms

*Pain / Swelling at Achilles Tendon Insertion*

*Can Lead to Thickening of Tendon*

*Tender To Touch*

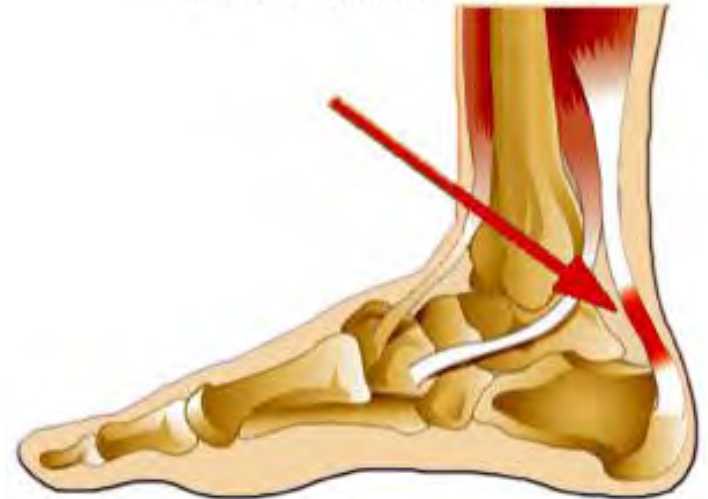
*Pain and / or Inability to Perform Heel Raise*

*Pain With Dorsi and Plantar Flexion*

## PREVENTION

- *PROPER WARM UP / COOL DOWN*
- *STRETCH + STRENGTHEN CALFS*

ACHILLES TENDINOSIS/TENDINITIS



# ANKLE SPRAINS

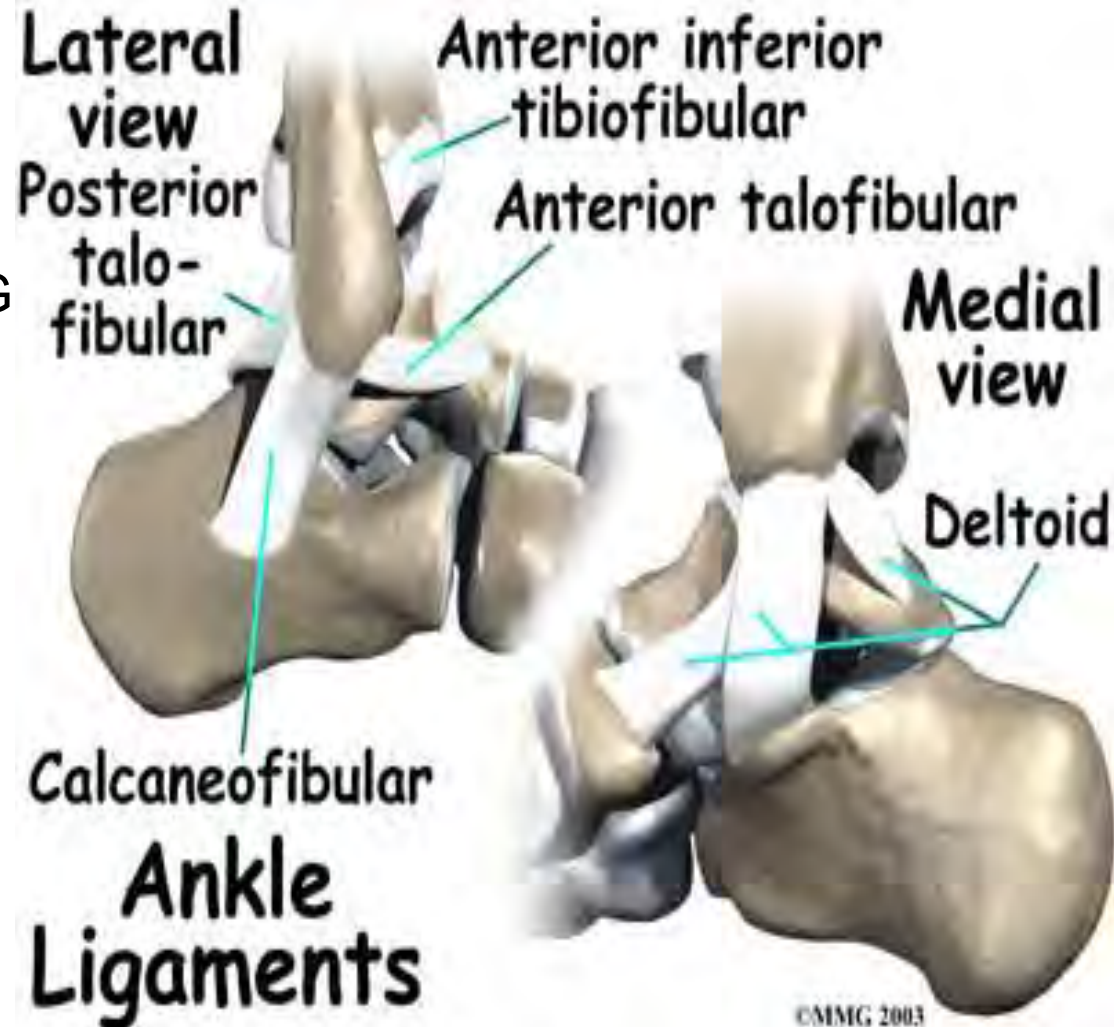
## ANATOMY INVOLVED

### INVERSION SPRAIN

ANTERIOR TALOFIBULAR LIG  
POSTERIOR TALOFIBULAR LIG  
CALCANEOFIBULAR LIG

### EVERSION SPRAIN

DELTOID LIGAMENT



# ANKLE SPRAINS

## *Common Causes*

- Weak Ankle Musculature
- Tough Luck

## PREVENTION

- *Strength and Proprioception*



# ANKLE SPRAINS

## Symptoms

### **Grade I Ankle Sprain:**

Ligament is stretched but not torn  
Probable pain / swelling / bruising  
May not be able to jog or jump

### **Grade II Ankle Sprain:**

Ligament is partially torn  
More significant swelling and bruising  
Usually have pain with just walking

### **Grade III Ankle Sprain:**

Ligaments are completely torn  
Walking usually initially difficult  
Later on may complain of instability

# GENERAL PREVENTION

- GOOD WARM UP
  - STRETCH
- STRENGTHEN / SPORT ACTIVITY
  - COOL DOWN

- PROPER FOOT WEAR

Should have proper foot wear for your foot type  
New shoes are recommended every 300 – 400 miles  
Get 2 Pairs !!!

## RUN TRAINING

Increase by no more than 10% per week  
Don't just run uphill....alternate with downhill  
Vary surfaces and direction

# PREVENTION STRETCHES

*GASTROC*



*SOLEUS*



*KNEELING*





# PREVENTION

## STRENGTHENING

### DORSI FLEXORS

TIBIALIS ANTERIOR

EXT DIGITORUM LONGUS

EXT HALLUCIS LONGUS

### EXERCISES

HEEL WALKING

TOE EXTENSIONS

RESISTED DORSIFLEXION





# PREVENTION

## STRENGTHENING

### PLANTAR FLEXORS

GASTROC / SOLEUS  
TIBIALIS POSTERIOR

### EXERCISES

CALF RAISES  
DOUBLE, SINGLE LEG  
OFF STEP



# PREVENTION

## STRENGTHENING

### ANKLE INVERSION

TIBIALIS ANTERIOR

TIBIALIS POSTERIOR

### EXERCISES

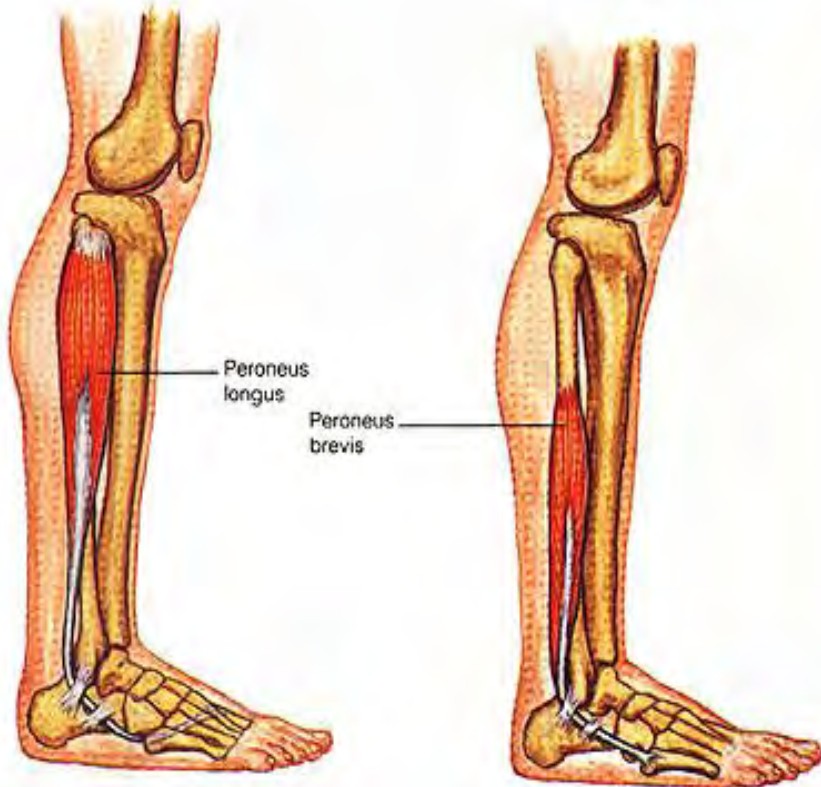
RESISTED INVERSION



# PREVENTION STRENGTHENING

## ANKLE EVERSION

PERONEUS LONGUS,  
BREVIS, TERTIUS



## EXERCISES RESISTED EVERSION



# PREVENTION

## STRENGTHENING / PROPRIOCEPTION

### SINGLE LEG STANCE

EYES OPEN

EYES CLOSED

ON FOAM

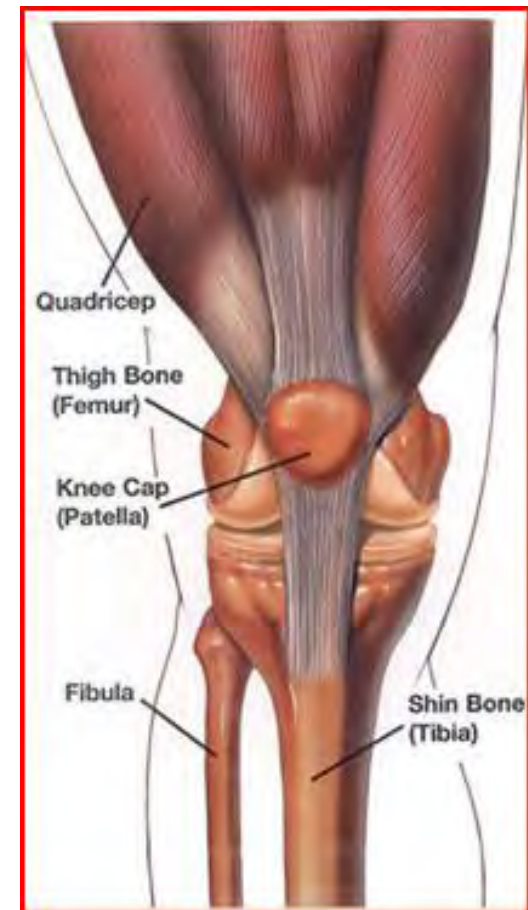
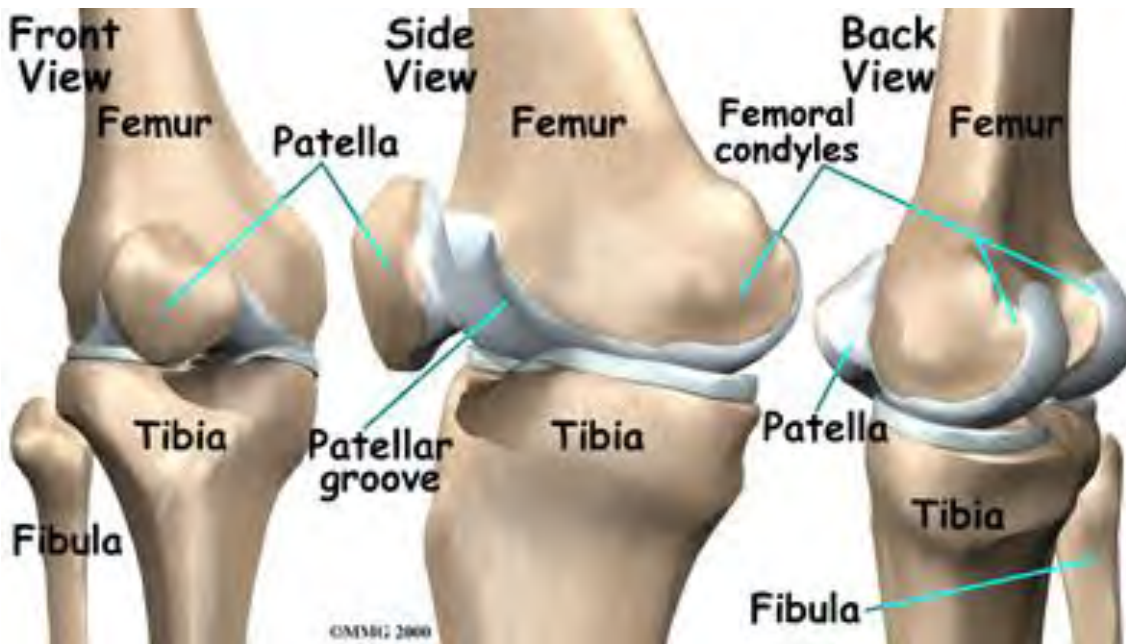




# PATELLOFEMORAL SYNDROME

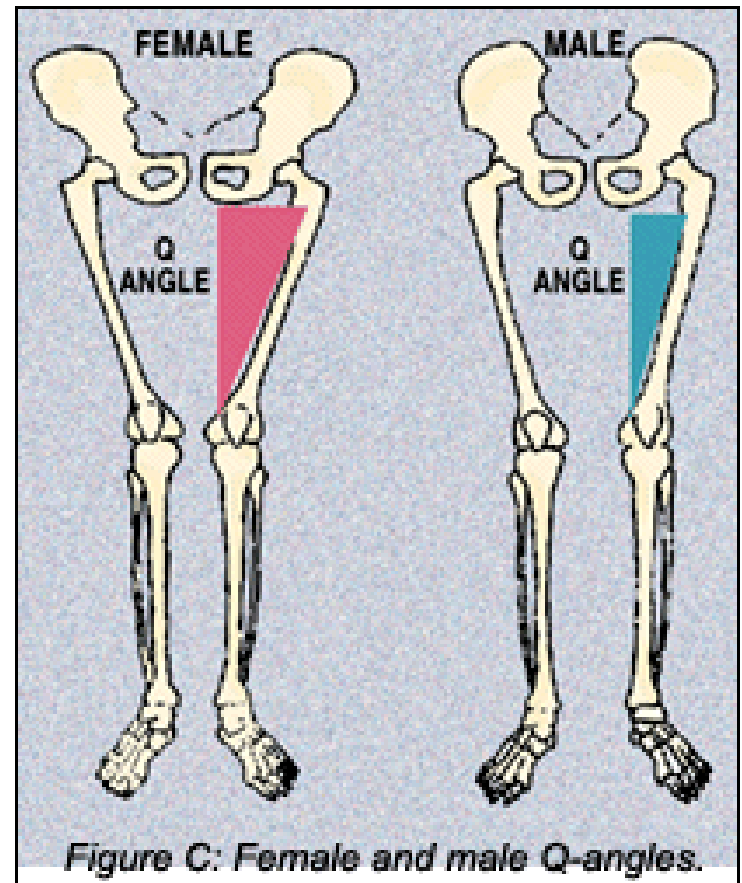
- *Generalized knee pain caused by abnormal positioning or tracking of the patella in the femoral groove*
- *Often worse with stairs, running, squatting, kneeling*

## ANATOMY INVOLVED



# PATELLOFEMORAL SYNDROME

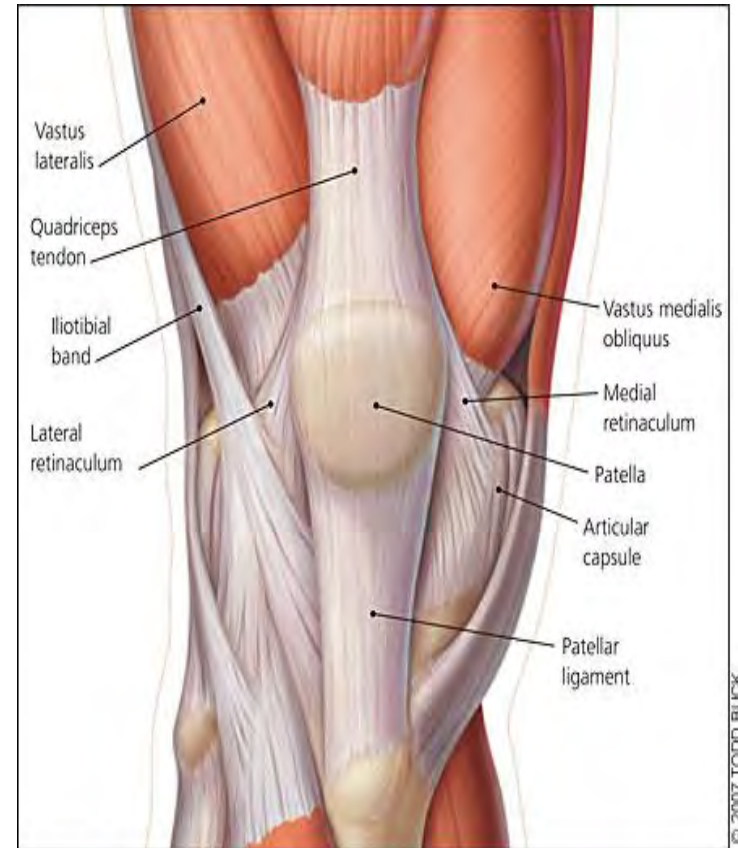
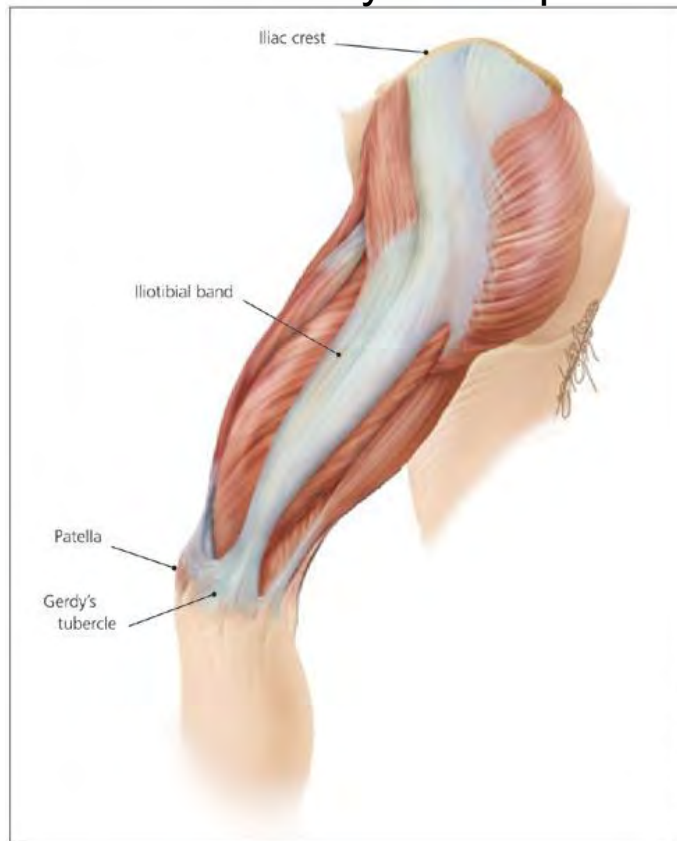
- *More common in females than males due to enlarged Q angle*



# PATELLOFEMORAL SYNDROME

## COMMON CAUSES

- Tightness in lateral knee structures
  - ITB and Lateral Retinaculum
- Weakness in Quad
  - Poorly developed VMO



# PATELLOFEMORAL SYNDROME

## PREVENTION

- *Acute flare ups can be usually managed with rest and ice*
- *Taping / Bracing for better patella tracking and positioning may be an option*





# PATELLOFEMORAL SYNDROME

## PREVENTION

### STRETCHES OF TIGHT LATERAL HIP MUSCLES AND ITB

SKTC



CROSSOVER

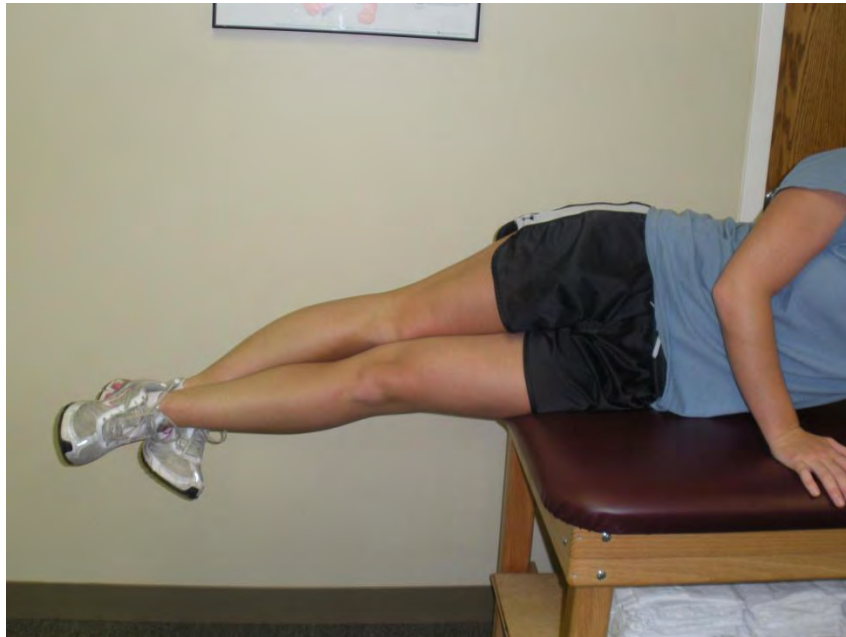


# PATELLOFEMORAL SYNDROME

## PREVENTION

### STRETCHES OF TIGHT LATERAL HIP MUSCLES AND ITB

SIDELYING ITB



STANDING ITB



# PATELLOFEMORAL SYNDROME

## PREVENTION

### STRENGTHEN QUAD MUSCLES

SLR



SAQ



INNER RAISE

# RUNNERS KNEE

AKA *“Iliotibial Band Friction Syndrome”*

- *Overuse irritation resulting from friction between the distal ITB and lateral femoral condyle*

**Iliotibial  
Band  
Syndrome**



©MMG 1999

# RUNNERS KNEE

## *Common Causes*

- *Associated with increase in training either in a single run or over a short period of time*
- *Running on same side of pitched road constantly (down leg)*

# RUNNERS KNEE

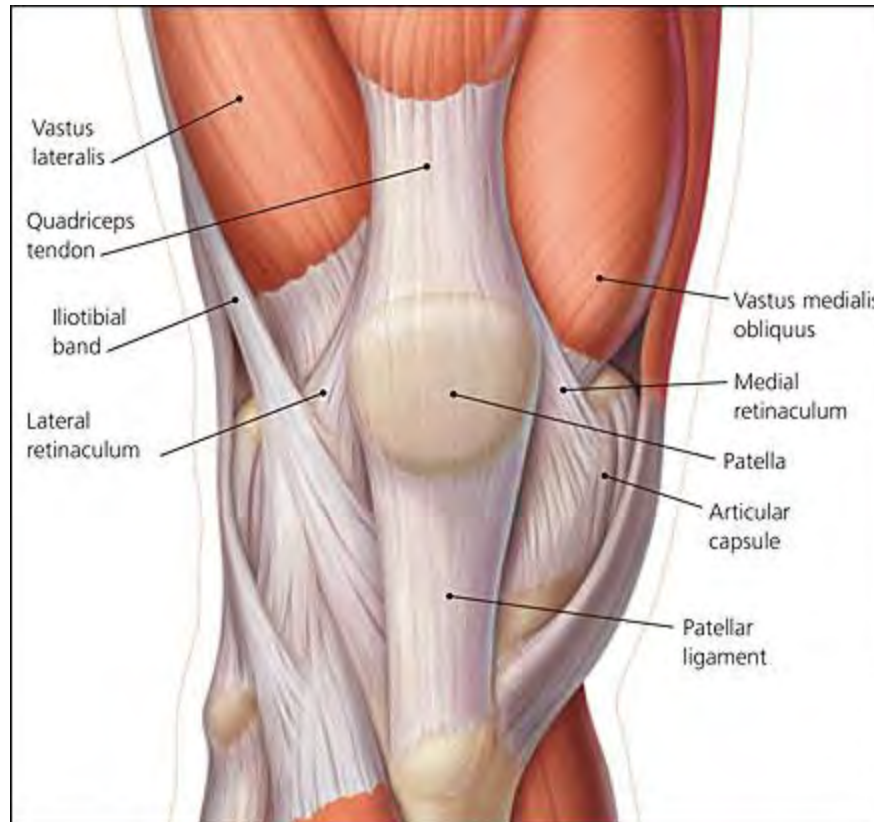
## PREVENTION

- *Acute flare ups can be managed with rest and ice*
  - *Stretching of tight lateral hips / ITB*
  - *Gradual increase in training intensity*
  - *Vary running routes and surfaces*



# JUMPERS KNEE

- *Overuse irritation / inflammation of distal patella tendon*
- *Commonly caused by tightness and / or weakness of the quad muscle*



# JUMPERS KNEE

## PREVENTION

- *Acute flare ups can be managed with rest and ice*
- *Proper stretching / flexibility of the quad*





# JUMPERS KNEE

## PREVENTION

- *Proper strengthening of the quad*



# JUMPERS KNEE

## PREVENTION

- *Proper strengthening of the quad*



# JUMPERS KNEE

## PREVENTION

- *Advanced Plyometric Jump Training*

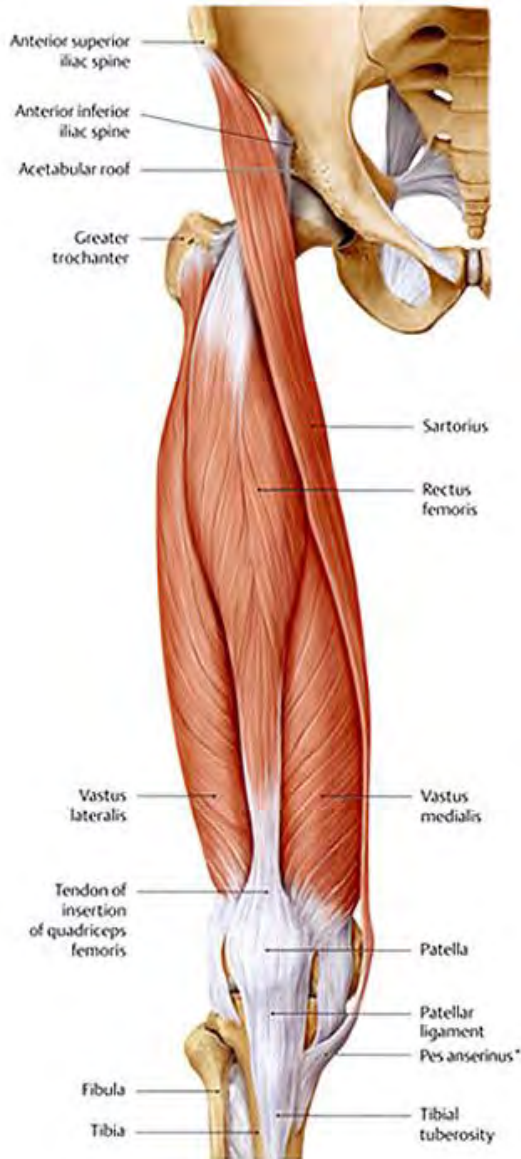


# MUSCLE STRAINS

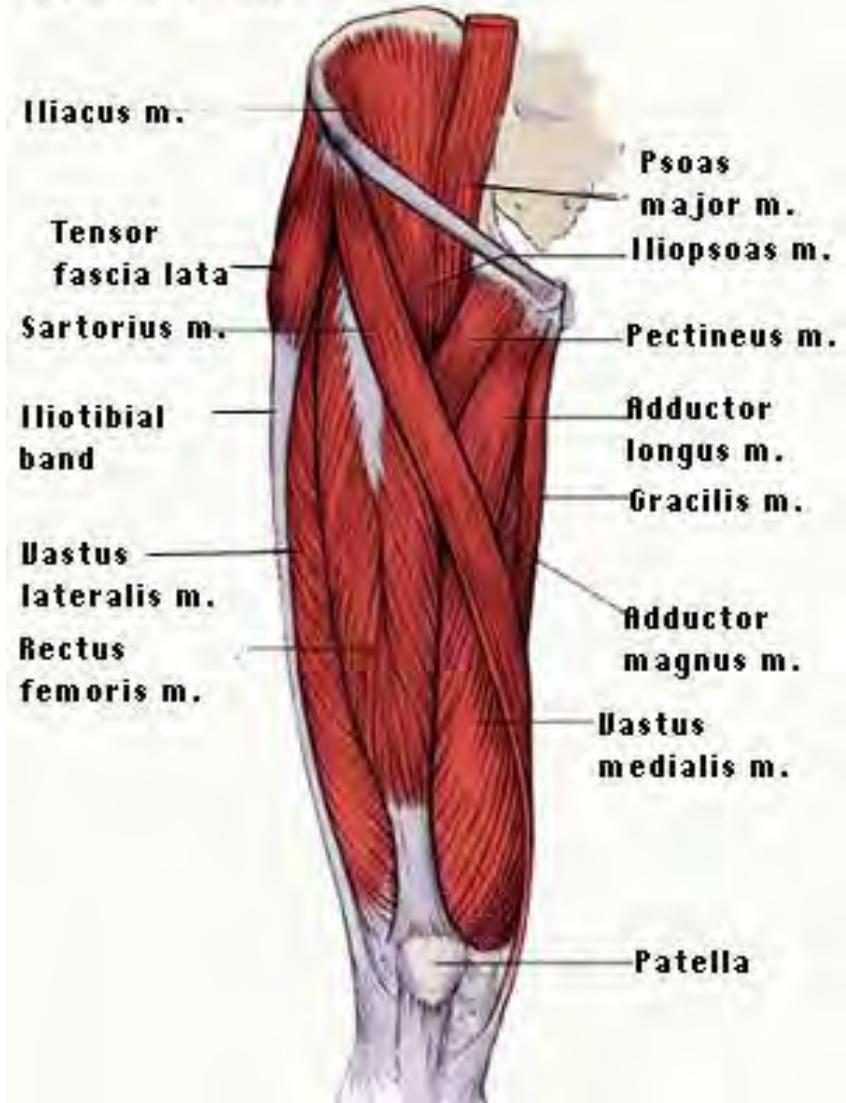
- *AKA “Pulled” Muscle*
- *Common muscle strains associated with running sports include hip flexor, hamstring, and calf strains*
  - *Generally occur when muscles are contracted forcefully during activities such as running, jumping, kicking*
- *Proper warm up is essential prior to high level sport activities*



# HIP FLEXOR STRAINS



## Superficial View



# HIP FLEXOR STRAINS PREVENTION

HIP FLEXOR STRETCH



QUAD STRETCH



# HIP FLEXOR STRAINS

## PREVENTION

### STANDING LEG RAISE / LEG KICK

SLR





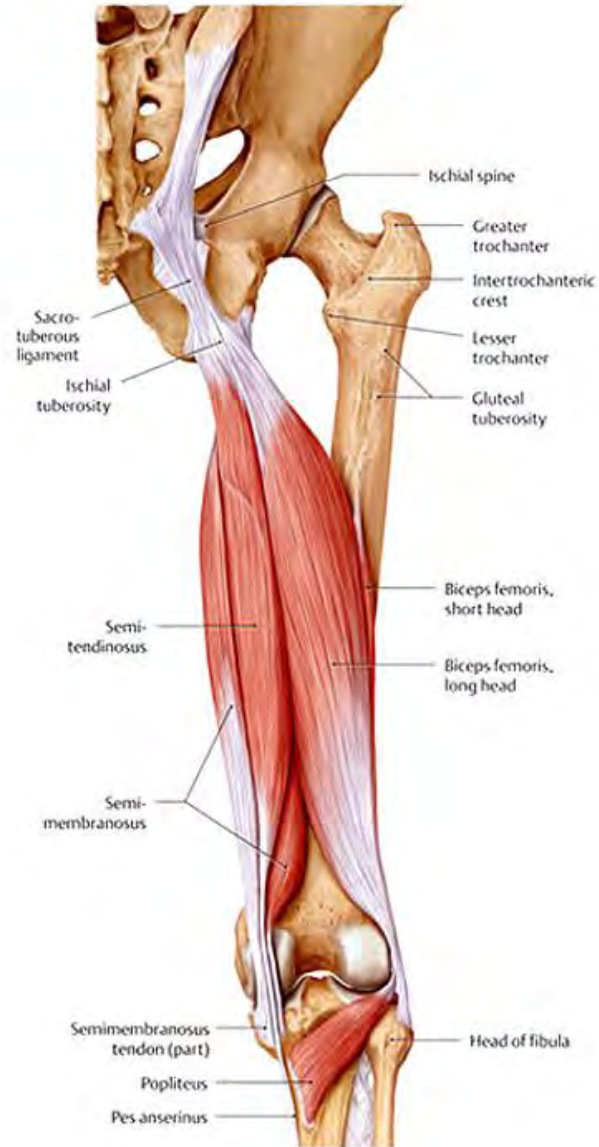
# HIP FLEXOR STRAINS PREVENTION

## HIP FLEXION WITH KNEE EXTENSION





# HAMSTRING STRAINS



# HAMSTRING STRAINS

## PREVENTION

### HAMSTRING STRETCH



# HAMSTRING STRAINS

## PREVENTION

HS CURL MACHINE



HS BALL CURL





# HAMSTRING STRAINS PREVENTION

## HIP EXTENSION WITH KNEE FLEXION



# CALF STRAINS

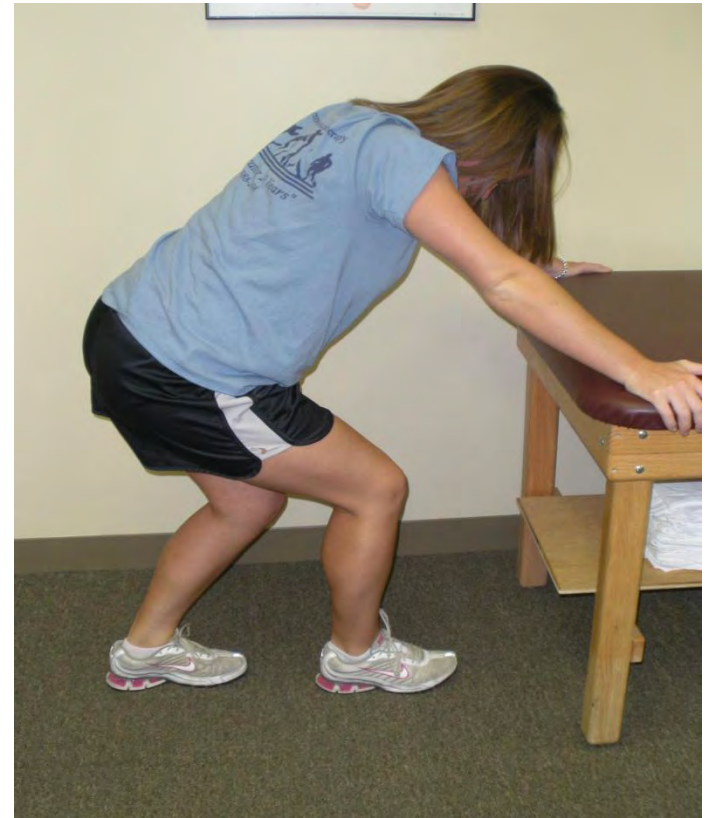


# CALF STRAINS PREVENTION

GASTROC



SOLEUS





# CALF STRAINS PREVENTION

DOUBLE LEG RAISES



SINGLE LEG RAISES

