



# Overuse Injuries on the Bike

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# Overuse Injuries on the Bike

## Introduction

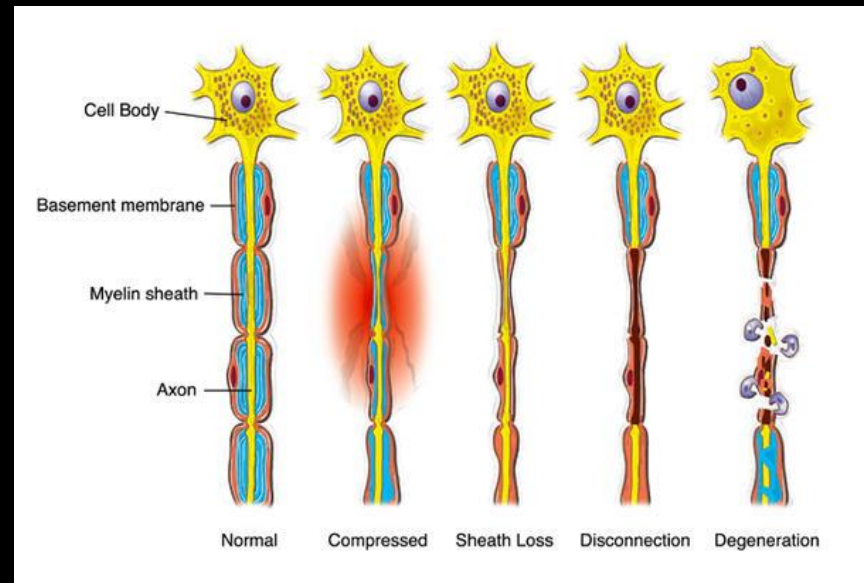
- Nerve injuries
- Tendinitis and Tendinosis
- Joint Problems
- Anatomy and Pathophysiology
- Rehab and Bike Fit Solutions



# Nerve Injuries

## Neuritis

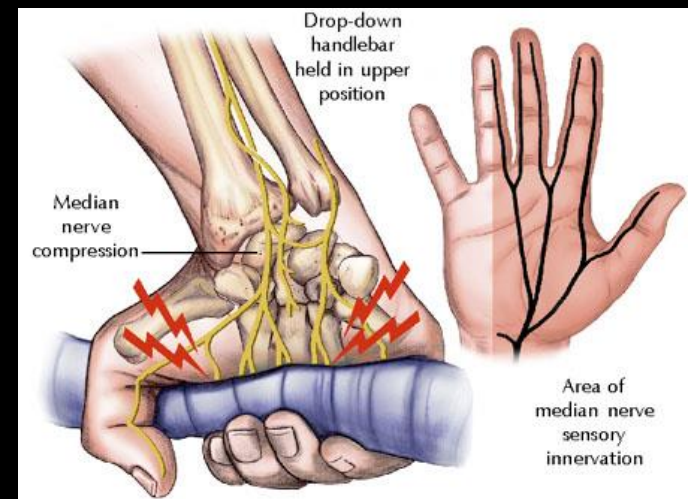
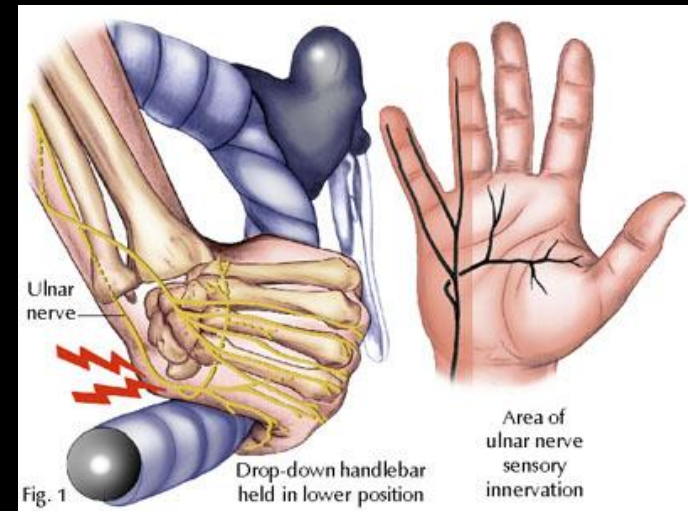
- Inflammation
  - Compression
  - Traction
- Sensory Nerves
  - Pain
  - Numbness
  - Tingling
- Motor Nerves
  - weakness



# Nerve Injuries

## Carpal

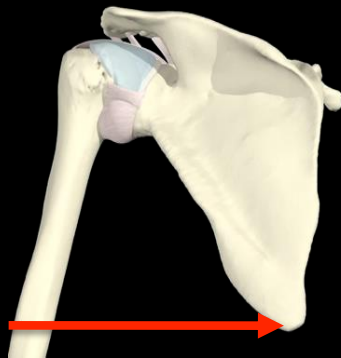
- Ulnar Nerve
  - 4<sup>th</sup> and 5<sup>th</sup> digits
- Median Nerve
  - Carpal Tunnel
  - First three digits



# Carpal Neuritis

## Bike Fit Solutions

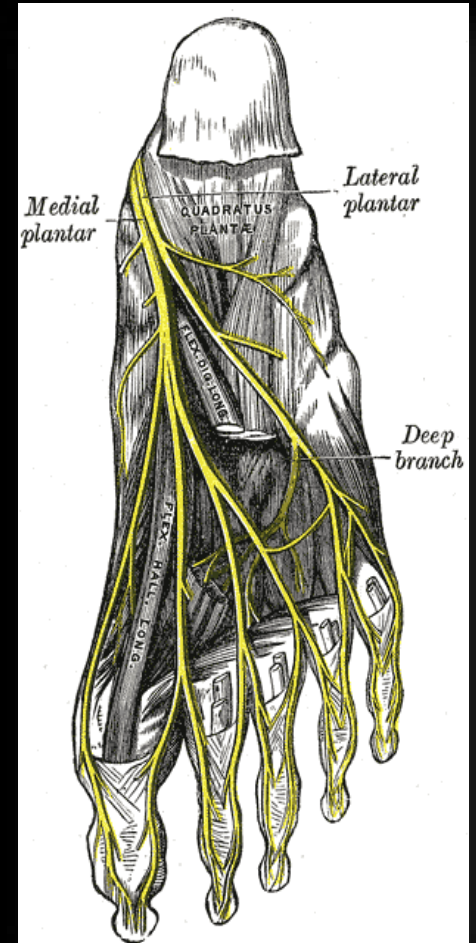
- Padded gloves
- Natural wrist position
- Move saddle backwards
  - Center of gravity
  - BMR (body mass representation)
  - Angle of scapula to BB



# Metatarsal Neuritis

## Digital Nerves

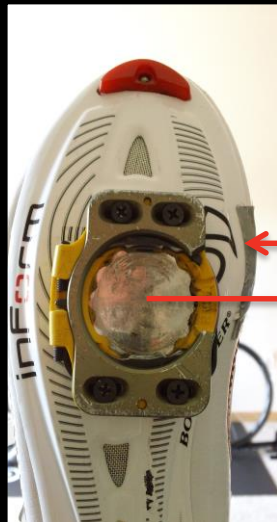
- Split between metatarsal heads
- Compression from both sides and sole
- “Hot foot”
- Morton’s Neuroma



# Metatarsal Neuritis

## Bike Fit Solutions

- Cleats  $\leq 1$  cm behind head of 1<sup>st</sup> metatarsal
- Shoe with wide toe box
- Arch length important!



1 cm



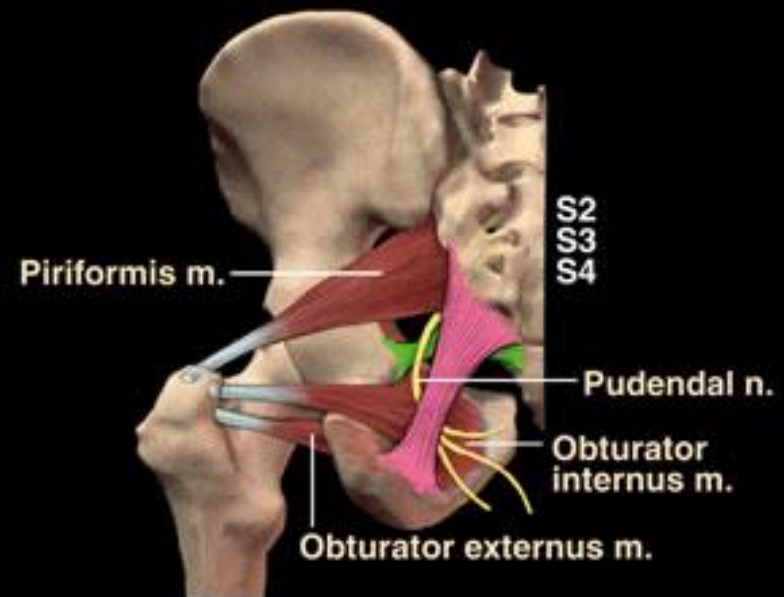
Shoe Size 40

Arch Length 42

# Pudendal Neuritis

## Pudendal nerves

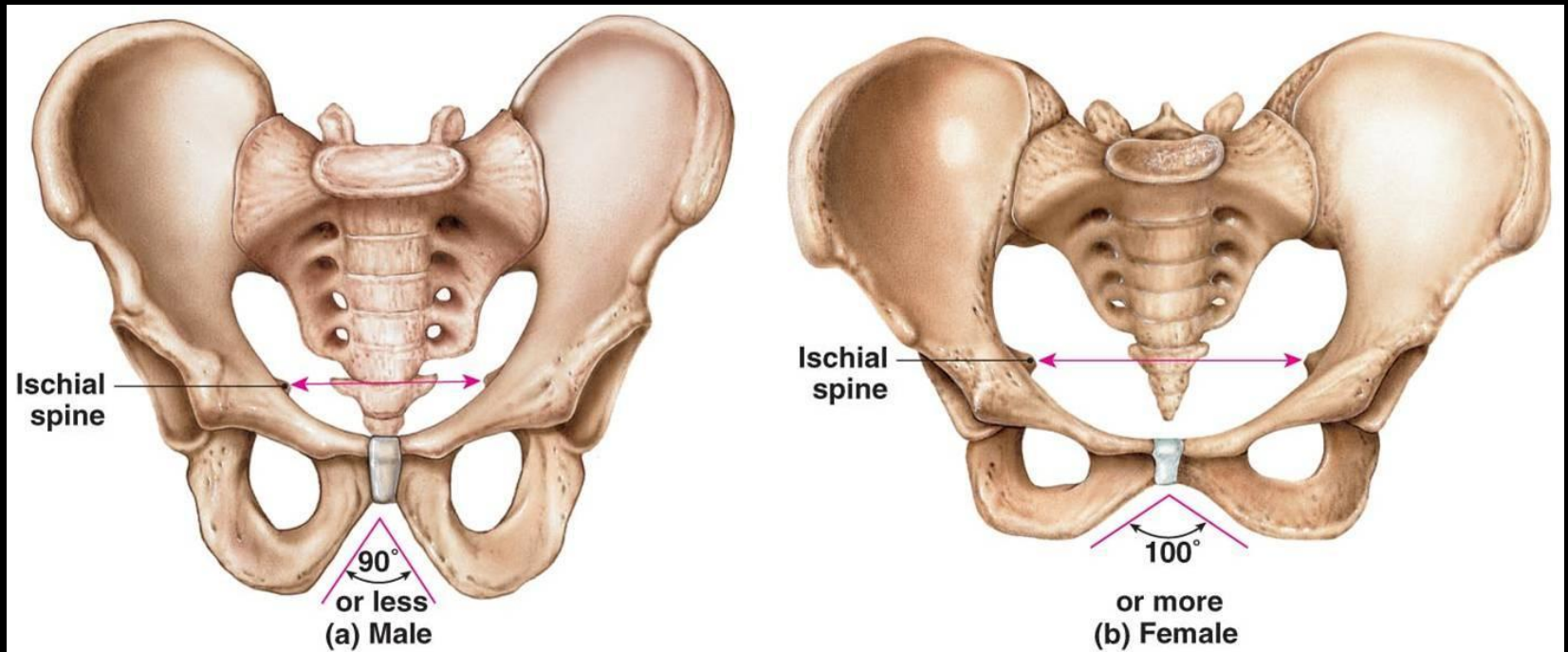
- Supply perineum and genitals
- Course below pubic arch
- Numbness, pain
- Erection dysfunction
- Vulvar inflammation
- Prostate inflammation



# Pudendal Neuritis

Male

Female



Narrow V shaped pelvic arch

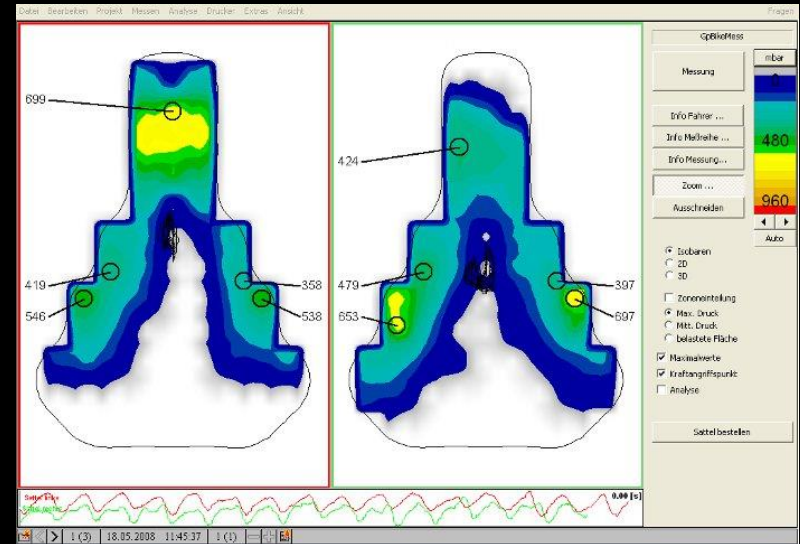
Wide U shaped pelvic arch

Up to 15% of men and women have the opposite sex pelvic structure

# Pudendal Neuritis

## Bike Fit Solutions

- Correct Bike Fit
- Saddle Selection
  - Pressure mapping
  - Gender specific or try switch
  - Distribution across pubic arch
  - Reduce soft tissue pressure
  - Pelvis rotation key
    - » Rider style / event
    - » Flexibility
    - » Females pubic bone limiting



# Spinal Nerve Injury

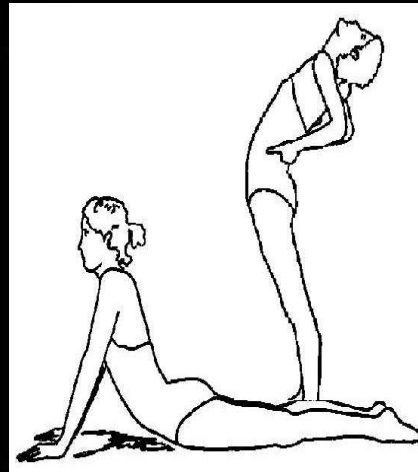
## Disc Herniation

- Prolonged spinal flexion
- Disc pushes back into spinal cord
- Often radiates (“sciatica”)
- Medical referral



## Prevention

- Pelvis guides fit
- Extension exercises



# Tendinitis

## Tendons

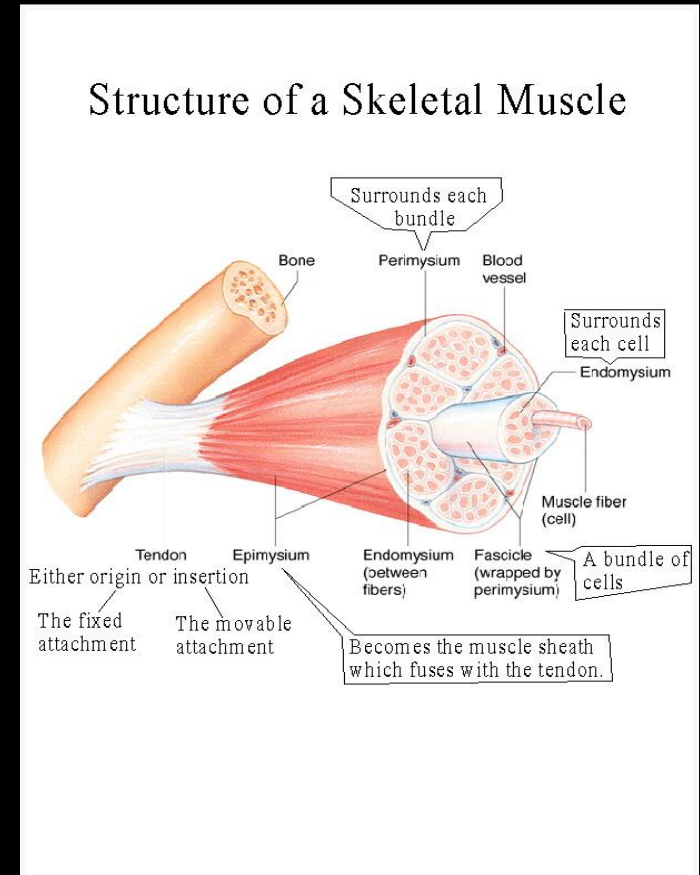
- Connect muscle to bone
- Anchor contracting muscle
- Strain: stretch or partial tear
- Attachment site vulnerable

## Tendinitis – acute

- Inflammation – 1<sup>st</sup> stage in healing
- NSAIDS?, rest, ice

## Tendinosis – chronic

- Collagen fibers degenerate, weaken
- Stimulation, strengthening



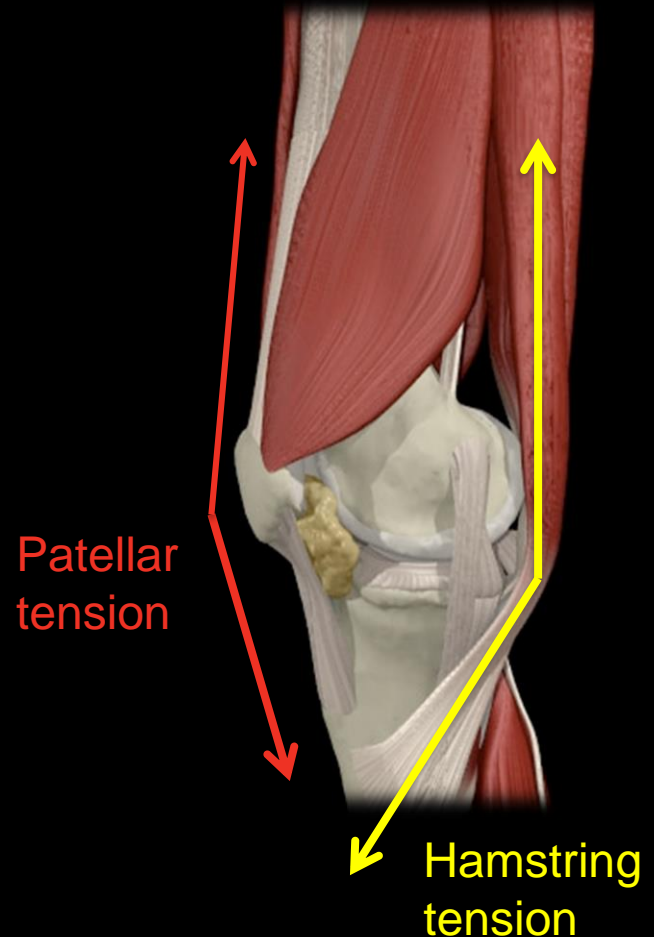
# Tendinitis

## Patellar Tendinitis

- Quadriceps / patellar tension
- Deep squats and lunges
- Move saddle up and or aft
- Shorten cranks
- Quad stretches

## Hamstring Tendinitis

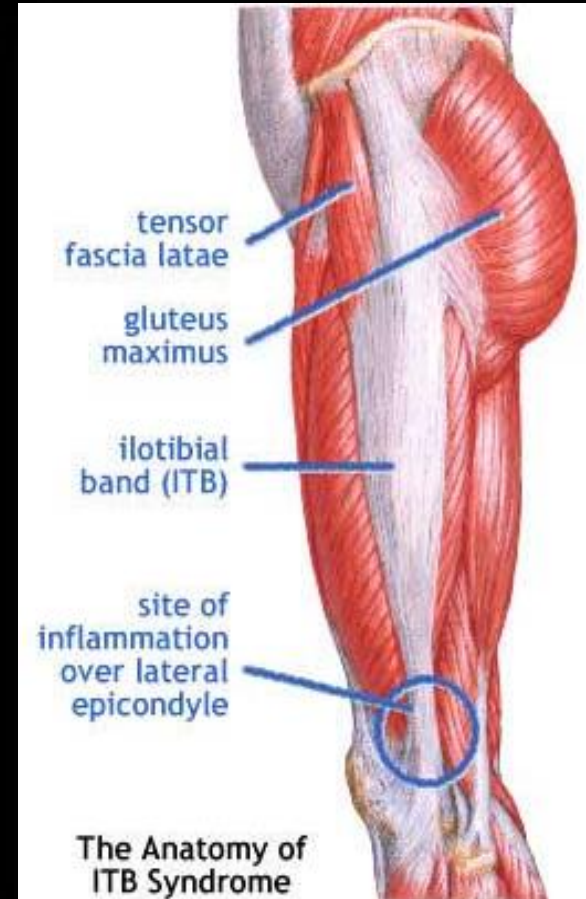
- Attach behind knee on tibia/fibula
- Strain if saddle high or if tight
- Move saddle down
- Hamstring stretches



# Tendinitis

## Iliotibial Band Syndrome

- Attaches from ilium to tibia
- Friction at Gr. Trochanter and LFE
- Connects to femur along course
- TFL is small muscle component
- Overused when gluts are weak
- Impossible to stretch \*
- Solutions:
  - Move saddle down or up
  - Strengthen gluts
  - Shorter cranks
  - Arch supports or wedges



\* Falvey, et al, Iliotibial Band Syndrome: an examination of the evidence behind a number of treatment options., Scand J Med Sci Sports. 2010 Aug;20(4) 580-7.

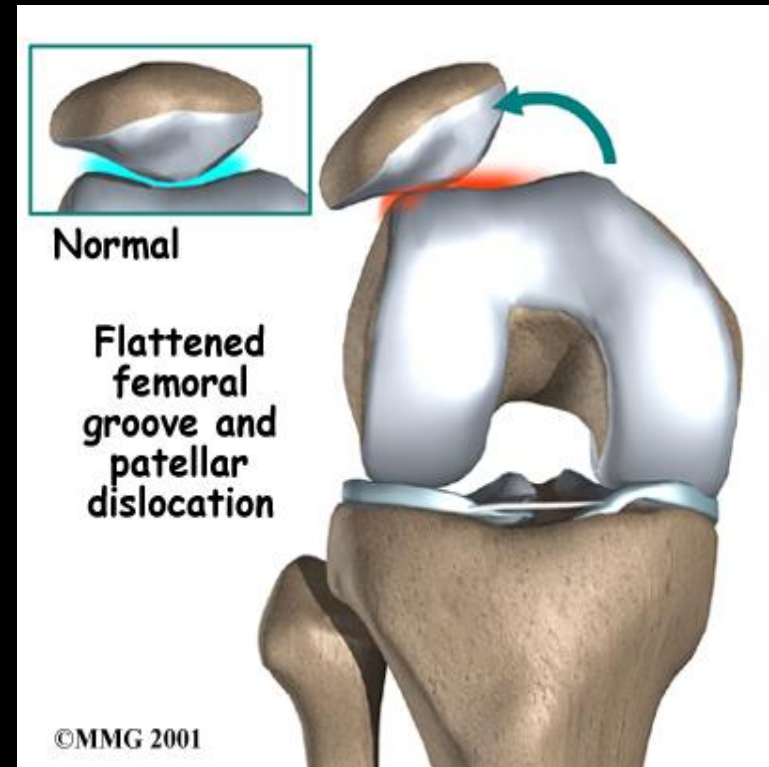
# Joint Problems

## Patellofemoral pain

- Iliotibial band pulls laterally
- Patellar grinds on lateral condyle
- Glut weakness is key
- Genu valgum contributes

### ▪ Solutions

- Strengthen glut muscles
- Arch supports or wedges
- Adjust saddle height



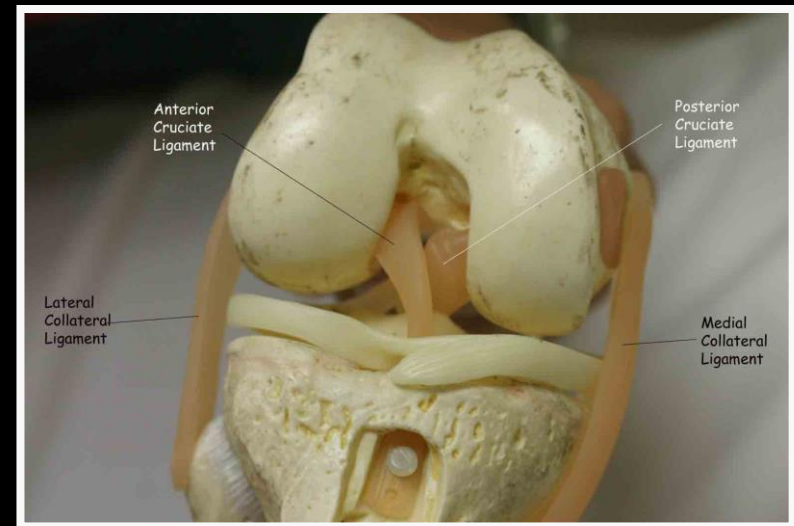
# Joint Problems

## Ligaments

- Stabilize joints
- Attach bone to bone
- Sprain: stretch or partial tear
- Joint ROM congenital
- Muscles surrounding joint support

## ■ Cartilage

- Meniscal
- Chondral or end bone



# Joint Problems

## Shoulder Instability

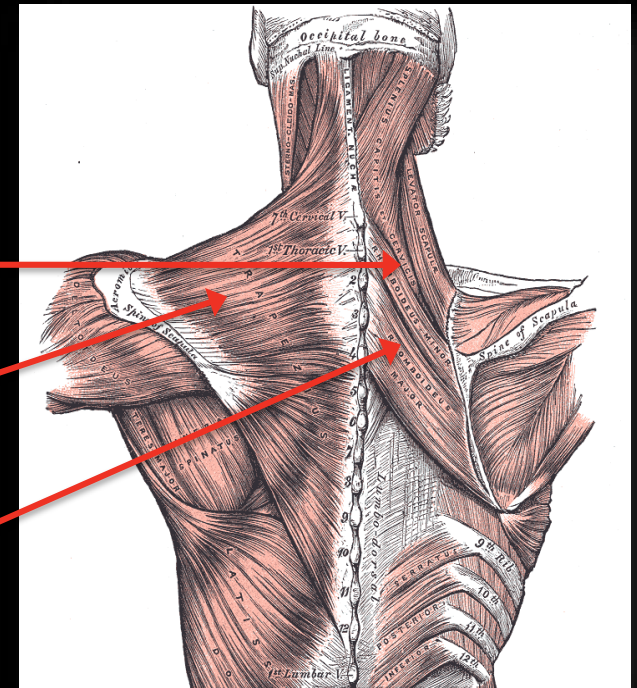
- Upper back supports shoulder
- Muscles attach to neck and head
- Neck and upper back pain
- Hands no wider than shoulders
- Pulling rather than pushing exercises



Levator scapula

Trapezius

Rhomboid



# Joint Problems

## Hip Restriction

- Angle determined by congenital hip
- Hip pain or rocking if exceeded
- Triathletes or TT particular concern



## Solutions

- Shorter cranks
- Move saddle aft
- Raise front end



# Key Points

- Inflammation is a natural part of healing
  - Consider the center of gravity during fitting
  - Arch length is perhaps more important than the shoe size
  - You can't stretch the IT band but you can strengthen the gluts
  - Pressure mapping is the best way to determine saddle shape
  - Extension exercises are good for backs that ride bikes
  - Handlebar width crucial for women or if shoulder laxity
  - Shorter crank arms can solve a lot of problems
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**THANK YOU**

**Mark Timmerman, M.D.**