Objectives

1. Demonstrate knowledge of the anatomy of the lower extremity - Hip, Knee, Ankle, Foot
2. Discuss and describe the clinical presentation and diagnosis of common injuries to the lower extremity
3. Describe and demonstrate a complete H&P examination of the lower extremity
Objectives

4. Describe and demonstrate OMT techniques to treat lower extremity injuries and conditions:

Specifically
1. FPR for Musculature/plantar fascia
2. Iliopsoas Muscle Energy/Hip capsule bounce
3. 5 (6 or 7)-Step Knee Treatment
4. Ankle/foot HVLA and articulation

Hip Problems

* A patient presents with hip pain...
Common Hip DDx

- Strain (muscles)
- Sprain (ligaments)
- Arthritis (OA, RA)
- Bursitis
- Radiculopathy
- Fracture
- Tumor
- Infection
- Synovitis
- Traumatic
- Somatic Dysfunction

Anatomy

Pelvic girdle has three joints:

- Acetabulofemoral joint - (hip joint)
- Sacroiliac joint (sacrum is the base of the spine & the innominate is considered part of the leg)
- Pubic symphysis (anterior strut that provides stability during walking or sitting)
  - The main motions of the pubic symphysis are superior/inferior glide and separation/compression
Anatomy

Acetabulofemoral joint:
- Ball & socket joint- mobility & weight bearing
- Intrinsic stability due to shape, ligamentous & cartilaginous attachments

Consists of:
- Acetabulum
  - Ilium
  - Ischium
  - Pubis
- Femoral head

Mechanics
Muscle Function

Hip Flexors:

- **Iliopsoas** - (hypertonic, runners, soccer, skaters have increased lumbar lordosis)
- Rectus femoris (stiff knee gait, retro patellar pain)
- Sartorius

Hip Extensors

- **Gluteus maximus**
- Hamstrings
  - *Medial hamstrings*
    - Semimembranosus
    - Semitendinosus
  - *Lateral hamstrings*
    - Biceps femoris
Adductors – 5 muscles

- Adductor longus
- Adductor brevis
- Adductor magnus
- Pectineus
- Gracilis

Abductors

- Gluteus medius
- Gluteus minimus
Knee Problems

A patient presents with knee pain...

Common Knee DDx

- Strain (muscles)
- Sprain (ligaments)
- MCL, LCL
- Medial/lateral Meniscal tear
- ACL/PCL tear
- Arthritis (OA, RA)
- Bursitis
- Radiculopathy
- Fracture
- Tumor
- Infection
- Synovitis
- Baker Cyst
- Traumatic
- Somatic Dysfunction
  - Fibular head
  - Tibiofemoral
- Chondromalacia patella
- Osgood-Schlatter
Observation, Inspection

http://www.mendmyknee.com/_img/bowlegged.jpg

Bursitis

Osteoarthritis Knee

Early-Stage  →  Mid-Stage  →  Late-Stage

Stages of knee OA

Stage I  Stage II  Stage III  Stage IV

http://www.regionalorthopedic.com/wp-content/uploads/2012/05/StagesofKneeOAIllustration.jpg

KNEE ROM

- **Flexion**  120-135 Degrees
- **Extension**  0-5 Degrees
- **Tib-fib ER/IR**  10 Degrees

Ankle/Foot Problems

- A patient presents with ankle/foot pain...
Common Ankle/Foot DDx
- Strain (muscles)
- Sprain (ligaments)
- Arthritis (OA, RA)
- Fracture
- Radiculopathy
- Fracture
- Traumatic/Achilles Tendon
- Plantar fasciitis
- Somatic Dysfunction

Lateral Ankle Complex
Medial Ankle Complex

- Triangular deltoid ligament
  - attachments
    - tuberosity of navicular
    - sustentaculum tali
    - calcaneus
    - medial tubercle of talus

Epidemiology

- Estimated that there is one inversion injury of the ankle per 10,000 persons per day (U.S. 23,000/day)
- Ankle sprain is the most common sports injury *(can be treated acutely and chronically with OMT!)*
- In running and jumping sports accounts for 25% of injuries
- Large majority of pts. are <35y.o., most are 15 - 19y.o.
Clinical Evaluation
Ankle/Foot

- lateral malleolus
- arches
- plantar fascia
- 5th Metatarsal base
- ligaments - (next two slides)
  - Valgus test
  - Varus test

Clinical Evaluation
Ankle/Foot

- Varus Test - Lateral ligaments
- Valgus Test - Deltoid (medial) ligament
Physical Exam

- **Tests for ankle stability**
  - **Anterior drawer test**
    - if positive is indicative of ATFL tear
    - perform at neutral and at 10 degrees of plantar flexion

Mechanism of Injury

- **Tears progress in predictable sequence**
  - ATFL, anterolateral capsule, distal tibiofibular ligament, CFL, PTFL
  - if PTFL ruptures, ankle dislocation may occur, eversion injuries may fracture the fibula
  - inversion is most common sprain ....85%
Inversion 85%

Eversion 15%

Physical Exam

Palpate
- point of maximal tenderness
- include palpation of proximal fibula
Bones of the Foot

- Calcaneus
- Talus
- Navicular
- Cuboid
- Cuneiforms (3)
- Metatarsals (5)
- Phalanx (14)
- Accessory bones (up to 24)

Be Mindful of the 5th

Stress Frx
Jones Frx
Avulsion Frx
Rearfoot Injuries

- Talar Stress Fractures
- Calcaneal Stress Fractures
- Retrocalcaneal bursitis.
- Plantar fasciitis
- Somatic dysfunctions

Metatarsalgia

- Pain in the region of the metatarsal heads.
- Ground reactive forces are not properly distributed.
**Plantar Fasciitis**

- **SSX- First step** in AM worst & w/ activity
  - Point tender over medial calcaneal tuberosity
  - Gastroc/achilles tight, overpronation common
  - Pain reproduced w/ jumping on involved toes
  - **Fat Pad Syndrome** - No pain w/ toe jumping
- may see heel spur in 30%

**Plantar Fasciitis**

- **Plantar Fascia** - maintains longitudinal arch
  - Provides shock absorption
  - Helps develop push-off power-running/jumping
- **Weight gain, growth spurt, poor shoeware**
- **Can be treated quickly and effectively with OMT!* (FPR)**
OMT for Lower Extremity

1. Hip
   1. FPR Muscles
   2. Spencer Technique for the Hip
   3. Fulford (see below)

2. Knee
   1. 5 (6, 7)-Step Knee Treatment
      1. Popliteal fossa MFR
      2. Fulford technique
      3. Fibular Head FPR (jiggle technique)
      4. BLT
      5. Patellar MFR

3. Foot/Ankle (HVLA, MFR, FPR)

Questions?
References

- Physical Examination of the Spine and Extremities. Hoppenfeld.