

## Conservative Management of FAI & Hip Labral Tears

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## Outline

- Brief history
- Define FAI and subtypes
  - Cause of LT
- Etiology
- Screening techniques
- Non-invasive treatment ideas
  - Manual and therapeutic exercise strategies

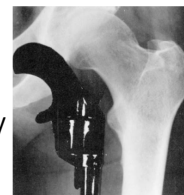


## Hips Don't Lie



## History

- 1960s Murray suggested a deformity of proximal femur as cause of hip OA
  - Minor developmental deformity
  - Perhaps a mild untreated SCFE
- 1970s and '80s Harris, Soloman et al expanded on this theory
  - Additional data
  - “Pistol grip” deformity



## History

- 2003 Ganz et al. coined “Femoracetabular Impingement”
  - Defined how these subtle deformities can cause OA
  - Introduced idea that correction of the deformity could reduce or slow development of OA
- Access was an issue
  - Open surgical dislocation best option
- Mid 2000's – Byrd, Kelly, Philippon....etc.
  - Developed arthroscopic techniques



## Joint Preservation and Function

– Depends on three biomechanical factors

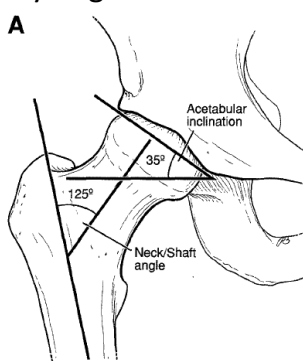
1. Good femoral head-neck offset
  - For proper ROM of femoral head w/in acetabulum
2. Proper acetabular anteversion
  - Decreased anteversion increases external rotation
3. Correct acetabular coverage of the femoral head
  - amount of femoral head coverage



### Normal Bony Alignment

**A**

- Acetabular face –
  - 35-45 deg caudally, 15-20 deg anterior (anteverted)
  - Figure C next slide
- Depth – 170 deg coverage of femoral head
- Femoral Neck-shaft angle – 125-135 degrees



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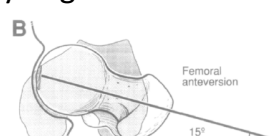
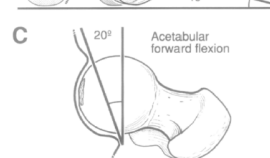
### Normal Bony Alignment

**B**

- **Femoral anteversion**
  - Gradual decrease throughout childhood
  - 10-15 degrees in adulthood
    - With respect to the femoral condyles
    - ↑ = toe in
    - ↓ = toe out

**C**

- **Acetabular anteversion**
  - ~ 20 degrees

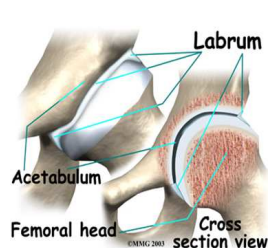



Kallas, KM & Guanche, CA 2002

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### Hip Labrum

- Fibrocartilage
- Deepens already stable FA joint
- Helps contain femoral head in extreme ROMs
  - Flexion mostly
- Maintains vacuum seal of joint space
- ↑ Joint congruity

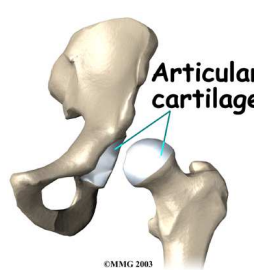


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### Articular Cartilage

- Articular hyaline cartilage
- Collagen, chondroitin sulfate...
- No innervation, avascular
- SHOCK ABSORPTION
- GLIDING of joint surfaces

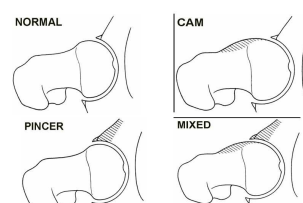


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### What is Femoroacetabular Impingement?

- Simple!
  - Subtle deformity of the bony structure of the FA joint
- **3 types**
  1. CAM
  2. Pincer
  3. Mixed CAM/Pincer



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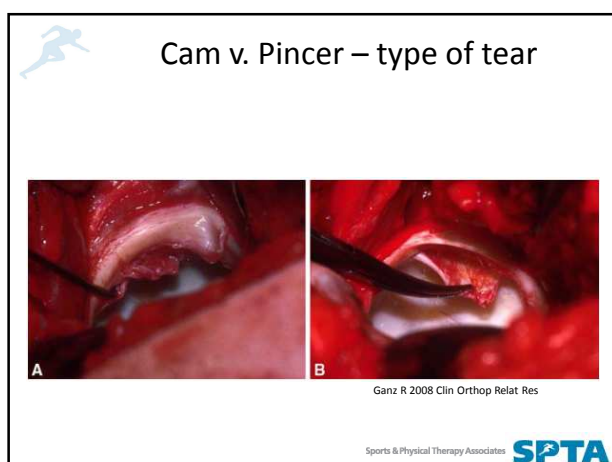
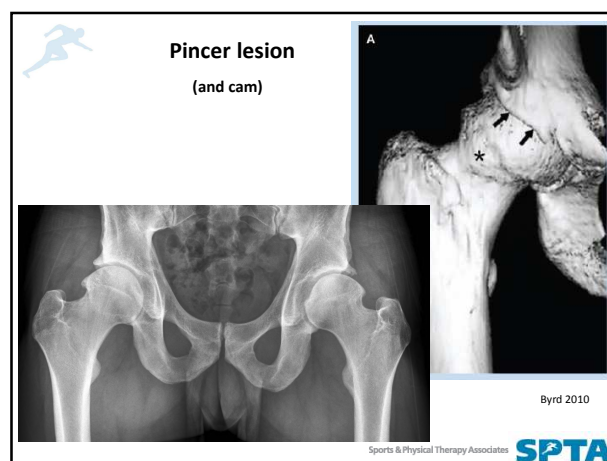
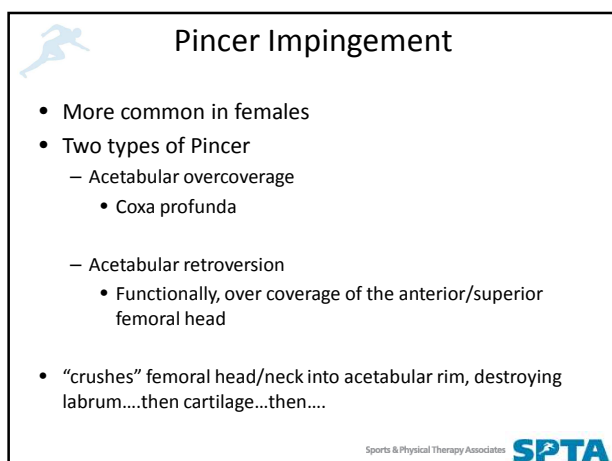
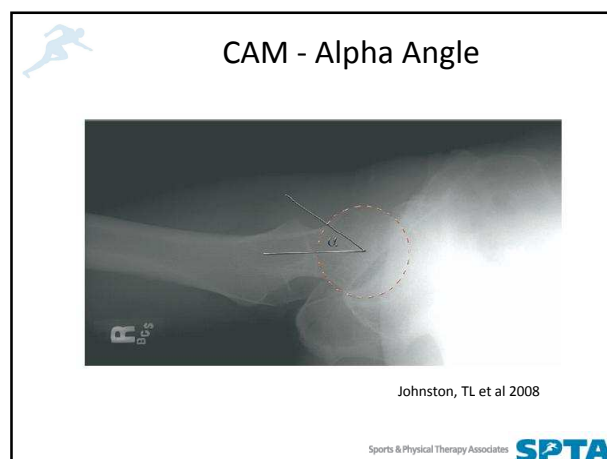
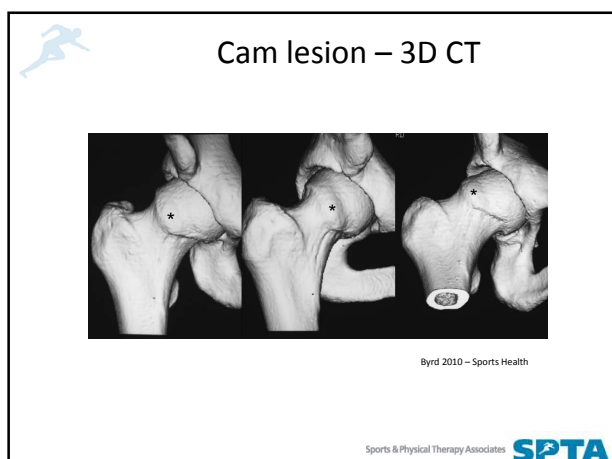
### Cam Impingement

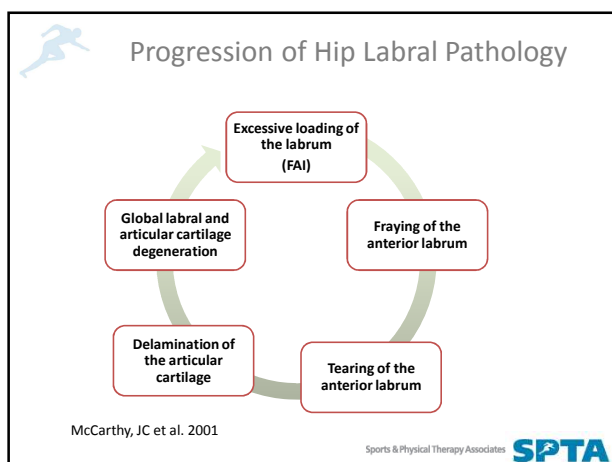
- CAM = Abnormally shaped femoral head
  - More common in males
  - Symptoms reproduced w/ flexion/IR
- Bump at femoral head/neck junction
  - Causes shearing of labrum off of acetabular rim
  - .....damages cartilage underneath, then...

Why??

Abnormal extension of epiphyseal scar  
-more about that later...

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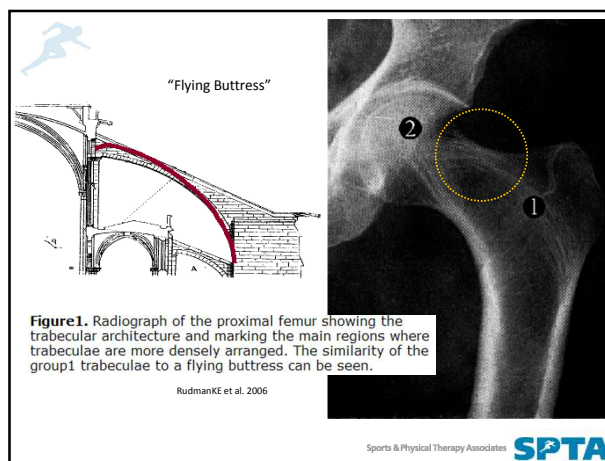
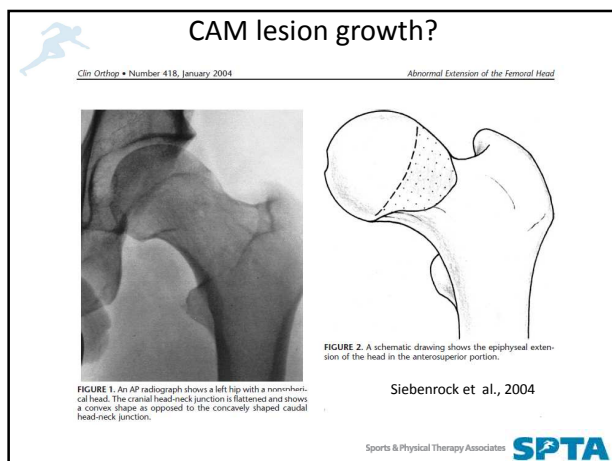




### Etiology?

- Inconclusive body of evidence
- Congenital?
  - Sure, lets just blame genetics
- Subacute SCFE?
  - Mild slip over time untreated
- Growth of CAM over time?
  - Deep flex/abd/IR causes and remodels osteophyte
  - Enlargement head/neck junction due to loading during adolescence.

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### FAI in College FB players

Kapron et. al JBJS 2011

Radiologic Prevalence of FAI in College FB

- 67 players, avg. age 21
  - Measured alpha angle, femoral head-neck offset, lateral center-edge angle, acetabular index, crossover.
- 95% of 134 hips had at least one sign of cam or pincer impingement, 77% > 1 sign

= hip morphologic changes common in highly trained powerful athletes.

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### CAM FAI in Adolescents

- Philippon et all (2013 AJSM)
  - 61 youth IH and 27 male youth skiers (ages 10-18)
  - Clinical hip exam and MRI alpha angle compared
  - Clinical exam findings did NOT differ b/w groups
  - but IH group had higher  $\alpha$  than skiers
  - AND, Alpha angles increased with age

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### Is this as bilateral problem?

- Klingenstein et al. 2013 AJSM
- Reported 514 bilateral and 132 unilateral FAI patients.
  - Bilateral pts:
    - higher alpha angles
    - Sig. lower acetabular anteversion
  - Younger pts had higher alpha angles, less acetabular anteversion, and more likely for bilateral FAI treatment (surgery).

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### Asymptomatic imaging

- Silvis et al, 2011 AJSM
  - 21 pro & 18 male college hockey players
    - Asymptomatic w/o hx pelvis/hip injury
  - 77% (30/39) demonstrated hip or groin abnormalities on 3T MRI
    - 64% hip pathology
    - 56% labral tear
    - 36% “common adductor/abdominal rectus dysfunction”

MRI must be adjunct to clinical evaluation of hip/groin pain

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### Relationship w/ Athletic Pubalgia

- Economopoulos et al. (2014 Sports Health)
  - Retrospective review 43 pts w/ 56 athletic pubalgia repairs
    - 42 male, 1 female; 22.3 y/o; mostly college/HS athletes
    - AP and frog leg lateral films evaluated
  - FAI identified in 86% pts
  - CAM lesions found in 83.7%
  - Pincer lesions in 28% of hips



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### Prevention Strategies

- Prevent FAI???
  - Are kids pushed too hard, or **specializing too early?**
- Can we identify those at risk?
- Can we slow progression of pathology?

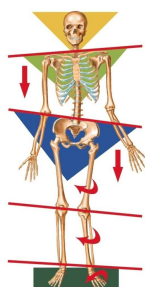
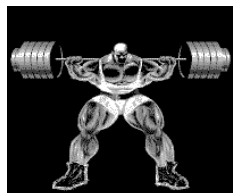
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### So what do we do??



?



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### FAI/LT treatment

- | non- surgical  | surgical   |
|--|--|
| <ul style="list-style-type: none"> <li>• Manual therapy               <ul style="list-style-type: none"> <li>– Joint mobilizations</li> <li>– A.R.T./IASTM, etc</li> </ul> </li> <li>• Injections               <ul style="list-style-type: none"> <li>– Tx and dx in nature</li> </ul> </li> <li>• Postural control</li> <li>• Neuromuscular re-ed</li> <li>• Restore “joint centration”</li> </ul> | <ul style="list-style-type: none"> <li>• Arthroscopy               <ul style="list-style-type: none"> <li>– Labral repair</li> <li>– Capsular plication</li> <li>– Chondroplasty/osteoplasty</li> <li>– Rim trimming</li> <li>– Microfx</li> </ul> </li> <li>• RTP ~ 4-6 months</li> </ul> |



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## Physical Evaluation

- Regardless of your evaluation techniques
  - Physical exam, SFMA/FMS..
- Your likely going to find some variation of the following:
  - Movement impairment
    - Poor motor patterns (squat)
    - Tight capsule -flexion, extension, internal rotation
    - Tight/inhibited gluteals and deep external rotators
    - Tight hip flexor complex
      - TFL, iliopsoas, adductors
  - Increased lumbar lordosis
    - w/ limited thoracic extension/rotation

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## Conservative Management Strategies:

What is our goal?

Thoracic mobility

Hip capsule or anterior ms tightness

Glute weakness/postural control

Poor technique/postural awareness

FAI &/or LT = Irreducible Dysfunction

No Dysfunction

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## Screening Athletes

FMS Overhead Squat

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- IR norm – 25-40 deg. →
- ER norm – 50-75 deg.
- Or FABER

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## PROM – hip flexion

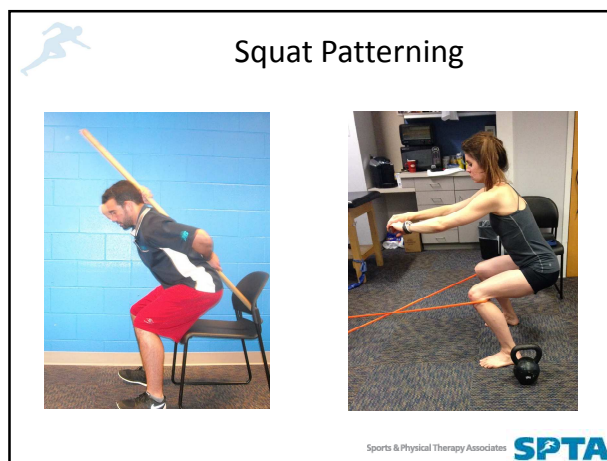
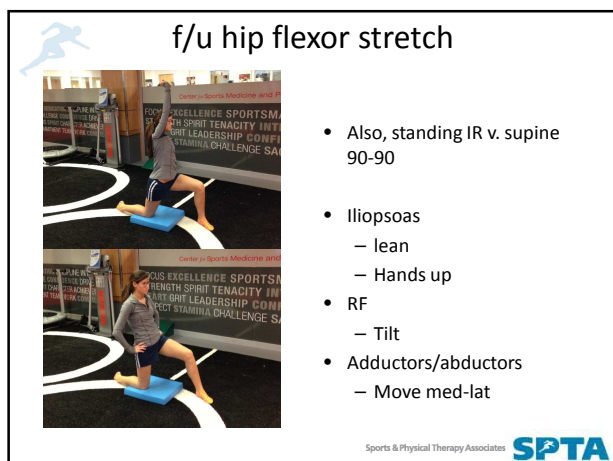
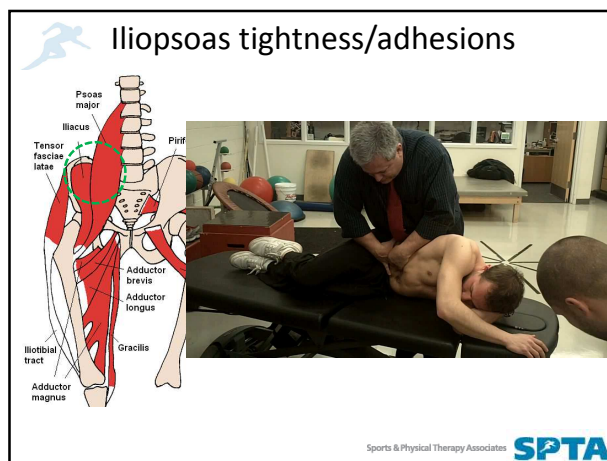
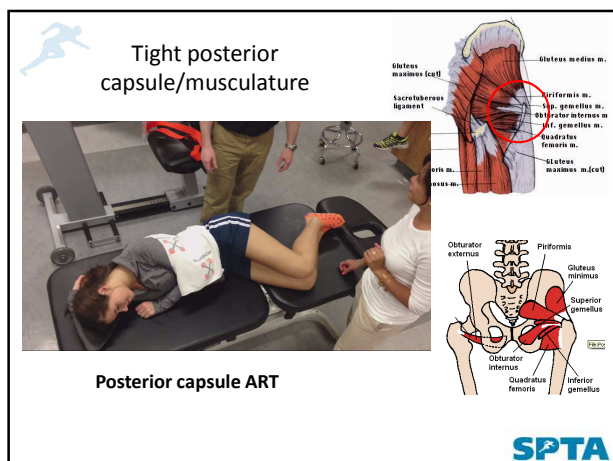
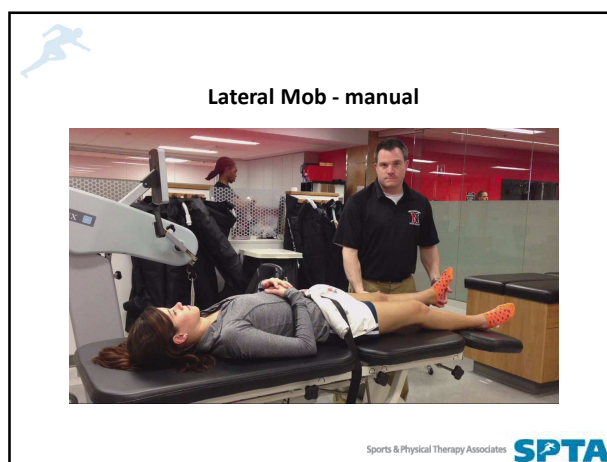
- Clinician monitors lordosis
  - Norm ~ 125°
- Decreased ROM:
  - Anterior block
    - FAI - **irreducible**
  - Posterior tightness
    - Glutes, piriformis posterior capsule

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## Joint Mobilization

### Inferior

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### Glute Strengthening




**FIGURE 3.** Single limb squat exercise.  
DiStefano et al. 2009 JOSPT



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### Glute Strengthening

**Band walk series**


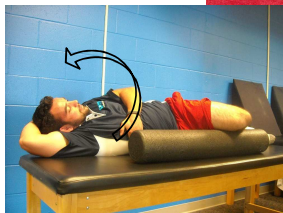


**1/3 SLDL rotations**



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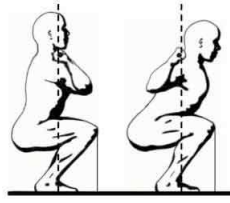
### T-spine mobility

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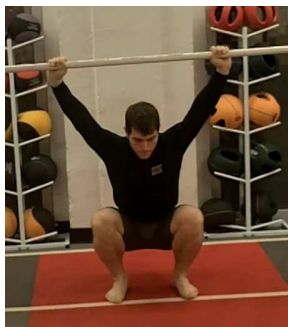
### Pelvic positioning

↑ lumbar lordosis = ↑ anterior pelvic tilt  
= ↑ hip flexion



Front squat v. back


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### Taping option

- Perhaps K-tape or similar
- Proprioceptive input



Gelber & Dames, NATA News Feb. 2010

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## So, when is surgery?

- Generally 3-6 months of conservative care before surgery
  - Insurance driven; not evidence based
- Timing of surgery
  - Life events, season, etc.



## Thank You !!



## References

- References at end of talk #2.