FAI: Subtle Deformities and the Role of the Joint Capsule

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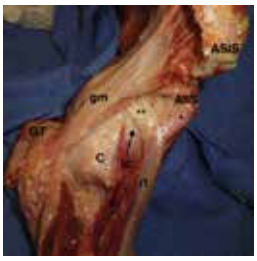
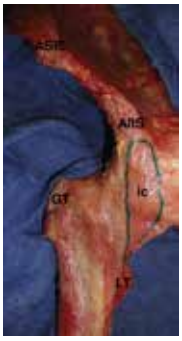
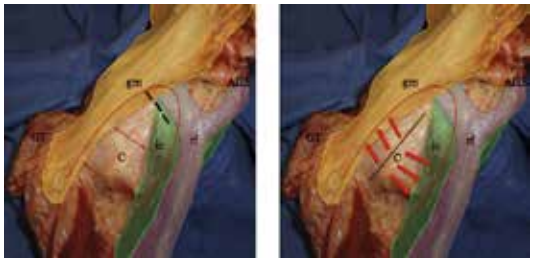
Hip Anatomy





Walters, Cooper, Rodriguez, *Arthroscopy* 2014

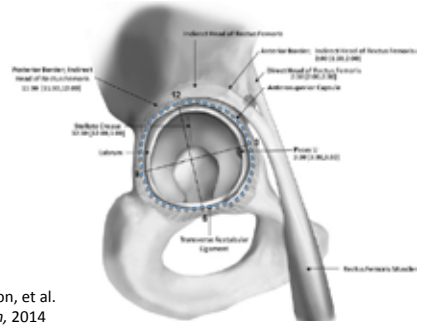
Capsular "Stability Arc"



"Stability Arc"

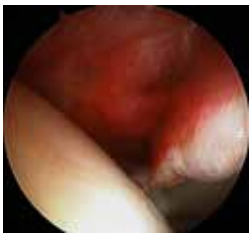
Capsular Thickness

Capsule, Clockface

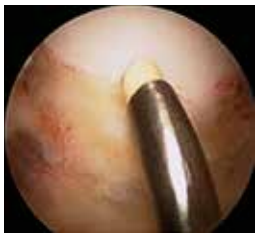


Philippon, et al.
JBJS Am, 2014

Arthroscopic Anatomy

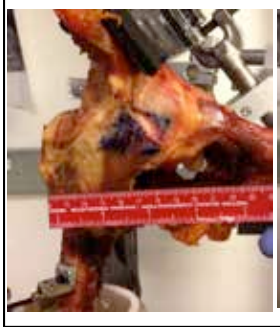


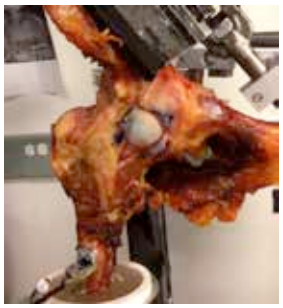
Interportal capsulotomy



T capsulotomy

Open Capsulotomy





Capsule - Biomechanics

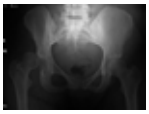
- Bayne, et al; 2014
- Myers, et al; 2011
- Martin, et al; 2008
- Hewett, et al; 2002

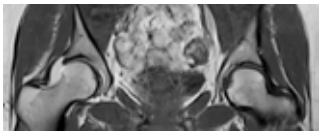
- Interportal capsulotomy
  - Increased ER, anterior translation
  - Increased distal, anterior translation (more translation in extension)
  - Increased distal, posterior translation (more rotation in flexion)

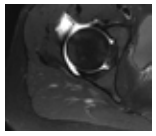
If you open it up, you should close it !!!

Hip Instability Following Arthroscopy

- 12 cases of dislocation in literature
  - Recovery room to 14 months post-op
  - All anterior/superior (except one posterior)
  - Only one with generalized ligamentous laxity
  - Only two with iatrogenic dysplasia
  - Variety of capsulotomies (only one "T")
    - However, only one capsular repair performed







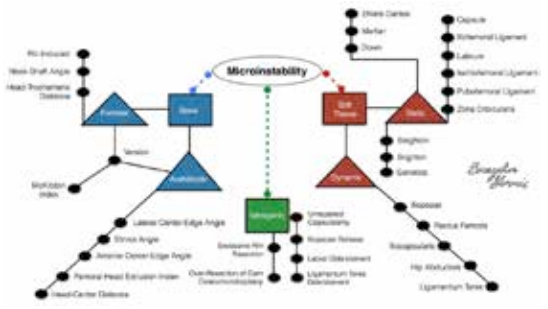
Outcomes with Partial vs Complete Capsular Repair

Improved Outcomes After Hip Arthroscopic Surgery in Patients Undergoing T-Capsulotomy With Complete Repair Versus Partial Repair for Femoroacetabular Impingement

A Comparative Matched-Pair Analysis

- Superior outcomes at 6, 12, 30 months in complete (vs partial) capsular repair
- 13% revision rate in partial repair
- 0% revision rate in complete repair

"Microinstability"



Hip Compartments

Intra-articular

Extra-articular

Central compartment

Labrum
Rim
Articular cartilage
Ligamentum teres

Peripheral compartment

Head-neck junction

Peritrochanteric space

Trochanteric bursa
Abductor tendons
IT band

Subgluteal space

Proximal hamstring
Sciatic nerve

AIIS subspine ***Subspine space***

FAI - Prevalence

- Important to recognize FAI morphology does not necessarily equate to symptoms
  - "Treat the patient and not the X-ray"

Prevalence of Femoroacetabular Impingement Imaging Findings in Asymptomatic Volunteers: A Systematic Review

Jonathan M. Frank, M.D., Joshua D. Harris, M.D., Brandon J. Erickson, M.D., William Slikker III, M.D., Charles A. Bush-Joseph, M.D., Michael J. Salata, M.D., and Shane J. Nho, M.D., M.S.

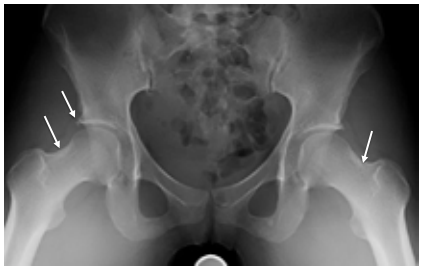
- ***37% cam***
- ***67% pincer***
- ***68% labral tear***

Subtle Findings

*Superolateral acetabular rim fracture

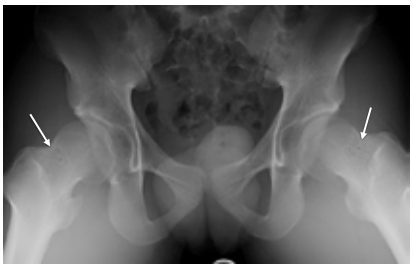
*Anterolateral head-neck junction cortical sclerosis

*Distal impingement cysts

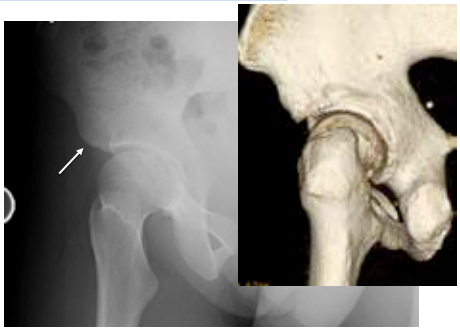


"Impingement Cysts"

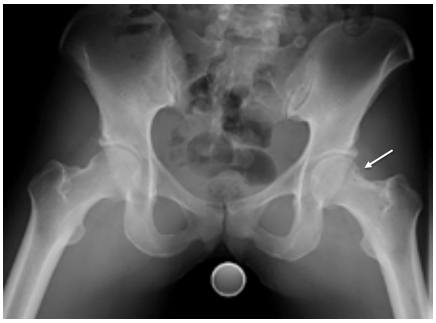
- Aka – synovial pits, Pitt's pits, herniation pits



Subspine Impingement



Pincer "divot"



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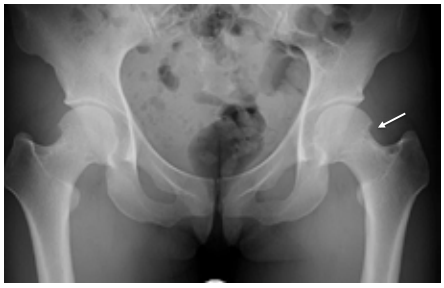

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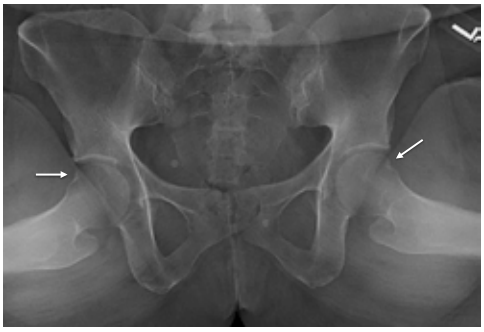


Splits X-ray Vacuum Sign

- 47 professional ballet dancers
  - 89% translated head laterally with "Splits"
  - 36% had a vacuum sign

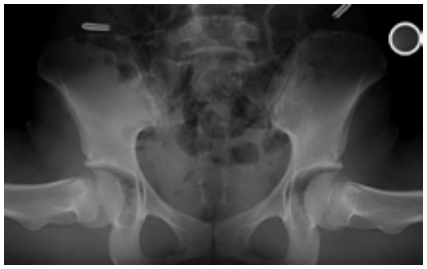
Harris JD, et al. 2015 *Arthroscopy*

Harris JD, et al. 2015 *Orthopedics*

Harris JD, et al. 2015 *Am J Sports Med*

Splits X-ray Vacuum Sign

*Trochanteric – pelvic impingement



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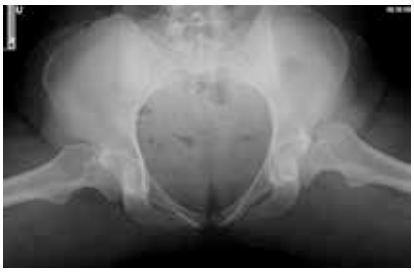
Harris JD, et al. 2015 *Orthopedics*

Harris JD, et al. 2015 *Am J Sports Med*

Splits X-ray – Trochanteric-pelvic impingement

*Trochanteric – pelvic impingement



Conclusions

- Capsular contribution to hip stability is important
- Recognize "at-risk" patients for hip instability
  - Macro-instability (i.e. dislocation)
  - Microinstability
- Intra-operative capsular management should be individualized, focused on addressing the soft tissue and bony pathology
  - If you open it up, you should close it
- Pre-operative recognition of subtle osseous patho-morphology optimizes intra-operative techniques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