

DIAGNOSIS AND MANAGEMENT OF HIP DISEASE IN YOUNG ADULTS

2014 NHMI 14th Annual Winter Meeting, Stowe VT

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DISCLOSURES

- Stock
- J&J



GOALS

- Discuss clinical presentation of hip disease
- Review diagnostic tools to evaluate hip pain
- Brief overview of treatment options



INTRODUCTION

- History
- Physical Exam
- Diagnostic Studies
- Differential Diagnosis
- Treatment



HISTORY

- Traumatic injury vs insidious onset
- Repetitive overuse (stress) injury
- Childhood hip problems ?
- Difficulties with ?
 - Walking
 - Sitting
 - Sleeping
 - Sports
 - Shoes & Socks
 - Stairs



HISTORY

- Previous Rx
 - Activity modification
 - PT
 - NSAIDS
 - Injections



SYMPTOMS

- Groin pain
- Buttock pain
- Lateral hip pain
- Back pain
- "C" Sign
- Knee pain



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SYMPTOMS

- Mechanical Symptoms
 - Clicking
 - Locking
 - Popping
 - Snapping
 - Giving way
 - Instability
 - Voluntary / involuntary
- Stiffness
- Weakness
- Numbness



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PHYSICAL EXAM

- Stance
 - Flexed hip
 - Trendelenberg sign
- Gait
- Seated / Supine / Lateral / Prone
- Limb length discrepancy
- AROM
- PROM
- Snapping
- Pain / tenderness
- Muscle weakness
- Neurovascular exam
- Lumbar spine
- Knee exam
- Pelvic exam
- Hernia
- Ligamentous laxity

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PHYSICAL EXAM

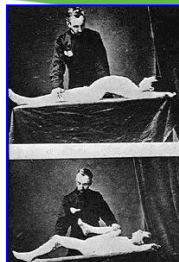
- Log rolling
 - Sensitive for intra-articular problems



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PHYSICAL EXAM

- Thomas test
 - Hip flexion contracture

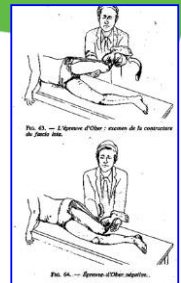


<http://www.orthoteers.com/images/uploaded/images8/ThomasTest.jpg>

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PHYSICAL EXAM

- OBER test
 - IT band



<http://www.vmqc.qc.ca/chroniquessante/2007/05/20070510.html>

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PHYSICAL EXAM

- FABER test
 - Flexion, **AB**duction, **External** Rotation
- Aka Patrick's test
 - SI joint
 - Hip joint



http://www.hughston.com/hhaha_15_1_1c.htm

PHYSICAL EXAM

- Straight leg raise
 - Passive
 - Lumbar nerve root irritation
 - Active (against resistance)
 - Hip joint irritation
 - Hip flexor problems



bjem.bmj.com/content/vol40/issue1/images/large/sem18879.ft.jpeg

PHYSICAL EXAM

- Impingement Signs
 - Anterior
 - FADIR
 - Flexion **AD**duction Internal Rotation



[Parvizi et al. JAAOS Sept 2007](http://www.jaao.org)

PHYSICAL EXAM

- Impingement Signs
 - Posterior
 - Extension w/ External Rotation



[Parvizi et al. JAAOS Sept 2007](http://www.jaao.org)

PHYSICAL EXAM

- Snapping Hip (Coxa Saltans)
 - Intra-articular
 - Loose bodies
 - Labral tear
 - Chondral flaps
 - Ligamentum teres

PHYSICAL EXAM

- Snapping Hip
 - Extra-articular
 - Iliopsoas
 - "Hear across the room"
 - Iliotibial band / Tensor fascia lata
 - "See across the room"

PHYSICAL EXAM

- Iliopsoas snap
 - Flex, Abduct & externally rotate hip
 - Extend w/internal rotation + adduction



Courtesy of Victor Ilizaliturri, MD
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PHYSICAL EXAM

- Snapping ITB



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DIAGNOSTIC STUDIES

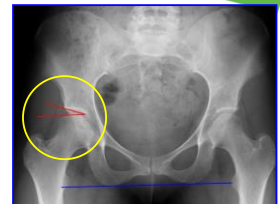
- X-rays
 - AP Pelvis
 - Coccyx 1-2 cm above symphysis
 - < 4 cm in males
 - < 6 cm in females



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DIAGNOSTIC STUDIES

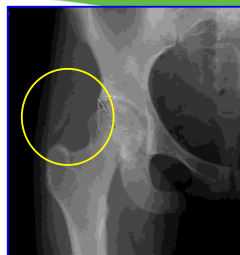
- X-rays
 - AP Pelvis
 - Tonnis angle
 - Aka Acetabular Index
 - >10°



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DIAGNOSTIC STUDIES

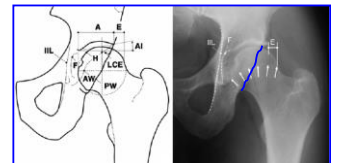
- X-rays
 - AP
 - Lateral Center Edge angle
 - Normal >25° - 40°



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DIAGNOSTIC STUDIES

- X-rays
 - Normal hip
 - Acetabular fossa lateral to Iliioischial line
 - Femoral head extrusion =25%
 - Posterior wall runs thru center of femoral head

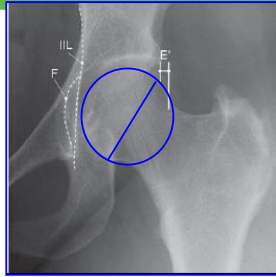


Tannast et al AJR 2007

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DIAGNOSTIC STUDIES

- X-rays
 - Coxa profunda
 - Acetabular fossa medial to ilioischial line
 - Femoral head extrusion < 25%
 - Posterior wall of acetabulum lateral to center of femoral head
 - Acetabular index < 10°
 - Center edge angle > 39°



Tannast et al. AJR 2007 Lahey Hospital & Medical Center

DIAGNOSTIC STUDIES

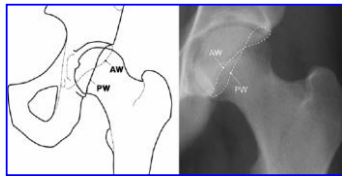
- X-rays
 - Protrusio Acetabuli
 - Femoral head medial to ilioischial line
 - Femoral head extrusion
 - < 0% or negative
 - Acetabular index < 0°



Tannast et al. AJR 2007 Lahey Hospital & Medical Center

DIAGNOSTIC STUDIES

- X-rays
 - Crossover sign
 - Focal anterior overcoverage of the femoral head



Tannast et al. AJR 2007 Lahey Hospital & Medical Center

DIAGNOSTIC STUDIES

- X-rays
 - Cross table lateral
 - Femoral head-neck offset
 - α angle
 - < 50°
 - Notzli et al. JBJS-B 2002



Tannast et al. AJR 2007

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DIAGNOSTIC STUDIES

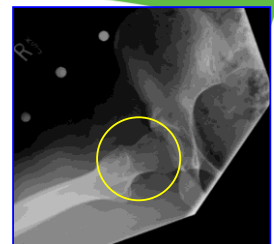
- X-rays
 - Frog lateral
 - Femoral head / neck offset



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DIAGNOSTIC STUDIES

- X-rays
 - Modified Frog lateral
 - Femoral head / neck offset
 - "Elongated neck" view
 - Dunn view



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DIAGNOSTIC STUDIES

- X- rays
 - False Profile
 - Anterior Center-edge angle
 - > 25° - normal
 - < 20° - dysplasia

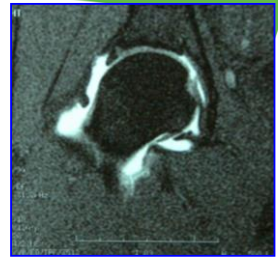


Kelly et al. JBJS 2008

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DIAGNOSTIC STUDIES

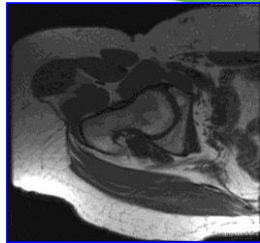
- MRI scans
 - Labral tears
 - FAI
 - Fractures
 - Stress
 - Traumatic
 - Osteonecrosis
 - Neoplasm
 - Muscle & tendon injuries



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DIAGNOSTIC STUDIES

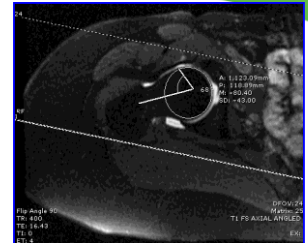
- MRI scan
 - FAI protocol
 - Coronal
 - Oblique axial
 - Oblique sagittal
 - Radial
 - Labrum
 - Articular cartilage
 - Femoral head / neck offset
 - α angle
 - Acetabular version
 - Paralabral cysts



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DIAGNOSTIC STUDIES

- MRI arthrogram
 - Improved visualization
 - Labrum
 - Articular cartilage
 - Capsular injury



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DIAGNOSTIC STUDIES

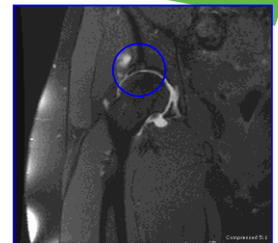
- MRI arthrogram
 - Herniation pits



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DIAGNOSTIC STUDIES

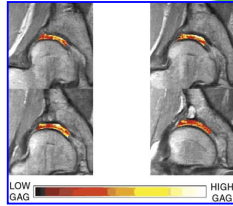
- MRI arthrogram
 - Para-labral cysts



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DIAGNOSTIC STUDIES

- dGMERIC MRI
 - Delayed Gadolinium Enhanced MRI of Cartilage
 - GAG content
 - IV gadolinium
 - 30 minutes walking
 - Then MRI

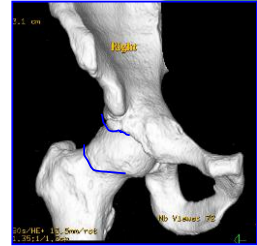


Cunningham T. et al. J Bone Joint Surg 2006;88:1540-1548

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DIAGNOSTIC STUDIES

- CT scan
 - Fractures
 - FAI
 - w/ 3D recons w/ digital subtraction
 - Elucidate bony morphology
 - Cam
 - Pincer
 - Acetabular version



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DIAGNOSTIC STUDIES

- CT scan
 - 3D cine



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DIAGNOSTIC STUDIES

- Dynamic Ultrasound
 - Snapping iliopsoas
 - Snapping ITB / TFL

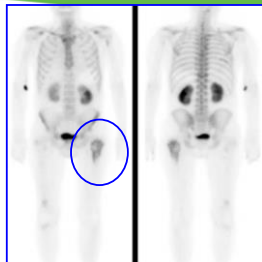


Courtesy of Victor Iizaliturri, MD

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DIAGNOSTIC STUDIES

- Bone scan
 - Stress injuries
 - Fractures
 - Aphyophysitis
 - Neoplasm
 - Infection
 - Osteonecrosis



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DIAGNOSTIC STUDIES

- Injections
 - Intra-articular
 - Trochanteric bursa
 - Iliopsoas bursa
 - LS spine
 - SI joint
 - Knee



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DIAGNOSTIC STUDIES

- Algorithm
 - X-rays: AP pelvis, Frog Lateral & Cross-table lateral
 - MRI or MRI arthrogram
 - 3D CT scan
 - + / - Fluoroscopic injection



DIFFERENTIAL DX OF HIP PAIN

- Intra-articular causes:
 - Labral Tears
 - Femoroacetabular Impingement (FAI)
 - Chondral lesions
 - Loose Bodies
 - Ligamentum Teres Tears
 - Instability
 - Dysplasia
 - DJD
 - Synovial diseases
 - Gout
 - CPPD
 - Inflammatory Arthropathy

DIFFERENTIAL DX OF HIP PAIN

- Extra-articular causes:
 - Adductor Strain
 - Trochanteric bursitis
 - Iliopsoas tendinitis
 - Internal Snapping Hip (Iliopsoas)
 - External Snapping Hip (ITB / TFL)
 - Abductor tendinitis / tear
 - Stress Fracture
 - Apophysitis / avulsion fractures
 - Osteitis Pubis

DIFFERENTIAL DX OF HIP PAIN

- Other causes:
 - Athletic Pubalgia / Sports Hernia
 - SCFE
 - Legg-Perthes
 - Osteonecrosis
 - Neoplasm
 - Transient osteoporosis
 - Knee problems
 - LS spine problems
 - Pelvic problems

Table 1 Differential diagnosis of hip pain	
Primary labral pathology	Non-metastable causes
Femoroacetabular impingement	Osteoarthritis
Loose body	Synovitis
Neuros	Peritrochanteric bursitis
Dysplasia	Hernia
Degeneration	Ectopic ossification
	Chondral cyst
Primary chondral	Peritrochanteric disease
Labral injury	Unknown etiology
Labral tear/dysplasia	Transient osteoporosis of the hip
Labral cyst	Bone marrow edema syndrome
Labral degeneration	
Primary synovial	Synovial proliferative disorders
Gout	Pigmented villonodular synovitis
Septic arthritis	Synovial chondromatosis
Spondylitis/sacroiliitis	Chondroblastoma
Femoral fracture	Metastatic neuroendocrine
Snapping hip (internal/external)	Septic arthritis
Ischiofemoral bursitis	Chondroblastoma
Ischiofemoral impingement	Foreign body and soft tissue
Clayton's palsy	Hemiparesis
Spina bursitis	Malignant tumor and soft tissue
Epitrochanteric bursitis	Hemiparesis
Epitrochanteric bursitis	Richter's disease
Hip flexor	Primary hyperparathyroidism
Abductor	Metastatic bone disease
Gluteus medius tear	
Inflammatory	Systemic
Rheumatoid arthritis	Polymyalgia
Psoriasis	SCD
Reiter's syndrome	Regional pain or
Paraneoplastic	burns

Shindle et al. Clin Sports Med 2006

FEMORO-ACETABULAR IMPINGEMENT

- FAI
 - Abnormal contact between the proximal femur and the acetabular rim that leads to early degenerative changes.
 - Typically with flexion & IR
 - Less commonly w/ extension & ER



Lavigne et al CORR 2004

FAI

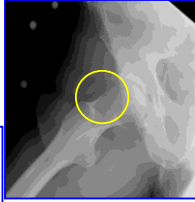
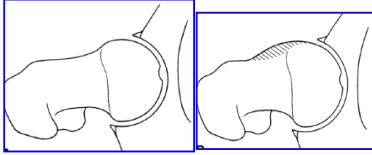
- Cam
- Pincer
- Combined

Genz et al. CORR 2003

FAI

- Cam
 - Abnormal head / neck offset
 - Aspherical femoral head
 - More common in males

Hack et.al. JBJS 2010



Lavigne et.al CORR 2004

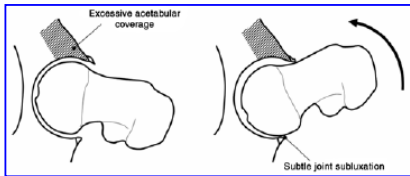
FAI

- Pincer Impingement
 - Prominence of the anterior acetabular rim
 - Acetabular retroversion
 - Global overcoverage of the femoral head
 - Coxa Profunda
 - Protrusio
 - More common in females



FAI

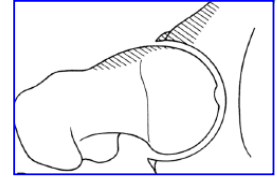
- Pincer Impingement



Tannast et.al AJR 2007

FAI

- Combined Cam & Pincer



Lavigne et.al CORR 2004

FAI

- Symptoms
 - Groin Pain
 - Worse with sitting
 - Worse with activities
 - + / - pain at night
 - Mechanical Sx

FAI

- PE
 - << ROM
 - IR
 - + Ant. Impingement sign

FAI

- Rx
 - PT ?
 - NSAIDs
 - Activity modification ?
 - Fluoro-guided steroid Injection
- Surgery
 - Open
 - Combined Arthroscopic & mini-open
 - Arthroscopic



LABRAL TEARS: ISOLATED

- Not very common
- Most often associated with FAI
- Traumatic event
- Sx
 - Groin Pain
 - Typically activity related
 - Mechanical Sx



LABRAL TEARS

- PE
 - Normal ROM
 - + Anterior impingement sign
- Dx
 - MRI
 - MRA



LABRAL TEARS

- Rx
 - Activity modification
 - PT ?
 - NSAIDs
 - Fluoro-guided steroid injection
 - Equivocal MRI
 - No mechanical Sx
 - Older patients
 - Arthroscopy



ILIOPSOAS PROBLEMS

- Sx
 - Groin pain
 - Running activities
 - Hip flexion
- Differential Dx
 - Psoas tendinopathy
 - Snapping psoas
 - Psoas impingement
 - Arthroscopic Dx



ILIOPSOAS PROBLEMS

- PE
 - Normal ROM
 - Pain with resisted seated hip flexion
 - Pain with resisted SLR
 - + / - snapping (Painful)
 - Active
 - Passive



ILIOPSOAS PROBLEMS

- Dx
 - MRI?
 - Dynamic ultrasound
 - Ultrasound guided injection of local anesthetic

ILIOPSOAS PROBLEMS

- Rx
 - PT
 - Activity modification
 - NSAIDs
 - Ultrasound guided steroid injection
 - Arthroscopic psoas tenotomy

TROCHANTERIC BURSTITIS

- Sx
 - Pain over lateral aspect of hip
 - Radiates to knee
 - Difficulty laying on side
 - Often associated with groin pain

TROCHANTERIC BURSTITIS

- PE
 - + / - normal ROM
 - Tenderness of GT
 - Tenderness over ITB
 - + / - weakness of abductors
 - + / - anterior impingement sign
- Dx
 - + / - MRI

TROCHANTERIC BURSTITIS

- Rx
 - PT
 - Activity modification
 - NSAIDs
 - Pillow-top mattress pad
 - Steroid injection(x 3?)
 - Bursectomy
 - Open
 - Arthroscopic
 - + / - Z-lengthening ITB

SNAPPING ITB

- Sx
 - Visible painful snapping

SNAPPING ITB

- PE
 - Visible snapping
 - Tenderness over GT
 - Tight ITB(Ober test)

SNAPPING ITB

- Rx
 - PT
 - NSAIDs
 - Steroid injection
 - ITB release
 - Open
 - Z- lengthening
 - Bursectomy
 - Arthroscopic

ABDUCTOR TEARS

- Hip Abductors: “rotator cuff of the hip”
- Sx
 - Pain over lateral hip
 - Weakness
 - Similar to Trochanteric Bursitis

ABDUCTOR TEARS

- PE
 - Similar to Trochanteric Bursitis
 - Weakness
 - +/- Trendelenberg sign
- Dx
 - MRI
 - Ultrasound

ABDUCTOR TEARS

- Rx
 - PT
 - NSAIDs
 - +/- steroid injection?
 - Surgery
 - Open Repair
 - Arthroscopic

CALCIFIC TENDINOPATHY

- Similar to calcific tendinopathy of the rotator cuff
- Sx
 - Similar to trochanteric bursitis
- PE
 - Similar to trochanteric bursitis



CALCIFIC TENDINOPATHY

- Rx
 - PT
 - NSAIDs
 - Fluoro guided steroid injection
- Surgery
 - Open
 - Arthroscopic



CONCLUSION

- Dx & Tx of hip disease is evolving
- Better understanding of
 - Anatomy
 - Radiology
 - Biomechanics
 - Natural history
- Similar to ACL & Shoulder Rx in early 90's



THE END

THANK YOU

