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CONTINUED

Current Concepts in the Treatment of Hip Injuries for the Physical Therapist Assistant

Keelan R. Enseki, MS,PT,OCS,SCS,ATC,CSCS

CONTINUED

Introduction

- This course will provide physical therapist assistants a clinical update on current concepts in treating patients with injuries of the hip region. The course will focus on condition-specific treatment in both non-operative and postoperative patients.

4

Objectives

As a result of this course, participants will be able to:

- Describe the condition characteristics that affect treatment methods for patients with pathology of the hip region.
- Safely implement rehabilitation activities that are commonly recommended for patients with pathological conditions of the hip region.
- Recognize surgical characteristics that dictate postoperative rehabilitation of patients undergoing surgery for conditions of the hip region.
- Progress patients with common hip region injuries through various stages of rehabilitation based upon their clinical presentation.

5

Course Outline

- Background and Review of Learner Outcomes
- Review of Clinical Anatomy
  - Bony Anatomy
  - Labrum and Capsuloligamentous
  - Musculature (by function)
  - Addtional Soft Tissue Structures
  - Neurovascular
- Treatment for Common Conditions of the Hip
  - Osteoarthritis
  - Femoralacetabular Impingement and Labral Tears
  - Hypermobility/Instability
  - Muscle Injuries
  - Recognition of pelvic floor involvement

6

Course Outline (contd.)

- Postsurgical Rehabilitation
  - Total Hip Arthroplasty
  - Hip Arthroscopy
- Rehabilitation Progression Case Examples
- Summary of Concerns for Treating Patients with Hip Disorders
- Conclusion/Question/Answer

7

Disclosures

- No personal disclosures/conflicts
- No institutional disclosures/conflicts

8

Acknowledgements

Image and video contributions:

- The Interactive Hip Software
- Primal Pictures

9

Introduction

- Patients presenting with symptoms in the hip and pelvic region present unique challenges
- The large number of adjacent structures can make examination and treatment of the hip and pelvic region a challenging process
- Patients may experience pain originating from numerous intra and extra-articular sources
- An organized approach to treatment and constant monitoring for status changes is imperative when treating individuals with hip pathology

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Clinical Anatomy Review

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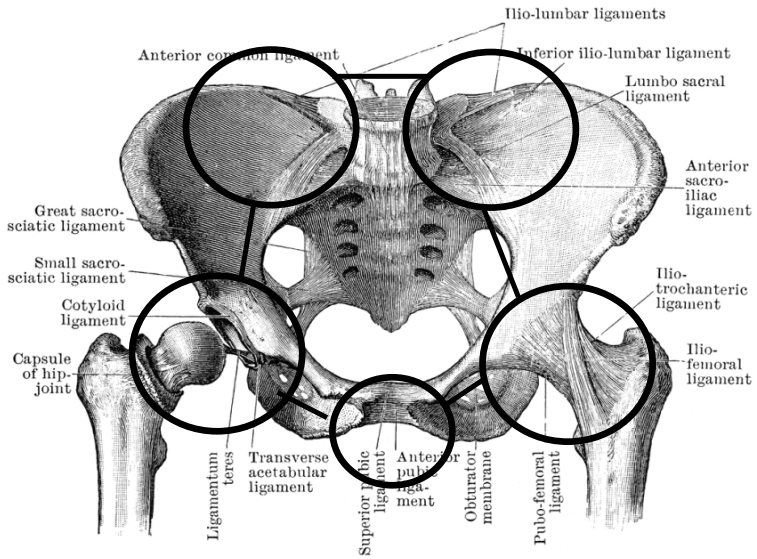
Mobile to Stable



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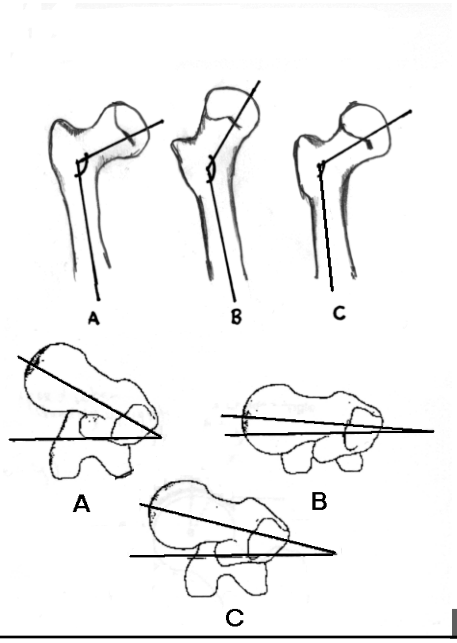
Femoral Neck

- Angulation in frontal (inclination) and transverse planes (declination/torsional)
- Angles change throughout development
- Variations from normal values can effect joint stability, lower extremity alignment, and injury patterns



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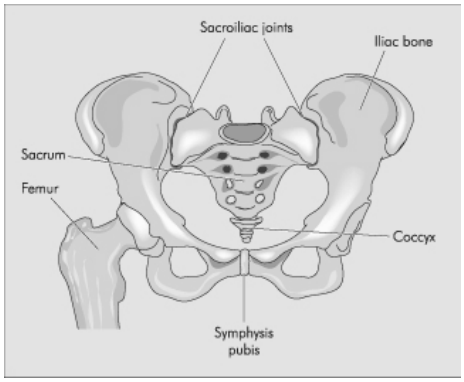
Pelvic Complex

Innominate

The innominate bones articulate with the sacrum to form a closed ring with three joints:

- Left and right sacroiliac joints
- The pubic symphysis

Function: Transmit forces between the lower extremities and the spine



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Acetabular Labrum

Fibrocartilagenous ring attached to periphery of the acetabulum

- *Internal Surface*: Attached to acetabular rim and transverse acetabular ligament
- *Central Surface*: Lined by articular cartilage continuous with that of the acetabulum
- *Peripheral Surface*: Attaches to joint capsule at the base

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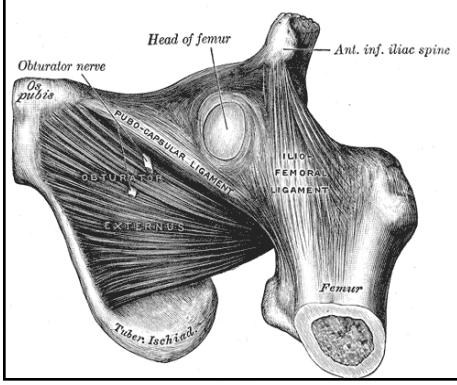
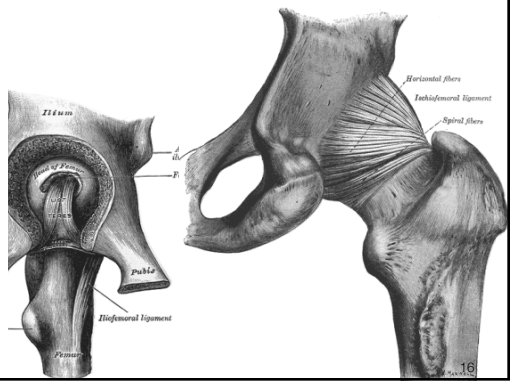
Hip Joint Capsule and Ligaments

- Dense, relatively inelastic, fibrous capsule
- Thickest anterior/superior, thinnest posterior/inferior
- Reinforced by exrtra-articular ligaments





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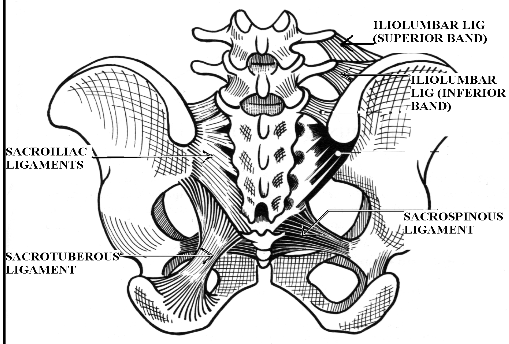
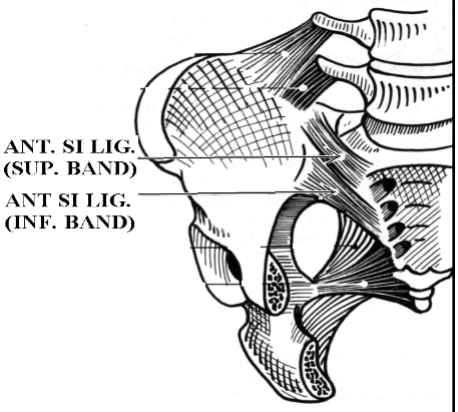
Pelvic Complex Ligaments





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Primary Hip Muscles

- Flexion: Iliopsoas, Rectus Femoris, TFL
- Extension: Gluteus Maximus, Hamstrings
- Abduction: Gluteus Medius, Gluteus Minimus, TFL
- Adduciton: Adductor Magnus, Longus, Brevis, Gracilis
- External Rotation: Piriformis, Obuturators, Gemelli, Quadratus Femoris
- Internal Rotation: Not the PRIMARY function of any muscle

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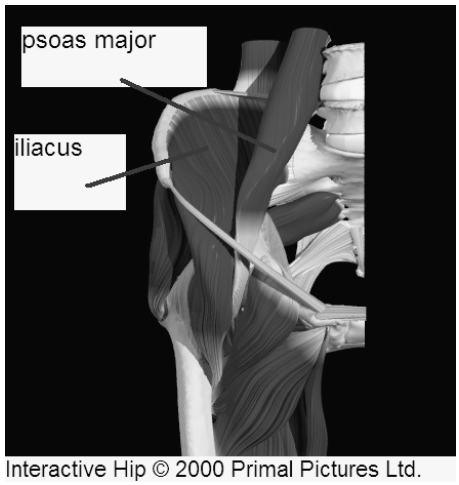

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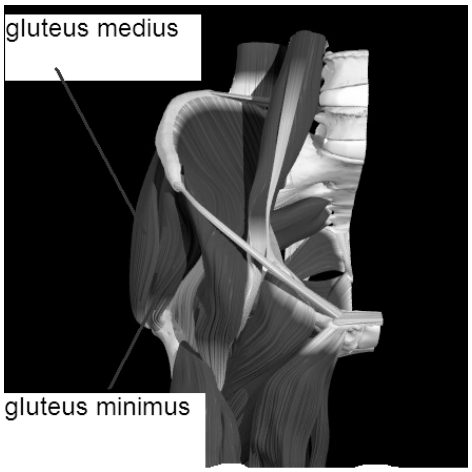

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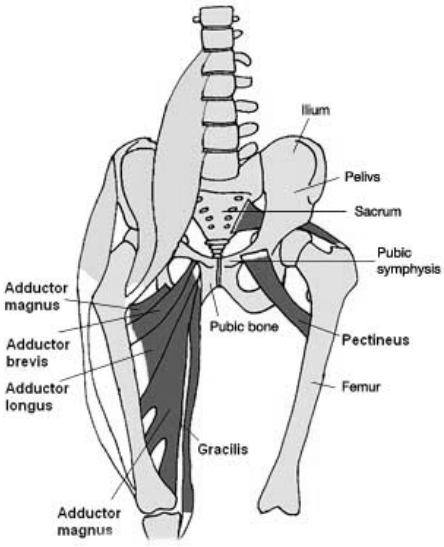

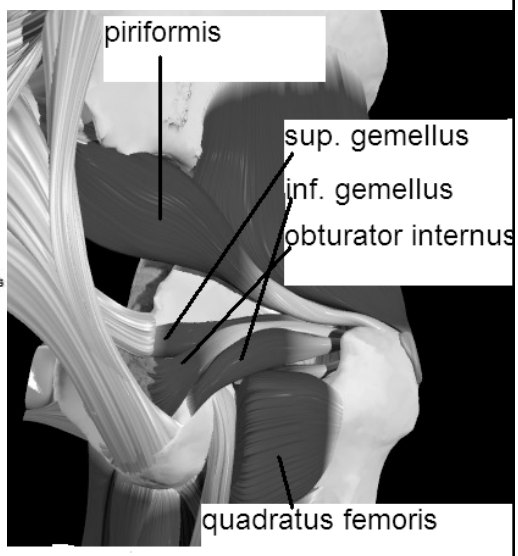

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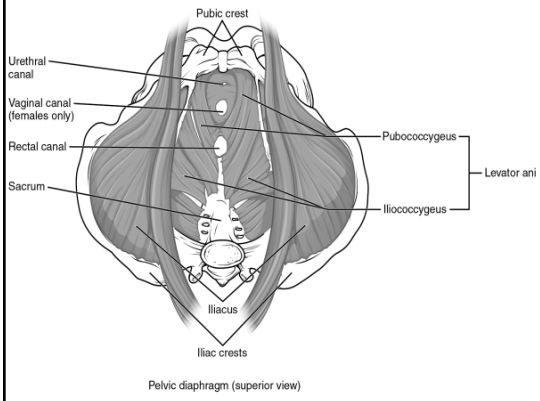
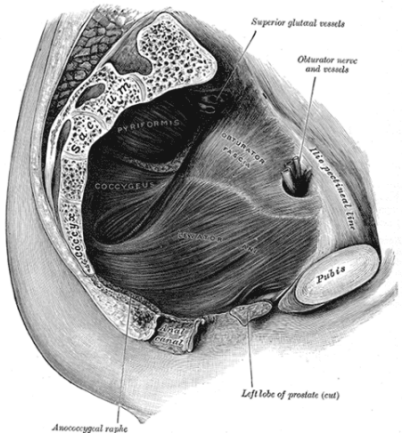
Pelvic Floor Muscles



Pelvic diaphragm (superior view)



Muscles of the pelvic outlet, spanning from the peritoneum to the perineum regions

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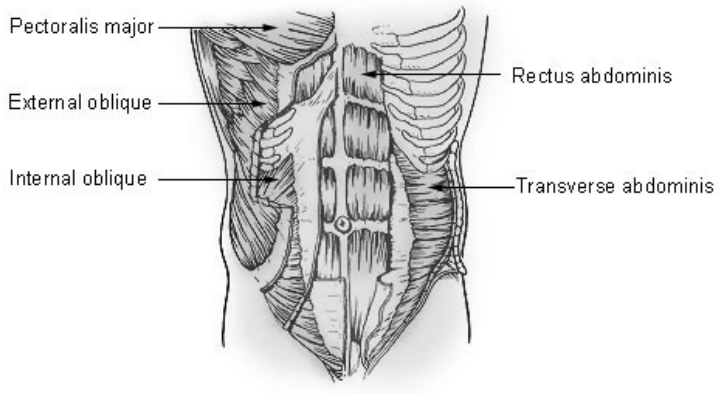
Abdominal Musculature

Muscles of the Trunk



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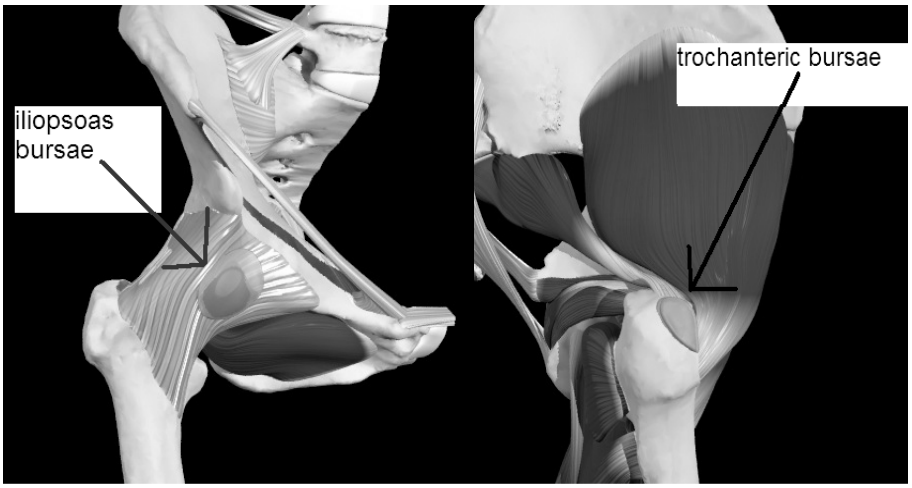
Hip & Pelvic Bursae



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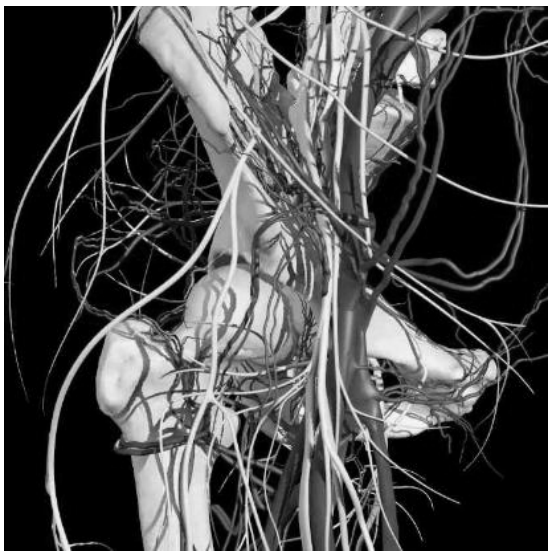
Neurovascular Structures



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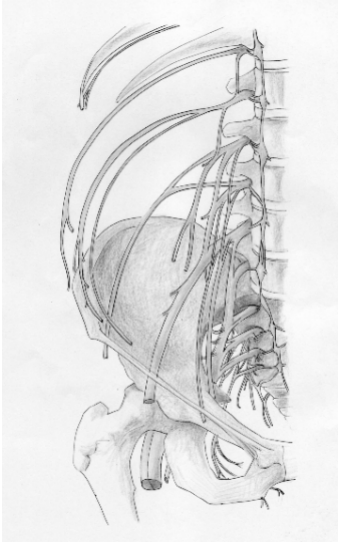
Lumbar Plexus Branches

- Iliohypogastric
- Ilioinguinal
- Genitofemoral
- Lateral Femoral Cutaneous
- Obturator
- Femoral
- Lumbosacral Trunk



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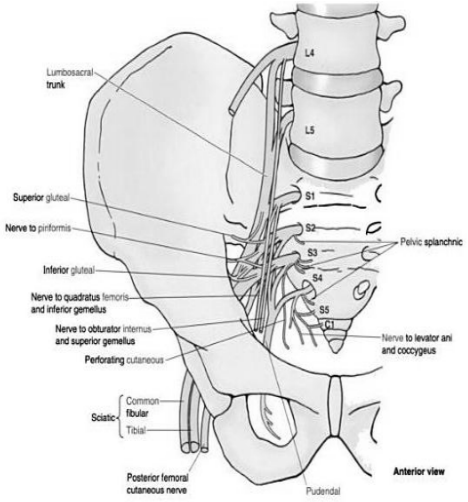
Sacral Plexus Branches

- Nerve to Quadratus Femoris and Gemellus Inferior
- Nerve to Piriformis
- Nerve to Obturator Internus and Gemellus Superior
- Superior Gluteal
- Inferior Gluteal
- Posterior Femoral Cutaneous
- Sciatic Nerve



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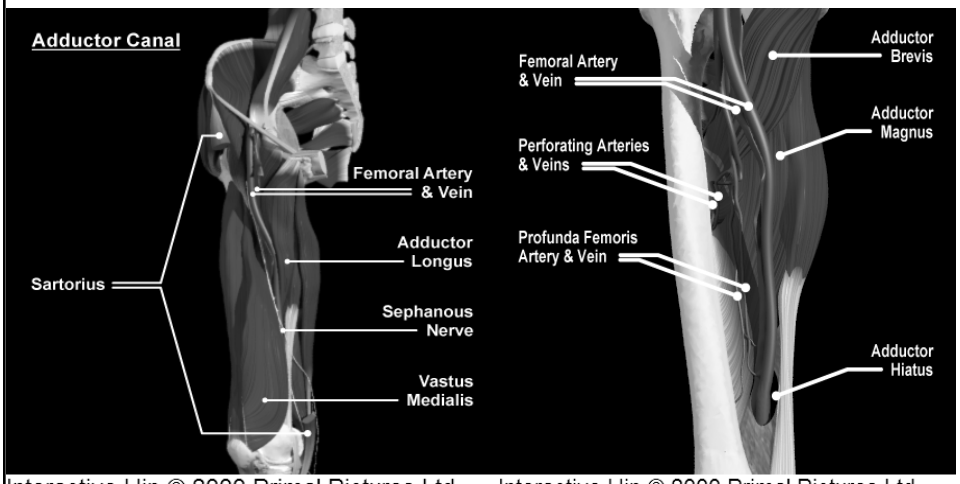
Vasculature



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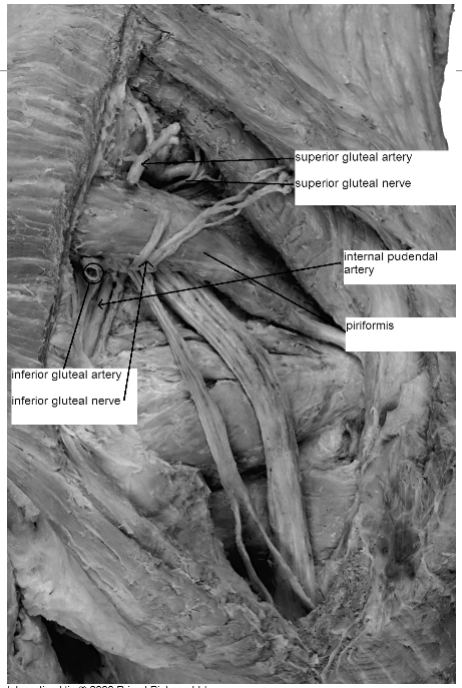
Gluteal Region Arteries

- Superior Gluteal Artery
- Inferior Gluteal Artery
- Internal Pudendal Artery



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Clinical Considerations for Treatment of Common Hip Conditions

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Treatment of Intra-articular Hip Disorders

- Femoral Acetabular Impingement Syndrome
- Hip Joint Hypermobility
- Osteoarthritis

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Femoral Acetabular Impingement Syndrome (FAI)

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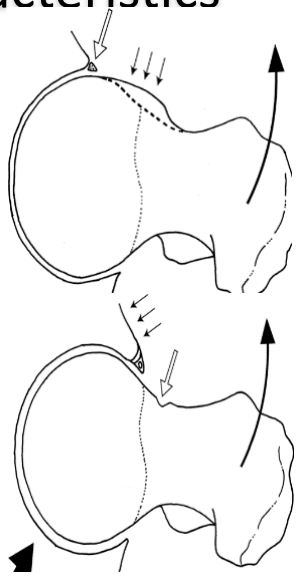
FAI Condition Characteristics

Femoral Acetabular Impingement (FAI)

- Occurs when there is decreased joint clearance between the femur and the acetabulum
- Two types have been described:
  - *Cam*: Femoral deformity
  - *Pincer*: Acetabular deformity



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FAI and Acetabular Labral Tears

- Most often FAI is not the initial diagnosis of interest.
- Patient symptoms most likely resulting from secondary labral tear, chondral damage, or degenerative changes
- These changes result in pain and functional limitation

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Clinical Presentation of FAI

- Clinical Tests
  - Numerous tests for FAI have been described
  - No tests demonstrates good specificity – primary utility is screening (Riemen et al, 2015)
- Diagnosis of symptomatic FAI is dependent on a "cluster" of findings
  - Groin pain
  - Pain with specific activities, typically involving repetitive or deep flexion
    - Squatting
    - Sitting
  - Relatively younger
  - No severe loss of ROM, with IR and flexion potentially being affected
  - Potential mechanical symptoms
  - Clinical tests (above) may be helpful in combination with other findings
  - Other differential diagnoses ruled out

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Key Treatment Strategies for FAI

Activity Modification
- Avoid repetitive end ranges of flexion, IR, and abduction

Joint Mobilization (PT)
- Address early capsular changes

Flexibility
- Psoas and rectus to eliminate anterior pelvic tilt

Strength in Protected Ranges
- Avoid impingent positions

Motor Control

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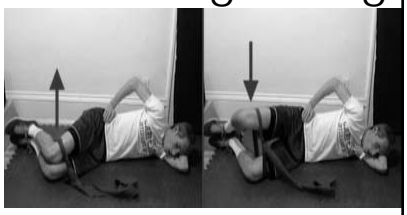
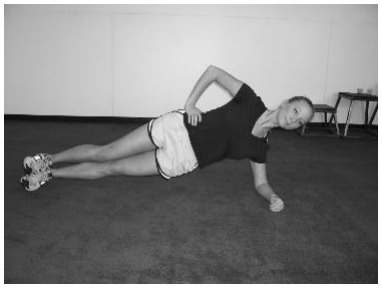
Multiplanar Hip & Lumbopelvic Strengthening

Progress from single joint emphasized exercises (non-weightbearing), to compound movements emphasizing movement in one plane of motion, while maintaining stability in others





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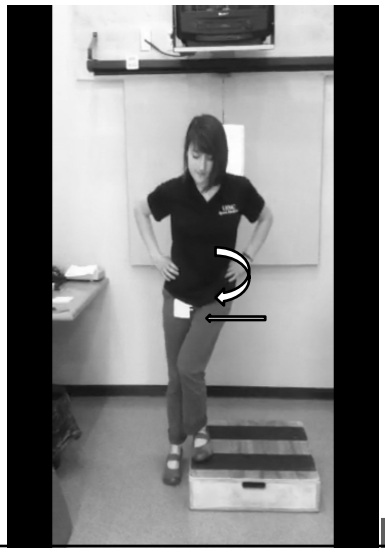
FAI – Multiplanar Control

Abnormal motion of the hip associated with symptomatic labral tears (Austin A, Meyer J, Powers C, Souza R, 2008)

Inadequate control

- Frontal plane (adduction)
- Transverse plane (internal rotation)



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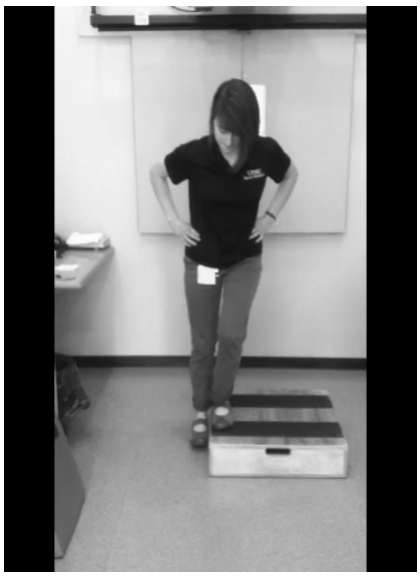
FAI – Multiplanar Control

Strength Activities

- Abductors
- External rotators

Functional Exercises

- Weight bearing with multiplanar stability demands



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Lumbopelvic Component

- Address flexibility and strength deficits contributing to dynamic pelvic positioning and stabilization
  - Loss of frontal plane stabilization of pelvis and transverse plane stability of the hip in weight bearing associated with symptomatic FAI (Austin et al, 2008)
    - Strengthen hip abductors and external rotators
  - Dynamic anterior pelvic tilt associated with impingement condition occurring earlier in flexion ROM (Ross et al, 2014)
    - Optimize flexibility of iliopsoas and rectus femoris
    - Strengthen and optimize recruitment of lumbopelvic stabilizers

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Pelvic Control

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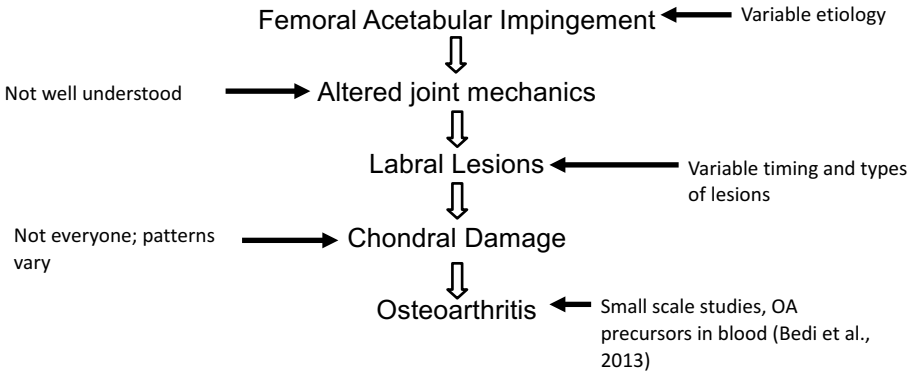
Spectrum of FAI-related Joint Pathology



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The Hypermobile Hip Joint

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CONTINUED

Hypermobile Hip Condition Characteristics

- Joint hypermobility may predispose individuals to injuries of the hip joint and lumbosacral structures
- Categories of Hypermobility
  - Generalized
  - Focal (acquired with trauma or repetitive force)
- Brief screen of joint tissue integrity may be useful in diagnosis and prognosis
- May guide treatment recommendations

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CONTINUED

The Hypermobile Patient (know the underlying cause)

Boney Architecture (dysplasia)

- Mis-shaped Femoral Head
- Femoral Deformity: Coxa valga, increased femoral version
- Shallow Acetabulum
- Anteverted Acetabulum

Primary Capsulo-labral Compromise

- Universal laxity (inherent)
- Focal Laxity (acquired)
- Ligamentum Teres Deficiency

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Clinical Presentation of Focal Hypermobility

Clinical Presentation

- Often reports pain during repetitive activity
- Often involved in activities requiring significant flexibility: dancing, gymnastics, etc.
- Examine for hip and lumbopelvic weakness

Clinical Tests

- Positive log roll test (anterior)
  - No metrics available regarding sensitivity or specificity
- Apprehensive with long axis distraction (anterior or general)

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Key Treatment Strategies for the Hypermobile Hip

- Dynamic Stabilization
  - Strength
    - Primary hip movers with specific focus on abductors and rotators of the hip
    - Lumbopelvic stabilizers
  - Neuromuscular Control
- Symmetry
- Patient Education

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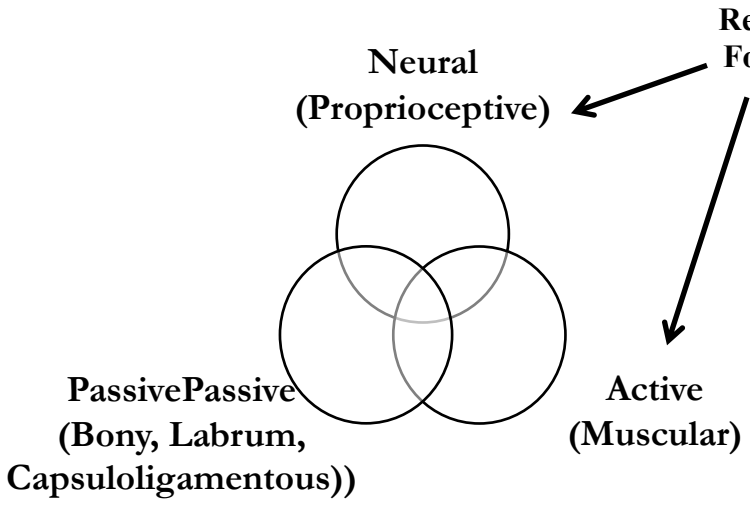

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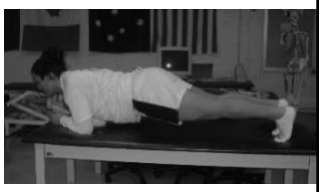
Treatment Spectrum

Strength

Motor Control



Central Strength / Endurance

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TABLE 1 NORMALIZED ELECTROMYOGRAPHIC AMPLITUDE OF EACH MUSCLE FOR EACH EXERCISE*

Exercise	Tensor Fascia Lata	Gluteus Medius	Superior Gluteus Maximus
Sidelying hip abduction	32.3 ± 13.1	43.5 ± 14.7 (P = .012)†	23.7 ± 15.3 (P = .033)‡
Bilateral bridge	8.2 ± 7.4	15.0 ± 10.5 (P = .011)†	17.4 ± 11.9 (P = .008)†
Clam	11.4 ± 11.4	26.7 ± 18.0 (P = .006)†	43.6 ± 26.1 (P<.001)†
Hip hike	31.4 ± 14.4	37.7 ± 15.1 (P = .196)	17.7 ± 15.2 (P = .001)‡
Lunge	21.6 ± 14.5	19.3 ± 12.9 (P = .623)	20.1 ± 11.1 (P = .728)
Quadruped hip extension, knee extending	15.6 ± 9.3	27.3 ± 14.9 (P<.002)†	28.5 ± 16.6 (P<.007)†
Quadruped hip extension, knee flexed	18.7 ± 10.6	30.9 ± 15.2 (P = .001)†	30.1 ± 12.5 (P = .012)†
Sidestep	13.1 ± 7.1	30.2 ± 15.7 (P = .002)†	27.4 ± 16.7 (P = .002)†
Squat	4.6 ± 3.8	9.7 ± 7.3 (P = .017)†	12.9 ± 7.9 (P<.001)†
Step-up	21.4 ± 11.4	29.5 ± 14.9 (P = .065)	22.8 ± 15.6 (P = .754)
Unilateral bridge	18.1 ± 12.9	30.9 ± 20.7 (P = .007)†	34.6 ± 16.8 (P = .001)†

*Values are mean ± SD percent maximum voluntary isometric contraction.
†Significantly greater than tensor fascia lata (P<.05).
‡Significantly less than tensor fascia lata (P<.05).

Selkowitz DM, Beneck GJ, Powers CM. Which exercises target the gluteal muscles while minimizing activation of the tensor fascia lata? Electromyographic assessment using fine-wire electrodes. *J Orthop.Sports Phys Ther*. 2013;43(2):54-65.

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CONTINUED

Symmetry

- Side-to-Side
  - Attempt to minimize the discrepancy between dominant and non-dominate sides
- Group-to-Group
  - External vs. internal rotators
  - Abdominal vs. lumbar extensors

  * Not specifically equal strength, but appropriate ratio
- Strength-to-Flexibility
  - Avoid over-emphasizing stretching without an appropriate strength foundation
  - Do not create motion that can not be controlled

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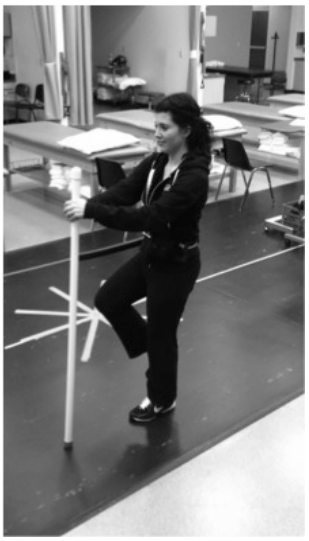
Focal Hip Strengthening Progression



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Weight-bearing Stabilization

Dynamic Strength

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Improve Motor Control

- Improve efficiency of control at various positions
- Begin early recruitment activities
- Progress to functional positions with multiple tasks
- Eliminate compensation strategies

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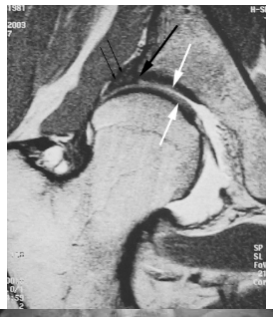
Clinical Course and Outcomes for the Hypermobile Hip

- Moderate or greater dysplasia has association with early onset hip OA (<50 years; Gala, Clohisy, Beaule, 2016)
- Unresponsive cases with hip dysplasia may be candidates for hip preservation procedure
  - Periacetabular osteotomy (PA)
- Focal capsular-ligamentous hypermobility has better prognosis for conservative treatment, however surgical options exist for unresponsive cases
  - Arthroscopy to address attenuated/torn structures and labral pathology



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Hip Osteoarthritis

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Hip Osteoarthritis – Condition Characteristics

- Description
  - Global cartilage loss and loss of joint space
  - Wide-spread loss of normal joint structure and related loss of function
  - Often the cumulative result of an earlier injury pattern progressing over time
    - Previous injury
    - Actebular labral tear
    - Dysplasia (early onset OA)
    - Avascular necrosis

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Clinical Criteria for Hip Osteoarthritis

- Hip internal rotation less than 15°,
- Hip flexion less than or equal to 115°
- Age greater than 50 years

Or…

- Hip internal rotation greater than or equal to 15°, along with
- Pain with hip internal rotation
- Duration of morning stiffness of the hip less than or equal to 60 minutes
- Age greater than 50 years

sensitivity, 86%; specificity, 75% (Altman, 1991)

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Hip OA – Key Treatment Strategies

- Strong Recommendations
  - Manual therapy
  - Flexibility
  - Strength
  - Endurance
- Moderate Recommendations
  - Education/activity modification
  - Ultrasound (1 study)
  - Weight loss
- Weak Recommendations
  - Bracing

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Clinical Course and Expected Outcomes for Hip OA

- Typically, symptomatic and functional changes related to hip OA are slow-developing
- Prognosis is related to extent of radiographic changes
- THA is a well-established option for end-stage OA not responsive to conservative treatment
- The time of progression from initial diagnosis to THA procedures is highly variable and patient dependent
- Current/developing interest in hip preservation surgeries and use of biologics

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Treatment of Soft Tissue Disorders of the Hip Region

- Proximal Hamstring Injuries
- Adductor Injuries
- Greater Trochanteric Pain Syndrome

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CONTINUED

Proximal Hamstring Injuries

- Proximal hamstring injuries can be a source of significant functional impairment
- Spectrum
  - Strain (gr I) -> Avulsion (gr III)
  - Usually eccentric load combined with stretching mechanism
  - Suspicion of acute avulsion necessitates need for referral
  - Conservative treatment is choice in majority of cases
  - Surgery may be indicated in majority/complete disruption or unresponsive cases
- Recurrence rate is high and complicates rehabilitation
- Involvement of sciatic nerve is a concern

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CONTINUED

Proximal Hamstring Injuries

- Profile/mechanism
  - Proximal hamstring injuries can be a source of significant functional impairment
  - Recurrence rate is high and complicates rehabilitation (Foreman et al. *Phys Ther in Sport*, 2006)
  - Involvement of sciatic nerve is a concern in more involved cases
- Clinical examination
  - Variable depending on injury severity
  - Historical context (acute vs. overuse), palpable tenderness, + pain selective tissue tension testing
- Treatment
  - Appropriate staging is critical
  - Criteria-based progression
  - Re-injury is primary concern
  - Address known risk factors for injury/re-injury

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Proximal Hamstring – Key Treatment Strategies

- Early treatment
  - Protect scar development while avoiding adhesion development: rest/modification , PROM
    - Manual therapy: commonly utilized as acuity decreases, weak evidence
  - Minimize atrophy: submaximal isometrics, AROM
- Criteria for progression
  - Full PROM and AROM of hip and knee
  - Symmetrical gait pattern
  - Tolerance to therapeutic activities

65

Proximal Hamstring – Key Treatment Strategies

- Intermediate treatment
  - Pain free strengthening: concentric to eccentric strength progression
  - Restoration of tissue mobility flexibility
  - Establish neuromuscular control of trunk and pelvis: lumbopelvic/core stabilization, balance
  - Improve endurance
- Criteria for progression
  - Full/symmetrical hamstring flexibility
  - >90% hamstring strength (vs. uninvolved)
  - Appropriate neuromuscular control
  - Jogging without pain or asymmetry

66

Proximal Hamstring – Key Treatment Strategies

- Late stage rehabilitation
  - Restore full flexibility
  - Restore strength
    - Emphasize eccentric control at position of maximal tension (hip flexion, knee extension)
  - Full restoration of endurance
  - Full neuromuscular control
  - Plyometric progression
  - Sport specific progression
- Criteria for progression
  - Full strength in all positions
  - Full flexibility
  - Pass sport-specific testing criteria
  - H Test (Askling et al. *Knee Surg Sports Traumatol Arthrosc, 2010)*

Dewitt &Vidale. *IJSPT*, 2014

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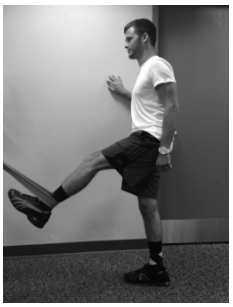
IJSPT INTERNATIONAL JOURNAL OF SPORTS PHYSICAL THERAPY

Int J Sports Phys Ther. 2014 Nov; 9(6): 796–812. PMCID: PMC4223289

RECURRENT HAMSTRING INJURY: CONSIDERATION FOLLOWING OPERATIVE AND NON-OPERATIVE MANAGEMENT

John DeWitt, PT, DPT, SCS, ATC[1] and Tim Vidale, PT, DPT[2]



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Adductor Injuries

- Common cause of groin pain
- Differential diagnoses
  - Hip flexor involvement
  - Radicular influences (L1,L2,L3)
  - Hip joint involvement
- Most common structure of interest is adductor longus
- Described in athletes
  - Soccer
  - Football
  - Ice hockey

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Adductor Injuries – Condition Characteristics

- Clinical examination
  - Painful to palpation
  - Pain and weakness with resisted testing
  - Pain with flexibility/ROM testing
  - + Adductor Squeeze Test

70

Key Treatment Strategies for Adductor Injuries

- Rehabilitation Considerations
  - Variably described in the literature
  - Manual therapy (soft tissue mobilization) is often recommended, but literature is weak
  - Strength progression
    - Isometric -> Concentric -> Eccentric
  - Emphasize local muscle endurance
  - Lumbopelvic strength
  - Focus on adductor to abductor ratio (>80%)

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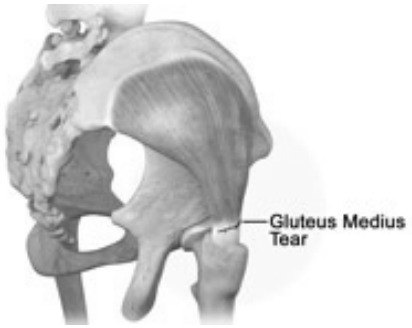
72

Greater Trochanteric Pain Syndrome (GTPS)

- Pain in this region was most commonly labeled trochanteric bursitis in the past
- While trochanteric inflammation is possible, other structures are often involved
  - Gluteus Medius
    - Tendonopathy
    - Tear
  - Gluteus Minimius
    - Tendonopathy
    - Tear



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Gluteal Tendinopathy – Condition Characteristics

- More common in females
- 40-65 years common age span
- Also recognized in athletes
- Functional Difficulties
  - Pain variable with walking, side lying, sitting
  - Fatigue and possible gait disturbance
- Clinical Findings
  - Palpable tendon attachment pain
    - Posterior/superior trochanter = glut medius
    - Anterior = glut minimus
  - Pain with resisted abduction
  - + De-rotational Test
  - Pain with 30 sec SLS
  - Rule out intra-articular involvement as primary source

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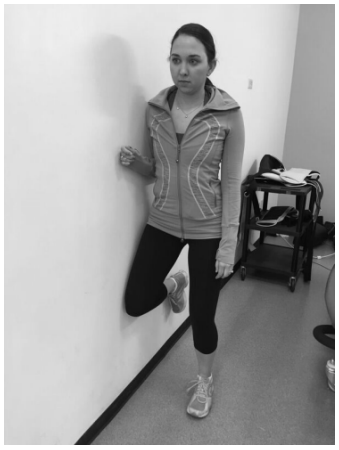
Key Treatment Strategies for Gluteal Tendinopathy

- Treatment
  - Impairment based
    - Stretching and strength only as tolerated
    - Soft tissue mobilization?
    - Activity modification
    - Motor control activities



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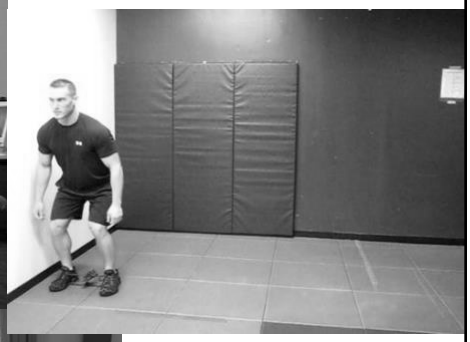

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Pelvic Floor Concerns

- Traditionally focused upon in the female population, urinary incontinence, pelvic pain, and girdle dysfunction are not exclusive to females can affect all ages
- Differential Diagnosis (limited list)
  - Urinary tract infection
  - Hernia
  - Prostate conditions (male)
  - Endometriosis
  - Polyp complications
  - Colitis
  - Lumbopelvic disorders
  - Osteitis pubis
  - STDs
  - Neoplasms

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CONTINUED

Pelvic Floor Concerns

- Pelvic floor questionnaires are freely available for organized screening approach
  - http://www.continencexchange.org.au/resources.php/449/pelvic-floor-screening-tool-for-women
- In many cases, appropriate screening is the goal for patients with pelvic floor dysfunction, in an attempt to refer to specialist
  - OBGYN
  - PT with pelvic floor specialization

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Female Hip and Pelvic Concerns

- Unique anatomy and specific life events such as pregnancy, delivery, and menopause predispose the female population to specific concerns
  - Pelvic muscle dysfunction
  - Underactive diaphragm
    - leakage
    - Prolapse
    - Sexual dysfunction
  - Overactive diaphragm
    - "Staccato" urination
    - Evacuation issues and/or constipation
    - Myofascial pain/"trigger" points
    - Painful intercourse

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Update: Surgical Procedures of the Hip Joint

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Update: Surgical Procedures of the Hip Joint

- Arthroscopy
  - Labral procedures
  - Osteoplasty (FAI)
  - Capsular Modification (Hypermobility)
  - Combination with Athletic Pubalgia Repair
- Arthroplasty
  - Posterior vs. Anterior Approach
  - Materials and Fixation
  - Hip Resurfacing Arthroplasty Procedures

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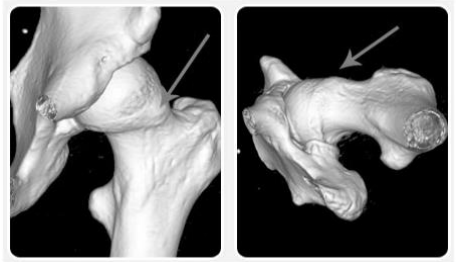
Hip Arthroscopy

- Arthroscopy offers the potential for less invasive management of conditions affecting the hip joint
- Indications
  - Labral tears
  - FAI
  - Capsular laxity/hypermobility
  - Snapping hip (extra-articular)



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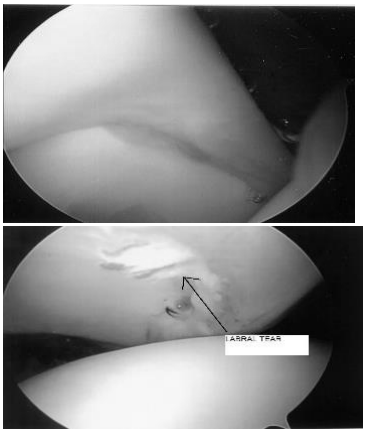
Acetabular Labral Tears

Debridement/Resection
- Most commonly performed arthroscopic hip procedure

Repair
- May be indicated for detachment or intrasubstance tears

Reconstruction
- More recently performed
- ITB allograft example



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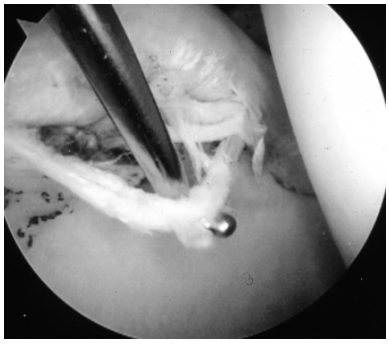
Resection of Peripheral Labral Tear



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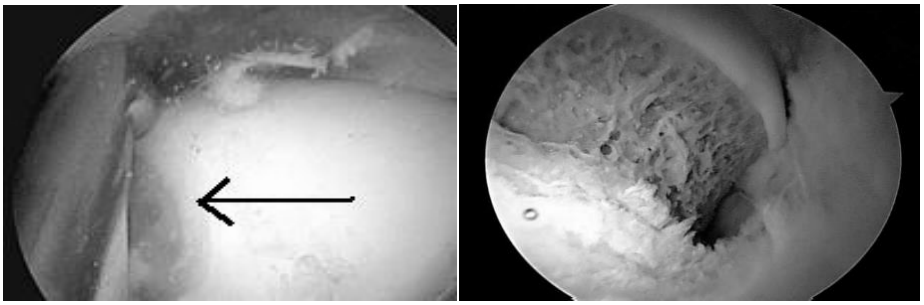
Osteoplasty – Arthroscopic Approach



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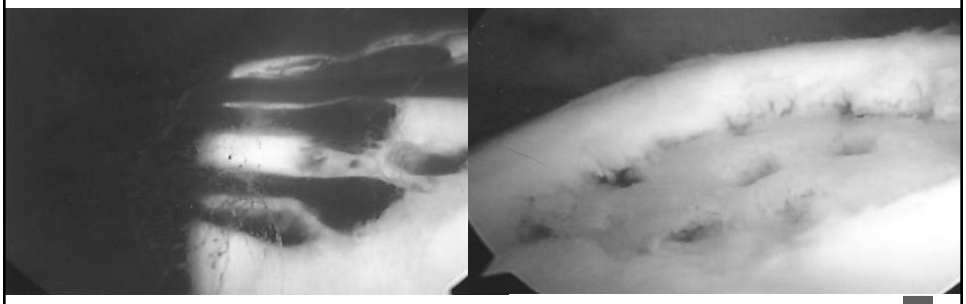
Microfracture for Chondral Lesions

- Suggested for small to medium-sized lesions
- Chondral lesions may be found in conjunction with labral compromise and/or FAI
- Attempt to facilitate growth of hyaline-like fibrocartilage



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Current Concepts in Postoperative Rehabilitation for Hip Arthroscopy

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Early Postoperative Rehabilitation Protocols

- Early protocols for hip arthroscopy were heavily based upon (Edelstein et al. *Curr Rev Musculoskelt Med*, 2010; Enseki et al., *Clin Sports Med*, 2010; Spencer-Gardner et al. *Knee Surg Sports Traum Arthrosc*, 2014):
  - Healing properties of involved tissues (time-based)
  - Limited available evidence
  - Demands of patient population
  - Clinician experience

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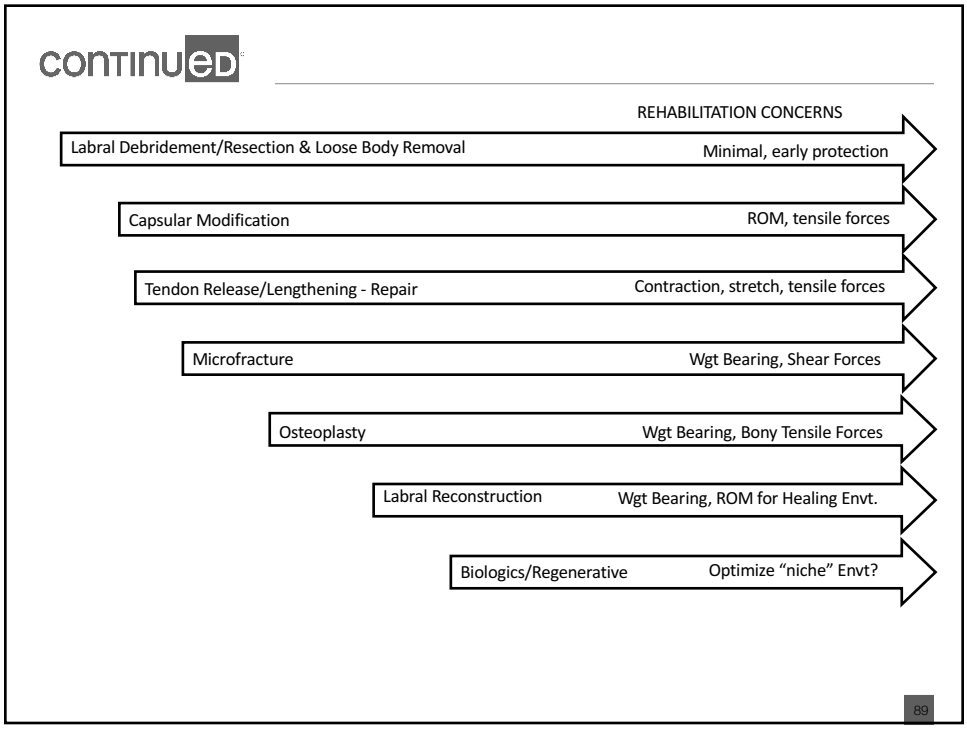

Postoperative Protection of Healing Tissues after Arthroscopy

- Acetabular labrum
  - resection vs. repair vs. reconstruction
- Femoral neck
  - osteoplasty
- Chondral preservation
  - microfracture
- Capsule
  - Modification procedures to address laxity
- Musculotendinous structures
  - tendon release procedures

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Immediate Postoperative Treatment

- Early ROM
- Stationary bike
- Strength integrity (non-weight bearing isometrics)
- Positioning consultation to avoid acquired flexibility issues
- Postural education
- Home exercise program
- Monitor for adverse/unexpected events

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Exercise Progression: Early Non-weight Bearing Exercises

- Isometrics
  - Thighs: Quad, hamstring, gluteal setting
  - Hip: All directions, with delayed initiation of flexion
- Thigh PRE's
  - SAQ's
  - "Clamshell" -> S/L SLR's
- Lumbopelvic Strength
  - PPT
  - Abdominal "hollowing"
  - Bridge progression

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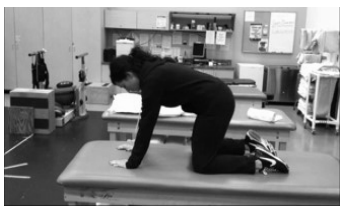
Range-of-Motion Progression

- Gentle PROM permitted within the first week
- Excessive flexion and abduction is initially avoided, to avoid soft tissue irritation
- Circumduction motion to decrease postoperative adhesions (Willimon et al, 2014)
- Caution with early joint mobilization intervention (typically no sooner than 4 weeks to address PROM deficits)



(Enseki & Kohlreiser, 2014)

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Range-of-Motion Progression

- Labral Debridement
  - Typically allow full PROM as tolerated after 2 weeks
- Labral Repair (Enseki & Kohlreiser, 2014)
  - Hip flexion <90 degrees – variable time frame
  - Hip extension to neutral- variable time frame
  - Variable limitation of external rotation
- Capsular Modification (Enseki et al, 2006; Edelstein et al, 2012)
  - Anterior capsular procedure: avoid forced external rotation and extension for 3-4 weeks
  - Posterior capsular procedure: avoid forced internal rotation and flexion for 3-4 weeks
- Osteoplasty (Enseki & Kelly, 2010)
  - Avoid forced internal rotation for 4 weeks

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Weight Bearing*

- Labral resection: 10 –14 days, partial weight bearing for less invasive procedures (labral resection)
- Labral repair: variable, with protected weight bearing extended 4+ weeks**
- Osteoplasty: 4+ weeks protected weight bearing**
- Microfracture: 6+ weeks protected weight bearing**

* Emphasize “heel-toe” gait pattern & pelvic stabilization to decrease potential for psoas irritation

** May utilize aquatic activities to normalize gait pattern in partial weight bearing environment

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Strength

- Tendon release procedures
  - Iliopsoas: Hold supine straight leg raise 4 weeks
    - Short lever hip flexion below 90 degrees is usually well tolerated
  - ITB: Hold side-lying straight leg raise 3 weeks
- Guided primarily by symptoms after patient is FWB

97

Strength

- All planes of motions emphasized
- Specific emphasis on stability of transverse and frontal planes to address known patterns of weakness in the non-arthritic hip pain population

  (Harris-Hayes et al, 2014)

(Enseki & Kohlreiser, 2014)

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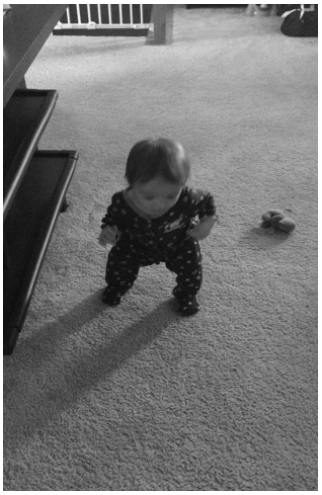
Combination Procedures

- Commonly will see labral resection/repair combined with another procedure
  - Labral resection & osteoplsty
  - Labral resection & capsular modification
- Rehabilitation protocols usually follow the most conservative aspect of each procedure
- Labral resection & osteoplasty
  - ROM as tolerated at 2 weeks
  - PWB until 4 weeks

99

Return to Occupational Activities Following Hip Arthroscopy

- Varies secondary to:
  - Individual patient characteristics
  - Nature of surgical procedure
- Low load occupation
  - 6 to 12 weeks
- Manual labor
  - 8 to 24 weeks



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Return to Athletic Activities Following Hip Arthroscopy

- Varies by:
  - Individual athlete characteristics
  - Demand of sport
  - Nature of procedure
- Return to sport
  - 8 weeks *minimal* for isolated labral resection
  - 12 to 24 weeks for capsular procedures
  - 12 to 32 weeks for osseous/chondral or involved combination procedures

*return to sport may occasionally be accelerated in high-level athletes, within the boundaries of tissue healing properties

10
1

Total Hip Arthroplasty

- Approaches
  - Posterior
  - Anterior
  - Lateral/Anterolateral
- Materials (femur-acetabulum)
  - Metal-on-polyethylene
  - Ceramic on ceramic
  - Metal-on-metal,
  - Ceramic-on-polyethylene
- Fixation
  - Cemented
  - Non-cemented
  - Hybrid

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CONTINUED

Surgical Approach – Rehabilitation Implications

- Posterior
  - Most common approach
  - Gluteus medius is typically spared
  - Precautions: Flexion, internal rotation, adduction
- Anterior
  - Less secondary muscle disruption
  - Allows larger femoral prosthetic
  - Less chance of dislocation
  - Technically demanding
- Lateral/Anterolateral
  - May involve muscle "splitting" as part of procedure
  - May have concerns for extension and external rotation
  - Precautions are variable

10 3

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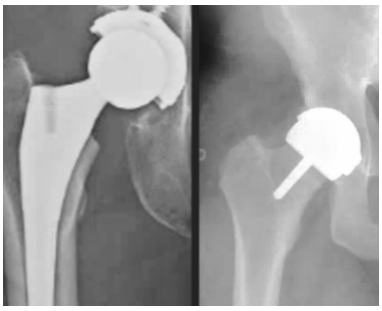
Fixation – Rehabilitation Implications

- Cemented (femur and acetabulum)
  - Immediate fixation, earliest weightbearing
  - Highest risk of loosening
  - Often reserved for least active patients
- Non-cemented (femur and acetabulum)
  - Biological fixation (stongest), may delay weightbearing
  - More active patients
- Cemented femur, Non-cemented acetablum

10 4

THA Variations

- Minimally Invasive Technique
  - Smaller incision
  - Theoretically allow accelerated rehabilitation
  - Small body of research
- Resurfacing THA
  - Femoral "cap" is utilized (anterior approach)
  - Spares bone
  - Younger, active patients, with appropriate bony qualities
  - Higher ceiling for activity goals
  - Controversial
    - Higher failure rate
    - Blood ion concerns



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Current Trends in Rehabilitation after THA

- Early Discharge (same day or next day)
  - Early results promising, further research needed (Basques BA et al., 2017)
- Early Weight Bearing
  - More aggressively promoting early mobilization
  - Increased confidence in materials and fixation
- ROM Precautions
  - Overall trend of becoming less restrictive
  - Better fit and methods of fixation
  - Larger femoral component, better fixation
- Expected Level of Activity
  - Higher ceiling for activity
  - Most evident for anterior approach and metal prosthetic components

10.6

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THA Rehabilitation Considerations

- Early PRE's supported in the literature (Okoro et al, 2012)
- Treadmill training may help normalize gait patterns (White et al, 2005)
- ADL return is variable
  - 6 weeks to 3 months
- Athletic Activity
  - Timing and type is not agreed upon
  - Impact is primary factor
  - Patient education is crucial

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THA – Clinical Signs of Concern

- Majority occur early in the rehabilitation process
- Dislocation (highest risk first 3 months)
  - Sudden pain and apparent shortening of the limb are potential indicators of dislocation.
- Infection
  - Pain!
  - Systemic Symptoms
- Deep vein thrombosis
  - Cardinal inidicators
- Prosthetic loosening / acquired fracture (non-traumatic)
  - Pain > mechanical symptoms
- Residual nerve injury (3%)
  - Plexus injury
  - Peripheral nerve injury (Sciatic and Peroneal)
    - Motor and sensory testing

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Case Study: Utilization of the Movement System Concept for a High School Wrestler with Femoral Acetabular Impingement Syndrome

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CONTINUED

Case Study: High School Wrestler with FAI Syndrome

- 16 year old high school (folk style) wrestler
- In season weight of 195 lbs.
- 3 month history of slowly progressive left groin pain (1-5/10), and occasional left SIJ pain (<50% of time vs. groin)
- Started at end of competitive season; but, more prominent in off-season training cycle
- Symptoms most prominent at end of training sessions or end of day after multiple sessions
- Once symptomatic, driving and sitting in class were also painful
- Injury Hx: low back "strain" x 1 yr. ago (resolved), grade II L MCL sprain x 6 months ago (resolved with PT and ATC treatment)
- OTC NSAIDs for current episode; not sure if helpful
- HOS = 90% for ADL subscale; 69% sport subscale (100% is optimal)

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Functional Tests

11

Impairment Examination

- Movement testing alone does not allow complete determination of cause
- Impairment examination must be conducted:
  - PROM: all symmetrical and WNL, except passive left hip flexion (115 degrees on left; limited by pain) vs 130 degrees on right, and passive IR on left (10 degrees on left; limited by pain) vs 15 degrees on right
  - Strength: Weakness noted on left side for hip abduction and external rotation (approx. 80%; 4/5)
  - Length Testing: + Thomas (tight iliopsoas)
  - Joint mobility: no perceived differences in distraction testing for hip, although simultaneous caudal glide allowed pain-free left hip flexion to 125 degrees
  - Spine AROM testing and PA spine mobility testing yielded negative results

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Treatment

- Hip Strength exercises
  - All planes of motion
- Lumbopelvic stabilization
- Activity modification

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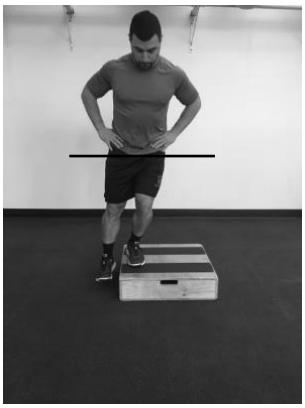

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Re-evaluation

- 5 weeks after initial evaluation
- Pain:
  - 0/10 ADL's/rest; 1/10 with maximal exertion (primarily squatting with heavier weight (225 lbs)
  - Vague groin distribution, no SIJ pain
- HOS
  - ADL subscale = 100%
  - Sport subscale = 94%
- PROM: symmetrical on both sides, except flexion on left (126 degrees vs. 130 degrees on right; limited by soreness/"pinching") and IR (12 degrees vs. 16 degrees on right; capsular end-feel with "stiffness")
- MMT for hip symmetrical, lower abdominal leg lowering test within 1-2 inches from ground before losing pelvic control)

CONTINUED

Re-evaluation

- Movement Examination
  - Deep Squat
    - Unweighted: approx. 100 degrees hip flexion, symmetrical performance, consistent pelvic and lumbar spine control, no pain
    - Weighted (225 lbs. x 5 repetitions): approx. 90 degrees hip flexion, no deviations, no pain
  - Step-Down Maneuver
    - Symmetrical performance between LE's with 6 inch elevation
    - No pain
    - No loss of stability – able to maintain speed and position (frontal and transverse planes) throughout task
- Concluded patient was ready for return-to-play progression

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Questions?

CONTINUED

Thank You!

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