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Rehabilitation Strategies for Common Hip and Pelvic Disorders

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Introduction

• This course will discuss the clinical course and treatment of common conditions of the hip and pelvic complex that are encountered in the outpatient orthopedic setting.
• Rehabilitation strategies, based upon current evidence, will be discussed for intra-articular and extra-articular disorders of the hip and pelvic region.
Objectives

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

• Define 3 categories of hip and pelvic disorders.
• Explain key condition characteristics, treatment strategies, and expected outcomes for pathological conditions of the hip joint.
• Explain key condition characteristics, treatment strategies, and expected outcomes for pathological conditions of the pelvic complex.
• Explain key condition characteristics, treatment strategies, and expected outcomes for soft tissue disorders of the hip and pelvic region.

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.
• Active individuals may experience pain originating from numerous intra and extra-articular sources.
• An organized screening and evaluation process is crucial for effective differential diagnosis in this population.
Course Outline

- Background and Review of Learner Outcomes
- Disorders of the Hip and Pelvic Complex
  - Anatomy of affected structures
  - Challenges in diagnosis and treatment
  - Categorization of hip and pelvic disorders
  - Crucial treatment concepts
- Treatment of Hip Disorders
  - Femoral acetabular impingement syndrome
  - Hypermobility
  - Osteoarthritis

Course Outline (contd.)

- Treatment of Osseous Pelvic Complex Disorders
  - Sacroiliac dysfunction
  - Pubic symphysitis/osteitis pubis
- Treatment of Hip Soft Tissue Disorders
  - Greater trochanteric pain syndrome
  - Proximal hamstring injuries
  - Adductor injuries
- Conclusions and Question & Answer
Disclosures

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

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Disorders of the Hip and Pelvic Complex

Anatomy of Affected Structures
Mobile to Stable

• 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
Innominate

Secondary to its inferior orientation, the acetabulum overhangs the femoral head. The degree of overhang typically ranges between 30 to 40 degrees and is termed the Center Edge Angle (Angle of Wiberg). Smaller Center Edge Angles (<20 degrees) have been associated with congenital dislocations.

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
Hip Joint Capsule and Ligaments

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

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
Pelvic Complex Ligaments

Primary Hip Muscles

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

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

Abdominal Musculature

Muscles of the Trunk

- Pectoralis major
- External oblique
- Internal oblique
- Rectus abdominis
- Transverse abdominis
Hip & Pelvic Bursae

- Iliopsoas bursae
- Trochanteric bursae

Neurovascular Structures

Interactive Hip © 2000 Primal Pictures Ltd.
Challenges in Diagnosis and Treatment

- Osseous
  - Femoral version issues
  - Coxa valga
  - Coxa vara
  - Cam impingement
  - Pincer impingement
  - Acetabular retroversion
  - Protusio
  - Dysplasia
  - Loose bodies
  - Osteochondral fracture
  - Cysts
  - Coxal profunda
  - Perthes
  - AVN
  - SFCE
  - Lateral rim impingement
  - Coxa breva
  - High trochanter
  - Post traumatic
  - Subluxation
  - DDJ
  - Auto Immune
  - Infections
  - Canceroo

- Capsular/ Labral
  - Teres tear
  - Iliofemoral ligament tear
  - Ischiofemoral ligament tear
  - Pubofemoral ligament tear
  - Connective tissue disorder
  - Contracture
  - Labral tear
  - Paralabral cyst
  - Synovial pathology

- Musculo Tendinous/ Soft Tissue
  - Psoas strain, contracture, tendinitis
  - Adductor tendinitis
  - Athletic pubalgia
  - Rectus strain, tendinitis, contracture
  - Heterotopic Ossification
  - Psoas impingement
  - Coxa sultans internus
  - Rectus abdominus
  - Gluteus medius strain, contracture, tendinitis
  - Gluteus minimus strain contracture, tendinitis
  - Greater trochanter bursitis
  - ITB/TFL
  - Sub gluteus medius bursitis
  - Piriformis syndrome
  - Endometriosis

- Neurovascular
  - Sciatic nerve entrapment
  - Pudendal nerve entrapment
  - Obturator nerve involvement
Diagnostic Challenges

- 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.
- Active individuals may experience pain originating from numerous intra and extra-articular sources.
- An organized screening and evaluation process is crucial for effective differential diagnosis in this population.

Systemic Causes of Hip and Pelvic Region Pain

- Rheumatic arthritis
- Crohn’s disease
- Psoriasis
- Reiter’s syndrome
- Systemic lupus erythematosus
- Genitourinary tract infection
- Endometriosis & reproductive organ issues
- Neoplasm
Pelvic Floor and Female Hip Pelvis Concerns

- Remember urinary incontinence, pelvic pain, and girdle dysfunction are not exclusive to females
- Unique anatomy and specific life events such as pregnancy, delivery, and menopause predispose the female population to specific concerns
- Pelvic muscle dysfunction
  - Urinary difficulties
  - Evacuation difficulties
  - Sexual dysfunction
  - Often accompanying musculoskeletal symptoms
    - Hip pain
    - Lumbopelvic pain

Categorization/Classification

Hip vs Pelvis vs. Lumbosacral Spine

- Eval and Treat Lumbosacral Pathology
- Eval and Treat Extra - Articular
- Symphysis
- Hypomobility/OA
- Hypermobility

(Adapted from Martin & Kivlan. Topics in Geriatric Rehabilitation, 2013)
Structured Approach for Hip and Pelvic Pain
(Reiman et al, 2014)

- Patient interview
  - Self-reported “Red Flags”?
- Observation
  - Obvious signs of distress or inappropriate presentation
- Screening Examination (high sensitivity)
  - Lumbosacral region
  - Hip
- Decision for further PT evaluation, or referral
- Disorder-specific Testing (high specificity)
- PT Diagnosis
- Treatment Approach

Identify serious concerns (immediate referral)
Rule in/out overlapping body regions
Identify specific pathology
History and Screening Process for Hip and Pelvic Issues

- Identify inappropriate patients (immediate referral)
  - Immediate referral
- Identify patients of concern
  - Additional diagnostic testing?
  - Consider future referral?
- Determine single vs. multiple regions of involvement
- Prioritize examination approach for specific regions
  - Hip joint
  - Pelvic girdle
  - Lumbosacral complex

History/Intake Drives Evaluation Algorithm

- Refer
- Screen
  - Sensitivity concerns
- Region-Specific Evaluation
  - Specificity concerns
  - If multiple regions are implicated, prioritize level of involvement
Treatment of Intra-articular Hip Disorders

- Femoral Acetabular Impingement Syndrome
- Hip Joint Hypermobility
- Osteoarthritis

Femoral Acetabular Impingement Syndrome (FAI)
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

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
Clinical Presentation of FAI

- Clinical Tests
  - Numerous tests for FAI have been described
  - No tests demonstrate good specificity – primary utility is screening
    (Riemen et al., 2015)
    - FADIR (SN = 99%, SP = 25%)
    - FABER (SN 53%-81%, SP = 25%-71%)
- 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

Key Treatment Strategies for FAI

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

Joint Mobilization
- Address early capsular changes

Flexibility
- Psoas and rectus to eliminate anterior pelvic tilt

Strength in Protected Ranges
- Avoid impinging positions

Motor Control
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.

FAI – Multiplanar Control


Inadequate control

- Frontal plane (adduction)
- Transverse plane (internal rotation)
FAI – Multiplanar Control

Strength Activities
- Abductors
- External rotators

Functional Exercises
- Weight bearing with multiplanar stability demands

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
Joint Mobilization

Hip mobilization techniques may be effective for numerous reasons:

- Optimization of capsular tension characteristics
- Modification of pain response/hypoglesia
- Decrease inhibition of surrounding musculature – improve joint support
- Decrease tone of “over-active” muscles
- Improve joint
- Nutrition

Clinical Course and Outcomes for FAI

- If the clinical presentation leads to impression of FAI, conservative treatment measures are recommended
- Outcomes studies for conservative treatment are early in development
- If the patient is unresponsive to conservative treatment, additional imaging may be warranted
  - Radiographs (FAI)
  - MRA (labral tear)
  - Diagnostic injection (confirmatory for source of symptoms)
- Surgical options are available for patients with ongoing pain and functional limitations related to intra-articular pathology related to FAI
  - Arthroscopy
    - Osteoplasty (proximal femur or acetabular rim)
    - Labral debridement, repair, or reconstruction
  - Open osteoplasty correction of FAI
Spectrum of FAI-related Joint Pathology

- Femoral Acetabular Impingement
  - Altered joint mechanics
    - Labral Lesions
      - Chondral Damage
        - Osteoarthritis

The Hypermobile Hip Joint
Hypermobile Hip Condition

Characteristics

• Joint hypermobility may predispose individuals to injuries of the hip joint and lumbosacral structures

• Categories of Hypermobility
  o Generalized
  o Focal (acquired with trauma or repetitive force)

• Brief screen of joint tissue integrity may be useful in diagnosis and prognosis

• May guide treatment recommendations

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
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)
  o No metrics available regarding sensitivity or specificity
• Apprehensive with long axis distraction
  (anterior or general)

Key Treatment Strategies for the Hypermobile Hip

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

- Side-to-Side
  - Attempt to minimize the discrepancy between dominant and non-dominant 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

Focal Hip Strengthening
Improve Motor Control

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

Clinical Course and Outcomes for the Hypermobile Hip

- If the clinical presentation leads to impression of hypermobility, conservative treatment measures are recommended
- If the patient is unresponsive to conservative treatment, additional imaging may be warranted
  - Radiographs (identification of dysplasia)
  - MRA (labral pathology)
  - Diagnostic injection (confirmatory for source of symptoms)
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

Hip Osteoarthritis
Hip Osteoarthritis – Condition Characteristics

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

Clinical Presentation of Hip Osteoarthritis

• Examination Findings (Cibulka et al, 2009)
  o Moderate anterior and/or lateral pain, most often prominent during weight bearing
  o Pain often prominent in morning, then subsiding in <1 hr
  o Typically >50 years of age (numerous exceptions: previous injury, dysplasia history, medication-induced AVN, etc.)
  o Progressive loss of ROM, notable IR (<15 degrees), then flexion (capsular pattern)
  o Decreased joint mobility or symptom relief with long-axis distraction
  o Related loss of strength

• Clinical Tests (Sutlive et al, 2008)
  o FABER/Patrick
    • SN=.57, SP=.71
  o Scour
    • SN=.62, SP=.75
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)

Clinical Prediction Rule for Hip OA (Sutlive et al, 2008)

- 5 possible clinical predictors for diagnosis
  - Pain aggravated with squatting
  - Lateral or anterior hip pain with the scour test
  - Active hip flexion causing lateral hip pain
  - Pain with active hip extension
  - Passive range of hip internal rotation less than 25°

- If at least 4 out of 5 variables were present, the positive likelihood ratio was 24.3 (95% CI: 4.4-142.1), increasing the posttest probability of hip OA to 91%.
Hip OA – Key Treatment Strategies

• Strong Recommendations
  o Manual therapy
  o Flexibility
  o Strength
  o Endurance

• Moderate Recommendations
  o Education/activity modification
  o Ultrasound
  o Weight loss

• Weak Recommendations
  o Bracing

Mobilization Progression for Golfer with an Arthritic Hip

• Case Example: Right-handed golfer with moderate right hip OA. Has progressed well in physical therapy, however does note stiffness when utilizing his driver.

• Significant Examination Findings: Decreased internal rotation and decreased movement noted with long-axis distraction. Decreased strength of the hip internal and external rotators is noted in the prone position.
Mobilization Progression for Golfer with an Arthritic Hip

Long Axis Distraction

↓

Prone anterior innominate mobilization for hip internal rotation

↓

Weight bearing lateral distraction with rotation

Distraction with Weight Bearing Hip Rotation
Follow-up Exercises

- Supine resisted hip rotation
- Weight bearing hip/pelvic rotation progression
- General transverse plane strengthening
- Simulated golf swing

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
Treatment of Osseous Pelvic Disorders

- Sacroiliac dysfunction
- Osteitis pubis

Sacroiliac Dysfunction – Condition Characteristics

- Expansive definition typically defined by positional faults, lack of, or excessive SIJ mobility
- Variable modes of onset
  - Traumatic
  - Repetitive use
  - Muscle imbalances
  - Inflammatory/arthritic
- Characteristic pain in SIJ region with potential referred pain into unilateral buttock region
Sacroiliac Dysfunction – Condition Characteristics

- Often associated with other conditions
  - Lumbopelvic instability
  - Hip FAI
  - Hip Hypermobility
  - Hip OA
- Pelvic landmark positional examination
- Numerous movement tests
- Manual techniques may be indicated
Key Treatment Strategies for SIJ Dysfunction

• Identify issue as primary or secondary
• Malposition = mobilization
• Excessive/uncontrolled motion = stabilize
• Suspiration/concern for cases without specific onset or other examination findings
• Hip and pelvic motor control emphasis
• After addressing positional or movement faults; re-evaluate for involvement of other regions
Sacroiliac Dysfunction

- Identify issue as primary or secondary
- Malposition = mobilization
- Excessive/uncontrolled motion = stabilize
- Suspicion/concern for cases without specific onset or other examination findings
- Hip and pelvic motor control emphasis
- After addressing positional or movement faults; re-evaluate for involvement of other regions

Case Study: SIJ and Hip Dysfunction

- 27 year old male runner, with gradual onset of left SIJ region and groin pain
- Pain becomes most notable after running 2 miles or more (>3/10)
- Prolonged sitting (>60 minutes) also increases symptoms
Case Study: SIJ and Hip Dysfunction

• Clinical Examination
  o Asymmetrical pelvic landmarks (low left ASIS and pelvic crest)
  o Palpable tenderness at left sacral sulcus region
  o Positive flexion test on left
  o Positive left FADIR test
  o Left hip weakness: 4/5 for glut med, and hip ER
  o Increased valgus moment with stepdown test on left
  o Tight left iliopsoas (+ Thomas Test)

• Clinical Impression
  o SIJ dysfunction (secondary)
  o FAI syndrome (primary)

• Initial Treatment
  o Manual mobilization for SIJ dysfunction
  o Quadruped rocking exercise
  o Basic lumbopelvic stabilization
  o Iliopsoas stretching

• Re-evaluation
  o SIJ region pain 0-1/10
  o Hip/groin pain decreased by 50%
    • Most notable after running (2 miles)
Case Study: SIJ and Hip Dysfunction

- Follow-up treatment
  - Lateral distraction at 90 degrees of left hip flexion
  - Increased emphasis on gluteal strength
  - Progression to weight bearing PREs; stepdown with control of valgus moment
  - Emphasis on minimizing anterior pelvic tilt with exercise (motor control)
  - Running progression as symptoms allowed

Osteitis Pubis
Osteitis Pubis - Condition Characteristics

• Clinical Presentation
  o Onset
    • Acute
    • Gradual
  o Pain Distribution
    • Central symphysis region
    • Proximal adductor region
    • Lower abdomen
    • Genital region
  o Functional Limitations
    • Gait: swing phase
    • Pivoting
    • Sport specific: cutting, jumping, kicking

• Clinical Presentation (contd.)
  o Muscle Imbalances
    • Tightness
      o Rectus abdominus*
      o Adductor
      o Iliopsoas
      o Rectus Femoris
    • Strength Asymmetries – weakness
      o Adductors*

*Muscles attach in proximity to each other and can create an antagonistic imbalance (Rodriguez, 2001)
Osteitis Pubis - Condition Characteristics

• Clinical Presentation (contd.)
  o Onset
    • Acute
    • Gradual
  o Sport Participation
    • Soccer (3-5%)
    • Hockey
    • Football
    • Running
  o Male > Females
    • May be subject to reporting bias in the literature
  o May be present in conjunction with other conditions
    • FAI
    • Athletic Pubalgia (shares risk factors and may be part of syndrome)
      • Adductor strains

Osteitis Pubis - Condition Characteristics

• Clinical Examination
  o History is imperative
  o Rule out other structures
    • Hip (clinical tests)
    • Extra-articular (MMT, length-testing, palpation)
  o Clinical Tests: minimal description
    • Multiposition adductor squeeze (for pain)
    • No significant data on testing methodology
  o Often does not become apparent until patient does not respond to conservative treatment
  o Imaging to confirm in non-responsive cases
    • Plain Radiography
      • Surface irregularities and degeneration
    • MRI
      • Edema
Pubic Symphysis Gap Test


Key Treatment Strategies for Osteitis Pubis

• Conservative Treatment
  ○ Activity modification
  ○ Physical therapy
  ○ Corticosteroid injection
  ○ NSAIDs
Key Treatment Strategies for Osteitis Pubitis

- Structured multimodal program/heavily impairment based
- **Relative** Rest; moderate stressors
- Modalities?
- Soft tissue mobilization
  - Adductors
  - Iliopsias

- Stretching
  - Gradual progression
  - Symptomatically dictated
- Strength
  - Localized (adductor : abductor ratio)
  - Lumbopelvic
- Correlate isolated strength exercises approach into motor control activities
Clinical Course and Expected Outcomes of Osteitis Pubitis

- Recovery course can be 4 – 9 months
- Surgical Options
  - Arthrodesis
  - Symphysis resection
  - Disc curettage
  - Mesh stabilization
Treatment of Soft Tissue Disorders of the Hip Region

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

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
  o Gluteus Medius
    • Tendonopathy
    • Tear
  o Gluteus Minimus
    • Tendonopathy
    • Tear
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

Key Treatment Strategies for Gluteal Tendinopathy

- Treatment
  - Impairment based
    - Stretching and strength only as tolerated
    - Soft tissue mobilization?
    - Activity modification
    - Motor control activities
  - Activity modification
  - Motor control activities
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
Proximal Hamstring Injuries – Risk Factors

- Prior hamstring injury
- Strength deficits
- Poor lumbopelvic stability
- Previous significant knee injury
- SIJ dysfunction
- Proprioceptive deficits
- Lack of warm-up previous to physical activity?

Proximal Hamstring – Condition Characteristics

- Clinical Findings
  - Vary depending on severity of injury
  - May see echymosis (grade II/III)
  - Palpable pain
  - Pain with end-range hip flexion or knee extension
  - Pain with active hip extension or knee flexion
  - Painful/unable to ambulate (acute)
  - Preferred position of knee flexion, neutral hip (acute)
Proximal Hamstring – Key Treatment Strategies

• Early Treatment
  o Goals
    • Protect scar development
    • Minimize atrophy
  o Example Activities
    • Gentle PROM
    • Submaximal isometrics
    • Stationary bike
    • Potential use of soft tissue mobilization
    • Pulsed US

Proximal Hamstring – Key Treatment Strategies

• Intermediate Treatment
  o Goals
    • Pain free strengthening
    • Establish neuromuscular control of trunk and pelvis
  o Example Activities
    • GENTLE stretching (hamstring, gastric)
    • Concentric hamstring strength emphasis
    • Lumbopelvic/core stabilization
    • Initiate weight bearing strength
      o Wall squat
      o Partial lunge
    • Balance activities
Proximal Hamstring – Key Treatment Strategies

- Late stage/subacute/chronic case rehabilitation
  - Restore full flexibility
  - Restore strength
    - Emphasize eccentric control in later stages
    - Strengthen at end-range of motion (hip flexion, knee extension)
  - Lumbo-pelvic strength
    - Endurance
    - Full neuromuscular control
    - Plyometric progression (for athletes)

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
Adductor Injuries – Condition Characteristics

- Risk factors
  - Hip muscle weakness
  - Ratio
  - Lower abdominal weakness
  - Poor off-season conditioning
  - Previous groin injury
  - Decreased hip ROM (vs contralateral side)
  - Adductor strength <80% abductor strength
  - *Strength appears more important than flexibility

Adductor Injuries – Condition Characteristics

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

Thank You!
REFERENCES


REFERENCES


