APPLICATION OF THE MOVEMENT SYSTEMS MODEL TO THE MANAGEMENT COMMON HIP PATHOLOGIES

Tracy Porter, PT, DPT
Des Moines University Department of Physical Therapy
Objectives

- Review current literature related to the management of surgical and non-surgical hip pathologies
- Discuss the concept of the movement system
- Recognize key examination findings to support common movement system diagnoses for the hip
- Discuss interventions guided by the specific movement system diagnosis
Mechanism of impingement, chronic impingement can stimulate excessive bone growth

“The goal of treatment in symptomatic patients with femoral-acetabular impingement is the restoration of the anatomy to as close to normal as possible while removing factors contributing to abutment of the femoral head and/or neck and the acetabular rim.” p. 891
Chattle (2012)

Surgery often opted for early due to restricted activity concerns

<table>
<thead>
<tr>
<th>Post-treatment result</th>
<th>Size of cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marked improvement</td>
<td>27</td>
</tr>
<tr>
<td>Partial improvement</td>
<td>6</td>
</tr>
<tr>
<td>(Recurrent pain at 24 months but not severe enough to require surgery)</td>
<td></td>
</tr>
<tr>
<td>No improvement proceeded to surgery</td>
<td>4</td>
</tr>
<tr>
<td>Stage</td>
<td>Treatment summary</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>One</td>
<td>Avoid excessive physical activity Anti-inflammatory medication (diclofenac 50mg)</td>
</tr>
<tr>
<td>2–4 weeks</td>
<td>2–4 weeks in acute attack</td>
</tr>
<tr>
<td></td>
<td>Physiotherapy – stretching exercises 20–30min a day to improve external rotation</td>
</tr>
<tr>
<td></td>
<td>and abduction in flexion and extension</td>
</tr>
<tr>
<td></td>
<td>Advised to avoid W-sit</td>
</tr>
<tr>
<td>Two</td>
<td>Assessment of normal ROM of internal rotation after acute pain subsided.</td>
</tr>
<tr>
<td>2–4 weeks</td>
<td>Instructed to adapt to safe ROM and perform activities of daily living (ADL) with</td>
</tr>
<tr>
<td></td>
<td>minimum friction</td>
</tr>
<tr>
<td>Three</td>
<td>Modification of ADL predisposing to FAI ie. internal rotation associated with</td>
</tr>
<tr>
<td>Four</td>
<td>flexion and adduction, eg. when sitting lean back every 5–7sec, avoid cycling.</td>
</tr>
</tbody>
</table>
- Short, Short, Strack, Anloague, & Brewster (2017)
- Article attached
- Dressendorfer & Callanen (2017)
- Article attached
The "movement system" represents the collection of systems (cardiovascular, pulmonary, endocrine, integumentary, nervous, and musculoskeletal) that interact to move the body or its component parts.

http://www.apta.org/Vision/
One Joint vs. Multi Joint Muscles

- Hip extensors
- Hip flexors
Standing Tests

- Posture
- Partial squat
- Single leg stance
Supine Tests

- Hip flexor length test
- Straight leg raise
- Iliopsoas muscle performance
- Single knee to chest
Side-lying Tests

- Hip abductor muscle performance
Prone Tests

- Knee flexion
- Hip medial and lateral rotation
Quadruped

- Alignment
- Quadruped rocking
Sitting Tests

- Knee extension
- Hip flexion
- Hip medial and lateral rotation
Gait

- Stance phase
- Swing phase
<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Accessory Movement</th>
<th>Associated Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral anterior glide</td>
<td>Without rotation</td>
<td>Iliopsoas tendinopathy; bursitis</td>
</tr>
<tr>
<td></td>
<td>With medial rotation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With lateral rotation</td>
<td>Adductor strain</td>
</tr>
<tr>
<td>Hip adduction</td>
<td>Without rotation</td>
<td>Gluteus medius strain, trochanteric bursitis, piriformis syndrome</td>
</tr>
<tr>
<td></td>
<td>With medial rotation</td>
<td></td>
</tr>
<tr>
<td>Femoral accessory hypermobility</td>
<td>With superior glide</td>
<td>Early DJD, labral tears</td>
</tr>
<tr>
<td>Femoral hypomobility</td>
<td>With superior glide</td>
<td>DJD</td>
</tr>
</tbody>
</table>
Femoral Anterior Glide Syndrome with Medial Rotation

Pathomechanics

- Inadequate posterior glide of the femoral head during hip flexion
- Medial femoral rotation during hip flexion
Symptoms

- Groin pain, particularly during hip flexion
- Iliopsoas tendinopathy
- Associated with activities involving hip extension (distance running, dancing, postural hip extension)
Key Examination Items – Movement Patterns

- Supine hip flexion with knee extension – evaluate passively and actively, femoral head will have insufficient posterior glide and associated medial rotation
- Prone hip extension – excessive anterior translation of femur
- Quadruped rocking – patient will prefer hips flexed to less than 90 degrees, affected hip will not flex as easily and ipsilateral pelvis will appear higher
- Seated knee extension – active knee extension will be associated with medial rotation
Muscle Length and Recruitment

- Shortened and dominant TFL relative to iliopsoas
- Single leg stance – associated with medial rotation
- Prone hip extension – hamstring dominance
- Seated active knee extension – increased motion when allowed to medially rotate
Intervention Goals

- Improve posterior femoral glide
- Strengthen the iliopsoas to counteract TFL dominance
- Correct hip hyperextension and medial rotation during postures and movements
Interventions

- Quadruped rocking
- Supine passive hip flexion
- Prone knee flexion
- Side lying gluteus medius strengthening
- Seated end-range iliopsoas strengthening
- Single leg stance
Postural and Movement Corrections

- Sit to stand – practice performing without medial hip rotation or adduction
- Avoid sitting with legs crossed thigh over thigh
- Correct sway back posture
- Use a pillow between knees in side-lying
- Engage gluteus maximus at heel strike
Femoral Accessory Motion
Hypermobility Pathomechanics

- Found in patients with early DJD and labral tears
- Rotational impairments associated with superior glide of the femur
- Pain results from compressive forces
- Distraction of femur alleviates pain
Symptoms

- Deep hip joint pain – may radiate anteromedially
- Pain with walking
- Stiffness upon initial walking
Key Examination Items – Movement Patterns

- Gait analysis – mildly antalgic gait
- Single leg stance – medial femoral rotation
- Prone passive knee flexion – lateral femoral rotation
- Seated knee extension – medial and possibly superior femoral movement
Muscle Length and Recruitment

- Rectus femoris and hamstrings stiff relative to the iliopsoas and intrinsic hip rotators
- Hamstring dominance during hip extension
- Gluteus medius and iliopsoas weakness
Intervention Goals

- Reduce hypermobility of accessory motions
- Improve quadriceps and hamstring flexibility
Interventions

- Quadruped rocking
- Prone knee flexion
- Side-lying hip abduction
- Seated knee extension
Postural and Movement Corrections

- Teach patient to monitor femoral movement
- Eliminate strength training of quadriceps and hamstrings
- Taping the proximal femur
Femoral Hypomobility with Superior Glide Pathomechanics

- Associated with DJD
- Marked limitation in both passive and active motion
Symptoms

- Deep joint pain with referral along medial and anterior thigh
- Joint stiffness
- Night pain
Key Exam Items – Movement Patterns

- AROM and PROM
- Hip flexor length
- Gait assessment – compensatory lumbar/pelvic motion due to restricted hip mobility, antalgic gait
Muscle Length and Recruitment

- Hip flexor dominance and stiffness
- Hip abductor/extensor weakness
- Joint hypomobility
Intervention Goals

- Maintaining maximum active and passive motion
Interventions

- Caudal long-axis distraction
- Standing exercises combined with distraction
- Hip flexor stretching
- Quadruped rocking
- Prone series – knee flexion, hip lateral rotation with knee flexion, hip abduction
- Lower abdominal strengthening
Postural and Movement Corrections

- Focus on decreasing lumbar lordosis in standing
- Contract gluteus muscles at heel strike
- Teach knee flexion over compensatory lumbar motion in presence of hip flexor contracture
- Encourage sitting in less hip flexion
- Minimize active hip flexion during sit to stand
Hip Adduction with Medial Rotation Pathomechanics

- Lengthened posterior gluteus medius and hip lateral rotators with or without associated weakness
- Imbalance between flexors/medial rotators and extensors/lateral rotators
- Risk factors include wide pelvis, side sleeping, crossing legs, running, or cycling
Symptoms

- Pain in area of gluteus medius
- Trochanteric bursitis, ITB pain
- Piriformis syndrome
- May mimic L4-5 radiculopathy or peroneal nerve entrapment
Key Exam Items – Movement Patterns

- Tenderness and nodules along ITB
- Pain reproduced by ITB stretching
- Extensor/lateral rotator weakness
- Single-leg stance – Trendelenburg
- Gait assessment
Muscle Length and Recruitment

- Increase flexibility/length of lateral rotators
- Hip adductors dominate
- May recruit sartorius or TFL to abduct
Intervention Goals

- Improve performance of the hip abductor and lateral rotator muscles
Interventions

- Use of assistive device if walking is painful and significant abductor weakness is present
- Prone hip abduction strengthening – isometric hip lateral rotation, AROM hip abduction
- Side-lying exercises
Postural and Movement Corrections

- Stand with symmetrical weight bearing avoiding hip adduction
- Avoid crossing legs and minimize time in sitting
- Minimize hip adduction during sit to stand
- Use pillow between knees in side-lying
- Consider use of assistive device
References

