FEMORAL ANTERIOR GLIDE SYNDROME

Excessive flexibility of the anterior hip joint structures as the result of maintained hip extension in standing and walking (10 degrees beyond neutral) creates a path of least resistance of anterior glide. The principal movement impairment in this syndrome is imprecise spinning of the femoral head during hip flexion. Imprecise spinning is related to a faulty starting position of the femoral head (anterior) or an anterior glide during hip flexion. In some cases, the stiffness of the hip extensors or posterior hip joint structures contributes to the anterior glide.

<table>
<thead>
<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Diagnosis</th>
<th>Associated Signs or Contributing Factors</th>
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<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin pain during active hip flexion or standing.</td>
<td>Standing Alignment/Appearance:</td>
<td>Generalized hypermobility</td>
<td>Muscle/Tendon/Bursae:</td>
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<tr>
<td>Groin pain may progress to aching pain of whole hip.</td>
<td>Post pelvic tilt, hip ext and knee hyperextension</td>
<td>Structural variations:</td>
<td>Iliopsoas</td>
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<tr>
<td>Activities/Population</td>
<td>Decreased gluteal definition</td>
<td>↓ head offset</td>
<td>Iliopsoatic bursae</td>
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<tr>
<td>Often occurs in young people</td>
<td>Movement Impairments:</td>
<td>↓ head neck offset</td>
<td>Joint/Bone:</td>
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<tr>
<td>Athletes such as distance runners or soccer players</td>
<td>Hip and knee hyperextension</td>
<td>Hip dysplasia</td>
<td>Anterior hip capsule</td>
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<tr>
<td>Those who perform activities associated with end range movements and stretching exercises such as dancers or participants in martial arts (either leg) or yoga</td>
<td>Cue to lift heel more quickly after midstance to avoid prolonged hip and knee extension may ↓ pain</td>
<td>Acetabular labrum</td>
<td>Femoral neck</td>
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<tr>
<td>Common referring diagnoses:</td>
<td>Sitting:</td>
<td>Appearance in Sitting:</td>
<td>Nerve:</td>
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<tr>
<td>Acetabular labral tear</td>
<td>Knee extension:</td>
<td>Femur may be positioned so that the inguinal crease appears less deep on the involved side</td>
<td>Ilioguinal</td>
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<td>Hip dysplasia</td>
<td>Passive: stiffness noted in HS (may also test in supine with the hip at 90°)</td>
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<td>Femoral Acetabular Impingement (CAM or Pincer)</td>
<td>Supine:</td>
<td>Muscle length:</td>
<td>Obturator</td>
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<tr>
<td>Iliopsoas tendinopathy</td>
<td>SLR (active, passive or passive/hold):</td>
<td>Short TFL-ITB</td>
<td>Lateral cutaneous n of thigh (lat fem cut.)</td>
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<tr>
<td>Iliopsoas bursitis</td>
<td>(+) test for anterior glide - Observe/palpate anterior deviation of proximal femur; Active is painful in the groin more often than passive.</td>
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<tr>
<td>SI joint dysfunction</td>
<td>Hip flex/knee flex active or passive:</td>
<td>* (+) pain after 90°</td>
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<td></td>
<td>(+) passive: if post/inf glide is applied at the inguinal crease, stiffness is evident and the range of painfree flexion ↑.</td>
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<td>Prone:</td>
<td>Hip Ext/Knee Ext:</td>
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<td>Onset of glut max after initiation of hip ext. (HS dominance).</td>
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<td>In severe cases, see anterior displacement of the &gt; trochanter (MR)</td>
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<td>The pelvis on the involved side appears higher (femur doesn’t glide posteriorly or flex easily during backward rocking)</td>
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<td>Muscle Length Impairments:</td>
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<td>Long iliopsoas (post tilt)</td>
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<td></td>
<td>Weak or painful contraction of iliopsoas,</td>
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<td>Weak gluteus maximus</td>
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5/1/2011
TREATMENT OF FEMORAL ANTERIOR GLIDE SYNDROME

EDUCATION
- Correct swayback standing alignment. Avoid knee hyperextension.
- Gait: instruct in early heel rise at push off to avoid prolonged hip extension and knee hyperextension.
- Sitting: avoid sitting slumped in the chair, may need to sit with hips higher than knees, feet supported.
- Address fitness activities - must decrease intensity or stop until pain is absent during standing and walking. Consider alternative types of fitness activities.
- Supine to sit: roll to side to get up
- Avoid habit of swaying hips forward during the final phase of returning from forward bending. Emphasize hip extension and use of gluteus maximus. Practice final phase with knees slightly flexed.
- Apply ice to areas of pain as needed

RESTORE PRECISION OF MOTION FOR HIP FLEXION
- Quadruped: assume position and rock backward through painfree range. NOTE: this is a key exercise and should be performed first in the home exercise sequence and repeated more than one time during the day.
- Supine: hip flexion with the knee flexed (knee to chest) with a towel (emphasize keeping hip flexors relaxed). It may be necessary to slightly laterally rotate and abduct the hip. Patient may apply a post/inf force over proximal femur with one hand while passively flexing the hip from 90 degrees with the other hand.
- Sitting: passive hip flexion in slight lateral rotation – Sometimes a patient can perform this exercise more easily than hip flexion in supine.
- Mobilization (for those with stiff posterior hip structures) - posterior, inferior or caudal glide or posterior glide combined with physiological flexion

IMPROVE MUSCLE PERFORMANCE OF ILIOPSOAS (NOTE: Don't force end range. Don’t perform if you suspect tendonitis until tendon heals.)
- Sitting: hip flexion (assist, assist and hold end range, active, resist)
- Supine: active hip flexion with the knee flexed (once painfree resistance may be added at their end range)

SHORTEN AND INCREASE MUSCLE PERFORMANCE OF POSTERIOR MUSCLES (gluteus maximus, gluteus medius)
- Sidelying (pillows between knees): lateral rotation or LR with ABD.
- Prone hip extension with the knee flexed: Must be performed over a pillow. The hamstrings should be as relaxed as possible either by supporting the foot on a chair/wall or allowing the lower leg to relax on the posterior thigh. Also the patient should only extend to the neutral position. The hip may be laterally rotated to assist in recruiting the gluteus maximus. A towel roll may be placed at the proximal femur to prevent anterior glide.
- Prone hip ext w/ knee extended: try to recruit glut max before hamstrings

LENGTHEN SHORT MUSCLES IF INDICATED:
TFL-ITB
- Sidelying with pillows between knees/perform lateral rotation or LR and abd. - progress to Modified Ober stretch
- Prone: hip lateral rotation
- Prone: knee flexion

Hamstrings: (NOTE: Straight leg raises are contraindicated)
- Knee extension in sitting (make sure TFL-ITB is relaxed and hip is in neutral to lateral rotation)
- Supine: the patient passively holds the thigh so the hip is at 90° then performs active knee extension repeatedly. The emphasis is on easy knee extension and let go rather than a sustained knee extension.
- Passive stretch: Caution: Anterior glide may occur in many sustained passive stretches of the hamstrings such as placing the heel on a bar with the knee extended. In this case, there is poor control of the proximal femur and the potential for femoral anterior glide. If a sustained stretch is needed, the PT may try this version: Stand – place foot on a low bench or stool (hip and knee flexed), apply posterior pressure over proximal femur as the knee is extended. Hold the final position or add more stretch by flexing the knee of the stance leg.
**FEMORAL ANTERIOR GLIDE with MEDIAL ROTATION SYNDROME**

Excessive flexibility of the anterior hip joint structures as the result of maintained hip extension in standing and walking (10 degrees beyond neutral) creates a path of least resistance of anterior glide. The principal movement impairment in this syndrome is imprecise spinning of the femoral head during hip flexion accompanied by excessive hip medial rotation. Imprecise spinning is related to a faulty starting position of the femoral head (anterior) or an anterior glide with medial rotation during hip flexion. There is often poor muscle performance of the iliopsoas and hip lateral rotators. In some cases, the stiffness of the hip extensors and posterior hip joint structures contributes to the anterior glide.

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<th>Differential Diagnosis</th>
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</thead>
<tbody>
<tr>
<td>Groin pain during active hip flexion.</td>
<td>Alignment/ Appearance: Stand:</td>
<td>Generalized hypermobility</td>
<td>Muscle/Tendon/Bursae:</td>
<td>Movement Diagnoses:</td>
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<tr>
<td>Groin pain may progress to aching pain of whole hip.</td>
<td>Post pelvic tilt, hip ext and knee hyperextension</td>
<td>Structural variations:</td>
<td>iliopsoas</td>
<td>• Femoral Multidirectional Accessory Hypermobility</td>
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<tr>
<td>Activities/Population</td>
<td>Hip MR</td>
<td>femoral antetorsion</td>
<td>Posterior gluteus medius</td>
<td>• Femoral Anterior Glide</td>
</tr>
<tr>
<td>Often occurs in young people F&gt;M</td>
<td>Decreased gluteal definition</td>
<td>femoral retroversion</td>
<td>Lateral hip rotators</td>
<td>• Hip Adduction with MR</td>
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<tr>
<td>Athletes such as distance runners or soccer players</td>
<td>Movement Impairments: Standing:</td>
<td>↓ head offset</td>
<td>Obturator Internus</td>
<td>• Lumbar syndrome</td>
</tr>
<tr>
<td>Those who perform activities associated with end range movements and stretching exercises such as dancers or participants in martial arts (either leg) or yoga</td>
<td>Gait:</td>
<td>↓ head neck offset</td>
<td>Iliopsoas abcess</td>
<td>• SIJ syndrome</td>
</tr>
<tr>
<td>Common referring diagnoses:</td>
<td>• Hip and knee hyperextension, hip MR</td>
<td>Hip dysplasia</td>
<td>Iliopsoas abcess</td>
<td>Potential diagnoses/conditions</td>
</tr>
<tr>
<td>Acetabular labral tear</td>
<td>* Cue for early heel rise at push off to avoid prolonged hip and knee extension may ↓ pain - should also cue to control MR by contracting gluteals/LRs during weight acceptance</td>
<td>genu valgus</td>
<td>Iliopsoas abcess</td>
<td>requiring referral suggested by signs and symptoms:</td>
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<tr>
<td>Hip dysplasia</td>
<td>Stand on 1 leg: observe MR</td>
<td>Acquired faults:</td>
<td>SI joint dysfunction</td>
<td>Neuromusculoskeletal:</td>
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<tr>
<td>Femoral Acetabular Impingement (CAM or Pincer)</td>
<td>Knee extension: Active: observe hip MR</td>
<td>ankle pronation</td>
<td></td>
<td>• Labral tear</td>
</tr>
<tr>
<td>Iliopsoas tendinopathy</td>
<td>* With LR, range ↓ or movement into extension is slower</td>
<td>apparent leg length discrepancy</td>
<td></td>
<td>• Avascular Necrosis</td>
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<tr>
<td>Iliopsoas bursitis</td>
<td>Passive: stiffness noted in HS (may also test in supine with the hip at 90°)</td>
<td>Muscle length:</td>
<td></td>
<td>• Osteoarthritis</td>
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<tr>
<td>Snapping hip syndrome</td>
<td>Supine: SLR (active, passive or passive/hold):</td>
<td>Short TFL-TIB</td>
<td></td>
<td>• Stress fx:</td>
</tr>
<tr>
<td>SI joint dysfunction</td>
<td>(+) test for anterior glide - Observe/palpate anteromedial deviation of proximal femur; Active is painful in the groin more often than passive.</td>
<td>HS asymmetry (med shorter than lat)</td>
<td></td>
<td>• &lt; trochanter proximal med femur</td>
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<tr>
<td></td>
<td>*Passive: If post/inf glide is applied at the inguinal crease during SLR, stiffness increases and range decreases.</td>
<td>Appearance in Sitting: Femur may be positioned so that the inguinal crease appears less deep on the involved side</td>
<td></td>
<td>• pubic symphysis</td>
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<td></td>
<td>Hip flex/knee flex active or passive:</td>
<td></td>
<td></td>
<td>• iliopsoas abcess</td>
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<td>• (+) pain after 90°</td>
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<td>• Internal oblique avulsion</td>
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<td>* passive: If post/inf glide is applied at the inguinal crease, stiffness is evident and the range of painfree flexion ↑. Range may also ↑ with LR.</td>
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<td>• Pubalgia</td>
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<td></td>
<td>Prone:</td>
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<td>• Osteitis pubis</td>
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<td>Hip LR:</td>
<td></td>
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<td>• Inguinal hernia</td>
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<tr>
<td></td>
<td>observe imprecise motion (&gt; trochanter moves through wide arc)</td>
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<td></td>
<td>• Lower Thoracic Disc Disease</td>
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<tr>
<td></td>
<td>*Correction of wide arc, ROM decreases</td>
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<td>Systemic:</td>
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<td></td>
<td>Hip Ext/Knee Ext:</td>
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<td>• Cancer</td>
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<tr>
<td></td>
<td>• Onset of gluteus maximus after initiation of hip ext. (HS dominance).</td>
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<td></td>
<td>• Upper urinary tract problems</td>
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<tr>
<td></td>
<td>In severe cases, see anterior displacement of the &gt; trochanter (MR)</td>
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<td>• Fluid in peritoneal cavity</td>
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<td>• Hemophelia (GI bleeding)</td>
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<td>• Abdominal aortic aneurysm</td>
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<td>• Gynecological conditions</td>
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<td>• Infection (abdominal/peritoneal)</td>
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<td>• Prostate impairment</td>
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<td>Symptoms or History</td>
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<tr>
<td><strong>Quadruped</strong></td>
<td>Rock Backward:</td>
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<td></td>
<td>• The pelvis on the involved side appears higher (hip doesn’t flex easily during backward rocking) OR the femur medially rotates during backward rocking (posterior hip structures are lengthened).</td>
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<tr>
<td><strong>Joint Integrity:</strong></td>
<td>• Limited hip flexion</td>
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<td></td>
<td>• Increased MR range of motion on involved side</td>
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<td><strong>Muscle Length Impairments:</strong></td>
<td>Based on length or ROM tests:</td>
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<td>• Long hip lateral rotators/increased MR ROM</td>
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<tr>
<td>Based on alignment:</td>
<td>• Long ilioptosoas (post tilt), PGM (hip add/MR) or intrinsic hip LRs (hip MR)</td>
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<td><strong>Muscle Strength/Performance Impairments:</strong></td>
<td><strong>MMT:</strong></td>
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<td></td>
<td>• Weak or painful contraction of ilioptosoas, posterior gluteus medius and Intrinsic hip LRs</td>
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<td></td>
<td>• Weak gluteus maximus</td>
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TREATMENT OF FEMORAL ANTERIOR GLIDE SYNDROME WITH MEDIAL ROTATION

CAUTION: If a patient has femoral antetorsion, do not force the hip into lateral rotation. Consider the patient's neutral position for hip rotation in your exercise prescription and do not allow them to excessively medially rotate.

EDUCATION
- Sit to stand without hip medial rotation.
- Sitting: sit back in chair - use backrest. Do not sit with legs crossed, thigh over other thigh (MR and ADD). Can sit with feet crossed at the ankles. Interrupt sitting. Initially, may adjust seat so hips are higher than knees.
- Correct swayback-standing alignment and instruct to stop standing on 1 leg and keep weight distributed evenly over both lower extremities. Avoid knee hyperextension. Also avoid swayback on return from forward bend (want more motion at the hip and less at the ankle).
- Gait - actively contract the gluteus maximus at heel strike and instruct in early heel rise during push off to avoid prolonged hip extension and knee hyperextension. May use pedometer to guide amount of walking.
- Avoid pivoting (foot fixed and hip rotates in a loaded position) – instruct in stepping around
- Address fitness activities - must decrease intensity or stop until pain is absent during standing and walking. Consider alternative types of fitness activities. If suspect labral tear, use upright bike rather than recumbent.
- Supine to sit: roll to side to get up
- Apply ice to areas of pain as needed

RESTORE PRECISION OF HIP MOTION

Hip Flexion:
- Quadruped: assume position and rock backward through painfree range. **NOTE:** this is a key exercise when the involved hip appears higher during your exam in quadruped. It should be performed first in the home exercise sequence and repeated more than one time during the day. If the hip **medially rotates** during your exam of backward rocking, this exercise is **contraindicated**.
- Supine: passive hip flexion with the knee flexed (knee to chest) using a towel (emphasize keeping hip flexors relaxed). It may be necessary to slightly laterally rotate and abduct the hip. Patient may apply a posterior/inferior force at the proximal femur from 90° and above.
- Sitting: passive hip flexion in slight lateral rotation – Sometimes a patient can perform this exercise more easily than hip flexion in supine.
- Mobilization: **NOTE:** Only for those with stiff posterior hip structures - Posterior, inferior or caudal glide or posterior glide combined with physiological flexion.

Hip Rotation:
- Prone: lateral rotation with manual stabilization of the head of the femur to prevent the faulty arc of motion during rotation. May start in some medial rotation and move in the direction of lateral rotation. Don’t push end range. **NOTE:** This exercise should not be performed if the patient is unable to apply manual contact to himself or a partner is unavailable to assist with the exercise.

IMPROVE MUSCLE PERFORMANCE OF ILIOPSOAS (NOTE: Don’t force end range. Don’t perform if you suspect tendonitis until tendon heals.)
- Sitting: hip flexion (assist, assist and hold end range, active, resist)
- Supine: active hip flexion with the knee flexed, once pain free resistance may be added at their end range hip flexion

TRAIN TO PERFORM SIMPLE MOVEMENTS WITHOUT MEDIAL ROTATION:
- Knee extension in sitting (make sure TFL-ITB is relaxed and hip is in neutral to lateral rotation)
- Standing on 1 leg (contract gluteals to control rotation- use mirror for feedback)
- May assist with taping to control hip MR or knee hyperextension – with the hip in slight LR and loaded, apply tape with force from proximal lateral thigh, then posterior around knee to medial side of mid lower leg (rotation) or “X” behind the knee (hyperextension)

SHORTEN AND INCREASE MUSCLE PERFORMANCE OF POSTERIOR MUSCLES (lateral rotators, glut maximus, gluteus medius)
- Prone hip extension with the knee flexed: Must be performed over a pillow. The hamstrings should be as relaxed as possible either by supporting the foot on a chair or allowing the lower leg to relax on the posterior thigh. Also the patient should only extend to the neutral position. The hip may be laterally rotated to assist in recruiting the glutus maximus. A towel roll may be placed under the proximal femur to prevent anterior glide.
- Prone hip extension with the knee extended: same parameters as above except the hamstrings will not be relaxed.
- Sidelying (pillows between knees): LR or LR with ABD (lower leg slowly)
- Sitting: resisted lateral rotation with theraband or a small ankle weight
- Standing (hip in extension): use theraband around foot to resist lateral rotation.
- Standing: side steps (may use theraband)
- Forward bending: hip flexion only, return to standing by contracting the gluteal mm to produce hip extension. (flex knees, avoid sway at end range)
LENGTHEN SHORT MUSCLES IF INDICATED:

**TFL-ITB**
- Sidelying with pillows between knees/perform lateral rotation or LR and abd. - progress to Modified Ober stretch
- Prone (over a pillow): hip lateral rotation (consider need for manual stabilization noted above)
- Prone (over a pillow): knee flexion

**Hamstrings: (NOTE: Straight leg raises are contraindicated)**
- Knee extension in sitting (make sure TFL-ITB is relaxed and hip is in neutral to lateral rotation). May apply force on proximal femur in the direction of lateral rotation and posterior glide. Do not hold end range.
- Supine: the patient passively holds the thigh so the hip is at 90° then performs active knee extension repeatedly. The emphasis is on easy knee extension and relax rather than a sustained knee extension.
- Passive stretch: Caution: Anterior glide may occur in many sustained passive stretches of the hamstrings such as placing the heel on a bar with the knee extended. In this case, there is poor control of the proximal femur and the potential for femoral anterior glide. If a sustained stretch is needed, the PT may try this version: Stand – place foot on a low bench or stool (hip and knee flexed), apply posterior pressure over proximal femur as the knee is extended. Hold the final position or add more stretch by flexing the knee of the stance leg.
FEMORAL ANTERIOR GLIDE with LATERAL ROTATION SYNDROME

Impaired standing alignment (hip extension and lateral rotation (LR)) causes the head of the femur to push into anterior structures. Stiffness of the hip extensors and LRs and excessive flexibility of anterior hip joint structures contributes to excessive anterior glide of the femoral head during extension. There is often poor muscle performance of the gluteus maximus and overuse of the hamstrings to control hip extension. In some cases, repeated attempts to increase LR when femoral antetorsion is present may lead to the development of this syndrome.

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<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Diagnosis</th>
<th>Associated Signs or Contributing Factors</th>
<th>Source of Signs or Symptoms</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
</table>
| Groin pain with hip extension and LR | Alignment/Appearance:  
Standing:  • Post pelvic tilt, hip ext and knee hyperextension  • Decreased gluteal definition  • Hip LR  *If painful in preferred alignment, MR may ↓ pain  
Sitting:  • Hip LR, often sits with foot on thigh | Lumbar flexibility > hip during forward bending |   
**Muscle/Tendon/Bursae:**  iliopsoas  ilioppectineal bursae  
**Joint/Bone:**  Anterior hip capsule  Acetabular labrum  Femoral neck | Movement Diagnoses:  
- Femoral Multidirectional Accessory Hypermobility  
- Femoral Accessory Hypomobility with Superior Glide  
- Femoral Anterior Glide  
- Hip Adduction Syndrome |   
**Potential diagnoses/conditions requiring referral suggested by signs and symptoms:**  
**Neuromusculoskeletal:**  
- Labral tear  
- Avascular Necrosis  
- Osteoarthritis  
- Stress fx: < trochanter proximal med femur  
- pubic symphysis  
- iliopsoas abscess  
- Internal oblique avulsion  
- Pubalgia  
- Osteitis pubis  
- Inguinal hernia  
- Lower Thoracic Disc Disease |   

<table>
<thead>
<tr>
<th>Activities/Population</th>
<th>Groin pain with hip extension and LR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence M &gt; F</td>
<td>Pain is worse during weight bearing activities such as running and jumping.</td>
<td></td>
</tr>
<tr>
<td>Participation in activities with emphasis on LR and abduction such as figure skating, ballet, soccer or ice hockey</td>
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<tr>
<td>Habit of sitting with legs crossed (foot on thigh)</td>
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<tr>
<td>History of performing exercises to increase LR in person with antetorsion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Common referring diagnoses:  
- Acetabular labral tear  
- Hip dysplasia  
- Femoral Acetabular Impingement (CAM or Pincer)  
- Iliopsoas tendinopathy  
- Iliopsoas bursitis  
- Adductor muscle strain or tendinopathy |   |

| Source of Signs or Symptoms | Movement Diagnoses:  
- Femoral Multidirectional Accessory Hypermobility  
- Femoral Accessory Hypomobility with Superior Glide  
- Femoral Anterior Glide  
- Hip Adduction Syndrome |   |
|-----------------------------|--------------------|
| **Potential diagnoses/conditions requiring referral suggested by signs and symptoms:**  
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- iliopsoas abscess  
- Internal oblique avulsion  
- Pubalgia  
- Osteitis pubis  
- Inguinal hernia  
- Lower Thoracic Disc Disease |   |

| Movement Impairments:  
**Standing:**  
- Hip and knee hyperextension, hip LR  
* Cue for early heel rise at push off to avoid prolonged hip and knee extension may ↓ pain  
**Sitting:**  
- Hip LR, often sits with foot on thigh |   |
|-----------------------------|--------------------|
| **Source of Signs or Symptoms** | Movement Diagnoses:  
- Femoral Multidirectional Accessory Hypermobility  
- Femoral Accessory Hypomobility with Superior Glide  
- Femoral Anterior Glide  
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</tr>
</thead>
<tbody>
<tr>
<td>Quadruped</td>
<td>Rock Backward:</td>
<td></td>
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<tr>
<td></td>
<td>- The pelvis on the involved side appears higher (hip doesn’t flex easily during backward rocking)</td>
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<tr>
<td><em>LR of hip improves alignment and hip flexion</em></td>
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<tr>
<td>Joint Integrity:</td>
<td>- increased LR ROM</td>
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<tr>
<td></td>
<td>- Limited hip flexion</td>
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<tr>
<td></td>
<td>- Limited range of MR compared to LR</td>
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<tr>
<td></td>
<td>- Greater LR on involved than uninvolved hip</td>
<td></td>
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<td></td>
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<tr>
<td>Muscle Length Impairments:</td>
<td>Based on length or ROM tests:</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>- Short hamstrings (most often short but may be long)</td>
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<tr>
<td></td>
<td>- Short hip lateral rotators</td>
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<tr>
<td></td>
<td>- Long iliopsoas (hip hyperextension during 2 joint hip flexor length test)</td>
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<tr>
<td></td>
<td>Based on alignment:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>- Long iliopsoas (post tilt)</td>
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<td></td>
</tr>
<tr>
<td>Muscle Strength/Performance Impairments:</td>
<td><strong>MMT:</strong></td>
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<tr>
<td></td>
<td>- Weak or painful contraction of iliopsoas</td>
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<tr>
<td></td>
<td>- Weak hip medial rotators (particularly when tested in hip extension)</td>
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<tr>
<td></td>
<td>- Weak gluteus maximus</td>
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</table>
TREATMENT of FEMORAL ANTERIOR GLIDE WITH LATERAL ROTATION SYNDROME:

CAUTION: If a patient has femoral antetorsion, do not force the hip into lateral rotation. Consider the patient’s neutral hip joint position for rotation in your exercise prescription.

If a patient has femoral retrotorsion, do not force the hip into medial rotation. Consider the patient’s neutral position for rotation and do not allow them to excessively laterally rotate.

EDUCATION

- Gait: Contract gluteals at heelstrike to midstance. Instruct in early heel rise during push off to avoid prolonged hip extension and knee hyperextension
- Standing: correct posterior pelvic tilt, decrease amount of hip LR and extension
- Avoid pivoting (foot fixed and hip rotates in a loaded position) – instruct in stepping around
- Sitting: Don’t cross legs (foot on thigh). Prevent too much hip abduction by sitting with thighs closer together and in neutral rotation.
- Sit to stand: Scoot to edge of chair and lean forward by flexing in hips rather than spine

RESTORE PRECISION OF HIP MOTION

Hip Flexion
- Quadruped: assume position and rock backward through pain free range. Hip may be placed in slight lateral rotation in the starting position and after repetitions may move hip into neutral rotation.
  NOTE: this is a key exercise and should be performed first in the exercise sequence and repeated more than one time during the day.
- Supine: passive hip flexion with the knee flexed (knee to chest) using a towel (emphasize keeping hip flexors relaxed). It may be necessary to slightly laterally rotate and abduct the hip.
- Mobilization: NOTE: Only for those with stiff posterior hip structures - Posterior, inferior or caudal glide OR posterior glide combined with physiological flexion

Hip Rotation
- Prone: hip rotation – start in medial rotation and move toward lateral rotation. Do not push end range, partial range of motion is best. Manual stabilization of the head of the femur to prevent the faulty arc of motion during rotation may be required.
  NOTE: If manual stabilization is required, this exercise should not be performed if the patient is unable to apply manual contact to himself or a partner is unavailable to assist with the exercise.

IMPROVE MUSCLE PERFORMANCE OF Iliopsoas (NOTE: Don’t force end range. Don’t perform if you suspect tendonitis until tendon heals.)
- Sitting/hip flexion (assist, assist and hold end range, active, resist) OR Supine: resisted end range hip flexion with knee flexed

INCREASE MUSCLE PERFORMANCE OF MEDIAL ROTATORS:
- Stand: Hip and knee in extension – perform resisted medial rotation (theraband around forefoot)

LENGTHEN SHORT MUSCLES AS INDICATED:

Lateral Rotators
- Correct standing alignment (neutral rotation)
- Prone medial rotation (avoid use of weights)
- Sitting: perform MR
- Supine: add/MR (bent knee fall in)

Hamstrings:
- Sitting - knee extension/df
- Supine: the patient passively holds the thigh so the hip is at 90° then performs active knee extension repeatedly. The emphasis is on easy knee extension and relax rather than a sustained knee extension.
- Passive stretch: Caution: Anterior glide may occur in many sustained passive stretches of the hamstrings such as placing the heel on a bar with the knee extended. In this case, there is poor control of the proximal femur and the potential for femoral anterior glide. If a sustained stretch is needed, the PT may try this version: Stand – place foot on a low bench or stool (hip and knee flexed), apply posterior pressure over proximal femur as the knee is extended. Hold the final position or add more stretch by flexing the knee of the stance leg.

Gluteus Maximus:
- Supine - hip flexion/knee flexed OR Quadruped: rock backward

TFL-ITB:
- Sidelying: hip adduction with top or bottom lower extremities
- Prone: knee flexion

TRAINING TO DISSOCIATE LUMBAR AND HIP MOVEMENT:
- Forward bending/hip flexion only: allow knees to flex during FB, return by using gluteals OR Quadruped: rock backward
The principal movement impairment in this syndrome is imprecise spinning of the femoral head during hip flexion accompanied by excessive hip medial rotation (MR). Imprecise spinning is related to a faulty starting position of the femoral head (posterior/MR) or a posterior glide with medial rotation during hip flexion. Increased flexibility of the posterior hip joint structures (capsule and hip lateral rotator muscles) and poor muscle performance of the hip lateral rotator muscles contribute to excessive medial rotation during hip flexion. Individuals who develop this syndrome tend to be generally hypermobile or have performed a great deal of stretching exercises.

<table>
<thead>
<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Dx</th>
<th>Associated Signs or Contributing Factors</th>
<th>Source of Signs or Symptoms</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep hip pain or aching of whole hip that occurs with sitting or with sport activity</td>
<td><strong>Standing Alignment/Appearance:</strong></td>
<td>Structural variations: femoral antetorsion genu valgus hip dysplasia</td>
<td>Muscle/Tendon/Bursae: Posterior gluteus medius Lateral hip rotators Proximal iliotibial band Trochanteric bursa</td>
<td>Movement Diagnoses:  - Femoral Multidirectional Accessory Hypermobility - Femoral Anterior Glide with MR - Hip Adduction with MR - Lumbar syndrome - SIJ syndrome</td>
</tr>
<tr>
<td>Active subluxation by sudden hip adduction and MR (may have habit of “popping” hip in standing). May report general hypermobility</td>
<td><strong>Standing:</strong> Forward Bending:</td>
<td>Appearance in sitting: Femoral head may be positioned so that the inguinal crease appears less deep on the involved side</td>
<td><strong>Structural variations:</strong></td>
<td><strong>Source of Signs or Symptoms</strong></td>
</tr>
<tr>
<td>Activities/Population</td>
<td>Knee extension:</td>
<td>Sidelying: greater trochanter appears prominent</td>
<td><strong>Muscle Length Impairments:</strong></td>
<td><strong>Movement Diagnoses:</strong></td>
</tr>
<tr>
<td>Incidence F&gt;M</td>
<td>Passive PRI/posterior glide</td>
<td>Muscle Length: Lengthened hip abductors Short TFL-ITB</td>
<td>Based on alignment: Long intrinsic hip LRs (hip MR)</td>
<td><strong>Muscle/Tendon/Bursae:</strong></td>
</tr>
<tr>
<td>Occurs in dancers or activity with excessive stretching such as yoga or gymnastics</td>
<td>Supine:</td>
<td></td>
<td></td>
<td><strong>Posterior gluteus medius</strong></td>
</tr>
<tr>
<td>Habit of sitting with legs crossed (thigh over thigh) or with hips and knees flexed</td>
<td>SLR (active, passive or passive/hold):</td>
<td></td>
<td></td>
<td><strong>Lateral hip rotators</strong></td>
</tr>
<tr>
<td>Habit of sleeping in a position with the hip in adduction and MR</td>
<td>(-) test for anterior glide</td>
<td></td>
<td></td>
<td><strong>Proximal iliotibial band</strong></td>
</tr>
<tr>
<td>Common referring diagnoses: Trochanteric bursitis Snapping Hip Syndrome Hypermobility Syndrome Hip dysplasia</td>
<td>Hamstrings flexible</td>
<td></td>
<td></td>
<td><strong>Trochanteric bursa</strong></td>
</tr>
<tr>
<td><strong>Hip flexion/knee flexed:</strong> Range achieved easily May be (+) for pain at end range (pinching neck on acetalabulum)</td>
<td></td>
<td></td>
<td></td>
<td><strong>Femoral neck</strong></td>
</tr>
<tr>
<td>Quadruped: Rock backward: Head of femur appears more prominent than other side in the starting position and prominence may increase with movement Pelvis on involved side appears low, increased hip flexion Femur medially rotates during backward rocking (may feel like “dislocation”)</td>
<td></td>
<td><strong>Joint Integrity:</strong> Normal to increased range of hip flexion increased range of medial rotation</td>
<td></td>
<td><strong>Muscle/Tendon/Bursae:</strong></td>
</tr>
<tr>
<td><strong>Muscle Length Impairments:</strong></td>
<td></td>
<td><strong>MMT:</strong> Weak or painful contraction of intrinsic hip LRs or PGM Weak gluteus maximus</td>
<td></td>
<td><strong>Posterior gluteus medius</strong></td>
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<td>Based on alignment:</td>
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<td><strong>Lateral hip rotators</strong></td>
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<tr>
<td>Long intrinsic hip LRs (hip MR)</td>
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<td><strong>Proximal iliotibial band</strong></td>
</tr>
</tbody>
</table>
TREATMENT of FEMORAL POSTERIOR GLIDE with MEDIAL ROTATION SYNDROME

EDUCATION:
- Stop popping the hip voluntarily
- Avoid standing with weight primarily on the involved hip
- Don’t cross legs when sitting (thigh over thigh) – may sit with feet crossed at ankles. Don’t sit with hips and knees flexed to end range (i.e. sit with arms wrapped around lower legs). Limit duration of sitting (interrupt sitting every 20 to 30 minutes). Avoid soft chairs. Fill in “bucket” on seats in car. If there is an appearance of a decreased inguinal crease, a towel roll under the ischial tuberosity may decrease pain.
- Correct sleeping posture (avoid adduction/MR in sidelying by placing pillows between the knees)
- Driving: avoid lifting foot from accelerator to brake by flexing and medially rotating the hip
- Sit to stand: avoid putting knees together; align knees over feet/ use quadriceps
- Avoidance of hip medial rotation in standing or walking (tighten gluteals and lateral rotators at heel strike to midstance).
- Dancers or gymnasts should avoid excessive ranges achieved during forward bending and stretches of the posterior hip mm (long sitting, lean forward over leg on bar).
- Apply ice to areas of pain as needed

INCREASE MUSCLE PERFORMANCE OF POSTERIOR MUSCLES:

Posterior Gluteus Medius:
- Low level:
  - Prone: hip abduction
  - Prone: foot pushes
  - Stand: stand on uninvolved leg and perform hip LR/abd/Ext on involved leg
  - Stand: weight shifting side to side or front/back controlling MR
  - Sidelying (pillows between the knees): Starting position: use enough pillows to place the hip in enough abduction and rotation so the head of the femur is positioned ideally in the acetabulum). Avoid popping by allowing enough hip flexion. From the starting position: perform LR or LR with ABD
- Mid to High level:
  - Use of theraband for hip abduction in prone or standing
  - Stand on involved leg with support, progress to no support
  - Sidelying: hip abduction with LR (emphasis on end range)
  - Standing: side step. Progress by using resistance with theraband around ankles

Gluteus Maximus:
- Low level:
  - Prone: hip extension with the knee flexed
  - Lunges, squats

Hip lateral rotators:
- Control MR during weight bearing activities Taping may be used to control hip MR- with the hip in slight LR and loaded, apply tape with force from proximal lateral thigh, then posterior around knee to medial side of mid lower leg (rotation) or “X” behind the knee (hyperextension)
- Resisted LR in sitting with theraband
- Resisted LR in standing with theraband (wrapped around forefoot)

CONTRAINDICATION: Rocking backward in Quaddruped
FEMORAL MULTIDIRECTIONAL ACCESSORY HYPERMOBILITY (MAH) SYNDROME
(With Knee Movement)

The principal movement impairment in this syndrome is increased accessory movement of the femoral head in a variety of directions (anterior, posterior or lateral) associated with excessive flexibility of the hip joint structures. Although this syndrome may be associated with early degenerative hip joint disease there is not a loss of hip motion in a capsular pattern. In some cases faulty accessory motion is observed primarily during hip movements and in other cases faulty accessory motion is observed during both hip movements AND knee movements (MAH with knee movement). In the latter case, there is often an appearance of well developed thigh musculature. Knee movements that stretch the hamstrings or quadriceps are associated with faulty hip joint motion. The hamstrings and quadriceps muscles are primarily used to control hip motion instead of the pelvic girdle muscles (iliopsoas, gluteals, and lateral rotators).

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</tr>
</thead>
<tbody>
<tr>
<td>Deep hip or groin pain associated with weight bearing activities (standing, walking, running)</td>
<td>Both MAH and MAH with Knee Movement Movement Impairments:</td>
<td>Generalized hypermobility</td>
<td>Muscle/Tendon/Bursae:</td>
<td>Movement Diagnoses:</td>
</tr>
<tr>
<td>Pain is Increased when sitting on a soft couch</td>
<td>SLR (active, passive or passive/hold):</td>
<td>Standing alignment:</td>
<td>Femoral Anterior Glide</td>
<td>* Labral tear</td>
</tr>
<tr>
<td>Activities/Population</td>
<td>• (+) for anterior glide - Observe/palpate anteromedial deviation of proximal femur; Active is painful in the groin more often than passive. *Passive: If post/inf glide is applied at the inguinal crease during SLR, stiffness increases and range decreases.</td>
<td>Hip MR</td>
<td>Femoral Anterior Glide with MR</td>
<td>* Avascular Necrosis</td>
</tr>
<tr>
<td>May have history of trauma to hip joint</td>
<td>Supine:</td>
<td>Knee hyperextension</td>
<td>Femoral Anterior Glide with LR</td>
<td>* Osteoarthritis</td>
</tr>
<tr>
<td>X-ray: may have early DJD of hip joint</td>
<td>• (+) for anterior glide - Observe/palpate anteromedial deviation of proximal femur; Active is painful in the groin more often than passive. *Passive: If post/inf glide is applied at the inguinal crease during SLR, stiffness increases and range decreases.</td>
<td>Structural variations:</td>
<td>Femoral Anterior Glide with MR</td>
<td>* Stress fx:</td>
</tr>
<tr>
<td>Childhood history of lower extremity structural problems</td>
<td>• Correction of wide arc, ROM decreases</td>
<td>femoral antetorsion</td>
<td>Femoral Hypomobility</td>
<td>&lt; trochanter proximal med femur</td>
</tr>
<tr>
<td>Often occurs in people performing frequent stretching exercises</td>
<td>• Hip MR and LR may be painful when assessed in prone or sitting</td>
<td>femoral retroversion</td>
<td>Hip Adduction</td>
<td>pubic symphysis</td>
</tr>
<tr>
<td>MAH with knee movement: often occurs in high level athletes or fitness training (especially quadriceps and hamstring training)</td>
<td>Hip Ext/Knee Ext:</td>
<td>hip dysplasia</td>
<td>Hip Adduction with MR</td>
<td>iliopsoas abcess</td>
</tr>
<tr>
<td>Common referring diagnoses:</td>
<td>• Onset of gluteus maximus after initiation of hip ext. (HS dominance).</td>
<td>Gait:</td>
<td>Lumbar syndrome</td>
<td>Internal oblique avulsion</td>
</tr>
<tr>
<td>Acetabular labral tear</td>
<td>• In severe cases, see anterior displacement of the</td>
<td>Trendelenburg or antalgic gait</td>
<td>SIJ syndrome</td>
<td>Pubalgia</td>
</tr>
<tr>
<td>Hip dysplasia</td>
<td>&gt; trochanter (MR) or LR of hip, may be (+) for pain</td>
<td>Knee hyperextension noted from initial contact to midstance</td>
<td></td>
<td>Osteitis pubis</td>
</tr>
<tr>
<td>Early osteoarthritis/DJD</td>
<td><strong>Quadruped:</strong></td>
<td>Appearance in Sitting:</td>
<td></td>
<td>Inguinal hernia</td>
</tr>
<tr>
<td>SI joint dysfunction</td>
<td>• The pelvis on the involved side may appear low (femur glides posteriorly or flexes easily during backward rocking) OR the femur medially rotates during backward rocking (posterior hip structures are lengthened). Movement may be painful. Repetition does not improve pain or movement.</td>
<td>Femur may be positioned so that the inguinal crease appears less deep on involved side</td>
<td></td>
<td>Lower Thoracic Disc Disease</td>
</tr>
<tr>
<td>Muscle Strength/Performance Impairments:</td>
<td><strong>MMT:</strong></td>
<td></td>
<td><strong>Systemic:</strong></td>
<td>Cancer</td>
</tr>
<tr>
<td><strong>Mental:</strong></td>
<td>• Weak posterior gluteus medius, gluteus maximus, intrinsic hip LRs, and iliopsoas</td>
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<td>Upper urinary tract problems</td>
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<td></td>
<td><strong>Joint Integrity:</strong></td>
<td></td>
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<td>Fluid in peritoneal cavity</td>
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<tr>
<td></td>
<td>• May have excessive hip flexion, MR, LR or adduction</td>
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<td></td>
<td>Hemophelia (GI bleeding)</td>
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<tr>
<td></td>
<td><strong>Muscle Length Impairments:</strong></td>
<td></td>
<td></td>
<td>Abdominal aortic aneurysm</td>
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<td>Based on length or ROM tests:</td>
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<td>Gynecological conditions</td>
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<tr>
<td></td>
<td>• Long hip lateral rotators</td>
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<td>Infecction (abdominal/peritoneal)</td>
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<tr>
<td></td>
<td>• Long iliopsoas (hip hyperextension during 2 joint hip flexor length test)</td>
<td></td>
<td></td>
<td>Prostate impairment</td>
</tr>
<tr>
<td>Symptoms or History</td>
<td>Key Tests &amp; Signs for Movement System Diagnosis</td>
<td>Associated Signs or Contributing Factors</td>
<td>Source of Signs or Symptoms</td>
<td>Differential Diagnosis</td>
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<tr>
<td>MAH with Knee Movement:</td>
<td><strong>Alignment/Appearance:</strong></td>
<td></td>
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<tr>
<td><strong>Standing:</strong></td>
<td>Hypertrophied quadriceps and hamstrings</td>
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<tr>
<td><strong>Sitting:</strong></td>
<td>(+) pain &lt;br&gt; *towel roll or small cushion under ischial tuberosity may ↓ pain</td>
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<tr>
<td>Movement Impairments:</td>
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<tr>
<td><strong>Sitting:</strong></td>
<td>Knee extension:</td>
<td></td>
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<tr>
<td><strong>Active:</strong></td>
<td>observe MR, may be painful &lt;br&gt; * With distraction or force is applied in the direction of LR pain ↓ and range may ↑</td>
<td></td>
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<td><strong>Passive:</strong></td>
<td>stiffness noted in HS  (may also test in supine with the hip at 90º)</td>
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<tr>
<td><strong>Prone:</strong></td>
<td>Knee flexion:</td>
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<tr>
<td>(in MAH with knee movement)</td>
<td>Observe LR of femur during passive knee flexion &lt;br&gt; (monitored at the greater trochanter, may be (+) for pain &lt;br&gt; *Distraction of the femur decreases LR during knee flexion and may decrease pain</td>
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<tr>
<td><strong>Stiffness</strong></td>
<td></td>
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<tr>
<td>Muscle Length Impairments:</td>
<td>Based on length or ROM tests:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Short/stiff hamstrings</strong></td>
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<tr>
<td><strong>Short/stiff quadriceps</strong></td>
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</table>
TREATMENT of FEMORAL MULTIDIRECTIONAL ACCESSORY HYPERMOBILITY SYNDROME (with knee movement)

In general, the focus of treatment is to increase the use of the muscles inserting closest to the hip joint axis of rotation (i.e., iliopsoas, gluteals, and intrinsic lateral rotators). In those cases where hip motion is associated with knee movement an additional focus is to decrease the use of the thigh musculature to control hip movement (i.e., hamstrings and quadriceps). When early degenerative changes have occurred in the joint, avoid resisted exercises for the iliopsoas. Proper positioning for exercise and activity must be modified to accommodate structural variations such as antetorsion or retrotorsion.

CAUTION: ** Avoid rocking backward in quadruped

EDUCATION

- Gait: may need a cane to control hip motion during gait
- Gait: increase use of gluteals from initial contact to midstance and decrease hyperextension. Instruct in early heel rise during push off.
- Stand with equal weight bearing, avoid knee hyperextension
- Avoid sitting in soft chair. If there is an appearance of a decreased inguinal crease, a towel roll under the ischial tuberosity may decrease pain.
- Discontinue quadriceps and hamstring weight training (MAH with knee movement)
- Apply ice to areas of pain as needed

INCREASE MUSCLE PERFORMANCE OF PROXIMAL HIP MUSCULATURE

Low level:
- Supine: heel slides - hip flexion and extension controlling hip MR and use of abdominals to control pelvis as hip flexors are stretched - may apply pressure proximally to prevent anterior glide during flexion
- Sitting: assisted hip flexion
- Prone: hip abd with LR (glut med < grade 3 by MMT)
- Prone over a pillow: perform hip extension with the knee flexed
- Stand: side steps

Mid to higher level:
- Sitting: assist and hold or active hip flexion
- Stand on 1 leg: contract gluteals and lateral rotators to prevent MR (may need to start with support and progress to no support)
- Sidelying: gluteus medius strengthening with use of pillows
- Stand: side step with resistance
- Sitting: resisted LR
- Stand: resisted LR (theraband around forefoot)

DECREASE HYPERMOBILITY/COMPRESSION OF HIP JOINT AND DECREASE STIFFNESS OF QUADRICEPS AND HAMSTRINGS (MAH with knee movement)

- Prone: knee flexion in neutral rotation and femoral stability-block anterior glide with towel or patient's hand. Stop knee flexion when rotation is felt. It is helpful if a partner is available to perform distraction during this exercise.
- Prone: lateral rotation with manual stabilization of the head of the femur to prevent the faulty arc of motion during rotation. **NOTE:** This exercise should not be performed if the patient is unable to apply manual contact to himself or a partner is unavailable to assist with the exercise.
- Sitting knee ext/df: emphasis on easy movement, do not stress full range of knee extension. Keep hip in neutral and control proximal femur by having patient apply manual pressure to prevent medial rotation
- Stand on step/1 leg dangles: weight on the ankle for distraction or have partner apply distraction
**FEMORAL HYPOMOBILITY SYNDROME with Superior Glide**

The principle movement impairment in this syndrome is limited accessory and physiological motion of the hip in a variety of directions, particularly flexion. This syndrome is associated with a decreased joint space, degenerative changes in the joint and surrounding soft tissue. There is decreased flexibility of the soft tissues surrounding the hip (muscle, ligament and capsule).

<table>
<thead>
<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Diagnosis</th>
<th>Associated Signs or Contributing Factors</th>
<th>Source of Signs or Symptoms</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep hip or groin pain or ache associated with weight bearing activities and sit to stand</td>
<td><strong>Alignment/Appearance:</strong></td>
<td>Decreased gluteal definition</td>
<td>Muscle/Tendon/Bursae: Posterior gluteus medius Lateral hip rotators Proximal iliobibial band Trochanteric bursa</td>
<td><strong>Movement Diagnoses:</strong></td>
</tr>
<tr>
<td>Stiffness noted after rest or in morning</td>
<td><strong>Standing:</strong></td>
<td>Weakness of lower abdominals and posterior gluteus medius and gluteus maximus</td>
<td>Hip dysplasia</td>
<td>- Femoral Multidirectional Accessory Hypermobility</td>
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<tr>
<td>Pain may be constant but varies in intensity</td>
<td>- May stand with trunk flexed over lower extremities or lordosis, anterior pelvic tilt and hip joint flexion</td>
<td>Forward Bending: Relative flexibility in back &gt; hip</td>
<td></td>
<td>- Femoral Anterior Glide</td>
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<tr>
<td>Pain is often worse at night (osteoarthritis)</td>
<td><strong>Movement Impairments:</strong></td>
<td>Structural Variations: Hip dysplasia</td>
<td></td>
<td>- Femoral Anterior Glide with MR</td>
</tr>
<tr>
<td>Pain may be referred pain along inner thigh or medial knee (osteoarthritis)</td>
<td><strong>Standing:</strong></td>
<td></td>
<td></td>
<td>- Femoral Anterior Glide with LR</td>
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<tr>
<td>X-ray findings: narrowing of joint space (osteoarthritis)</td>
<td><strong>Gait:</strong></td>
<td></td>
<td></td>
<td>- Hip Adduction</td>
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<tr>
<td>Activities/Population</td>
<td>- Trendelenburg or antalgic gait</td>
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<td>- Hip Adduction with MR</td>
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<tr>
<td>Typically occurs in ages 55 and over</td>
<td>- Limited hip ext. during midstance - push off with compensatory lumbar extension and rotation</td>
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<td>- Lumbar syndrome</td>
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<td>May report history of trauma involving hip joint</td>
<td><strong>Sit-to-stand:</strong></td>
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<td>- SIJ syndrome</td>
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<tr>
<td><strong>Common referring diagnoses:</strong></td>
<td>- Painful if initiate with hip flexion *decreased pain if scoot forward and increase use of gluteals to initiate standing</td>
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<tr>
<td>Osteoarthritis</td>
<td><strong>Supine:</strong></td>
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<tr>
<td>Degenerative disc disease</td>
<td><strong>Hip flexion/abduction/LR:</strong></td>
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<tr>
<td>Hip dysplasia</td>
<td>- (+) for pain</td>
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<tr>
<td>Low back pain</td>
<td><strong>Quadruped:</strong></td>
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<td><strong>Rocking backward</strong></td>
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<td></td>
<td>- Limited hip flexion, observe shift toward uninvolved side or pelvic rotation at end range of hip flexion ROM</td>
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<td><strong>Joint Integrity:</strong></td>
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<td></td>
<td>- PROM is limited in capsular pattern (MR/flex&gt;abd.&gt;ext)</td>
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<td></td>
<td><strong>Muscle Length Impairments:</strong></td>
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<td></td>
<td>Based on length or ROM tests:</td>
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<td></td>
<td>- Shortness of iliopsoas, rectus femoris, TFL-ITB</td>
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TREATMENT of FEMORAL HYPOMOBILITY SYNDROME with SUPERIOR GLIDE

Whether the cause of hypomobility is related to osteoarthritis (OA) or immobility, the emphasis in treatment is to improve range of motion while maintaining stability of the pelvis and lumbar spine. In both cases high repetitions and frequent motion is required. Patients with healthy hips and loss of motion due to immobilization should expect some pain during the exercises. Patients with OA should avoid pain during the exercises.

EDUCATION:
- Standing: avoid habit of standing relaxed on that extremity. Relax knees and use abdominals to correct anterior tilt.
- Gait: increased use of gluteals in gait (hip ext/push off), may need cane
- Supine to sit: don’t sit up, roll to side
- Sit to stand: don’t initiate by flexing the trunk over the lower extremities and begin standing up from the back of the chair. Instead, scoot to the edge of the chair and stand up using gluteals and quadriceps. May need to drop the involved hip into more extension by sliding the foot back and straddling the feet before standing.
- Apply heat to hip region as needed

IMPROVE RANGE OF MOTION AND LENGTHEN HIP MUSCULATURE:
- Flexion - Quadruped: rock backward moving in the hip only
- Extension:
  - Supine: hold one knee to chest while performing heel slides on the other side - contract abdominals during heel slides
  - Prone (often needs a pillow): lie in this position
  - Prone over a pillow: perform knee flexion
  - Prone over a pillow: perform hip extension with the knee extended
- Rotation:
  - Prone: hip rotation,
  - Sitting: hip rotation,
  - Supine: hip abduction/LR and hip adduction/MR (bent knee fall out/in) – also helps with abduction and adduction
- Adduction:
  - Sidelying: TFL-ITB stretch
- Mobilization:
  - Standing/Distraction: hang 2-4 pound weight of ankle, stand on stair on uninvolved leg and hang involved leg from the stair, perform hip rotation
  - Distraction (in 90° hip flex or resting position)
- Posterior glide

SHORTEN AND INCREASE PERFORMANCE OF GLUTEALS:
- Prone over a pillow: hip abduction
- Prone over a pillow: hip extension with the knee flexed
- Sidelying: LR or LR and ABD

SHORTEN AND INCREASE PERFORMANCE OF ABDOMINALS: (AVOID ACTIVE HIP FLEXION)
- Stand against the wall: posterior pelvic tilts
- Instruct patient to recruit abdominals during all exercises to increase ROM or muscle length
HIP ADDUCTION SYNDROME

The principal movement impairment in this syndrome is excessive hip adduction and increased flexibility of the superior and posterolateral hip capsule and hip abductors due to faulty alignment in standing activities. There is poor muscle performance of the hip abductors and an imbalance between the hip adductors and abductors for control of the pelvis.

<table>
<thead>
<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Diagnosis</th>
<th>Associated Signs or Contributing Factors</th>
<th>Source of Signs or Symptoms</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
</table>
| Buttock pain or lateral thigh pain during standing, walking, stair-climbing, sit to stand or occasionally sitting with legs crossed (hip abductor strain) | **Movement Impairments:**  
**Standing:**  
- hip drop or lat trunk flexion (If adductors, quadriceps and HS mm are strong, hip drop will not be evident)  
**Stand on 1 leg:**  
- hip drop or lateral trunk flexion  
**Muscle Strength/Performance Impairments:**  
**MMT:**  
- Hip abductors are weak (gluteus medius, gluteus minimus and possibly TFL-ITB)  
**Muscle Length:**  
- Lengthened hip abductors Short adductors (<35°)  
**Joint:**  
- Trochanteric bursa  
- Posterior hip capsule | Standing alignment:  
- Apparent leg length discrepancy (pain on side of high iliac crest).  
**Structural variations:**  
- broad pelvis, prominence of greater trochanter, genu valgus, pronated feet  
**Muscle/Tendon/Bursae:**  
- Posterior gluteus medius: resisted hip abduction is weak and painful  
- TFL-ITB: resisted hip flexion, abduction, MR is weak and painful  
- Adductors: resisted hip adduction is weak and painful | Muscle/Tendon/Bursae:  
- Posterior gluteus medius: resisted hip abduction is weak and painful  
- TFL-ITB: resisted hip flexion, abduction, MR is weak and painful  
- Adductors: resisted hip adduction is weak and painful | Movement Diagnoses:  
- Lumbar syndrome  
- Femoral posterior glide with MR  
- Femoral hypomobility  
- Hip adduction with MR  
- SIJ syndrome |
| May report pain along inner thigh or medial groin area (hip adductor strain) | Activities/Population  
Incidence F>M  
History of sleeping in the side lying position (hip in adduction)  
Habit of standing in hip adduction with > weight bearing on involved lower extremity | Common referring diagnoses:  
- Gluteus medius strain or tendinopathy  
- Adductor strain or tendinopathy  
- Trochanteric bursitis  
- ITB fasciitis  
- Ischiogluteal bursitis  
- Pubic Symphysis Dysfunction | Potential diagnoses/conditions requiring referral suggested by signs and symptoms:  
Patients with buttock or lateral thigh pain:  
Neuromusculoskeletal:  
- peripheral neuropathy  
- disk protrusion  
- stenosis  
Systemic:  
- neurogenic claudication  
- neoplasm  
Patients with inner thigh or medial groin pain:  
Neuromusculoskeletal:  
- hip joint pathology such as osteoarthritis (early stages)  
- avascular necrosis  
- Stress fracture; pubic symphysis or lesser trochanter  
- iliopsoas abscess  
Systemic:  
- neurogenic claudication  
- neoplasm |
TREATMENT of HIP ADDUCTION SYNDROME

EDUCATION:
- Stop standing or sitting with most weight on involved leg.
- Don't cross legs when sitting and limit duration of sitting (interrupt sitting every 20 to 30 minutes).
- Correct sleeping posture (sidelying; pillow between knees).
- Sit to stand: avoid putting knees together; align knees over feet/ use quads.
- Gait: May need cane or crutches/decrease load on gluteals/allow the tissue to heal - limit duration of walking

INCREASE MUSCLE PERFORMANCE OF HIP ABDUCTOR MUSCLES:
Low level:
- Prone: hip abduction
- Prone: foot pushes
- Stand: stand on uninvolved leg and perform hip LR/abduction/Extension on involved leg
- Stand: weight shifting side to side or front/back controlling MR
- Sidelying (pillows between the knees): Starting position: use enough pillows to place the hip in enough abduction and rotation so the head of the femur is positioned ideally in the acetabulum), Avoid popping by allowing enough hip flexion. From the starting position: perform LR or LR with adduction
Mid to High level:
- Use of theraband for hip abduction in prone or standing
- Stand on involved leg with support, progress to no support
- Sidelying: hip abduction with LR (emphasis on end range)
- Standing: side step. Progress by using resistance with theraband around ankles

TREAT THE SOURCE OF SYMPTOMS
- Ice
- Support (tape, cane)
- Rest: interrupt activities that aggravate the symptoms, provide safe alternatives
- Progressive strengthening of strained muscle (adductors or TFL-ITB)
HIP ADDUCTION SYNDROME WITH MEDIAL ROTATION

The principal movement impairment in this syndrome is excessive hip adduction and medial rotation during activity and prolonged standing or sitting positions. Faulty alignment and repeated adduction and medial rotation during functional activities leads to increased flexibility of the posterolateral capsule, hip lateral rotators and abductors. Poor muscle performance of the hip abductors and lateral rotators is often associated with the syndrome. In some cases, the lengthened piriformis muscle, may compress the sciatic nerve (lengthened piriformis syndrome) or there may be inflammation of the iliotibial band (ITB) from overuse of the TFL-ITB (recruitment of TFL-ITB for hip abduction and flexion).

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<tr>
<td>Buttock or lateral hip pain (hip abductor or lateral rotator strain) OR Sciatica (no LBP) (Lengthened Piriformis Syndrome) OR Aching or burning pain along lateral thigh (ITB fasciitis)</td>
<td>Pain occurs with standing, walking, stair-climbing, sit to stand, prolonged sitting or occasionally sitting with legs crossed History of a fall or surgery where there is soft tissue damage to gluteals Activities/Population Incidence F&gt;M History of sleeping in the side lying position (hip in adduction/MR) Habit of crossing legs (thigh over thigh) Habit of standing in hip adduction/MR with &gt; weight bearing on involved lower extremity (pain on side of high iliac crest) - May have been told of a leg length discrepancy Common referring diagnoses: Lengthened Piriformis Sciatica Hamstring strain Ischiogluteal bursitis ITB Fasciitis Gluteus medius strain or tendinopathy Trochanteric bursitis Snapping Hip Syndrome SI region dysfunction Obturator Internus strain</td>
<td>Alignment/Appearance: Standing: • Hip adduction medial rotation • Iliac crest height asymmetry (pain on high side) *Pain ↓ w/ hip LR or gluteal contraction Sidelying: • observe prominence of the &gt; trochanter if hip is in add and MR • may be painful in pts w/ lat thigh pain Movement Impairments: Standing: • + Trendelenburg or antalgic gait Stand on 1 leg: • hip drop MR or lateral trunk flexion Functional mobility: • MR associated with gait, sit to stand, stairs Joint Integrity: • Increased MR Muscle Length Impairments: Based on length or ROM tests: • Short TFL-ITB Muscle Strength/Performance Impairments: MMT: • Primary hip abductors are weak (Gluteus maximus, gluteus medius, and gluteus minimus) • Weak hip lateral rotators</td>
<td>Standing alignment: Apparent leg length discrepancy (pain on side of high iliac crest). Structural variations: broad pelvis, prominence of greater trochanter, genu valgus, pronated feet Muscle Length: Lengthened hip abductors Short adductors (&lt;35°) Muscle/Tendon/Bursae: Posterior gluteus medius: -resisted hip abduction is weak and painful TFL-ITB: -resisted hip flexion, abduction, MR is weak and painful -ITB tender to palpation -Supine:hip flex/abd/LR limited range and (+) for pain – If repeated, range s &amp; pain ↓ Hip LRs: -resisted test may be weak and painful</td>
<td>Muscle/Tendon/Bursae: Posterior gluteus medius: -resisted hip abduction is weak and painful TFL-ITB: -resisted hip flexion, abduction, MR is weak and painful -ITB tender to palpation -Supine:hip flex/abd/LR limited range and (+) for pain – If repeated, range s &amp; pain ↓ Hip LRs: -resisted test may be weak and painful</td>
</tr>
</tbody>
</table>

Differential Diagnosis

| Movement Diagnoses: Lumbar syndrome w/ radiating sxs Femoral posterior glide with MR Hip adduction Hip LR syndrome Hip Extension w/ MR Hip Extension with knee ext SJ syndrome |
| Potential diagnoses/conditions requiring referral suggested by signs and symptoms: Patients with buttock or lateral thigh pain: Neuromusculoskeletal: peripheral neuropathy disk protrusion stenosis Systemic: neurogenic claudication neoplasm Patients with inner thigh or medial groin pain: Neuromusculoskeletal: hip joint pathology such as osteoarthritis (early stages) avascular necrosis Stress fracture: pubic symphysis or lesser trochanter iliopsoas abcess Systemic: neurogenic claudication neoplasm |

<table>
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<tbody>
<tr>
<td>Movement Diagnoses: Lumbar syndrome w/ radiating sxs Femoral posterior glide with MR Hip adduction Hip LR syndrome Hip Extension w/ MR Hip Extension with knee ext SJ syndrome</td>
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<tr>
<td>Potential diagnoses/conditions requiring referral suggested by signs and symptoms: Patients with buttock or lateral thigh pain: Neuromusculoskeletal: peripheral neuropathy disk protrusion stenosis Systemic: neurogenic claudication neoplasm Patients with inner thigh or medial groin pain: Neuromusculoskeletal: hip joint pathology such as osteoarthritis (early stages) avascular necrosis Stress fracture: pubic symphysis or lesser trochanter iliopsoas abcess Systemic: neurogenic claudication neoplasm</td>
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</table>
TREATMENT of HIP ADDUCTION SYNDROME WITH MEDIAL ROTATION

The treatment for the hip adduction with medial rotation syndrome incorporates all of the education and exercises noted for the hip adduction syndrome plus additional exercises to correct the faulty medial rotation. In addition, special considerations are made for patients with sciatica or inflammation of the iliotibial band.

CAUTION: If a patient has femoral antetorsion, do not force the hip into lateral rotation. Try to get the hip in a neutral position for them (trochanter is in midline).

**EDUCATION:**
- Stop popping the hip voluntarily
- Avoid standing with weight primarily on the involved hip
- Avoidance of hip medial rotation in standing or walking (tighten gluteals and lateral rotators at heel strike to midstance).
- Don’t cross legs when sitting (thigh over thigh) – may sit with feet crossed at ankles. Don’t sit with hips and knees flexed to end range (i.e. sit with arms wrapped around lower legs). Limit duration of sitting (interrupt sitting every 20 to 30 minutes). Avoid soft chairs. Fill in “bucket” on seats in car. If there is an appearance of a decreased inguinal crease, a towel roll under the ischial tuberosity may decrease pain.
- Correct sleeping posture (avoid adduction/MR in sidelying by placing pillows between the knees)
- Driving: avoid lifting foot from accelerator to brake by flexing and medially rotating the hip
- Sit to stand: avoid putting knees together; align knees over feet/ use quadriceps
- Dancers or gymnasts should avoid excessive ranges achieved during forward bending and stretches of the posterior hip mm (long sitting, lean forward over leg on bar).
- Apply ice to areas of pain as needed

**INCREASE MUSCLE PERFORMANCE OF POSTERIOR MUSCLES:**

**Posterior Gluteus Medius:**
- Low level:
  - Prone: hip abduction
  - Prone: foot pushes
  - Stand: stand on uninvolved leg and perform hip LR/abd/Ext on involved leg
  - Stand: weight shifting side to side or front/back controlling MR
  - Sidelying (pillows between the knees): Starting position: use enough pillows to place the hip in enough abduction and rotation so the head of the femur is positioned ideally in the acetabulum). Avoid popping by allowing enough hip flexion. From the starting position: perform LR or LR with ABD
- Mid to High level:
  - Use of theraband for hip abduction in prone or standing
  - Stand on involved leg with support, progress to no support
  - Sidelying: hip abduction with LR (emphasis on end range)
  - Standing: side step. Progress by using resistance with theraband around ankles

**Hip lateral rotators:**
- Control MR during weight bearing activities Taping may be used to control hip MR- with the hip in slight LR and loaded, apply tape with force from proximal lateral thigh, then posterior around knee to medial side of mid lower leg (rotation) or “X” behind the knee (hyperextension)
- Resisted LR in sitting with theraband
- Resisted LR in standing with theraband (wrapped around forefoot)

**ILIOTIBIAL BAND FASCIITIS (SPECIAL CONSIDERATIONS):**

Treatment is determined by the severity and level of pain. If severe, initial treatment will include ice, rest (use of cane), taping, gentle stretching (i.e. bent knee fall out), proper positioning in supine, sitting and standing (avoid excessive flexion and MR) and retraining to increase participation of under-used synergist (quadriceps and posterior gluteus medius).

**AS ABOVE PLUS:**

**EDUCATION:**
- Driving: avoid lifting foot from accelerator to brake by flexing and medially rotating the hip.

**INCREASE PERFORMANCE OF THE QUADRICEPS AND TRAINING TO PERFORM HIP AND KNEE MOTION WITHOUT MEDIAL ROTATION:**
- Sit to stand/knee over foot and use quads
- Step ups
- Wall sits
- Lunges
- Squats
- Machines: ie. leg press
STRENGTHENING THE TFL-ITB
NOTE: If the TFL-ITB is strained, strengthening exercises may be prescribed but only after the muscle has healed sufficiently and the muscle performance of the synergists (PGM and LRs) has improved.

- Supine: hip abduction with MR
- Sidelying: hip abduction with neutral rotation
- Supine: hip flexion, abduction and MR

SCIATICA/LENGTHENED PIRIFORMIS (SPECIAL CONSIDERATIONS):

Patients with irritation of the sciatic nerve due to compression from the piriformis muscle must be instructed to respect the symptoms. When sciatica is present, the patient must change positions. The level of intensity of functional activities and exercise should be graded in order to avoid the reproduction of symptoms. The patient should interrupt prolonged sitting.

The corrective program is otherwise the same as noted under Hip Adduction with Medial Rotation.
HIP EXTENSION and KNEE EXTENSION  
(with Hip Medial Rotation)

The principal movement impairment in this syndrome occurs during weight bearing activities and is associated with a strain of the hamstring muscle. During sit to stand or stair climbing, there is an overuse of the hamstrings to control the combination of hip and knee extension and poor muscle performance of the gluteus maximus and quadriceps. In some cases excessive hip medial rotation is associated with these activities (Hip and Knee Extension with Hip MR). In these cases, there is poor muscle performance of the intrinsic hip lateral rotators and overuse of the biceps femoris to control hip lateral rotation or prevent excessive medial rotation.

<table>
<thead>
<tr>
<th>Symptoms or History</th>
<th>Key Tests &amp; Signs for Movement System Diagnosis</th>
<th>Associated Signs or Contributing Factors</th>
<th>Source of Signs or Symptoms</th>
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</table>
| Pain most often in posterior proximal thigh but may be in the hamstring muscle belly or at the distal insertion | **Alignment/Appearance:**  
Standing:  
- Hip hip extension and knee hyperextension  
- Hip MR (Syndrome with Hip MR) |  
Swayback posture  
Ankle pronation (Syndrome with Hip MR)  
M length:  
- Short gastrocnemius  
Asymmetrical HS length | Muscle/Tendon/Bursae:  
Hamstrings:  
- Resisted test for HS in prone or end range of SLR: (+) for pain but may test weak or strong  
- Passive Stretch of HS (+) for pain  
-Palpation of HS: Tenderness noted in HS most often in proximal m. belly  
- Appearance: May see bruising | Movement Diagnoses:  
- Lumbar syndrome w/ radiating sxes  
- Hip Extension with MR  
- Hip Adduction with MR  
- Tibiofemoral Rotation  
- Proximal tibiofibular glide syndrome |
| May be sudden (i.e. trauma) or insidious onset | **Movement Impairments:**  
Standing:  
Gait:  
- observe knee hyperextension during loading  
- observe Hip MR during loading (Syndrome with Hip MR) |  
Returning from FB: Faulty hip extension: Sways hips forward and uses ankle dorsiflexion to bring lower extremity forward - use of upper body momentum and ankle dorsiflexion more than use of gluteus maximus - Ideally, there is greater rotation about the hip and less about the ankles | |
| Pain with gait, stairs, running | Steps:  
- Going up, observe backward knee movement as the knee is extended with the foot fixed (HS over quads)  
- Going down observe poor knee control (↓ m. performance of quads)  
- Observe MR going up or down (Syndrome with Hip MR) |  
Structural Variation: (Syndrome with Hip MR)  
Femoral antetorsion  
Genu valgus |  |
| Pain with sitting/driving if pain is in proximal thigh | **Stand on 1 leg:**  
- Observe MR (Syndrome with Hip MR) |  
Ishiogluteal bursa |  |
| Activities/Population | **Sit to stand:**  
- observe backward knee movement as the knee is extended with the foot fixed (HS over quads)  
- Observe MR (Syndrome with Hip MR) |  
Joint:  
Posterior hip capsule |  |
| Often occurs in runners or athletes | **Prone:**  
Hip ext/knee ext:  
- onset of gluteus maximus after initiation of hip extension |  
| Common referring diagnoses:  
Sciatica  
Hamstrings strain  
Piriformis Syndrome  
Ischiogluteal bursitis  
SI joint dysfunction | **Muscle Length Impairments:**  
Based on length:  
- Short HS |  
|  | **Muscle Strength/Performance Impairments:**  
**MMT:**  
- Weak gluteus maximus  
- Weak posterior gluteus medius (Syndrome with Hip MR)  
- Weak hip lateral rotators (Syndrome with Hip MR) |  
|  | **Function:**  
- Poor muscle performance of quadriceps  
- Over recruitment of the HS for a variety of activities (i.e. abdominal exercise, upper extremity movements) |  

TREATMENT of HIP EXTENSION and KNEE EXTENSION SYNDROME (with Hip Medial Rotation)

Without Hip Medial Rotation: Strain of hamstrings from excessive use to substitute for weak quadriceps and gluteus maximus.

With Hip Medial Rotation: Strain of hamstrings from excessive use of biceps femoris to substitute for intrinsic hip lateral rotators for control or hip rotation. There may also be strain from excessive use of hamstrings to substitute for weak quadriceps and gluteus maximus.

Treatment will depend on the severity and stage of recovery of the hamstring strain. Follow the guidelines for the typical management of soft tissue injuries taught in orthopedics.

Stage 1: ice, rest (stop fitness activity, may need cane or crutches) compression, elevation, gentle massage, passive pain free knee extension and isometrics (i.e. sitting: resist knee flexion with opposite foot).

Stage 2 and 3: the use of modalities decreases, the intensity of exercise increases with pain as the guide (i.e. active knee flexion to resisted knee flexion), the application of compressive bandages and massage continues and stretching the hamstrings begins. The PT management needs to focus on facilitating the recovery of the hamstring strain AND to introduce exercises to correct the associated muscle imbalances. The following exercises can be initiated in the subacute phase with pain as your guide in determining the intensity of the program.

EDUCATION
- Relax/unlock knees in standing and decrease hyperextension of knees in gait. Tape may be used behind the knee to control hyperextension.
- Keep trunk and body weight forward during sit to stand and ascending stairs (increase use of quads and avoid pulling knee back)
- Provide instructions to keep the knee over the foot during stance and gait. (Syndrome with Hip MR)
- Relax hamstrings during activities when hamstrings are recruited unnecessarily (i.e. lower abdominal exercise (relax the nonmoving limb/don’t push down with that leg)

INCREASE MUSCLE PERFORMANCE OF THE HAMSTRINGS:
- Exercises that emphasize eccentric muscle contraction of the hamstrings (For example, sit in hamstring weight machine: flex both knees against resistance, release/extend one knee and control knee extension with opposite knee – may set up pulleys to provide eccentric use of hamstrings - perform exercises daily with high repetitions -
- Sitting or Prone: active knee flexion without resistance then progress to adding resistance (concentric)

LENGTHEN HAMSTRINGS IF SHORT:
- Sitting: knee extension with dorsiflexion-neutral hip rot.
- Long sitting against the wall: extend knee
- Supine: SLR passive hamstring stretch through a doorway with dorsiflexion

TRAINING TO RELAX HAMSTRINGS
- Active knee flexion, then relax performed in sitting, prone or supine with the hip at 90°

INCREASE MUSCLE PERFORMANCE OF THE QUADRICEPS
- Bilateral/symmetrical: Sit to stand transfers, wall sits, squats
- Unilateral/asymmetrical: step-ups, lunges (must cue to lean trunk forward, may select lunges where you move across the floor rather than lunge and return to standing)

INCREASE MUSCLE PERFORMANCE OF THE GLUTEUS MAXIMUS (SYNERGIST):
- Prone: hip extension with the knee flexed, lunges, squats

INCREASE MUSCLE PERFORMANCE OF THE HIP LATERAL ROTATORS: (Syndrome with Hip MR)
- Control MR during weight bearing activities:
  - Sit to stand with knee over foot
  - Step ups or lunges
  - Taping may be used to control hip MR- with the hip in slight LR and loaded, apply tape with force from proximal lateral thigh, then posterior around knee to medial side of mid lower leg (rotation) or “X” behind the knee (hyperextension)
- Resisted LR in sitting with theraband
- Resisted LR in standing with theraband (wrapped around forefoot)
- Sidelying: gluteus medius progression
**HIP LATERAL ROTATION SYNDROME**

Hip lateral rotation during activity and standing alignment is the principle movement impairment in this syndrome. Shortened hip lateral rotator muscles, particularly the piriformis compress the sciatic nerve (Shortened Piriformis Syndrome).

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| Pain in buttock and posterior thigh (sciatic n distribution) (no back pain) | Alignment/Appearance: Standing:  
- Hip LR, may have reduced L-curve  
  *Pain may be relieved by increasing lateral rotation in standing or walking  
- Hip extension and knee hyperextension  
- If there is an apparent leg length discrepancy, the pain is on the side of lower iliac crest  
Movement Impairments:  
Quadruped:  
Starting position:  
- Involved hip if high or in LR or abduction  
Rocking backward:  
- Pain is reproduced  
  * lateral rotation of the hip is associated with increased range of hip flexion before the onset of pain  
Functional mobility:  
- Lateral rotation is associated with sit to stand, gait and stairs  
Joint Integrity:  
- Limited MR | Decreased range of hip flexion.  
Weak/long iliopsoas  
Short hamstrings  
Structural Variation:  
Femoral retroversion | Muscle/Tendon/Bursae:  
Hip LR:  
-Resisted LR may reproduce sxs  
-tenderness to palpation in buttock  
Nerve:  
Sciatic nerve:  
-supine hip flex/add/MR reproduces sxs  
- May have a positive slump test.  
tenderness to palpation in buttock | Movement Diagnoses:  
- Lumbar syndrome w/ radiating sxs  
- Hip Extension with MR  
- Hip Adduction with MR  
Potential diagnoses/conditions requiring referral suggested by signs and symptoms:  
Neuromusculoskeletal:  
- Disk herniation  
- stenosis  
Systemic:  
- neoplasm  
- diabetic neuropathy  
- Megacolon  
- Staph infection  
- Intrapelvic aneurysm |
| Pain is worse with standing and walking compared to sitting | Activities/Population  
Incidence: M > F  
May see in male golfers  
Have a habit of sitting with legs crossed (foot on thigh) | Common referring diagnoses:  
Sciatica  
Hamstrings strain  
Piriformis Syndrome (shortened)  
SI joint dysfunction | | |


TREATMENT of HIP LATERAL ROTATION SYNDROME (SHORTENED PIRIFORMIS)

The patient must be instructed to respect the symptoms. When sciatica is present, the patient must change positions. The level of intensity of functional activities and exercise should be graded in order to avoid the reproduction of symptoms.

Generally, modalities are not useful in treatment of piriformis syndromes.

EDUCATION
- Standing: decrease amount of hip LR and extension and knee hyperextension
- Sitting: Don’t cross legs (foot on thigh). Prevent too much hip abduction by sitting with thighs closer together and in neutral rotation.
- Sit to stand: keep knee over foot and perform in position of neutral hip rotation

LENGTHEN LATERAL ROTATORS
- Quadruped: assume position and rock backward through pain free range. Hip may be placed in slight lateral rotation in the starting position and after repetitions may move hip into neutral rotation. **NOTE:** this is a key exercise and should be performed first in the exercise sequence and repeated more than one time during the day.
- Supine: passive hip flexion with the knee flexed (knee to chest) Add adduction and MR as tolerated
- Prone: foot pushes followed by hip medial rotation.
- Mobilization: **NOTE:** Only for those with stiff posterior hip structures - Posterior, inferior or caudal glide OR posterior glide combined with physiological flexion

CORRECT MUSCLE IMBALANCE ASSOCIATED WITH POSTERIOR TILT
- strengthen the iliopsoas,
- lengthen gluteus maximus
- stretch short hamstrings  **NOTE:** if the patient has short hamstrings and positive neural tension signs, avoid end range sustained stretched and focus on easy knee extension and relax. You do not want to aggravate acute sciatica. If the sciatica is chronic, some symptom reproduction during the exercise is allowed but should not be aggravated more than 15 minutes after completion of the exercises.

TEACH DISSOCIATION OF LUMBAR AND HIP FLEXION
- Standing: forward bend, hip flexion only
- Quadruped: rock backward moving in the hips only