Hip

The hip is designed to operate under loads that exceed 3 times the normal body weight. In order to balance the wide ROM allowed at the joint with the forces placed upon it, it is controlled by muscles of enormous power and coordination.

The largest forces at the hip joint are those resulting from muscular contraction. Consider the muscles required to stand on one leg: Gluteus medius and minimus, TFL, superior portions of Gluteus maximus, as well as passive tensions in the fascia latae and ITB. All of these contract in order to prevent the dropping of the contralateral side of the pelvis. This action produces a compressive force of up to 3-4 times the body weight, and an even greater force when walking or running.

There are several mechanisms that aid the body in managing the forces around the hip joint. Passive mechanisms may include bone or cartilage deformation while active mechanisms are neuromuscular and affect joint motion and muscle lengthening under tension. Joint motion includes knee flexion, foot pronation, internal rotation of the hip and adduction of the hip during heel strike. Contraction of the global stabilizers and mobilizers absorb the load and stabilize all the joints in the lower extremity. These mechanisms allow for optimal control of joint function.

Hip Conditions

Impairment patterns of the hip

Faulty mechanics may arise due to an imbalance in muscle length/strength, resulting in compressive forces on the back, hip and knee joints. Various impairment patterns correlate to overuse pathologies. These pathologies may be seen singularly or in groups and movement dysfunctions may exist alone or as part of a complex combination.

Decreased flexibility

- Hyperlordosis – shortened iliopsoas and rectus femoris, lengthened / weak abdominals and hamstrings
- Flat back – Shortened gluteus maximus and hamstrings, lengthened / weak rectus femoris and abdominals

Hip clicking

Can indicate a weakness or dysfunction in the stabilizers, tendons snapping over joints, tears in the labrum

The Plan: Unload (remove gravity), decrease ROM, find neutral and focus on control while maintaining it, make use of short levers first, use proprioceptive tools where possible

Exercise Examples: Bend and Stretch with band, One Leg Circle with band (shorten the lever by bending the knee), hip flexor stretch, quadriceps stretch

Patellofemoral pain

Is associated with weak gluteus medius and minimus.

Piriformis syndrome

Is associated with weak hip abductors and extensors.

Osteoarthritis

Space in the hip joint has decreased

Joint has degenerated, as well as surrounding tissue

ROM limited, particularly flexion

Deep hip and groin pain, pain down inner thigh and into medial knee

Pain increases after weightbearing

May result in hip replacement surgery

The Plan: avoid compression of the joint, focus on neutral, work in a mid-range. Increase length of warm-up and work to improve biomechanics.

Exercise Examples: Begin with AROM exercises, bridging, hip extension standing, gentle fascial movements like Tai Chi, gentle glute max, hip flexor and adductor stretches

Hip replacement

End result of severe arthritis, hip/femur fractures or avascular necrosis of the femoral head, resulting from compromised blood flow to the femoral head

A full replacement involves both an acetabular replacement, as well as a femoral component

It restores movement and eliminates pain

The Plan: restore normal biomechanics as able, avoid flexion beyond 90°, and do not combine flexion, adduction and internal rotation. Build towards weightbearing, avoid side-lying on the affected side, and use a prop to maintain knees hip distance apart. Do not let the lumbar spine take over to increase limited hip extension, avoid impact

Exercises Examples: Single Leg extension prone on folded pillow, heel slides, knee tips, hamstring stretches, gentle glute stretches

Nerve Dysfunction

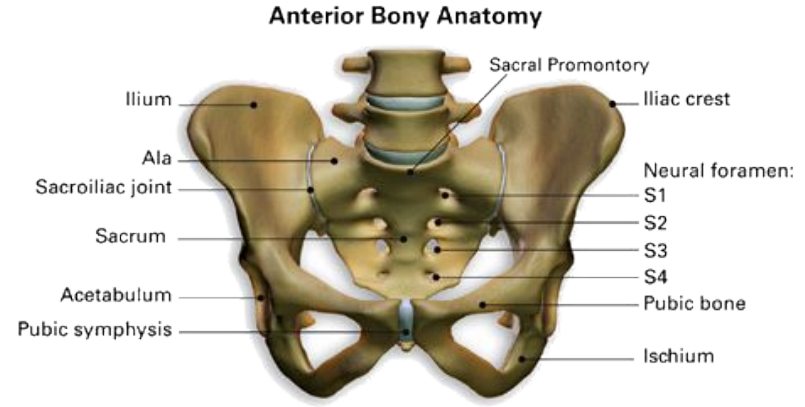
May result from nerve entrapment or injury

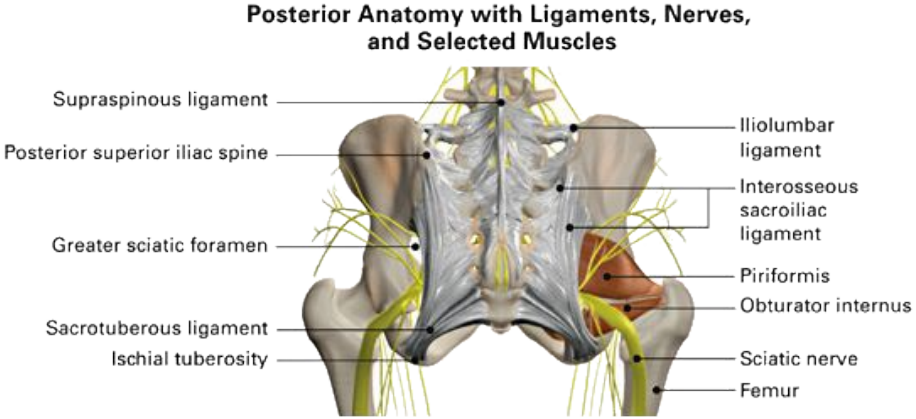
The sciatic nerve may be aggravated by inflammation in the piriformis

The Plan: Rebalance the muscles around the hip, work in parallel and hip distance apart, mobilize and release the hip joint gently

Exercise Examples: Hip Release, Windswept knees, small standing hip hikes, bridging, Standing Cowboy, Ball sit, Thread the Needle stretch

SI Joint





The sacroiliac or SI joint is the joint connection between the spinal column and the pelvis. It is a large joint made up of the sacrum and the two innominates of the pelvis. Each innominate is formed by the fusion of the three bones of the pelvis: the ilium, ischium, and pubic bone. Sprains to the si occur in 10%-33% of the population.

Exercise interventions for the hip region
Pg 750

No matter what the cause, muscle strength or flexibility imbalance in the hip can lead to abnormal lumbopelvic and hip mechanics, which can contribute to low back, SI or hip pain. Abnormal hip mechanics from muscle flexibility and strength imbalances may also affect knee and ankle during weight-bearing activities, potentially causing overuse syndromes or increased stress in these regions.

Increase hip extension

Open textbook to page 751

- Prone press up
- “Thomas test” stretch
- Modified fencer stretch
- Kneeling fencer stretch

Increase hip flexion

Page 751

- Bilateral knee to chest stretch
- Unilateral knee to chest stretch
- Quadruped (all fours) stretch
- Short -sitting stretch

Increase hip abduction

Page 752

Fig. 20.13

Increase hip abduction and external rotation simultaneously

Page 752

Fig. 20.14

Increase hip internal rotation

Page 753

Fig. 20.15

Rectus femoris stretches

Page 753

- “Thomas test” stretches
- Prone stretch
- Standing stretch

Hamstring stretches

Page 753-754

- Straight leg raising
- Hamstrings stretch in doorway
- Hamstrings stretch on chair or table
- Bilateral toe touching

TFL and ITB stretches

Page 755

- Supine stretch
- Side-lying stretch
- Standing stretch

Open-chain exercises

Develop control and strength of hip abduction

Page 756

- Supine abduction
- Side-lying abduction
- Standing abduction

Develop control and strength of hip extensors

Page 757

- Gluteal muscle setting
- Standing leg lifts with trunk support
- Quadruped leg lifts
- Standing extension

Develop control and strength of hip external rotation

Page 757-758

- Prone isometrics
- Clam shell exercise
- Side-lying external rotation
- Sitting: external rotation

Develop control and strength on hip flexion

Page 758

- Supine heel slides
- Hip and knee flexion
- Straight-leg hip flexion

Develop control and strength of hip adduction

Page 758

- Side-lying abduction
- Standing adduction

Closed-chain exercises

Closed-chain isometric exercise

Page 759

- Alternating isometrics and rhythmic stabilization
- Stabilization in single-leg stance

Closed-chain dynamic exercises

Page 760

- Hip hiking/pelvic drop
- Bridging
- Wall slide
- Partial squats/mini-squats
- Single-limb deadlift
- Step-ups and step-downs
- Partial and full lunges
- Resisted side stepping
- Resisted side sliding

Independent learning activities pg 764 due next class