

# The Pelvic Girdle

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# The Pelvic Girdle

- A. General Structure & Function
- B. Structure & Function of Specific Joints
- C. Muscular Considerations
- D. Specific Functional Considerations
- E. Common Injuries

# The Hip and Pelvic Girdle

#### A. General Structure & Function

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#### General Structure: Pelvic Girdle Anterior view L/R Pelvic Bones Psoas major Fusion of: ilium, pubis, ischium Illian Quadratus tuberosity 3 Joints: pubic symphysis, 2 lumborum Erector Auricular surface sacroiliac Transversus abdominis Obliquus internus abdominis Obliquus externus abdominis Anterior-superior Sartorius iliac spine llium Rectus femoris Anterior-inferior iliac spine Psoas minor-Rectus Adductor Pectineus on pectineal line Piriformis Acetabulum Obturator internus Obturate and gemelli bturato nembrane Gluteus minimus Quadratus femoris Adductor Disc of Vastus lateralis Adductor brevis pubic magnus symphysis Obturator lliopsoas Pubis externus Vastus medialis Ischium

#### **General Structure: The Hip Joint**

- Hip Joint: union of acetabulum of pelvis and head of femur
- Stable joint, great mobility
- Surrounded by several large muscles



# **Structural Factors that Affect Girdle Function: Angle of Inclination**

- Larger at birth, decreases with age...why?
- □ Hip abductors?
- Length of limb?
- Compression vs. Shear?



### Structural Factors that Affect Girdle Function: Angle of Anteversion

- Angle of anteversion
- □ Gluteus Maximus…ext. rotation?









# Functional Anatomy of the Hip Joint: Acetabulum Alignment

Center-Edge Angle

Acetabular Anteversion Angle





To provide stability for weight bearing
To allow for mobility of the leg
Load transmission



•Flexion and Extension

•Abduction and Adduction

•External Rotation and Internal Rotation.



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# Kinematics of the Hip Joint

Femoral-on-Pelvic Osteokinematics Pelvic-on-Femoral Osteokinematics



# **Kinematics of the Hip Joint** Femoral-on-Pelvic Osteokinematics:

1. Flexion and Extension in Sagittal Plane



### Kinematics of the Hip Joint Femoral-on-Pelvic Osteokinematics:

Abduction and Adduction in the Frontal Plane





Internal and External Rotation in the Horizontal Plane







#### Kinematics of the Hip Joint Pelvic-on-Femoral Osteokinematics:

Lumbopelvic Rhythm



### Kinematics of the Hip Joint Pelvic-on-Femoral Osteokinematics:

- Abduction and Adduction in the Frontal Plane
- Right lateral tilt and left lateral tilt



### Kinematics of the Hip Joint Pelvic-on-Femoral Osteokinematics:

- Internal and External Rotation in the Horizontal Plane
- □ Right rotation and left rotation



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#### Muscular Considerations: Sagittal Plane Pelvic Motion

#### 1. Pelvic-on-Femoral Flexion: Anterior Pelvic Tilt

Force couple
 Hip flexors
 Lower trunk extensors



#### Muscular Considerations: Sagittal Plane Pelvic Motion

1. Pelvic-on-Femoral Flexion: Posterior Pelvic Tilt

Force couple
 Hip extensors
 Lower trunk flexors



# Muscular Considerations: Overall Function of the Hip Flexors

#### 2. Femoral-on-Pelvic Hip Flexion



synergy
 between hip
 flexors and
 abdominal
 muscles



#### **Muscular Considerations: Extensors**

Pelvic-on-Femoral Hip Extension



#### Muscular Considerations: Hip Adductors



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# Specific Functional Considerations

- Bilateral hip motion in sagittal plane
- Unilateral hip motion if sagittal plane
- □ Single-leg stance
  - Walking
  - Running
  - Untrained