

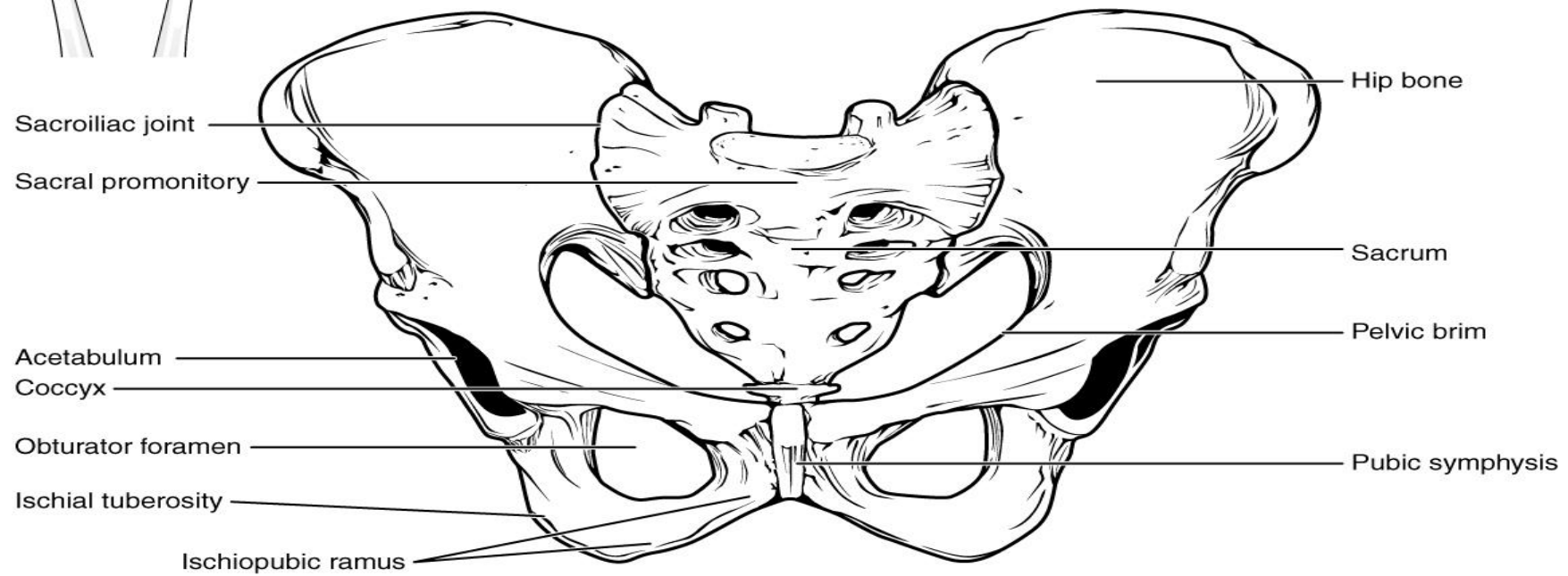
The Pelvic Girdle and Pelvis

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Introduction

- ▶ The two **hip bones** (also called coxal bones or os coxae) are together called the **pelvic girdle** (hip girdle) and serve as the attachment point for each lower limb. When the two hip bones are combined with the **sacrum and coccyx of the axial skeleton**, they are referred to as the **pelvis**. The right and left hip bones also converge anteriorly to attach to each other at the pubic symphysis
- ▶ Unlike the bones of the pectoral girdle, which are highly mobile to enhance the range of upper limb movements, the bones of the pelvis are strongly united to each other to form a largely immobile, weight-bearing structure. This is important for stability because it enables the weight of the body to be easily transferred laterally from the vertebral column, through the pelvic girdle and hip joints, and into the weight bearing lower limb(s). Thus, the immobility of the pelvis provides a strong foundation for the upper body as it rests on top of the mobile lower limbs.

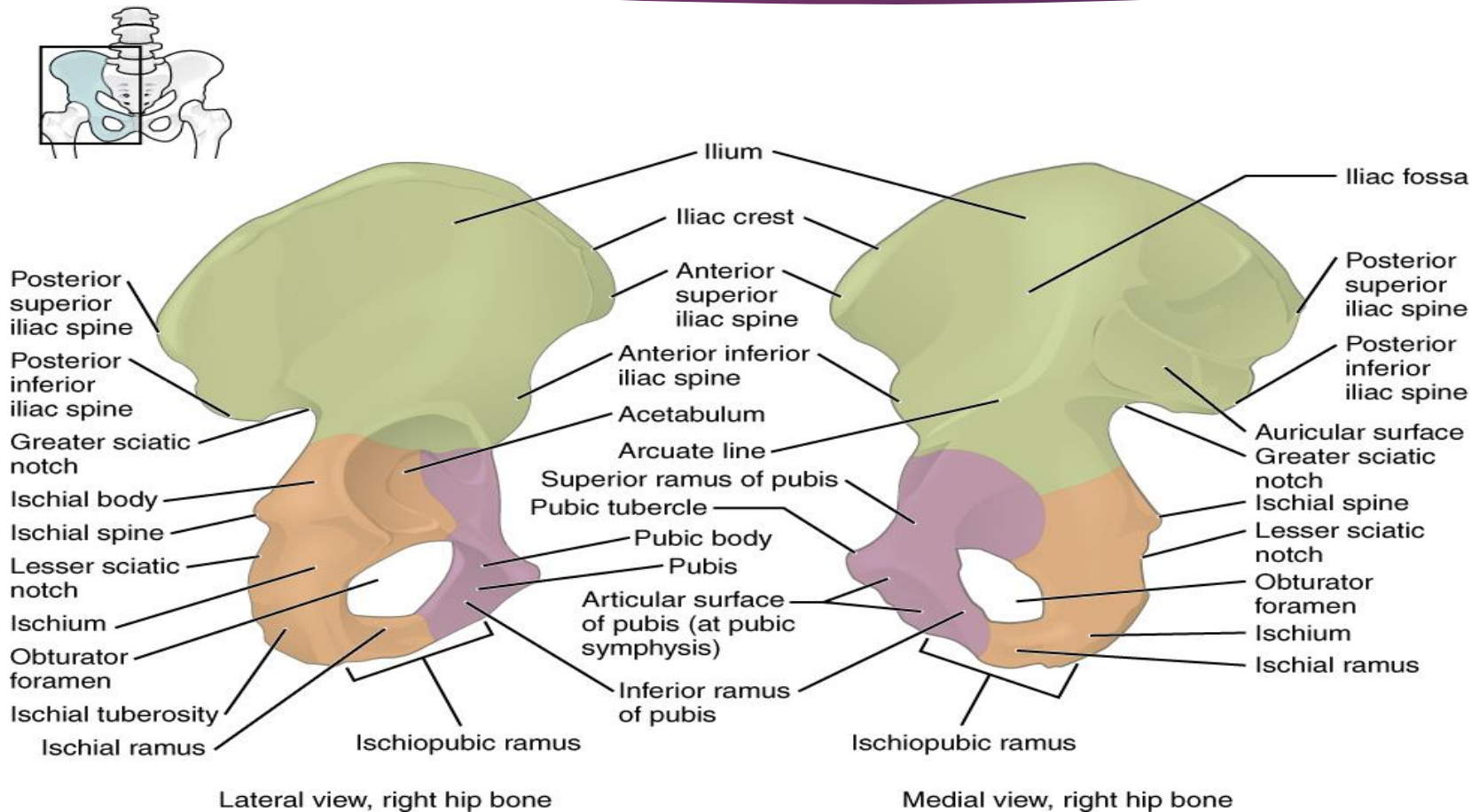
Pelvic Bones



Hip Bone

- ▶ The hip (or coxal) bones form the pelvic girdle portion of the pelvis. The hip bones are large, curved bones that form the lateral and anterior aspects of the pelvis. Each adult hip bone is formed by three separate bones that fuse together during the late teenage years. These bony components are the ilium, ischium, and pubis. These names are retained and used to define the three regions of the adult hip bone.

Hip Bones



Ilium

- ▶ When you place your hands on your waist, you can feel the arching, superior margin of the ilium along your waistline. This curved, superior margin of the ilium is the **iliac crest**. The rounded, anterior termination of the iliac crest is the **anterior superior iliac spine**. This important bony landmark can be felt at your anterolateral hip. Inferior to the anterior superior iliac spine is a rounded protuberance called the **anterior inferior iliac spine**. Both of these iliac spines serve as attachment points for muscles of the thigh. Posteriorly, the iliac crest curves downward to terminate as the **posterior superior iliac spine**. Muscles and ligaments surround but do not cover this bony landmark, thus sometimes producing a depression seen as a “dimple” located on the lower back. More inferiorly is the **posterior inferior iliac spine**. This is located at the inferior end of a large, roughened area called the **auricular surface of the ilium**. The auricular surface articulates with the auricular surface of the sacrum to form the sacroiliac joint. Both the posterior superior and posterior inferior iliac spines serve as attachment points for the muscles and very strong ligaments that support the sacroiliac joint.

Ilium

- ▶ The shallow depression located on the anteromedial (internal) surface of the upper ilium is called the **iliac fossa**. The inferior margin of this space is formed by the **arcuate line of the ilium**, the ridge formed by the pronounced change in curvature between the upper and lower portions of the ilium. The large, inverted U-shaped indentation located on the posterior margin of the lower ilium is called the **greater sciatic notch**.

Ischium

- ▶ The ischium forms the posterolateral portion of the hip bone. The large, roughened area of the inferior ischium is the **ischial tuberosity**. This serves as the attachment for the posterior thigh muscles and also carries the weight of the body when sitting. You can feel the ischial tuberosity if you wiggle your pelvis against the seat of a chair. Projecting superiorly and anteriorly from the ischial tuberosity is a narrow segment of bone called the **ischial ramus**. The slightly curved posterior margin of the ischium above the ischial tuberosity is the **lesser sciatic notch**. The bony projection separating the lesser sciatic notch and greater sciatic notch is the **ischial spine**. The central **body of the ischium** connects the ischial tuberosity, the acetabulum and the ischial spine.

Pubis

- ▶ The pubis forms the anterior portion of the hip bone. The enlarged medial portion of the pubis is the **pubic body**. Located superiorly on the pubic body is a small bump called the **pubic tubercle**. The **superior pubic ramus** is the segment of bone that passes laterally from the pubic body to join the ilium. The narrow ridge running along the superior margin of the superior pubic ramus is the **pectineal line** of the pubis.
- ▶ The pubic body is joined to the pubic body of the opposite hip bone by the pubic symphysis. Extending downward and laterally from the body is the **inferior pubic ramus**. The **pubic arch** is the bony structure formed by the pubic symphysis, and the bodies and inferior pubic rami of the adjacent pubic bones. The inferior pubic ramus extends downward to join the ischial ramus. Together, these form the single **ischiopubic ramus**, which extends from the pubic body to the ischial tuberosity. The inverted V-shape formed as the ischiopubic rami from both sides come together at the pubic symphysis is called the **subpubic angle**.

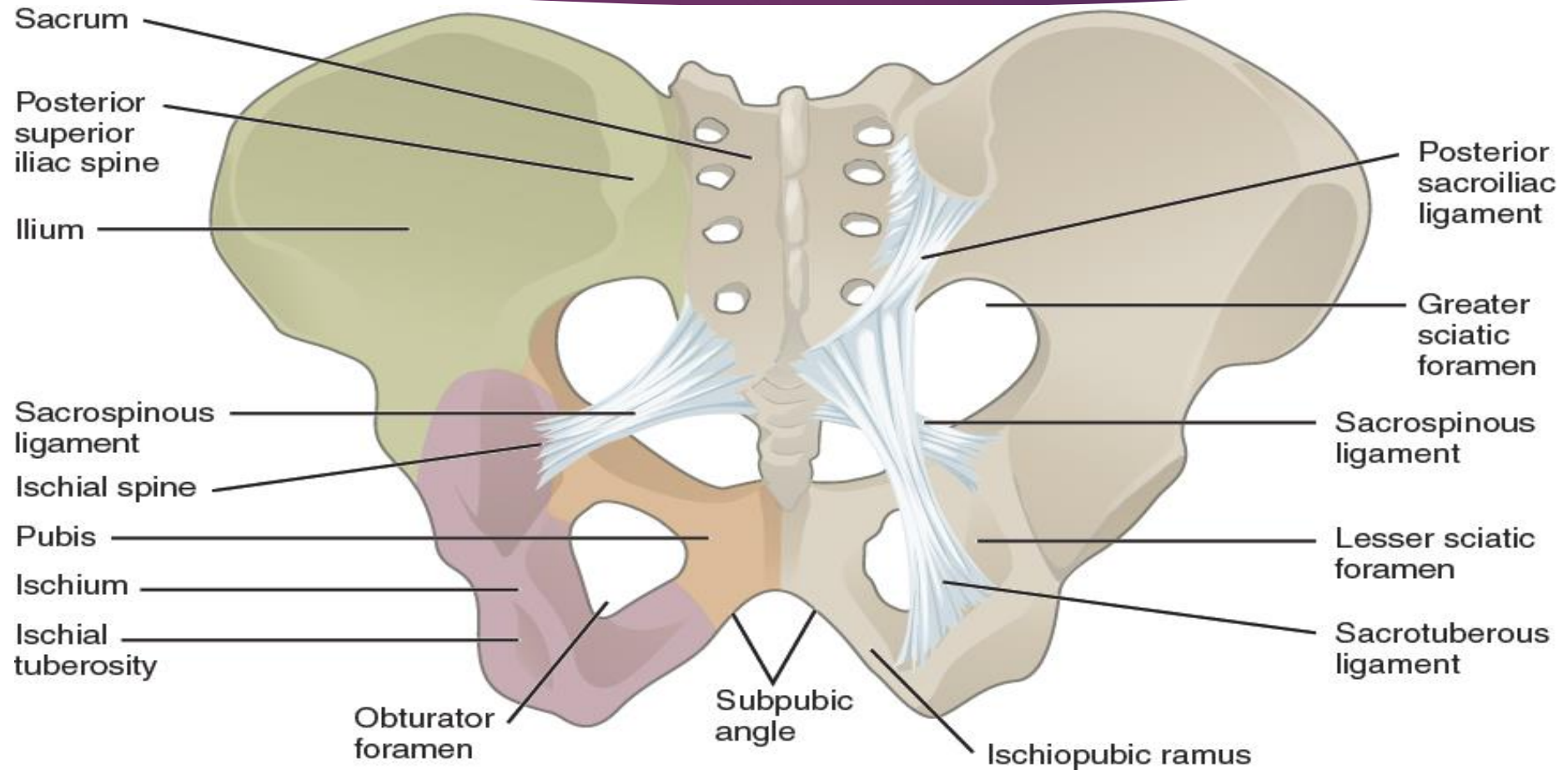
Pelvis

- ▶ The pelvis consists of four bones: the right and left hip bones, the sacrum, and the coccyx. The pelvis has several important functions. Its primary role is to support the weight of the upper body when sitting and to transfer this weight to the lower limbs when standing. It serves as an attachment point for trunk and lower limb muscles, and also protects the internal pelvic organs. When standing in the anatomical position, the pelvis is tilted anteriorly. In this position, the anterior superior iliac spines and the pubic tubercles lie in the same vertical plane, and the anterior (internal) surface of the sacrum faces forward and downward.
- ▶ The three areas of each hip bone, the ilium, pubis, and ischium, converge centrally to form a deep, cup-shaped cavity called the **acetabulum**. This is located on the lateral side of the hip bone and is part of the hip joint. The large opening in the anteroinferior hip bone between the ischium and pubis is the **obturator foramen**. This space is largely filled in by a layer of connective tissue and serves for the attachment of muscles on both its internal and external surfaces.

Pelvis

- ▶ Several ligaments unite the bones of the pelvis. The largely immobile sacroiliac joint is supported by a pair of strong ligaments that are attached between the sacrum and ilium portions of the hip bone. These are the **anterior sacroiliac ligament** on the anterior side of the joint and the **posterior sacroiliac ligament** on the posterior side. Also spanning the sacrum and hip bone are two additional ligaments. The **sacrospinous ligament** runs from the sacrum to the ischial spine, and the **sacrospinous ligament** runs from the sacrum to the ischial tuberosity. These ligaments help to support and immobilize the sacrum as it carries the weight of the body.

Pelvis



Glossary

- ▶ **acetabulum**
 - ▶ large, cup-shaped cavity located on the lateral side of the hip bone; formed by the junction of the ilium, pubis, and ischium portions of the hip bone
- ▶ **anterior inferior iliac spine**
 - ▶ small, bony projection located on the anterior margin of the ilium, below the anterior superior iliac spine
- ▶ **anterior sacroiliac ligament**
 - ▶ strong ligament between the sacrum and the ilium portions of the hip bone that supports the anterior side of the sacroiliac joint
- ▶ **anterior superior iliac spine**
 - ▶ rounded, anterior end of the iliac crest
- ▶ **arcuate line of the ilium**
 - ▶ smooth ridge located at the inferior margin of the iliac fossa; forms the lateral portion of the pelvic brim

Glossary

- ▶ **auricular surface of the ilium**
- ▶ roughened area located on the posterior, medial side of the ilium of the hip bone; articulates with the auricular surface of the sacrum to form the sacroiliac joint
- ▶ **coxal bone**
- ▶ hip bone
- ▶ **greater pelvis**
- ▶ (also, greater pelvic cavity or false pelvis) broad space above the pelvic brim defined laterally by the fan-like portion of the upper ilium
- ▶ **greater sciatic foramen**
- ▶ pelvic opening formed by the greater sciatic notch of the hip bone, the sacrum, and the sacrospinous ligament
- ▶ **greater sciatic notch**
- ▶ large, U-shaped indentation located on the posterior margin of the ilium, superior to the ischial spine

Glossary

- ▶ **hip bone**
- ▶ coxal bone; single bone that forms the pelvic girdle; consists of three areas, the ilium, ischium, and pubis
- ▶ **iliac crest**
- ▶ curved, superior margin of the ilium
- ▶ **iliac fossa**
- ▶ shallow depression found on the anterior and medial surfaces of the upper ilium
- ▶ **ilium**
- ▶ superior portion of the hip bone

Glossary

- ▶ **inferior pubic ramus**
 - ▶ narrow segment of bone that passes inferiorly and laterally from the pubic body; joins with the ischial ramus to form the ischiopubic ramus
- ▶ **ischial ramus**
 - ▶ bony extension projecting anteriorly and superiorly from the ischial tuberosity; joins with the inferior pubic ramus to form the ischiopubic ramus
- ▶ **ischial spine**
 - ▶ pointed, bony projection from the posterior margin of the ischium that separates the greater sciatic notch and lesser sciatic notch

Glossary

- ▶ **ischial tuberosity**
 - ▶ large, roughened protuberance that forms the posteroinferior portion of the hip bone; weight-bearing region of the pelvis when sitting
- ▶ **ischiopubic ramus**
 - ▶ narrow extension of bone that connects the ischial tuberosity to the pubic body; formed by the junction of the ischial ramus and inferior pubic ramus
- ▶ **ischium**
 - ▶ posteroinferior portion of the hip bone
- ▶ **lesser pelvis**
 - ▶ (also, lesser pelvic cavity or true pelvis) narrow space located within the pelvis, defined superiorly by the pelvic brim (pelvic inlet) and inferiorly by the pelvic outlet
- ▶ **lesser sciatic foramen**
 - ▶ pelvic opening formed by the lesser sciatic notch of the hip bone, the sacrospinous ligament, and the sacrotuberous ligament

Glossary

- ▶ **lesser sciatic notch**
 - ▶ shallow indentation along the posterior margin of the ischium, inferior to the ischial spine
- ▶ **obturator foramen**
 - ▶ large opening located in the anterior hip bone, between the pubis and ischium regions
- ▶ **pectineal line**
 - ▶ narrow ridge located on the superior surface of the superior pubic ramus
- ▶ **pelvic brim**
 - ▶ pelvic inlet; the dividing line between the greater and lesser pelvic regions; formed by the superior margin of the pubic symphysis, the pectineal lines of each pubis, the arcuate lines of each ilium, and the sacral promontory
- ▶ **pelvic girdle**
 - ▶ hip girdle; consists of a single hip bone, which attaches a lower limb to the sacrum of the axial skeleton

Glossary

- ▶ **pelvic inlet**
- ▶ pelvic brim
- ▶ **pelvic outlet**
- ▶ inferior opening of the lesser pelvis; formed by the inferior margin of the pubic symphysis, right and left ischiopubic rami and sacrotuberous ligaments, and the tip of the coccyx
- ▶ **pelvis**
- ▶ ring of bone consisting of the right and left hip bones, the sacrum, and the coccyx
- ▶ **posterior inferior iliac spine**
- ▶ small, bony projection located at the inferior margin of the auricular surface on the posterior ilium
- ▶ **posterior sacroiliac ligament**
- ▶ strong ligament spanning the sacrum and ilium of the hip bone that supports the posterior side of the sacroiliac joint

Glossary

- ▶ **posterior superior iliac spine**
- ▶ rounded, posterior end of the iliac crest
- ▶ **pubic arch**
- ▶ bony structure formed by the pubic symphysis, and the bodies and inferior pubic rami of the right and left pubic bones
- ▶ **pubic body**
- ▶ enlarged, medial portion of the pubis region of the hip bone
- ▶ **pubic symphysis**
- ▶ joint formed by the articulation between the pubic bodies of the right and left hip bones
- ▶ **pubic tubercle**
- ▶ small bump located on the superior aspect of the pubic body

Glossary

- ▶ **pubis**
 - ▶ anterior portion of the hip bone
- ▶ **sacroiliac joint**
 - ▶ joint formed by the articulation between the auricular surfaces of the sacrum and ilium
- ▶ **sacrospinous ligament**
 - ▶ ligament that spans the sacrum to the ischial spine of the hip bone
- ▶ **sacrospinous ligament**
 - ▶ ligament that spans the sacrum to the ischial tuberosity of the hip bone
- ▶ **subpubic angle**
 - ▶ inverted V-shape formed by the convergence of the right and left ischiopubic rami; this angle is greater than 80 degrees in females and less than 70 degrees in males
- ▶ **superior pubic ramus**
 - ▶ narrow segment of bone that passes laterally from the pubic body to join the ilium

