Structure of the Posterior Abdominal Wall

The posterior abdominal wall is formed in the midline by the five lumbar vertebrae and their intervertebral discs and laterally by the 12th ribs, the upper part of the bony pelvis (Fig. 4.29), the psoas muscles, the quadratus lumborum

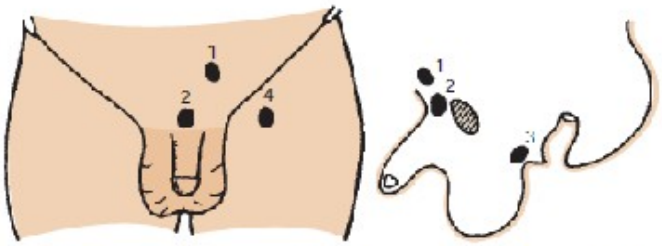

FIGURE 4.28 Four types of maldescent of the testis. **1.** In the superficial fascia of the anterior abdominal wall, above the superficial inguinal ring. **2.** At the root of the penis. **3.** In the perineum. **4.** In the thigh.

muscles, and the aponeuroses of origin of the transversus abdominis muscles. The iliacus muscles lie in the upper part of the bony pelvis.

Lumbar Vertebrae

The **body** of each vertebra (Fig. 4.30) is massive and kidney shaped, and it has to bear the greater part of the body weight. The 5th lumbar vertebra articulates with the base of the sacrum at the **lumbosacral joint.**

The **intervertebral discs** (Fig. 4.31) in the lumbar region are thicker than in other regions of the vertebral column. They are wedge shaped and are responsible for

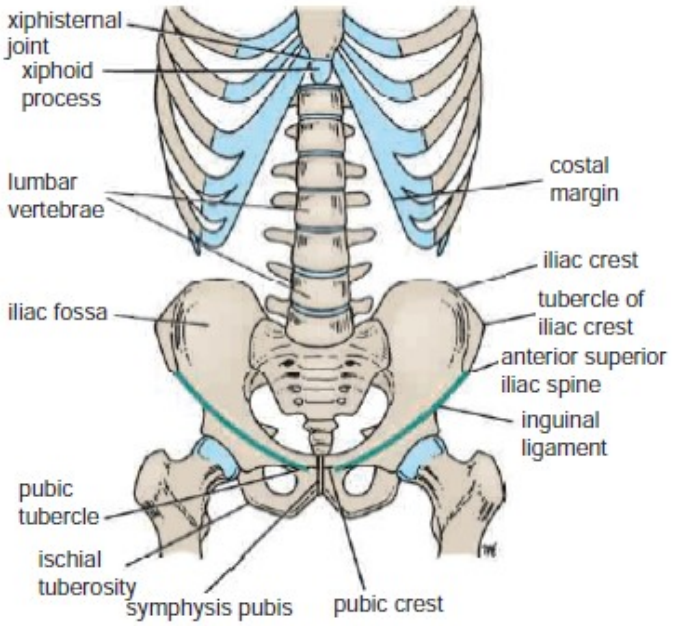

FIGURE 4.29 Costal margin and bones of the abdomen.

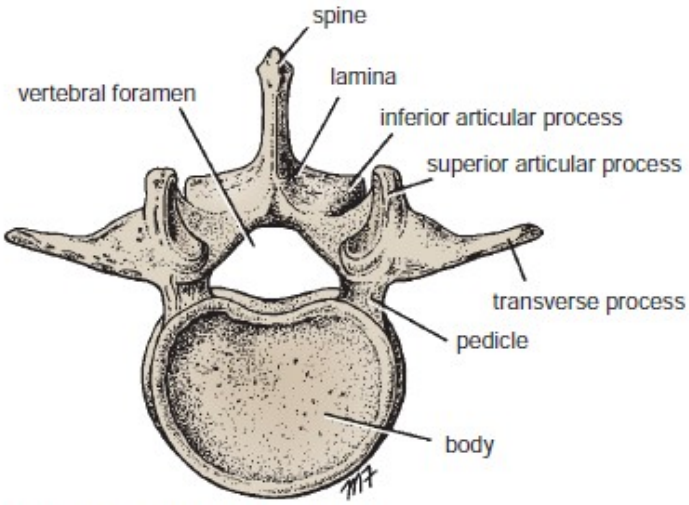

FIGURE 4.30 Fifth lumbar vertebra.

the normal posterior concavity in the curvature of the vertebral column in the lumbar region (lordosis). For a full description of the structure of the lumbar vertebrae and the intervertebral discs, see page 687.

Twelfth Pair of Ribs

The ribs are described on page 36. It should be noted that the head of the 12th rib has a single facet for articulation with the body of the 12th thoracic vertebra. The anterior end is pointed and has a small costal cartilage, which is embedded in the musculature of the anterior abdominal wall. In many people, it is so short that it fails to protrude beyond the lateral border of the erector spinae muscle on the back.

Ilium

The ilium, together with the ischium and pubis, forms the hip bone (Fig. 4.32); they meet one another at the acetabulum. The medial surface of the ilium is divided into two parts by the **arcuate line.** Above this line is a concave surface called the **iliac fossa;** below this line is a flattened surface that is continuous with the medial surfaces of the pubis and ischium. It should be noted that the arcuate line of the ilium forms the posterior part of the **iliopectineal line,** and the **pectineal line** forms the anterior part of the iliopectineal line. The iliopectineal line runs forward and demarcates the false from the true pelvis. For further details on the structure of the hip bone, see page 245.

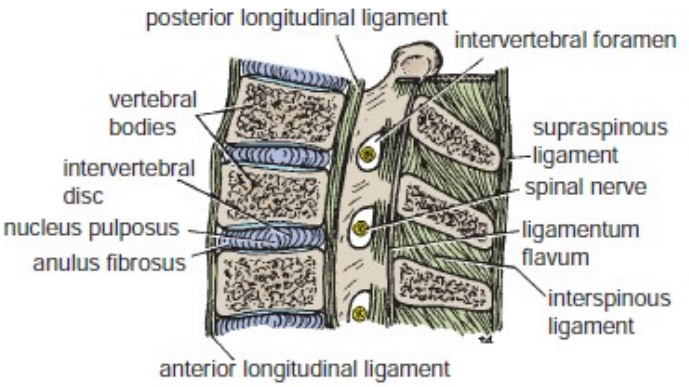

FIGURE 4.31 Sagittal section of the lumbar part of the vertebral column showing intervertebral discs and ligaments.

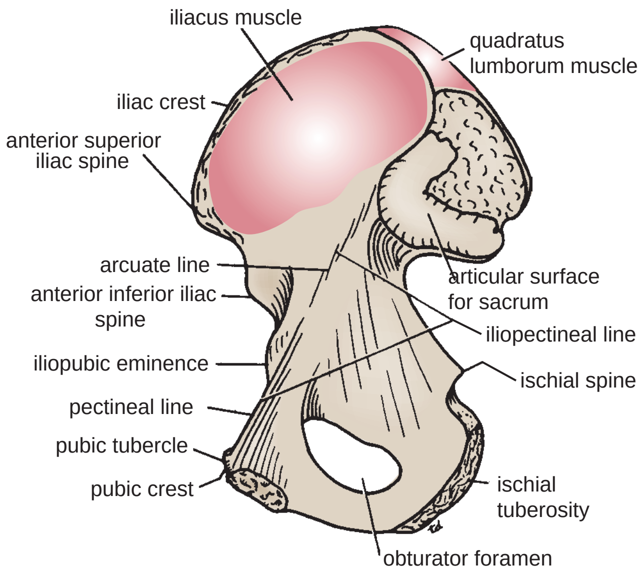

FIGURE 4.32 Internal aspect of the right hip bone.

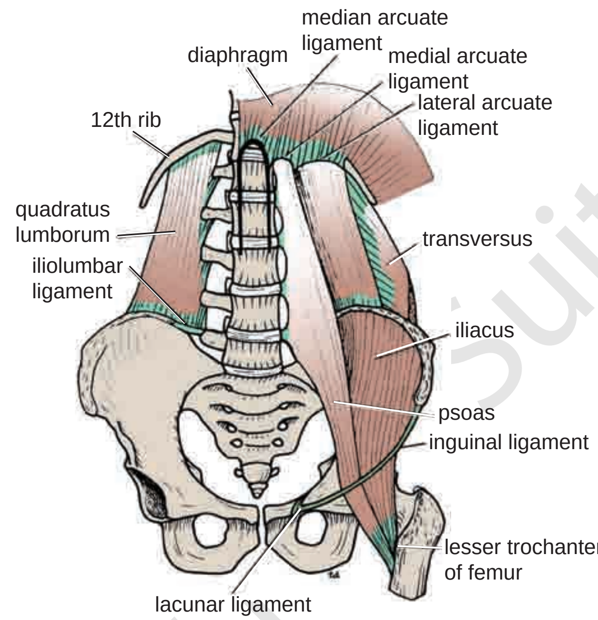

FIGURE 4.33 Muscles and bones forming the posterior abdominal wall.

Muscles of the Posterior Abdominal Wall

Psoas Major

The psoas muscle[†] arises from the roots of the transverse processes, the sides of the vertebral bodies, and the intervertebral discs, from the 12th thoracic to 5th lumbar vertebrae (Fig. 4.33). The fibers run downward and laterally and leave the abdomen to enter the thigh by passing behind the inguinal ligament. The muscle is inserted into the lesser trochanter of the femur. The psoas is enclosed in a fibrous sheath that is derived from the lumbar fascia. The sheath is thickened above to form the **medial arcuate ligament.**

- **Nerve supply:** This muscle is supplied by the lumbar plexus.
- **Action:** The psoas flexes the thigh at the hip joint on the trunk, or if the thigh is fixed, it flexes the trunk on the thigh, as in sitting up from a lying position.

Quadratus Lumborum

The quadratus lumborum is a flat, quadrilateral-shaped muscle that lies alongside the vertebral column. It arises below from the iliolumbar ligament, the adjoining part of the iliac crest, and the tips of the transverse processes of the lower lumbar vertebrae (see Fig. 4.33). The fibers run upward and medially and are inserted into the lower border of the 12th rib and the transverse processes of the upper four lumbar vertebrae. The anterior surface of the muscle is covered by lumbar fascia, which is thickened above to form the **lateral arcuate ligament** and below to form the **iliolumbar ligament.**

- **Nerve supply:** This muscle is supplied by the lumbar plexus.
- **Action:** It fixes or depresses the 12th rib during respiration (see page 77) and laterally flexes the vertebral column to the same side.

CLINICAL NOTES

Psoas Fascia and Tuberculosis

The psoas fascia covers the anterior surface of the psoas muscle and can influence the direction taken by a tuberculous abscess. Tuberculous disease of the thoracolumbar region of the vertebral column results in the destruction of the vertebral bodies, with possible extension of pus laterally under the psoas fascia (Fig. 4.34). From there, the pus tracks downward, following the course of the psoas muscle, and appears as a swelling in the upper part of the thigh below the inguinal ligament. It may be mistaken for a femoral hernia.

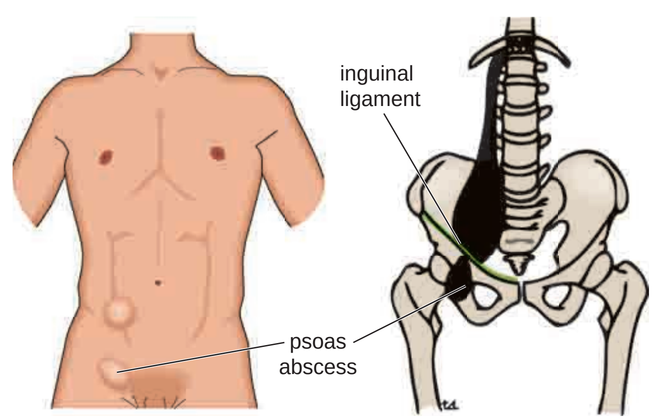

FIGURE 4.34 Case of advanced tuberculous disease of the thoracolumbar region of the vertebral column. A psoas abscess is present, and swellings occur in the right groin above and below the right inguinal ligament.

[†] The psoas minor is a small muscle with a long tendon that lies anterior to the psoas major. It is unimportant and is absent in 40% of patients.

TABLE 4.2 Muscles of the Posterior Abdominal Wall

Name of Muscle	Origin	Insertion	Nerve Supply	Action
Psoas	Transverse processes, bodies, and intervertebral discs of 12th thoracic and five lumbar vertebrae	With iliacus into lesser trochanter of femur	Lumbar plexus	Flexes thigh on trunk; if thigh is fixed, it flexes trunk on thigh, as in sitting up from lying position
Quadratus lumborum	Iliolumbar ligament, iliac crest, tips of transverse processes of lower lumbar vertebrae	12th rib	Lumbar plexus	Fixes 12th rib during inspiration; depresses 12th rib during forced expiration; laterally flexes vertebral column same side
Iliacus	Iliac fossa	With psoas into lesser trochanter of femur	Femoral nerve	Flexes thigh on trunk; if thigh is fixed, it flexes the trunk on the thigh, as in sitting up from lying position

Transversus Abdominis

The transversus abdominis muscle is fully described on page 120.

Iliacus

The iliacus muscle is fan shaped and arises from the upper part of the iliac fossa (see Figs. 4.32 and 4.33). Its fibers join the lateral side of the psoas tendon to be inserted into the lesser trochanter of the femur. The combined muscles are often referred to as the **iliopsoas.**

- **Nerve supply:** This muscle is supplied by the femoral nerve, a branch of the lumbar plexus.
- **Action:** The iliopsoas flexes the thigh on the trunk at the hip joint, or if the thigh is fixed, it flexes the trunk on the thigh.

The posterior part of the **diaphragm** (see Fig. 4.33) also forms part of the posterior abdominal wall. It is described on page 44. A summary of the muscles of the posterior abdominal wall, their nerve supply, and their action is given in Table 4.2.

fascia. This fact is important in the understanding of the femoral sheath (see Fig. 4.35). This is simply a downward prolongation of the fascial lining around the femoral vessels and lymphatics, for about 1.5 in. (4 cm) into the thigh, behind the inguinal ligament. Because the femoral nerve lies outside the fascial envelope, it has no sheath (see page 463).

In certain areas of the abdominal wall, the fascial lining performs particularly important functions. Inferior to the level of the anterior superior iliac spines, the posterior wall of the rectus sheath is devoid of muscular aponeuroses (see Figs. 4.10 and 4.13) and is formed by the fascia transversalis and peritoneum only (see page 122).

At the midpoint between the anterior superior iliac spine and the symphysis pubis, the spermatic cord pierces the fascia transversalis to form the deep inguinal ring (see Fig. 4.8). From the margins of the ring, the fascia is continued over the cord as a tubular sheath, the internal spermatic fascia (see Fig. 4.4).