

# Anatomy and Physiology of the Pelvic Floor

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## KEYWORDS

• Pelvic floor muscles • Levator ani • Pelvic girdle • Sacroiliac joint • Pubic symphysis

## KEY POINTS

- The bony anatomy of the pelvic girdle consists of 3 bones—the 2 innominate bones and the sacrum, and 3 joints—the sacroiliac joints and the pubic symphysis.
- The pelvic floor muscles are comprised mainly of the levator ani muscles with somatic innervation from the lumbosacral plexus.
- The bony and muscular pelvis is highly interconnected to the hip and gluteal musculature, which together provide support to the internal organs and core muscles.
- Pelvic floor physiology is centered on bladder and bowel control, sexual functioning, and pregnancy.

## INTRODUCTION

Understanding the anatomic relationship of the pelvic floor muscles with the pelvic girdle, spine, and hips aids the rehabilitation provider in diagnosis, management, and appropriate referrals. This article reviews the anatomy of the pelvic girdle, the pelvic floor musculature, and its innervation, and highlights the normal physiology of the pelvic floor.

## ANATOMY OF THE PELVIC FLOOR

The pelvic floor is composed of muscles, ligaments, and fascia that act as a sling to support the bladder, reproductive organs, and rectum. This sling of soft tissue is enclosed by the bony scaffolding of the pelvis, formed by 2 innominate bones made from the ilium, ischium, and pubis, which articulate with the sacrum posteriorly and each other anteriorly (Fig. 1). Extending from the sacrum is the coccyx, which acts as an important ligamentous and tendinous anchor.

The stability of the articulating surfaces of the pelvis is thought to arise through mechanisms termed “force closure” and “form closure.” Force closure is achieved

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The author has nothing to disclose.

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**Fig. 1.** The bony pelvic girdle consists of the 2 innominate bones and the sacrum, which are connected by 2 posterior sacroiliac joints and 1 anterior pubic symphysis joint.

through the interlocking of the ridges and grooves of the bony joint surfaces in the pelvis, whereas form closure is achieved through the compressive forces of the muscles, ligaments, and fascia, providing passive stability.<sup>1,2</sup>

In the posterior pelvic ring, there are 2 sacroiliac joints. The anterior sacroiliac ligaments, composed of the anterior longitudinal ligament, the anterior sacroiliac ligament, and the sacrospinous ligament, stabilize the joint by resisting upward movement of the sacrum and lateral movement of the ilium. The posterior sacroiliac ligaments are made up by the short and long dorsal sacroiliac ligaments, the supraspinous ligament, the iliolumbar ligament, and the sacrotuberous ligament. These ligaments function to resist downward and upward movement of the sacrum and medial motion of the ilium. Of note, the long dorsal sacroiliac ligament is believed to be a source of posterior pelvic pain owing to the forces transmitted from the sacroiliac joints and hip joint to the nociceptors and proprioceptors within the ligament.<sup>3</sup> Anteriorly, the pubic symphysis is a cartilaginous joint between the 2 pubic bones reinforced by superior, inferior, anterior, and posterior ligaments. Functionally, it resists tension, shearing, and compression, and is subject to great mechanical stress as it widens during pregnancy.

The superficial pelvic floor muscles are the bulbospongiosus, ischiocavernosus, and superficial and deep transverse perineal muscles. The deep pelvic floor muscles that line the inner walls of the pelvis are the levator ani and coccygeus that, along with the endopelvic fascia, comprise the pelvic diaphragm (**Table 1**). The levator ani is composed of 3 muscles—the puborectalis, pubococcygeus, and iliococcygeus (**Fig. 2**). The pubococcygeus is located most anteriorly. It originates from both the posterior pubic bone and the anterior portion of the arcus tendineus; it inserts into the anococcygeus ligament and the coccyx. The iliococcygeus is the posterior part of the levator ani. It originates from the posterior part of the arcus tendineus and ischial spine and attaches along the anococcygeal raphe and coccyx. Last, the puborectalis is located below the pubococcygeus and forms a U-shaped sling around the rectum. Its sphincterlike action pulls the anorectal junction forward, contributing to continence.

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