

Anorectal Anatomy and Physiology

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KEYWORDS

- Anus • Anal canal • Anorectal • Rectal
- Anatomy • Physiology

ANATOMY

The Rectum

The rectum and anal canal comprise the last portion of the large intestine. The rectum is located in the pelvis, begins at the level of the sacral promontory, and extends 12 to 18 cm distally. This portion of the enteric tract differs from the colon, and its beginning can be marked by noting where the adventitial taeniae bands have coalesced to form outer longitudinal muscle. The rectum has 2 or 3 curves within its lumen, created by submucosal folds called the valves of Houston. The peritoneum covers the upper two-thirds of the rectum anteriorly, but only the upper third laterally. The reflection of the peritoneum is variable but occurs approximately 6 to 8 cm above the anal verge. The lower one-third of the rectum is without peritoneal covering. The endopelvic fascia, also referred to as Denonvilliers fascia, envelops this portion of the rectum. The lateral portion of this fascia is also known as the lateral rectal stalk. The rectum is attached to a strong endopelvic fascia extending from the anterior surface of the sacral bone at about the level of S4. This area of attachment is known as Waldeyer ring (**Fig. 1**).

The Anal Canal

The anal canal is approximately 2.5 to 5 cm in length. It begins at the level of the levator ani muscle and opens to the anal verge. The anal canal is surrounded by the internal and external anal sphincter muscles. The internal anal sphincter is an extension of the inner circular smooth muscle layer of the rectum. The puborectalis muscle can be palpated digitally, as it helps to form the superior external anal sphincter forming the top of the anorectal ring. The internal anal sphincter is wrapped superiorly by the levator ani muscle, then more distally by the superficial external sphincter muscle (an extension of the anococcygeal ligament), and subsequently by the subcutaneous external striated anal sphincter muscle (**Fig. 2**).

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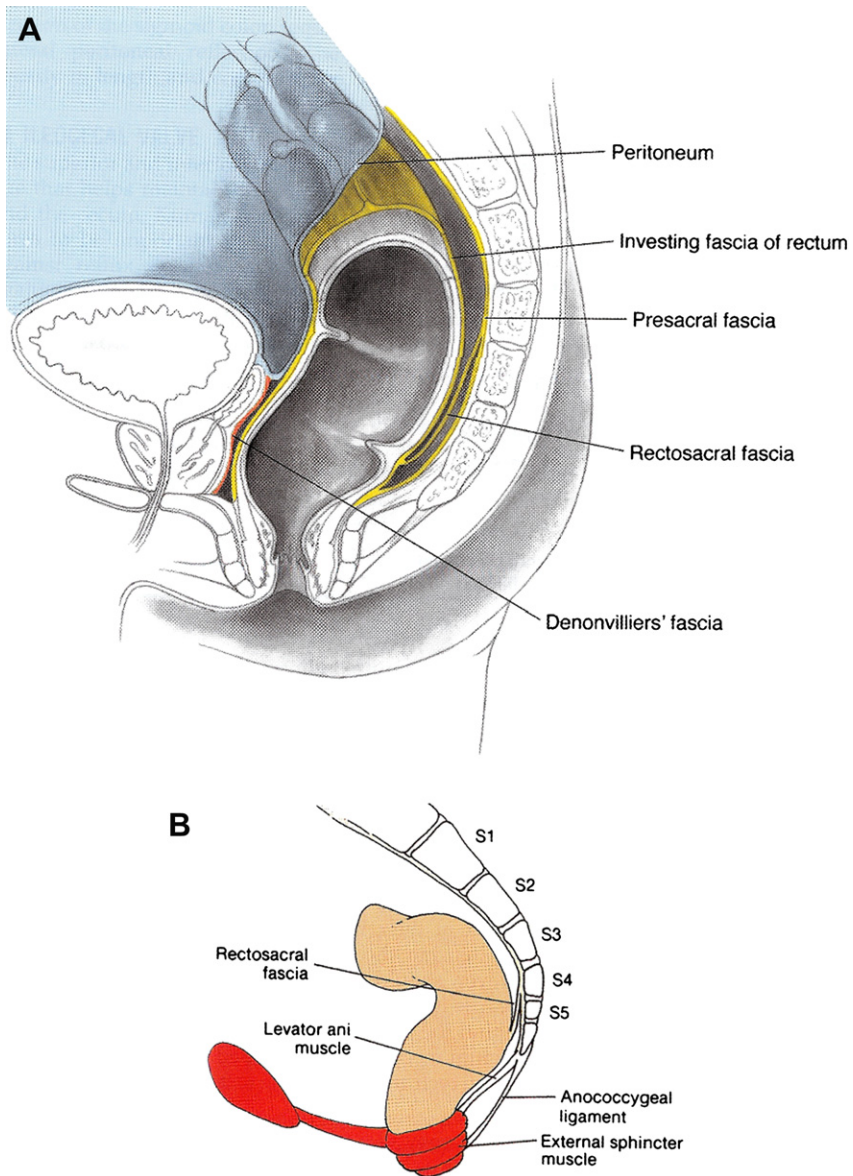


Fig. 1. Pelvic fascia. (A) Relation of pelvic fascia to peritoneal layers, prostate and bladder. (B) Pelvic fascia and Waldeyer ring. Adapted from Gordon PH, Nivatvongs S. Principles and practice of surgery for the colon, rectum, and anus. 3rd edition. Informa Healthcare; 2007; with permission.

Histologically, the anal canal has a variable lining. The top of the anal canal contains columnar epithelium. There is a transitional or cloacogenic zone where the mucosa is composed of columnar, transitional, or stratified squamous epithelium. The distal border of this anal transitional zone is called the dentate or pectinate line, which forms an abrupt junction between the anal transitional zone and the squamous epithelium of the external anoderm. Folds in the mucosa parallel to the length of the anal canal

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