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Anatomy

The **anal canal** is the terminal segment of the large intestine between the rectum and anus, located below the level of the pelvic diagram. It is located within the anal triangle of perineum, between the right and left ischioanal fossa. As the final functional segment of the bowel, it functions to regulate release of excrement by two muscular sphincter complexes. The aperture at the terminal portion of the anal canal is known as the anus.

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| **Precusor** | Hindgut, proctodeum |
| **Artery** | Superior rectal artery (above pectinate line) and inferior rectal artery  (below line) |
| **Vein** | Superior rectal vein (above pectinate line) and inferior rectal brain (below line) |
| **Nerve** | Autonomic inferior hypogastric plexus  (above pectinate line) and somatic inferior rectal nerves (below line) |
| **Lymph** | Superficial inugual lymph nodes (below pectinate line) and internal iliac lymph nodes  (above line) |

In humans, the anal canal is approximately 2.5" to 4" long, from the anorectal junction to the anus. It is directed downwards and backwards. It is surrounded by inner involuntary and outer voluntary sphincters which keep the lumen  closed in the form of an anteroposterior slit.

The canal is differentiated from the rectum by a transition along the internal surface from endodermal to skin-like ectodermal tissue.

Anal canal is traditionally divided into two segments, upper and lower, separated by the pectinate line  (also known as the dentate line):

* upper zone (zona columnaris)
  + mucosa is lined by simple columnar epithelium
  + features longitudinal folds or elevations of tunica mucosa which are joined together inferiorly by folds of mucous membrane  known as anal valves
  + supplied by the superior rectal artery (a branch of the inferior mesenteric artery)
* lower zone
  + divided into two smaller zones, separated by a white line known hiltons line:
    - zona hemorrhagica - lined by stratified squamous non keratinized epithelium
    - zona cutanea - lined stratified squamous keratinized  epithelium, which blends with the surrounding perianal skin
  + supplied by the inferior rectal artery (a branch of the internal pudental artery)

The *anal verge* refers to the distal end of the anal canal, a transitional zone between the epithelium of the anal canal and the perianal skin. It should not be confused with the pectinate line between the upper and lower zones within the anal canal.

Anal gland secretes lymphal discharge and built up fecal matter from the colon lining. In some animals this gland expungement can be done routinely every 24 – 36 months to prevent infection and fistula formation.

The external anal sphincter muscle is the voluntary muscle that surrounds and adheres to the anus at the lower margin of the anal canal. This muscle is in a state of tonic contraction, but during defecation, it relaxes to allow the release of feces.

Movement of the feces is also controlled by the involuntarily controlled internal anal sphincter which is an extension of the circular muscle surrounding the anal canal. It relaxes to expel feces from the rectum and anal canal.