

ASSIGNMENT.

Anal canal is the last part of the gastrointestinal tract. It is about 3 to 4 cm long and lies completely extraperitoneally, it begins at the anorectal junction distally from the perineal flexure and ends at the anus. Overall, it is an important part of the continence organ. Anatomically, it is subdivided into three zones:

1. COLUMNAR ZONE: The lumen has folds of mucous membrane (anal columns) produced by arterial cavernous bodies (anal cushions) in the submucosa. These columns are connected to each other at their distal ends by transverse folds (anal valves). Behind the anal valves lie crypts (crypts of Morgani) into which the excretory ducts of the anal glands open, all anal valves together form the dentate or (pectinate) line, a serrated line where the intestinal mucosa merges with the squamous epithelium of the anal canal.

2. INTERMEDIATE ZONE: Distally from the dentate line lies a 1 cm long zone with anal mucosa (anoderm).

3. CUTANEOUS ZONE; This zone below the anal verge (anocutaneous line) is a hollow between the internal and external anal sphincter and has regular perianal skin. The tension of the corrugator cutis ani muscle gives it its fan-like look.

BLOOD SUPPLY AND INNERVATION.

The columnar zone derives from the endoderm whereas both the intermediate and cutaneous zone develop from the protoderm (cloaca). As a result of the different embryologic origins, the zones have separate supplying structures. The dentate line serves as an important marker.

The arterial blood is supplied by the superior rectal artery (branch of the inferior mesenteric artery). The venous blood flows through the internal hemorrhoidal plexus into the superior rectal vein. The lymph drains into the lumbar (para-aortic) lymph nodes. The sympathetic innervation is carried by the inferior mesenteric plexus while the parasympathetic innervation by the pelvic splanchnic nerves and the inferior hypogastric plexus.

Below the blood supply comes from the middle (branch of the internal iliac artery), the venous blood drains via the external hemorrhoidal plexus into the middle and inferior rectal veins (body circulation). The lymph flows into the inguinal lymph nodes. The pudendal nerve is responsible for the sensory innervation.

In anal canal, the intestinal mucosa (colorectal zone) changes to anal mucosa (anoderm) through a transitional zone and finally merges with the perianal skin (cutaneous zone).

FUNCTION OF THE ANAL CANAL.

The anal canal is an important part of the continence organ. It is surrounded by a muscular sphincter system which tightly closes the lumen. The internal anal sphincter is permanently contracted through the sympathetic tonus and relaxes under parasympathetic influence. The external anal sphincter surrounds the anal canal like a clamp. It is in close relationship to the puborectalis muscle

(part of levator ani muscle) which encircles the rectum from behind (puborectal sling) and thus forms a bending closure. Both the external anal sphincter and the puborectalis muscle are voluntarily controlled.

The anal cushions play an important role in the fine control. Physiologically, they are filled with arterial blood. During defecation, the anal sphincter relaxes so that the blood in the cushions drain away, allowing smooth passage of the stool through the anal canal. A pathological enlargement of the anal cushions lead to haemorrhoids.