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DEPARTMENT: ANATOMY

**THE GROSS ANATOMY OF THE ANAL CANAL**

The **anal canal** is the final segment of the gastrointestinal tract, extending between the rectum and the anus. It has an important role in defecation and maintaining faecal continence.

**DIAGRAM:**



**Anatomical Location**

The anal canal is located within the **anal triangle** of the perineum. It is bounded by these organs

* **Anteriorly**;- in male; - Perineal body

                                  - Urogenital diaphragm

                                  -Urethra

                             -Bulb of the penis

  in female; - Perineal body

                     - Urogenital diaphragm

                    -  Vagina

* **posteriorly**;-     – Anococcygeal ligament

                                     -Coccyx and sacrum

* **laterally          -** Ischioanal fossae

**Anatomical Structure**

The anal canal is the **final segment** of the gastrointestinal tract, and is around 4cm in length.

It begins as a continuation of the **rectum**, and passes in an infero-posterior direction to terminate at the anus. Except during defecation, the anal canal is collapsed by the internal and external anal sphincters to preventing the passage of faecal material.

**Anal Sphincters**

The anal canal is surrounded by internal and external anal sphincters, which play a crucial role in the maintenance of faecal continence:

* **Internal anal sphincter** – surrounds the upper 2/3 of the anal canal. It is formed from a thickening of the involuntary circular smooth muscle in the bowel wall.
* **External anal sphincter** – voluntary muscle that surrounds the lower 2/3 of the anal canal. It blends superiorly with the puborectalis muscle of the floor of pelvis.
* At the junction of the rectum and the anal canal, there is a muscular ring – known as the**anorectal ring**. It is formed by the fusion of the internal anal sphincter, external anal sphincter**Internal Structure**

The superior aspect of the anal canal has the same epithelial lining as the rectum (**columnar epithelium**). However, in the anal canal, the mucosa is organized into longitudinal folds, known as **anal columns**. These are joined together at their inferior ends by **anal valves**. Above the anal valves are small pouches which are referred to as anal sinuses – these contain glands that secret mucus.

The anal valves collectively form an irregular circle – known as the **pectinate line**(or dentate line). This line divides the anal canal into upper and lower parts, which differ in both structure and neurovascular supply.

**BLOOD SUPPLY**

* **Arterial Supply;**

**Above Pectinate line— I) Superior rectal artery (branch of inferior mesenteric artery)**

                                                   II) Anastomosing branches from the middle rectal artery.

**Below Pectinate line         I) Inferior rectal artery (branch of the internal pudendal artery)**

                                                     II) Anastomosing branches from the middle rectal artery.

* **Venous Drainage**

**Above Pectinate line—** Superior rectal vein empties inferior mesenteric vein.

**Below Pectinate line—–**Inferior rectal vein, which empties into the internal pudendal vein**.**

* **innervation**

**Above Pectinate line—    i) Visceral** innervation via the inferior hypogastric plexus.

                                                      ii)  Sensitive to stretch.

**Below Pectinate line—**i) Somatic innervation via the inferior anal nerves (branches of the                                                                                                 pudendal nerve)

                                                        ii) Sensitive to pain, temperature, touch and pressure

* **Lymphatic Drainage**

**Above Pectinate line-**Internal iliac lymph nodes

**Below Pectinate line-**Superficial inguinal lymph nodes

**CLINICAL ANATOMY**

Haemorrhoids are **vascular cushions** found within the anal canal of healthy individuals, which help with the maintenance faecal continence. If they become swollen and distended, they are referred to as pathological haemorrhoids.

Pathological haemorrhoids are observed in people who suffer from **constipation**, prolonged straining when defecating, or raised intra-abdominal pressure (e.g. pregnancy, ascites). Upon examination of the anal canal (with the patient in the lithotomic position), the haemorrhoids are typically located at the 3, 7 and 11 o’clock positions.

They can cause bleeding and pain on defecation, and depending on the severity, can be managed conservatively or surgically.