

ANAL CANAL

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INTRODUCTION, LENGTH, EXTENT ,AND,DIRECTION

- **Anal canal is terminal part of gastrointestinal tract, situated below the level of pelvic diaphragm**
- **Lies anal triangle of perineum in between right and left ischioanal fossae**
- **Taeniae are absent**
- **3.8cm long ,extend anorectal junction to anus ,directed downwards and backward, surrounded inner involuntary and outer voluntary sphincter**
- **Anorectal junction marked by forward ,lies 2-3 cm in front and tip of coccyx, in male correspond level of apex of the prostate**
- **Anus is surface opening of anal canal, situated 4cm below, cleft in between the two buttocks**
- **Contain a ring of large apocrine glands**

RELATION OF THE ANAL CANAL

ANTERIORLY

- In both sexes: peritoneal body
- In male: urethra and bulb of penis
- In female: lower end of vagina

POSTRIORLY

Anococcygeal Ligament

Tip of coccyx

Laterally: ischioanal fossae

**All-round: anal canal is surround
sphincter muscle**

INFERIOR OF THE ANAL CANAL

Divided into three parts

Upper part about 15mm long

Middle part about 15 mm long

Lower part about 8mm long

Part is lined by charecteristic epithelium

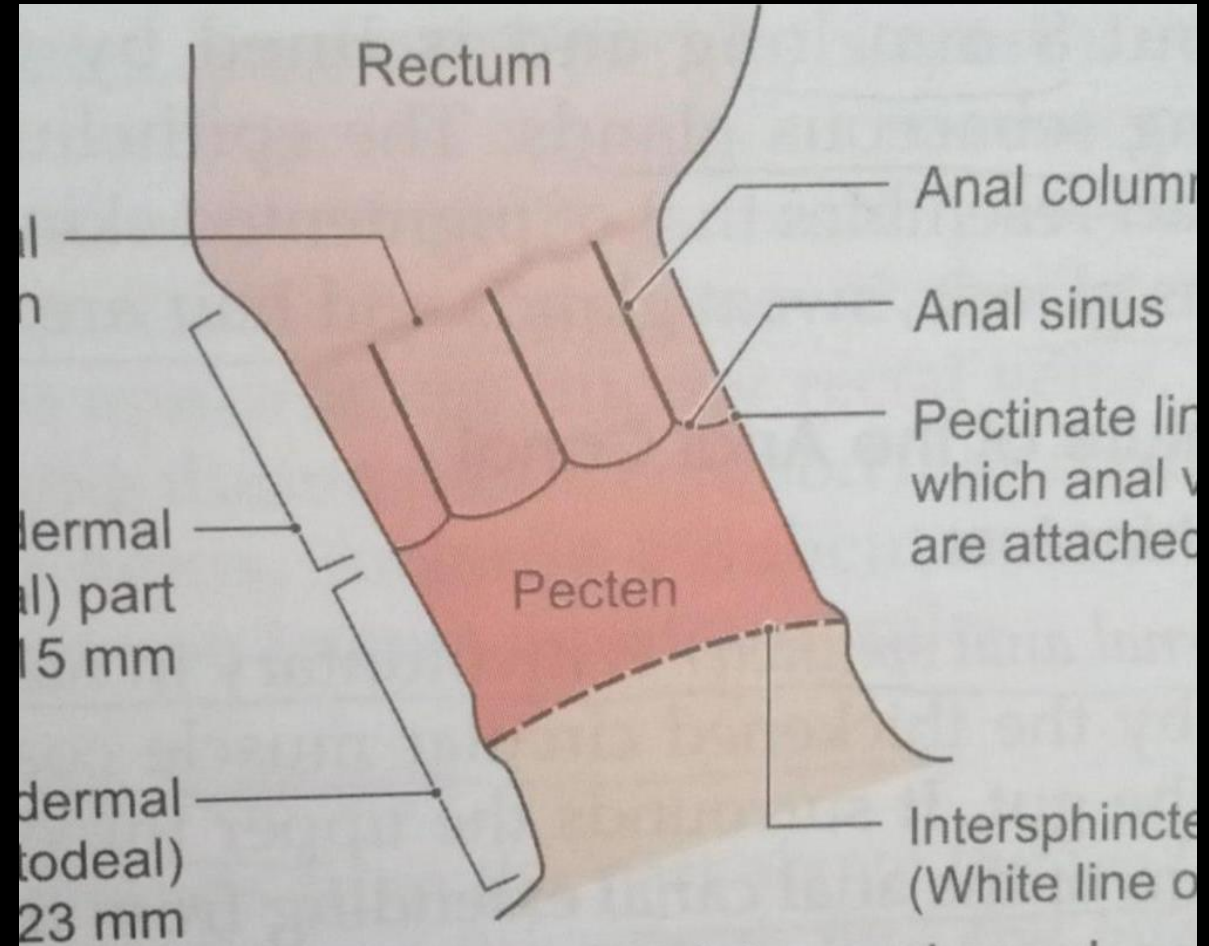


Fig. 33.10: Interior of the anal canal

UPPER MUCOUS PART

15 mm long

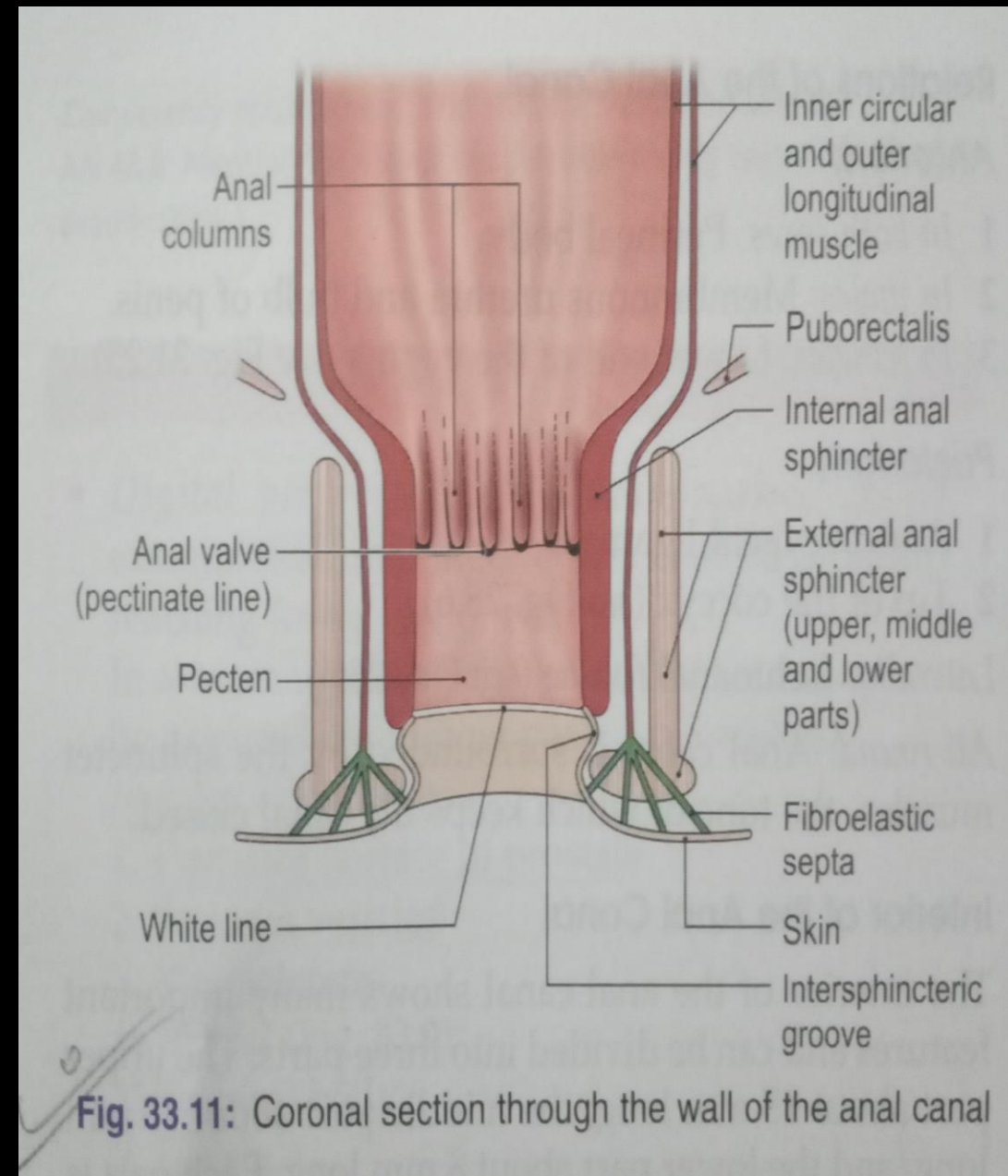
6 to 10 vertical columns of fold these fold called anal columns

Lower end of anal columns these fold of mucous members called anal valves

Depression in mucous called anal sinus

Run all round the anal canal this is pectinate line ,situated opposite middle of internal anal sphincter ,anal valve shows epithelium called anal papilla

Anal sinus contains anal glands



MIDDLE PART OF TRANSITIONAL ZONE OR PECTEN AND LOWER CUTANEOUS PART

- Next 15 mm or anal canal also lined by mucous membranes, anal columns are not present here
- This region referred as pecten or transitional zone
- Hilton's line situated at level of internal between subcutaneous part of external anal sphincter and lower border of internal anal sphincter
- Lower limit of pecten or stratified squamous epithelium, thin ,pale and glossy and devoid sweat glands
- Lower cutaneous part :-8mm long, lined by true skin containing sebaceous glands
- Lowest part pigments skin which sebaceous glands, sweat glands and hair are present

MUSCULATURE OF ANAL CANAL

- **ANAL SPHINCTER:-** internal anal sphincter is voluntary in nature, formed by thickened circular muscles coat ,surrounded upper three fourths, 30mm of anal canal
- **EXTERNAL anal sphincter:-** under voluntary control ,made ,supplied striated muscles ,supplied inferior rectal nerve and perineal branch of fourth sacral nerve, three parts- subcutaneous, superficial and deep
- **Anteriorly:**superficial transverse perinei muscle and posterior fibers attached anococcygeal rephe
- **Middle fibers surround lower part of internal anal canal sphincter and coccyx via anococcygeal ligament posterior**
- **Lower fibers lies below level internal anal sphincter and separated from anal epithelium by submucous**
- **In male:-** transverse perinei and bulbospongiosus end, central poit of peritoneum
- **In female:-**puborectalis separated external anal sphincter, anterior portion is thinner and shorter
- **Female transverse perinei and bulbospongious fuse**

CONJOINT LONGITUDINAL COAT

Longitudinal muscle coat of rectum at anorectal junction, lies between external and internal sphincter

Traced downwards

Level of white line

Attached to skin around anus called corrugator cutis ani

Lateral septa perianal fascia

Median septum form anal intramuscular septum

Attached white line

Obliquely internal sphincter and end submucous below anal valve

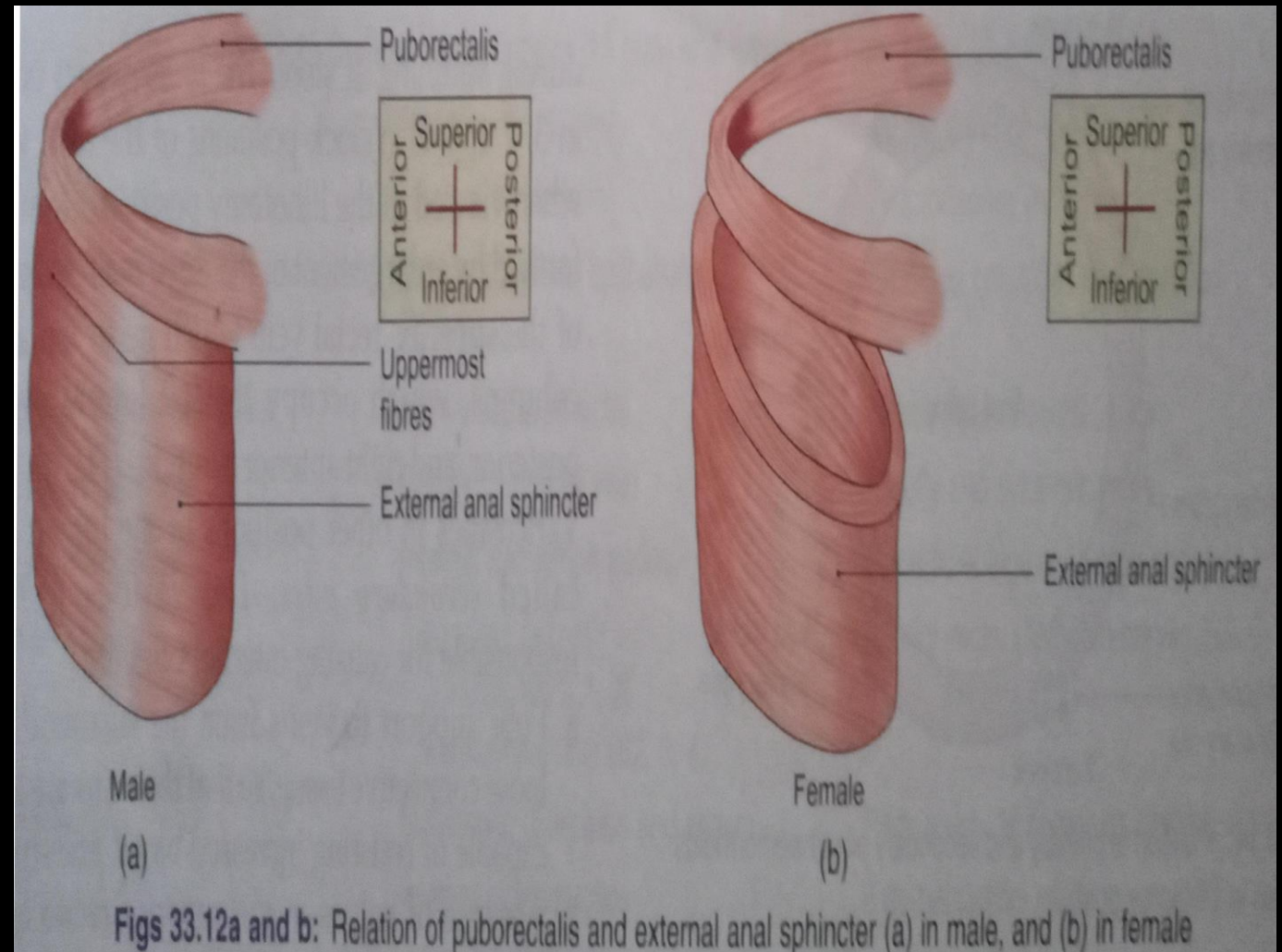
ANORECTAL RING

Muscular ring present at anorectal junction

Formed puborectalis, upper most fibers external sphincter and internal sphincter

Surgical division ring results in rectal incontinence, less mark Anteriorly

Puborectalis are absent



SURGICAL SPACE RELATED TO ANAL CANAL

Ischioanal space lies each side of anal canal

Perianal space surrounds anal canal, below white line, contains lower fibers of external sphincter, terminal branches of inferior rectal vessels and nerve

Submucous space lies above white line, between mucous membranes and internal sphincter

Contains internal rectal venous plexus and lymphatic

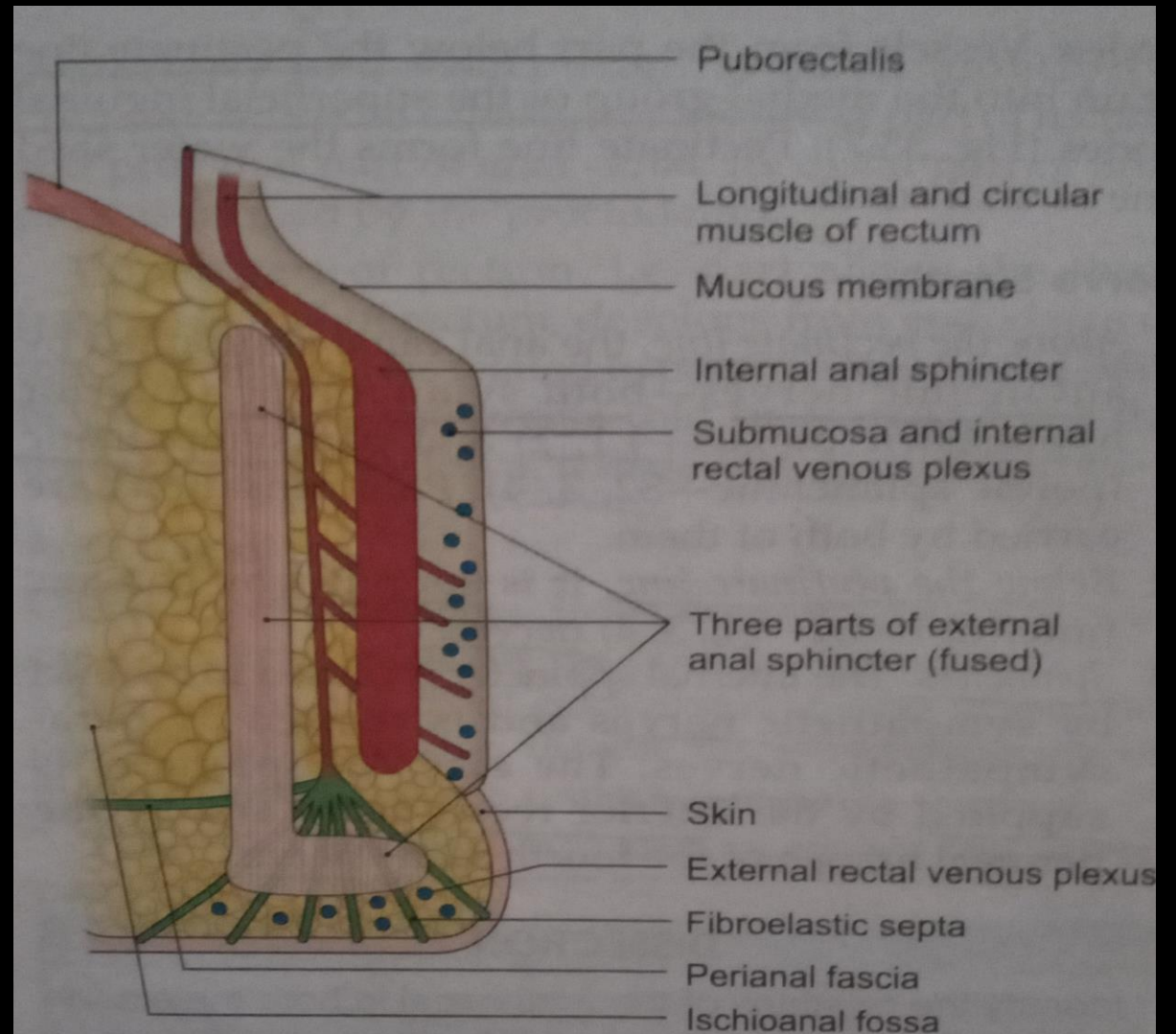


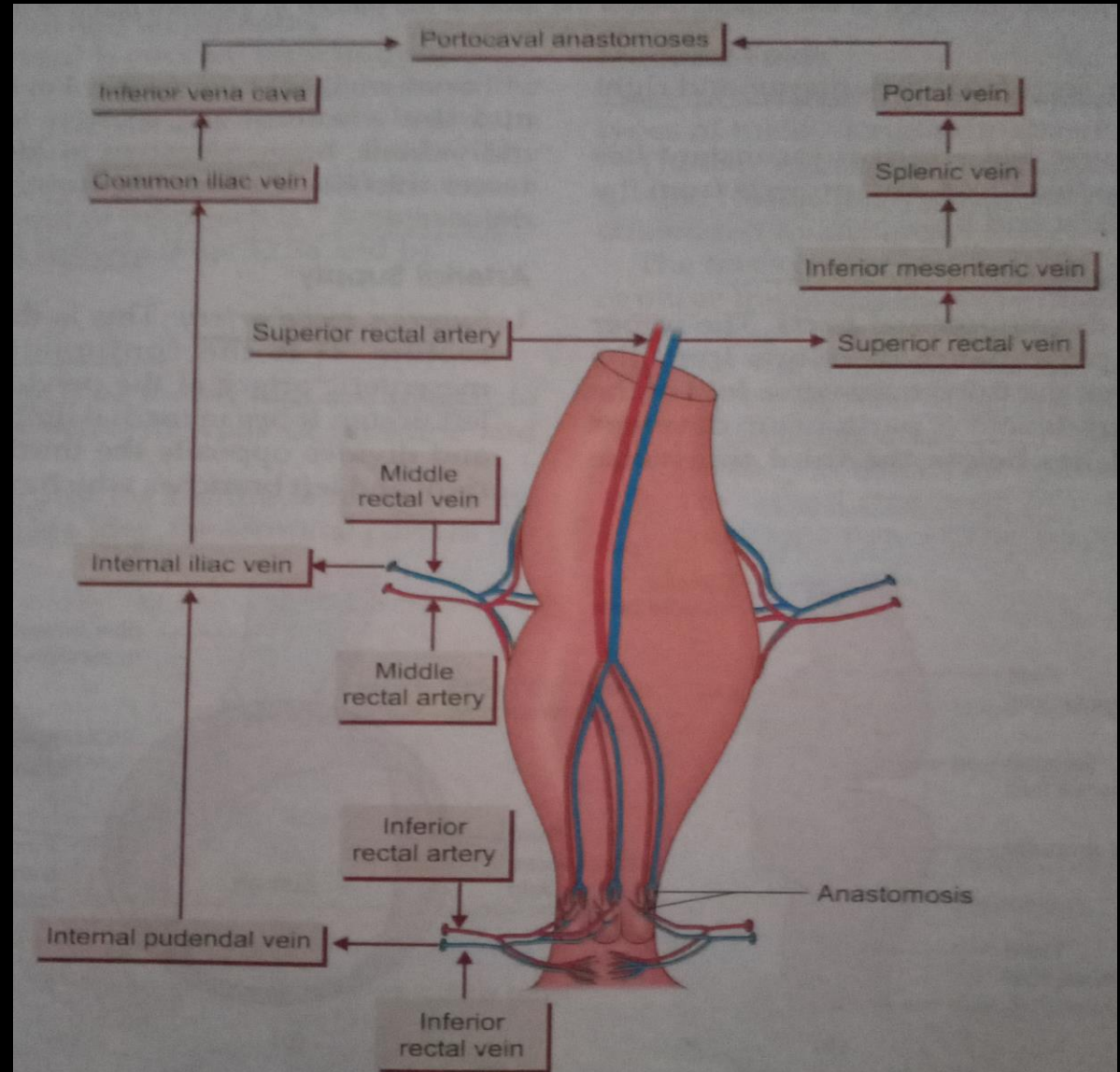
Fig. 33.13: Coronal section through the anal canal (magnified)

ARTERIAL SUPPLY

Part of anal canal above pectinate line
supplied by superior rectal artery

Part below pectinate line

Supplied by inferior rectal arteries



VENOUS DRAINAGE

Internal rectal venous plexus lies submucous of anal canal, drain superior rectal vein

Important site communication between portal and systemic vein, dilated pouch connected transverse branches around anal canal

Vein present in three anal columns ,situated 3,7 and 11 o'clock position

External rectal venous plexus lies outside muscular coat of rectum and anal canal, lower part external plexus drained inferior rectal veins into internal pudendal vein

Middle part by middle rectal vein into internal iliac artery

Anal vein arranged radially around anal margin

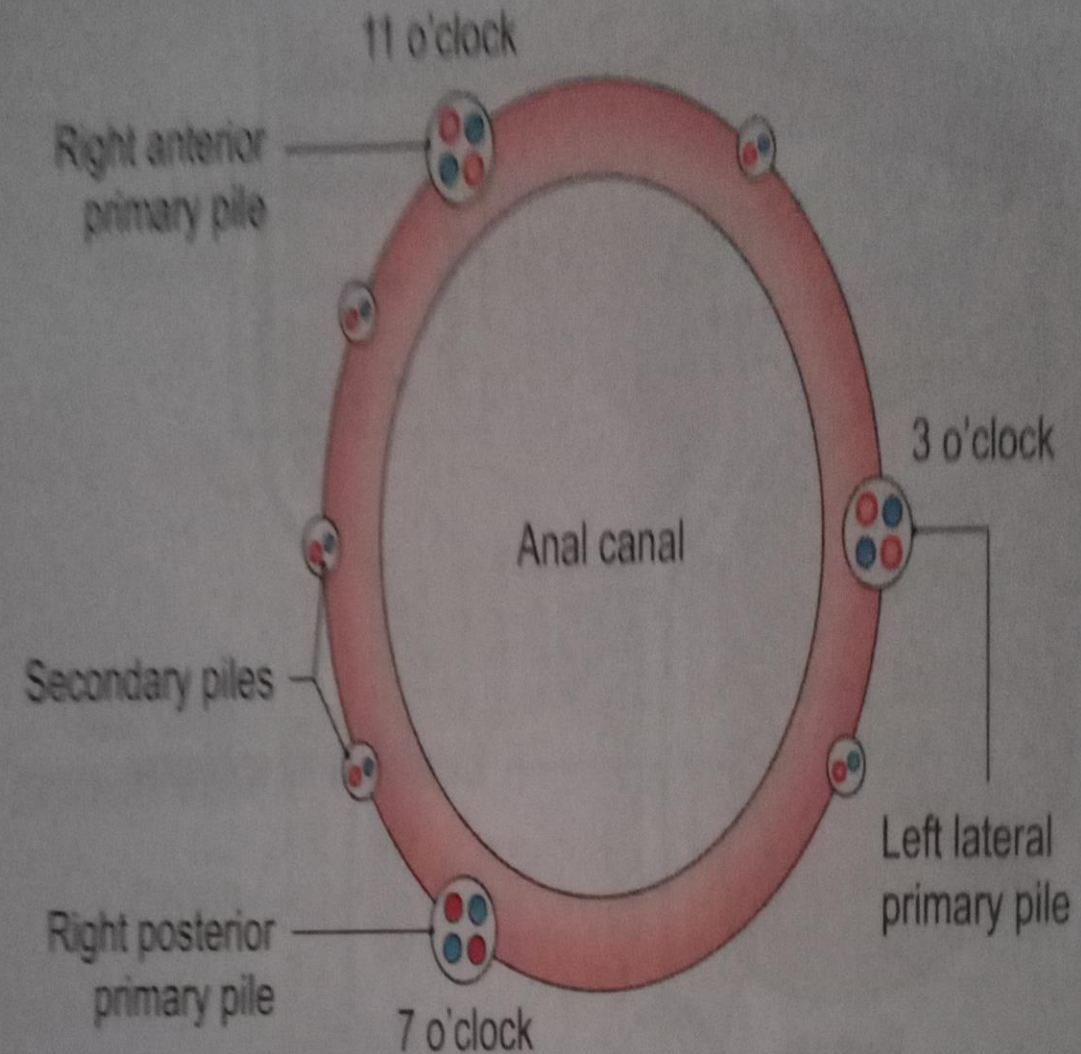
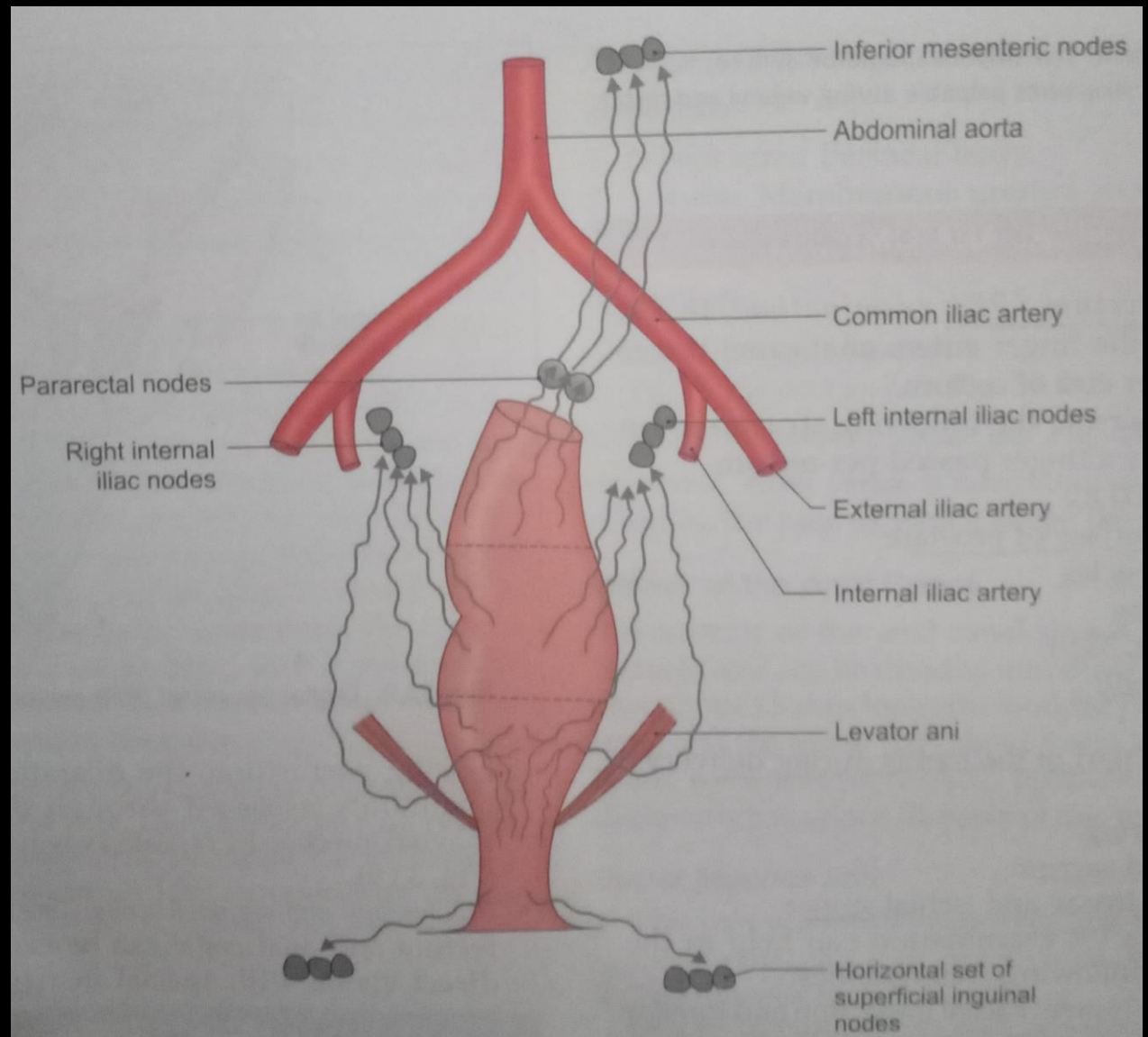


Fig. 33.14: Position of primary and secondary piles/haemorrhoids as seen in lithotomy position

LYMPHATIC DRAINAGE

Above pectinate line drain with rectum into internal iliac nodes

Below pectinate line drain medial group of superficial inguinal nodes



NERVE SUPPLY

- **About the pectinate line supplied autonomic nerve- Both sympathetic**
- **Parasympathetic pain sensations carried by both of them**
- **Below the pectinate line supplied somatic nerve**
- **Sphincter: Internal sphincter causes contract by sympathetic nerve**
- **Relaxed by parasympathetic nerves**
- **External sphincter supplied by inferior rectal nerve and perineal branch of fourth sacral nerve**

CLINICAL ANATOMY

- **Piles/haemorrhoids: internal piles or true pile** saccular dilation of internal rectal venous plexus, primary pile 3,7 and 11 o'clock position anal wall
- **Superior rectal vein** lies anal columns occupy left lateral, right posterior and right anterior position
- **External piles or false piles**, below pectinate line, very painful
- **Fissures in ano: usually** passed of dry hard stools in constipated persons, line mucous membranes above and skin below, conditions extremely painful
- **Fistula in ano: abnormal epithelialised tract** connecting two cavities
- **Mire serves malformations of anorectal regions include:-**
 - **Anal stenosis**
 - **Anal agenesis with or without fistula**
 - **Most of anorectal malformations** cause by abnormal partitioning of cloaca by urorectal septum