The applied anatomy of rectal examination

In the examination of any part of the body, the clinician must carry out a two-staged process. First, he/she must decide which anatomical structure is involved and, second, what is the pathological condition involving that structure. There is no better example of this principle than in the performance of a rectal examination.

The anal canal is 1.5 " (4 cm) in length, the rectum 5 " (12 cm); the bulk of this can be explored by an index finger of average length.

The rectum

The rectum commences in front of the third piece of the sacrum and ends at the apex of the prostate or the lower quarter of the vagina as it passes through levator ani to become the anal canal (*Figures 1* and *2*). Although it is straight in lower mammals – hence its name – it lies curved in man, to fit into the hollow of the sacrum, and has a series of three indentations, the valves of Houston, which indent the lumen to the left, right and left from above downwards, and which are seen on sigmoidoscopy.

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Posteriorly lies the sacrum, separated by loose connective tissue (Waldeyer's fascia), containing the superior rectal artery and vein, lymphatics and autonomic nerves. Implication of the sacral nerve roots, emerging laterally from the anterior sacral foramina, by an advanced rectal cancer, may result in severe sciatic pain. In front, the upper two thirds of the rectum are covered by peritoneum and relate to coils of small intestine in the pouch of Douglas, between it and the bladder in the male and the uterus in the female.

The lower rectum is extraperitoneal, with the prostate, seminal vesicles and bladder base in front in the male, the vagina in the female. A layer of fascia, Denonvillier's fascia, separates the rectum from these organs. It is these fascial planes that the surgeon uses in mobilization of the rectum. Laterally the rectum is supported on each side by levator ani, which forms a diaphragm across the lower pelvis.

The anal canal

The anal canal is directed sharply backwards and downwards from the rectum to terminate at the anal verge. The mid canal represents the junction between the columnar endoderm of the hind gut and the invagination of the body wall stratified squamous ectoderm. Failure of breakdown of the separating membrane in the fetus results in an imperforate anus. The lower anal canal – skin – receives a rich cutaneous supply from the inferior rectal branch of the pudendal nerve (S2, 3, 4), while the upper part of the canal receives autonomic innervation. A small anal fissure at the anal verge causes intense pain, while a large malignant ulcer in the upper canal may be painless. For the same anatomical reason the surgeon must be careful to place the injection or banding treatment of haemorrhoids in the upper, insensitive, part of the canal.

The anal sphincter

Surrounding the anal canal is a strong muscle arrangement (*Figure 3*) made up of an internal sphincter of involuntary muscle which continues above with the circular muscle wall of the rectum, a surrounding voluntary muscle, the external sphincter, and superiorly, the innermost part of levator ani, forming a sling, termed puborectalis, around the anorectal junction. When the patient is told to tighten the back passage during a rectal examination, it is the voluntary external sphincter that is felt to contract. If the finger tip is flexed above this, a distinct ring is appreciated – the anorectal ring – which clearly demar-

Figure 1. Sagittal section of the pelvis in the male to show the relations of the rectum and anal canal.

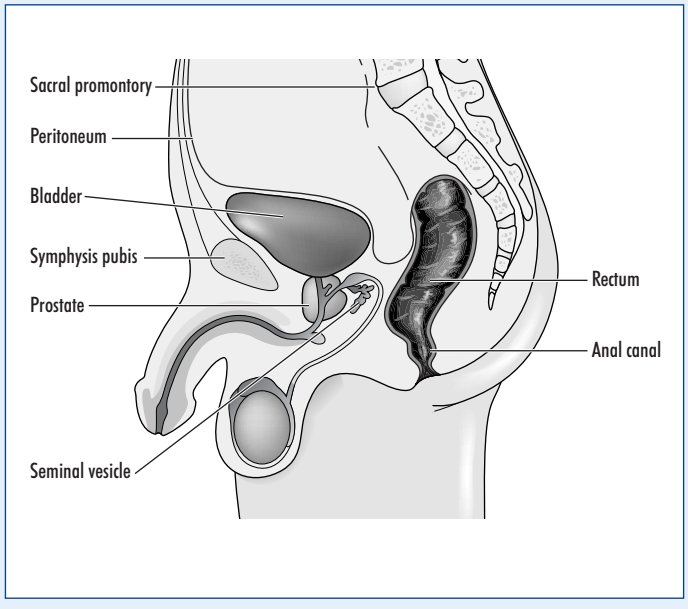
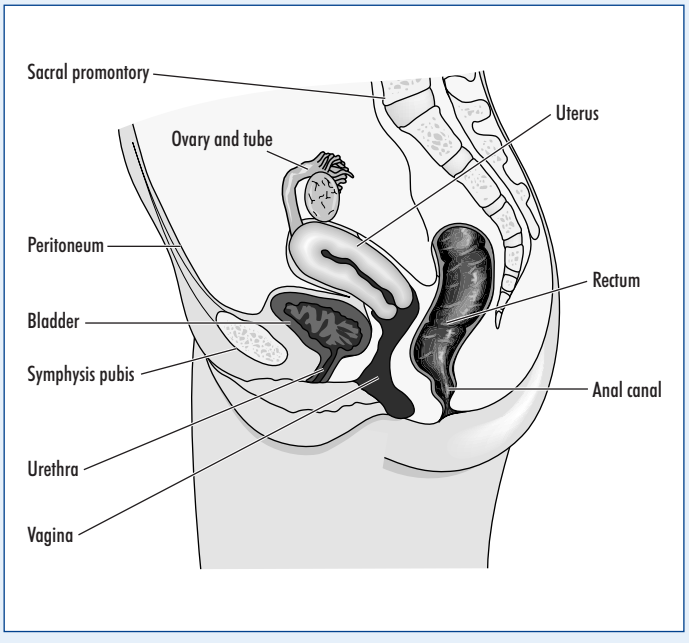


Figure 2. Saggital section of the female pelvis.



cates the junction between the anal canal and rectum and defines the upper edge of the anal sphincter.

Relations

The anal canal relates posteriorly to the fibrous tissue between it and the coccyx (the ano-coccygeal body), and then to the coccyx itself. On either side lie the fat-filled ischiorectal fossae, which are now often called by their more accurate anatomical name, the ischioanal fossae; these are common sites of an abscess. In front lies the perineal body which separates the canal from the bulb of the urethra in the male and from the posterior wall of the lower vagina in the female.

Rectal examination

The following structures can be felt by the finger in examination of the normal subject:

In both the male and the female

The strength of the anal sphincter can be assessed and the anorectal ring defined, as described above. The rectum is normally more or less empty, unless immediately before defaecation. Posteriorly, palpate the coccyx, which can usually be felt to move between the index finger and thumb, and feel the sacrum above. Laterally lie the ischioanal fossae; sometimes the ischial spines are palpable.

In the male

The prostate is felt anteriorly above the anorectal ring. In the healthy young adult this is appreciated as a smooth rubbery bulge, not, as so often described, as having lateral lobes and a mid-line groove. However, in men over their mid-fifties, some degree of benign prostatic hypertrophy is almost invariable, and now the lateral lobes and mid-line groove can be felt; indeed, the experienced examiner can give quite an accurate assessment of the prostate's size. The healthy seminal vesicles are rarely palpable.

In the female

The perineal body and the cervix of the uterus are felt.

Pathology

Among the pathologies which can be detected are:

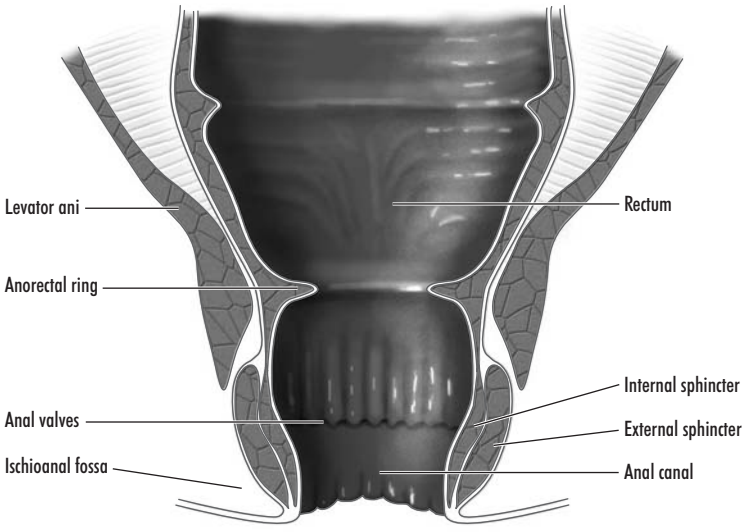


Figure 3. The anal canal and lower rectum in coronal section.

Within the lumen

Impacted faeces, foreign bodies, rarely the tip of an intussusception. Always inspect the examining finger for fresh or altered blood, which can be confirmed by means of a test paper, and for mucus.

In the wall

A benign polyp or papilloma, a rectal carcinoma (a higher colonic growth may be felt bulging down into the rectum), a rectal stricture or granuloma. Note, all these pathologies can be readily visualized by sigmoidoscopy (or, more accurately named 'rectoscopy') in the outpatient clinic, biopsy material obtained painlessly and histological diagnosis reached. Haemorrhoids cannot be felt unless they are thrombosed, but can be seen easily at proctoscopy or visualized at the anal verge if they are prolapsing.

Outside the rectal wall

Pelvic bony tumours; malignant deposits, collections of fluid (blood or pus) in the pouch of Douglas; a distended bladder; uterine or ovarian masses, including, of course, the pregnant uterus – note that during parturition dilatation of the os of the cervix can be assessed by rectal examination since it can be felt quite easily through the rectal wall; abnormalities of the prostate – benign hypertrophy, prostatitis, carcinoma.

A final warning

Do not be fooled into diagnosing some unpleasant pelvic 'tumour' by a foreign object in the vagina – usually a tampon or a pessary. BJHM

Conflict of interest: none.

KEY POINTS

- Rectal examination requires a knowledge of anatomy of the anal canal and rectum.
- The rectum is 5" long and relates to the sacrum and pouch of Douglas, prostate and seminal vesicles in the male and uterus and vagina in the female.
- The anal canal is 1.5" long, surrounded by the complex anal sphincter and terminating above at the anorectal ring.
- At rectal examination, abnormalities can be classified into those in its lumen, its wall and outside its wall.