

# REVIEW PAPERS

## ANATOMIA KLINICZNA OKOLICY ODBYTOWO-ODBYTNICZEJ CLINICAL ANATOMY OF THE ANORECTAL REGION

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The anorectal region in terms of the anatomical and clinical function is a complicated area, due to the close localization of important anatomical structures. Their damage might lead towards significant functional consequences, including stool incontinence. Additionally, in medical literature publications, as well as during medical conferences more "casual" nomenclature is used, as compared to the obligatory anatomical terminology (1). Therefore, the authors of the study decided to recall the anatomical nomenclature of the anorectal region, in accordance with the following principle: „repetitio est mater studiorum (Latin) – repetition is the mother of knowledge” (2).

### General description of the anorectal region

The rectum is the distal part of the colon with an average length of 12-15 cm. The rectum is the continuation of the sigmoid colon. The rectum begins at the sight where the sigmoid colon mesentery ends (3). The rectum may be divided into the pelvic part (*pars pelvina recti*), located above the levator ani muscle (*m. levator ani*), that is where the rectum passes through the pelvic diaphragm (*diaphragma pelvis*), and the anal part (*pars analis recti*) or anal canal (*canalis analis*).

Considering the pelvic part the rectum is located anteriorly to the sacral and coccygeal bones forming the so-called perianal flexure

(*flexura perianalis*). On the other hand, the anal canal is located posteriorly and inferiorly, thus, forming the perineal flexure (*flexura perinealis*). Thus shaped rectal segments lead towards damage of the long axis of each part, which is described as the anorectal angle -Park's angle (4).

The anus is the final opening of the digestive tract (3) located in the median line in the anal cleft (*crena ani*). Part of the rectum located below the anal sphincter muscles is called the anal canal (5). The above-mentioned is surrounded by the sphincter corona (external and internal) in its lower part, while the upper part is surrounded by fibers of the anal sphincter muscle, the so-called puborectal loop (*ansa puborectalis*), which penetrate between the median and deep part of the external anal sphincter muscle. Such a description of the anal canal is termed as the anatomical canal, contrary to the surgical canal which consists of the anatomical canal and distal part of the rectum lined with mucous membrane and Morgagni rectal columns. Between the rectal papilla one may observe folds, which form pouches, the so-called Morgagni sinuses. The anatomical canal of the rectum is surrounded by anal sphincters: external, internal and the puborectal loop (6).

The internal anal sphincter muscle (*m. sphincter ani internus*) is a smooth cell muscle, being the continuation of the circular muscular layer of the rectum. In 50 to 85% of cases the

above-mentioned is responsible for the basic anal canal pressure (7). The external anal sphincter muscle (*m. sphincter ani externus*) covering the internal anal sphincter consists of the subcutaneous, superficial and deep segments. The external anal sphincter together with the puborectal loop, form the triple loop system (7) (fig. 1).

In order to maintain full stool continence the interaction of the lower rectal nerves (*nervi rectales inferiores*) is important. The above-mentioned are branches of the pudendal nerve, responsible for the senso-motor innervation of the external anal sphincter muscle. These nerves run along the external surface of the anal sphincter muscle, and can be subject to damage near the ischioanal fossa (*fossa ischioanal*). The greatest probability of neural branch damage is observed in the middle part between the apex of the coccygeal bone and central tendon of the perineum (8).

The superior rectal artery (branch of the superior mesenteric artery) is responsible for the arterial vascularization of the rectum. The above-mentioned supplies the pelvic part of the rectum descending to the anal canal. The remaining two vessels- the middle rectal artery (branch of the internal iliac artery) and inferior rectal artery (branch of the internal pudendal artery) supply the anal canal and skin surrounding the anus.

The perianal plexus transferring blood to the lower rectal veins is responsible for the confluence of blood from the anorectal plexus region. At the level of Morgagni's columns one may observe the presence of hemorrhoidal plexuses, the so-called hemorrhoids.

#### Discussion concerning the clinical nomenclature

The rectum when it passes through the minor pelvic canal is divided into the pelvic part and anal canal. The topographic border between the above-mentioned is the site of the anal sphincter muscle attachment, which is also the muscle closing the floor of the pelvis. The space

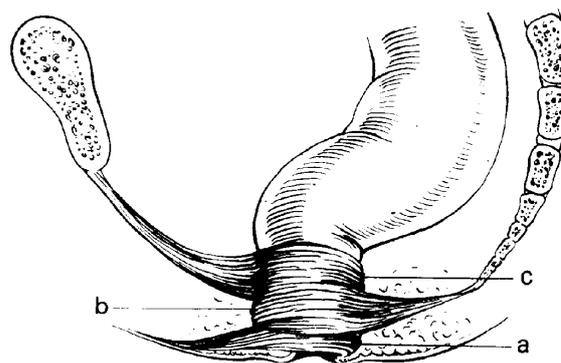


Fig. 1. The triple loop system: a – subcutaneous layer, b – superficial layer, c – deep layer with the puborectal loop (7)

below the anal sphincter, laterally to the anal canal and medially to the sciatic tubers is called the ischioanal fossa (*fossa ischioanal*). According to previous anatomical nomenclature the above-mentioned structure was improperly termed as the ischioanal fossa. Based on the topography the rectum is located above the anal sphincter, while the anal canal is below the anal sphincter muscle. Therefore, all proctological disorders surrounding the anus and anal canal must be called in accordance with the current anatomical terminology. When describing anal varices (*varices ani*), one should consider the venous plexuses localized under the anoderm near the anus. When diagnosing hemorrhoids one should bear in mind the venous plexuses localized under Morgagni's columns.

If we observe the external orifice of the fistula surrounding the anus, then according to anatomical nomenclature one should diagnose a perianal fistula, contrary to a perirectal fistula. The same concerns a perianal abscess localized below the anal sphincter muscle in the ischioanal fossa.

Therefore, in order to speak the same anatomic-clinical language one should consider the current anatomical terminology. The above-mentioned concerns medical literature and textbooks, the internet, as well as nomenclature used during medical conferences and symposia.

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