

THE RECTOGENITAL SEPTUM – ANATOMICAL CONSIDERATIONS ON DEFAECATION DISORDERS

Hypothesis / aims of study

The rectogenital septum (known in clinical literature as Denonvilliers' fascia) forms an incomplete partition between the rectum and the urogenital organs in both men and women. It is composed of collagenous and elastic fibers and smooth muscle cells intermingled with nerve fibers emerging from the autonomic inferior hypogastric plexus. Recent PET-CT studies of the support system and continence function of the pelvic organs demonstrated the activity of smooth muscle bundles scattered throughout pelvic structural fat tissue and fascial structures like the rectogenital septum (1). The aim of this study was to investigate the fetal development of the rectogenital septum, and the origin and innervation of the longitudinal smooth muscle cells within the septum, as well as to consider possible effects on function of operations that compromise the integrity of these structures.

Study design, materials and methods

Macroscopic dissections on embalmed human pelves and plastination histology of 40 fetal and newborn pelvic specimens were performed. By means of conventional and immunohistochemical staining methods using monoclonal and polyclonal antibodies for tissue analysis and neuronal labeling, the motor and sensory innervation of the longitudinal muscle bundles within the septum was defined.

Results

The rectogenital septum is formed by a local condensation of mesenchymal connective tissue in the early fetal period. The longitudinal muscle bundles could be traced back to the longitudinal layer of the rectal wall, and, using the septum as a guiding structure, it was possible to identify autonomic nerve fibers and ganglion cells innervating the muscle cells and crossing the midline without detectable gender differences. Furthermore three-dimensional reconstructions were made to underline both spatial and sequential morphological changes during fetal development. We showed that the decisive steps of epithelial and muscular differentiation in the anorectal junction take place between the 7th and 9th post-gestational week.

Interpretation of results

The described longitudinal muscle bundles and their ramifications hypothetically play a physiological role as an "anal dilator" system capable of foreshortening and opening the anal canal during defecation similar to Dorschner's description of the musculus dilatator urethrae (2). Thus, the intrinsic sensory innervation of the rectogenital septum might be crucial for rectal filling and asymmetric rectal distension.

Concluding message

Because of a coinnervation of the rectal muscle layers and the adjacent longitudinal muscle fibers of the septum, a functional correlation between the two structures during defecation is postulated. On the basis of these findings, a safer dissection of the anterior rectal wall during rectal resection is postulated, thus limiting functional disturbance and preventing neural damage. Thorough knowledge of the topographical relationships between the different organ systems, neurovascular structures and connective tissue compartments of the pelvic floor is therefore indispensable for clinical application to improve and optimize surgical treatment both for benign and malignant conditions.

References

1. Stelzner F, Biersack HJ, von Mallek D, Reinhardt M (2005) PET-CT studies of the support system and continence function of pelvic organs. The pivotal importance of Denonvilliers' fascia for surgical procedures. *Chirurg* 76:1168-1174
2. Dorschner W, Stolzenburg JV, Neuhaus J (2001) Structure and function of the bladder neck. *Adv Anat Embryol Cell Biol* 159. Berlin Heidelberg New York: Springer Verlag

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Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	No

<i>This study did not require ethics committee approval because</i>	the specimens were obtained from the local Institute of Anatomy and were exclusively preserved for research and educational purposes. In Austria, body donors for anatomical studies give their informed consent during lifetime.
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	No