

Pelvic autonomic nervous system

The pelvic [autonomic nervous system](#) (PANS) is a division of the autonomic nervous system (ANS) that controls the functions of the pelvic organs, including the bladder, rectum, and sexual organs. It consists of both sympathetic and parasympathetic fibers that originate from the spinal cord and ganglia located in the pelvis.

The sympathetic fibers of the PANS originate from the thoracic and lumbar regions of the spinal cord and pass through the sympathetic chain ganglia to reach the pelvic organs. These fibers are responsible for controlling functions such as bladder and rectal sphincter tone and sexual arousal.

The parasympathetic fibers of the PANS originate from the sacral region of the spinal cord and pass through the pelvic splanchnic nerves to reach the pelvic organs. These fibers are responsible for controlling functions such as bladder and rectal emptying and sexual arousal.

The PANS plays an important role in maintaining the proper functioning of the pelvic organs and can be affected by various medical conditions, such as pelvic pain, urinary incontinence, and sexual dysfunction. Treatment options for PANS-related conditions may include medication, pelvic floor exercises, and nerve stimulation therapies.

The aim of a work is to define the morphological peculiarities of the pelvic autonomic nervous system (ANS) and their importance in the clinical and surgical interventions in the lesser pelvis. Material and methods: Anatomical variations in the formation of the pelvic ANS were observed in 20 cadavers. The study included 17 men (85%), aged 18 to 84, and 3 women, aged 27 to 86. The average age was 53.8 years. The subjects most often died by violent death in car accidents, by asphyxia, or by sudden death. The study was approved by the Ethics Committee of the Health Care Surveillance Authority, Bratislava, Slovakia. We studied cadavers without congenital or detected anomalies, cancer, deformities of the body, or spinal or abdominal surgeries within 24 h of death. We observed a relationship between the dimensions and the number of ganglia, as well as the number and course of nerve branches and anastomoses. In the pelvic area, we observed the hypogastric plexus superior, hypogastric plexus inferior, and the truncus sympathicus. In all cadavers, we clarified the lumbosacral plexuses after evisceration. In the lumbosacral region, the roots were defined based on their participation in the formation of the plexuses. To show the intimate relationship between both systems, we also focused on the details of the structure (rami communicantes) related to the connections of the ANS with the spinal nervous system. Results: Anatomical variations in the formation of the pelvic ANS were observed in all cases. We included cases with more than two truncus sympathicus ganglia as the segmental type. The segmental form occurred in 14 (70%) cases, and was concentrated in 6 (30%) cases. Rami communicantes provided anastomoses to the spinal nerves. Small ganglia were observed on the rami communicantes. With the concentrated type, we observed the division of the sympathetic and parasympathetic systems. With the segmental and concentrated forms, symptoms of the "diffuse form" may occur, which we observed in all cases. We observed significant right-left asymmetry and differences in the formation of ganglia and anastomoses. Conclusions: This study allowed us to identify and describe the morphological peculiarities of the pelvic ANS and their possible influence on the clinical picture. Asymmetry and dependence of their occurrence on the type of ANS was observed. The variations were frequent. Their preoperative diagnosis is difficult to impossible. The absence or lack of intraoperative vigilance can lead to the damage of pelvic ANS during operations and blockades of the pelvic plexus. The acquired knowledge can be helpful in clarifying clinical signs and symptoms of these conditions ¹⁾

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Kuruc R, Szórádová A, Kristová J, Solárová M, Šidlo J, Matejčík V. Morphological Peculiarities of the Pelvic Autonomic Nervous System and Their Impact on Clinical Interventions in the Lesser Pelvic Region. *Medicina (Kaunas)*. 2022 Dec 29;59(1):72. doi: 10.3390/medicina59010072. PMID: 36676696; PMCID: PMC9861675.

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