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Anatomy of Spinal Dorsal Rami and its implications in Back Pain

Back pain presents a difficult diagnostic and therapeutic challenge. But to do this, it is essential to understand neuroanatomy and the biomechanics of the spinal dorsal rami. The spinal nerve's posterior branches are known as the spinal dorsal rami. From the occiput to the sacrum, they innervate backward. The greater, lesser, and third occipital nerves are formed from the dorsal rami of C2 and C3. Cervicogenic headaches can be brought on by the dysfunction of these nerves. Each spinal dorsal ramus splits into medial and lateral branches in the low cervical and lumbar spine. The medial (small) branch innervates two to three neighbouring zygapophysial joints as well as soft tissues from the midline to the zygapophysial joint line. The tissues lateral to the zygapophysial joint line are innervated by the lateral (large) branch. The textbook's description of the dermatome is completely unrelated to the dermatome of the dorsal ramus. These anatomic distributions, which can be used to pinpoint the disrupted dorsal ramus, are followed by the clinical pain manifestations. A single dorsal ramus block that relieves discomfort and muscular spasms can confirm the diagnosis. Anatomically, the zygapophysial joint is surrounded by the common dorsal ramus and its medial and lateral branches, which act as a pivot for the spinal functional unit. Back pain can result from any aberrant zygapophysial muscle activity or pathology because these conditions put stress or tension on the dorsal rami. Due to its anatomical and biomechanical characteristics, L1 and L2 are the most typical sites of dorsal rami dysfunction in the low back clinically. Spinal dorsal ramus injection, percutaneous neurotomy, and core muscle strengthening exercises are all used to treat back pain. In conclusion, the dysfunction of the spinal dorsal ramus is a significant cause of back discomfort. It is possible to identify and treat the disturbed spinal dorsal ramus based on its anatomy and clinical manifestation.

Recent Publications

1. Linqiu Zhou, Carson Schneck, Zhenhai Shao. The anatomy of dorsal ramus nerves and its implications in lower back pain. *Neuroscience & Medicine* 3(2):192-201, 2012
2. Nikolai Bogduk. The Clinical Anatomy of the Cervical Dorsal Rami. *Spine* 7(4): 319-330
3. Ishizuka K, Sakai H, Tsuzuki N, Nagashima M. Topographic anatomy of the posterior ramus of thoracic spinal nerve and surrounding structures. *Spine* 37(14): E817-22, 2012

Biography

Linqiu Zhou completed his orthopaedic residency and spine fellowship in China before moving to the United State where completed his second residency in PM&R at the University of Pennsylvania and pain fellowship training at Thomas Jefferson University. Currently, he is board certified by the American Board of PM&R and Pain Management. He has extensive experience with the diagnosis and treatment of spinal and musculoskeletal disorders having done clinical and basic research on spinal dorsal ramus disorder and treatment in the past thirty-five years. He teaches in several medical universities as a clinical professor training pain physicians from multiple countries and has published more than 50 articles and chapters. In addition, he invented several medical devices and received numerous awards including "America's Top Physician in Pain Management" and was honored as "Best in Medicine" by American Health Council in 2017. He serves several journals as an editorial member.

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