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Evaluation of a Novel Spinal Ligament in the Cervical, Thoracic, and Lumbar Spine: The Midline Interlaminar Ligament

Alexandra C. Millhuff
Kansas City University

M. Scott Draper
Kansas City University

Hannah Haddad
Kansas City University

Barth Wright
Kansas City University

Edwin Glueck
Kansas City University

See next page for additional authors

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Authors

Alexandra C. Millhuff, M. Scott Draper, Hannah Haddad, Barth Wright, Edwin Glueck, Brandalynn Holland, and Micaela Motzko

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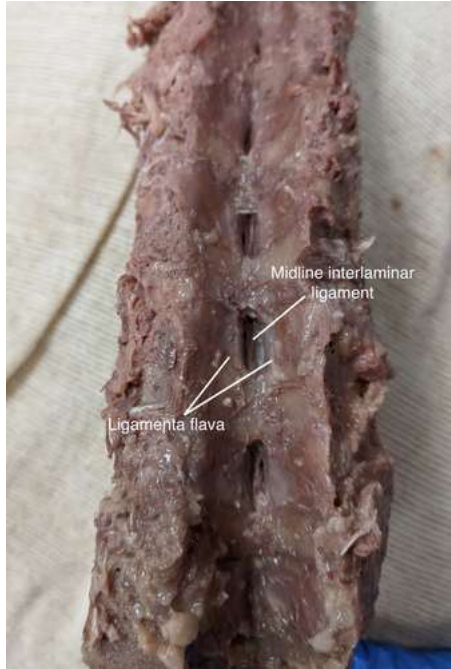
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Abstract

The ligaments of the spine have been well studied and are an essential component of neuromuscular structure and function. However, during routine cadaveric dissection, Simonds et al. 2019 found a previously undocumented ligament, which they termed the midline interlaminar ligament (MIL), in 24 out of 36 (76.5%) lumbar spinal levels; Simonds et al. 2019 did not report the presence or absence of the MIL in the cervical or thoracic regions of the spine. The MIL is an unpaired ligament located between and distinctly separate from the right and left ligamenta flava (LF). The purpose of this study was to identify the presence or absence of the MIL in the cervical, thoracic, and lumbar spinal regions and obtain detailed measurements of the toughness of the MIL. Intact preserved cadaveric spines from C2 to the upper sacral region were dissected. Presence or absence of the MIL was documented, and length and width of each MIL were measured in situ. The toughness of MILs was measured using scissors tests, which help guide fracture through structurally heterogeneous tissues like ligaments. The LF from corresponding spinal segments also underwent toughness measurements for comparison to MIL toughness. In 27 cadaveric specimens, 67 MILs were observed out of 621 total intervertebral levels (10.8%), 162 cervical intervertebral levels (0.6%), 324 thoracic intervertebral levels (2.5%), and 135 lumbar intervertebral levels (43.0%). There was at least one MIL observed in 77.8% (21) specimens, and no MIL observed at any spinal level in 22.2% (6) specimens. The mean width and length of the MIL were 1.21 ± 0.36 mm and 16.37 ± 2.17 mm, respectively. The mean toughness of the MIL and the LF were 1390.27 J/m² and 2068.04 J/m², respectively. Based on our findings, the MIL was present in the majority of spines with a predominance for the lumbar region. The results of this study may help to improve practitioners' understanding of pathologies of the spine through increased knowledge of the anatomy and biomechanics of the MIL.



Relationship of the midline interlaminar ligament and ligamenta flava.