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A morphological characterization of the Lumbar Neural Arch in males and females with Degenerative Spondylolisthesis

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Introduction: Although Degenerative Spondylolisthesis (DS) is a very common osseous dysfunction, few studies have examined the bony morphology of lumbar the neural arch in the population afflicted with DS. Therefore, the aim of this study is to characterize the neural arch (NA) morphology along with the whole lumbar spine in individuals with degenerative Spondylolisthesis (DS) and compare them to healthy controls.

Methods: 100 CTs from a database of 500 lumbar CTs of Spondylolisthesis were chosen. We excluded non-L4-L5 slips, vertebral fractures, vertebral Spondyloarthropaties, previous surgeries, and scoliosis. Scans were divided into a group of 50 individuals with single-level DS (grades 1-2) at L4-5 (25 females and 25 males), and an age-sex matched control group of 50 individuals. Angular and linear measurements from all lumbar segments included: vertebral canals, pedicles, intervertebral foramens, and articular facets.

Results: Compared with the controls, all individuals with DS had shorter intervertebral foramens in all the lumbar segments and greater pedicle dimensions in the lower lumbar segments. The lower lumbar facets were mostly wider and more sagittaly-oriented than the controls, in DS females. Larger prevalence of grade-3 facet arthrosis was found only in the DS population. In DS males, degenerated facets were examined along with the whole lumbar spine, whereas, in DS females, the facets were observed mainly in the lower lumbar segments. Individuals with DS have greater pedicle dimensions and shorter intervertebral foramens compared with controls.

Conclusions: Females with DS have wider articular facets, more sagittaly-oriented facets, and excessively degenerated facets than the controls. This unique NA shape may explain its greater prevalence in females compared to males and further clarify DS's pathophysiology.

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