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Anatomical consideration for less invasive lateral exposure in posterior decompression surgery of cervical spine — Cadaveric study —

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Background: Deep extensor muscles (Semispinalis, Multifidus, Rotators Cervicis) and the facet joints capsules work as stabilizers of the cervical spine. Resection of the facet capsule greater than 50% reportedly results in significant hypermobility of the joint. This study aimed to investigate the anatomical characteristics of these stabilizers to assist surgeons to reduce surgical invasiveness in posterior decompression surgeries.

Research question: Where do Multifidus and Rotators originate? How is the facet capsule covering the joint space observed?

Design: Cadaveric study

Methods: Four cadavers were observed microscopically. (1) The dorsal aspect of Multifidus was exposed by removing Semispinalis from the spinous processes. Multifidus was detached from its insertion to the spinous processes and flipped caudo-laterally, and then its ventral aspect was observed to determine its origin. (2) Next, Rotators which runs in the deepest layer among the three muscles was identified, and its origin and insertion were determined. The space between the medial border of facet joint and the lateral border of Rotators insertion to the lamina (LR) were carefully identified.

Results: (1) Multifidus originates from the dorsal aspect of the lateral mass of C5 and C6 and the transverse processes of C7 and T1. (2) Rotators also originate from the dorsal aspect of the lateral mass from C3 downwards, together with Multifidus from C5 downwards, and insert to the adjacent laminae by one (brevis) or two (longus) levels rostrally. LR was always found slightly medial to the medial border of the facet joint. The space between LR and the facet joint was filled with membranous tissue, instead of a capsule-like fibrous structure.

Discussion: Unprepared lateral exposure can violate the origins of Multifidus and Rotators on the lateral mass. Additionally, the fibrous capsule at the medial border of the facet joint is hardly visible even using a microscope. LR may serve as an anatomical landmark to avoid unintentional damages to the facet joint and to preserve the muscle origins on the lateral mass.