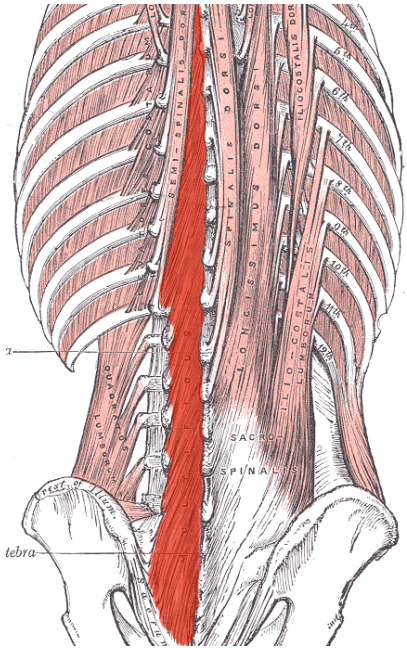
Multifidus muscle



The multifidus muscle is the most medial part of the lumbar paraspinal muscles [1], unisegmentally innervated by the dorsal ramus medial branch of the segmental nerve [2].

In young patients with unilateral neurological symptoms of lumbar disc herniation, symmetrical atrophy of the bilateral MF muscle is more prone to causing low back pain. Older age, higher subcutaneous fat tissue thickness (SFTT) at the L1-L2 levels, longer symptom duration, higher Mo-fi-di score, and greater muscle atrophy on the normal side of the MF increased the incidence of low back pain in young patients with unilateral lumbar disc herniation [3].

In the conventional posterior approach to the lumbar spine, the lamina is exposed by stripping the paravertebral muscles from the spinous process, and the resulting paravertebral muscle damage can produce muscle atrophy and decreased muscle strength.

Reduced lumbar multifidus muscle (LMM) CSA (<8.5 cm2) and muscle atrophy were associated with less favourable outcomes following lumbar spinal decompression. Pre-operative CSA of LMM appeared to be a more reliable predictor of post-operative clinical outcomes compared to the Kader Grading Score. This is the first study to investigate the prognostic value of pre-operative MRI appearance and CSA of LMM with respect to post-operative outcome following lumbar decompression surgery. Healthy pre-operative LMM is associated with better outcomes following lumbar spinal decompression [4].

Chatani developed a surgical approach to the lumbar spine in which the attachment of the paravertebral muscles to the spinous process is preserved. In the novel approach, the spinous process

is split on the midline without stripping the attached muscles, and a hemilateral half of the spinous process is then resected at the base, exposing only the ipsilateral lamina. Before closing, the resected half is sutured and reattached to the remaining half of the spinous process.

Thirty-eight patients with lumbar spinal canal stenosis (LSCS) undergoing unilateral partial laminectomy and bilateral decompression using this novel approach were analyzed. Postoperative changes in the multifidus muscle were evaluated by T2 signal intensity on MR images. MRI performed 1 year after the operation revealed no significant difference in the T2 signal intensity of the multifidus muscle between the approach and nonapproach sides. This result indicated that postoperative changes of the multifidus muscle on the approach side were slight. The clinical outcomes of unilateral partial laminectomy and bilateral decompression using this approach for LSCS were satisfactory. The novel approach can be a useful alternative to the conventional posterior lumbar approach [5].

Atrophy

see Lumbar paraspinal muscle atrophy.

Multifidus Neurostimulation

Multifidus Neurostimulation.

1)
Kader DF, Wardlaw D, Smith FW. Correlation between the MRI changes in the lumbar multifidus muscles and leg pain. Clin Radiol. 2000 Feb;55(2):145-9. PubMed PMID: 10657162.
2)
Kim WH, Lee SH, Lee DY. Changes in the cross-sectional area of multifidus and psoas in unilateral sciatica caused by lumbar disc herniation. J Korean Neurosurg Soc. 2011 Sep;50(3):201-4. doi: 10.3340/jkns.2011.50.3.201. Epub 2011 Sep 30. PubMed PMID: 22102949; PubMed Central PMCID: PMC3218178.
3)
Zhao X, Liang H, Hua Z, Li W, Li J, Wang L, Shen Y. The morphological characteristics of paraspinal muscles in young patients with unilateral neurological symptoms of lumbar disc herniation. BMC Musculoskelet Disord. 2022 Nov 18;23(1):994. doi: 10.1186/s12891-022-05968-5. PMID: 36401228; PMCID: PMC9673353.
4)
Zotti MG, Boas FV, Clifton T, Piche M, Yoon WW, Freeman BJ. Does pre-operative magnetic resonance imaging of the lumbar multifidus muscle predict clinical outcomes following lumbar spinal decompression for symptomatic spinal stenosis? Eur Spine J. 2017 Feb 8. doi: 10.1007/s00586-017-4986-x. [Epub ahead of print] PubMed PMID: 28180981.
5)
Chatani K. A novel surgical approach to the lumbar spine involving hemilateral split-off of the spinous process to preserve the multifidus muscle: technical note. J Neurosurg Spine. 2015 Nov 6:1-6. [Epub ahead of print] PubMed PMID: 26544596.