Cigna Medical Coverage Policies – Musculoskeletal Lumbar Microdiscectomy Guidelines

Effective December 27, 2024

Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by eviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

CMM-606: Lumbar Microdiscectomy (Laminotomy, Laminectomy, or Hemilaminectomy)

400 Buckwalter Place Boulevard, Bluffton, SC 29910 (800) 918-8924 www.eviCore.com

CMM-606.1: General Guidelines

Application of Guideline

- The determination of medical necessity for the performance of lumbar microdiscectomy and excision of extradural lesion other than neoplasm is always made on a case-by-case basis.
- For additional timing and documentation requirements, see **CMM-600.1: Prior Authorization Requirements**.

Urgent/Emergent Indications/Conditions

- The presence of urgent/emergent indications/conditions warrants definitive surgical treatment. **Imaging findings noted in the applicable procedure section(s) are required**.
  - The following criteria are **NOT** required for confirmed urgent/emergent conditions:
    - Provider-directed non-surgical management
    - Absence of unmanaged significant mental and/or behavioral health disorders (e.g., major depressive disorder, chronic pain syndrome, secondary gain, opioid and alcohol use disorders)
    - Timeframe for repeat procedure
- Urgent/emergent conditions for lumbar microdiscectomy **and/or** excision of extradural lesion other than neoplasm include **ANY** of the following:
  - Cauda equina syndrome (CES)
  - Documentation of progressive neurological deficit on two separate physical exams
  - **ANY** of the following due to a neurocompressive pathology
    - Motor weakness of grade 3/5 or less of specified muscle(s)
    - Rapidly progressive symptoms of motor loss
    - Bowel incontinence
    - Bladder incontinence/retention
  - Epidural hematoma
  - Infection (e.g., discitis, epidural abscess, osteomyelitis)
  - Primary or metastatic neoplastic disease causing pathologic fracture, cord or nerve compression, or instability
  - A condition otherwise meeting criteria listed in the applicable procedure section(s) with documentation of severe debilitating pain and/or dysfunction to the point of being incapacitated

Credentialed Spine Surgeon Required

- Endoscopic lumbar discectomy requires the procedure be performed by a spine surgeon with surgical privileges at a hospital, hospital outpatient department, or ambulatory surgery center to perform open surgical approach(es) for lumbar discectomy.

CMM-606.2: Initial Primary Lumbar Microdiscectomy (Laminotomy, Laminectomy or Hemilaminectomy)

Initial primary lumbar microdiscectomy (laminotomy, laminectomy, or hemilaminectomy) is considered **medically necessary** when performed for **ANY** of the following conditions when **ALL** of the associated criteria have been met:

Neurogenic Claudication

- Subjective symptoms including **BOTH** of the following:
  - Significant level of pain on a daily basis defined as clinically significant functional impairment (e.g., inability to perform household chores, prolonged standing, etc.)
  - Pain, cramping, weakness, or tingling in the lower back, buttock(s), and leg(s) brought about by walking or positions that cause thecal sac or nerve root compression (e.g., standing, extension) and **EITHER** of the following:
    - Symptoms worsen with standing and/or walking
    - Symptoms are alleviated with sitting and/or forward flexion
- Objective physical exam findings concordant with MRI/CT
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):
  - Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for 6 weeks
  - Provider-directed exercise program prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician for 6 weeks
  - Epidural steroid injection(s) or selective nerve root block(s) performed at the same level(s) as the requested surgery
- MRI/CT shows neural structure compression at the requested level(s) that is concordant with the individual's symptoms **and** physical exam findings and that is caused by **ANY** of the following:
  - Herniated disc(s) (retained disc material or a recurrent disc herniation)
  - Synovial cyst or arachnoid cyst
  - Central/lateral/foraminal stenosis
  - Osteophytes
- Absence of unmanaged significant mental and/or behavioral health disorders (e.g., major depressive disorder, chronic pain syndrome, secondary gain, opioid and alcohol use disorders)

Radiculopathy

- Subjective symptoms include **BOTH** of the following:
  - Significant level of pain on a daily basis defined as clinically significant functional impairment (e.g., inability to perform household chores, prolonged standing, etc.)
  - Persistent radiating pain into the buttock(s) and/or lower extremity(ies)in
- Objective physical exam findings include **EITHER** of the following:
  - Nerve root tension sign including **ANY** of the following:
    - Positive straight leg raise
    - Crossed straight leg raise
    - Femoral stretch test
  - Neurologic deficit including **ANY** of the following:
    - Dermatomal sensory deficit
    - Functionally limiting motor weakness (e.g., foot drop, quadriceps weakness)
    - Reflex changes
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):
  - Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for 6 weeks
  - Provider-directed exercise program prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician for 6 weeks
  - Epidural steroid injection(s) or selective nerve root block(s) performed at the same level(s) as the requested surgery
- MRI/CT shows neural structure compression at the requested level(s) that is concordant with the individual's symptoms **and** physical exam findings and that is caused by **ANY** of the following:
  - Herniated disc(s) (retained disc material or a recurrent disc herniation)
  - Synovial cyst or arachnoid cyst
  - Central/lateral/foraminal stenosis
  - Osteophytes
- Absence of unmanaged significant mental and/or behavioral health disorders (e.g., major depressive disorder, chronic pain syndrome, secondary gain, opioid and alcohol use disorders)

CMM-606.3: Repeat Lumbar Microdiscectomy (Laminotomy or Laminectomy) at the Same Level

Repeat lumbar microdiscectomy (laminotomy or laminectomy) at the same level is considered **medically necessary** when performed for **ANY** of the following **when ALL** of the associated criteria have been met:

Neurogenic Claudication

- Greater than 12 weeks since initial lumbar disc decompression surgery
- Subjective symptoms include **BOTH** of the following:
  - Significant level of pain on a daily basis defined as clinically significant functional impairment (e.g., inability to perform household chores, prolonged standing, etc.)
  - Pain, cramping, weakness, or tingling in the lower back, buttock(s), and leg(s) brought about by walking or positions that cause thecal sac or nerve root compression (e.g., standing, extension) and **EITHER** of the following:
    - Symptoms worsen with standing and/or walking
    - Symptoms are alleviated with sitting and/or forward flexion
- Objective physical exam findings are concordant with post-operative MRI/CT
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):
  - Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for 6 weeks
  - Provider-directed exercise program prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician for 6 weeks
  - Epidural steroid injection(s) or selective nerve root block(s) performed at the same level(s) as the requested surgery
- Post-operative MRI /CT shows neural structure compression at the requested level(s) that is concordant with the individual's symptoms **and** physical exam findings and that is caused by **ANY** of the following:
  - Herniated Disc(s) (retained disc material or a recurrent disc herniation)
  - Synovial cyst or arachnoid cyst
  - Central/lateral/foraminal stenosis
  - Osteophytes
- Absence of unmanaged significant mental and/or behavioral health disorders (e.g., major depressive disorder, chronic pain syndrome, secondary gain, opioid and alcohol use disorders)

Radiculopathy

- Greater than 12 weeks since initial lumbar disc decompression surgery
- Subjective symptoms include **BOTH** of the following:
  - Significant level of pain on a daily basis defined as clinically significant functional impairment (e.g., inability to perform household chores, prolonged standing, etc.)
  - Persistent radiating pain into the buttock(s) and/or lower extremity(ies)
- Objective physical exam findings include **EITHER** of the following:
  - Nerve root tension sign including **ANY** of the following:
    - Positive straight leg raise
    - Crossed straight leg raise
    - Femoral stretch test
  - Neurologic deficit including **ANY** of the following:
    - Dermatomal sensory deficit
    - Functionally limiting motor weakness (e.g., foot drop, quadriceps weakness)
    - Reflex changes
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):
  - Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for 6 weeks
  - Provider-directed exercise program prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician for 6 weeks
  - Epidural steroid injection(s) or selective nerve root block(s) performed at the same level(s) as the requested surgery
- Post-operative MRI /CT shows neural structure compression at the requested level(s) that is concordant with the individual's symptoms **and** physical exam findings and that is caused by **ANY** of the following:
  - Herniated Disc(s) (retained disc material or a recurrent disc herniation)
  - Synovial cyst or arachnoid cyst
  - Central/lateral/foraminal stenosis
  - Osteophytes
- Absence of unmanaged significant mental and/or behavioral health disorders (e.g., major depressive disorder, chronic pain syndrome, secondary gain, opioid and alcohol use disorders)

CMM-606.4: Non-Indications

Not Medically Necessary

- Lumbar microdiscectomy (laminotomy, laminectomy, and hemilaminectomy) performed without meeting the criteria in the **General Guidelines** (Credentialed Spine Surgeon Required; and, when applicable, Urgent/Emergent Indications/Conditions) **and** the criteria in the **applicable procedure-specific section** (initial microdiscectomy or repeat microdiscectomy) is considered **not medically necessary**.
- Initial and repeat lumbar microdiscectomy (laminotomy, laminectomy, and hemilaminectomy) performed for **ANY** of the following sole indications is considered **not medically necessary**:
  - Annular tears
  - Degenerative disc disease
  - Concordant discography
  - MR Spectroscopy results
- The performance of lumbar microdiscectomy (laminotomy, laminectomy, and hemilaminectomy) with laser technique is considered **not medically necessary**.

Experimental, Investigational, or Unproven (EIU)

- Percutaneous lumbar discectomy (i.e., lumbar discectomy performed with indirect visualization of the spine) is considered **experimental, investigational, or unproven (EIU)**.

Procedure (CPT®) Codes (CMM-606)

This guideline relates to the CPT® code set below. Codes are displayed for informational purposes only. Any given code's inclusion on this list does not necessarily indicate prior authorization is required.

CPT®	Code Description/Definition
62380	Endoscopic decompression of spinal cord, nerve root(s), including laminotomy, partial facetectomy, foraminotomy, discectomy and/or excision of herniated intervertebral disc, 1 interspace, lumbar
63030	Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc; 1 interspace, lumbar
+63035	Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc; each additional interspace, cervical or lumbar (List separately in addition to code for primary procedure)
63042	Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; lumbar
+63044	Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; each additional lumbar interspace (List separately in addition to code for primary procedure)
63056	Transpedicular approach with decompression of spinal cord, equina and/or nerve root(s) (e.g. herniated intervertebral disc), single segment; lumbar (including transfacet, or lateral extraforaminal approach) (e.g. far lateral herniated intervertebral disc)
+63057	Transpedicular approach with decompression of spinal cord, equina and/or nerve root(s) (e.g. herniated intervertebral disc), single segment; each additional segment, thoracic or lumbar (List separately in addition to code for primary procedure)
63267	Laminectomy for excision or evacuation of intraspinal lesion other than neoplasm, extradural; lumbar
63272	Laminectomy for excision of intraspinal lesion other than neoplasm, intradural; lumbar
63277	Laminectomy for biopsy/excision of intraspinal neoplasm; extradural, lumbar
HCPCS Code	**Code Description/Definition**
S2350	Diskectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; lumbar, single interspace
+S2351	Diskectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; lumbar, each additional interspace (list separately in addition to code for primary procedure)

This list may not be all-inclusive and is not intended to be used for coding/billing purposes. The final determination of reimbursement for services is the decision of the health plan and is based on the individual's policy or benefit entitlement structure as well as claims processing rules.

References (CMM-606)

1. Ahn Y, Youn M, Heo D. Endoscopic transforaminal lumbar interbody fusion: a comprehensive review. *Expert Rev Med Devices*. 2019;16(5):373-380. doi:10.1080/17434440.2019.1610388.
2. Arts, Mark P., Brand R, Elske vanden Akker, M, Koes, Bart W., Baretls, Ronald H. M. A., Peul, Wilco C. for the Leiden-The Hague Spine Inteverntion Prognostic Study Group(SIPS). Tubular Disckectomy vs Conventional Microdiscectomy for Sciatica: A Randomized Controlled Trial. *JAMA*. 2009;(302):149-158.
3. Albert R, Lange M, Brawanski A, et al. Urgent discectomy: clinical features and neurological outcome. *Surgical Neurol Int*. 2016;7:17.
4. Bailey C, Glennie A, Rasoulinejad P, et al. Discectomy Compared with Standardized Nonoperative Care for Chronic Sciatica Due to a Lumbar Disc Herniation. *JBJS*. 2021;103(23):2161-2169. doi:10.2106/jbjs.21.00448.
5. Best NM, Sasso RC. Success and safety in outpatient microlumbar discectomy. *J Spinal Disord Tech*. 2006;19(5):334-337.
6. Boonstra AM, Schiphorst Preuper HR, Balk GA, Stewart RE. Cut-off points for mild, moderate, and severe pain on the visual analogue scale for pain in patients with chronic musculoskeletal pain. *Pain*. 2014;155(12):2545-2550. doi:10.1016/j.pain.2014.09.014.
7. Boonstra, AM, Stewart RE, Koke AJA, Oosterwijk RFA, Swann JL, Schreurs KMG, Sciphorst Preuper HR. Cut-off Points for Mild, Moderate, and Severe Pain on the Numeric Rating Scale for Pain in Patients with Chronic Musculoskeletal Pain: Variability and Influence of Sex and Catastrophizing. *Front Psychol*. 2016;(7)1466:1-9.
8. Brouwer PA, Brand R, Elske van den Akker-van Marle M, et al. Percutaneous laser disc decompression versus conventional microdiscectomy in sciatica: a randomized controlled trial. *Spine J*. 2015:(15) 857-865. doi:10.1016/j.spinee.2015.01.020.
9. Carragee, EJ, Don AS, Hurwitz EL Cuellar JM, Carrino JA, Herzog R. 2009 ISSLS Prize Winner: Does Discography Cause Accelerated Progression of Degeneration Changes in the Lumbar Disc: A Ten-year Matched Cohort Study. *Spine*. 2009;34(21):2338-2345. doi:10.1097/BRS.0b013e3181ab5432.
10. Carragee, J, Lincoln T, Parmar VS, Alamin T. A Gold Standard Evaluation of the “Discogenic Pain” Diagnosis as Determined by Provocative Discography. *Spine*. 2006;31(18):2115-2123. doi:10.1097/01.brs.0000231436.30262.dd.
11. Chen Z, Zhang L, Dong J, et al. Percutaneous Transforaminal Endoscopic Discectomy Versus Microendoscopic Discectomy for Lumbar Disc Herniation: 5-year Long-term Results of a Randomized Controlled Trial. *Spine (Phila Pa 1976)*. 2023;48(2):79-88. doi:10.1097/brs.0000000000004468.
12. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Int Med*. 2007;147(7):478-491. doi: 10.7326/0003-4819-147-7-200710020-00006.
13. Chou R, Loeser JD, Owens DK, et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidence-based clinical practice guideline from the American Pain Society. *Spine*. 2009;34(10):1066-1077.doi:10.1097/BRS.0b013e3181a1390d.
14. Chou R, Huffman LH. Medications for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Ann Int Med*. 2007;147(7):505-514.
15. Cohen SP, Hanling S, Bicket MC, et al. Epidural steroid injections compared with gabapentin for lumbosacral radicular pain: multicenter randomized double blind comparative efficacy study. *BMJ*. 2015;350:h1748 Published 2015 Apr 16. doi:10.1136/bmj.h1748.
16. Conn A, Buenaventura RM, Datta S, Abdi S, Diwan S. Systematic review of caudal epidural injections in the management of chronic low back pain. *Pain Physician*. 2009;12(1):109-135.
17. Desai A, Ball PA, Bekelis K, et al. Outcomes after incidental durotomy during first-time lumbar discectomy. *J Neurosurg Spine*. 2011;14(5):647-653. doi:10.3171/2011.1.SPINE10426.
18. Eliyas JK, Karahalios D. Surgery for degenerative lumbar spine disease. Disease-a-Month 2011;57(10):592-606
19. Fallah A, Massicotte EM, Fehlings MG, et al. Admission and acute complication rate for outpatient lumbar microdiscectomy. *Can J Neurol Sci*. 2010;37(1):49-53. doi:10.1017/s0317167100009641.
20. Farshad M, Burgstaller JM, Held U, et al. Do preoperative corticosteroid injections increase the risk for infections or wound healing problems after spine surgery? *Spine*. 2018;43(15):1089-1094.
21. Gadjradj P, Harhangi B, Amelink J, et al. Percutaneous Transforaminal Endoscopic Discectomy Versus Open Microdiscectomy for Lumbar Disc Herniation. *Spine (Phila Pa 1976)*. 2020;46(8):538-549. doi:10.1097/brs.0000000000003843.
22. Gadjradj PS, Rubinstein SM, Peul WC, et al. Full endoscopic versus open discectomy for sciatica: randomised controlled non-inferiority trial. *BMJ*. 2022;376:e065846. doi:10.1136/bmj-2021-065846.
23. Gebara, NV, Meltzer DE. Extraspinal findings on lumbar spine MR imaging. *Radiol Case*. 2009;3(8):5-13.
24. Gerbershagen HJ, Rothaug J, Kalkman CJ, Meissner W. Determination of moderate-to-severe postoperative pain on the numeric rating scale: a cut-off point analysis applying four different methods. *Br J Aneaesth*. 2011;107(4):619-626. doi:10.1093/bja/aer195.

25. German JW, Adamo MA, Hoppenot RG, Blossom JH, Nagle HA. Perioperative results following lumbar discectomy: comparison of minimally invasive discectomy and standard microdiscectomy. *Neurosurg Focus*. 2008;25(2):E20.
26. Gibson JN, Waddell G. Surgical interventions for lumbar disc prolapse. *Cochrane Database of Syst Rev*. 2007; 2007(2):CD001350. Published 2007 Apr 18. doi:10.1002/14651858.CD001350.pub4.
27. Goldberg H, Firtch W, Tyburski M, et al. Oral Steroids for Acute Radiculopathy Due to a Herniated Lumbar Disk: A Randomized Clinical Trial. *JAMA*. 2015:(313)19:1915-1923. doi:10.1001/jama.2015.4468.
28. Hahne AJ, Ford JJ, McMeeken JM. Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review. *Spine*. 2010;35(11):E488-E504.
29. Harrington JF, French P. Open versus minimally invasive lumbar microdiscectomy: comparison of operative times, length of hospital stay, narcotic use and complications. *Minim Invasive Neurosurg*. 2008;51(1):30-35.
30. Heo D, Son S, Eum J, Park C. Fully endoscopic lumbar interbody fusion using a percutaneous unilateral biportal endoscopic technique: technical note and preliminary clinical results. *Neurosurg Focus*. 2017;43(2):E8. doi:10.3171/2017.5.focus17146.
31. Hutchins TA, Peckham M, Shah LM, et al. ACR Appropriateness Criteria® Low back pain. American College of Radiology (ACR). Revised 2021. Available at: https://acsearch.acr.org/docs/69483/narrative/.
32. Jacobs WCH, Van Tulder M, Arts M, et al. Surgery versus conservative management of sciatica due to a lumbar herniated disc: a systematic review. *Eur Spine J*. 2011. doi:10.1007/s00586-010-1603-7.
33. Jarvik JG, Hollingworth W, Heagerty PJ, et al. Three-year incidence of low back pain in an initially asymptomatic cohort: clinical and imaging risk factors. *Spine (Phila Pa 1976)*. 2005;30:1541.
34. Jarvik JJ, Hollingworth W, Heagerty P, et al. The Longitudinal Assessment of Imaging and Disability of the Back (LAIDBack) Study: baseline data. *Spine (Phila Pa 1976)*. 2001;26:1158.
35. Kamson S, Lu D, Sampson P, Zhang Y. Full-Endoscopic Lumbar Fusion Outcomes in Patients with Minimal Deformities: A Retrospective Study of Data Collected Between 2011 and 2015. *Pain Physician*. 2019;1(22;1):75-88. doi: 10.36076/ppj/2019.22.75.
36. Kanayama M, Hashimoto T, Shigenobu K, Oha F, Togawa D. Effective prevention of surgical site infection using a Centers for Disease Control and Prevention guideline-based antimicrobial prophylaxis in lumbar spine surgery. *J Neurosurg Spine*. 2007;6(4):327-329.
37. Kim J, Yoo H, Choi D, Park E, Jee S. Comparison of Minimal Invasive Versus Biportal Endoscopic Transforaminal Lumbar Interbody Fusion for Single-level Lumbar Disease. *Clin Spine Surg*. 2020;34(2):E64-E71. doi:10.1097/bsd.0000000000001024.
38. Koc Z, Ozcakir S, Sivrioglu K, Gurbet A, Kucukoglu S. Effectiveness of physical therapy and epidural steroid injections in lumbar spinal stenosis. *Spine*. 2009;34(10):985-989.
39. Kushchayev SV, Glushko T, Jarraya M, et al. ABCs of the degenerative spine. *Insights Imaging*. 2018;9(2):253-274. doi:10.1007/s13244-017-0584-z.
40. Lee BS, Nault R, Grabowski M, et al. Utility of repeat magnetic resonance imaging in surgical patients with lumbar stenosis without disc herniation. *Spine J*. 2019;19(2):191-198. doi:10.1016/j.spinee.2018.06.357.
41. Lee J, Choi K, Kang S, et al. Nonsurgical treatments for patients with radicular pain from lumbosacral disc herniation. *Spine J*. 2019;19(9):1478-1489. doi:10.1016/j.spinee.2019.06.004.
42. Lequin Ml B, Verbaan D, Jacobs, WCH., Brand R, Bouma GJ, Vandertop WP, Peul, WC for the Leiden-The Hague Spine Intervention Prognostic Study Group. Surgery versus prolonged conservative treatment for sciatica: 5-year results of a randomized controlled trial. *BMJ Open*. 2013; 3: e002534.
43. Lurie JD, Tosteson TD, Tosteson ANA, Zhao W, Morgan TS, Abdu WA, Herkowitz H, Weinstein JN. Surgical versus Non-Operative Treatment for Lumbar Disc Herniation: Eight-Year Results for the Spine Patient Outcomes Research Trial (SPORT). *Spine*. 2014;39(1):3-16.
44. McGill, C.M. Industrial back problems. *J Occup Med*. 1968;10:1740-1748.
45. Munter FM, Wasserman BA, Wu HM, Yousem DM. Serial MR Imaging of Annular Tears in Lumbar Intervertebral Disks. *AJNR*. 2002;23:1105.
46. North American Spine Society (NASS) Coverage Policy Recommendations. *Lumbar Discectomy*. Dec 2019. Burr Ridge, IL. North American Spine Society (NASS). Available at: https://www.spine.org/coverage.
47. North American Spine Society (NASS) Coverage Policy Recommendations. *Endsocopic Decompression*. Feb 2019. Burr Ridge, IL. North American Spine Society (NASS). Available at: https://www.spine.org/coverage.
48. North American Spine Society (NASS) Coverage Policy Recommendations. *Laser Spine Surgery*. May 2014. Burr Ridge, IL. North American Spine Society (NASS). Available at: https://www.spine.org/coverage.
49. North American Spine Society (NASS) Coverage Policy Recommendations. *Lumbar Decompression: Laminectomy, Laminotomy & Foraminotomy.* Jan 2022. Burr Ridge, IL. North American Spine Society (NASS). Available at: https://www.spine.org/coverage.
50. Oster BA, Kikanloo SR, Levine NL, Lian J, Cho W. Systematic Review of Outcomes Following 10-Year Mark of Spine Patient Outcomes Research Trial (SPORT) for Degenerative Spondylolisthesis. *Spine*. 2020;45(12):820-824. doi:10.1097/brs.0000000000003485.

51. Oster BA, Kikanloo SR, Levine NL, Lian J, Cho W. Systematic Review of Outcomes Following 10-Year Mark of Spine Patient Outcomes Research Trial for Intervertebral Disc Herniation. *Spine*. 2020;45(12):825-831. doi:10.1097/brs.0000000000003400.
52. Oster BA, Kikanloo SR, Levine NL, Lian J, Cho W. Systematic Review of Outcomes Following 10-year Mark of Spine Patient Outcomes Research Trial (SPORT) for Spinal Stenosis. *Spine*. 2019;45(12):832-836. doi:10.1097/brs.0000000000003323.
53. Panagopoulos J, Hush J, Steffens D, Hancock MJ. Do MRI Findings Change Over a Period of Up to 1 Year in Patients With Low Back Pain and/or Sciatica? *Spine*. 2017;42(7):504-512. doi:10.1097/brs.0000000000001790.
54. Park SM, Park J, Jang HS, et al. Biportal endoscopic versus microscopic lumbar decompressive laminectomy in patients with spinal stenosis: a randomized controlled trial. *Spine J*. 2020;20(2):156-165. doi:10.1016/j.spinee.2019.09.015.
55. Peul WC, van De Hout WB, Brand R, et al. Prolonged conservative care versus early surgery in patients with sciatica caused by lumbar disc herniation: two year results of a randomised controlled trial. *BMJ*. 2008;336(7657):1355-1358. doi:10.1136/bmj.a143.
56. Peul WC, van houwelingen HC, van De Hout WB, et al. Surgery versus prolonged conservative treatment for sciatica. *NEJM*. 2007;356(22):2245-2256. doi:10.1056/NEJMoa064039.
57. Podichetty VK, Spears J, Isaacs RE, Booher J, Biscup RS. Complications associated with minimally invasive decompression for lumbar spinal stenosis. *J Spinal Disord Tech*. 2006;19(3):161-166.
58. Rampersaud YR, Moro ERP, Neary MA, et al. Intraoperative adverse events and related postoperative complications in spine surgery: implications for enhancing patient safety founded on evidence-based protocols. *Spine*. 2006;31(13):1503-1510. doi:10.1097/01.brs.0000220652.39970.c2.
59. Ries ZG, Glassman SD, Vasilyev I, Metcalfe L, Carreon LY. Updated imaging does not affect revision rates in adults undergoing spine surgery for lumbar degenerative disease. *J Neurosurg Spine*. Published online Nov 2018. 2019;30(2):228-223. doi:10.3171/2018.8.spine18586.
60. Shafshak TS, Elnemr R. The Visual Analogue Scale Versus Numerical Rating Scale in Measuring Pain Severity and Predicting Disability in Low Back Pain. *J Clin Rheumatol*. 2020;27(7):1. doi:10.1097/rhu.0000000000001320.
61. Simpson A, Lightsey H, Xiong G, Crawford A, Minamide A, Schoenfeld A. Spinal endoscopy: evidence, techniques, global trends, and future projections. *Spine J*. 2022;22(1):64-74. doi:10.1016/j.spinee.2021.07.004.
62. Song Q, Zhu B, Zhao W, Liang C, Hai B, Liu X. Full-Endoscopic Lumbar Decompression versus Open Decompression and Fusion Surgery for the Lumbar Spinal Stenosis: A 3-Year Follow-Up Study. *J Pain Res*. 2021;(14):1331-1338. doi:10.2147/jpr.s309693.
63. Thomas JG, Hwang SW, Whitehead WE, Curry DJ, Luerssen TG, Jea A. Minimally invasive lumbar microdiscectomy in pediatric patients: a series of 6 patients. *J Neurosurg. Pediatrics*. 2011;7(6):616-619. doi:10.3171/2011.3.PEDS10570.
64. Tran de QH, Duong S, Finlayson RJ. Lumbar spinal stenosis: a brief review of the nonsurgical management. *Can J Anaesth*. 2010;57(7):694-703. doi:10.1007/s12630-010-9315-3.
65. Weinstein JN, Lurie JD, Tosteson TD, et al. Surgical versus nonoperative treatment for lumbar disc herniation: four-year results for the Spine Patient Outcomes Research Trial (SPORT). *Spine*. 2008;33(25):2789-800. doi:10.1097/BRS.0b013e31818ed8f4.
66. Weinstein JN, Lurie JD, Tosteson TD, et al. Surgical vs nonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT): a randomized trial. *JAMA*. 2006; 296(20):2441-2450. doi:10.1001/jama.296.20.2441.
67. Weinstein JN, Lurie JD, Tosteson TD, et al. Surgical vs Nonoperative Treatment for Lumbar Disk Herniation: The Spine Patient Outcomes Research Trial (SPORT) Observational Cohort. *JAMA*. 2006:296(20):2451-2459. doi:10.1001/jama.296.20.2451.
68. Wilby M, Best A, Wood E, et al. Microdiscectomy compared with transforaminal epidural steroid injection for persistent radicular pain caused by prolapsed intervertebral disc: the NERVES RCT. *Health Technol Assess*. 2021;25(24):1-86. doi:10.3310/hta25240.
69. Williams KD, Park AL. *Lower back pain and disorders of intervertebral discs*. IN: Canale ST, Beaty JH, eds. Campbell's Operative Orthopaedics. 11th ed. Philadelphia, PA: Mosby Elsevier; 2008:2159-236.
70. Winters ME, Kluetz P, Zilberstein J. Back pain emergencies. *Med Clin North Am*. 2006;90(3):505-523.
71. Yaksi A, Özgönenel L, Özgönenel B. The Efficiency of Gabapentin Therapy in Patients With Lumbar Spinal Stenosis. *Spine*. 2007;32(9):939-942. doi:10.1097/01.brs.0000261029.29170.e6.
72. Young K, Brown R, Kaufmann L. Clinical inquiries. When is discectomy indicated for lumbar disc disease? *J Family Pract*. 2011;60(8):490.

400 Buckwalter Place Boulevard, Bluffton, SC 29910 (800) 918-8924 www.eviCore.com