

# Cigna Medical Coverage Policies – Musculoskeletal Thoracic Decompression and Discectomy

Effective February 25, 2026



---

## 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.

CPT® (Current Procedural Terminology) is a registered trademark of the American Medical Association (AMA). CPT® five digit codes, nomenclature and other data are copyright 2025 American Medical Association. All Rights Reserved. No fee schedules, basic units, relative values or related listings are included in the CPT® book. AMA does not directly or indirectly practice medicine or dispense medical services. AMA assumes no liability for the data contained herein or not contained herein.

©Copyright 2025 eviCore healthcare

## CMM-613: Thoracic Decompression/Discectomy

**CMM-613.1: General Guidelines**

**CMM-613.2: Initial Thoracic Decompression/Discectomy**

**CMM-613.3: Thoracic Corpectomy**

**CMM-613.4: Repeat Thoracic Decompression/Discectomy at the Same Level**

**CMM-613.5: Non-Indications**

**Codes (CMM-613)**

**Evidence Discussion (CMM-613)**

**References (CMM-613)**

## **CMM-613.1: General Guidelines**

### **Application of Guideline**

- The determination of medical necessity for the performance of thoracic decompression/discectomy 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 thoracic decompression/discectomy include **ANY** of the following:
  - ◆ Acute/unstable traumatic spinal fractures or dislocations with neural compression
  - ◆ Myelopathy or Cord signal changes on MRI due to cord compression
  - ◆ 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 findings 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 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

## **CMM-613.2: Initial Thoracic Decompression/Discectomy**

Initial primary thoracic decompression/discectomy is considered **medically necessary** when performed for **EITHER** of the following conditions when **ALL** of the associated criteria have been met:

## **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.)
  - ◆ Unremitting radicular pain into the chest wall or upper abdominal wall resulting in disability
- Objective physical exam findings include **ANY** of the following:
  - ◆ Dermatomal sensory deficit
  - ◆ Unremitting radicular pain into the chest wall or upper abdominal wall without concordant objective physical exam findings
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):
  - ◆ Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for six (6) weeks
  - ◆ Provider-directed exercise program (prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician) for six (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 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, drug and alcohol abuse)

## **Myelopathy**

- Subjective symptoms include **ANY** of the following:
  - ◆ Lower extremity weakness, numbness, or pain
  - ◆ Gait disturbance
  - ◆ New-onset bowel or bladder dysfunction
  - ◆ Frequent falls
- Objective physical exam findings include **ANY** of the following:
  - ◆ Ataxic gait
  - ◆ Tandem walking test demonstrating ataxia
  - ◆ Lower extremity hyperreflexia
  - ◆ Increased muscle tone or spasticity
  - ◆ Clonus
  - ◆ Babinski sign

- MRI/CT shows findings that are concordant with the individual's symptoms and physical exam and that are caused by **EITHER** of the following:
  - ◆ Thoracic/thoracolumbar spinal cord compression
  - ◆ Thoracic/thoracolumbar spinal stenosis

### **CMM-613.3: Thoracic Corpectomy**

Thoracic corpectomy is considered **medically necessary** and can be performed **as an alternative** for thoracic discectomy when **ALL** of the following criteria have been met:

- Complete corpectomy or partial corpectomy (i.e., removal of **at least one-third of the vertebral body** [not for resection of osteophytes alone]) is being performed for **ANY** of the following:
  - ◆ Infection
  - ◆ Trauma
  - ◆ Tumor
  - ◆ Compression at or behind the level of the vertebral body
- Thoracic corpectomy must be performed with a thoracic fusion due to the iatrogenic instability of the thoracic corpectomy procedure.
- **ALL** of the criteria for thoracic decompression have been met per the applicable procedure-specific section below:
  - ◆ **CMM-613.2: Initial Thoracic Decompression/Discectomy**
  - ◆ **CMM-613.4: Repeat Thoracic Decompression/Discectomy at the Same Level**

### **CMM-613.4: Repeat Thoracic Decompression/Discectomy at the Same Level**

Repeat thoracic decompression/discectomy at the same level is considered **medically necessary** when performed for **EITHER** of the following conditions when **ALL** of the associated criteria have been met:

#### **Radiculopathy**

- Greater than 12 weeks since the prior thoracic decompression/discectomy
- 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.)
  - ◆ Unremitting radicular pain into the chest wall or upper abdominal wall resulting in disability
- Objective physical exam findings include **ANY** of the following:
  - ◆ Dermatomal sensory deficit
  - ◆ Unremitting radicular pain into the chest wall or upper abdominal wall without concordant objective physical exam findings
- Less than clinically meaningful improvement with at least **TWO** of the following (unless contraindicated):

- ◆ Prescription strength analgesics, steroids, gabapentinoids, and/or NSAIDs for six (6) weeks
- ◆ Provider-directed exercise program (prescribed by a physical therapist, chiropractic provider, osteopathic or allopathic physician) for six (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, drug and alcohol abuse)

### Myelopathy

- Subjective symptoms include **ANY** of the following:
  - ◆ Lower extremity weakness, numbness, or pain
  - ◆ Gait disturbance
  - ◆ New-onset bowel or bladder dysfunction
  - ◆ Frequent falls
- Objective physical exam findings include **ANY** of the following:
  - ◆ Ataxic gait
  - ◆ Lower extremity hyperreflexia
  - ◆ Tandem walking test demonstrating ataxia
  - ◆ Increased muscle tone or spasticity
  - ◆ Clonus
  - ◆ Babinski sign
- Post-operative MRI /CT shows findings that are concordant with the individual's symptoms **and** physical exam findings and that are caused by **EITHER** of the following:
  - ◆ Thoracic/thoracolumbar spinal cord compression
  - ◆ Thoracic/thoracolumbar spinal stenosis

## **CMM-613.5: Non-Indications**

### **Not Medically Necessary**

- **Thoracic decompression/discectomy/corpectomy** performed without meeting the criteria in the **General Guidelines** (when applicable for urgent/emergent conditions) **and** the criteria in the applicable procedure-specific section(s) (initial decompression, corpectomy, or repeat decompression) is considered **not medically necessary**.
- **Thoracic decompression/discectomy/corpectomy** performed for **ANY** of the following sole indications is considered **not medically necessary**:
  - ◆ Annular tears
  - ◆ Concordant discography
  - ◆ MR Spectroscopy results
  - ◆ Degenerative disc disease
- The performance of thoracic decompression or discectomy with laser technique is considered **not medically necessary**.

### **Experimental, Investigational, or Unproven (EIU)**

- **ANY** of the following procedures are considered **experimental, investigational, or unproven (EIU)**:
  - ◆ Percutaneous thoracic discectomy (i.e., thoracic discectomy performed with indirect visualization)
  - ◆ Percutaneous thoracic decompression (i.e., thoracic decompression performed with indirect visualization)
  - ◆ Endoscopic thoracic decompression or discectomy

## **Codes (CMM-613)**

The inclusion of any code in this table does not imply that the code is under management or requires prior authorization. Refer to the applicable health plan for management details. Prior authorization of a code listed in this table is not a guarantee of payment. The Certificate of Coverage or Evidence of Coverage policy outlines the terms and conditions of the member's health insurance policy.

<b>Code</b>	<b>Code Description/Definition</b>
<b>63003</b>	Laminectomy with exploration and/or decompression of spinal cord and/or cauda equina, without facetectomy, foraminotomy or discectomy (e.g., spinal stenosis), 1 or 2 vertebral segments; thoracic
<b>63016</b>	Laminectomy with exploration and/or decompression of spinal cord and/or cauda equina, without facetectomy, foraminotomy or discectomy (e.g., spinal stenosis), more than 2 vertebral segments; thoracic
<b>63046</b>	Laminectomy, facetectomy and foraminotomy (unilateral or bilateral with decompression of spinal cord, cauda equina and/or nerve root[s], [e.g., spinal or lateral recess stenosis]), single vertebral segment; thoracic
<b>+63048</b>	Laminectomy, facetectomy and foraminotomy (unilateral or bilateral with decompression of spinal cord, cauda equina and/or nerve root[s], [e.g., spinal or lateral recess stenosis]), single vertebral segment; each additional segment, cervical, thoracic, or lumbar (List separately in addition to code for primary procedure)
<b>63055</b>	Transpedicular approach with decompression of spinal cord, equina and /or nerve root(s) (e.g., herniated intervertebral disc), single segment; thoracic
<b>+ 63057</b>	Transpedicular approach with decompression of spinal cord, equina and/or nerve(s) (e.g., herniated intervertebral disc), single segment; each additional segment, thoracic or lumbar (List separately in addition to code for primary procedure)
<b>63077</b>	Discectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; thoracic, single interspace
<b>+63078</b>	Discectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; thoracic, each additional interspace (List separately in addition to code for primary procedure)
<b>63085</b>	Vertebral corpectomy (vertebral body resection), partial or complete, transthoracic approach with decompression of spinal cord and/or nerve root(s), thoracic, single segment
<b>+63086</b>	Vertebral corpectomy (vertebral body resection), partial or complete, transthoracic approach with decompression of spinal cord and/or nerve root(s), thoracic, each additional segment (List separately in addition to code for primary procedure)

Code	Code Description/Definition
<b>63087</b>	Vertebral corpectomy (vertebral body resection), partial or complete, combined thoracolumbar approach with decompression of spinal cord, cauda equine or nerve root(s), lower thoracic or lumbar, single segment
<b>+63088</b>	Vertebral corpectomy (vertebral body resection), partial or complete, combined thoracolumbar approach with decompression of spinal cord, cauda equine or nerve root(s), lower thoracic or lumbar, each additional segment (List separately in addition to code for primary procedure)
<b>63090</b>	Vertebral corpectomy (vertebral body resection), partial or complete, transperitoneal or retroperitoneal approach with decompression of spinal cord, cauda equine or nerve root(s), lower thoracic, lumbar, or sacral; single segment
<b>+63091</b>	Vertebral corpectomy (vertebral body resection), partial or complete, transperitoneal or retroperitoneal approach with decompression of spinal cord, cauda equine or nerve root(s), lower thoracic, lumbar, or sacral; each additional segment (List separately in addition to code for primary procedure)
<b>63101</b>	Vertebral corpectomy (vertebral body resection), partial or complete, lateral extracavitory approach with decompression of spinal cord and/or nerve root(s) (e.g., For tumor or retropulsed bone fragments); thoracic, single segment
<b>+63103</b>	Vertebral corpectomy (vertebral body resection), partial or complete, lateral extracavitory approach with decompression of spinal cord and/or nerve root(s) (e.g., For tumor or retropulsed bone fragments); thoracic or lumbar, each additional segment (List separately in addition to code for primary procedure)
<b>63266</b>	Laminectomy for excision or evacuation of intraspinal lesion other than neoplasm, extradural; thoracic
<b>0274T</b>	Percutaneous laminotomy/laminectomy (interlaminar approach) for decompression of neural elements (with or without ligamentous resection, discectomy, facetectomy and/or foraminotomy), any method, under indirect image guidance (e.g., fluoroscopic, CT), single or multiple levels, unilateral or bilateral; cervical or thoracic

## **Evidence Discussion (CMM-613)**

### **Thoracic Decompression/Discectomy**

Risks of thoracic spine decompression/disc surgery include, but are not limited to, the following: infection; neurovascular injury; persistent or incomplete relief of symptoms; possible need for more surgery; dural tear; pulmonary complications; neurologic injury; and, death. Complication rates range from 20-42% with variations depending upon the surgical approach. Given the potential possibility for significant complications, proper surgical candidacy selection is critical to minimize the risk benefit ratio. Symptoms, physical exam findings, and imaging findings should support thoracic decompression/discectomy surgery. Subjective symptoms and examination findings need to be concordant with imaging as asymptomatic herniations on imaging are estimated to be 11-37%.

The majority of individuals with thoracic disc herniations do not require surgery. Symptomatic thoracic disc herniation represents only 0.1-3% of all herniations and the majority of symptomatic herniations can be successfully treated with conservative care. Therefore, an initial course of non-operative care is warranted. However, the presence of an urgent/emergent condition (e.g., rapidly progressive findings of motor loss, infection, epidural hematoma) would obviate the need for conservative treatment.

In those individuals who fail conservative management or those with neurological concern, success rates for thoracic disc procedures range from 53-100% depending upon the underlying pathology and surgical approach.

Jackson et al. (2020) noted higher rates of postoperative complications and worse functional outcomes in individuals with psychological disorders undergoing spinal surgery. It was concluded that proper identification and treatment of these conditions prior to surgery may significantly improve many outcome measures in this population.

## **References (CMM-613)**

1. American Academy of Orthopedic Surgeons (AAOS)® *OrtholInfo: Surgery and Smoking*. May 2024. American Academy of Orthopaedic Surgeons (AAOS). Available at: <https://orthoinfo.aaos.org/en/treatment/surgery-and-smoking>.
2. American Medical Association. Code 20660 as an Independent or Unrelated Procedure-Coding Tip. *CPT® Assistant Newsletter*. April 2012:11. Accessed October 5, 2023. Available at: <https://ocm.ama-assn.org/OCM/CPTAA/Newsletters.do?articleType=IssueArticle&filename=20120411&hitTerms=corpectomy>.
3. 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.
4. Brotis AG, Tasiou A, Paterakis K, Tzerefos C, Fountas KN. Complications Associated with Surgery for Thoracic Disc Herniation: A Systematic Review and Network Meta-Analysis. *World Neurosurg*. 2019;132:334-342. doi:10.1016/j.wneu.2019.08.202.
5. Brown CW, Deffer PA Jr, Akmakjian J, Donaldson DH, Brugman JL. The natural history of thoracic disc herniation. *Spine (Phila Pa 1976)*. 1992;17(6 Suppl):S97-S102. doi:10.1097/00007632-199206001-00006.
6. Chatley A, Kumar R, Jain V, Behari S, Sahu R. Effect of spinal cord signal intensity changes on clinical outcome after surgery for cervical spondylotic myelopathy. *J Neurosurg Spine*. 2009;11(5):562-567. doi:10.3171/2009.6.spine091.
7. Cheung JPY. The importance of sagittal balance in adult scoliosis surgery. *Ann Transl Med*. 2020;8(2):35.

8. Ciesla N, Dinglas V, Fan E, Kho M, Kuramoto J, Needham D. Manual muscle testing: a method of measuring extremity muscle strength applied to critically ill patients. *J Vis Exp.* 2011;(50):2632. doi:10.3791/2632.
9. Conable KM, Rosner AL. A narrative review of manual muscle testing and implications for muscle testing research. *J Chiropr Med.* 2011;10(3):157-165. doi:10.1016/j.jcm.2011.04.001.
10. 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. doi:10.1136/bmj.h1748.
11. Court C, Mansour E, Bouthors C. Thoracic disc herniation: Surgical treatment. *Orthop Traumatol Surg Res.* 2018;104(1S):S31-S40. doi:10.1016/j.otsr.2017.04.022.
12. Danielsson, A. Natural history of adolescent idiopathic scoliosis: a tool for guidance in decision of surgery of curves above 50°. *J Child Orthop.* 2013;7:37-41.
13. Diebo BG, Varghese JJ, Lafage R, Schwab FJ, Lafage V. Sagittal alignment of the spine: What do you need to know? *Clin Neurol Neurosurg.* 2015;139:295-301.
14. Fiani B, Siddiqi I, Reardon T, et al. Thoracic Endoscopic Spine Surgery: A Comprehensive Review. *Int J Spine Surg.* 2020;14(5):762-771. doi:10.14444/7109.
15. Gille O, Soderlund C, Razafimahandri HJ, Mangione P, Vital JM. Analysis of hard thoracic herniated discs: review of 18 cases operated by thoracoscopy. *Eur Spine J.* 2006;15(5):537-542. doi:10.1007/s00586-005-1014-3.
16. Glassman SD, Anagnost SC, Parker A, et al. The effect of cigarette smoking and smoking cessation on spinal fusion. *Spine (Phila Pa 1976).* 2000;25(20):2608-2615.
17. Graham RB, Sugrue PA, Koski TR. Adult degenerative scoliosis. *Clin Spine Surg.* 2016;29(3):95-107.
18. Jackson KL, Devine JG. The Effects of Smoking and Smoking Cessation on Spine Surgery: A Systemic Review of the Literature. *Global Spine J.* 2016;6(7):695-701.
19. Jackson KL, Rumley J, Griffith M, Agochukwu U, DeVine J. Correlating Psychological Comorbidities and Outcomes After Spine Surgery. *Global Spine J.* 2020;10(7):929-939. doi:10.1177/2192568219886595.
20. Kelly DM, McCarthy RE, McCullough FL, Kelly HR. Long-term outcomes of anterior spinal fusion with instrumentation for thoracolumbar and lumbar curves in adolescent idiopathic scoliosis. *Spine.* 2010;35(2):194-198.
21. 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.
22. 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;19:191-198.
23. Lindstrom D, Azodi OS, Wladis A, et al. Effects of a perioperative smoking cessation intervention on postoperative complications: a randomized trial. *Ann Surg.* 2008;248:739-745.
24. McCullen G, Vaccaro AR, Garfin SR. Thoracic and lumbar trauma: Rationale for selecting the appropriate fusion technique. *Orthop Clin North Am.* 1998;29(4):813-828.
25. Mills E, Eyawo O, Lockhart I, et al. Smoking cessation reduces postoperative complications: a systematic review and meta-analysis. *Am J Med.* 2011;124(2):144-154.
26. Moller AM, Villebro N, Pedersen T, et al. Effect of preoperative smoking intervention on postoperative complications: a randomized clinical trial. *Lancet.* 2002;359:114-117.
27. Myers K, Hajek P, Hinds C, et al. Stopping smoking shortly before surgery and postoperative complications: a systematic review and meta-analysis. *Arch Intern Med.* 2011;171:983-989.
28. Osman NS, Cheung ZB, Hussain AK, et al. Outcomes and complications following laminectomy alone for thoracic myelopathy due to ossified ligamentum flavum: A systematic review and meta-analysis. *Spine (Phila Pa 1976).* 2018;43(14):E842-E848.
29. 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.
30. 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.
31. Russo A, Balamurali G, Nowicki R, Boszczyk BM. Anterior thoracic foraminotomy through mini-thoracotomy for the treatment of giant thoracic disc herniations. *Eur Spine J.* 2012;21 Suppl 2(Suppl 2):S212-S220. doi:10.1007/s00586-012-2263-6.
32. Sardar ZM, Ames RJ, Lenke L. Scheuermann's Kyphosis: Diagnosis, Management, and Selecting Fusion Levels. *J Am Acad Orthop Surg.* 2019;27(10):e462-e472.
33. 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.
34. Siecean A, Seicean S, Alan N, et al. Effect of smoking on the perioperative outcomes of patients who undergo elective spine surgery. *Spine.* 2013;38:1294-1302.
35. Smith JS, Shaffrey CI, Glassman SD, et al. Risk-benefits assessment of surgery for adult scoliosis: An analysis based on patient age. *Spine.* 2011;36(10):817-824.

36. Smith JS, Shaffrey CI, Lafage V, et al. Comparison of best versus worst clinical outcomes for adult spinal deformity surgery: A retrospective review of a prospectively collected, multicenter database with 2-year follow-up. *J Neurosurg Spine*. 2015;23(3):349-359.
37. Sorensen LT. Wound healing and infection in surgery: the pathophysiological impact of smoking, smoking cessation, and nicotine replacement therapy: a systemic review. *Ann Surg*. 2012;255:1069-1079.
38. Theadom A, Cropley M. Effects of preoperative smoking cessation on the incidence and risk of intraoperative and postoperative complications in adult smokers: a systematic review. *Tobacco Control*. 2006;15:352-358.
39. Tsuji H. Laminoplasty for patients with compressive myelopathy due to so-called spinal canal stenosis in cervical and thoracic regions. *Spine*. 1982;7(1):28-34.
40. Wong J, Lam DP, Abrishami A, et al. Short-term preoperative smoking cessation and postoperative complications: a systematic review and meta-analysis. *Can J Anaesth*. 2012;59(3):268-279.
41. 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.
42. Yin L, Zhang J, Wu Y, Li J, Yang Q. Increased signal intensity of spinal cord on T2W magnetic resonance imaging for cervical spondylotic myelopathy patients. *Medicine (Baltimore)*. 2020;99(49):e23098. doi:10.1097/MD.00000000000023098.
43. Yoon WW, Koch J. Herniated discs: when is surgery necessary?. *EFORT Open Rev*. 2021;6(6):526-530. doi:10.1302/2058-5241.6.210020.
44. York PJ, Kim HJ. Degenerative Scoliosis. *Curr Rev Musculoskelet Med*. 2017;10(4):547-558. doi:10.1007/s12178-017-9445-0.
45. York PJ, Kim HJ. Degenerative scoliosis. *Curr Rev Musculoskelet Med*. 2017;10(4):547-558.