

Discogenic Pain Treatment (for Indiana Only)

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[Instructions for Use](#)

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Related Policies
<ul style="list-style-type: none"> Ablative Treatment for Spinal Pain (for Indiana Only) Minimally Invasive Spine Surgery Procedures (for Indiana Only)

Application

This Medical Policy only applies to the state of Indiana.

Coverage Rationale

For thermal intradiscal procedures (TIPs), refer to the InterQual® Medicare: Procedures, Thermal Intradiscal Procedures (TIPs).

Click [here](#) to view the InterQual® criteria.

The following procedures are unproven and not medically necessary due to insufficient evidence of efficacy:

- [Annular closure devices \(ACDs\)](#)
- [Percutaneous injection of allogeneic cellular/tissue based products](#)

Note: For percutaneous discectomy for the treatment of axial or radicular pain, refer to the Medical Policy titled [Minimally Invasive Spine Surgery Procedures \(for Indiana Only\)](#).

Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by federal, state, or contractual requirements and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Guidelines may apply.

CPT Code	Description
*0627T	Percutaneous injection of allogeneic cellular and/or tissue-based product, intervertebral disc, unilateral or bilateral injection, with fluoroscopic guidance, lumbar; first level

CPT Code	Description
*0628T	Percutaneous injection of allogeneic cellular and/or tissue-based product, intervertebral disc, unilateral or bilateral injection, with fluoroscopic guidance, lumbar; each additional level (List separately in addition to code for primary procedure)
*0629T	Percutaneous injection of allogeneic cellular and/or tissue-based product, intervertebral disc, unilateral or bilateral injection, with CT guidance, lumbar; first level
*0630T	Percutaneous injection of allogeneic cellular and/or tissue-based product, intervertebral disc, unilateral or bilateral injection, with CT guidance, lumbar; each additional level (List separately in addition to code for primary procedure)
*22526	Percutaneous intradiscal electrothermal annuloplasty, unilateral or bilateral including fluoroscopic guidance; single level
*22527	Percutaneous intradiscal electrothermal annuloplasty, unilateral or bilateral including fluoroscopic guidance; 1 or more additional levels (List separately in addition to code for primary procedure)
22899	Unlisted procedure, spine

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HCPCS Code	Description
*S2348	Decompression procedure, percutaneous, of nucleus pulposus of intervertebral disc, using radiofrequency energy, single or multiple levels, lumbar

Note: Codes labeled with an asterisk (*) are not managed for medical necessity review for the state of Indiana at the time this policy became effective. Refer to the most up to date prior authorization list for Indiana at [Prior Authorization and Notification: UnitedHealthcare Community Plan of Indiana](#).

Description of Services

Annular Closure Devices

The annulus fibrosus is a ring of fibrocartilage and fibrous tissue around the intervertebral disc, surrounding the nucleus pulposus of the spine. During a surgical discectomy or other spine surgeries, an open pathway or hole (defect) is made in the annulus fibrosus, which is then left to heal. Annulus fibrosus repair devices are designed to reinforce or bridge material to form a strong flexible wall between the annulus and nucleus of the herniated region to close the defect and repair the annulus fibrosus of the intervertebral disc (Long et al., 2016).

Intradiscal Biacuplasty (IDB) or Biacuplasty

Intradiscal biacuplasty (IDB) or biacuplasty is a modification of IDET that aims to destroy the nerve fibers that generate pain sensations. IDB is a minimally invasive outpatient procedure that requires local anesthesia or mild sedation. IDB uses radiofrequency energy to heat the tissue, while circulating water is used to cool the tissue near the disc. This bilateral approach is intended to facilitate controlled lesioning between the electrodes in the disc.

Percutaneous Injection of Allogeneic Cellular/Tissue-Based Products

Allogeneic cellular/tissue-based products are cell therapies injected through the skin into discs of the lumbar spine to stimulate tissue repair.

Clinical Evidence

Annular Closure Devices (ACDs)

There is insufficient high-quality evidence to support annulus fibrosus repair devices as an adjunct for discectomy. Overall quality of evidence is low and does not allow sufficient follow-up time to determine long-term outcomes. Further research with randomized controlled studies, larger patient sample sizes and long-term outcomes are required to demonstrate its safety and efficacy.

Wang et al. (2023) conducted a meta-analysis aimed at summarizing the clinical efficacy and safety of the various annular defect repair methods that have emerged in recent years. The analysis included 7 RCTs and 8 observational studies which included a total of 2161 participants. The authors found by adding the annular repair technique to the surgical procedure for lumbar disc herniation (LDH), a reduction was seen in the postoperative recurrence rate, reoperation rate, and loss of intervertebral height. Furthermore, a subgroup analysis identified the Barricaid Annular Closure Device (ACD) more effective than the annulus fibrosus suture in preventing re-protrusion and reducing reoperation rates. All 15 studies reported reherniation rates as a follow-up endpoint and all suggested that the postop recurrence rate in the annular repair group was significantly lower than that in the control group. Serious adverse events included dural injury/spinal fluid leakage, epidural hematoma, and wound-related adverse events (such as infection, dehiscence, and delayed healing) and were reported in 12 studies, but only participants from four studies had experienced any of these. It was concluded that lumbar discectomy combined with an annular closure device could effectively reduce the postop recurrence and reoperation rates in patients with lumbar disc herniation.

A Hayes Technology Assessment was conducted on 9 studies that met the inclusion criteria for implantation of an annular closure device (ACD) to close sizable defects (typically $\geq 6\text{mm}$), for the prevention of recurrent lumbar disc herniation (LDH) following lumbar discectomy. All included studies recruited and treated patients who had symptomatic radiculopathy caused by LDH. In most cases, either the patients had LDH that had failed to respond to more than 6 weeks of conservative care, or they had contraindications to conservative treatment strategies (such as neurological deficits). It was concluded that overall, the quality of evidence evaluating the safety and efficacy of ACD is low quality. Only one study demonstrated good quality. Limitations of the individual studies included retrospective design, use of historical controls, small sample sizes, and insufficient follow-up time to determine the long-term outcomes. Additionally, it was noted that numerous studies involved overlapping authors and research groups, which may result in the analysis of duplicate patient data (Hayes 2023).

In a Clinical Evidence Assessment, ECRI reported the findings on the Barricaid annular closure device (Intrinsic Therapeutics, Inc.) for preventing recurrent vertebral disc herniation after lumbar discectomy versus lumbar discectomy alone for preventing disc reherniation and reoperation. Based on the results of a systematic review (SR) with meta-analysis of data from 2 randomized controlled trials (RCTs) and 2 nonrandomized comparison studies, it was determined the evidence is somewhat favorable. The studies included in this report were conducted in Europe and South Korea and data may not be directly applicable to healthcare systems in other countries; additional randomized controlled trials conducted in the United States would be useful in confirming these results (ECRI 2023).

Thomé et al. (2021) reported 5-year results on patients that received an annular closure with a bone-anchored implant (Barricaid) for lumbar disc herniation. Participants included in the study were aged between 21 and 75 years, had a single-level disc herniation between L1 and S1, had a large annular defect (4 to 6 mm tall and 6 to 10 mm wide), leg pain and failure of conservative treatment for at least 6 weeks prior to surgery. MRI confirmed disc herniation prior to surgery. 550 patients from 21 sites were randomized into two groups; the device group (n = 272) had lumbar microdiscectomy with the Barricaid device and the control group (n = 278) had lumbar microdiscectomy only. Patient reported outcomes included Oswestry Disability Index (ODI), leg pain, and quality of life. Patients were followed up at 6 weeks, 3 months, 6 months, and annually for 5 years. The authors found the addition of the Barricaid device during surgery lowered the patient's risk of recurrence and reoperation; when compared to other similar studies, these findings suggest promising long-term results. Limitations included lack of blinding contributed to performance bias, approximately 25% of participants lost to follow-up and inability to apply the results to patients with small annular defects.

In an ongoing prospective, randomized, multicenter study of 554 patients in 21 centers in Europe, a total of 276 patients were randomized to the annular closure device (ACD) group and 278 patients to the control group (CG) to demonstrate the superiority of the Barricaid device to a discectomy for primary lumbar disc herniation (Clinicaltrial.gov NCT01283438). Three year results (Kienzler et al., 2019, included in the 2023 ECRI and 2023 Hayes assessments) showed Barricaid was superior to discectomy alone for symptomatic reherniation, reoperation, leg pain, back pain, Oswestry Disability Index (ODI), and Physical Component Study (PCS). There were specific risks associated with ACD group such as implantation difficulties, radiographic evidence of migration, mesh detachment, and vertebral endplate changes (VEPC), however the safety profile was similar between the two groups. Nada et al. (2019, also included in the 2020 ECRI and 2021 Hayes assessments) reported the four year results on the risk of lumbar disc reherniation and reoperation rate for lumbar discectomy in patients with large annular defects following single level lumbar discectomy. Clinical follow-up occurred at 6 weeks, 3 months, 6 months, and annually for 4 years. The results showed the risk of reoperation was 14.4% for those who received the device, and 21.1% for the controls. The reoperation rate was not significantly affected by age, sex, body mass index, smoking status, level of herniation, leg pain or ODI

scores. Additionally, the percentage of patients who achieved the minimal clinically important difference without a reoperation was proportionally higher in the ACD group compared to the control group for leg pain. The authors concluded that the addition of a bone anchored ACD reduces the risk of reoperation and provides better long term pain and disability relief. The authors acknowledged that this trial has several limitations; only patients with large post-discectomy annular defects were included and there are additional patient characteristics that were crucial to achieving positive results and included adequate disc height and non-osteoporotic bone mineral density (BMD) of the lumbar spine. Additionally, the decision to re-operate involved shared decision-making between the patient and surgeon resulting in a potential for bias in the reported re-operation rates. In 2021, Kienzler et al. analyzed the data from this same trial to report the risk factors for early reherniation after lumbar discectomy with or without annular closure. The results showed four (1.5%) symptomatic reherniations in the ACD group and 18 (6.5%) in the control group. A significant correlation was found with recurrent herniation for disc degeneration, and a trend for current smoker status. In the control group, age ≥ 50 years and disc degeneration were predictive factors for reherniation. The authors concluded that these were predictive factors for early disc herniation after lumbar surgery and suggest that the ACD reduced the risk.

In a prospective RCT on sixty patients, Cho et al. (2019, included in the 2023 Hayes assessment above) compared the recurrence and re-operation outcomes for conventional lumbar discectomy (CLD) with that of a discectomy utilizing the Barricaid® annular closure device (ACD). The participants were aged 18 to 75 years and suffering from sciatica that was unresponsive to conservative treatment for at least 6 weeks; no restrictions were placed on defect height, size, or width except as defined by the manufacturer's instructions for use. In the ACD group, a limited discectomy was followed by implantation of the Barricaid device. In the CLD group, patients received CLD alone. Study outcomes included patient-reported pain as measured with the visual analog scale (VAS), disability with the Oswestry Disability Index (ODI), and quality of life using the Medical Outcomes Study 12-item Short-Form health survey (SF-12) scale. Patients were assessed postoperatively at 1 week and again at 1, 3, 6, 12, and 24 months. The authors found that while both ACD and CLD groups showed positive results in scores for VAS, ODI and SF-12, no significant difference was found between the two groups themselves. It was concluded that the Barricaid® ACD was associated with excellent clinical scores and thus compelling evidence to support its use, however limitations include small sample size, large loss to follow-up and lack of long-term outcomes.

Thomé, et al. (2018, included in both 2023 ECRI and 2023 Hayes assessments above) reported the findings of an RCT testing whether bone-anchored annular closure device, in addition to lumbar microdiscectomy, resulted in lower reherniation and reoperation rates plus increased overall success compared with lumbar microdiscectomy alone. Participants with symptoms of lumbar disc herniation for at least 6 weeks and a large annular defect (6-10 mm width) after lumbar microdiscectomy were included in the study and randomized to bone-anchored annular closure device (n = 276) or lumbar microdiscectomy only (control; n = 278). Based on modified intention-to-treat analyses, participants in the annular closure device treatment arm were less likely to have recurrent herniation (50% vs. 70%, $P < .001$) and more likely to meet the composite end point success (27% vs. 18%, $P = .02$). The frequency of reoperations to address recurrent herniation was 5% with annular closure device and 13% in controls ($P = .001$). Scores for back pain, leg pain, Oswestry Disability Index, and health-related quality of life at regular visits were comparable between groups over 2-year follow-up. In 2021, the same author reported the final outcomes over 5 years. In this secondary analysis with related results, the authors found implantation of annular closure device with a bone-anchored implant significantly reduced the risk of recurrent herniation and reoperation; 40 patients underwent 53 reoperations in the device group, and 58 patients underwent 82 reoperations in the control group. Serious adverse events were comparable and were less frequent in the device group. The findings are limited by lack of masking of the participants and investigators to the intervention, which could have introduced biases in the findings, and possible conflicts of interest in this industry-sponsored study.

Kuršumović et al. (2018, included in the 2023 Hayes assessment above) conducted a retrospective analysis of the Thomé (2018) RCT described above to characterize the morphology and clinical relevance of vertebral endplate changes (VEPC) following limited lumbar discectomy with or without implantation of a bone-anchored annular closure device (ACD). Of 554 randomized patients, the as-treated population consisted of 550 patients (267 ACD, 283 controls). VEPC were preoperatively identified in 18% of patients in the ACD group and in 15% of controls. At 2 years, VEPC frequency increased to 85% with ACD and 33% in Controls. Device- or procedure-related serious AEs (8% vs. 17%, $P = 0.001$) and secondary surgical intervention (5% vs. 13%, $P < 0.001$) favored the ACD group over controls. In the ACD group, clinical outcomes were comparable in patients with and without VEPC at 2 years follow-up. In the control group, patients with VEPC at 2 years had higher risk of symptomatic reherniation versus patients without VEPC (35% vs. 19%, $P < 0.01$) The authors concluded that in patients with large annular defects following limited lumbar discectomy, additional implantation with a bone-anchored ACD reduces risk of postoperative complications despite a greater frequency of VEPC. VEPC were associated with higher risk of symptomatic reherniation in

patients treated with limited lumbar discectomy, but not in those who received additional ACD implantation. Additional RCTs are needed to validate these findings.

Parker et al. (2016, included in both 2023 ECRI and 2023 Hayes assessments above) conducted a prospective cohort study to evaluate whether an annular closure device (Barricaid®) could be implanted safely to reduce same-level recurrent disk herniation, or attenuate disk height loss and improve the outcome after lumbar discectomy. Forty-six consecutive patients undergoing lumbar discectomy for single-level herniated disk at 2 institutions were followed prospectively with clinical and radiographic evaluations at 6 weeks, and 3, 6, 12, and 24 months (control cohort). A second consecutive cohort of 30 patients undergoing 31 lumbar discectomies with implantation of an annular closure device was followed similarly. Incidence of recurrent disk herniation, disk height loss, the leg and back pain VAS, and the ODI were assessed at each follow-up. By 2 years of follow-up, symptomatic recurrent same-level disk herniation occurred in 3 (6.5%) patients in the control cohort versus 0 (0%) patients in the annular repair cohort ($P = 0.27$). A trend of greater preservation of disk height was observed in the annular repair versus the control cohort 3 months (7.9 vs. 7.27 mm, $P = 0.08$), 6 months (7.81 vs. 7.18 mm, $P = 0.09$), and 12 months (7.63 vs. 6.9 mm, $P = 0.06$) postoperatively. The annular closure cohort reported less leg pain (VAS-LP: 5 vs. 16, $P < 0.01$), back pain (VAS-BP: 13 vs. 22, $P < 0.05$), and disability (ODI: 16 vs. 22, $P < 0.05$) 1 year postoperatively. The authors conclude that closure of annular defect after lumbar discectomy may help preserve the physiological disk function and prevent long-term disk height loss and associated back and leg pain. The study is limited by the lack of randomization between interventions, which could have introduced a bias. RCTs with larger patient populations and longer-term follow-up are needed to further evaluate Barricaid.

Ledic et al. (2015, included in the 2023 ECRI assessment above) reported two-year outcomes from two prospective case series of patients treated with limited discectomy and an annular closure device. A total of 75 patients were included in this study consisting of 40 men and 35 women with an average age of 40 years. Disk height maintenance within the group overall was 90% at 24 months. Overall, 97% of the treated disks demonstrated disk height maintenance of at least 75% of preoperative levels at 12 months and 92% at 24 months. Disk height maintenance was correlated with less nucleus removal. Patient disability, back pain, and leg pain were significantly improved from preoperative levels at 6 weeks and maintained over the course of study. There was a single symptomatic reherniation requiring surgical intervention within this series. According to the authors, limited lumbar discectomy combined with the use of an annular closure device provided very low rates of disk reherniation and exhibited excellent disk height maintenance and sustained disability, leg pain, and back pain improvement within a 24-month postoperative study period. Study limitations include lack of comparison group and small patient population.

Percutaneous Injection of Allogeneic Cellular/Tissue-Based Products

There is insufficient high quality evidence to support percutaneous injection of allogeneic cellular/tissue based products for treating discogenic pain. Further research with robust RCTs, larger patient sample sizes and long-term outcomes are required to demonstrate its safety and efficacy.

In 2021, Beall et al. reported the one year results of the VAST RCT below. A total of 218 patients with chronic low back pain secondary to single-level or 2-level degenerative disc disease were blinded and randomized to receive intradiscal injections of either viable disc allograft or saline or continued with nonsurgical management (NSM) and assessed at 6 and 12 months. After 3 months, the NSM group could crossover to the allograft group. The results showed at 12 months, clinically meaningful improvements in VASPI and ODI scores in both groups, with 76% responders in the allograft group compared to 57% in the saline group. Limitations of this study include a relatively small number of participants as well as the loss of 36 participants to follow up. Furthermore, future studies are needed using a more accurate neutral comparator than saline to better understand the therapeutic effects.

Beall et al. (2020) reported the preliminary results of the first 24 patients from an ongoing prospective parallel-arm, multicenter randomized controlled trial for individuals with degenerative disc disease who received the VIADISC™ NP (VIVEX Biologics, Inc.) allograft. Individuals were randomized to receive allograft or saline at either 1 or 2 levels or continue nonsurgical management (NSM); outcomes were assessed using a visual analog scale (VAS) and Oswestry Disability Index (ODI). At 12 months, the VAS score improved from 54.81, 55.25, and 62.255 in the allograft, saline, and NSM subjects, to 12.27, 19.67, and 6.0 at 12 months. The ODI score improved from 53.73, 49.25, and 55.75 in the allograft, placebo, and NSM subjects, to 15.67, 9.33, and 11.0 at 12 months. At 3 months, participants from both groups were given the option to cross over to the allograft treatment and all subjects chose that option. Adverse events were short-lived and resolved in all cohorts. The trial has completed recruitment of 218 of the 220 planned participants, and follow-up will continue for 36 months.

Clinical Practice Guidelines

American Society of Interventional Pain Physicians (ASIPP)

In an ASIPP Interventional Pain Management guideline, the authors performed a systematic assessment of the literature and concluded that the evidence is limited to fair for intradiscal electrothermal therapy.

International Society for the Advancement of Spine Surgery (ISASS)

In a detailed review of the evidence by Lorio et al. (2019), the ISASS identifies scientific evidence that supports the use of bone-anchored annual closure devices in patients with large annular defects for treatment of LDH. Current “evidence demonstrates that, in appropriately selected patient populations, implantation of a bone-anchored ACD reduces the risk of symptom recurrence and revision surgery compared to discectomy alone.

North American Spine Society (NASS)

In the 2012 clinical guidelines on the diagnosis and treatment of lumbar disc herniation with radiculopathy, NASS states that there is insufficient evidence for or against the use of percutaneous electrothermal disc decompression in the treatment of patients with lumbar disc herniation with radiculopathy.

In their 2020 clinical guideline on the diagnosis and treatment of low back pain, NASS concluded that there is insufficient evidence to make a recommendation for or against the use of percutaneous intradiscal radiofrequency thermocoagulation.

U.S. Food and Drug Administration (FDA)

This section is to be used for informational purposes only. FDA approval alone is not a basis for coverage.

The Center for Biologics Evaluation and Research (CBER) regulates cellular therapy products, human gene therapy products, and certain devices related to cell and gene therapy. CBER uses both the Public Health Service Act and the Federal Food Drug and Cosmetic Act as enabling statutes for oversight. Cellular therapy products include cellular immunotherapies, cancer vaccines, and other types of both autologous and allogeneic cells for certain therapeutic indications, including hematopoietic stem cells and adult and embryonic stem cells. Refer to the following website for further information:

<https://www.fda.gov/vaccines-blood-biologics/cellular-gene-therapy-products>. (Accessed September 19, 2023)

Additional information for marketed devices indicated for closure of the annulus fibrosus can be found at <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmnmn.cfm> under the following product codes:

- Product code: FTL (surgical mesh, polymeric)
- Product code: FTM (mesh, surgical)
- Product code: GAT (suture, nonabsorbable, synthetic, polyethylene)

(Accessed September 19, 2023)

On February 8, 2019, the Barricaid® Anular Closure Device (Intrinsic Therapeutics, Inc.) received FDA premarket approval, and is indicated for reducing the incidence of reherniation and reoperation in skeletally mature patients with radiculopathy (with or without back pain) attributed to a posterior or posterolateral herniation, and confirmed by history, physical examination and imaging studies which demonstrate neural compression using MRI to treat a large anular defect (between 4-6 mm tall and between 6-10 mm wide) following a primary discectomy procedure (excision of herniated intervertebral disc) at a single level between L4 and S1. Additional information can be found at:

<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmnmn.cfm?ID=K201676>. (Accessed September 19, 2023)

FDA approved electrosurgical cutting and coagulation devices and accessories can be found (under product codes GEI, GXI, HRX, BSO and BSP) at: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmnmn.cfm>. (Accessed September 19, 2023)

References

American Society of Interventional Pain Physicians. An Update of Comprehensive Evidence-Based Guidelines for Interventional Techniques in Chronic Spinal Pain. Part II: Guidance and Recommendations.2013.
<https://www.painphysicianjournal.com/current/pdf?article=MTg3Mg%3D%3D&journal=74>. Accessed September 20, 2023.

Beall DP, Wilson GL, Bishop R, et al. VAST Clinical Trial: Safely supplementing tissue lost to degenerative disc disease. *Int J Spine Surg*. 2020 Apr 30;14(2):239-253.

Beall DP, Davis T, DePalma MJ, et al. Viable disc tissue allograft supplementation; one- and two-level treatment of degenerated intervertebral discs in patients with chronic discogenic low back pain: one year results of the VAST randomized controlled trial. *Pain Physician*. 2021 Sep;24(6):465-477.

Cho PG, Shin DA, Park SH, et al. Efficacy of a novel annular closure device after lumbar discectomy in Korean patients: a 24-month follow-up of a randomized controlled trial. *J Korean Neurosurg Soc*. 2019 Nov;62(6):691-699.

Desai MJ, Kapural L, Petersohn JD, et al. A prospective, randomized, multicenter, open-label clinical trial comparing intradiscal biacuplasty to conventional medical management for discogenic lumbar back pain. *Spine (Phila Pa 1976)*. 2016 Jul 1;41(13):1065-74.

ECRI Institute. Clinical Evidence Assessment. Barricaid Annular Closure Device (Intrinsic Therapeutics, Inc.) for Preventing Recurrent Vertebral Disc Herniation after Lumbar Discectomy. June 2020.

Hayes, Inc. Evidence Analysis Research Brief. Automated Percutaneous Lumbar Discectomy for Lumbar Disc Disease. Lansdale, PA: Hayes, Inc; September 2020. Archived October 2021.

Hayes, Inc. Health Technology Assessment. Annular Closure for Prevention of Lumbar Disc Reherniation. Lansdale, PA: Hayes, Inc; June 2023.

Hirsch JA, Singh V, Falco FJ, et al. Automated percutaneous lumbar discectomy for the contained herniated lumbar disc: a systematic assessment of evidence. *Pain Physician*. 2009 May-Jun; 12(3):601-20.

Kienzler JC, Klassen PD, Miller LE, et al; Annular Closure RCT Study Group. Three-year results from a randomized trial of lumbar discectomy with annulus fibrosus occlusion in patients at high risk for reherniation. *Acta Neurochir (Wien)*. 2019 Jul;161(7):1389-1396.

Kienzler JC, Fandino J, Van de Kelft E, et al; Barricaid® Annular Closure RCT Study Group. Risk factors for early reherniation after lumbar discectomy with or without annular closure: results of a multicenter randomized controlled study. *Acta Neurochir (Wien)*. 2021 Jan;163(1):259-268.

Kuršumović A, Kienzler JC, Bouma GJ, et al. Morphology and clinical relevance of vertebral endplate changes following limited lumbar discectomy with or without bone-anchored annular closure. *Spine (Phila Pa 1976)*. 2018;43(20):1386-1394.

Ledic D, Vukas D, Grahovac G, et al. Effect of anular closure on disk height maintenance and reoperated recurrent herniation following lumbar discectomy: two-year data. *J Neurol Surg A Cent Eur Neurosurg*. 2015 May;76(3):211-8.

Long RG, Bürki A, Zysset P, et al. Mechanical restoration and failure analyses of a hydrogel and scaffold composite strategy for annulus fibrosus repair. *Acta Biomater*. 2016 Jan;30:116-125.

Lorio M, Kim C, Araghi A, et al. International Society for the Advancement of Spine Surgery Policy 2019-Surgical Treatment of Lumbar Disc Herniation with Radiculopathy. *Int J Spine Surg*. 2020 Feb 29;14(1):1-17.

Manchikanti L, Abdi S, Atluri S, et al. An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. *Pain Physician*. 2013a Apr; 16(2Suppl):S49-283.

Martins, DE, Astur N, Kanas, M. Quality assessment of systematic reviews for surgical treatment of low back pain: an overview. *The Spine Journal* 16 (2016) 667–675.

Nanda D, Arts MP, Miller LE, et al. Annular closure device lowers reoperation risk 4 years after lumbar discectomy. *Med Devices (Auckl)*. 2019 Sep 4;12:327-335.

North American Spine Society (NASS). Evidence-Based Clinical guidelines for multidisciplinary spine care. Diagnosis and treatment of lumbar disc herniation with radiculopathy. 2012.

North American Spine Society (NASS). Evidence-Based Clinical guidelines for multidisciplinary spine care. Diagnosis and treatment of low back pain. 2020.

North American Spine Society (NASS) website. Spine Definitions. <https://www.spine.org/KnowYourBack/Resources/Definitions>. Accessed September 20, 2023.

Park CH, Lee SH, Lee PB. Intradiscal pulsed radiofrequency application duration effect on lumbar discogenic low back pain. *Pain Physician*. 2020 Sep;23(5):E535-E540.

Parker SL, Grahovac G, Vukas D, et al. Effect of an annular closure device (Barricaid) on same-level recurrent disk herniation and disk height loss after primary lumbar discectomy: two-year results of a multicenter prospective cohort study. Clin Spine Surg. 2016 Dec;29(10):454-460.

Thomé C, Klassen PD, Bouma GJ, et al. Annular Closure RCT Study Group. Annular closure in lumbar microdiscectomy for prevention of reherniation: a randomized clinical trial. Spine J. 2018 Dec;18(12):2278-2287.

Thomé C, Kuršumovic A, Klassen PD, et al; Annular Closure RCT Study Group. Effectiveness of an annular closure device to prevent recurrent lumbar disc herniation: a secondary analysis with 5 years of follow-up. JAMA Netw Open. 2021 Dec 1;4(12):e2136809.

Wang Y, He X, Chen S, et al. Annulus fibrosus repair for lumbar disc herniation: a meta-analysis of clinical outcomes from controlled studies. Global Spine J. 2023 Apr 17:21925682231169963.

Wu J, Yu B, He B, et al. Outcome predictors of the transforaminal endoscopic spine system technique for single-level lumbar disk herniation. J Neurol Surg A Cent Eur Neurosurg. 2018 Jul;79(4):285-290.

Zhu H, Zhou XZ, Cheng MH, et al. The efficacy of coblation nucleoplasty for protrusion of lumbar intervertebral disc at a two-year follow-up. Int Orthop. 2011 Jan 15.

Policy History/Revision Information

Date	Summary of Changes
02/01/2024	Supporting Information <ul style="list-style-type: none">Updated <i>Description of Services</i>, <i>Clinical Evidence</i>, and <i>References</i> sections to reflect the most current informationArchived previous policy version CS031IN.06

Instructions for Use

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the federal, state, or contractual requirements for benefit plan coverage must be referenced as the terms of the federal, state, or contractual requirements for benefit plan coverage may differ from the standard benefit plan. In the event of a conflict, the federal, state, or contractual requirements for benefit plan coverage govern. Before using this policy, please check the federal, state, or contractual requirements for benefit plan coverage. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

UnitedHealthcare may also use tools developed by third parties, such as the InterQual® criteria, to assist us in administering health benefits. The UnitedHealthcare Medical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.