Discectomy

Policy Number: 7.01.146  Last Review: 12/2018
Origination: 12/2014  Next Review: 12/2019

Policy
Blue Cross and Blue Shield of Kansas City (Blue KC) will provide coverage for Discectomy when it is determined to be medically necessary because the criteria shown below are met.

When Policy Topic is covered
Lumbar discectomy (see Considerations) may be considered medically necessary for the treatment of lumbar herniated disc when the following criteria are met:

- Signs and symptoms of radiculopathy on history and physical exam (see Considerations)
- One of the following clinical presentations is present:
  - Rapidly progressing neurologic deficits; OR
  - Persistent debilitating back or leg pain that is refractory to at least 6 weeks of conservative therapy (see Considerations).
- Documentation of nerve root compress on imaging (MRI or CT) at a level that corresponds with the patient’s symptoms (see Considerations).

Cervical discectomy (see Considerations) may be considered medically necessary for the treatment of cervical herniated disc when the following criteria are present:

- Signs and symptoms of radiculopathy and/or myelopathy on history and physical exam (see Considerations)
- One of the following clinical presentations is present:
  - Rapidly progressing neurologic deficits; OR
  - Persistent debilitating neck, back, or arm pain that is refractory to at least 6 weeks of conservative therapy (see Considerations); OR
  - Persistent or progressive symptoms of myelopathy that are refractory to at least 6 weeks of conservative therapy (see Considerations)
- Documentation of nerve root compress on imaging (MRI or CT) at a level that corresponds with the patient’s symptoms (see Considerations).

When Policy Topic is not covered
Lumbar discectomy is considered not medically necessary for the treatment of lumbar herniated disc when the above criteria are not met.
Cervical discectomy is considered **not medically necessary** for the treatment of cervical herniated disc when the above criteria are not met.

Discectomy is considered **investigational** for all other indications.

**Considerations**
Lumbar discectomy refers to standard open discectomy or minimally invasive microdiscectomy. Microdiscectomy will be defined for the purpose of this assessment as having the following features: 1) Uses a small surgical incision (as opposed to an endoscopic “port”, 2) Uses a specially designed microscope to achieve direct visualization of the vertebral column (as opposed to indirect visualization with an endoscope or other type of cameras), and 3) removes disc and other surgical products by direct visualization through the surgical incision. Microdiscectomy may be done with adjunctive devices, such as tubular retractors to improve visualization, or endoscopy to localize the correct areas to operate. However, removal of the disc itself must be done under direct visualization in order to be considered microdiscectomy.

Cervical discectomy refers to open anterior cervical discectomy (with or without fusion), or minimally invasive posterior cervical discectomy/foraminotomy.

There are numerous other alternative procedures for performing discectomy, with uncertain efficacy compared with standard procedures. For the purpose of this reference policy, the following procedures are considered investigational and therefore not valid alternatives for discectomy:

- Laser discectomy
- Radiofrequency coblation (nucleoplasty)
- Automated percutaneous discectomy
- Endoscopic discectomy
- Intradiscal electrothermal annuloplasty (IDET)
- Intradiscal radiothermal annuloplasty
- Chemonucleolysis

Radiculopathy presents with a characteristic set of signs and symptoms, as follows:

**History**
- Pain that radiates down the back of the leg to below the knee
- Numbness and tingling in a dermatomal distribution
- Muscular weakness in a pattern associated with spinal nerve root compression

**Physical Exam**
- Positive straight leg raise test
- Loss of deep tendon reflexes corresponding to affected nerve root level
- Loss of sensation in a dermatomal pattern
Conservative nonsurgical therapy for the duration specified should include the following:

- Use of prescription strength analgesics for several weeks at a dose sufficient to induce a therapeutic response
  - Analgesics should include anti-inflammatory medications with or without adjunctive medications such as nerve membrane stabilizers or muscle relaxants AND
- Participation in at least 6 weeks of physical therapy (including active exercise) or documentation of why the patient could not tolerate physical therapy, AND
- Evaluation and appropriate management of associated cognitive, behavioral, or addiction issues
- Documentation of patient compliance with the preceding criteria.

Persistent debilitating pain is defined as:

- Significant level of pain on a daily basis defined on a visual analog scale (VAS) as greater than 4; AND
- Pain on a daily basis that has a documented impact on activities of daily living in spite of optimal conservative nonsurgical therapy as outlined above and appropriate for the patient.

Medical necessity is established by documentation of medical history, physical findings, and diagnostic imaging results that demonstrate spinal nerve compression and support the surgical treatment intervention. Documentation in the medical record must clearly support the medical necessity of the surgery and include medical history, physical examination, and diagnostic testing.

**Medical History**
- Assessment of comorbid physical and psychological health conditions (e.g., morbid obesity, current smoking, diabetes, renal disease, osteoporosis, and severe physical deconditioning)
- History of back surgery, including minimally invasive back procedures
- Prior trial, failure, or contraindication to conservative medical/non-operative interventions that may include but are not limited to the following:
  - Activity modification for at least 6 weeks
  - Oral analgesics and/or anti-inflammatory medications
  - Physical therapy
  - Chiropractic manipulation
  - Epidural steroid injections

**Physical Examination**
- Clinical findings including the patient’s stated symptoms and duration
Diagnostic Testing
- Radiologist’s report of a magnetic resonance image (MRI) or computerized tomography (CT) scan with myelogram of the lumbar spine within the past 6 months showing a lumbar spine abnormality
- Report of the selective nerve root injection results, if applicable to the patient’s diagnostic workup

Description of Procedure or Service

<table>
<thead>
<tr>
<th>Populations</th>
<th>Interventions</th>
<th>Comparators</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals:</td>
<td>Interventions of interest are:</td>
<td>Comparators of interest are:</td>
<td>Relevant outcomes include:</td>
</tr>
<tr>
<td>With lumbar herniated disc and symptoms of radiculopathy that are rapidly progressing or refractory to conservative care</td>
<td>Lumbar discectomy</td>
<td>Conservative, nonsurgical care</td>
<td>Symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Functional outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Health status measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quality of life</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment-related mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment-related morbidity</td>
</tr>
<tr>
<td>Individuals:</td>
<td>Interventions of interest are:</td>
<td>Comparators of interest are:</td>
<td>Relevant outcomes include:</td>
</tr>
<tr>
<td>With cervical herniated disc and symptoms of radiculopathy that are rapidly progressing or refractory to conservative care</td>
<td>Cervical discectomy</td>
<td>Conservative, nonsurgical care</td>
<td>Symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Functional outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Health status measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quality of life</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment-related mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment-related morbidity</td>
</tr>
</tbody>
</table>

Discectomy is a surgical procedure in which one or more intervertebral discs are removed. Extrusion of an intervertebral disc beyond the intervertebral space can compress the spinal nerves and result in symptoms of pain, numbness and weakness. Discectomy is intended to treat symptoms by relieving pressure on the affected nerve(s). Discectomy can be performed by a variety of surgical approaches, with either open surgery or minimally invasive techniques.

For individuals who have lumbar herniated disc(s) and symptoms of radiculopathy that are rapidly progressing or refractory to conservative care who receive lumbar discectomy, the evidence includes randomized controlled trials (RCTs), nonrandomized comparative studies, and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. Four RCTs were identified for inclusion in this evidence review, 2 of which were moderately large in size. The RCT evidence is limited by high rates of crossover from the conservative care to the surgery group in most trials. Crossover rates were 40% or higher in some trials, including the largest trial (SPORT), thereby greatly limiting the power to detect differences when using an intention-to-treat (ITT) analyses. Despite the methodologic limitations, results from these comparative studies are fairly consistent. They report that, on ITT analysis, the direction of short-term benefit favors surgery for almost all comparisons, but group differences in many cases were not statistically significant. Analysis by treatment received shows larger,
clinically significant differences in outcomes favoring surgery, and a similar magnitude of effect has been reported in nonrandomized, comparative trials. However, these analyses are limited by potential noncomparability of treatment groups. Thus it is likely that there is a true short-term benefit for surgery, and that the true treatment effect lies between the values reported for the ITT analyses and the treatment-received analyses. The evidence is also consistent in reporting that the benefits are mainly short term, lasting for weeks to months. At follow-up of 1 year or more, the best evidence reports equivalent outcomes for surgery and conservative care. This supports the conclusion that surgery will result in more rapid recovery of symptoms and disability, but no definite long-term advantage. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have cervical herniated disc(s) and symptoms of radiculopathy that are rapidly progressing or refractory to conservative care who receive cervical discectomy, the evidence includes RCTs, nonrandomized comparative studies, and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. Two small RCTs were identified for inclusion in this evidence review. Although there is less evidence for this indication, it does not differ substantially from lumbar herniated disc, showing that patient-reported symptoms and disability favor surgery in the short-term, and that long-term outcomes do not differ. Because cervical discectomy closely parallels lumbar discectomy, with close similarities in anatomy and surgical procedure, it can be inferred that the benefit reported for lumbar discectomy supports a benefit for cervical discectomy. Based on the available evidence and extrapolation from studies of lumbar herniated disc, it is likely that use of discectomy for cervical herniated disc improves short-term symptoms and disability. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

**Background**

**Disc Herniation**

Extrusion of an intervertebral disc beyond the intervertebral space can compress the spinal nerves and result in symptoms of pain, numbness, and weakness.

The natural history of untreated disc herniations is not well-characterized, but most herniations will decrease in size over time due to shrinking and/or regression of the disc. Clinical symptoms will also tend to improve over time in conjunction with shrinkage or regression of the herniation.

**Treatment**

Because most disc herniations improve over time, initial care is conservative, consisting of analgesics and a prescribed activity program tailored to patient considerations. Other potential nonsurgical interventions include opioid analgesics and chiropractic manipulation. Epidural steroid injections can also be used as a second-line intervention and are associated with short-term relief of symptoms.

---

1. Clinical symptoms will also tend to improve over time in conjunction with shrinkage or regression of the herniation.

2. Epidural steroid injections can also be used as a second-line intervention and are associated with short-term relief of symptoms.
However, some disc herniations will not improve over time with conservative care. A small proportion of patients will have rapidly progressive signs and symptoms, thus putting them at risk for irreversible neurologic deficits. These patients are considered to be surgical emergencies, and expedient surgery is intended to prevent further neurologic deterioration and allow for nerve recovery.

Other patients will not progress but will have the persistence of symptoms that require further intervention. It is estimated that up to 30% of patients with sciatica will continue to have pain for more than 1 year. For these patients, there is a high degree of morbidity and functional disability associated with chronic back pain, and there is a tendency for recurrent pain despite treatment. Therefore, treatments that have more uniform efficacy for patients with a herniated disc and chronic back pain are needed. In particular, decreased chronic pain and decreased disability are the goals of treatment of chronic low back pain due to a herniated disc.

**Surgical Treatment**

Discectomy is a surgical procedure in which one or more intervertebral discs are removed. The primary indication for discectomy is herniation (extrusion) of an intervertebral disc. Discectomy is intended to treat symptoms by relieving pressure on the affected nerve(s).

*Lumbar Discectomy*

Lumbar discectomy can be performed by a variety of surgical approaches. Open discectomy is the traditional approach. In open discectomy, a 2- to 3-cm incision is made over the area to be repaired. The spinal muscles are dissected, and a portion of the lamina may be removed to allow access to the vertebral space. The extruded disc is removed either entirely or partially using direct visualization. Osteophytes that are protruding into the vertebral space can also be removed if deemed necessary.

The main alternative to open discectomy is microdiscectomy, which has gained popularity. Microdiscectomy is a minimally invasive procedure that involves a smaller incision, visualization of the disc through a special camera, and removal of disc fragments using special instruments. Because less resection can be performed in a microdiscectomy, it is usually reserved for smaller herniations, in which a smaller amount of tissue needs to be removed. A few controlled trials comparing open discectomy with microdiscectomy have been published and reported that neither procedure is clearly superior to the other, but that microdiscectomy is associated with more rapid recovery. Systematic reviews and meta-analyses have also concluded that the evidence does not support the superiority of 1 procedure over another.

*Cervical Discectomy*

The most common procedure for cervical discectomy is anterior cervical discectomy. This is an open procedure in which the cervical spine is approached through an incision in the anterior neck. Soft tissues and muscles are separated to expose the spine. The disc is removed using direct visualization. This procedure
can be done with or without spinal fusion, but most commonly it is performed with fusion.

A less invasive procedure for cervical discectomy is posterior cervical discectomy and foraminotomy. They are performed through a small incision in the back of the neck. The nerves and muscles are separated using a small retractor. The spine is visualized with microscopic guidance, and a portion of the spine—the foramen—is removed to expose the spinal canal. Special instruments are used to remove a portion of the disc or the entire disc.

**Adverse Events**
Complications of discectomy generally include bleeding, infections, and inadvertent nerve injuries. Dural puncture occurs in a small percentage of patients, leading to leakage of cerebrospinal fluid that can be accompanied by headaches and/or neck stiffness. In a small percentage of cases, worsening of neurologic symptoms can occur postsurgery.

**Other Surgical Alternatives**
Other variations on discectomy include the following. These procedures do not have high-quality comparative trials vs standard discectomy, and will therefore not be considered as true alternatives to discectomy for this evidence review:

- Laser discectomy
- Radiofrequency coblation (nucleoplasty)
- Automated percutaneous discectomy
- Automated endoscopic discectomy
- Intradiscal electrothermal annuloplasty
- Intradiscal radiofrequency therapy
- Vertebral axial decompression
- Chemonucleolysis.

**Regulatory Status**
Discectomy is a surgical procedure and, as such, is not subject to regulation by the U.S. Food and Drug Administration. Some instrumentation used during laminectomy may be subject to Food and Drug Administration approval.

**Rationale**
This evidence review was created in October 2014 and has been updated regularly with searches of the MEDLINE database. The most recent literature update was performed through March 8, 2018.

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens;
and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

The best evidence on the efficacy of discectomy consists of several RCTs comparing discectomy with conservative care, and systematic reviews of these trials. The RCTs form the main body of evidence for evaluating the efficacy of discectomy. However, conducting high-quality RCTs for this condition is challenging, due to strong preferences for treatment on the part of both patients and physicians. This leads to difficulty enrolling a population representative of patients seen in clinical care and to high rates of crossover between treatment groups following randomization. For this reason, it is important to consider evidence from nonrandomized comparative trials. Some of the representative, larger nonrandomized comparative studies are evaluated.

**Lumbar Discectomy**

**Systematic Reviews**

Lewis et al (2015) published a network meta-analysis comparing 21 different strategies for treating sciatica. Reviewers included 122 comparative studies, 90 of which were RCTs. For disc surgery, 8 studies compared surgery with conservative care (3 RCTs, 1 quasi-RCT, 4 cohort studies), and 34 studies compared discectomy with alternative treatments, including other surgical variations. For the main outcome (overall recovery), surgery was better than exercise therapy, traction, and percutaneous discectomy. However, for the outcome of pain, disc surgery was not found to be better than alternative treatments.

A Cochrane review by Jacobs et al (2011) evaluated surgery and conservative management of sciatica due to lumbar herniated disc. Reviewers included 5 RCTs, 4 of which are discussed below, with the additional trial being a 1983 trial excluded from this review. Reviewers assigned a low risk of bias to 2 of the 4 trials, the randomized (Spine Patient Outcomes Research Trial [SPORT]) and the Leiden-The Hague Spine Intervention Prognostic Study. Reviewers determined that pooling results was not appropriate due to differences in trial methodologies, so a qualitative synthesis of the data was performed. Reviewers concluded that
surgery was likely to lead to better short-term control of leg pain, but that the overall quality of the body of evidence for this outcome was low. No differences were demonstrated between surgical and conservative care outcomes at 1 year and beyond.

Chou et al (2009) published a systematic review of the evidence for the efficacy of different surgical procedures for back pain, in conjunction with the development of clinical guidelines for the American Pain Society. For the comparison of discectomy with nonsurgical care, 4 studies were included, 3 of which are reviewed below. Studies were not pooled. Reviewers found that discectomy, performed either by open surgery or microdiscectomy, had superior outcomes for pain and disability at up to 3 months, but no definite benefits at longer time points.

**Randomized Controlled Trials**

Six RCTs comparing discectomy with conservative care were identified. One trial by Weber (1983) was not included because it was unlikely that results reflected current surgical management. Another RCT by Erginousakis et al (2011) compared percutaneous discectomy with conservative care. Because percutaneous discectomy is considered investigational (see evidence review 7.01.18), this trial was also excluded, leaving 4 RCTs for review (see Table 1).

In an RCT, Abou-Elroos et al (2017) compared conservative treatment with surgical intervention in patients who had lumbar disc herniation. Sixty patients were randomized to 2 groups: patients (n=29) treated with prolonged (6 months) physical therapy and rehabilitation (conservative treatment) and patients (n=27) who received early surgical discectomy (4 patients were lost during follow-up). To evaluate progress, 2 assessments were used: one to measure disability (the Oswestry Disability Index [ODI]) and the other (the Prolo Functional Economic Outcome Rating Scale) to measure work status (ie, the ability to get back to work). Patients in both groups experienced significant improvements in both tests. However, patients in the conservative treatment group performed better on the assessments during follow-up(s). At the end of 6 months, ODI scores were improved to 29.1 for the conservative treatment group and 32.9 for patients treated with surgical intervention. Prolo scale scores, also measured at the end of 6 months, improved from 2.1 at first assessment to 4.4 for patients in the conservative treatment group and from 2.0 at first assessment to 3.9 for patients in the surgical intervention group. Moreover, at 6 months, 62% of patients in the conservative treatment group returned to work vs 41% of patients in the surgical intervention group. The trialists concluded that a prolonged physical therapy and rehabilitation program was not only beneficial but also improved functional capacity and facilitated a faster return to work than surgery.

**Leiden-The Hague Spine Intervention Prognostic Study**

Peul et al (2007) reported on a multicenter RCT, conducted at 11 hospitals in the Netherlands, comparing immediate surgery with conservative care and surgery as necessary. Patients were 18 to 65 years old, with severe sciatica for 6 to 12 weeks, and had radiologically confirmed disc herniation. Patients (N=283) were
randomized to a surgery group (microdiscectomy) or to a conservative care group. Length of follow-up was 1 year. The primary outcomes were scores on the Roland-Morris Disability Questionnaire for sciatica, leg pain ratings on a 0-to-100 visual analog scale (VAS), and self-rating of perceived recovery on a 7-point Likert scale. Secondary outcomes included observational assessment of neurologic status and disability, the 36-Item Short-Form Health Survey (SF-36) scores, and sciatica symptom scales.

Of the 141 patients initially assigned to the surgery group, 125 (89%) underwent microdiscectomy after a mean of 2.2 weeks. Of the 142 patients assigned to conservative care, 55 (39%) underwent surgery after a mean of 18.7 weeks. At early follow-up, there were differences in favor of the early surgery group. However, at the 1-year follow-up, there were no significant between-group differences in primary outcomes (see Table 1).

**Osterman et al**
A small, single-center RCT comparing discectomy with conservative care was reported by Osterman et al (2006). \(^\text{15}\) Fifty-six patients referred to orthopedics for sciatica were eligible for inclusion, as defined by sciatica with pain radiating below the knee, at least 1 specific physical exam sign consistent with sciatica, and radiologic confirmation of a herniated disc. Patients in the surgery group were treated with microdiscectomy, and patients in the conservative care group were enrolled in a structured physical therapy program. The primary outcome measure was the intensity of leg pain on a 0-to-100 VAS; secondary outcomes were back pain, work ability, general quality of life, disability, depression, and satisfaction with care. Follow-up time points were 6 weeks, 3 months, 1 year, and 2 years.

All 28 patients assigned to the surgery group underwent microdiscectomy, and 11 (39%) of 28 patients in the physical therapy group underwent surgery by the end of the trial. At 6 weeks, patients in the surgery group reported significantly less leg pain; by the 2-year follow-up, no overall differences in leg pain were noted between the surgery and conservative care groups. At each time point, the surgery group had numerically superior results, but the differences were not statistically significant (see Table 1). On subgroup analysis, significant improvements were noted for the group initially assigned to surgery, specifically among patients older than 37 years and those with L4-5 herniation.

**The SPORT Trial**
Weinstein et al (2006) reported on SPORT, a moderately large trial that compared discectomy with nonoperative care in patients who had lumbar disc herniation; the trial included both a randomized and a nonrandomized component. \(^\text{9,16}\) The trial randomized 501 patients to discectomy or usual care. Discectomy was performed by the open technique and, in some cases, the medial border of the superior facet joint was removed. Crossover was allowed during the trial: 107 of 245 patients assigned to usual care underwent surgery, and 140 of 245 patients assigned to the surgery group underwent surgery. The main outcomes were changes from baseline in the bodily pain and physical function subscales of the SF-36 and the modified ODI measured at time points up to 2 years. Secondary outcomes included self-
reported improvement, work status, satisfaction with care, and a symptom severity measure (Sciatica Bothersomeness Index).

For the primary outcomes evaluated using intention-to-treat analysis, improvements in ODI scores were superior for the surgery group at 3 months, but, at the 1- and 2-year follow-ups, there were no significant group differences on either primary outcome (see Table 1). For secondary outcomes, there were significant improvements for the surgery group on the Sciatica Bothersomeness Index at all time points, and satisfaction with care was superior for the surgery group at 3 months, but not at longer time points. A secondary analysis was performed on a treatment-received basis, and this analysis showed significantly greater improvements for the surgery group at all time points. The estimated treatment effects for the SF-36 bodily pain and physical function subscales were 15.0 and 17.5, respectively, on a 0-to-100 scale. The estimated change in the ODI score was -15.0 on a 0 to 100 scale.

In a secondary analysis of the SPORT trial, Suri et al (2017) investigated the risks and predictors of recurrent pain in patients who had discectomy for subacute or chronic symptomatic lumbar disc herniation. As noted, SPORT was a randomized trial with a concurrent observational cohort study. A total of 1244 participants made up the trial; however, in this analysis, the authors focused only on those who received surgery within 4 years of the study and only on those who had participated in at least 1 follow-up since the operation (n=788). Using Cox proportional hazards models and Kaplan-Meier survival curves, the authors reported a cumulative risk of leg pain recurrence of 20% (95% confidence interval [CI], 17% to 24%) at 1 year and 45% (95% CI, 41% to 50%) at 3 years. Those who experienced complete initial resolution of leg pain had less recurring leg pain at 1-year follow-up (17%) and at 3-year follow-up (41%) than those who did not experience complete initial resolution of leg pain (27% at 1 year vs 54% at 3 years). In multivariate analyses, the following factors were found to play a role in leg pain recurrence: a person’s ability to experience complete leg pain resolution, smoking status, and whether a person suffered from depression. The authors concluded that it is common for leg pain to occur again after discectomy but that pain levels would likely be lower in those who experience complete pain resolution shortly after surgery.

**Buttermann et al**

An RCT comparing discectomy with epidural steroid injections was reported by Buttermann et al (2004). Patients diagnosed with large disc herniation who did not respond to 6 weeks of conservative care were randomized to discectomy or epidural steroid injections. Twenty-seven of the patients randomized to the injection group crossed over and underwent discectomies due to continued pain (crossover occurred between 1 and 13 months). Follow-up was 2 to 3 years, but there was a large decrease in the percentage of patients available for follow-up after 3 months, particularly for the injection group, in which approximately half of the patients were available at any time point past 3 months.
At 1- to 3-month follow-up, pain scores, ODI scores, and medication use were all lower in the surgery group than in the injection group, but, at later time points, differences between groups were not statistically significant (see Table 1). The percentages of patients who self-reported treatment as being successful at various time points ranged from 92% to 98% for those in the surgery group compared with 42% to 56% in the injection group.

Table 1. RCT Outcomes for Use of Discectomy or Microdiscectomy to Treat Lumbar Disc Herniation

<table>
<thead>
<tr>
<th>Trial</th>
<th>N</th>
<th>FU</th>
<th>Treatment</th>
<th>Comparator</th>
<th>Measure</th>
<th>Mean</th>
<th>95% CI or SD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abou-Elroos et al (2017)</td>
<td>60</td>
<td>6 mo</td>
<td>Discectomy</td>
<td>Prolonged conservative care</td>
<td>Score at 6 mo</td>
<td>OD</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peul et al (2007)</td>
<td>283</td>
<td>1 y</td>
<td>Microdiscectomy, within 2 wk</td>
<td>Prolonged conservative care, surgery if necessary</td>
<td>Between-group mean change difference at 8 wk</td>
<td>RMDQ</td>
<td>3.1</td>
<td>1.7 to 4.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osterman et al (2006)</td>
<td>56</td>
<td>2 y</td>
<td>Microdiscectomy</td>
<td>Structured PT, surgery if necessary</td>
<td>Score at 6-wk follow-up</td>
<td>VAS leg pain</td>
<td>12.3</td>
<td>-4.0 to 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: NS = Not Significant.
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Outcome Measure</th>
<th>Time Point</th>
<th>Pain</th>
<th>Microdiscectomy</th>
<th>Physical therapy</th>
<th>VAS satisfaction</th>
<th>Follow-up at 2 y</th>
<th>VAS leg pain</th>
<th>Microdiscectomy</th>
<th>Physical therapy</th>
<th>VAS back pain</th>
<th>Microdiscectomy</th>
<th>Physical therapy</th>
<th>VAS satisfaction</th>
<th>Follow-up at 2 y</th>
<th>VAS leg pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weinstein et al (2006)⁹SPORT</td>
<td>501</td>
<td>2 y Open discectomy Individualized nonoperative treatment</td>
<td>Between-group mean change difference at 3 mo</td>
<td>SF-36 bodily pain</td>
<td>2.9</td>
<td>-2.2 to 8.0</td>
<td>SF-36 PF</td>
<td>2.5</td>
<td>-2.8 to 8.1</td>
<td>ODI</td>
<td>-4.7</td>
<td>-9.3 to -0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— —</td>
<td>100</td>
<td>3 y Discectomy ESI Score at 1-3 mo⁸</td>
<td>— —</td>
<td>VAS leg pain</td>
<td>Discectomy</td>
<td>1.4</td>
<td>1.6</td>
<td>ESI</td>
<td>4.1</td>
<td>2.8</td>
<td>— —</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

⁸ Butterman et al 2004
<table>
<thead>
<tr>
<th></th>
<th>Discectomy</th>
<th>ESI</th>
<th>ESI</th>
<th>Score at 2-3 y&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS leg pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discectomy</td>
<td>1.5</td>
<td>0.8</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>ESI</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

CI: confidence interval; ESI: epidural steroid injection; FU: follow-up; ODI: Oswestry Disability Index; PF: physical function; PFEORS: Prolo Functional Economic Outcome Rating Scale; POR: perception of recovery; PT: physical therapy; RCT: randomized controlled trials; RMDQ: Roland-Morris Disability Questionnaire; SF-36: 36-Item Short-Form Health Survey; SPORT: Spine Patient Outcomes Research Trial; VAS: visual analog scale.

<sup>a</sup> Seven-point Likert scale of global perceived recovery.

<sup>b</sup> Data extrapolated from graphs.

**Nonrandomized Comparative Studies**

Gugliotta et al (2016) published a prospective cohort study comparing open discectomy (n=297) with conservative treatment (n=73) for lumbar disc herniation. Assignment to treatment group was made by physicians based on patients’ clinical indications. Conservative treatment consisted of active physical therapy, education, and nonsteroidal anti-inflammatory drugs. Outcomes were the North American Spine Society (NASS) scores (back pain, neurogenic, function) and SF-36 scores (physical and mental function). Follow-up measurements were obtained at 6 weeks, 12 weeks, 1 year, and 2 years. Of the 3 different NASS scores measured at the 4 follow-up times, the only statistically significant differences in the surgery group over the conservative treatment group were in the NASS back pain score at 6 weeks and the NASS function score at 1 year. SF-36 physical and mental function scores were comparable between treatment groups at all follow-up points.

The observational cohort component of SPORT enrolled patients who met the eligibility criteria for the RCT component, but who declined randomization to treatment group. A total of 743 patients were enrolled; 528 underwent discectomy, and 191 were treated with conservative care. The primary outcomes (SF-36, modified ODI) and secondary outcomes (self-reported improvement, work status, satisfaction with care, and a symptom severity measure [Sciatica Bothersomeness Index]) were the same as for the RCT, and follow-up was according to the same schedule up to 2 years. Follow-up visit completion ranged between 82% and 89% for different time points. The surgery group had superior improvements at 2 years on all primary and secondary outcome measures, except for work status. The treatment effect, measured using the SF-36 bodily pain subscale, was 10.2 (95% CI, 5.9 to 14.5); the treatment effect, assessed using the SF-36 physical function subscale, was 12.0 (95% CI, 7.9 to 16.1); and the treatment effect, evaluated using the modified ODI score, was -13.4 (95% CI, -17.0 to -9.7).
The Maine Lumbar Spine Study (2005) was a prospective cohort study comparing 10-year outcomes for discectomy with conservative care. Of the 507 patients enrolled in the study, 477 survived to 10 years; of these, 10-year outcomes data were available for 400 (84%), of whom 217 were treated surgically and 183 treated conservatively. Baseline data were obtained from a physician questionnaire, and outcome data were obtained from questionnaires mailed to patients. Patients treated initially with surgery had worse baseline symptoms and decreased functional status compared with patients initially treated conservatively. Approximately 25% of patients initially treated with conservative care underwent a surgical procedure during the 10-year period. At 10 years, there were no differences in the percentages of patients reporting improvements of their predominant symptom, no differences in modified Roland-Morris Disability Questionnaire scores, and no differences in work or disability status. Differences favoring surgery over conservative care were reported for low back or leg pain (completely gone or much better, 56% vs 40%, p=0.006) and satisfaction with their care (71% vs 56%, p=0.002), respectively.

Section Summary: Lumbar Discectomy
The comparative evidence on lumbar discectomy vs conservative care consists of a small number of RCTs and nonrandomized comparative studies. The RCT evidence is limited by a lack of high-quality trials. In most, a high percentage of patients in the conservative care group crossed over to surgery. This high degree of crossover reduced the power to detect differences when assessed by intention-to-treat analysis. Analysis by treatment received was also flawed because of the potential noncomparability of groups resulting from the high crossover rate.

Despite the methodologic limitations of the evidence, the RCTs have consistently demonstrated a probable short-term benefit for surgery and a more rapid resolution of pain and disability. For the intention-to-treat analyses, there were small differences in favor of surgery, which sometimes were statistically significant and other times not. In contrast, on analysis by treatment received and in the nonrandomized comparative studies, there were larger differences in favor of surgery that exceed the threshold for clinical significance. At time points of 1 year or longer, outcomes from surgery and conservative care appear to be equivalent.

Cervical Discectomy
There is considerably less evidence on cervical discectomy than on lumbar discectomy. Two small RCTs were identified that compared cervical discectomy with conservative care.

Systematic Reviews
A Cochrane systematic review by Nikolaidis et al (2010) included 2 RCTs, which are summarized below. Reviewers judged both trials to have a significant risk of bias due to inadequate allocation concealment and unclear blinding of outcomes assessment. Reviewers concluded that there was low-quality evidence for a short-term benefit of surgery, with an uncertain risk-benefit ratio for surgery. They found no evidence for a long-term benefit of surgery.
Randomized Controlled Trials
Peolsson et al (2013) published a multicenter RCT from Sweden in which 63 patients with cervical disc disease (verified by magnetic resonance imaging) were randomized to structured exercise alone or structured exercise with cervical discectomy. The surgical procedure consisted of anterior cervical decompression with fusion. Follow-up was at 3, 6, 12, and 24 months. During the trial, there were 2 crossovers from the exercise group to surgery. At the 2-year follow-up, there were no significant differences on any of the main outcomes. There were improvements in both groups on multiple measures of functional status over time, but these improvements do not differ significantly between groups. This trial did not assess any outcomes for pain or disability.

An earlier trial, reported by Persson et al (1997), compared surgery with conservative care in 81 patients who had longstanding cervical radiculopathy. Patients were randomized to surgery or 1 of 2 control groups: an active exercise program or use of a cervical collar. Outcome measures included a VAS for pain (range, 0-100), muscle strength in the upper extremities, and sensation in the upper extremities. Follow-up time points were at 4 and 12 months. Three patients in the surgery group declined surgery because of improvement in symptoms, and there were no crossovers from conservative care to surgery. At the 4-month follow-up, the surgery group had less sensory loss and better muscle strength. By 1-year, there were no group differences on any of the main outcomes.

Observational Studies
Faught et al (2016) published results from a telephone interview evaluating the long-term outcomes among a cohort of patients (N=338) who underwent posterior cervical foraminotomies. Each interview collected information on symptomatic and functional improvements postsurgery. The EuroQol-5D, a standardized instrument to measure health-related quality of life, was also administered. Mean follow-up was 10 years. Ninety-three percent of patients who could not work before surgery were able to return to work. As measured by the EuroQol-5D, patients reported: “no problems” in mobility (65%), self-care (90%), usual activities (60%), pain (41%), and anxiety/depression (77%).

Section Summary: Cervical Discectomy
There is considerably less evidence on cervical discectomy than on lumbar discectomy. Two small trials with methodologic limitations and a long-term observational study were identified. These trials reported results similar to those from the lumbar discectomy trials, but the cervical discectomy trials were smaller and, as a result, had less power to detect statistical differences. Although the evidence for cervical discectomy is limited, given the similarities in anatomy and surgical procedure, outcomes from lumbar discectomy can inform a chain of evidence to cervical discectomy—it is unlikely that there are large differences in outcomes between lumbar and cervical discectomy.

Summary of Evidence
For individuals who have lumbar herniated disc(s) and symptoms of radiculopathy rapidly progressing or refractory to conservative care who receive lumbar
discectomy, the evidence includes RCTs, nonrandomized comparative studies, and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. Four RCTs were identified for inclusion in this evidence review, two of which were moderately large. The RCT evidence is limited by high rates of crossover from the conservative care to the surgery group in most trials. Crossover rates were 40% or higher in some trials, including the largest trial (SPORT), thereby greatly limiting the power to detect differences when using an intention-to-treat analyses. Despite the methodologic limitations, results from these comparative studies are fairly consistent. They have reported that, on intention-to-treat analysis, the direction of short-term benefit favors surgery for almost all comparisons, but group differences in many cases were not statistically significant. Analysis by treatment received has shown larger, clinically significant differences in outcomes favoring surgery, and a similar magnitude of effect has been reported in nonrandomized, comparative trials. However, these analyses are limited by potential noncomparability of treatment groups. Thus, it is likely that there is a true short-term benefit for surgery, and that the true treatment effect lies between the values reported for the intention-to-treat analyses and the treatment-received analyses. The evidence is also consistent in reporting that the benefits are mainly short-term, lasting for weeks to months. At follow-up of 1 year or more, the best evidence has reported equivalent outcomes for surgery and conservative care. This supports the conclusion that surgery will result in more rapid recovery of symptoms and disability, but no definite long-term advantage. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have cervical herniated disc(s) and symptoms of radiculopathy rapidly progressing or refractory to conservative care who receive cervical discectomy, the evidence includes RCTs, nonrandomized comparative studies, and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. Two small RCTs were identified for inclusion in this evidence review. Although there is less evidence for this indication, it does not differ substantially from lumbar herniated disc, showing that patient-reported symptoms and disability favor surgery in the short-term, and that long-term outcomes do not differ. Because cervical discectomy closely parallels lumbar discectomy, with close similarities in anatomy and surgical procedure, it can be inferred that the benefit reported for lumbar discectomy supports a benefit for cervical discectomy. Based on the available evidence and extrapolation from studies of lumbar herniated disc, it is likely that use of discectomy for cervical herniated disc improves short-term symptoms and disability. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Supplemental Information

Practice Guidelines and Position Statements
North American Spine Society

The North American Spine Society published evidence-based clinical guidelines in 2014 on the diagnosis and treatment of lumbar disc herniation with radiculopathy. Table 2 summarizes the recommendations specific to open discectomy or microdiscectomy.

Table 2. Recommendations for Treating Lumbar Disc Herniation With Radiculopathy

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>GORa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endoscopic percutaneous discectomy is suggested for carefully selected patients to reduce early postoperative disability and reduce opioid use compared with open discectomy.</td>
<td>B</td>
</tr>
<tr>
<td>There is insufficient evidence to make a recommendation for or against the use of automated percutaneous discectomy compared with open discectomy.</td>
<td>I</td>
</tr>
<tr>
<td>Discectomy is suggested to provide more effective symptom relief than medical/interventional care for patients whose symptoms warrant surgical care. In patients with less severe symptoms, both surgery and medical/interventional care appear to be effective in short and long term relief.</td>
<td>B</td>
</tr>
<tr>
<td>Use of an operative microscope is suggested to obtain comparable outcomes to open discectomy for patients whose symptoms warrant surgery.</td>
<td>B</td>
</tr>
<tr>
<td>There is insufficient evidence to make a recommendation for or against the use of tubular discectomy compared with open discectomy.</td>
<td>I</td>
</tr>
</tbody>
</table>

GOR: grade of recommendation.
a Grade B: fair evidence (level II or III studies with consistent findings); grade I: insufficient evidence.

The Society published evidence-based clinical guidelines (2011) on the diagnosis and treatment of cervical radiculopathy from degenerative disorders. The guidelines included evaluations of anterior cervical discectomy (ACD), ACD with fusion, ACD with instrumented fusion, ACD with fusion plus plate, and posterior laminoforaminotomy. Recommendations are listed in Table 3.

Table 3. Recommendations Treating Cervical Radiculopathy From Degenerative Disorders

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>GORa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical intervention is suggested for the rapid relief of symptoms when compared to medical/interventional treatment.</td>
<td>B</td>
</tr>
<tr>
<td>Surgery is an option to produce and maintain favorable long-term (&gt;4 years) outcomes.</td>
<td>C</td>
</tr>
<tr>
<td>Both ACD and ACDF are suggested as comparable treatment strategies, producing similar clinical outcomes.</td>
<td>B</td>
</tr>
<tr>
<td>ACDF and total disc arthroplasty are suggested as comparable treatments, resulting in similarly successful short-term outcomes.</td>
<td>B</td>
</tr>
<tr>
<td>Both ACDF with and without a plate are suggested as comparable treatments, resulting in similar clinical outcomes and fusion rates.</td>
<td>B</td>
</tr>
<tr>
<td>Either ACDF or PLF are suggested for treatment of single level degenerative cervical radiculopathy secondary to foraminal soft disc herniation to achieve comparably successful clinical outcomes.</td>
<td>B</td>
</tr>
</tbody>
</table>

ACD: anterior cervical discectomy; ACDF: anterior cervical discectomy with fusion; GOR: grade of recommendation; PLF: posterior laminoforaminotomy.
a Grade B: fair evidence (level II or III studies with consistent findings); grade C: poor quality evidence (level IV or V studies).

U.S. Preventive Services Task Force Recommendations

Not applicable.
Medicare National Coverage
There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

Ongoing and Unpublished Clinical Trials
Currently unpublished trials that might influence this review are listed in Table 4.

Table 4. Summary of Key Trials

<table>
<thead>
<tr>
<th>NCT No.</th>
<th>Trial Name</th>
<th>Planned Enrollment</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCT02477176</td>
<td>A Prospective Multicenter Study Investigating Reherniation Risk Factors and Associated Costs in Primary Lumbar Disc Herniation Patients</td>
<td>100</td>
<td>Mar 2018</td>
</tr>
<tr>
<td>NCT01335646</td>
<td>Surgery Versus Standardized Non-operative Care for the Treatment of Lumbar Disc Herniations: A Canadian Trial</td>
<td>140</td>
<td>Aug 2018</td>
</tr>
</tbody>
</table>

NCT: national clinical trial.

References


Billing Coding/Physician Documentation Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63020</td>
<td>Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc; 1 interspace, cervical</td>
</tr>
<tr>
<td>63030</td>
<td>Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc; 1 interspace, lumbar</td>
</tr>
<tr>
<td>63035</td>
<td>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)</td>
</tr>
<tr>
<td>63040</td>
<td>Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; cervical</td>
</tr>
<tr>
<td>63042</td>
<td>Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; cervical</td>
</tr>
</tbody>
</table>
including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; lumbar

63043  Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc, reexploration, single interspace; each additional cervical interspace (List separately in addition to code for primary procedure)

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) (eg, herniated intervertebral disc), single segment; lumbar (including transfacet, or lateral extraforaminal approach) (eg, far lateral herniated intervertebral disc)

63057  Transpedicular approach with decompression of spinal cord, equina and/or nerve root(s) (eg, herniated intervertebral disc), single segment; each additional segment, thoracic or lumbar (List separately in addition to code for primary procedure)

63075  Discectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; cervical, single interspace

63076  Discectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophytectomy; cervical, each additional interspace (List separately in addition to code for primary procedure)

C2614  Probe, percutaneous lumbar discectomy

ICD10 Codes
M50.00-  Cervical disc disorder with myelopathy or radiculopathy code range
M50.13
M50.20-  Other cervical disc displacement code range
M50.23
M51.05;  Lumbar intervertebral disc disorders with myelopathy or radiculopathy code list
M51.06;
M51.15;
M51.16;
M51.17
M51.25-  Other lumbar intervertebral disc displacement code list
M51.27

Additional Policy Key Words
N/A

Policy Implementation/Update Information
12/1/14  New Policy. Discectomy is medically necessary for the treatment of herniated disc when symptoms are refractory to conservative care and criteria are met.
3/1/16  Policy statements revised for clarity. “Rapidly progressing neurologic symptoms” changed to “Rapidly progressing neurologic deficits”, and in statement on cervical discectomy “Persistent debilitating back or leg pain” changed to “Persistent debilitating neck, back, or arm pain”

12/1/16  No policy statement changes.
12/1/17  No policy statement changes.
12/1/18  No policy statement changes.

State and Federal mandates and health plan contract language, including specific provisions/exclusions, take precedence over Medical Policy and must be considered first in determining eligibility for coverage. The medical policies contained herein are for informational purposes. The medical policies do not constitute medical advice or medical care. Treating health care providers are independent contractors and are neither employees nor agents Blue KC and are solely responsible for diagnosis, treatment and medical advice. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, photocopying, or otherwise, without permission from Blue KC.