

7.01.126 Image-Guided Minimally Invasive Decompression for Spinal Stenosis

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Policy Statement

Image-guided minimally invasive spinal decompression is considered **investigational**.

NOTE: Refer to [Appendix A](#) to see the policy statement changes (if any) from the previous version.

Policy Guidelines**Coding**

The following category III CPT codes are applicable to this procedure:

- **0274T:** 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
- **0275T*:** 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; lumbar

The procedure uses an epidurogram. The following CPT code may also be reported:

- **72275:** Epidurography, radiological supervision and interpretation

The following HCPCS "G" code is specific to percutaneous image-guided lumbar decompression:

- **G0276*:** Blinded procedure for lumbar stenosis, percutaneous image-guided lumbar decompression (PILD) or placebo-control, performed in an approved coverage with evidence development (CED) clinical trial

*Please note that codes 0275T and G0276 may be allowable for Medicare recipients participating in a Coverage with Evidence Development (CED) program.

Description

Image-guided minimally invasive decompression describes a percutaneous procedure for decompression of the central spinal canal in patients with spinal stenosis and hypertrophy of the ligamentum flavum. In this procedure, a specialized cannula and surgical tools (mild®) are used under fluoroscopic guidance for bone and tissue sculpting near the spinal canal. Image-guided minimally invasive lumbar decompression is proposed as an alternative to existing posterior decompression procedures.

Related Policies

- N/A

Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control. Please refer to the member's contract benefits in effect at the

time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates (e.g., Federal Employee Program [FEP]) prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

Regulatory Status

In 2006, the X-Sten MILD Tool Kit (now the mild® device kit, X-Sten Corp. renamed Vertos Medical) was cleared for marketing by the U.S. Food and Drug Administration through the 510(k) process for treatment of various spinal conditions. This set of specialized surgical instruments is used to perform percutaneous lumbar decompressive procedures.

Vertos's mild® instructions state that the device is not intended for disc procedures but rather for tissue resection at the perilaminar space, within the interlaminar space, and at the ventral aspect of the lamina. The device is not intended for use near the lateral neural elements and remains dorsal to the dura using image guidance and anatomic landmarks.

Food and Drug Administration product code: HRX.

Rationale

Background

Spinal Stenosis

In spinal stenosis, the space around the spinal cord narrows, compressing the spinal cord and its nerve roots. The goal of surgical treatment is to "decompress" the spinal cord and/or nerve roots.

The most common symptoms of lumbar spinal stenosis are back pain with neurogenic claudication (i.e., pain, numbness, weakness) in the legs that worsens with standing or walking and is alleviated by sitting or leaning forward. Compression of neural elements generally occurs from a combination of degenerative changes, including ligamentum flavum hypertrophy, bulging of the intervertebral disc, and facet thickening with arthropathy. Spinal stenosis is often linked to age-related changes in disc height and arthritis of the facet joints. Lumbar spinal stenosis is among the most common reasons for back surgery and the most common reason for lumbar spine surgery in adults over the age of 65.

The most common symptoms of cervical/thoracic spinal stenosis are neck pain and radiculopathy of the shoulder and arm. The most common cause of cervical radiculopathy is degenerative changes, including disc herniation.

Treatment

Conventional Posterior Decompression Surgery

For patients with lumbar spinal stenosis, surgical laminectomy has established benefits in reducing pain and improving quality of life.

For patients with cervical or thoracic stenosis, surgical treatment includes discectomy or foraminal decompression.

A systematic review by Chou et al (2009) assessed surgery for back pain; it was commissioned by the American Pain Society and conducted by an evidence-based center.¹² Four higher quality randomized trials were reviewed; they compared surgery with nonsurgical therapy for spinal stenosis, including 2 studies from the multicenter Spine Patient Outcomes Research Trial that evaluated laminectomy for spinal stenosis (specifically with or without degenerative

spondylolisthesis).³⁴ All 4 studies found that initial decompressive surgery (laminectomy) was slightly to moderately superior to initial nonsurgical therapy (e.g., average 8- to 18-point differences on the 36-Item Short-Form Health Survey and Oswestry Disability Index). However, there was insufficient evidence to determine the optimal adjunctive surgical methods for laminectomy (i.e., with or without fusion, instrumented vs noninstrumented fusion) in patients with or without degenerative spondylolisthesis. The Spine Patient Outcomes Research Trial continues to be referenced as the highest quality evidence published on decompressive surgery.

Less invasive surgical procedures include open laminotomy and microendoscopic laminotomy. In general, the literature comparing surgical procedures is limited. The literature has suggested that less invasive surgical decompression may reduce perioperative morbidity without impairing long-term outcomes when performed in appropriately selected patients. Posterior decompressive surgical procedures include: decompressive laminectomy, hemilaminotomy and laminotomy, and microendoscopic decompressive laminotomy.

Decompressive laminectomy, the classic treatment for lumbar spinal stenosis, unroofs the spinal canal by extensive resection of posterior spinal elements, including the lamina, spinous processes, portions of the facet joints, ligamentum flavum, and the interspinous ligaments. Wide muscular dissection and retraction is needed to achieve adequate surgical visualization. The extensive resection and injury to the posterior spine and supporting musculature can lead to instability with significant morbidity, both postoperatively and longer term. Spinal fusion, performed at the same time as laminectomy or after symptoms have developed, may be required to reduce resultant instability. Laminectomy may also be used for extensive multilevel decompression.

Hemilaminotomy and laminotomy, sometimes termed laminoforaminotomy, are less invasive than laminectomy. These procedures focus on the interlaminar space, where most of the pathologic changes are concentrated, minimizing resection of the stabilizing posterior spine. A laminotomy typically removes the inferior aspect of the cranial lamina, superior aspect of the subjacent lamina, ligamentum flavum, and the medial aspect of the facet joint. Unlike laminectomy, laminotomy does not disrupt the facet joints, supra- and interspinous ligaments, a major portion of the lamina, or the muscular attachments. Muscular dissection and retraction are required to achieve adequate surgical visualization.

Microendoscopic decompressive laminotomy, similar to laminotomy, uses endoscopic visualization. The position of the tubular working channel is confirmed by fluoroscopic guidance, and serial dilators are used to dilate the musculature and expand the fascia. For microendoscopic decompressive laminotomy, an endoscopic curette, rongeur, and drill are used for the laminotomy, facetectomy, and foraminotomy. The working channel may be repositioned from a single incision for multilevel and bilateral dissections.

Image-Guided Minimally Invasive Spinal Decompression

Posterior decompression for spinal stenosis has been evolving toward increasingly minimally invasive procedures in an attempt to reduce postoperative morbidity and spinal instability. Unlike conventional surgical decompression, the percutaneous mild[®] decompressive procedure is performed solely under fluoroscopic guidance (e.g., without endoscopic or microscopic visualization of the work area). This procedure is indicated for central stenosis only, without the capability of addressing nerve root compression or disc herniation, should either be required. Percutaneous image-guided minimally invasive spinal decompression using a specially designed tool kit (mild[®]) has been proposed as an ultra-minimally invasive treatment of central lumbar spinal stenosis. In this procedure, the epidural space is filled with contrast medium under fluoroscopic guidance. Using a 6-gauge cannula clamped in place with a back plate, single-use tools (portal cannula, surgical guide, bone rongeur, tissue sculpter, trocar) are used to resect thickened ligamentum flavum and small pieces of lamina. The tissue and bone sculpting is conducted entirely under fluoroscopic guidance, with contrast media added throughout the procedure to aid visualization of the decompression. The process is repeated on the opposite

side for bilateral decompression of the central canal. The devices are not intended for use near the lateral neural elements and are contraindicated for disc procedures.

Literature Review

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the 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 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 technology, two domains are examined: the relevance, and 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.

Image-Guided Minimally Invasive Lumbar Decompression

Clinical Context and Therapy Purpose

The purpose of image-guided minimally invasive lumbar decompression is to provide a treatment option that is an alternative to or an improvement on existing therapies for patients with lumbar spinal stenosis.

The question addressed in this evidence review is: Does the use of image-guided minimally invasive lumbar decompression improve the net health outcome in patients with lumbar spinal stenosis?

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with lumbar spinal stenosis.

In spinal stenosis, the space around the spinal cord narrows, compressing the spinal cord and its nerve roots. The goal of surgical treatment is to “decompress” the spinal cord and/or nerve roots.

The most common symptoms of lumbar spinal stenosis are back pain with neurogenic claudication (i.e., pain, numbness, weakness) in the legs that worsens with standing or walking and is alleviated by sitting or leaning forward. Compression of neural elements generally occurs from a combination of degenerative changes, including ligamentum flavum hypertrophy, bulging of the intervertebral disc, and facet thickening with arthropathy. Spinal stenosis is often linked to age-related changes in disc height and arthritis of the facet joints. Lumbar spinal stenosis is among the most common reasons for back surgery and the most common reason for lumbar spine surgery in adults over the age of 65.

Interventions

The therapy being considered is image-guided minimally invasive lumbar decompression. Image-guided minimally invasive lumbar decompression describes a percutaneous procedure for decompression of the central spinal canal in patients with spinal stenosis and hypertrophy of

the ligamentum flavum. In this procedure, a specialized cannula and surgical tools (mild®) are used under fluoroscopic guidance for bone and tissue sculpting near the spinal canal.

Comparators

The following practices are currently being used to treat lumbar spinal stenosis: Conservative therapy and open decompression.

Image-guided minimally invasive lumbar decompression is proposed as an alternative to existing posterior decompression procedures.

Outcomes

The general outcomes of interest are symptoms, functional outcomes, health status measures, and treatment-related morbidity.

Outcome measures for spinal surgery are relatively well-established. Most studies used back and leg visual analog scores or the Zurich Claudication Questionnaire to assess pain and the Oswestry Disability Index (ODI) to assess functional limitations. Most studies also use a broader functional status index such as the 36-Item Short-Form Health Survey (SF-36) or 12-Item Short-Form Health Survey (SF-12), particularly the physical function subscale of SF-36. Determining the minimal clinically important differences (MCID) for these measures is complex. The MCID for a given measure can depend on the baseline score or severity of illness, the method used to calculate MCID, and the times at which the scores are measured. For these reasons, some investigators prefer to calculate a minimum detectable difference (MDD).

Both short-term and long-term outcomes are important in evaluating spinal treatments. Net benefit should take into account immediate (perioperative) adverse events; improvements in pain, neurological status, and function at 12 to 24 months as measured by the ODI, SF-36, Zurich Claudication Questionnaire, or visual analog scale measures; and 5-year secondary surgery rates, which reflect longer-term complications, recurrences, and treatment failures.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
3. To assess longer-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

This evidence review addresses posterior decompression of lumbar spinal stenosis with percutaneous treatment performed under fluoroscopic guidance. The primary literature on image-guided minimally invasive lumbar decompression includes a large RCT (n=302) that is ongoing, a small RCT (n=38), and a number of prospective and retrospective cohort studies and case series.

Randomized Controlled Trials

The protocol for the MiDAS ENCORE (Evidence-based Neurogenic Claudication Outcomes Research) trial (NCT02093520) was approved by the Centers for Medicare & Medicaid Services under coverage with evidence development. This nonblinded study, conducted at 26 interventional pain management centers in the U.S., randomized 302 patients in a 1:1 ratio to image-guided minimally invasive lumbar decompression or epidural steroid injections.⁵ This trial included Medicare beneficiaries 65 years or older who had neurogenic claudication symptoms for at least 3 months and had failed standard therapies, including physical therapy, home exercise programs, and oral analgesics.

Selection criteria required radiologic evidence of lumbar spinal stenosis with ligamentum flavum greater than 2.5 mm confirmed by preoperative magnetic resonance imaging or computed tomography. Patients had a number of spinal stenosis cofactors in addition to ligamentum flavum hypertrophy, including bulging disc (91%), foraminal narrowing (88%), facet hypertrophy (84%), facet arthropathy (82%), and degenerative disc disease (71%), that could not be addressed by the image-guided minimally invasive lumbar decompression technique.

Baseline scores were similar in both groups (see Table 1). However, more patients in the epidural steroid injection group withdrew prior to trial treatment (22 patients vs 6 patients) due to dissatisfaction with randomization results and decisions to have surgery or other nonstudy therapy. This unequal dropout rate would suggest risk of bias due to nonblinding of patients and assessors and patient expectations. Patients who withdrew from the trial after treatment but before the 1-year follow-up (22 image-guided minimally invasive lumbar decompression, 32 epidural steroid injections) were considered treatment failures.

Six-month and 1-year results were published in 2016 (see Table 1).^{5,6} Patients in the epidural steroid injection group were allowed up to 4 epidural steroid injection treatments and received a mean of 2 injections over 1 year. The primary endpoint the proportion of responders achieving the minimally important difference of at least a 10-point improvement on the ODI score was significantly higher in the image-guided minimally invasive lumbar decompression group than in the epidural steroid injection group at both 6 months and 1 year. Secondary efficacy endpoints were the proportion of responders achieving the minimally important difference on the numeric rating scale for pain and the Zurich Claudication Questionnaire. Adverse events were low (1.3% for both groups). Responder rates in patients with spinal comorbidities were reported to be similar to overall responder rates. However, it may be difficult to separate out the effect of comorbidities, because over 80% of patients had 1 or more spinal stenosis comorbidities.

Two-year follow-up data for patients treated with image-guided minimally invasive lumbar decompression in the MiDAS ENCORE trial was published in 2018.⁷ Follow-up data was available for 69% of study participants and is summarized in Table 1. Comparative data for the epidural steroid injection cohort was not reported.

Study relevance, design, and conduct limitations are summarized in Table 2 and 3.

Table 1. MiDAS ENCORE* Results

Outcomes	Baseline Score, Mean (SD)	Percent Response at 6 Months, %	Percent Response at 1 Year, %	Percent Response (%) and Mean Improvement at 2 Years (95% CI)
Pain (NRS) ¹	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=99 (IG-MD)
IG-MLD	7.7 (1.4)	55.9**	57.3**	71.73.6 (3.1 to 4.2)
ESI	7.8 (1.3)	33.3	27.1	NR
Disability (ODI) ²	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=98 (IG-MLD)
IG-MLD	53.0 (12.9)	62.2**	58.0**	72.422.7 (18.5 to 26.9)
ESI	51.7 (12.0)	35.7	27.1	NR
ZCQ: Symptom Severity ³	N=142 (IG-MLD)N=129 (ESI)	N=142 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=98 (IG-MLD)
IG-MLD	Pain: 3.8 (0.5) Neuroischemic: 3.2 (0.9)	52.8**	51.7*	73.51.0 (0.8 to 1.2)
ESI	Pain: 3.8 (0.5) Neuroischemic: 3.2 (0.8)	28.7	31.8	NR

Outcomes	Baseline Score, Mean (SD)	Percent Response at 6 Months, %	Percent Response at 1 Year, %	Percent Response (%) and Mean Improvement at 2 Years (95% CI)
ZCQ: Physical Function ³	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=98 (IG-MLD)
IG-MLD	2.9 (0.5)	52.4**	44.1**	59.60.8 (0.6 to 0.9)
ESI	2.8 (0.4)	14.0	17.8	NR
ZCQ: Patient Satisfaction ³	N=142 (IG-MLD)N=129 (ESI)	N=142 (IG-MLD)N=129 (ESI)	N=143 (IG-MLD)N=129 (ESI)	N=98 (IG-MLD)
IG-MLD	NA	64.8**	61.5**	76.82.0 (1.8 to 2.2)
ESI	NA	30.2	33.3	NR

* MiDAS ENCORE: Evidence-based Neurogenic Claudication Outcomes Research trial.^{6,7}

CI: confidence interval; ESI: epidural steroid injection; IG-MLD: image-guided minimally invasive lumbar decompression; MIC: minimally important change; NA: not applicable; NR: not reported; NRS: Numeric Rating Scale; ODI: Oswestry Disability Index; SD: standard deviation; ZCQ: Zurich Claudication Questionnaire.

¹ Pain score as determined with the Numerical Rating Scale, with 0 reflecting no pain and 10 reflecting worst possible pain. A positive response was defined by a ≥ 2 -point improvement in score.

² Disability score as determined with the Oswestry Disability Index (0-100), with a score of 0-20 reflecting minimal disability, a score of 21-40 reflecting moderate disability, and a score of 41-60 reflecting severe disability.

A positive response was defined with an improvement (decrease) of 10 or more points as determined by the Minimally Important Change (MIC).

³ Pain symptom severity, physical function, and patient satisfaction with the procedure was assessed with relevant subdomains of the Zurich Claudication Questionnaire (ZCQ). Lower scores indicate better health status or higher patient satisfaction with treatment.

A ≥ 0.5 -point improvement in ZCQ subdomain scores denotes a MIC and defines a positive response.

Patient satisfaction scores are only assessed post-treatment.

** $p < 0.001$

* $p = 0.001$

Table 2. Study Relevance Limitations

Study	Population ^a	Intervention ^b	Comparator ^c	Outcomes ^d	Follow-Up ^e
MiDAS ENCORE (2016, 2018) ^{6,7}	4. Study population had a high proportion of patients with comorbidities that the intervention was not designed to address.		3. Delivery not similar intensity as intervention.		1-2. Follow-up data at 2 years not reported for comparator.

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.

^a Population key: 1. Intended use population unclear; 2. Clinical context is unclear; 3. Study population is unclear; 4. Study population not representative of intended use.

^b Intervention key: 1. Not clearly defined; 2. Version used unclear; 3. Delivery not similar intensity as comparator; 4. Not the intervention of interest.

^c Comparator key: 1. Not clearly defined; 2. Not standard or optimal; 3. Delivery not similar intensity as intervention; 4. Not delivered effectively.

^d Outcomes key: 1. Key health outcomes not addressed; 2. Physiologic measures, not validated surrogates; 3. No CONSORT reporting of harms; 4. Not established and validated measurements; 5. Clinical significant difference not prespecified; 6. Clinical significant difference not supported.

^e Follow-Up key: 1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.

Table 3. Study Design and Conduct Limitations

Study	Allocation ^a	Blinding ^b	Selective Reporting ^c	Data Completeness ^d	Power ^e	Statistical ^f
MiDAS ENCORE (2016, 2018) ^{6,7}	3. Allocation concealment unclear.	1. Not blinded to treatment assignment.		1. High loss to follow-up or missing data.	1. Power calculations not clearly reported. 2. Power not calculated for primary outcome. 3. Not clear if	3. Confidence intervals and/or p values not reported for all outcome

Study	Allocation ^a	Blinding ^b	Selective Reporting ^c	Data Completeness ^d	Power ^e	Statistical ^f
					power calculations were based on clinically important difference(s).	measures. 4. Comparative treatment effects not reported for 2 year follow-up.

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.

^a Allocation key: 1. Participants not randomly allocated; 2. Allocation not concealed; 3. Allocation concealment unclear; 4. Inadequate control for selection bias.

^b Blinding key: 1. Not blinded to treatment assignment; 2. Not blinded outcome assessment; 3. Outcome assessed by treating physician.

^c Selective Reporting key: 1. Not registered; 2. Evidence of selective reporting; 3. Evidence of selective publication.

^d Data Completeness key: 1. High loss to follow-up or missing data; 2. Inadequate handling of missing data; 3. High number of crossovers; 4. Inadequate handling of crossovers; 5. Inappropriate exclusions; 6. No intent to treat analysis (per protocol for noninferiority trials).

^e Power key: 1. Power calculations not reported; 2. Power not calculated for primary outcome; 3. Power not based on clinically important difference.

^f Statistical key: 1. Analysis is not appropriate for outcome type: (a) continuous; (b) binary; (c) time to event; 2. Analysis is not appropriate for multiple observations per patient; 3. Confidence intervals and/or p values not reported; 4. Comparative treatment effects not calculated.

Systematic Reviews

Prior to publication of MiDAS ENCORE trial results, the International Spine Intervention Society published a systematic review of the image-guided minimally invasive lumbar decompression literature.⁸ Included were an RCT with 38 patients⁹ and 12 cohort studies or series. Pain measurements, using a visual analog score or the Zurich Claudication Questionnaire, showed a weighted mean improvement of 41% in the short term (4 to 6 weeks), 46% at 3 months, 42% at 6 months, and 49% at 1 year. However, mean visual analog score scores exceeded 3 at all times posttreatment. Ten studies assessed function, 9 using the Oswestry Disability Index or one using the Roland-Morris Disability Questionnaire. Oswestry Disability Index scores improved by a weighted mean of 16.5 at 6 weeks, 16.2 at 12 weeks, 15.4 at 6 months, and 14.0 at 1 year, a weighted cumulative decline to 33 from 47 at baseline. The study by Chopko (2013), reporting 2-year outcomes, was of questionable validity, and data were not included.¹⁰ Mean final ODI scores exceeded 30 for most studies, which would not be considered in the normal range. No direct procedure-related complications were identified in the selected studies, although the possibility of damage to dura and nerve roots with this procedure was noted. Overall, the body of evidence addressing the image-guided minimally invasive lumbar decompression procedure was of low quality.

Case Series

One potential indication for image-guided minimally invasive lumbar decompression is patients with symptomatic lumbar spinal stenosis primarily caused by a hypertrophic ligamentum flavum who are considered poor candidates for traditional decompressive surgery.

Chopko (2011) also reported on image-guided minimally invasive lumbar decompression in 14 patients considered at high-risk for complications from open spine surgery and general anesthesia.¹¹ Comorbidities included obesity, diabetes, hypertension, chronic obstructive pulmonary disease, chemotherapy, and coronary artery disease. Postoperatively, 9 (64%) of the 14 patients reported improvement in visual analog score pain scores of at least 3 points. Oswestry Disability Index scores did not change significantly. A retrospective review by Lingreen and Grider (2010) reported on outcomes of a consecutive series of 42 patients who underwent image-guided minimally invasive lumbar decompression by an interventional pain specialist.¹² Most patients had not been considered surgical candidates by a spine surgeon.

visual analog score pain scores averaged 9.6 at baseline and 5.8 at 30 days postprocedure, with 34 (80%) of patients reporting changes in visual analog score of 3 or more points. Thirty (71%) patients reported improvements in function following image-guided minimally invasive lumbar decompression. No major adverse events were identified.

Section Summary: Image-Guided Minimally Invasive Lumbar Decompression

The evidence on the use of image-guided minimally invasive lumbar decompression to treat lumbar spinal stenosis or cervical/thoracic spinal stenosis consists of a large, ongoing RCT (n=302), a systematic review of a small RCT (n=38), and a number of prospective and retrospective cohort studies and case series. The largest RCT compared image-guided minimally invasive lumbar decompression with epidural steroid injections (control) in patients with ligamentum flavum hypertrophy and who failed conservative therapy. Early results have suggested reductions in pain and improvements in function scores in the image-guided minimally invasive lumbar decompression group vs the control group. The trial was unblinded and there is evidence of differing expectations and follow-up in both groups, suggesting a high-risk of bias. The available evidence is insufficient to determine the efficacy of mild® compared with placebo or to determine the efficacy of image-guided minimally invasive lumbar decompression compared with open decompression. Trials with relevant control groups could provide greater certainty on the risks and benefits of this procedure.

Image-Guided Minimally Invasive Cervical or Thoracic Decompression

Clinical Context and Therapy Purpose

The purpose of Image-guided minimally Invasive spinal decompression is to provide a treatment option that is an alternative to or an improvement on existing therapies for patients with cervical or thoracic spinal stenosis.

The question addressed in this evidence review is: Does the use of minimally Invasive spinal decompression improve the net health outcome in patients with cervical or thoracic spinal stenosis?

The following PICO was used to select literature to inform this review.

Populations

The population of interest is individuals with cervical or thoracic spinal stenosis.

In spinal stenosis, the space around the spinal cord narrows, compressing the spinal cord and its nerve roots. The goal of surgical treatment is to “decompress” the spinal cord and/or nerve roots.

The most common symptoms of cervical/thoracic spinal stenosis are neck pain and radiculopathy of the shoulder and arm. The most common cause of cervical radiculopathy is degenerative changes, including disc herniation.

Interventions

The therapy being considered is image-guided minimally invasive cervical or thoracic decompression.

Image-guided minimally invasive spinal decompression describes a percutaneous procedure for decompression of the central spinal canal in patients with spinal stenosis and hypertrophy of the ligamentum flavum. In this procedure, a specialized cannula and surgical tools (mild®) are used under fluoroscopic guidance for bone and tissue sculpting near the spinal canal.

Comparators

The following practice is currently being used to treat cervical or thoracic spinal stenosis: conservative therapy and open decompression.

For patients with cervical or thoracic stenosis, surgical treatment includes discectomy or foraminal decompression.

Outcomes

The general outcomes of interest are symptoms, functional outcomes, health status measures, and treatment-related morbidity.

Outcome measures for spinal surgery are relatively well-established. Most studies used back and leg visual analog scores or the Zurich Claudication Questionnaire to assess pain and the ODI to assess functional limitations. Most studies also use a broader functional status index such as the SF-12 or SF-36, particularly the physical function subscale of SF-36. Determining the MCID for these measures is complex. The MCID for a given measure can depend on the baseline score or severity of illness, the method used to calculate MCID, and the times at which the scores are measured. For these reasons, some investigators prefer to calculate an MDD.

Both short-term and long-term outcomes are important in evaluating spinal treatments. Net benefit should take into account immediate (perioperative) adverse events; improvements in pain, neurological status, and function at 12 to 24 months as measured by the ODI, SF-36, Zurich Claudication Questionnaire, or visual analog scale measures; and 5-year secondary surgery rates, which reflect longer-term complications, recurrences, and treatment failures.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
3. To assess longer-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

No evidence assessing use of image-guided minimally invasive cervical or thoracic decompression for treatment of patients with cervical or thoracic spinal stenosis was found.

Section Summary: Image-Guided Minimally Invasive Cervical or Thoracic Decompression

There is no evidence to inform conclusions about use of image-guided minimally invasive spinal decompression to treat cervical or thoracic spinal stenosis.

Summary of Evidence

For individuals who have lumbar spinal stenosis, or cervical or thoracic spinal stenosis who receive image-guided minimally invasive lumbar decompression, the evidence includes a large, ongoing RCT (n=302), a systematic review of a small RCT (n=38), and a number of prospective and retrospective cohort studies and case series. Relevant outcomes are symptoms, functional outcomes, health status measures, and treatment-related morbidity. The largest RCT compared image-guided minimally invasive lumbar decompression with epidural steroid injections (control) in patients who had ligamentum flavum hypertrophy and who failed conservative therapy. Early results have suggested reductions in pain and improvements in function scores in the image-guided minimally invasive lumbar decompression group vs the control group. The trial was unblinded and there is evidence of differing expectations and follow-up in the 2 groups, suggesting a high-risk of bias. The available evidence is insufficient to determine the efficacy of mild® compared with placebo or to determine the efficacy of image-guided minimally invasive lumbar decompression compared with open decompression. Trials with relevant control groups could provide greater certainty on the risks and benefits of this procedure. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cervical or thoracic spinal stenosis who receive image-guided minimally invasive spinal decompression, no evidence was identified. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Supplemental Information

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

Lumbar Spinal Stenosis Consensus Group

In 2018, the Lumbar Spinal Stenosis Consensus Group, composed of a panel of nationally recognized spine experts, convened to evaluate the available literature and develop guidelines for minimally invasive spine treatment (MIST Guidelines).¹³ Based on a systematic review of the available literature on percutaneous image-guided lumbar decompression, the consensus committee determined there is sufficient support to warrant Level I evidence (Grade A, Level I, Consensus strong). Grade A evidence is defined as "extremely recommendable (good evidence that the measure is effective and that benefits outweigh the harms.)"

North American Spine Society

In 2011, the North American Spine Society revised clinical practice guidelines on the diagnosis and treatment of degenerative lumbar spinal stenosis.¹⁴ Treatment recommendations included:

- Interlaminar epidural steroid injection for short-term (6 weeks to 6 months) symptom relief in patients with neurogenic claudication or radiculopathy; however, there is conflicting evidence regarding long-term efficacy. (Grade of Recommendation: B)
- A multiple injection regimen of radiographically-guided transforaminal epidural steroid injection or caudal injection for medium-term relief of pain. (Grade of Recommendation: C)
- Decompressive surgery to improve outcomes in patients with moderate to severe symptoms of lumbar spinal stenosis. (Grade of Recommendation: B)

No specific recommendations on percutaneous image-guided lumbar decompression were provided.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

Effective for services performed on or after January 9, 2014, the Centers for Medicare & Medicaid Services has determined that percutaneous image-guided lumbar decompression for lumbar spinal stenosis is not reasonable and necessary.¹⁵

The Centers for Medicare & Medicaid Services determined that percutaneous image-guided lumbar decompression would be covered by Medicare when provided in a clinical study through coverage with evidence development for beneficiaries with lumbar spinal stenosis enrolled in an approved clinical study meeting criteria in the decision memo.

According to the national coverage decision, percutaneous image-guided lumbar decompression is a posterior decompression of the lumbar spine performed under indirect image guidance without any direct visualization of the surgical area. This procedure is proposed

as a treatment for symptomatic lumbar spinal stenosis unresponsive to conservative therapy. This procedure is generally described as a noninvasive procedure using specially designed instruments to percutaneously remove a portion of the lamina and debulk the ligamentum flavum. The procedure is performed under x-ray guidance (e.g., fluoroscopic, computed tomography) with contrast media to identify and monitor the compressed area via epidurogram.

Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 4.

Table 4. Summary of Key Trials

NCT No.	Trial Name	Planned	
		Enrollment	Completion Date
<i>Ongoing</i>			
NCT03072927 ^a	MILD [®] Percutaneous Image-Guided Lumbar Decompression: A Medicare Claims Study	4000	Dec 2024
NCT03610737 ^a	A Multi-center, Randomized Controlled Study of the Vertos MILD Procedure With Conventional Medical Management Versus Conventional Medical Management Alone in the Treatment of Lumbar Spinal Stenosis (MOTION)	150	Mar 2022
NCT04594980	An Open-Label Randomized Controlled Study of the Efficacy of Surgical Treatment in Patients With Single Level Lumbar Spinal Stenosis Using Minimally Invasive Decompression and Fusion and Traditional Open	96	Feb 2025
<i>Unpublished</i>			
NCT01129921 ^a	Comparative Study of Sham Versus Mild [®] (Minimally Invasive Lumbar Decompression) Procedure in Patients Diagnosed With Symptomatic Moderate to Severe Lumbar Central Canal Stenosis	40	Oct 2011 (completed)
NCT02079038 ^a	A Prospective, Multi-center, Randomized Controlled Double-Blind Trial Evaluating the VertiFlex [®] Totalis™ Direct Decompression System Versus a Sham Comparator Surgical Procedure in Patients With Lumbar Spinal Stenosis	180	Jan 2017 (completed)

NCT: national clinical trial.

^a Denotes industry-sponsored or cosponsored trial.

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Documentation for Clinical Review

- No records required

Coding

This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy.

The following codes are included below for informational purposes. Inclusion or exclusion of a code(s) does not constitute or imply member coverage or provider reimbursement policy. Policy Statements are intended to provide member coverage information and may include the use of some codes for clarity. The Policy Guidelines section may also provide additional information for how to interpret the Policy Statements and to provide coding guidance in some cases.

Type	Code	Description
CPT®	0274T	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
	0275T	Percutaneous laminotomy/laminectomy (interlaminar approach) for decompression of neural elements, (with or without ligamentous resection,

Type	Code	Description
		discectomy, facetectomy and/or foraminotomy), any method, under indirect image guidance (e.g., fluoroscopic, CT), single or multiple levels, unilateral or bilateral; lumbar
	72275	Epidurography, radiological supervision and interpretation
HCPCS	G0276	Blinded procedure for lumbar stenosis, percutaneous image-guided lumbar decompression (PILD) or placebo-control, performed in an approved coverage with evidence development (CED) clinical trial

Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

Effective Date	Action
02/27/2015	Policy title change from Laminectomy/Discectomy/Decompression BCBSA Medical Policy adoption Policy revision with position change
07/31/2015	Policy revision without position change
06/01/2016	Policy revision without position change
11/01/2016	Coding update
02/01/2017	Coding update
06/01/2017	Policy revision without position change
09/01/2017	Coding update
06/01/2018	Policy revision without position change
06/01/2019	Policy revision without position change
06/01/2020	Annual review. No change to policy statement. Literature review updated.
06/01/2021	Annual review. No change to policy statement. Literature review updated.

Definitions of Decision Determinations

Medically Necessary: Services that are Medically Necessary include only those which have been established as safe and effective, are furnished under generally accepted professional standards to treat illness, injury or medical condition, and which, as determined by Blue Shield, are: (a) consistent with Blue Shield medical policy; (b) consistent with the symptoms or diagnosis; (c) not furnished primarily for the convenience of the patient, the attending Physician or other provider; (d) furnished at the most appropriate level which can be provided safely and effectively to the patient; and (e) not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of the Member's illness, injury, or disease.

Investigational/Experimental: A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

Split Evaluation: Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

Prior Authorization Requirements (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department at (800) 541-6652, or the Transplant Case Management Department at (800) 637-2066 ext. 3507708 or visit the provider portal at www.blueshieldca.com/provider.

Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.

Appendix A

POLICY STATEMENT (No changes)	
BEFORE	AFTER
Image-Guided Minimally Invasive Decompression for Spinal Stenosis 7.01.126 Policy Statement: Image-guided minimally invasive spinal decompression is considered investigational .	Image-Guided Minimally Invasive Decompression for Spinal Stenosis 7.01.126 Policy Statement: Image-guided minimally invasive spinal decompression is considered investigational .