

**Subject:** Cervical and Thoracic Discography  
**Document #:** RAD.00053  
**Status:** Reviewed

**Publish Date:** 01/03/2024  
**Last Review Date:** 11/09/2023

## Description/Scope

This document addresses discography as a diagnostic tool for cervical and thoracic pain. Discography, also known as provocative discography, has been used in the diagnosis of cervical and, to a limited extent, thoracic pain syndromes in individuals being considered for surgical intervention.

**Note:** This document is limited to the discussion of cervical and thoracic discography. For information on lumbar discography, refer to [CG-SURG-29 Lumbar Discography](#).

## Position Statement

### Investigational and Not Medically Necessary:

Cervical and thoracic discography are each considered **investigational and not medically necessary** for all indications.

## Rationale

### *Cervical Discography*

Although the technique of cervical discography was first described in 1963 (Cloward, 1963), cervical and thoracic discography has been evaluated in only a small number of studies and remains unproven. Cervical discography has been recommended as a tool to identify specific intervertebral levels causing neck pain as a guide to pre-operative cervical fusion planning for individuals with axial neck pain and cervical spondylosis (Wieser, 2007).

Critics of cervical discography contend that it contributes no unique information beyond that available from standard imaging studies and that there is substantial risk associated with the procedure. Disc space infection following cervical discography has been reported to range from 1% to 4% (Guyer, 1997; Osti, 1990). Complications associated with discography include spinal cord injury, hematoma and rare reports of epidural abscess with quadriplegia (Connor, 1993). As indicated by Boswell (2013), complications secondary to cervical discography include, but are not limited to discitis, annular strains, subdural abscess, spinal cord injury, vascular injury, local anesthetic toxicity, as well as epidural and prevertebral abscess.

Kapoor and colleagues (2010) reported the results of a meta-analysis that estimated the incidence of discitis after cervical discography, delineated the consequences of discitis, and identified factors that may influence complication rates. Studies were identified by a literature review and bibliographic search. Studies were screened for inclusion into the meta-analysis by two reviewers. Data collected included clinical and demographic variables such as age, gender, morbidities, number of study participants, number of discograms, use of prophylactic antibiotics, type of surgical prep, number of needles used, and the number of participants and discs infected. Cervical discography was complicated by post-procedural discitis in 22 of 14,133 disc injections (0.15%) and 21 of 4804 participants (0.44%). Only 1 participant suffered from an infection at more than one spinal level. The authors concluded that the rate of discitis after cervical discography is relatively low and can perhaps be further decreased by the use of prophylactic intra-discal antibiotics.

Parfenchuck and colleagues (1994) studied the correlation between discography and MRI in 52 participants with cervical discogenic pain. They found no correlation between either pain response or morphology as seen on discography and MRI.

Schellhas et al (1996) reported a small prospective study in which asymptomatic participants and individuals with chronic head/neck pain were studied with high-field magnetic resonance imaging and cervical discography to compare and correlate both tests. Ten asymptomatic participants and 10 "non-litigious" chronic neck pain participants underwent cervical discography after magnetic resonance imaging. In this small study, the authors reported that discographically normal discs (n=8) were never painful in either group, while intensely painful discs on discography had tears of both the inner and outer disc annulus. They concluded that significant cervical disc annular tears are often missed on MRI, and that MRI cannot reliably identify the source(s) of cervical discogenic pain.

Zheng and colleagues (2004) looked at the correlation between MRI and cervical discography in degenerative disc disease in 55 individuals with cervical discogenic pain. All participants went on to anterior cervical discectomy and fusion, and postoperative pain relief was assessed by the participants. Successful cervical fusion was achieved in 95% of individuals, and the overall satisfactory result was reported at 76 %. In this study, 161 cervical discs were studied with discography and 79 levels were positive. Of 79 discs with positive discography, only 58 (73%) had an abnormal MRI. Of 82 levels studied with negative discography, only 40 (49%) had a normal MRI. From these observations, the authors concluded that a combination of clinical symptoms, MRI, and discography provided the most information for decision making and can improve the management of cervical discogenic pain. The limitations of this study include its retrospective design and lack of a randomized control.

Two reviews of cervical discography identified only 10 studies meeting a minimal evidence threshold; all but 3 were retrospective and none included a randomized control (Buenaventura, 2007; Shah, 2005). In only 4 of these studies were the sensitivity and specificity for the test calculated. Carragee et al (2006) and others have questioned the validity of discography in both the lumbar and cervical spine. They reported that the specificity of discography is dependent upon the psychological profile of the participant. Nordin and colleagues undertook a broader review of the assessment of neck pain and concluded that no evidence supports using cervical discography in assessing neck pain (Nordin, 2008).

Manchikanti and colleagues (2009) performed a systematic review of studies on cervical discography as a diagnostic test for chronic spinal pain. The authors noted that the limitations of the review included "a paucity of literature, poor methodologic quality, and very few studies performed utilizing IASP [International Association for the Study of Pain] criteria." The researchers rated the evidence for cervical discography at only II-2 ("from at least one properly conducted diagnostic accuracy study of adequate size").

Onyewu and colleagues (2012) conducted a systematic review of the diagnostic accuracy of cervical discography. Using the modified Agency for Healthcare Research and Quality (AHRQ) accuracy evaluation and United States Preventive Services Task Force

(USPSTF) level of evidence criteria, the systematic review indicated the strength of evidence is limited for the diagnostic accuracy of cervical discography.

The American College of Radiology's panel on musculoskeletal imaging for chronic neck pain or cervical radiculopathy did not recommend discography for the evaluation of individuals with these conditions (ACR, 2018).

The American Society of Interventional Pain Physicians (ASIPP) released updated evidence-based practice guidelines in the management of chronic spinal pain which state the following:

The major obstacle confronting cervical discography is the lack of consensus as to what constitutes a positive response. Widespread variations in criteria exist not only for pain provocation (i.e., designation of concordance and threshold for a positive response), but also for morphological classification. While some investigators have interpreted certain patterns of contrast dispersion as being indicative of disc pathology, others have found a lack of correlation between morphology and pain reproduction. ... Multiple questions have been raised regarding the utility of cervical discography, including reported high false-positive rates, the lack of standardization; the discrepancies regarding the need for "control levels," pain concordance and pain intensity threshold; and utilization (Manchikanti, 2013).

The ASIPP recommends that "cervical discography is indicated only when a treatment is available to test the diagnostic hypothesis of discogenic pain of the cervical spine in individuals who have been properly selected and screened to eliminate other sources of cervical pain" (Manchikanti, 2013).

The North American Spine Society (NASS) Coverage Policy Recommendations of Discography limit the use of cervical discography to select individuals when the clinical criteria are met. However, NASS acknowledges that "the greatest concern with cervical discography is the lack of a standardized grading system for what constitutes as a positive response". The authors also indicate that "more high quality studies need to be developed in order to determine the utility of this procedure in the cervical spine" (NASS, 2019).

#### *Thoracic Discography*

Schellhas and colleagues (1994) analyzed the results of thoracic discograms after MR imaging in a retrospective series of 100 subjects with spinal pain. There were no serious complications in the series. They found that approximately 75% of discs with annular tears, intrinsic degeneration, and/or endplate deformities were painful during discography and clinically concordant with the subject's pain approximately 50% of the time. The authors concluded that thoracic discography can be performed safely as a diagnostic procedure to determine if degenerated discs on MRI are related to clinical symptoms. The limitations of this study include its retrospective, uncontrolled design.

In 2008, Singh and colleagues undertook a systematic review of thoracic discography and identified the two articles for review. The authors rated both of these studies as level II-3, indicating that the evidence was derived from low quality or very low quality evidence. Based on the evidence available for the systematic review, the authors stated that:

Thoracic provocation discography is provided with a weak recommendation for the diagnosis of discogenic pain in the thoracic spine, if conservative management has failed. This is qualified by the need to appropriately evaluate and diagnose other causes of chronic thoracic pain including pain originating from thoracic facet joints.

In 2012, Singh and colleagues performed another systematic review to assess the diagnostic accuracy of thoracic discography with respect to chronic, function limiting, thoracic or extrathoracic pain. The studies were evaluated using a methodological quality assessment tool (Quality Appraisal of Reliability Studies [QAREL]). Based on the quality of evidence developed by the U.S. Preventive Services Task Force (USPSTF), the researchers found only two studies that met the inclusion criteria. The authors indicated that the evidence for and clinical value of thoracic provocation discography is limited (poor).

The 2007 ASIPP's evidence-based practice guidelines in the management of chronic spinal pain indicate that the evidence is limited for thoracic discography (Boswell, 2007). A 2013 update of the guideline did not yield any additional studies evaluating thoracic discography. The updated guidelines state "if the indication is appropriate and a treatment is available, thoracic discography can be performed to diagnose thoracic discogenic disease" (Manchikanti, 2013).

The NASS Coverage Policy Recommendations of Discography (2019) do not specifically discuss or provide any coverage recommendations for thoracic discography (NASS, 2019).

#### *Cervical and Thoracic Discography*

Shah et al (2005) and Buenaventura et al (2007) performed extensive reviews of the literature evaluating the diagnostic accuracy of discography in the management of chronic spinal pain. Studies were scored according to the Agency for Healthcare Research and Quality (AHRQ; West, 2002) and Quality Assessment of Diagnostic Accuracy (QUADAS; Whiting, 2003) rating scales for diagnostic testing. For inclusion, studies first had to meet at least 50% of the total possible points for each scale. Evidence was then classified into five levels: conclusive, strong, moderate, limited, or indeterminate. The authors concluded in their review of the evidence through November 2006 that there is only "moderate" evidence supporting the role of discography in identifying a subset of individuals with cervical discogenic pain and only "limited" evidence supporting the role of discography in identifying individuals with thoracic discogenic pain. In their review, the authors defined "moderate" evidence as evidence obtained from comparative studies with non-randomized concurrent or historical controls, single arm trials or interrupted time series without a parallel control group. "Limited" evidence was defined as well-designed non-experimental studies from more than one center or research group; or conflicting evidence with inconsistent findings in multiple trials.

#### *Conclusion*

At this time, there is insufficient evidence from well-designed clinical trials to demonstrate the clinical utility of cervical and thoracic discography in individuals with chronic cervical or thoracic spine pain. While cervical and thoracic discography may demonstrate disc pathology and concordant pain, there is insufficient evidence from well-designed clinical trials to show these tests improve the management or clinical outcome of individuals with neck or thoracic pain. The American Society of Interventional Pain Physicians' updated evidence-based practice guidelines in the management of chronic spinal pain (Manchikanti, 2013) concluded that the evidence is limited for both cervical and thoracic discography. The American College of Radiology's panel on musculoskeletal imaging for chronic neck pain does not recommend cervical discography for the evaluation of individuals with cervical spondylosis, assigned the procedure an appropriateness criterion of 1, signifying the least appropriate test. Also, the American College of Radiology (ACR) clinical appropriateness criteria on myelopathy acknowledges that when treating individuals with cancer or an infectious disease, it may be necessary to study the entire spine or even the entire skeleton despite a specifically localized myelopathic level. However, they do not mention the use of discography in their appropriateness criteria for myelopathy (ACR, 2020).

## Background/Overview

Discography involves the pressure-controlled injection of a water-soluble contrast material directly into the center (that is, the nucleus pulposus) of the vertebral disc. Information is then documented about the amount of dye accepted, the pressure necessary to inject the material, the pattern of the opaque material, and the reproduction of the individual's pain. For a response to be considered positive, concordant pain must be produced; and for the test to be considered valid, there must be at least one or more discs that do not elicit pain upon injection which serve as an internal control. Discography is a procedure used to characterize the architecture of the intervertebral disc and to determine if the disc is a cause of an individual's chronic spinal pain. Since discography is an invasive diagnostic test, it is generally reserved for chronic spinal pain in individuals refractory to conservative therapies in whom disc pathology is felt to be a likely cause of the individual's pain and surgery is being considered. While lumbar discography may be of value in the treatment planning of individuals with discogenic low back pain (see CG-SURG-29 Lumbar Discography), its utility in the diagnosis and management of cervical and thoracic discogenic pain is less well studied.

The discographer relies only on pain reproduction from a suspected disc, and with a positive response the results may be either true-positives or false-positives. Those skeptical of the utility of discography suggest that discography may reveal the subclinical potential of a disc with abnormal morphology to cause pain, but contend that does not prove that the disc is actively a source of the individual's complaints. Lacking are randomized, prospective controlled trials demonstrating that the results of cervical and thoracic discography can be used to achieve improved clinical outcomes.

## Coding

*The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. 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.*

### When services are Investigational and Not Medically Necessary:

#### CPT

62291	Injection procedure for discography, each level; cervical or thoracic
72285	Discography, cervical or thoracic, radiological supervision and interpretation

#### ICD-10 Diagnosis

All diagnoses

## References

### Peer Reviewed Publications:

1. Ahn Y, Lee SH, Chung SE, et al. Percutaneous endoscopic cervical discectomy for discogenic cervical headache due to soft disc herniation. *Neuroradiology*. 2005; 47(12):924-930.
2. Buenaventura RM, Shah RV, Patel V, et al. Systematic review of discography as a diagnostic test for spinal pain: an update. *Pain Physician*. 2007; 10(1):147-164.
3. Carragee EJ, Alamin TF, Carragee JM. Low pressure positive discography in subjects asymptomatic of significant low back pain illness. *Spine (Phila Pa 1976)*. 2006; 31(5):505-509.
4. Cloward RB. Cervical discography. *Acta Radiol Diagn (Stockh)*. 1963 1:675-688.
5. Connor PM, Darden BV 2nd. Cervical discography complications and clinical efficacy. *Spine (Phila Pa 1976)*. 1993; 18(14):2035-2038.
6. Grubb SA, Kelly CK. Cervical discography: clinical implications from 12 years of experience. *Spine (Phila Pa 1976)*. 2000; 25(11):1382-1389.
7. Guyer RD, Ohnmeiss DD, Mason SL, Shelokov AP. Complications of cervical discography: findings in a large series. *Spinal Disord*. 1997; 10(2):95-101.
8. Hamasaki T, Baba I, Tanaka S, et al. Clinical characterizations and radiologic findings of pure foraminal-type cervical disc herniation: CT discography as a useful adjuvant in its precise diagnosis. *Spine (Phila Pa 1976)*. 2005; 30(20):E591-596.
9. Kapoor SG, Huff J, Cohen SP. Systematic review of the incidence of discitis after cervical discography. *Spine J*. 2010; 10(8):739-745.
10. Manchikanti L, Dunbar EE, Wargo BW, et al. Systematic review of cervical discography as a diagnostic test for chronic spinal pain. *Pain Physician*. 2009; 12(2):305-321.
11. Motimaya A, Arici M, George D, Ramsby G. Diagnostic value of cervical discography in the management of cervical discogenic pain. *Conn Med*. 2000; 64(7):395-398.
12. Nordin M, Carragee EJ, Hogg-Johnson S, et al. Assessment of neck pain and its associated disorders: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine*. 2008; 33(4 Suppl):S101-122.
13. Onyewu O, Manchikanti L, Falco FJ, et al. An update of the appraisal of the accuracy and utility of cervical discography in chronic neck pain. *Pain Physician*. 2012; 15(6):E777-E806.
14. Osti OL, Fraser RD, Vernon-Roberts F. Discitis after discography. *J Bone Joint Surgery Br*. 1990; 72(2):271-274.
15. Parfenchuck TA, Janssen ME. A correlation of cervical magnetic resonance imaging and discography/ computed tomographic discograms. *Spine (Phila Pa 1976)*. 1994; 19(24):2819-2825.
16. Schellhas KP, Pollei SR, Dorwart RH. Thoracic discography. A safe and reliable technique. *Spine (Phila Pa 1976)*. 1994; 19(18):2103-2109.
17. Schellhas KP, Smith MD, Gundry CR, Pollei SR. Cervical discogenic pain. Prospective correlation of magnetic resonance imaging and discography in asymptomatic subjects and pain sufferers. *Spine (Phila Pa 1976)*. 1996; 21(3):300-311.
18. Shah RV, Everett C, McKenzie-Brown A, Sehgal N. Discography as a diagnostic test for spinal pain: a systematic and narrative review. *Pain Physician*. 2005; 8(2):187-209.
19. Singh V, Manchikanti L, Onyewu O, et al. An update of the appraisal of the accuracy of thoracic discography as a diagnostic test for chronic spinal pain. *Pain Physician*. 2012; 15(6):E757-E775.
20. Singh V, Manchikanti L, Shah RV, et al. Systematic review of thoracic discography as a diagnostic test for chronic spinal pain. *Pain Physician*. 2008; 11(5):631-642.
21. Slipman CW, Plastaras C, Patel R, et al. Provocative cervical discography symptom mapping. *Spine J*. 2005; 5(4):381-388.
22. Whiting P, Rutjes AW, Reitsma JB, et al. The development of QUADAS: a tool for the quality assessment of studies of diagnostic accuracy included in systematic reviews. *BMC Med Res Methodol*. 2003; 3:25.
23. Wieser ES, Wang JC. Surgery for neck pain. *Neurosurgery*. 2007; 60(1 Suppl 1):S51-56.

24. Zheng Y, Liew SM, Simmons ED. Value of magnetic resonance imaging and discography in determining the level of cervical discectomy and fusion. *Spine (Phila Pa 1976)*. 2004; 29(19):2140-2145.

#### Government Agency, Medical Society, and Other Authoritative Publications:

1. American College of Radiology (ACR) Appropriateness criteria cervical neck pain or cervical radiculopathy. ACR 2018. Available at: Available at: <http://www.acr.org>. Accessed on September 23, 2023.
2. American College of Radiology (ACR) Appropriateness criteria myelopathy. ACR 2020. Available at: <http://www.acr.org>. Accessed on September 24, 2023.
3. Boswell MV, Trescot AM, Datta S, et al.; American Society of Interventional Pain Physicians. Interventional techniques: evidence-based practice guidelines in the management of chronic spinal pain. *Pain Physician*. 2007; 10(1):7-111.
4. Manchikanti L, Abdi S, Atluri S, et al. An update of comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. Part II. Guidance and Recommendations *Pain Physician*. 2013; 16(2 Suppl):S49-S283.
5. North American Spine Society (NASS). NASS coverage policy recommendations. Discography (2019). Available at: <https://www.spine.org/coverage>. Accessed on September 24, 2023.
6. West S, King V, Carey TS, et al. Systems to rate the strength of scientific evidence. Evidence Report/Technology Assessment No. 47. *Evid Rep Technol Assess (Summ)*. 2002; (47):1-11.

## Index

Cervical Discography  
Thoracic Discography

## Document History

Status	Date	Action
Reviewed	11/09/2023	Medical Policy & Technology Assessment Committee (MPTAC) review. Updated References sections.
Reviewed	11/10/2022	MPTAC review. Updated Rationale and References sections.
Reviewed	11/11/2021	MPTAC review. Updated References section.
Reviewed	11/05/2020	MPTAC review. Updated Rationale and References sections.
Reviewed	11/07/2019	MPTAC review. Updated References section.
Reviewed	01/24/2019	MPTAC review. Updated References section.
Reviewed	02/27/2018	MPTAC review. The document header wording updated from "Current Effective Date" to "Publish Date." Updated References and History sections.
Reviewed	02/02/2017	MPTAC review. Updated review date, References and History sections.
Reviewed	02/04/2016	MPTAC review. Updated review date, Description/Scope, Rationale, Background/Overview, References and History sections. Removed ICD-9 codes from Coding section.
Reviewed	02/05/2015	MPTAC review. Updated review date, Rationale, References and History sections.
Reviewed	02/13/2014	MPTAC review. Updated review date, Rationale, References and History sections.
Reviewed	02/14/2013	MPTAC review. Updated review date, Rationale, References and History sections.
Reviewed	02/16/2012	MPTAC review. Updated review date, Rationale, References and History sections.
Reviewed	02/17/2011	MPTAC review. Updated review date, References and History sections.
Reviewed	02/25/2010	MPTAC review. Updated review date, References and History sections.
Reviewed	02/26/2009	MPTAC review. Updated review date, Rationale, References and History sections.
New	02/21/2008	MPTAC initial document development. Document created to address cervical and thoracic discography. Lumbar discography addressed in CG-SURG-29 Lumbar Discography.

Applicable to Commercial HMO members in California: When a medical policy states a procedure or treatment is investigational, PMGs should not approve or deny the request. Instead, please fax the request to Anthem Blue Cross Grievance and Appeals at fax # 818-234-2767 or 818-234-3824. For questions, call G&A at 1-800-365-0609 and ask to speak with the Investigational Review Nurse.

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 eligibility for coverage. The member's contract benefits in effect on the date that services are rendered must be used. Medical Policy, which addresses medical efficacy, should be considered before utilizing medical opinion in adjudication. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from the health plan.

© CPT Only – American Medical Association