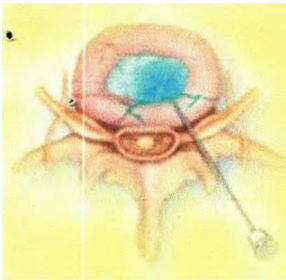


*This article was dictated and written by my esteemed colleague, Dr. Michael Brown M.D. DC. Dr. Brown was a wonderful teacher and superb doctor who passed away too young. The information dictated by Dr. Brown still remains pertinent today and I corrected spelling and grammar to make it more easily readable and I find it useful to provide to my patients. I hope you like it.*

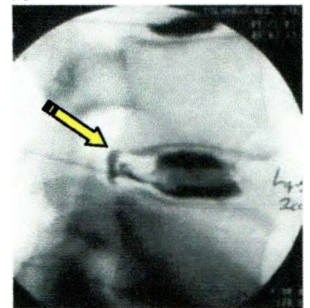
Charles F Mahl M.D.



# Analgesic Discography: A Patient's Guide

## WHAT IS A CONVENTIONAL DISCOGRAM?

A conventional discogram is a procedure performed by interventional spine physicians where a small needle or catheter is placed within the disc under the guidance of x-ray. A special contrast is injected within the disc during this procedure. If there are tears or disruptions within the disc that are painful then exerted by the injection and the irritation of the contrast can replicate the patient's pain exactly as they typically feel it. In addition, the physician performing the procedure can also visualize the tear within the disc on a video screen. Conventional discography has been around for many years. Discography is a common method utilized to confirm whether or not the patient has disc pain as the primary source of their chronic back pain. The discogram to the right demonstrates the injected contrast leaking out of the center of the disc and filling a tear in the back of the disc. This is just one of many potential patterns of types of disc disruption that a physician may be able to identify as the cause of the patient's pain during discography. The conventional "provocational discography" is a procedure that attempts to provoke pain in a disc to see if it is a "similar" pain and pain distribution that the patient normally experiences. Conventional discography is a pain inducing procedure.

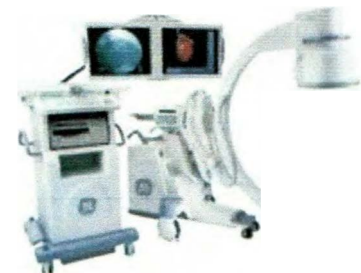


## WHAT IS AN ANALGESIC DISCOGRAM?

"Analgesic discography" is a somewhat different procedure where rather than pressurizing the disc and provoking pain, the physician will inject a local anesthetic to relieve the pain. Conventional discography is an unpleasant experience. Analgesic discography provides a means of obtaining important diagnostic information without causing the pain typically caused by discography. I personally do not use conventional discography much because I do not like to pressurize the disc. Analgesic discography uses only a minimal amount of local anesthetic and does not over pressurize the disc. In addition, I personally feel it is much easier on the patient since it does not elicit the rather severe pain that is often experienced with discography. There are other reasons why I feel analgesic discography may be more helpful too.

## WHAT CAN I EXPECT TO HAPPEN DURING THE PROCEDURE?

During the procedure you will be placed face down on the table with pillows placed under your abdomen to support your lower back. The skin overlying your lower back will be surgically cleaned and draped and a small amount of local anesthetic injected on the skin to numb the skin. Additional local anesthetic will be injected for your comfort. A 25-



gauge catheter/needle will be directed into the disc utilizing a very specialized x-ray machine (fluoroscopy machine) as seen on the picture to the right. This specialized x-ray device can pivot and turn to provide interventional spine physicians the ability to precisely target structures of the spine. Once the catheter is in place a small amount of local anesthetic will be injected into the disc and the needle is then removed. We will then be asked you to get up off of the table and walk about the procedure suite or office or perform activities that might aggravate your pain such as sitting, or bending. You will be requested to fill out a pain questionnaire of how your back pain has responded to the anesthetic injected within the disc over the course of the day. This provides critical diagnostic information to the interventional spine physician.

### **WILL I BE SEDATED OR UNDER ANESTHESIA FOR THE PROCEDURE?**

Typically analgesic discography is relatively comfortable and does not require significant sedation. This is another advantage of analgesic discography over the conventional discography. Patients who are typically anxious may be given an oral sedative such as Valium or occasionally we may start an IV and provide a sedative such as versed and a pain medication (fentanyl). If you are given any sedative for the procedure even if it is an oral sedative you will be requested to bring a driver.

### **HOW DO I PREPARE FOR THE PROCEDURE?**

1. You must be off of aspirin, and anti-inflammatory medications for 7-10 days before the procedure. You must be off all “blood thinners” such as Coumadin and other medications that effects platelets, etc. If you are on any blood thinning agents such as warfarin, Coumadin, heparin, Plavix, etc. please notify us immediately. We will have to work out a specific plan for each individual. In some patients we may need to contact your cardiologist or physician who has prescribed this medication to make sure that we can take you off of this for a period of several days prior to the procedure.
2. If there is a plan to do IV sedation you cannot eat anything after midnight before the procedure. If the procedure is going to be done during the afternoon you need to be sure you have had 12 hours of not eating before the procedure.
3. Wear comfortable clothing and pants with an elastic waistband if possible. We have shorts and gowns, etc. which we can provide as well.
4. If you are given Valium or oral sedatives or if you have been given IV sedation you will need a driver to take you home. We will not be able to proceed with the procedure if you need sedation and you do not have a driver.
5. We typically recommend that a driver take you home regardless of whether you are sedated or not.
6. You are able to bathe and shower after the procedure without limitation.



### **WHY WOULD WE DO A DISCOGRAM WHEN WE HAVE MRI TECHNOLOGY?**

The MRI is an incredible advanced diagnostic radiology technology. However, it provides only visual images of the current anatomy of your spine. It provides us important structural information in regards the size of your spinal canal, the degree of degenerative disc and joint disease that may be present and a myriad of other important information such as the condition of your disc. Many times however the information provided by MRI does not really provide information as to where the patient's pain is really coming from. It is a well known fact based on current medical research that the MRI provides the diagnosis of specifically where a patient's back pain comes from only 15% of the time! One of the problems with MRI is that it shows all of the details of degenerative pathology but cannot tell you which of these pathologies is causing your specific pain. A discogram however does provide a means of determining if discogenic back pain is suspected, which of the discs are causing pain. It also provides important

information on the type of tearing or internal disc disruption that is present. The pattern of disruption in your disc may be important when doing specific injection interventions that can be later targeted to the specific sites of disruption or annular tear. You may have 2 or 3 discs with significant degeneration, bulge, etc. and yet, you may only have one disc that is causing all of the pain. Then again, you may have one disc which shows significant degeneration even collapse and yet the normal-looking disc above is the source of the pain. Therefore, combining MRI imaging and discography provides a much more specific diagnosis and also provides a means to develop a treatment plan or strategy specific for your problem. Interventional spine physicians target specific nerves, ligaments, tendons, muscles, discs and soft tissues with analgesic medications directed either

under ultrasound or x-ray/fluoroscopy in order to precisely diagnose the source of the patient's back pain. Analgesic discography is just one of those procedures utilized in our practice to make a precise diagnosis.



MRI demonstrating large annular tear in a lumbar disc.

### **WHAT ARE THE RISKS OF DISCOGRAPHY?**

Because discography involves injection into 1 or more discs there are inherent risks. First discography can cause a flare of back pain that can last for days, or weeks. With analgesic discography flares of back pain are rare because the disc is not pressurized during the process and involves an injection of analgesic which typically does not cause significant pain when it wears off. Because contrast and analgesic medication is used an allergic reaction can occur to the medication. Nerve injuries can occur by the needle. The connective tissue covering over the spine that houses cerebral spinal fluid can be punctured and thus cause post dural puncture headaches. This problem typically resolves on its own. However, on occasion some patients may require a second procedure called a "blood patch" to resolve the problem. This involves a epidural injection of the patient's own blood which is used to "patch" the leak.

A hematoma can occur periodically with epidural injections especially in those patients who are on blood thinners. The hematoma can cause pressure on nerves and the spinal cord and damage them if it is not picked up immediately. This is why we take precautions with blood thinners before the procedure as described below. Infections are also possible both within the disc and in the form of an abscess outside the disc. The complication of infection can be catastrophic and therefore we take extra precaution to prevent this. We actually utilize an antibiotic that we mix into the solution that we inject in the disc to prevent infection. We also provide an IV antibiotic also as a preventative measure.

It has been my opinion for years that piercing the disc especially with a large needle can cause damage to the disc. For years research scientists including ourselves have induced degenerative disc disease in animals by creating a cut or large puncture in a disc.<sup>1-3</sup> For many years we have known that larger gauge needles can cause degenerative changes in the disc.<sup>4</sup> The good news is that small gauge needle puncture does not seem to cause the same changes as the large gauge needle. Because of this we have made significant changes to the way to do these testing procedures today. This will be addressed later below. It is felt at present time that with treatment procedures directed to the disc most spine practitioners of these techniques estimate the risk of secondary degenerative change to be extremely remote.<sup>5-7</sup>

In 2009 a study by Eugene Carragee, MD and his colleagues from Stanford University brought into question this whole issue of the safety of discography once again.<sup>8</sup> He followed individuals who had undergone diagnostic discography over a period of 7-10 years following the procedure.

He put into question the modern discography techniques that have been used up to that point and was able to show that these techniques also resulted in some damage to the disc and degenerative changes.<sup>8</sup> I spoke to many spine practitioners around the nation following the release of this study and many practitioners continued to perform the same techniques. This study caused me to discontinue doing discography for a period of many years until a suitable alternative could be established.

It is important to digress for just a moment. Many years ago discography was performed by most practitioners by applying manual pressure with a syringe into the disc to cause increased pressure on the annular tear to elicit pain. The problem with this was that there was no way to control the amount of pressure applied within the disc and many practitioners were pressurizing the disc over 100 pounds PSI (pounds per square inch). This was thought to cause false positive discograms where pain could be elicited but the disc was not actually the source of pain. One of my mentors Richard Derby, M.D. in California began to describe the importance of measuring the pressure applied within the disc and creating a standard method of pressure tenometry (pressure measurement) during discography.<sup>9,10</sup> This began an era where spine physicians doing advanced diagnostic procedures such as discography could create a standard method of testing to reduce the issues of overpressure in the disc and reducing the issue of false positive testing. It was felt this increased the predictive value of the test. When Carragee published his work on modern discography still causing issues with the disc we began to search for another alternative.

#### **ADVANCING DISCOGRAPHY:**

Practitioners from iROM (our organization) which include Carlos Garcia, M.D. in Denton Texas and myself in Seattle Washington began to explore both invasive and noninvasive disc procedures. For example Dr. Garcia began utilizing electrical stimulation of the outer annulus by simply touching the annulus in various locations and stimulating the annulus with a specific electrical frequency seems to be able to mimic pain patterns that the patient was experiencing suggesting that the disc being tested contained a tear that was causing a patient specific pain and pain pattern. He also began to modify discography where he discontinued the use of pressure tonometry and began to use low pressures only to evaluate the morphology or internal architecture of the disc disruption which can also stimulate the patient's pain but does not put the amount of pressure within the disc that standard or modern discography does. We began to utilize small needle insertion in the disc and inject local anesthetics into the disc to relieve disc pain rather than to pressurize the disc to elicit pain. We feel that injecting a small quantity of local anesthetic causes less injury to the disc than injecting larger volumes pressurizing the internal components of the disc which can separate connective tissues and disrupt the internal architecture of the disc. Again, I feel it is easier on a patient to state whether the procedure relieves the pain rather than causes pain that they later have to determine as to whether or not it is the same pain they normally experience. These modifications and others that we are currently utilizing has transformed our ability to once again begin to make precision diagnoses and categorize discogenic disease in a unique way that provides us a means to make determinations as to specific treatment techniques that can be employed.

#### **DO I HAVE TO HAVE PAIN BEFORE THE PROCEDURE?**

**Yes !** If you have back pain that comes and goes then this procedure will be canceled. There are modified techniques that can be used such as a modified provocation discogram where we try to provoke the pain but we still do not use significant pressures. This will be handled on a case by case basis. But, remember analgesic discography is designed to relieve pain and therefore is only conducted in patients with pain.

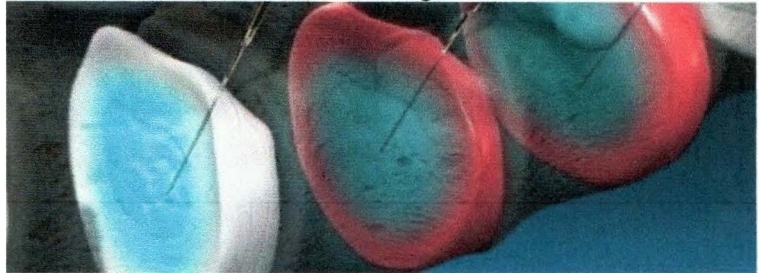


### **WHAT CAN I EXPECT AFTER ANALGESIC DISCOGRAPHY?**

Following a analgesic discography sufficient time will be allowed for the anesthetic to take effect. You will then be reevaluated and requested to get up, move around, sit or perform certain movements that typically would provoke pain. It is critical that you fill out your pain questionnaire and provide your subjective experience of pain following the injection procedure. If you have disc pain and we have targeted the exact disc that is causing your pain you may experience a period of time where your back pain is substantially improved. This is exactly the response we are looking for. You may have a period of time when the symptoms are much improved and then they will come back. Please remember this is a diagnostic test utilizing an anesthetic medication that wears off and the pain will return. So, do not be surprised by this. Most individuals do not experience much back pain flare following a analgesic discography as they do a conventional discogram. It is part of the reason why I use this method preferentially. You may experience increased back pain however which typically is temporary.

### **WHAT DO WE DO WITH THIS INFORMATION?**

For years we have been developing a categorization scheme to put patients with disc pain and disc disease into a number of categories. Each of these categories has specific criteria to fit that category and different treatment techniques that are employed. This process is part of our research that we have been working on for years. Once we can identify specific disc pathology and replaced the patient's disc disease in specific categories we can then select the appropriate protocol. As our technology has advanced we are finding more and more scenarios where we can save a patient from a spinal fusion. Over the last 25 years I have had the privilege of working with some of the greatest interventional spine physicians who have pioneered a great deal of technology for disc pain. We have explored countless technologies directed to help patients with discogenic pain. More recently the advancements of stem cell therapies and other cellular and biologic therapies have emerged that we are now using to treat patients with disc pain. This is an incredibly complex topic. Many physicians and researchers have been working on various biologic, cellular and tissue engineering techniques for discogenic back pain for many years.



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