

FACT SHEET

Discogenic Back Pain & Stem Cells



Low back pain (LBP) affects 60-80% of the adult population at some stage. It is the most frequently seen musculoskeletal condition in general practice, and about the 5th most common reason for seeking care.¹

Discogenic pain is pain that arises from an intervertebral disc. The disc is the strong and somewhat mobile structure connecting adjacent spinal bones, which are known as vertebrae. Discogenic pain is the most common cause of chronic, severe low back pain (LBP), accounting for around 40%-65% of patients attending a spinal pain practice for chronic LBP.²⁻⁴

The diagnosis of discogenic pain is not a simple process. The gold standard test to confirm discogenic pain is discography performed according to specified standards.⁵ If discography is not performed, the surrogate is MRI, from which discogenic pain is assumed from two particular findings: end-plate changes (Modic types 1 and 2) and annular tear. Discogram is an invasive procedure, and these abnormal MRI findings are typically accepted as the minimum requirement for stem cell injection into a disc.

Classic discogenic pain is deep, aching low back pain. It can spread to the legs and groin but the back pain is worse than the leg pain. The pain comes from inside the disc. When the pain spreads from the disc into the legs the pain is known as referred pain.

Although the pain is felt down the leg is not true sciatica, which is an electric shock down the leg and is caused due to nerve pinching. In discogenic pain, the sciatic nerve is not being pinched or aggravated; rather the pain is arising from the disc itself.

The inability to sit for a long time is often the most incapacitating symptom of discogenic pain.⁶ Patients with pain originating from the disc also have pain with standing for a long time and generally feel better moving around. However, these features also occur with pain due to other structures in the back such as facet joints or sacroiliac joints, therefore, pain with sitting and standing are not diagnostic of discogenic pain.

The severity of any painful condition including discogenic pain is sometimes significantly exacerbated by a process known as central sensitisation. This is akin to a short-circuiting of the nervous system so that the messages the brain receives from an injured area are amplified. This amplification significantly increases the pain making it disproportionate or worse than it should be. It might lead to pain spreading to up the back, and creates much confusion as MRI's or other scans may only show minor changes but the pain can be very severe. The pain from central sensitisation is disproportionate to the injury, unpredictable, is

made worse by many non-specific activities or movements, and the local tenderness to even light touch can be severe. It is also commonly associated with an emotional component of pain (e.g. it makes you depressed, anxious or frustrated).⁷

INVESTIGATIONS

For diagnosing discogenic pain, x-rays are unhelpful. Likewise, CT does not offer any further diagnostic value. They are both used to exclude other causes of back pain.

MRI is the best preliminary test. Although this may be the case, you still cannot tell from MRI whether or not a disc is the causing the pain.⁸ However, there are 3 findings on MRI that make it more likely that the pain is coming from the disc; disc degeneration, high intensity zones and Modic changes. Degeneration of the lumbar discs has been shown to be related to symptoms, and moderately degenerated discs appear more likely than mildly degenerated discs to be associated with the most severe LBP.⁹ High intensity zones (HIZ – looks like a white spot or line in the disc), also known as an annular tear, predicts discogenic pain in up to 80% of patients.^{10,11} Modic changes, which are white or black areas in the bones on either side of the disc, represent inflammation in the bone and also predict discogenic pain in up to 90% of patients with LBP. When Modic changes are absent, discography is less likely to be positive.¹¹

When MRI fails to detect any changes at all in the disc or end-plates the odds of a discogram revealing discogenic pain are extremely low.

PATHOPHYSIOLOGY

The disc can be thought of like a squashed and flattened golf ball, with a tough exterior layer that can still distort, and an inner part that is filled at high pressure with material that is very like chewing gum. The outer part is known as the annulus (fibrosus), and the inner part is known as the nucleus (pulposus).

If this “golf ball” is squashed further it can bulge out in all directions (a disc bulge); this is a fairly normal process. It happens as the disc degenerates. This process of degeneration is normal although it can be accelerated. The nucleus dries out – this is like what happens to chewing

gum when it is chewed – at the start it is very juicy because it contains large proteins that hold water within the structure. As the protein breaks down (by chewing the gum) the protein breaks down and water is no longer contained – the gum dries out. In the same way, genetic factors and mechanical stress predispose the nucleus protein to break down, and the water content drops (the disc becomes darker on MRI, and this is called disc degeneration or degradation). Again, this is a normal process. If the process is accelerated, the loss of compressibility of the disc (it becomes like a semi flattened car tyre) places more stress on the outer layers (of the “golf ball = annulus”) and this in turn means that these outer layer can start to split or delaminate. Eventually it is possible for some of the dehydrated inner material (the chewing gum) to rupture through the outer layers (the golf ball outer layers) and when it does it is called a disc prolapse (or similar – protrusion, extrusion etc).

The annulus (“outer golf ball layers”) contains small nerves that are pain sensitive. Discs can become painful as a result of single injury or more typically due to repetitive trauma. Commonly lifting and twisting can lead to disc injury. These stresses may cause the bony plate between the disc and the vertebra to develop a microscopic break. (These might be seen as Modic changes on MRI). This then leads to a weakening of the disc, and the disc can begin to split. A tear may then occur in the outer layers of the annulus. This is seen as a High Intensity Zone on MRI. It is then possible for the soft, internal part of the disc (the nucleus; aka “the chewing gum”) to spread along the tear into the outer part of the disc. This nucleus is very irritating when it contacts the small nerves in the outer part of the disc, it may produce low back pain and referred pain. The disc does not heal well. It has a poor blood supply, and thus less ability to attract the body’s natural healing mechanisms, such as stem cells.

THE DIAGNOSIS OF DISCOGENIC PAIN

The studies that state that the prevalence of discogenic pain in a spinal pain centre is 40-65% rely on the investigation called discography²⁻⁴.

Discography, performed under the Spinal Intervention Society guidelines, is best performed using this standardised procedure by an experienced practitioner.⁵

MRI can be used as a surrogate for discography but not all abnormal MRI findings are associated with positive discography, as discussed above. Discography involves the placement of needles into at least two of the lower lumbar discs with the patient asleep. Once the needles are in place, the patient is woken up, and dye is injected through these needles into the disc to see if the disc has splits through the annulus, and that the injection reproduces the patient's typical pain. The information sheet on discography should be read as an accompaniment to this document. In relation to stem cell injection, often the discogram will be done at the time of stem cell injection, as the stem cell injection process is identical to the process of discography. In such instances, it is assumed that the LBP is discogenic.

WHAT WE DO AT THE METRO PAIN GROUP AND THE MELBOURNE STEM CELL CENTRE?

Prior to any treatment you will receive a thorough consultation with one of our pain doctors. You will need to have a relatively recent lumbar MRI. Your LBP problem will be assessed, and the possibility of the pain being discogenic and amenable to stem cell therapy will be discussed. However, the diagnosis and possible treatment will be put into context. Your pain management options and less invasive conservative measures will be evaluated and, if relevant, be optimised. Consideration will be given for other assessments regarding such treatments as diet, pain management and exercise rehabilitation. Other advanced medical therapy options will also be discussed. Discogenic pain is similar in nature to other causes of pain in the back. If indicated, we commonly perform diagnostic blocks to rule out other causes of pain.

We have the skills and experience to perform nearly all possible advanced treatment options available for LBP. If we treat you, your response to treatment will be regularly followed to maximise potential improvement.

SUMMARY OF TREATMENT OPTIONS FOR DISCOGENIC LBP

Conservative medical therapy

- General pain management advice including cognitive-behavioural and Mindfulness therapy
- Medication management
- Exercise
- Physical therapy

Surgery

- Intradisc procedures such as nucleoplasty
- Discectomy
- Spinal fusion and disc replacement
- Neuromodulation

Advanced medical therapy

- Stem cells

WHY STEM CELLS?

Theoretically, your stem cells might either act as a strong anti-inflammatory agent, and/or, act to partially restore the inner contents of the disc. It is worth noting however, that despite initial promising results, the use of stem cell therapies remains experimental as formal controlled studies have not been completed. Metro Pain Group are optimistic about the future benefits of this treatment.

REMEMBER:

The primary goal is to help you find ways to manage your pain and return to your usual activities. Stem cells are not a magic bullet they form a part of a comprehensive strategy to manage your pain. It is important to work with all members of your pain team including your pain doctor, general practitioner, and allied health practitioners to manage your pain. It is also essential to follow up with your doctor or health practitioner as you may need further assessment.

DISCLAIMER

Please note the contents contained in this Patient Fact Sheet are not intended as a substitute for your own independent health professional's advice, diagnosis or treatment. At Metro Pain Group, we assess every patient's condition individually. As leaders in pain intervention, we aim to provide advanced, innovative, and evidence-based treatments tailored to suit each patient. As such, recommended treatments and their outcomes will vary from patient to patient. If you would like to find out whether our treatments are suitable for your specific condition, please speak to one of our doctors at the time of your consultation.

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