

POSTERIOR FUSION DECOMPRESSION



Fig 1 View of spine from the side

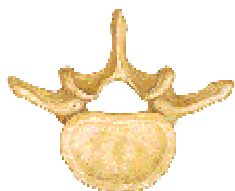


Fig 2 A vertebra viewed from top

THE PARTS OF YOUR SPINE AND HOW THEY WORK

The spine is made up of 25 small bones (vertebrae) that are stacked on top of each other to create the spinal column. Between two vertebra is a soft, gel-like cushion called a disc that helps absorb pressure. In addition to the discs the spine also has small joints at the back called facet joints. The spine itself has four main segments: the cervical (neck), thoracic (behind the rib cage), lumbar spine (low back) and sacrum (behind the pelvis). The normal spine has an "S"-like curve when looking at it from the side. This allows for an even distribution of weight. Each vertebra has a hole in the center, so when they stack on top of each other they form a hollow tube (spinal canal) that holds and protects the spinal cord and its nerve roots.

SPINAL CORD AND NERVE ROOTS

The spinal cord is a column of millions of nerve fibers that run through the spinal canal. The spinal cord extends from the brain to just below the chest. After this it continues as a collection of nerves called the cauda equina. The spinal cord branches off into thirty-one pairs of nerve roots. These roots exit the spine on both sides through spaces (neural foramina) between each vertebra. The nerves in each area of the spinal cord connect to specific parts of your body. **The spinal cord is thus like a motorway that goes through a bony tunnel and branches off into 31 A roads on either side.**

WHAT ARE DISCS?

The discs are the cushions that act as shock absorbers between each of the vertebra in your spine. They are made of cartilage. Each disc has a strong outer ring of fibres called the Annulus Fibrosus, and a soft jelly-like centre called the nucleus pulposus. They are like a jam doughnut. The bread of the doughnut being the annulus fibrosus and the jam in the centre being the nucleus pulposus. The disc contains a lot of water and acts as a soft cushion.

When the disc contains a lot of water we call it hydrated.

WHAT IS AN MRI SCAN

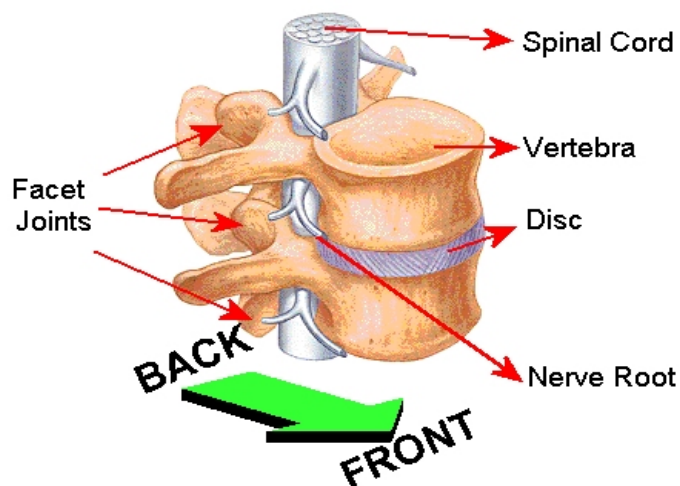
A MRI scan is one of the ways we can scan and see your spine and nerve roots. This involves going into a tube like machine. You may have to lie still in the machine for about 30 minutes. The machine contains a magnet and sensors which revolve around your body and picks up details. The computer then analyses the details and provides different images. These images are usually cut slices. The lengthwise cuts are called sagittal images. Cross sectional cuts are called axial images. There are also different types of images the MRI scan provides. Some of types are called T1 and T2 images. There are like negative and positive images that we can produce from a black and white camera. Each type of image provides a different detail. A well hydrated (normal) disc is white in colour on the T2 weighted MRI scan pictures.

DISC DEGENERATION

Sometimes over a period of time the disc loses its water content and becomes dehydrated. This condition is called disc degeneration. This is a natural ageing process but can occur even in younger age in some individuals. A degenerated disc is black on the T2 weighted MRI scan picture. Disc degeneration causes back pain and only some leg pain. Disc degeneration is not serious and all of us get it with age. Unfortunately some get it a bit earlier. Please also note that disc degeneration symptomatically gets better in 99.9% of the cases and nothing needs to be done.

Sometimes the degenerate disc may show a white spot at the back. This is called a High Intensity Zone (HIZ) and may indicate a small tear in the annulus. This is like a small puncture.

Sometimes the height of the disc is reduced and becomes like a flat tyre. In some cases the bones on either side of the disc may show some changes on the scan. These are called Modic end plate changes.

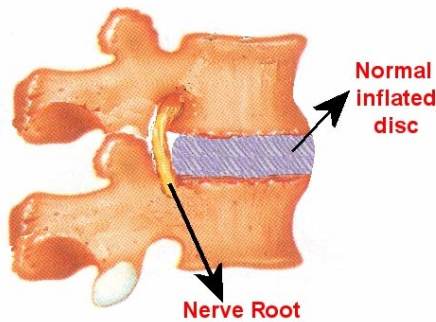


POSTERIOR FUSION DECOMPRESSION

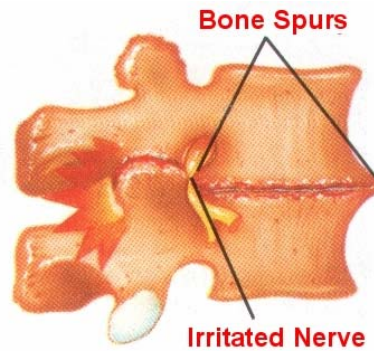
As stated before disc degeneration symptomatically improves in 99.9% of the cases and nothing needs to be done. In other words the pain decreases with time. It is important to remain active and try to carry on with your job. In very rare occasions some surgical intervention may be required for disc degeneration.

FUSION DECOMPRESSION - RATIONALE OF THE OPERATION

The intervertebral discs are flat, round "cushions" that act as shock absorbers between each vertebra in your spine. The



Normal disc acting as a good cushion / shock absorber.

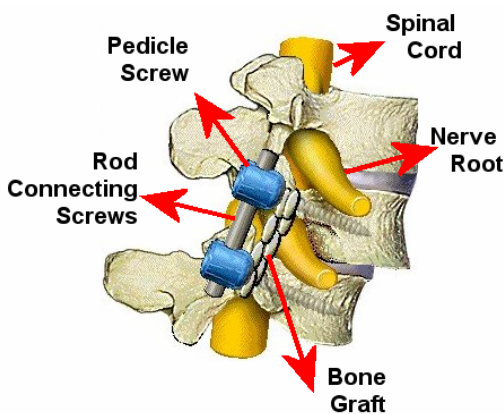


Degenerate disc (advanced stage) causing bone to rub one against the other. The worn out disc also pinches the nerve.

disc allows motion to occur between each vertebra. Degeneration, or wear and tear of the discs between one or more vertebrae can lead to pain. Removing a degenerated disc and allowing the two vertebrae to grow together or fuse can reduce the pain from the condition. With degeneration of the discs the space available for the nerves to pass through may also become less.

THE OPERATION - POSTERIOR APPROACH

There are 2 parts to the operation. Your operation may entail either both the parts or only one of them. This is decided by the problem that exists. The 2 parts are DECOMPRESSION and FUSION. Decompression is taking OFF the pressure on the nerves and FUSION is to attach the two vertebrae to each other. The posterior approach means operating from the back. An incision is made in the middle of the lower back over the area of the spine that is going to be fused. The muscles are moved to the side and the vertebrae is reached. This operation is like freeing up an earthworm encased in a block of concrete by using a chisel and hammer. The earthworm being the nerves and the concrete being the bone around the nerves. It is a tricky and a difficult operation as all care needs to be taken not to damage the nerves. Sometimes however damage does occur. In Decompression some bone and soft tissue is removed so as to remove the compression of the nerves. Only a limited amount of bone is removed to relieve the pressure on the nerves. Removing too much bone can make the spine unstable.



Spine with screws, rods and bone graft.

In a fusion special screws called pedicle screws are inserted into the vertebral body. These screws are placed down the small bony tube created by the pedicle on each side of the vertebra, between the nerve roots. This allows the screws to grab into the bone of the vertebral body, giving them a good solid hold on the vertebra. Once these screws are placed, one in each pedicle, they are attached to metal rods that connect all the screws together. Once everything is bolted together and tightened, this creates a stiff metal frame that holds the vertebrae still so that healing can occur. Finally, bone graft is placed around the back of the vertebrae. The bone graft helps the vertebrae heal together, or fuse. The bone graft may be taken from the bone removed from your spine, your hip or actual bank bone. There is only a very fine window of opportunity to insert the screws. If slightly misplaced they can cause nerve damage, paralysis and severe pain following the operation. Sometimes spinal fusion can be done without using screws and just by using bone graft.

Please read the leaflet "Complications of spinal surgery" before consenting for any spinal surgical procedure.

Please note that disc degeneration and spinal canal stenosis does not shorten your life and hence surgery by no means is life saving or essential. Surgery may help is resolving symptoms. If you do not have pain or you can cope with your pain then you do not need surgery.

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