

# Intervertebral Disc

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#### **Is a Disc Bulge Always Significant?**

The intervertebral disc has a spongy gel-like center, which is surrounded by a supportive ring of fibers collectively referred to as the annulus fibrosis. When pressure is applied in a downward fashion onto the intervertebral disc, the annular fibers stretch and the gel-like center is compressed resulting in its migration in a sideward direction. When the intervertebral disc begins to undergo degenerative changes the annular fibers become less capable of withstanding the internal pressure from the gel-like nucleus of the disc within the central location. This leads to bulging of the outer annular fibers and portion of the disc. A bulging disc can also occur due to disruption of fibers within the annulus that may not be detected on advanced imaging techniques such as MRI or CT studies. A disc bulge can also occur in the absence of annular fiber tears (disc tears).

A bulging disc may not cause symptoms or functional limitations. Advanced imaging studies such as CT and MRI often reveal one or more levels of bulging discs in patients who do not have any associated symptoms. A disc may bulge secondary to degeneration or as the result of increased physical loads/stress placed upon it. Certain postures and muscle tension patterns can cause a disc to bulge. If the disc bulge is large enough or projects in a direction that contributes to stretching or compression of neighboring structures that are pain sensitive there may be associated symptoms.

#### **Can a disc bulge become a disc herniation?**

The term physiological bulging refers to the bulging of the disc that is completely normal and intact. A physiological bulge secondary to postural factors is not considered a precursor to developing a herniated disc at that level. It can be difficult with current advanced imaging to confirm whether a bulge is physiological or whether it may represent an early stage of degeneration with weakened or torn fibers.

The more annular fibers which degenerate (weaken) and separate within a disc, the greater the likelihood of the gel-like center migrating away from the center and contributing to causing the disc herniation. The gel-like center of the disc (nucleus pulposus) will always migrate into the path of least resistance

The annular ring of the intervertebral disc is somewhat like a radial tire having multiple laminar fibers that are oriented in different directions providing strength and stability. When these fibers are physically compromised the disc becomes more vulnerable to herniation secondary to normal activity or as the result of trauma.

#### **What is a torn disc?**

The annular fibers of the intervertebral disc can become disrupted when one of three primary conditions present. The first

condition is when normal annular fibers are exposed to abnormal physical stress and strain. The second condition is when there is degeneration and weakening of the annular fibers in the presence of normal physical strain and the third condition is when there is both abnormal degenerative change with a loss of strength and support in the presence of abnormal physical stress and strain. With any of these conditions exist, a certain amount of twisting, bending or other abnormal forces can cause "disc tears."

### **Can a torn disc cause inflammation?**

Disc tears can coalesce with neighboring tears, thus forming a larger tear. Back pain can occur secondary to a disc bulge, disc herniation or disc extrusion. Pro-inflammatory chemicals can leak from the interior of the intervertebral disc into the spinal canal and cause inflammation of pain sensitive structures in the spine. Back pain associated with a disc tear is usually made worse during certain positions and movements, particularly with rotation or twisting.

### **What is discogenic pain?**

The term discogenic pain refers to pain that arises from the intervertebral disc. Research has demonstrated that the outer portion of the intervertebral disc has pain nerve endings. Spinal ligaments that lie adjacent to the disc are pain sensitive. Pain sensitive nerve endings within the outer portion of the disc may signal the presence of a tear in the presence of certain chemicals or inflammation.

### **What is discography (discogram)?**

Discography is an advanced imaging procedure used to reveal the extent of degeneration and tears in the disc. This procedure may be considered to help determine whether a disc problem is contributing to signs or symptoms. Discography is performed with a C-arm fluoroscope, an x-ray device used in operative procedures to visualize internal body structures. There are two primary types of discography, the first is referred to provocative discography and the second is referred to as an anesthetic discogram. During a provocative discogram fluid is injected into the inside of the disc in order to place stress upon a tear. If the procedure reproduces the patient's chief complaint, the pain is referred to as concordant and the test is considered positive. If the pain does not reproduce the patient's primary complaint, the result is discordant and represents a negative test result.

An anesthetic discogram requires that a long-acting anesthetic pharmaceutical agent be injected into the interior of the disc. This helps block pain from nerve endings that might be irritated in the presence of a torn annulus and certain chemicals. If the intradiscal injection of an anesthetic agent completely relieves the patient's primary complaint, it is considered a positive test and confirms that there is discogenic pain.