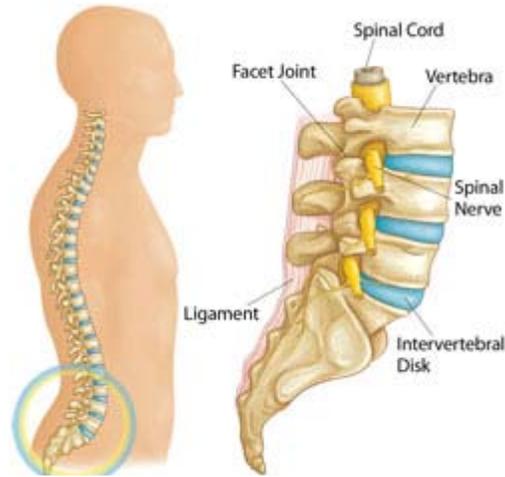




Lumbar Disc Herniation/Bulge Protocol

Anatomy and Biomechanics

The lumbar spine is made up of 5 load transferring bones called vertebrae. They are stacked in a column with an intervertebral disc sandwiched between each set of vertebrae. The lumbar spine comprises the 5 vertebrae that are below the thoracic vertebrae and are labeled L1, L2, L3, L4, and L5 in descending order starting from the top. The intervertebral discs are numbered as well and are based upon the name of the vertebrae above and below. The first lumbar disc is labeled L1-2, and they are labeled sequentially down to L5-S1. S1 represents the sacrum, and is identified as the region of the spine that connects the spine to the pelvis. The most common location for disc injury is at L4-5 and L5-S1.



<http://orthoinfo.aaos.org/topic.cfm?topic=A00575>

Under normal circumstances the discs act to transfer and absorb loads traveling from our upper body to our lower body. The discs are soft cartilaginous structures that are semi-elastic. They are comprised of a softer central area called the nucleus and a thicker outer wall called the annulus. Subsequent to injury or as we age the discs can slowly lose water content and become more fibrotic or stiff. When the disc material herniates or bulges, a portion of the disc pushes out beyond its anatomical borders and may inflame or compress some of the sensitive structures in its area. The name given to the disc injury (i.e. bulge, herniation, extrusion) describes the extent and pathway of the disc material.



<http://orthoinfo.aaos.org/topic.cfm?topic=A0057>

Common symptoms that you may feel as a result of a disc bulge or herniation include central low back pain, pain that radiates into your leg(s), sensation changes in the hips or legs, and/or weakness in the muscles of the hips or legs. Pain in the low back can come from muscle spasm and nerve irritation. Pain radiating to the legs can be referred to as sciatica, as the nerve the message travels down is the sciatic nerve. Sensation changes and weakness can be caused by interruption of the normal pathway of signals between r legs. Rarely, bowel and bladder problems related to the disc

compression can occur. If you are experiencing problems with urination, problems having bowel movements, or if you have numbness around the area of your genitals this may be a sign of cauda equina syndrome, which is a *medical emergency*. You should consult a medical doctor *immediately* if you are experiencing these symptoms.

Disc herniations and bulges are very common occurrences. Most diagnoses of disc herniations can be made by a physician's physical exam.

Treatment Options

Treatment depends upon the symptoms experienced by the patient, the physical exam findings, and any diagnostic tests that have been done. The need for imaging will be determined by your physician. It is common to find normal degenerative changes when imaging is performed and often disc abnormalities are observed that may not be responsible for the current symptoms. The most common way of managing and treating disc related symptoms are to begin conservatively and then become more aggressive if the symptoms continue.

Most symptoms related to discs will improve with time and your body's natural healing response, therefore the first treatment involves no more than one day of rest and avoidance of activities that would significantly aggravate your symptoms. During this time the initial use of ice to reduce inflammation may be employed. After a few days switching to using applied heat, rubs, or gels may help to alleviate muscle spasms.

Physical therapy is often recommended for the treatment of pain and restoration of functional deficits associated with disc injury. The physical therapist will evaluate mobility, flexibility and strength with the purpose of determining the underlying cause of the abnormal stress on the back. The patient will be counseled on which activities they can safely continue and which should be avoided. The patient will also be instructed in exercises, postures and positions that can alleviate symptoms. Physical therapy involves learning the exercises to remain active and prevent muscle disuse. *Remaining active while avoiding specific activities that aggravate symptoms optimizes conservative recovery after disc injury.*¹ Physical therapists are experts in assisting people with disc injury to transition to more functional and active lifestyles.

To reduce pain, decrease inflammation, and relax muscles that are in spasm, physicians may prescribe oral medications. There are different classifications and strengths of medications that can be prescribed. Some of the stronger or more potent medications can lead to drowsiness or even have potential for addiction. Your physician is an excellent resource for advice pertaining to safe and effective medications to take.

If oral medications are not adequately alleviating symptoms you and your physician may discuss having you undergo an epidural steroid injection. This procedure involves injecting anti-inflammatory medication directly into the area of compression. In many cases more than one injection is required to achieve adequate symptom relief.

Surgery is reserved for disc injuries that present with nerve compression which has caused significant weakness, cauda equina syndrome, or a rapidly declining neurological status. Surgery may be considered if conservative care is unsuccessful. Surgery involves removing the disc material that is causing the compression and freeing up the compressed nerve(s). Prior to undergoing surgery your doctor will discuss the procedure and recovery process in detail.

Rehabilitation

****The following is an outlined progression for rehab. Advancement from phase to phase as well as specific exercises performed should be based on each individual patient's case and sound clinical judgment by the rehab professional. ****

Phase 1: ACUTE PHASE

Goals

Control pain and inflammation
Reduce muscle spasm
Establish positions and postures for sitting, sleeping and standing which reduce pain or are pain free
Continue to stay active and walk daily

Recommended Exercises

Will be determined based on individual assessment and should reduce pain

Walking

These exercises will include gentle...

- Stretching

- Core muscle activation

- ROM(Range of Motion)

Guidelines

Perform activities and exercises that minimize pain
Stay as active as possible
Avoid activities and positions that worsen symptoms

Phase 2: SUB-ACUTE PHASE

Goals

Progressive increase in activity level and distance walking
Begin to improve spinal and low extremity flexibility
Begin to strengthen areas of weakness
Begin abdominal and pelvic stabilization exercises

Recommended Exercises

Range of Motion and Flexibility

Active ROM of the spine and extremities
Lower extremity stretches

Strengthening

Initiation of core stabilization exercise progressions incorporating activation of transverses abdominus and multifidi coordinated with hip musculature

- Quadruped (bird dog) progression
- Bridge progression
- Side plank (gluteus medius) progression
- Prone plank or hooklying abdominal progression

Light hip and lower extremity strengthening

Guidelines

Walk daily and stay as active as possible
Perform stretches daily
Perform stabilization exercises daily
Perform lower extremity strengthening 3 times per week
Begin functional movements such as squatting and bending

Phase 3: REHABILITATION PHASE

Goals

Aerobic conditioning
Restore spinal and lower extremity flexibility
Restore spinal and lower extremity muscular strength
Continue stabilization exercises progression
Perform functional lifting, bending and reaching activities with light resistance

Recommended Exercises

Range of Motion and Flexibility

Spinal stretches
Lower extremity stretches

Cardio

Walking, jogging, elliptical, swimming, etc

Strengthening

Continued progression of core stabilization exercises incorporating activation of transverses abdominus and multifidi coordinated with hip musculature

- Quadruped (bird dog) progression
- Bridge progression
- Side plank (gluteus medius) progression
- Prone plank or hooklying abdominal progression
- Use of exercise machines to strengthen spinal musculature

Hip and lower extremity strengthening

- Squat progression
- Lunge progression
- Use of exercise machines to strengthen lower extremities

Guidelines

Once good motor control and endurance within the core musculature is achieved then progression to functional and activity specific movements can be undertaken

Perform stretching program daily. Hold stretches for 30 seconds and perform 2-3 repetitions of each.

Cardio program should be performed no more than 3-5 times a week for 20-45 minutes.

Perform strengthening exercises 3 times a week. Do 2-3 sets of 15-20 Reps.

Phase 4: RETURN TO SPORT/ACTIVITY PHASE

Goals

Continue aerobic conditioning

Return to all functional activities

Achieve maximal strength and flexibility for return to sport/activity

Recommended Exercises

Flexibility

Continue daily spinal and lower extremity stretching

Cardio

Continue aerobic exercise

Sport specific aerobic challenges

Strengthening

Transition to gym equipment

Progress to multiplanar ball stabilization exercises

Return to Sport

Work with physician or physical therapist to outline progressive return to sport

Guidelines

Perform stretching program daily. Hold stretches for 30 seconds and perform 2-3 repetitions of each.

Cardio program should be progressed in preparation for return to sport.

Perform strengthening exercises 3 times a week. Do 2-3 sets of 15-20 Reps.

Phase	Emphasis	Recommended Exercises	Guidelines
Phase 1 Acute Phase	<ul style="list-style-type: none"> Control pain and Inflammation Reduce muscle spasm Establish pain free positions and postures for sitting, sleeping and standing Stay active/walk 	To be determined based upon individual assessment and will include gentle stretching, ROM and core muscle activation.	<ul style="list-style-type: none"> Perform activities and exercise that minimize pain Avoid activities and positions that worsen symptoms Stay as active as possible
Phase 2 Sub-acute Phase	<ul style="list-style-type: none"> Continue to avoid exacerbation of Symptoms Progressive increase in activity level and distance walking Begin improving spinal and LE flexibility Begin lower extremity strengthening Begin abdominal and pelvic stabilization exercises 	<p><u>ROM and Flexibility</u> Lower extremity stretches Spinal stretches</p> <p><u>Strength</u> Initiate core stabilization exercise progressions incorporate transverses abdominus and multifidi coordinated with hip musculature</p> <ul style="list-style-type: none"> Quadruped (bird dog) progression Bridge progression Side plank (gluteus medius) progression Prone plank or hooklying abdominal progression <p>Light hip and lower extremity strengthening</p> <p><u>Function</u> Bending and squatting Walk daily</p>	<ul style="list-style-type: none"> Stay as active as possible Perform strengthening and stabilization exercises 3 times a week, 2- sets of 15-20 reps Stretching program daily 2-3 repetitions of 30 seconds Begin functional movements
Phase 3 Rehabilitation Phase	<ul style="list-style-type: none"> Continue to maximize return of strength and flexibility Initiate functional activities 	<p><u>Flexibility</u> Continue spinal and lower extremity stretching</p> <p><u>Cardio</u> Daily walking, jogging, swimming, elliptical or aerobic conditioning</p> <p><u>Strengthening</u> Continue progressed stabilization exercises incorporating transverses abdominus and multifidi coordinated with hip musculature</p> <ul style="list-style-type: none"> Quadruped (bird dog) progression Bridge progression Side plank (gluteus medius) progression Prone plank or hooklying abdominal progression Use of exercise machines to strengthen spinal musculature <p>Hip and lower extremity strengthening</p> <ul style="list-style-type: none"> Squat progression 	<ul style="list-style-type: none"> Perform functional lifting, bending and reaching Stretching program daily 2-3 repetitions of 30 seconds Cardio program should be performed no more that 3-5 times a week for 20-45 minutes Perform strengthening exercises 3 times a week, 2-3 sets of 15-20 reps

		<ul style="list-style-type: none"> • Lunge progression • Use of exercise machines to strengthen lower extremities 	
Phase 4 Sport Specific Phase	<ul style="list-style-type: none"> • Achieve adequate strength and flexibility to return to sport/activity 	<p><u>Flexibility</u> Continue Daily Stretching</p> <p><u>Cardio</u> Sport specific aerobic challenges</p> <p><u>Strengthening</u> Transition to Gym equipment Progress to multiplanar ball stabilization exercises</p> <p><u>Return to Sport</u> Outlined by PT or MD</p>	<ul style="list-style-type: none"> • Stretching program daily 2-3 repetitions of 30 seconds • Cardio program should be progressed in preparation for return to sport • Perform strengthening exercises 3 times a week, 2-3 sets of 15-20 reps

Reference:

1. Delitto A, George SZ, Van Dillen L, et al. Low back pain: Clinical guidelines linked to the international classification of functioning, disability, and health from the orthopaedic section of the American Physical Therapy Association. *J Orthop Sports Phys Ther.* 2012; 42(4): A1-A57.

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