

PHYSIOTHERAPY ASSESSMENT AND MANAGEMENT OF DISC PROLAPSE A REVIEW

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INTRODUCTION

Structure of Intervertebral Disc

A crucial component of the spine's operation, the intervertebral disc is composed of a fibrocartilaginous structure. There are twenty-three discs total in the human spine:

- Six in the cervical (neck) area
- Twelve in the thoracic (middle back) region
- Five in the lower back, or lumbar region

Intervertebral discs give the spinal cord strength and flexibility, absorb trauma, and stop the vertebrae from gliding against one another [1]. They function as shock absorbers and allow controlled movement between vertebrae during daily activities such as bending, twisting, lifting, and walking. Without these discs, the spine would lack flexibility and would be vulnerable to mechanical stress.

Anatomically

Intervertebral discs are divided into three parts:

- A central nucleus pulposus
- A peripheral annulus fibrosus
- Two vertebral endplates

The nucleus pulposus is a gel-like structure that distributes pressure evenly. The annulus fibrosus surrounds the nucleus and consists of strong concentric fibrous rings that provide structural support. The vertebral endplates connect the disc to adjacent vertebral bodies and facilitate nutrient exchange.

INTRODUCTION ABOUT CONDITION

What is Disc Prolapse?

A herniated disc is another name for disc prolapse. Essentially, the nucleus pulposus is displaced from the intervertebral region in a herniated disc. With an initiating event, back discomfort is the main cause. The discomfort might travel to the lower extremities and has burning and stinging symptoms.

The patient experiences alterations in feeling and weakness. The disc may occasionally compress nearby nerves, resulting in pain.

Herniated Disc Characteristics

- Extremely painful
- The majority of herniated discs recover in a week or more

The patient often experiences no pain in relation to the herniated disc. Surgery is typically the final resort because of its unpredictable outcome. Following surgery, patients frequently experience worsening neurological impairments and lingering discomfort. Those who are sedentary have a higher risk of disc prolapse than people who exercise regularly.

Four Stages of Disc Herniation

Stage 1: Degeneration

Over time, the spinal disc weakens and wears down, yet its contents do not break.

Stage 2: Prolapse

The disc bulges when the nucleus starts to push out against the annulus. A bulging spinal disc can cause symptoms if the disc presses on a nearby nerve.

Stage 3: Extrusion

There is a tiny tear in the annulus where the nucleus starts to protrude.

Stage 4: Sequestration

When a disc ruptures, the nucleus protrudes from the disc center, frequently producing significant pain and nerve irritation [3].

ETIOLOGY, EFFECTS AND PATHOGENESIS OF DISC PROLAPSE

Etiology

Age-related degeneration is the main cause of disc herniation. The nucleus pulposus weakens and becomes less hydrated.

- Carrying too much weight puts excessive strain on the discs.
- Occupation: People with sedentary employment are the most affected.
- Genetics: A propensity to disc prolapse can be inherited.
- Lifestyle factors include smoking, constant driving, and leading a sedentary life [4].

Effects

An untreated case can lead to severe nerve damage. In rare cases, the slipped disc can cut off the nerve impulse, and the patient may lose bladder and bowel control.

Saddle block anesthesia, a form of low spinal block that causes anesthesia over the saddle area (perineum, perianal area, medial aspect of legs and thigh), is another major effect. This condition indicates serious nerve involvement and requires urgent medical attention.

Pathogenesis

As people age, their vascular channels begin to fail and vascular diffusion of nutrients decreases. This lowers the amount of viable chondrocytes in the nucleus pulposus.

As a result, the amount of collagen in the nucleus pulposus increases, and the rate and concentration of proteoglycan synthesis decreases. Therefore, as the nucleus's ability to bind water decreases, the nucleus becomes more fibrous and stiff. Load is transferred to the posterior annulus by the nucleus, which is less able to support and distribute it.

This mechanical imbalance increases the risk of annular tears and nerve compression.

PHYSIOTHERAPY ASSESSMENT OF DISC HERNIATION

The physician can assess any back muscle soreness while performing the physical examination. The muscles that are most impacted are the lumbar stabilizers.

Neurological examinations are conducted to verify:

- Reflexes
- Strength of muscles
- Capacity to walk and sense vibrations, pinpricks, and light touches

Imaging Tests

X-rays

Plain X-rays cannot detect herniated discs but can rule out other causes of back pain such as fractures, tumors, infection, or alignment problems.

CT Scan

A CT scanner obtains multiple X-rays from various angles. Cross-sectional images of the spinal column and surrounding structures are produced. These are utilized to identify disc prolapse.



MRI

MRI is used to identify affected nerves and confirm the location of the herniated disc.

Nerve Tests

Nerve conduction studies and electromyograms (EMGs) measure the

efficiency of electrical impulse transmission through nerve tissue.

- **Nerve Conduction Study:** Electrodes are applied to the skin to measure electrical nerve impulses.
- **Electromyogram (EMG):** A needle electrode is inserted into muscles to assess electrical activity at rest and during contraction [2].

PHYSIOTHERAPY MANAGEMENT OF DISC PROLAPSE

Physiotherapy management in disc prolapse improves muscle strength, flexibility, and reduces pain.

Spinal Manipulation

Spinal Manipulation Therapy (SMT) is used to treat musculoskeletal conditions by applying controlled force to spinal joints. It reduces pain, restores structural integrity, and initiates natural healing processes.

Soft Tissue Manipulation

Herniated discs can cause numbness, weakness, stiffness, or restricted motion. Massage therapy relieves tightness in muscle tissue caused by nerve compression. It helps diffuse trigger points and relax tense muscles.

Exercises for Herniated Disc

A correct exercise plan improves back muscles and corrects posture.

1. Press-Up Back Extension

- Lie prone with elbows close to sides.
- Raise upper back using hands.
- Hold for 2 minutes.
- Repeat 3–4 times.

2. Backward Bend

- Stand with feet hip-width apart.
- Bend backward with knees extended.
- Hold for a few seconds.

3. Hamstring Exercises

Stretching helps relieve lower back and leg tension.

- Sit with one leg extended.
- Bend forward until stretch is felt.
- Hold 15–30 seconds.
- Repeat on both sides [5].

Scapular Stability Exercises

ITYWs Exercise:

- I position
- T position
- Y position

Lateral Raises:

Theraband held under foot, raise hands laterally at 20° in front of chest [6].



Cupping Therapy

Cupping therapy increases circulation and reduces inflammation. It strengthens back muscles and restores balance.



Cupping therapy on back muscles

TENS

TENS helps reduce pain associated with muscle spasm and slipped disc.

METHODOLOGY

To understand physical therapy measures in disc prolapse, the following sources provide useful information:

1. National Institutes of Health – Causes, effects, tests, and treatment options.
2. Cleveland Clinic – Symptoms and diagnosis using physical examination, MRI, X-rays, EMG.
3. Journal of Analytical Research in Clinical Medicine – Six-week exercise plan for lumbar disc herniation.
4. NewYork-Presbyterian – Comprehensive overview of disc herniation.

RESULTS

Various articles reviewed show:

- Herniated disc affects intervertebral space and nucleus pulposus.
- Symptoms include tenderness and shooting pain.
- Diagnosis through MRI and X-ray.
- Treatment includes painkillers, strengthening exercises, TENS, and ultrasound.
- Inflammatory response and nerve stimulation contribute to pain.

DISCUSSION

Differences between PT Evaluation and Management

PT Assessment in Disc Prolapse

Literature Review:

- Use of VAS, Numeric Pain Rating Scale, Disability Index.
- Detailed neuromuscular assessment.
- Standardized protocols.

Clinical Review:

- Practical, simplified assessment.
- Functional observation.
- Imaging use.

Management

Literature Review:

- Structured rehabilitation programs.
- Evidence-based interventions.
- Measurable treatment goals.

Clinical Review:

- Individual treatment plans.
- Flexible exercise progression.
- Hands-on therapy.
- Patient education and emotional support.

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