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Current physiotherapy approaches in lumbal disc herniation

Abstract

In lumbal disc herniation, physiotherapy and rehabilitation applications should be planned depending on the patient's symptoms. There are various physiotherapy approaches. Therefore, applications should be investigated in terms of patient's suitability for treatment, indications and contraindications. The acute, subacute or chronic stage of the disease should not be overlooked in the treatment program. In this short review, physiotherapy approaches with high evidence value are explained.

Keywords: lumbal disk hernia, physiotherapy, pain, rehabilitation, exercises

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Lumbal disk hernia

Stabilization in the lumbar region is provided by muscles and ligaments. Lumbal column can carry 2.5 kg load without support. The compression force generated by axial loading directly affects the intervertebral joints and discs.[1,2] Lumbal disc hernia occurs when the nucleus pulposus inside the disc crosses the boundaries of the annulus fibrosis capsule in the lumbar region. The cause of lumbar disc herniation is mostly injuries in the direction of flexion.

Disc herniation is observed at 98 %, L4-L5, L5-S1 levels. In disc herniations, the pathology is classified as follows:

Bulging: The nucleus pulposus between the discs shifts towards the annulus fibrosis fibers. Protrusion: The nucleus pulposus is shifted by shifting towards the ruptured annulus fibrosis fibers. At this stage, the outer fibers of the annulus fibrosis are still intact. Extrusion: The nucleus pulposus tears the annulus fibrosis and overflow into the spinal canal. Sequestration: It is the presence of free disc material in the spinal canal.[1–3]

Clinical Symptoms

In the posterolateral and lateral herniation, the symptoms are on the side of the herniation. In posterior herniation, the symptoms are bilateral. Pain, superficial sensory loss, paralysis, loss of strength in the lower extremity, decrease in deep tendon reflexes, scoliosis the opening of which is on the side of the lesion, and cauda equina pressure are among the symptoms.[2,3]

Physiotherapy and rehabilitation in lumbal disc herniation

The purpose of physiotherapy and rehabilitation in patients with lumbar disc herniation; reducing pain and muscle spasm, restoring flexibility to soft tissues, strengthening weak muscles, eliminating muscle imbalances, ensuring stabilization in areas with instability, teaching controlled movement adaptations, protection from occupational stress and chronic postural effects, increasing functionality, participation of the patient in physical and social activities is to be provided.[2–4]

Evaluation of patients with lumbal disc herniation

Subjective assessment

Story acquisition, Inspection (retracted tissue bands and tissue areas (showing paravertebral muscle spasm), bone deformities of vertebral column, atrophy evaluation of muscles such as Quadriceps Femoris in L3-4 level herniation, and gastrocnemius and soleus in L5-S1 level herniation), Palpation (Priformis, Trochanter major, Paraspinal muscles, L3 - L4 -L5 spinal processus, pelvic asymmetry, sweating, heat change, atrophy are evaluated).[3,4]

Objective evaluation

Pain assessment: It is appropriate to obtain detailed information about the time, character and duration of pain in these patients.

Posture analysis: With the loss of lumbal lordosis, antalgic posture can coexist with antalgic scoliosis. In the presence of hyperlordosis, spondylolisthesis, weakness in the anterior abdominal wall muscles or flexion deformity in the hip can be observed. Especially in L4-5 level herniation, lumbal lordosis is flattened, posterior pelvic tilt and pes planus. Therefore, posture analysis of patients from anterior, posterior and lateral should be evaluated in detail. Normal Joint Movement Assessment: In the lumbar disc herniation, the pain and limitation in lumbar spine movements are most evident in the flexion movement. In addition, the movements of the hip joint in 3 planes, knee flexion-extension, ankle dorsi-plantar flexion, eversion, inversion movements, goniometer should be measured.

Muscle test: The muscles to be evaluated differ according to the level of disc herniation. Quadriceps Femoris in herniation at L3-L4 level, Tibialis Anterior and Extensor Hallucis Longus at L4-L5 level; Tibialis Posterior and Gastrosoleus weakness occurs at L5 - S1 level. Muscle strength; Apart from the manual muscle test, tensiometer, back dynamometer, a maximum repetition are also evaluated with computer-added instruments.[5,6]

Shortness test: As a result of the lumbar disc herniation, in the postural impaired, all muscle groups may be affected; Shortness of lumbar extensors, hip flexors, hip adductors, hamstring, M. Quadriceps femoris, M.Gastrosoleus, Tensor Fascia Lata, M.Pectoralis Major - Minor, Shoulder adductor and internal rotator muscle/muscle groups are evaluated.

Body composition assessment: The evaluation of the body mass index is important in individuals with lumbal disc herniation because it increases the pressure from the intervertebral discs.

Flexibility test: Body flexion (Modified Schober Test), trunk lateral flexion (Modified Moll Test, Fingertip ground distance) hamstring,

gastrosoleus, trunk hyperextension, knee flexion elasticities are evaluated. Anthropometric Measurements: Length measurements, environmental measurements (gastrosoleus atrophy etc.) should be evaluated in patients with lumbal disc herniation depending on clinical findings, antalgic posture.[3–5]

Neurological evaluation

Sensory Assessment: Sensory loss in people with disc herniation is in the form of paresthesia. L3-4 level herniation, thigh anterior medial and knee numbness, L4-5 level herniation, leg lateral, thumb and second finger numbness, L5-S1 level herniation, back of the leg, heel, lateral numbness in the feet and fingers. Sensory evaluation is performed in the form of light touch, superficial heat, superficial pain assessments and bilaterally.[5,6]

Reflex Evaluation: Some reflexes may be affected depending on the level of herniation in Lumbal disc herniation. Patellar reflex may be affected in L3-4 level herniation, and Achilles reflex in L5-S1 level herniation. Balance - Coordination Assessment: The patient's static balance assessment can be assessed with one-foot standing test, while eyes are open and closed, and dynamic balance assessment can be evaluated with timed rise and walk test.

Gait Analysis: Especially in the mobility, such as waist, hip, knee and foot-ankle, chronic pain in joints affects the individual's gait, leading to the formation of antalgic gait posture and increases energy consumption. In gait evaluation, the position of the trunk, arm swings, knee, hip flexion - extension, foot - ankle movements should be observed. In L4 - 5 level herniation, since dorsi flexion is insufficient, the patient should be evaluated on the heel, and L5 - S1 level herniation is inadequate, and plantar flexion is performed on the fingertip.

Special tests in evaluation

Femoral nerve tension test: This test is positive in L3–4 herniations.

Jugular compression test: It is positive in L3 - 4, L 4 - 5, L5- S1 level herniations.

Straight leg lift (SLR): Positive in L4– 5 and L5 - S1 level herniations.

Laseque test: It is positive in L4 –5, L5 - S1 level lesions.

Orthosis assessment, professional assessment (working capacity, job analysis, working environment etc.), daily life activity (Lawton, Barthel etc.) and functional assessments (Oswestry, Quebec and Roland-Morris low back pain surveys, Roland-Morris Low Back Pain Questionnaire etc.) It should be done.[3–5]

Physiotherapy and rehabilitation applications in lumbal disk herniations

Patient Training: It is important to inform patients that they should be at the ideal weight in lumbal disc herniation. In acute low back pain, short-term bed rest, waist school has been shown to be a valuable treatment component in this group of patients. In chronic low back pain, strong evidence suggests that exercise is most effective in improving pain, function and disability, as well as the 'stay active' recommendation.

Bed cure: It is recommended in individuals with lumbal disc herniation in the acute period. Bed rest is known to reduce axial loading on the degenerated disc. While the intradiscal pressure is low in the supine position, it reaches a higher value in the sitting position. However, when the bed rest period is more than two weeks, it is recommended that the patients be gradually increased after short-term bed rest due to the risk of atrophy, osteoporosis, thromboembolism and cardiovascular complications in the paravertebral muscles.[4,5] Heat Applications: Hotpack, infrared and hydrotherapy etc. are superficial heat treatment methods. Deep heat methods; ultrasound, shortwave diathermy and microwave diathermy etc. Since the application of heat in individuals with lumbal disc herniation will increase inflammation, it is not recommended in the acute period and is recommended in subacute and chronic periods. Cold works by reducing inflammation, edema and pain. Cold pack, ice massages, superficial cold treatment methods are applied. In individuals with lumbal disc herniation, cold application may be recommended in the acute period.[6,7]

Electrotherapy applications

Tens: TENS applications can be performed in the acute and chronic periods to relieve pain. TENS applications have been found effective in patients with lumbal disc herniation.

Enterferential current: It is used to increase circulation and reduce pain. In the lumbar disc herniation, the method of vacuum application with 4 electrodes is frequently used due to its greater effect. The treatment period is usually 20-30 minutes.

Diadinamic current: It is applied more in acute period pain. Shortwave Diathermy and Microwave Diathermy applications; As it is a deep-heat agent, it is used in the subacute and chronic period.[5,6] Classic Massage: As it improves blood circulation, removes metabolic wastes causing pain and reduces muscle spasm, it has been concluded that the classical massage application in literature will be effective in treatment of acute, subacute and chronic low back pain, especially exercise and patient education.[7,8]

Manipulation: Manipulation practices are effective in the treatment of lumbal disc herniation due to its effects on relieving muscle spasm, reducing pain and increasing mobility. However, manipulation applications are contraindicated in patients with osteoporosis, fractures, osteomyelitis, malignancies, bleeding disorders, anticoagulant use, cauda equina syndrome. It is stated in the literature that spinal manipulation has an important treatment effect in short and medium level pain and activity limitation.

Traction: Traction application is a method that distracts the lumbar vertebrae and decreases the pressure inside the disc. It is also stated that it provides muscle relaxation and reduces pain. Continuous or intermittent traction can be applied after moist heat application, exercise and massage. In lumbal disc herniation, while constant traction is preferred in the acute period, intermittent traction is preferred in the subacute and chronic period.[5–7]

Exercise methods in lumbal disc herniations

Stretching Exercises: In patients with low back pain, depending on inactivity, soft tissue and joints may be limited and tight. Shortness in the hamstrings, iliopsoas and quadriceps muscles can cause excessive load in the lumbar region. Stretching exercises especially for these muscles are the exercises used in lumbar disc herniation to increase mobility in the lumbar region.

Lumbal stabilization exercises: It provides reactivation and strengthening of the muscles, which usually provide stabilization of the spinal column in the long term. These exercises are based on the co-contraction of Transversus Abdominus and Multifidus, the key local muscles. In lumbal disc herniation, subacute and chronic low back pain, stabilization exercises have been shown to be more effective.[7–9]

Pilates: In the literature, studies investigating the effectiveness of pilates based exercises in chronic low back pain have shown that they have pain and function improving effects.[7]

Yoga: Strong evidence in literature suggests that yoga reduces pain in chronic low back pain, shortly reduces disability and provides overall improvement.

Orthesis (Corset): The use of corset in lumbal disc herniation reduces lumbal lordosis, changes intraabdominal pressure, prevents painful movement and supports trunk muscles. The corsets increase the intraabdominal pressure and reduce the load on the vertebral column. Prolonged use of corsets is not recommended, as this will lead to atrophy in the abdominal and back muscles. When the pain subsides, the exercises are started and the corset is removed gradually.[8,9]

Banding techniques: In the literature, kinesiological taping has been shown to reduce disability and pain by one month in patients with chronic low back pain.[9,10]

Waist school: In the Lumbal region, it is aimed to maintain proper posture and daily activities in an appropriate position, to protect the muscles, ligaments and joints. The 10 golden rules of the waist school are as follows: 1-Move and exercise 2-Keep your waist straight 3-Crouch to lift something 4-Do not lift heavy load 5-Divide the load and keep it close to the body 6-Keep your waist straight while sitting and put a support on your waist 7-Do not stand straight with your legs 8-Bend your legs while lying down 9-Do sports such as swimming and jogging 10-Do strengthening exercises for your waist muscles every day.[10,11]

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Conflicts of interest

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