

ANALYSIS OF THE ETIOPATHOGENIC FACTORS OF LUMBAR DISC DISEASE AND KINETIC APPROACH TO STABILIZE THE SOMATO-FUNCTIONAL STATUS.

Author(s)¹ Mihai Constantinescu

Institutional affiliation ¹ Ștefan cel Mare University of Suceava, Romania

Email adress ¹ mihai.constantinescu@usm.ro

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Abstract In this paper we will address a problem that is as topical as possible and at the same time quite well studied in research in this area. Due to a very fast-running lifestyle with activities that overload the human body, it is no longer able to cope with the demands, and as a consequence of physical stress and the inability to recover in time, the disease easily takes hold on a vulnerable ground. Lumbar disc disease is a fairly common condition, but the way it is treated is flawed. People who have been diagnosed with this condition have not received conservative treatment, but rather have stayed in pain and disability until surgery was needed.

In the direction of this problem we will present some aspects of the installation of pathological conflict in the spine but at the same time we will elaborate a therapeutic pathway leading to the prevention of complications and stabilization of spine function.

Introduction

In order to understand the etiopathogenic mechanisms of lumbar disc disease and the framework of lumbosacral algo-functional syndrome, we will present some elements of anatomic-physiology and biomechanics of the spine, especially at the lumbar level. The spine is the central axis of the body, made up of 33-34 superimposed bony segments called vertebrae, 24 intervertebral discs, 365 ligaments, driven by 730 muscles, to which are added vascular and nervous formations [3, 8]. The vertebrae are made up of 3 parts, the vertebral body, the neural arch and the costal processes. The size of the vertebral bodies is determined by the weight supported in the orthostatic position. [4].

The lumbar vertebrae are the most voluminous, have a slightly broadened transverse body, horizontally arranged spinous processes, and atrophied transverse processes. The joints of the vertebral bodies are perfect amphiarthroses and between the articular surfaces are the intervertebral discs.

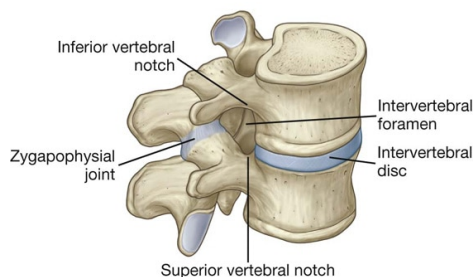


Fig. 1. joint at lumbar spine level. [10]

Intervertebral discs are fibrocartilaginous formations, consisting of a fibrous peripheral portion called the annulus fibrosus and a central formation called the nucleus pulposus. The consistency of the nucleus is due to its water and proteoglycan content and is held together by a network of type II collagen and elastin fibers.[9]

The peripheral area is made up of fibrous bands of approximately 1 mm thick cartilaginous and elastic fibres. The central zone is acellular and avascular, the ground substance is without proteoglycans but with cartilaginous components, it is strongly hydrophilic due to OH radicals in polysaccharides. The nucleus pulposus is a gel-like structure that is composed of approximately 80% water, with the rest made by type 2 collagen and proteoglycans.[1]

Also the nucleus pulposus is not innervated. The role of the intervertebral discs is multiple: by resistance, they contribute to maintaining the curvature of the spine; by elasticity, they return to a state of equilibrium at the end of the movement; they transmit the weight of the body in all directions of the spine; they cushion shocks during movements or efforts [3, 6].

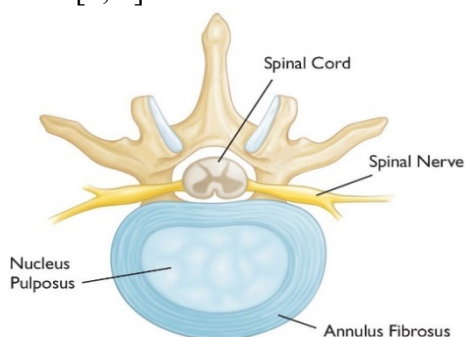


Fig. 2. – Type of intervertebral disc .[11]

Regarding the biomechanics of the spine we can say that it is a rather mobile segment in which we find all the movements specific to physical activities; flexion, extension, lateral tilt, circumduction and rotation,. At the level of the lumbar spine, flexion and extension movements have a high amplitude due to the relatively high intervertebral disc and the disposition of the articular surfaces. [5].

Lumbar disc disease is mainly manifested by pain, which can be local or radiating, and can start suddenly or insidiously. Depending on the nature of the pain, low back pain can take three clinical forms: acute low back pain, chronic low back pain and lumbosciatica. Lumbosciatica is an important cause of temporary disability, lumbago is associated with sciatic neuralgia. Due to the installation of senescent or provoked deconditioning processes, degeneration of the intervertebral disc occurs and under these conditions, when the spine is subjected to minimal stress (lifting weights, twisting the trunk in the axis, excessive walking, etc.), acute or chronic pain is caused in the lumbar spine. [6].

Sciatic neuralgia is a radicular pain, which translates into suffering from a root of the sciatic nerve, is the painful syndrome on the path of the sciatic nerve and in its territory of distribution.

It results in most cases from a discoradicular impingement, consecutive to an intra-axial herniation, at the level of the L4-L5 or L5-S1 intervertebral disc. [6].

The most common cause of sciatic neuralgia is degeneration of the intervertebral disc.

Neuralgic syndrome is characterized by nerve fiber irritation without structural damage, and clinically by pain of variable intensity in the distribution territory of the irritated sensory neuron. [2].

The causes of lumbosciatica can be presented in the following pathological statuses:

- Degenerative changes of the intervertebral disc (protrusion or prolapse);
- Congenital defects at the lumbosacral level;
- Joint arthrosis;
- Vertebral body fractures;
- Spinal canal stenosis (listosis, vertebral compression, distension, malalignment)
- Infectious, inflammatory, metabolic, malignant diseases.

The most common causes of lumbosciatica are mechanical and are caused by alterations in the intervertebral disc. [6] Up to the stage of disc herniation in the evolution of lumbar vertebral disc disease, corresponding to the degree of decondensation of the annulus fibrosus and migration of degenerated nuclear material, the following evolutionary stages occur:

- simple protrusion that irritates the intervertebral comulum ligament (the pain is ligamentous);
- subligamentous disc herniation (may irritate dural sac, epidural suffering, term is lumbosciatica);
- posterior transligamentous herniation, slips along the root and blocks it by compressing it in the conjugate foramen. [4,7]

According to de Seze, disc damage evolves in terms of anatomic-pathological changes and clinical manifestations in 4 phases.

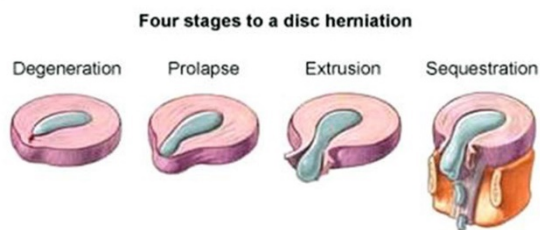


Fig. 3. Stages to a disc herniation.[12]

Triggers for herniated discs include: physical exertion through lifting weights with the spine flexed, sudden twisting movements, trauma, exposure to cold and wet. The clinical picture of lumbosciatica due to mechanical disc herniation is dominated by pain, tenderness and decreased muscle strength. Walking on heels and toes is difficult.

Functional examination shows:

- Antalgic attitude;
- Limitation of movement in the lumbar spine;
- Triggering pain by pressure or percussion;
- Positive Lasegue;
- Altered osteotendinous reflexes.

Paraclinical investigations: lumbar spine X-ray; CT scan; nuclear magnetic resonance; contrast myelography; discography; EMG. [6]

Aim and objectives of the study:

The aim of the study is to present the analysis of the etiopathogenic factors for the onset of lumbar disc disease and the identification of an optimal therapeutic management.

Research objectives:

- Literature review on how to approach the treatment of lumbar disc herniation;
- To develop a specific physiotherapy model for stabilising a radicular conflict in the lumbar spine.

Materials and methods: Before starting the presentation of the working model, it is important to point out that a positive diagnosis of a herniated disc often results in a wrong therapeutic approach due to a cursory investigation. Differential diagnosis is necessary in order not to interfere with other pathologies that may cause the same symptoms, through pain reflected from other anatomical structures; hip, ankylosing spondylitis, pancreas, stomach, uterus, kidneys, etc. Also in the same context, comorbidities and remaining functional at the time of the acute stage are elements of reference that can create favourable or unfavourable premises for a physio-kinetic approach, drug treatment or surgery.

In order to establish the proposed pathway of treatment, it is assumed that the patient with lumbar disc disease is consulted by a specialist neurologist who has undertaken all the necessary investigations to issue a positive diagnosis and issue a medical letter with all the history and clinical evaluation process. In the same context, the physiotherapist will start his own evaluation of the patient's morpho-functional status in order to determine the remaining functionality at the time of starting the work programme.

The objectives of the program derive from the results of the assessment and will include a mandatory patient education and information programme on the specific contraindications of lumbar disc disease. Awareness of the correct position of the lumbar spine and pelvis and the constant maintenance of correct (neutral) posture in all activities.

Specific contraindications for patients with lumbar disc disease include: avoiding heavy lifting, avoiding flexion and rotation of the spine, maintaining a normal weight status, avoiding prolonged walking or walking on uneven ground, avoiding sitting still, avoiding cold, avoiding sudden uncontrolled movements. In the acute phase, pain relieving, anti-inflammatory and decongestant medication is required. It can be gradually switched to pathology-specific physiotherapy procedures and decontracting massage.

Management of pain and circulation in the area are paramount and are addressed both medicinally and through specific asuplization and relaxation techniques (mobilization, posturing and stretching).

Regaining mobility of the lumbar segment and toning the paravertebral muscles is also a primary objective. Increasing the spinal column's exercise capacity and performing physical activities safely.

Results and discussions: Stabilization of the lumbar spine following a radicular conflict is only possible if clinical investigations are undertaken in a timely manner and if the patient strictly follows the indications received from the specialist. One factor that can obstruct or limit the recovery process is the severity of the injury, its intensity with respect to morphofunctional changes of the anatomical elements subject to the discovertebral conflict. Age and comorbidities are also vulnerable factors in the economics of lumbar disc disease management.

Conclusions:

- intervertebral disc deconditioning can occur suddenly through trauma or slowly through overuse, wear and tear;
- clinical and paraclinical investigations determine the therapeutic course of lumbar disc disease;
- the earlier it is discovered, the greater the chances of recovery;
- surgery is the last option.

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