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Original article

CURRENT INFORMATIONS REGARDING FUNCTIONAL MEDICAL RECOVERY IN OPERATED LUMBAR DISC HERNIATION

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Abstract

Aim. Current studies show that the incidence of cases with a diagnosis of operated lumbar disc herniation is growing rapidly, which is an alarm signal for the medical recovery.

The aim of this study is to improve the system of assessment in dynamics of patients with lumbar disc herniation operated for a functional recovery and reintegration into daily life by addressing the pathology from the point of view of the biopsychosocial model.

This research will be done 12 subjects aged between 40 and 50 years in INEMRCM Bucharest, during 10 days to which a physiotherapy protocol was applied for 3 hours / day. Subjects underwent surgery for a lumbar disc herniation operated by the traditional method on the L5-S1 vertebrae. During this research, the 12 patients will be given a physiotherapeutic program adapted to the pathology of the operated lumbar disc herniation.

Methods. Global assessment of subjects, according to the biopsychosocial model through the Lumbar Schober Test, Tomayer Test, Biometric Assessment, Visual Analogue Scale, Patient Health Questionnaire, Fear-Avoidance Beliefs Questionnaire, in the initial phase to create a program that meets the needs patients, and to verify the effectiveness of the proposed physiotherapy program in the final phase.

Results. The results of the study show the importance of the evaluation and selection process according to the evaluation results of therapeutic physical exercise for functional recovery in operated lumbar disc herniation, as well as the beneficial effect it has on the human body both physically and psycho-emotionally.

Conclusions. Research has shown that therapeutic physical exercise performed under specialized medical instructions has a beneficial effect on the biopsychosocial balance and promotes well-being.

Keywords: lumbar disc herniation, exercise, physiotherapy

Introduction

Operated lumbar disc herniation, unfortunately, has an increasing trend which determines us to take considerable measures in this regard. (Carrigan, 2020) It seems that the unbalanced lifestyle, the uncontrolled daily activities and the lack of information on preventive behavior lead us to realize that the price paid is too high and the herniated disc can be prevented thus vertebral stress and their wear over time leads to hernia. (Badley, 1979)

The feasibility of a graded step test for assessing work capacity was investigated and the value of energy expenditure for prolonged walking was shown to be comparable to the value of energy expenditure during work. (Nagle, 1965)

The first workers' compensation system in the United States was established by Wisconsin in 1911. It was designed as a system to allow disabled workers to obtain medical and time-loss benefits without suing the employers. This continued to be a dominant theme well into the 1990s. (Robinson, 1997)

A study shows that approximately 70% of all patients who underwent surgery for lumbar disc herniation were assessed as being able to resume their activity after the operation. It was found that 60% of these patients are able to work and can resume professional activity within 6 months. After surgery, a return to work rate of 53% was found 1 year after a single discectomy. Other authors have pointed out that 80-90% of patients return to work after a discectomy. (Donceel, 1998)

Quality of life was also severely affected in those with an indication for HDL surgery, and this was also more evident in women than in men. In studies reporting normative values for the general population, women rate their quality of life compared to age-matched men as generally lower. (Strömqvist, 2016)

Despite the psyche's integral role in the pain experience, few individuals or professionals are aware that pain is defined as an aversive "sensory and emotional experience" and even fewer understand how to address the emotional aspects of the pain experience; the biomedical model was the approach most used by healthcare professionals in the management of patients with chronic low back pain. (Tatsumi, 2019)

Obesity is one of the determining factors of lumbar disc herniation due to the pressure on the bone and muscle system as a result of weight gain and implicitly the increase of gravitational force on the body. Overweight and patients with a high pain threshold remain important factors underlying delayed diagnosis. (Loukas, 2008)

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For this reason, secondary kinetoprophylaxis has an important role because, following the basic rules, it is possible to prevent surgical reintervention for disc herniation as it happens in 44% of cases in the first two years and 69% in the first 5 years. (Reith, 1989)

Regarding the age-related changes, it can be deduced that the maximum moment of force of the plantar extensors of the foot in patients with radiculopathy and signs remain at the same level at the ages of 20–60 years, thus showing a sharp decrease after age for 60 years. (Shchurova, 2008)

The purpose of the research

This research aims at the effective medical recovery of patients with lumbar disc herniation pathology operated in order to recover work capacity and approach the pathology from a biopsychosocial point of view according to the CIF, which can raise the degree of common understanding regarding medical staff and facilitate communication, the use of assessment tools as well as standardized outcome measures for rehabilitation interventions. (Ustun, 2003)

Objectives

Improving the assessment in dynamics system of patients with lumbar discectomy syndrome or post-laminectomy;
Increasing functional independence and quality of life for patients with post-laminectomy or lumbar discectomy surgery;

Resumption of daily activities and reintegration into social and professional life;

Decreased rate of invalidation in patients with post-laminectomy or lumbar discectomy.

Research hypotheses

Hypothesis 1: The application of a medical recovery protocol based on the assessment results by selecting therapeutic physical exercises can contribute to the functional recovery of HDL operated patients;

Hypothesis 2: The proposed therapeutic protocol contributes to restoring/maintaining biopsychosocial balance.

Research methods

In the proposed study, I include the following research methods:

Scientific documentation method, observation method, survey method, statistical-mathematical method, case study method, experimental method, graphic representation method.

Research period, place and subjects

The research will be performed on a sample of 12 subjects, for a period of 10 days (5 days, 2 days break and then another 5 days), of 3 hours / day at the Institute of Medical Expertise and Work Capacity Recovery Bucharest in that the subjects were hospitalized for medical recovery in collaboration with the doctor Dr. Dan Moldoveanu, head of department within the Medical Recovery Laboratory, they underwent a lumbar disc herniation surgery using the traditional method due to overwork at work.

Inclusion criteria:

Age between 40 and 50 years; factor of the disease: overload, surgical procedure performed at least 3 months before the conventional method; acute treatment of the disease, radiculopathy present; osteosynthesis materials present

Exclusion criteria:

No hypertension in treatment, obesity, diabetes, postoperative complications, history of COVID, no spine surgery before.

Methods

Measurements and tests used in research

Regarding the testing, we will use several evaluation tests targeting 2 statistical indicators, namely the evolution of the subjects by comparison during two weeks after the application of the proposed medical recovery program. We also want to assess whether the psychological indicator was positively affected after the treatment.

1. Lumbar Schober Test:

Test position: orthostatic

- a sign is placed on the skin over the 5th spinous process of the S1 vertebra, which is at the level of the superior iliac spines or the pits of Venus, and another sign 10 cm above in the midline, the subject performs the flexion of the trunk without bending the knees, it is measured in cm, the distance starting from the L5/S1 level with 10 cm caudal (for lumbar Schober) and 10 cm proximal (for dorsal Schober) the change made by flexion of the spine is measured. In healthy patients, the distance between the two signs increases by more than 5 cm, while an increase of less than 4 cm suggests a decrease in the mobility of the lumbar spine.

2. Tomayer test - from orthostatism the bent torso, with close legs and arms outstretched, is assessed by measuring the distance between the ground and the top of the middle after performing the spine flexion, the optimal distance is 0.

3. Biometric evaluation - joint evaluation that can be done using:

Joint balance - is done with the goniometer

- is an objective evaluation method used to measure from a biomechanical point of view, the range of motion of the joint of interest, on the possible anatomical directions, in the corresponding planes and axes.

In this pathology, the execution of walking was by rotating the chest further forward and with the pendulum movements of the legs, thus limiting the amplitudes of rotation of the spine. (Huang, 2011)

Torso flexion



• movement involving the concave curvature of the torso forward: lumbar lordosis changes in the opposite direction, dorsal kyphosis is accentuated and the cervical spine is rectilinear and slightly concave forward. (Jiri, 1991)

The range of motion is between 00-900 of which 500 are made from the spine and the next 40 are made from the lumbar spine

Lateral tilt of the torso

Orthostatism with the hands next to the body, the subject performs the lateral tilt of the torso so that the hand approaches the lateral epicondyle of the femur. The range of motion is between 00-350 (Sidenco, 2005)

4. Analog visual scale (VAS)

Pain assessment is recommended using an analog visual scale (0 to 10 points). 2. The etiological assessment of pain (eg musculoskeletal or neuropathic), location, qualitative and quantitative characteristics, intensity, duration, determination of factors that aggravate or ameliorate pain is recommended. Pain Assessment Scale - The Wong Baker Faces Scale (VAS) or visual analog scale is an important tool used by many specialists to determine the intensity of pain. (Puolakka, 2008)

5. Patient Health Questionnaire (PHQ 9)

- includes a series of questions that reflect the influence of lumbar disc herniation on the subject's mental health.

6. Fear-Avoidance Beliefs Questionnaire

Used to assess the events that patients are trying to avoid due to fear of triggering pain - some items are proposed in order to assess the quality of pain in patients. To determine the extent to which activities such as bending, lifting, walking, or driving affect or may affect back pain. (Gordon, 1993)

7. Roland-Morris Disability Assessment Questionnaire Due to Low Back Pain

The Roland-Morris Disability Scale was created based on the Impact Profile of the disease, in order to measure physical disability in people with back pain. (Stratford, 1996)

The medical recovery protocol for subjects with lumbar disc herniation operated on contains the following means and methods.

Magnetodiaflux - acts on SNV components and on various organs and tissues depending on intensity and frequency, F 50-100 Hz, 4-10 min. The 50 Hz module with sedative role, respectively 100 Hz will be used to obtain an exciting response and the exposure time will be gradually starting with 10-15 in the first 5 days of treatment and then 20 minutes in the last 5 days of treatment.

The exponential current in the case of the operated lumbar disc herniation is used to stimulate the muscles totally or partially denervated in the disc herniations with motor deficit. For this procedure, the exposure time is 3 minutes at the beginning of treatment until 10 minutes at the end of treatment.

Massage therapy - is a series of manipulations performed manually or mechanically applied symptomatically on the body surface for therapeutic purposes sedative massage and maintenance of muscle and vascular trophicity that will be applied to all back muscles.

Hydrokinetic therapy - is particularly useful in lumbar disc herniation, can be applied even in the acute inflammatory onset and is continued progressively with its decrease. Adapted equipment is needed in the water to perform the exercises. The exercises are selected from those applied in the gym, but adapted to the aquatic environment. (Hurley, 2010)

Proprioceptive neuromuscular facilitation techniques (FNP) is the facilitation, encouragement or acceleration of the voluntary motor response by stimulating proprioceptors in muscles, tendons, joints; to this is added external stimulation and telereceptors (Drăgan 2014). In the case of hypotonic muscles, we use the following neurophysiological mechanisms in performing FNP techniques: Sherrington's law of "successive induction": "a movement is facilitated by the immediately preceding contraction of its antagonist"; Contraction facilitates alpha and gamma motoneurons; increases the recruitment of motor units under the isometric contractions applied on each side of the joints. (El-Bsat, 2002)

Specific methods for correcting pathological curves of the spine, Klapp method. The method is based on two observations such as: lack of scoliosis in the case of quadrupeds and the appearance of scoliosis in the case of bipeds with the evolution of species lateral mobility of the spine is high in four-legged animals due to the action of the limbs on the spine.

The Williams method used in the recovery of lumbar disc herniation

In order to prevent muscle contractions, therapeutic physical exercises are recommended immediately after the intervention, at 24-48 hours. An adapted program, applied 3 times a day, helps reduce pain. (Brox, 2006)

Therapeutic physical exercises recovery program in operated lumbar disc herniation

The subjects will perform 15 repetitions of the exercises indicated below and which will be performed on the work table

Supine with the upper and lower limbs outstretched, the patient performs warm-up movements of the ankle joint by plantar flexion, dorsiflexion and rotations in one direction and the other direction 3 minutes

The patient lying on his back on a work table, his knees bent and his feet on the sauce, the therapist in front together with the patient, performing the bringing of a bent knee towards the chest, alternatively, return

The same exercise but with both knees bent at the chest.

With the knees bent and glued together, the soles on the ground, the patient performs the extension of the right knee with the plantar and dorsal flexion of the foot, return

Same exercise but with the other lower limb



From the same starting position, bring the bent knees to the side, return so that the shoulder blades remain in contact with the ground

Supine with the knees bent, the patient performs the lifting of the seat upwards, the thoracic spine remaining in permanent contact with the ground, return; The abdominal muscles remain tense throughout the exercise

Supine with the knees bent, the patient performs the bringing of one knee to the chest pulled with both hands, simultaneously with the bringing of the forehead to the knees and the lifting of the bent torso from the table, return.

The same exercise but with both knees pulled to the chest with his hands, come back

Supine with one knee bent, the other leg simulates cycling 10 times forward, back, with the other leg, back

The same exercise, but in the opposite direction, is performed alternately with both legs

Supine with the knees bent, apply pressure to the right lower limb, simultaneously with the slight lifting of the lower sacrum and the left shoulder on the floor up x15 repetitions

Later on the opposite side x15 repetitions

Supine with the knees bent and both heels planted on the floor, place the hands below the knees and pull one knee to the chest for 10 seconds, return x15 repetitions

The same exercise but with the help of both knees

We keep the same posture, each knee bent is held by the hand, performs circumductions in one direction and the other

The same exercise but with your knees glued together

To stretch the piriformis muscle in the DD with the knees bent and the soles on the ground, move both knees sideways to the left, hold for 6 seconds, return, to the right, hold for 6 seconds, return, while the pelvis remains fixed so as not to rotate column.

From the same position, perform pelvic tilt or abdominal tilt.

For stretching and decompression by stretching the intervertebral space of the spine, facing the trellis with the lower limbs placed under the trellis, knees glued to the trellis, hands catch the highest slat, kneeling and balancing the pelvis forward at the maximum point of descent, maintenance and return by force of the feet, 15 repetitions.

Lying on the side with the head resting on the lower hand, the upper limb remains stretched, the lower knee bent, the upper leg extended, the upper leg performs abduction movements simultaneously with the dorsiflexion, return

In the same position, the patient performs the bending of the knee towards the chest, return / x10 repetitions

Keep the same lying on the side position, both knees bent, the subject performs the above knee lift, return

The same exercises are performed on the opposite side, the torso remaining stretched and the upper leg is the continuation of the torso

From a quadruped with a lumbar spine, sit on the heel at the same time as bringing the chin to the chest, returning to the same position 15x

Sitting on the knees with the arms outstretched in the extension of the shoulders, the extension of the outstretched arms is performed laterally, 15x return; In the other direction, return 15x.

Adaptation of active movements with resistance to lumbar disc herniation is done by applying weights with increasing difficulty to the limbs as follows for:

Regarding the progressive difficulty of the exercises, each subject will perform the exercises as follows: In the first part of the hospitalization, the subjects will perform the exercises as presented and in the second part of the hospitalization, all the exercises will be performed by applying weight 1 kg on the lower limbs.

Results

The presentation of the recorded data will be done in the form of graphs, tables, statistical series. All this will be approached in the form of a logical sequence, the systematization of the data making possible the statistical interpretation.

The results will be presented in the form of figures in the text and we will describe the graphical representation in the form of a table, specifying in this way what is the effect of the research I have proposed and what effect on the validity and interpretation of the research results.

Through various comments we will try to explain the significance of the recorded results.

In the following we will present the results recorded following the application of the tests mentioned above and we will see if the proposed hypotheses are affirmed or refuted.

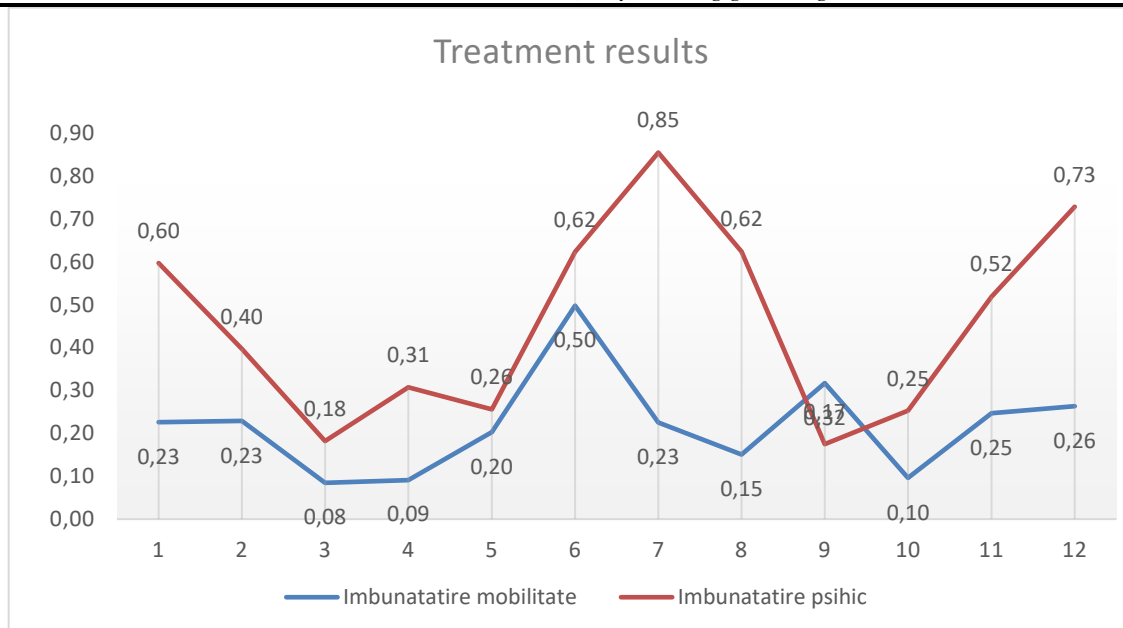


Fig. 1. Treatment results

From Fig. 1 we observe that the patients whose psychic stress is lower, respectively the subject 1, 6, 7, 8, 11, and 12 are distinguished by a psychic improvement that takes values above average, and the patients with higher muscle density respectively subject 1, 2, 6, 9, 11 and 12 stand out through an improvement in mobility that takes values above average. It is worth noting the cases 7.8 in which the mental improvement does not entail an equally obvious improvement in mobility and the case 9 in which the mental improvement is not very obvious. However, the patient gets above-average improved mobility.

Factor analysis

For CFA factor analysis we used SmartPLS software which offers many high accuracy tests that allow a consistent interpretation of data and assumption of research results, even when we have few records (subjects).

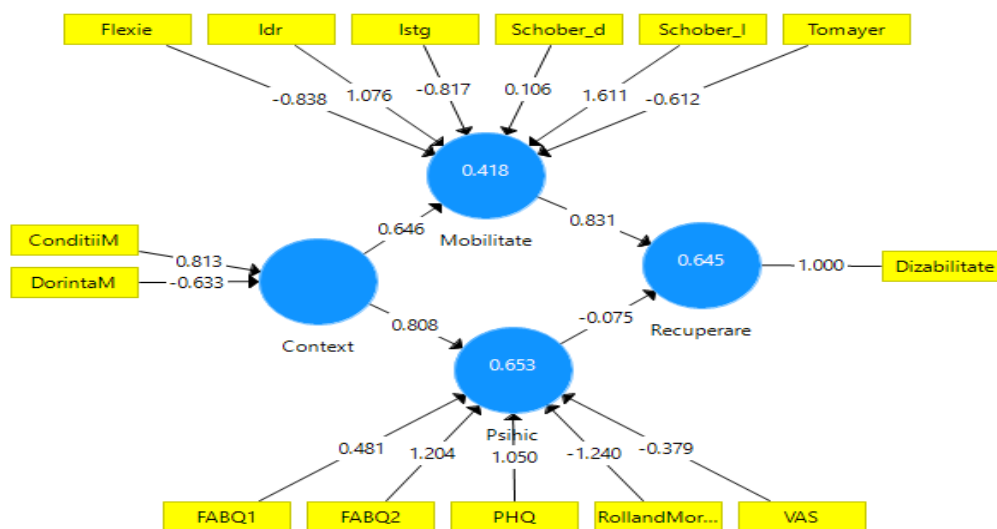


Fig.2. Analysis of the factors that influence the recovery process

From the above model it is observed that the desire to return to work and working conditions (context variable) influences the efficiency of the kt program and the mental balance of the patient. The last 2 variables have a great influence, in turn, on physical recovery.

From this model we decided to eliminate the dorsal Schrober and Tomayer variables, because they presented multicollinearity, measuring the same characteristic of the patient in different ways. This resulted in the model in Fig. 2.

The coherence of our model was based on the validation steps provided in Table 1, which shows that the practice of the physical therapy program (mobility variable) and the psychic factor (psychic variable) influence the medical recovery



of patients. The values of all variables exceed the minimum allowable values: Composite Reliability (> 0.6), Cronbach Alpha and ρ_A (> 0.7), AVE (> 0.5).

Discussions

The subjective responses of the subjects to the therapist's requests, which to some extent may influence the quality of the medical recovery and implicitly the final result.

The study that can be included would be that in terms of testing the psycho-emotional factor, the response may be influenced by the subject's interest in recovery which is a subjective element.

Regarding the limitations of this study, the main limitation is presented by the pandemic situation that affected the small number of patients included in the study as a result of government laws imposed for the access of patients in hospital. we therefore admit that this research needs to be done on a larger sample as a result of the substantial contribution on the human body.

Conclusions

Analyzing the results obtained after the conclusion of this study, following the initial and final assesment of the subjects and after the application of the physiotherapeutic treatment, we can consider the following:

□ Regarding the numerical data, it can be observed that regardless of the reason why the subject presents in the medical recovery department and if he follows the treatment indicated by specialists, he registers an increase in the range of motion.

□ At the same time it is visible that the low desire of patients to recover functionally, is reflected in the tests applied and here we can motivate the financial situation, difficult working conditions, distance from work, relationship with colleagues and physical and mental overload.

□ Regarding the mobility indicator, we could observe a high frequency of the right lateral tilt test in terms of the predominantly increased value result and this aspect can be explained based on the fact that most people prefer to use the right side of the body. Hi.

□ All this indicator proved that pain and physical incapacity cause subjects to reduce household activities, limiting contact with the outside environment, a poor relationship with loved ones but also an unbalanced lifestyle.

Finally, we can say that this direction of research proves that the two hypotheses established at the beginning of the study proved to be valid, which shows the statistical conclusion on the beneficial effect of exercise on all areas of interest.

The study showed that therapeutic physical exercise associated with various means of physiotherapy applied according to specialized medical instructions have a beneficial effect on the biopsychosocial balance and favor well-being. It also influences the recovery of work capacity by increasing the pain threshold, which causes the subject to resume his usual activity, restore his financial situation, make him change his way of life, thus giving him the desire to do more. a lot for him and for society.

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