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TITLE OF THE DOCTORAL THESIS: STRATEGIES TO OPTIMIZE THE RECOVERY OF HERNIATED LUMBAR DISK BY MEANS OF PHYSICAL EDUCATION AND OF KINETOTHERAPY

Key-words: *optimization, lumbar disc hernia, activity, increasing the quality of life*

With all methodological encountered difficulties, we can affirm that lombalgia is almost the most widespread pain, probably along with headache. At adult population, between $\frac{1}{2}$ and $\frac{3}{4}$ feel lumbar pain once in life. Approximately 40% of them have an acute episode once a year and 20 % may have an experience of this kind at any time, in any moment. Apparently, only 10-20% of the total adults does ever have lumbar problems.

The present doctoral thesis is structured on 3 parts including 13 chapters.

Part I treats appropriateness about the Theoretical, conceptual and methodological foundation regarding the treatment of lumbar disk hernia.

The purpose of the study is to draw up a program for optimal kynetoterapy from the curative point of view, prophylactic, but also support in the education of patients diagnosed as this illness, according to the main key of improving quality of life, with a long-term social reintegration.

Combining various means of physical education, sports and kinetotherapy will create a complex recovery program, which will provide the basis for attaining the purpose.

Objectives relate to adapt kinetic treatment in relation with particularities related to the process of disk degeneration - physiological and pathophysiology- and customize it according to associated symptoms.

Summarizing the above data, we have proposed that, by applying to the patients with lumbar disk hernia program *specially created*, to achieve:

- Improved postural balance;
- The position of the line centre of gravity;
- Maintaining physiological lumbar lordosis;
- Toning the muscle belt (shoulder and pelvis) and lower limbs, simultaneously with toning the abdominal and paravertebral muscles;

- Objectifying the means by which it can be achieved the self-management of the disease.

The high incidence of this disease in the world and nationally, also confirmed by numerous cases of hospitalizations in the Resort and Recovery Sanatorium Techirghiol (place where I worked), led me to investigate current therapeutic trends in an attempt to design a more efficient *new program of recovery*, in order to improve/remove the symptoms of this disease. Chapter 5 approaches means of physical education and the associate kynetoterapy which can be used in recovery of lumbar disk hernia.

Effects of physical exercise in the case of a patient with lumbar disk herniation may be briefly summarised as follows: Maintain correct body posture, maintain and increase muscular strength and resistance, develop and maintain normal underlying driving functions and recover them on the disrupted preventing osteoporosis, increase strength and elasticity of ligamentous capsule, improves muscle properties: The nutrition, the elasticity, excitability and the synchronization of underlying driving units, myocardial contractility, etc.

Part II is a preliminary research on improving recovery on herniated lumbar disc by means of the associated physical education and kynetoterapy

Our main purpose is designing a program of kynetoterapy to avoid the shortcomings of Williams's method and to supplement it.

For our preliminary research we formulated the following hypothes:

Associating specific physical exercises with a moderately body-building program to treat patients with lumbar disk herniation results in optimizing the recovery.

Our objectives were:

- Control the pain and outstanding inflammation;
- Poor muscle tone;
- Controlling the muscle contraction;
- Control of posture in motion and rest;
- Restoration of functional synergism of agonists and antagonists muscle;
- Recovery of static and dynamic disorder vertebral body centre of gravity recovery;
- Controlling and rehabilitation of effort ;

- Increasing the quality of life of the patients.

Direct communication with the patient is very important to this, specialized studies pointing out that a dialog of only 15 minutes between the therapist and patient can get much more obvious results than actually working with the patient for 25 minutes. Therefore, before applying the kynetotherapy meetings, we have driven careful conversations with selected patients in the two groups, on the edge of their condition and how it affects their quality of life.

Another important rule is correct composition of the rehabilitation program of recovery, in stages, to establish a clear specific objectives and descriptions of the techniques used, the intensity and correct dosing of the effort. Patients who have been trained regarding to these aspects. The efficiency of the program was assessed by repeated assessment (initial and final).

The research has been performed on **2 groups**, one experimental and one control, each consisting of 10 subjects, 5 women and 5 men in each group.

The results of the study shows that, practicing for 2 weeks (10 sessions) of active exercises with resistance present in the proposed schedule, decreases pain intensity and significantly improves pain and overall mobility. Very likely, this concerns muscular smoothness and fibre neural mobility.

However, this study has helped subjects to become more responsible for their health and to develop skills for physical exercise, which are likely to induce prophylactic effects on lumbar pain and complications, so exceeding fear of movement that installs after an episode acute MI.

The hypothesis proposed is confirmed: practicing a moderate and implementing body building activism (versus high care and prolonged rest) significantly improves symptoms of lumbar disk hernia. The statement is supported by the statistical processing data.

Part 3 includes the main contributions related to the optimizing strategies oh physical therapy programs for the lumbar disk hernia.

The purpose of our experimental research is to identify the physical therapy strategy which can optimize the somatically functional and psycho-social recovery process for the patients with lumbar disk hernia.

In this sense we formulate the following hypotheses:

1. Implementation of a complex original recovery program for lumbar disc hernia patients, consisting from combining the movements Williams type with McKenzie type movements, executed with strength and stretching exercises as an alternative to classical kinetic program increases the effectiveness of therapeutic intervention.

We included in this experiment subjects with lumbar disc hernia in phases I, II, III (stage 1) and stage IV of the disease progression, respecting also other criteria selection mentioned above.

2. Promoting a moderate and progressive activism in patients with lumbar disk hernia causes relieving symptoms, prevents their functional capacity secondary of their inactive status and increases the quality of their life.

To conduct our research we selected 30 subjects, 15 women and 15 men, mean age of 45.5 and/or 47.1 years. Patients have been selected observing the criteria for acceptance or rejection specified. The recovery program included exercises carried out on the mat, stretching exercises fixed scale, exercises with stick and exercises for analytical tone of certain groups' lower limb muscle. To assess the results obtained after therapy in motion and for determining strategies of optimizing kinetic programs for recovery of lumbar disk herniation, we used the index finger- ground, and Krause and scale Oswestry tests.

The methods used in this part of our research were the following:

- Observation method;
- Conversation method;
- Experiment method;
- Statistical-mathematics of data processing;
- Graphical method.

The results of our research emphasize the importance of each monitored parameter and of the functional recovery programs, as we noticed significant differences between the subjects' initial testing and final testing. The results registered in the two assessments significantly differ from the statistical point of view. The calculated arithmetical means are significantly different in both of the assessments, with evolutions in a positive sense. The coefficient of variation, in all the cases, has a smaller value in the final assessment and this diminution validates the increased means; the value results are closer, passing from a nonhomogeneous or a relatively homogeneous structure to a homogeneous one,

which means progress. In all the parameters, after the process of testing the statistical hypotheses by using the t test, the null hypothesis was rejected and the alternative hypothesis was accepted, the calculated significance threshold (p) being smaller than 0.05. Relying on this result, we can assert that, on an average, the results of the assessment methods are significantly different from the statistical point of view, which means that the exercises for the functional remaining potential recovery, associated to the physical and technical training operational structures, were successful.

As *general conclusions* we shall mention the following;

1. Lombalgia – lower-back pain (the central symptom of herniated lumbar disc) is so common among population, so that it can be said that is normal. Along with other endemic diseases, such as flu or dental pain, its resistance to medical intervention must be aligned approach to copyright, in which everyone's responsibility must be involved.

2. Evolution of lumbar disk hernia frequently involves acute episodes of acute relapses and chronicity. It is important to take this into consideration in discussions with a specialist. In treating it, it should be taken into account the long term benefits and not only eliminate the symptoms for the moment.

3. Treatment of the lumbar disc hernia recovery may vary considerably. In the medical world there is no consensus on the most effective therapeutic approaches: Almost every therapist has a certain design over the management of disease, according to the school which shall promote, in agreement with his personal vision. In this context, therapeutic decisions are more influenced by the skilled professional guidelines than the symptoms the patient is addressed.

4. In lumbar disc hernia, flares are followed by long periods in which installs fear of recurrence of pain that will restrict his movements, activism in general, resulting in time to decrease muscle strength and to reduction of muscle mass on certain groups, "spared" by the patient. The analytical tone of hypotonic muscle will result in breaking the vicious circle and to improve symptoms.

5. Numerous studies carried out over the past few decades, concerning the impact lumbar pain on the population of all ages, have led for placing kynetoterapy in the centre of attention, as a basic component of the recovery programs. Also, the studies reveals that iatrogen factors which may lead to chronic illness are exaggerated concerning pain, over-prescription of rest and physiotherapy, as well as stopping day activities.

6. Many people who suffer from this illness is tend by themselves, without the need of medical help. They achieve this objective by practising physical exercise and/or adopting postural and ergonomic strategies. Some patients find difficult this personal involvement and must be educated in this regard. The success of self-care (disease self-management) requires adoption of certain mental and behavioural strategies to minimize pain and maximize functionality.

7. The costs of the hernia lumbar disc treatment are very high as both medically and socially. The medical cost is directly attracted by population in the chronic stage of the disease. The social one is indirectly and it absorbs most of these expenses. For this reason, the management of disease should be directed toward reducing the functional impotence and the need for medical care of this group of patients, as well as encouraging attitudes of "coping" (to resist the disease).

8. Lumbar disk hernia is not always a curable disease, and, for many of us, there is a lifelong problem. Not even one treatment has been able to reduce prevalence, incidence or recurrence. With consistency, disease management should provide models of self-care and patient involvement.

9. Passive therapeutic procedures seem to have no role in recovering of this condition. On the other hand, there are indications that promotes and recommended to use physical exercise, education, information and behavioral therapies.

10. Performed in a controlled, progressive, gradually, exercises are intended to increase distribution of nutrients to the affected lumbar intervertebral disc and the soft tissue, in order to preserve the health and proper functioning. Repeated consistently, programs of kynetoterapy helps preventing stiffness spine joints, muscle hypotonia, as well as reducing recurrence of acute episodes or to decrease the severity and the duration of them.

11. Physical activity can create that favourable continuum that decrease or even disappearance of physical and mental discomfort that installs to the patient with lumbar disc hernia, which he perceives his affection as an obstacle occurred in the normal course of his life. They are useful if they include programs that are individualized for each patient condition and if they are executed correctly, observing a work pace appropriate to an optimal number of repetitions throughout the course of the motion. The therapist is the one that ensures that these conditions have been fulfilled.

12. Kynetotherapy is the one that, by means of various methods, offers solutions to patients and appropriate information, regarding to the normal activity performance, disease self-management and overcoming the fear of movement. All these result in *increased quality of life of the patient*.

The *experimental conclusions* are:

1. Contrary to popular opinion, active resistance movements performed by patients diagnosed with lumbar disk hernia in phases I, II, III (stage 1) and IV, in compliance with the criteria for inclusion in the experimental group do not cause increased pain. Moreover, this study, by statistically significant results we obtained supports the theoretical conclusions number 9 and 10.

2. This research demonstrates the effective combination type movements Williams, with type McKenzie, within the same recovery program, resulting in reducing symptoms and bringing forward arguments to theoretical conclusion number 4, which stresses the importance of analytical toning of hypotonic muscles.

3. Stretching exercises for certain muscles (the sural triceps, hamstrings, multiphysics, dorsal and lumbar para-spinal) increase mobility of the structures involved in maintaining a correct position of the body, suggesting also the essence of the theoretical conclusion number 4.

Cervical Spine involvement and the seat belt in recovery program helps to maintain correct posts, when repositioning centre of gravity of the body and its global commitment to effort.

4. Statistical indicators and the result of the test t for average values to scale insignificant appearance Oswestry highlights the initial testing ($p=0.049$), i.e. the two groups were similar in results, and the final testing ($p=0.041$), statistically significant. So it appears that the application of the physical exercise program specially designed increases the quality of life patients diagnosed with lumbar disk hernia.

5. Toning helps scapular girdle taking over biomechanical forces of the body, which provides a system of unmitigated and minimum lumbar intervertebral discs affected demand and increase the activism of patients with lumbar disk hernia.

6. The recovery program used in experiment consisted by means of physical education and related kynetotherapy, being ***original in concept and application***. Directing has been carried out on the basis of the results of an evaluation results of functional tests in conjunction with those obtained by the use of questionnaire, which offered the possibility of dosing effort, with the principle of individualization.

Elements of originality of this study are:

Combining the two methods of recovery, Williams and McKenzie, being theoretically in contradiction;

Performing exercises included in the proposed program active resistance, in usual counterpart with limitation of the level of mobilization of a patient diagnosed with lumbar disk hernia;

Toning of muscle-key and encouraging activity to this kind of patients, thus replacing the instructions in "back school".