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Original article

THE LOW BACK PAIN AMELIORATION BY USING MUSCULAR RELAXATION TECHNIQUES

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Abstract

Aim: The research had the purpose to improve the classical aproach through the physical therapy means, by introducing two of the neuro-proprioceptive techniques in the rehabilitation program of the low back pain and had as main objective the pain decreasing in intensity by creating a relationship between relaxing certain muscles and realieved symptomps.

Methods: The study was conducted at the Techirghiol Balneal and Recovery Sanatorium in September 2019 and involved a number of 20 subjects, 10 men, 10 women, with age between 35-65, divided in two groups, control and experimental. All subjectes were diagnosed with lumbar discopathy and had low back pain with vary intensities and no surgical intervention. Every subject attended a number of 10 consecutive physical therapy sessions of 45-50 minutes, one per day, two weeks. The control group performed the Williams program for lumbar disk hernia, the experimental group performed the Williams program, slow revearsal and slow revearsal with resistance.The study subjects were measured, innitial and final, with Schober Test and Oswestry Questionnaire.

Results: From the statistical analysis of the data, it can be observed progress and the symptomps improvement on both groups, with higher values for the experimental, so the experiment hypotesis was confirmed.

Conclusions: The study demonstrates the effectiveness of specific physical therapy means to diminish/abolish the patients pain intensity, preparing them to perform qualitative normal life activities.

Key-words: low back pain, muscular relaxation, neuro-proprioceptive techniques.

Introduction

The low back pain seems to be specific to man, perhaps as a price of gaining vertical position, of bipodal orthostatism. Naturally, all authors accept the idea that this disease is as old as that of the human being. Precisely due to this fact, the present study aims to recover patients with lumbar disc herniation through muscle relaxation techniques.

At one moment in life, 40% of adults population suffer of lombalgia and for 23% of them the pain is sustained approximately one month (Hoy D., Bain C., Williams G.,2012). The acute low back pain development is favorable in general, while the chronic pain persists for 12 weeks or longer (Calotă N.D., 2020). Thus, it is a common pain and the central symptom of the lumbar disk hernia, affecting the patients quality of life, with long repercussions and major medical, social and costs implications (Calotă N.D., 2017). During time, as the population is growing older, the number of affected individuals increases, lombalgia being common through 40-80 years old persons (Biering-Sorensen F., 1983). This kind of suffering seams specific for humans, all authors agreed it is as old as the human nature (Badley E.M., Rasooly I., Webster G.K., 1994).

Despite of that, its diagnosis is not as simple to bo made, considering the structural and functional complexity of the lumbar area. This is why the pshycho-sociological involved in the matter must be separated by the neurological issues, the vertebral fractures, infections or spinal tumours. Most low back pain episodes has as cause the musculoskeletal disorders (Koes B.W., 2010).

The treatment varies on many criteria, especially regarding the cause (Chavannes A.W., Gubbles J., Post D., Rutten G., Thomas S., 1986). Phisical therapy is a non-surgical treatment option for spine conditions and pain that have impaired or imobilized movement and flexibility and involve guidance from a physical therapist who teaches patients how to use their own muscles to improve flexibility, range of motion, muscular strength and endurance (Calotă N.D., 2017). The physical exercise, the tonic status of the legs muscles and the movement in general have a very good impact on the relieving or abolition of the symptomps and the improving of patients life in general (Calotă N.D,, Oprea C., Ionescu E.V., 2015).

Lumbar disk hernia is not always a curable condition and for many people it remains a problem throughout their lifetime[5]. Thus, the relaxation concept, both physical and psychological, comes naturally în the context, as a well being state attached with a chronic desease, as the lumbar back pain shoul be seen, with an unorganized pattern, with long periods of relative absence, intercalated with acute episodes of exacerbation and recurrence (Calotă N.D., 2020). The mobility also will improve as the patient goes through a rehabilitation process. The disability as well as the

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functional damage minimisation could be considered a good criteria in identifying those treated optimally (Calotă N.D., Oprea C., Ionescu E.V., 2015).

This study has sought to apprehend a way of improving the classical aproach through the physical therapy means, as its purpose, by introducing two of the neuro-proprioceptive techniques in the rehabilitation program and had as main objective the decreasing in intensity of the low back pain by creating a relationship between relaxing certain muscles and realieved symptomps.

The neuro-proproceptive techniques, described and defined by Knott and Voss (Calotă N.D., 2016) are classified on two categories: fundamenrtal (the manual grip, the commands and communication, the muscle stretch along with the limb rotation, the traction and compression, the maximum resistance, the normal sequential of muscular activity, the reinforcement of the results obtained through movement, the decompensation movements) and special.

There are two types of proprioceptive neuromuscular facilitation (PNF) stretching: passive - stretching without a muscular contraction active - using a voluntary muscular contraction PNF techniques can be both passive (no associated muscular contraction) or active (voluntary muscle contraction). While there are several variations of PNF stretching, they all have one thing in common - they facilitate muscular inhibition. It is believed that this is why PNF is superior to other forms of flexibility training. (Gidu, D.,V., et al, 2013)

The special neuro-proprioceptive techniques are divided in two: those with general character (the slow revearsal, the slow revearsal with oposition/resistance, the repetitive contractions, the sequential for the reinforcement, the agonistic revearsal) and the specific ones, applied particulary in each of the four stages of the motor control.

For the use of the present study have been selected two of the neuro-proprioceptive techniques with general character of the usage: the slow revearsal and the slow revearsal with resistance.

Hypothesis

The association between the classical lumbar disk hernia physical exercises (Williams program) and the muscular relaxation techniques (the neuro-proprioceptive type) has as a result the rehabilitation optimization and the abolish or diminish of the symptomps intensity on the low back pain.

Methods

The research used the following methods: documentation, experiment, test methods and statistical indicators.

The study was conducted at the Techirghiol Balneal and Recovery Sanatorium in September 2019 and involved a number of 20 subjects, 10 men, 10 women, with age between 35-65, included in two groups – control group and experimental group, with 10 subjects each.

All subjects were diagnosed with lumbar discopathy and had low back pain with vary intensities with no surgical intervention. Every subject attended a number of 10 consecutive physical therapy sessions of 45-50 minutes, one per day, two weeks, Monday to Friday, with an weekend break between it.

The control group had performed the Williams program for lumbar disk hernia, fase 1-3, as physical therapy exercises.

The experimental group had also performed the Williams program exercises (Sbenghe T., 1981) plus two of the neuro-proprioceptive facilitation techniques, slow revearsal (IL) and slow revearsal with resistance (ILO) (Calotă N.D., 2016).

All patients who were included in the study were informed in advance about the procedures that will be applied and the risks involved. "Patients' personal data is confidential and will not be used for purposes other than those related to this study.

The study subjects were measured with Schober Test and questioned with Oswestry Questionnaire inniatial, before starting the experiment and final, at the end of it.

Measurement of lumbar flexion (Schober): a sign is made at the line that joins the posterior iliac spines - L5, the next sign is made by measuring 10 cm up from L5. The patient was asked to bend forward as much as possible from the waist, with the knees extended. In the conditions of a normal mobility of the lumbar spine, at bending the distance between the signs is at least 15 cm. If this increase is below 15 cm, then it can be said that there is a limitation of mobility in the lumbar spine, resulting in a positive Schober Test.

The Oswestry questionnaire is used to determine the impact that pain has on the patient's life and on the activities of daily activities. The questionnaire comprises 10 items for which only one answer is accepted.

The percentage obtained represents the degree of impairment of the patient's quality of life due to a herniated disc. Thus, the classification of disability is:

- 0-20% - minimum deficiency
- 20-40% - moderate deficiency
- 40-60% - severe deficiency
- 60-80% - maximum deficiency with severe degree of disability
- 80-100% - total disability with bed immobilization

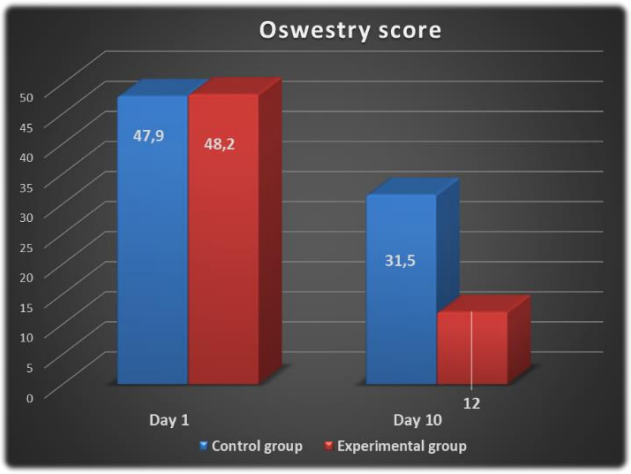
Exclusion criteria were low back pain not associated with a herniated disc, herniated disc at another level, tumors and surgery.

Inclusion criteria were: lumbar disc herniation, no surgery, associated with low back pain and / or lumbosciatica.

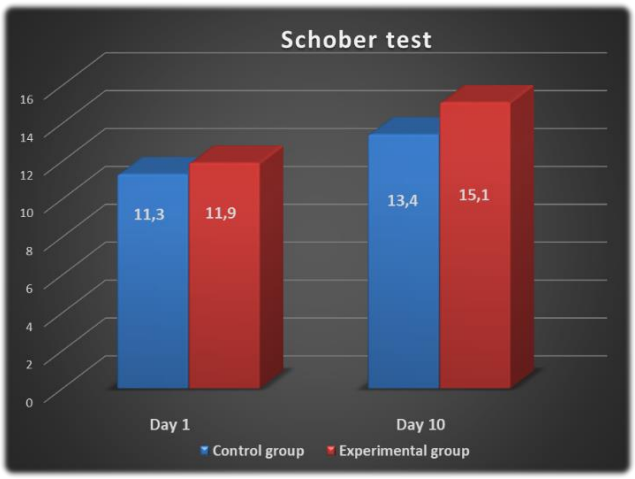
Results

In the two graphs presented below you can see the differences of the two groups of subjects registered between day 1, at the initial test and at day 10 of treatment, at the final test.

The final results of measurements and questionnaire can be seen in graphics as follows:



Graphic 1. The Oswestry score



Graphic 2. The Schober Test values

We noticed that of all the patients included in this research 75% were female (table 1, tabel 2) and the predominant age of this condition among our subjects was 35-50 years (70%).

The data collected show that 80% of the subjects are from urban areas. 47% are employed and 47% retired, the rest not having a job.

All these data are presented in the tables (table 1, tabel 2).

Also in the tables presented in this research are found information related to the diagnosis received by the subjects included in the two groups but also other representative medical indicators for the inclusion or exclusion of patients from our study.

Tabel 1. Control group indicators

Subjects	Gender	Area of origin	Age (years)	Diagnostic	Other medical aspects
1	F	Urban	41	lumbar disc herniation, L3-L4,L4-L5	no surgery
2	F	Urban	42	lumbar disc herniation, L4-L5, L5-S1	left foot paresis, static and gait disorders, no surgery
3	F	Urban	41	lumbar disc herniation, L4-L5 (7mm), L5-S1	slight paresis of the left foot, severe static and gait disorders, no surgery
4	F	Urban	48	lumbar disc herniation, L4-L5, L5-S1; L2-3	L3-4 disc protrusion, no surgery
5	M	Rural	64	lumbar disc herniation, L4-5, L5-S1	intermittent radicular pain syndrome, spondyloarthritis, no surgery
6	F	Urban	35	lumbar disc herniation, L3-4, L4-5, L5-S1	intermittent radicular pain syndrome, spondyloarthritis, no surgery
7	F	Urban	58	lumbar disc herniation, L3-4, L4-5, L5-S1	static and walking disorders, no surgery

8	M	Urban	45	lumbar disc herniation, L3-4, L4-5, L5-S1	intermittent left radicular syndrome, no surgery
9	M	Rural	36	lumbar disc herniation, L4-5, L5-S1	intermittent pain syndrome, no surgery
10	F	Urban	50	lumbar disc herniation, L4-5, L5-S1	persistent moderate pain syndrome, no surgery

The control group is represented by 70% women. 80% of the subjects of this group are from urban areas, and 80% are aged between 35-50 years.

The experimental group is represented by 80% women. 80% of the subjects of this group are from urban areas, and 70% are aged between 35-50 years.

All research subjects, both in the control group and in the experimental group, presented a herniated disc at L4-L5, but also at other levels of the spine, as well as other problems associated with this condition.

Tabel 2. Experimental group indicators

Subjects	Gender	Area of origin	Age (years)	Diagnostic	Other medical aspects
1	F	Urban	48	lumbar disc herniation, L4-L5	no surgery
2	F	Urban	50	lumbar disc herniation, L4-L5, L5-S1	bilateral lumbosciatica, no surgery
3	F	Urban	58	lumbar disc herniation, L4-L5, L5-S1	chronic lumbago with sciatica, no surgery
4	F	Rural	61	lumbar disc herniation, L4-L5, L5-S1	no surgery
5	F	Urban	41	lumbar disc herniation, L3-4L4-5	psoriatic seronegative spondylitis, sacroileitis, no surgery, no surgery
6	F	Rural	65	lumbar disc herniation, L3-4, L4-5, L5-S1	no surgery
7	M	Urban	50	lumbar disc herniation, T11-T12, L3-4, L4-5	no surgery
8	F	Urban	44	lumbar disc herniation, L3-4, L4-5	L2-3 protrusion, no surgery
9	F	Urban	46	lumbar disc herniation, L4-5, L5-S1	L2-3 protrusion, no surgery
10	M	Urban	37	lumbar disc herniation, L3-4, L4-5, L5-S1	no surgery

Discussions

The Williams program for lumbar discopathy included a number of 10 physical exercises and each was repeated 10 times in one session.

Slow revearsal and slow revearsal with resistance had a 10 repetitions dose each, on each session, at the upper limbs level.

The experiment subjects lumbar flexion measurements was made by using Schober Test.

From the Schober Test results graphic it can be observerd a 2,1 cm lumbar flexion increasing at the control group and a 3,2 cm one at the experimental group, at the end of the study.

The Oswestry Questionnaire was applied in order to investigate the impact of the low lumbar back pain upon the patients quality of life and its increasing or decreasing in intensity.

Also, comparing the two groups Oswestry Questionnaire score, an 38,2% improvement can be noticed on experimental group, versus a 16,4% one on the control group

From the statistical analysis of the data, it can be observed progress and the symptomps improvement on both groups included in the experiment, but the one which attended the neuro-proprioceptive techniques had a higher score, at both tests, so the experiment hypotesis is confirmed.

In the literature there are researches (Calotă N.D., et.al, 2017, Hides J.A., et. Al, 1996) which suggest that the optimizing of the muscular status for the low back pain is also an efficient strategy, but these studies do not make a clear refference at the efficiency of the obtainning also the muscular relaxation, like the present study. Most probably, both these two types of approach, put together with a classical program, would

have an icreased efficiency, as one does not exclude the other, on contrary.

Another study should be made on the same theme, extending the use of the neuro-proprioceptive techniques on the level of the lower limbs also and selecting those specific to a motor control stage, as, for example, the rhythmic initiation, used in theory for the mobility amelioration and/or promotion and needed in unilateral antalgic reflex paravertebral contracture, such as the one from lumbar area various pathology and the rhythmic stabilization, utilized for painful muscular contractures as well.

The chronic pain of any kind develops the risk of disuse syndrome occurrence (Calotă N.D., 2016), the muscles not being properly utilized conducting at their decrease of mass and force, which will lower the level of body relaxation, as a vicious circle has installed, having in its centre the patient depression (Wright D, Barrow S., Fisher A.D., Horsley S.D., Jayson M.I.V., 1995).

The disuse syndrome implies the sedentarism effects upon the human physic and psychic. The non utilization of the human body components in optimum parameters conducts at multiple functional deteriorations, which predispose or maintain the low back pain, many authors agree that the disuse syndrome is the key-variable for this issue.

The progress might have been also due to the fact that the experimental group subjects, through these techniques, got a boost in their general capacity of movement, affected or restricted by the low back pain intensity.

Conclusions

The study results show that doing muscular relaxation techniques, along with classical lumbar disk hernia physical therapy program, for 2 weeks (10 sessions), like in the presented experiment, is equal with the pain decreasing and an important improvement of the patients well being. The improvement could be also due to muscular flexibility and neural mobility (Calotă N.D., 2016). The hypothesis is confirmed: a use of two neuro-proprioceptive facilitation techniques, besides classical physical therapy approach of low back pain, has as a result the symptomps amelioration.

Lumbar disk hernia and its central symptom, low back pain, are not always a curable condition and for many people it remains a problem throughout their lifetime. Through various methods, physical therapy provides patients with solutions and relevant information for performing normal activities, self managing their condition and overcoming the fear of movement. All these result in the increase of the patients quality of life (Calotă N.D., Oprea C., Ionescu E.V., 2015).

It can be concluded that, aside the role of the mechanical and psycho-social factors in chronic pain, physical therapy practices (movement in general and the relaxation techniques) applied with regularity take a central role in symptoms amelioration (Kendall N., Watson P., 2000). It is highly recommended the patients education to remain active, by improving the control and the efficiency of the body movement and relaxation, to be directly involved in the pain course management.

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