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# ANALYTICAL MUSCULAR TONIFYING IN LUMBAR DISK HERNIA SYMPTOMPS **IMPROVEMENT**

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#### Abstract

Aim. This study has sought to apprehend a causal relationships between toning certain muscles analytical key (creating a "shield" that muscle to absorb unwanted forces) and relieve symptoms of lumbar disc hernia.

Methods. This study included 20 patients diagnosed with lumbar disk hernia and under a balneal treatment at The Recovery and Balneal Sanatorium Techirghiol. They were split into two groups: the control group, doing free active movements during the physical therapy sessions and the experimental group, doing movements against resistance.

*Results.* The muscular tonifying elements included in the program did not determine any muscular hypertrophy. From the statistical analysis of the data, we observed progress and the symptoms improvement. In the literature there are researches (Hides, et al., 1996; Leinonen, et al., 2003) which suggest that the optimizing of the muscular status for low back pain is an efficient strategy.

Conclusions. The study results shows that doing active against a resistance exercises, like in the experiment program, for 2 weeks (10 sessions) is equal with the pain decreasing and an important improvement of the well being of the patients diagnosed with lumbar disk hernia. Probably this fact is due to muscular flexibility and neural mobility (Calotă, 2016).

Key words: Lumbar disk hernia, body-building program, The Numerical Rating Scale, "Sit and Reach" Test

#### Introduction

Lumbar disk hernia is a complex pathological condition, debilitating, with a massive bio-psychosocial impact. The cause of this disease is mainly put on the musculo-ligamentar prejudice, or on the degenerative skeletal transformations, although the differential diagnosis is vast.

Taken separately, the investigations offer few clues upon the causes, but the big number and the consequence of some factors, also the frequent association between these variables and lumbar disk hernia, show a certain relation between the biomechanical exposure of the vertebral column of external forces and the debut of this disease (Frank, et al., 1996; Burdof, et al., 1997).

Pheasant (1998) identified two types of persons in danger of a lumbar disk hernia diagnosis: those having a physical solicitant profession and those having a sedentary one. Individuals having a profession which permits an often change of position and with a moderate physical effort, so having a permanent active musculature, are taken a very low risk of low back pain, only of 2%.

This study has sought to apprehend a causal relationships between toning certain muscles analytical key (creating a "shield" that muscle to absorb unwanted forces) and relieve symptoms of lumbar disc hernia.

#### Hypothesis

The association between the specific physical exercises with a moderate body-building program in lumbar disk hernia treatment has as a result the rehabilitation optimization.

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### Methods

This study included 20 patients diagnosed with lumbar disk hernia and under a balneal treatment at The Recovery and Balneal Sanatorium Techirghiol. They were split into two groups: the control group, doing free active movements during the physical therapy sessions and the experimental group, doing movements against resistance (500 g at each ankle).

The study was made at The Recovery and Balneal Sanatorium Techirghiol in August 2010. The patients from experiment did a specific physical therapy program for 2 weeks (10 sessions lasting 45-50 minutes each).

The groups were formed aleatory, with an alternative distribution (control group – experimental group), due to their arrival for the procedure appointment.

The including in the experiment criteria (Calotă, 2013):

- Lumbar disk hernia as a main diagnostic;
- No recent surgery of any kind;
- No acute phase;
- No lumbar disk hernia in antecedent;
- No neurological symptoms.

The exclusion in the experiment criteria (Calotă, 2013):

- Heart diseases;

- Having lumbar or cervical surgeries in antecedent;

- Gonartrosis or coxartrosis (not being able to maintain the all four position);

- Vestibular diseases;
- Age over 75 years old.

The physical therapy program included in the study was inspired by Williams' protocol. Experimental group subjects were applied to the ankles or at the wrist, for certain movements, weights of 500 grams, to work actively with the resistance. The control group subjects were conducted all program through mobilization of assets free.

In parallel with physical therapy sessions, patients have followed procedures for physical therapy (ultrasound, shortwave, current interferențial, magnetotherapy etc.), Techirghiol balneotherapy resort-specific (mud wraps, baths in the tub, etc.), hidrokinetotherapy (20-minute sessions, general borrowings) and massage. All these means are currently associated kinetic treatment.

Measurement and evaluation of the subjects surveyed were made before the imposition of treatment (initial values) and at the end of the period differed/groups studied (final), as follows:

1. The Numerical Rating Scale, for pain evaluation;

2. The perimetry of the thighs and the legs (Cordun, 2009);

3. The "Sit and Reach" Test for the lumbar mobility (Wells, et al., 1952).

Table 1. The NRS results for the control group							
Current No	Name	Age	Sex	Initial Evaluation	Final Evaluation		
1.	Т. М.	62	М	4	4		
2.	I.M.	23	М	5	2		
3.	Z. A.	48	Μ	7	5		
4.	P. V.	59	Μ	6	6		
5.	D. E.	57	М	6	5		
6.	I.E.	31	F	5	4		
7.	R.S.	55	F	7	6		
8.	C.C.	69	F	2	2		
9.	E.N.	26	F	8	5		
10.	S.O.	58	F	5	2		

### Results





	Table 2. The NRS results for the experimental group								
Current No	Name	Age	Sex	Initial Evaluation	Final Evaluation				
1.	P.G.	52	М	6	3				
2.	S.F.	34	М	7	4				
3.	T.M.	71	Μ	5	2				
4.	C.A.	49	Μ	7	3				
5.	M.L.	56	Μ	4	1				
6.	M.I.	38	F	8	5				
7.	P.N.	40	F	7	6				
8.	B.D.	28	F	5	5				
9.	A.C.	65	F	5	2				
10.	G.I.	53	F	8	3				
-			5 6	7 8 9					

Figure 1.Pain evaluation - experimental group



Figure 2.Pain evaluation - final evaluation





In table 1 we presented the NRS for the control group, in table 2 the NRS for the experimental group.

Table 4 represents the initial and the final results for the control group.

Table 5 – the initial and the final results for the experimental group.

In table 3 there is the standard variation for the "Sit and Reach" test.

Table 3. The standard variation for the "Sit and Reach" Test						
Calificativa	Values					
Camicauve	MEN	WOMEN				
EXCELENT	>+27	>+30				
VERY GOOD	Between +17 and +27	Between +21 and +30				
GOOD	Between +6 and +16	Between +11 and +20				
SATISFACTORY	Between 0 and +5	Between +1 and +10				
ACCEPTABLE	Between -8 and -1	Between -7 and 0				
POOR	Between -20 and -9	Between -15 și -8				
VERY POOR	Under -20	Under-15				

Table 4. The comparative results of the "Sit and Reach" Test (initial evaluation – final evaluation) for the control group							
Current No	Name	Age	Sex	Inițial Test	Final Test		
1.	T.M.	62	М	-2	+4		
2.	I.M.	23	М	+ 5	+10		
3.	Z.A.	48	М	-21	-18		
4.	P.V.	59	М	-6	-2		
5.	D.E.	57	М	+3	+7		
6.	I.E.	31	F	+11,5	+19		
7.	R.S.	55	F	+1	+10		
8.	C.C.	69	F	0	+5		
9.	E.N.	26	F	-9	-8		
10.	S.O.	58	F	-4	0		





Table 5. The comparative results of the "Sit and Reach" Test (initial evaluation – final evaluation) for the experimental group						
Current No	Name	Age	Sex	Inițial Test	Final Test	
1.	P.G.	52	М	-18	-10	
2.	S.R.	34	Μ	+16	++22	
3.	T.M.	71	Μ	-5	+4	
4.	C.A.	49	Μ	-13	-2	
5.	M.L.	56	Μ	-9	+3	
6.	M.I.	38	F	+19	+24	
7.	P.N.	40	F	0	+12	
8.	B.D.	28	F	-11	-1	
9.	A.C.	65	F	+6	+14	
10.	G.I.	53	F	-7	+2	

Table 6. Flexibility of the lumbar spineExperimental group								
Evaluation	Average	Average difference	Mediana	Std. Dev.	Minimum	Maximum	Amplitude	Covariation
Initial	-2.20	9.00	-6.00	12.35	-18.00	19.00	37.00	-561.5%
Final	6.80		3.50	10.91	-10.00	24.00	34.00	160.5%



Figure 3."Sit and reach test" - experimental group







Figure 4."Sit and reach test" – final evaluation

#### Discussions

The arithmetical media for Pain is > 4,10 for the control group and 3,40 for the experimental group. It can be observed a difference of 0,70 points, in favor of the experimental group. The data are dispersed mixed around the average in both groups. Effect size (0.29) show little difference toward the middle between the two groups. Mann-Whitney test on a bilateral indicate a value for p (SIG.) equal with 0355 greater than 0.05.In these circumstances, we do not reject the null hypothesis, which assumes that there are no significant differences between the two groups with respect to the characteristic of pain.

The "Sit and reach" test, at its final evaluation showed an 9cm lumbar flexibility improvement, from -2,20 to 6,80cm. The median value was 2,70cm for the control group and 6,80 for the experimental group. Effect size (0.89) show a very big difference between the two context. Bilateral test indicate a value for Wilcoxon as p (SIG.) equal with 0.005 less than 0.05.It rejects the null hypothesis and the research hypothesis is accepted, that there are significant differences between the two context. In conclusion, the final evaluation reveal an significant increase of the flexibility of the spine, the equivalent rating being "okay" on a whole group, "good" for men and "satisfactory" for female.

The "sit and reach" test showed an average value of lumbar spine flexibility equal to 2.70 cm in the control group, respectively at 6.80 cm in the experimentally group. Averages difference of 4.10 cm is equivalent to an average goal difference of ranks of 1.40. The comparison of the initial and final evaluations results showed no difference between the two groups. Effect size (0.17) show a very small difference between the two groups. Mann-Whitney test on a bilateral indicate value for p (SIG.) to 0.596, greater than 0.05.We do not reject the null hypothesis that there are significant differences between the two groups. In conclusion, it was found a insignificant difference between the two groups relating to the flexibility of the lumbar spine, the equivalent rating being "satisfactory" for the control and "good" for the experimental group.

Comparing the measurements of limb segments, it appears that the program applied to subjects brought almost no change.

Except for a single subject, which has recovered 0.5 cm from the difference between the legs (probably due to uneven loading of the lower limbs during exercises for toning), all the others have experienced the same values to both the initial measurement and at the final. The muscular tonifying elements included in the program did not determine any muscular hypertrophy.





From the statistical analysis of the data, we observed progress and the symptoms improvement. In the literature there are researches (Hides, et al., 1996; Leinonen, et al., 2003) which suggest that the optimizing of the muscular status for low back pain is an efficient strategy. Though, these studies do not make a clear reference at the analytical muscular tonifying, like our study.

### Conclusions

The study results shows that doing active against a resistance exercises, like in the experiment program, for 2 weeks (10 sessions) is equal with the pain decreasing and an important improvement of the well being of the patients diagnosed with lumbar disk hernia. Probably this fact is due to muscular flexibility and neural mobility (Calotă, 2016).

The hypothesis is confirmed: a moderate body-building and the patients activism (versus prolonged rest) have as a result the symptoms amelioration.

### Aknowledgements

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