

MODERN APPROACHES IN THE PHYSICAL REHABILITATION OF CERVICAL SPINE

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Abstract: *In this work the variety of methods and techniques of physical rehabilitation of cervical spine with degenerative processes, from classical to eclectic approaches, have been approached and analyzed. On the basis of this program was the principle of combining techniques with neurophysiological effect with postural correction and pain relief, depending on the manifestation of psycho-physical qualities. The kinetic program has been constituted by 17 sessions, each lasting from 60 to 80 minutes depending on the restoring stage. The efficiency of the program was tested with the Myo Test device on two lots of subjects of 12 people, the witness lot (healthy people) and the experimental lot (people with algic cervical syndrome). There has been registered a dynamic increase of the psycho-physical quality indices for both groups, but a significant statistical difference was registered for mobility $t = 1.37, p > 0.05$; stability $t = 1.27, p > 0.05$ and general physical condition $t = 6.83, p > 0.01$; in the experimental lot the improvement being more obvious.*

Key words: *cervical spine, kinetotherapy, psycho-physical qualities, physical rehabilitation.*

1. Actuality and Importance of the Topic Discussed

It is estimated that 80% to 90% of the Western population has an episode of acute back pain at least once during their lifetime; becoming one of the most frequent problems evaluated and treated by kinetotherapists [2].

Causes of problems which involves the back are in the wrong position and accidents occurring during different activities. Last but not least are the degenerative processes at the level of the column, which, unfortunately, appear too early, from the age of 23-25 years old. This

is due more to repetitive daily activity, ie work or service, where day by day, hours in a row we do the same thing, the same operations in the same position. Another cause is age, which results in the physiological and pathological aging of the osteo-arthro-mio-kinetics system [7], [10].

Coming out of the clinical picture of degenerative processes, we can highlight the underlying symptoms: pain (constant nagging, aggravated by sudden movements) and motion disorders in some segments of the spine. According to Kocetkov, it was found that with the aging, the amplitude of motion decreases insignificant, varying, depending on the

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direction of movement, between 10 and 30 degrees. In a group of people of 20 to 30 years old, the mobility in the cervical spine is slightly higher in males, and in the slightly older people group - higher among women. In the case of chronic diseases in the cervical region, decreasing the amplitude is a constant symptom [3], [4], [7].

From the entire spine, the cervical region is the most vulnerable, but it can not surpass the lumbar region that carries the weight of the trunk and takes care of it. The cervical region (neck) connects the trunk and the head, between the heart and the brain. This connection is called by Frederick Matthias Alexander a "primary control panel" that governs the way the rest of the body works [6], [9]. If this connection presents problems, the postural muscles become tense, and those phasics need to work harder to achieve the movement. The result is that, over time, the body loses its grace and suppleness.

To strengthen the "control panel" from a functional point of view, modern technical devices and physical rehabilitation systems, including those computerized and microprocessors, are used lately, using in the real time the biofeedback [2], [4] In Western Europe, the USA, China, Russia and other countries of the world, David's simulators are widely used, which significantly increase the effectiveness of rehabilitation programs in the case of leisures and diseases of the locomotor system, especially of the cervical spine. But passive methods, such as manual therapy, massage, physiotherapy, etc., are not omitted from the recuperator program, but are meant to halt the disorders from the complex point of view [1], [2].

The David Spine Concept system is based on 6 training devices controlled through the computer. One of the devices for the cervical region is David G140, measures the power for extension and

lateral flexion in the cervical area of spine, and trains them. At this device, initially performs the cervical extension movement, then the right lateral flexion, followed by left lateral flexion. In every direction, is executed 20 repetitions of each series. Movements are performed slowly, following the tempo and the amplitude of movement displayed on the computer monitor [8], [9].

Muscle tension relief techniques - is a technique from the manual therapy that uses mild muscle contractions for 5 seconds against controlled manual resistance, from a precise position and in a certain direction, followed by a prolonged stretch for the purpose of muscle relaxation and normalization of articular movement. The muscle contraction is performed by the patient 3 to 5 times in a row [5], [10].

2. Research

2.1. The purpose of research is to improve the process of recovering people with degenerative processes in the cervical area by developing a kinetic program based on David Spine Concept in combination with muscle tension relief techniques.

2.2. The hypothesis of research. It is assumed that the development of the kinetotherapy program based on muscle tension relief techniques in association with the David Spine Concept will contribute to the effectiveness of the process of rehabilitation of people with degenerative processes of the cervical spine.

2.3. The Objectives of Research

- Studying the theory and practice of the content of the process of recovering the psychophysical qualities under the aspect of its efficiency.

- Establishing the optimal structure and content of the psychophysical qualities recovery program for people with degenerative cervical spine disorders.

- Implementation and evaluation of kinetic program based on muscle tension relief techniques in association with the David Spine concept for the recovery and maintenance of the desired effect in people with degenerative diseases in the cervical area.

- Experimental verification of the kinetherapeutic program based on the association of muscle tension relief techniques with the David Spine concept in people with degenerative cervical spine disorders.

2.4. Organization of Research

The research that we performed included a group of 12 people with algic syndrome (cervical discopathy) and 12 who did not show signs of discopathy, aged 25-60 years. This study was conducted in the "Neokinetica" Medical Rehabilitation Center in the period September 2016 - March 2017. The complex evaluation took place at the beginning of the recovery treatment at the end of the kinetic therapy (on average about 4 weeks, 1 month), we used the Myotest Test System as a method of evaluation of the data.

3. Myotest Test System

It is a device for quantifying and validating muscle development during both the training and recovery period. The device is a set consisting of an accelerometer, electronic goniometer, software that allows graphic representation of movement and analysis of muscle activity.

Thanks to the modern software, it is possible the tabular or graphically view of the received data, as well as generating reports regarding performances of the tested individuals that allow the following realization of actions: structuring the training, optimizing the time management, developing the diet, etc. Also, by comparing the data made at different time points, it is possible to identify developments or failures of sports activity.

Criteria for inclusion in the study

Patients diagnosed with cervical, clinical and imaging discopathy were included in the study; patients who were available and were able to obtain at the time of study complete clinical-functional data according to objectives of study.

The repartition on sex, age and medium of provenance of the patients under study is shown in the following tables.

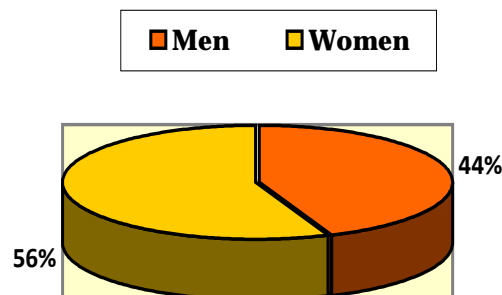


Fig. 1. *Repartition on sex*

The repartition of patients based on cervical discopathy in women. gender denotes a higher incidence of

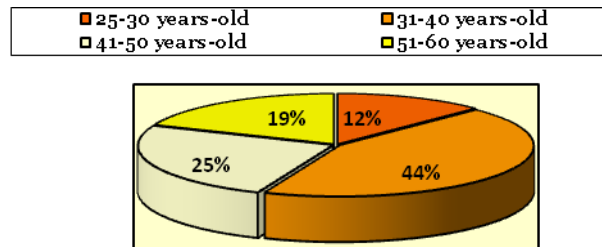


Fig. 2. Composition by age groups of the studied lot

Table 1
Evolution of the statistical data of clinical tests recorded before and after kinetic treatment in the persons enrolled in the study

Psychophysical qualities	Male			
	Gr.	x±m	t	p
Dynamic balance	M	3,81±0,11	1,10	>0,05
	E	2,71±0,92		
Explosive force	M	3,73±0,20	1,61	>0,05
	E	2,12±1,26		
Dynamic mobility	M	3,60±0,21	1,37	>0,05
	E	2,23±0,94		
Stability	M	3,72±0,14	1,27	>0,05
	E	2,45±1,53		
Resistance	M	3,81±0,12	1,48	>0,05
	E	2,33±1,28		
General physical condition	M	18,67±1,22	6,83	>0,01
	E	11,84±2,46		

Regarding the demonstrated results with the Myotest Pro Test System we observe an increase in dynamic of the psycho-physical qualities indices for both groups, but a significant statistical difference was registered for mobility $t = 1.37$, $p > 0.05$; stability $t = 1.27$,

$p > 0.05$ and general physical condition $t = 6.83$, $p > 0.01$; In the experimental lot the improvement being more obvious.

None of the groups reached values of norms, but we can highlight a positive dynamic more pronounced for the experimental group.

Table 2

Dynamics of results according to Copenhagen Scale

Clinical tests	Group	Dynamics of results							
		before treatment			after treatment			t	P
		X ±m	t	P	X ±m	t	P		
Copenhagen Scale	M	18,27±1,03	1,29	>0,05	12,92±0,91	2,89	<0,05	2,79	<0,05
	E	17,87±1,07			7,36±0,85			4,17	<0,001

Note: M – witness group
E – experimental group

Quantitative data (Table 3, Figure 3) of the Copenhagen Scale demonstrate us an improvement in quality of life by significantly reducing disabilities caused to neck pain. The statistical difference for the witness group being $t = 2.79$; $P < 0.05$, and for the experimental group the difference recorded was higher $t = 4.17$; $P < 0.001$.

The statistical data presented above are the results of the comparative analysis of the recorded values until to the application of kinetic treatment and after completion of treatment.

As a result of the conducting experiment, we can remark the effectiveness of experimental program developed by us for the recovery of people with instability and with algic cervical syndrome by:

- the increase of mobility of the cervical spine and general physical condition;
- reducing pain;
- the analysis of Copenhagen questionnaire results demonstrates us an improvement in quality of life by significantly reducing disabilities caused by neck pain.

4. Conclusions

The approach of patients with neck pain is complex and can not yet be subject to a generalized algorithm. The recovery process requires from the kinetotherapist a clear understanding of the column anatomy, a pertinent presentation of the anamnesis and examination, relevant

laboratory studies, detecting of the causes of dorsolumbar pain and the therapeutic approach to improve patient care.

The selection and combination of kinetotherapy methods start from the consideration that the stability of the spine is not due nor the conformation of the articular extremities nor the capsulo-ligament formations, which are insufficient passive elements of support, but to the periarticular muscle groups. On the other hand, it was found that precocious mobilization is superior as a result of prolonged immobilization which ends with muscle atrophies.

Through the used therapeutic means, a pain reduction occurred in all patients at all stages of the assessment, with the indication that the reduction in the pain parameter was significant, regardless of the gender and age group of the patients.

Any kinetic treatment at the level of the cervical region entails restoring the functionality of this segment under the conditions of a muscular force, stabilities and movements controlled at this level, with the preventing neurological complications and increasing the quality of life.

Through the obtained results we have succeeded to emphasize the role of the kinetotherapist in functional evaluation and recovery of the consequences due to cervical suffering in order to substantiate the objectives, methods and kinetic means within the complex functional recovery program.

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