

# Approaches and Models in Special Education and Rehabilitation



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THEMATIC COLLECTION OF INTERNATIONAL IMPORTANCE

### Approaches and Models in Special Education and Rehabilitation Thematic Collection of International Importance

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## APPLICATION OF TRAINING TECHNOLOGY PROGRAMS AND DOSED, PLANNED, PHYSICAL ACTIVITIES FOR CARDIOVASCULAR PATIENTS WITH IMPLANTED CORONARY STENTS

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#### **SUMMARY**

Training technology, as a method of choice in post-operative therapy of patients with implanted coronary stents, has given results, primarily due to the non-invasive nature of the therapy. Humans, as kinetically dependent beings, are familiar with the nature of movement Professional guidance and planned procedures use the nature of human motoric values in order to full recovery. The individual physiological characteristics of all patients are also crucial. Subjective analyzes contributed to the objective values of each patient. Hypokinetic syndrome was a common feature in all patients, which implies that as the main etiological factor of cardiovascular diseases, it must be the focus of attention in the therapeutic part of the treatment. Dosed exercises, professionally monitored, aim to initiate the physiological norms of the organism. By initiating physiological processes and encouraging the creation of an adequate oligo-structure, the organism, as a functional and complete unit, is given space for self-healing, to achieve the oligostructure focuses on the location that is deficient in the human body. The cardio part of the therapeutic program is based on natural movement for these reasons. The movements that patients are exposed to, while working on a treadmill or static exercise machine, such as a bicycle, simulate natural, innate and non-invasive movement. In the aerobic part, which includes shaping exercises, continuous and dosed contraction of smaller muscle groups is stimulated. Their activation stimulates an oligo-structure that contributes to adequate systemic reperfusion. The individual sensations that patients feel in the very process of training technologies give room for the detection of secondary problems that are not related to the cardiovascular system. The observed problem with the cervical spine, endocrinological problems, as well as pathological phenomena in the locomotor system, contribute to the confirmation of the thesis that the organism must be treated as a whole structure. Functionally, in both of physiological and pathological processes, by opening the cardboard - physiological diary, precise anamnesis, adequate medical documentation and concise monitoring of the patient, an error in the assessment of physical status is prevented and a clear physiological picture of the patient's status is obtained. Pedagogically and psychologically acceptable approach, the therapist towards the patient contributes to the adequate assessment of all parameters included in the analysis and prevents the impact of anxiety in patients on the goal of therapy. Cardiovascular patients do not have basic medical knowledge, but are informed about the essential function of the heart muscle in existence. When all the parameters in the approach to the patient, work with the patient and thorough monitoring of the obtained data are respected, the therapeutic application of treatment technologies gives concrete results.

Key words: training technologies, cardiovascular patients, dosed exercises, hypokinetic syndrome, coronary stents

#### INTRODUCTION

Cardiovascular diseases are increasingly present, both in Serbia and in other parts of the world. According to the official report of the Ministry of Health of the Republic of Serbia - Dr. Milan Jovanović Batut, mortality caused by heart diseases is significant and the first in terms of mortality statistics, patients suffering from cardiovascular diseases. In Serbia, about 55,000 people die of heart diseases every year, which is the size of population of a small town. The main cause of diseases of the cardiovascular system is lifestyle, increased stress and low hygienic living conditions. In the last thirty years, the importance of prevention has been increasingly pointed out, for which we are obviously late, but prevention programs are proving necessary in immediate treatment. The recommendation of official institutions and the World Health Organization is that the promotion of healthy lifestyles must be persistent, persistent to the level of immediate adoption by a wider population. Bearing in mind the development of health problems and the necessity of the connection between science and the profession trough practice. Thirty-four years of work and therapeutic experience with training technology, resulted in the formation of a program that has the task and goal to adjust the dosed physical activity to all age categories and all health conditions with prevention, correction, therapy, revitalization, rehabilitation, recreation, sports recreation and professional sports. Since not every physical activity is always dedicated to health and can often cause damage, it is necessary to adhere to the rules of training technology. Physical activity must be dosed, planned, professionally guided and applicable. Any improvisation or lump sum assessment can cause a risk zone and a contra-indication zone. Certainly, in the therapy of cardiovascular patients with implanted stents, dosed and controlled physical activity is recommended. Dosed physical activity is also used in the prevention of potential complications. All patients are advised to exercise accurately and in moderation. In the deficit of knowledge and motor-adequate condition, patients often improvise, practicing an exercise that they remember, invent or uncritically copy. Improvised work gives improvised results, which is inadmissible and strictly ethically forbidden in working with such patients. The preventive moment of work with cardiovascular patients is based on the prevention of further potential complications. The therapy is based on stimulating the reperfusion of damaged parts of the cardiovascular system, while the diagnostic part of the procedure is reduced to the perception of secondary systemic disorders. Given that cardiovascular, endocrine, locomotor diseases are the result of neglect of a human as a whole functional unit, the focus of the profession must be focused on a human as a whole functional unit. Anxiety and fear are often noticed in communication with the mentioned type of patients, because lay information has its share in the psychological status. This parameter is considered, to when working with patients. A frightened patient cannot provide evaluative accurate data during the program. In this regard, a pedagogical approach is necessary. Also, in addition to the therapist's approach, there is also an adequate ambience, an exercise site, which must be prepared and hygienically adequate for use (exercise room).

#### MATERIAL AND METHODS

The sample of this research consisted group of subjects after cardiac surgery with implanted coronary stents, aged between 40 and 75 years. The heterogeneous structure of patients was involved with individuals of different social status, professional activities, gender, living environment, and personal good or bad habits. What was common to all patients in the heterogeneous group was an identical or similar cardiac diagnosis. The patient sample consisted of 41 subjects, while the initial number of respondents was over 50.

CARD	CARDIO-VASCULAR PATIENTES (CORONAR STENT)								
I.D.	GENDER	YEAR OF BIRTH	PROFESSION	INCLUDED	DISCLUDED				
M.A.	Female	1940	Worker	YES					
S.P.	Male	1950	Pensioner	YES					
S.K.	Male	1952	Worker		YES				
LJ. K.	Male	1949	Pensioner	YES					
M.N.	Male	1951	Worker	YES					
Ž.B.	Male	1949	Lawyer		YES				
LJ.Ž.	Female	1950	Professor	YES					
B.A.	Female	X	Medical Worker	YES					

In accordance with this data, the number of patients who gave up participating in the program process was also a reference. The reasons for withdrawing from the program were different. Most often, giving up was explained as saturation from the clinical, exhaustive environment of practice and trust in alternative methods of post-operative therapy. The analysis includes already existing diagnoses, initial and control examination by a specialist doctor. Patients submitted photocopies of medical findings that were a part of the cardboard - physiological diary. The process of working with patients consisted of the following phases: opening a medical record, noting down patient's medical history, program proposal, survey of patient's previous knowledge on the subject, initial measurements at the training technology center (body weight, body height), initial measurements that the patient records at home (pulse, blood pressure, body weight over a period of 7 days), initial tests (3), adaptation to training procedure (10 sessions), adaptation to training procedure (21 sessions) and the analysis of achieved results.

### Medical recording documentation

#### -Physiological diary-card-

In this part of the program we get to know the patient better. Through conversation we come to subjective and objective data about the patient, and the data is recorded. In order to thoroughly process the clinical picture and therapy of all patients, physiological diaries-cards were opened, with all relevant data.

#### Medical history

The patient submits all medical documentation. Through conversation, he or she describes his subjective difficulties and the time when they happened. He or she describes the problems, orally and subjectively. He or she reports the presence of allergies, previously prescribed medications, medical data that are not related to the current diagnosis, as well as bad habits (smoking, alcohol consumption, diet).

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#### Initial measurements taken by the patient at home

The aim of this part of the test is to assess the level of stress to which the patient is exposed during 24 hours, which is seen by oscillations in pulse and blood pressure, as well as stomach volume, followed by oscillations in morning and evening body weight. By measuring these parameters at home, in the morning and in the evening, in an environment that is not psychologically invasive, the results can be compared with those during the application of training technologies.

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#### Program proposal

Working with cardiovascular patients with implanted stents, caution is of a crucial importance. A simulation of natural motion is proposed which must be continuous and accurate. Therefore, exercise machines that simulate natural movement (treadmill and stationary bicycle) and aerobic exercises in accordance with the patient's motor abilities are proposed. Patients directed to the training technology center were thoroughly treated. A recognition of patient's comprehensive and thorough medical history was crucial, as all cardiovascular patients already had or have a secondary diagnosis. In cooperation with the competent clinics and attending physicians, individual programs have been created.

#### **Information survey**

The survey provides valid information about how well the patient actually understands the entire exercise process - what does he or she think about it and how much does he or she know. This part of the opening of the physiological diary-card, gives the therapist the necessary information about the previous physical status of the patient. The goal is to acquire the objective information precisely and adapting the individual program to them. Essentially, written patient survey contributes to objectivity of the application of the professional methods.

#### **Initial measurements**

The patient reports his or hers weight and height, since the last subjective measurement of body weight and height. The obtained data are compared with the measurements that are practiced at the first entry into the gym and diagnostics. Initial measurements are based on body weight, body height, chest circumference, waist circumference, forearm circumference, upper arm circumference, lower leg circumference, and upper leg circumference. Essentially, the current morphology of the body is analyzed in relation to the reported one. Patients were informed about the necessary equipment for the analysis process. Therapists insisted on clean gym shoes, shoes and a clean towel. The upper part of the tracksuit was supposed to be long-sleeved for the purpose of personal hygiene and maintaining thermoregulation. Thermoregulation had been explained to patients as the prevention of potential colds and the preservation of body heat. Appointments for working with patients were organized in such a way that the absolute attention of the therapist was directed to the patient, so that three appointments were scheduled per appointment. The time required for adequate testing was about 45 minutes to an hour. In accordance with these criteria, patients scheduled their appointments.

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Обим струка			
Обим бокова			
Обим кукова			
Обим надлактица			
Обим подлактище			
Обим надколенице			
Обим подколенице			

#### **Initial tests**

First initial test consisted of treadmill or static bicycle. Upon the arrival at the first initial test, the patient is introduced to the plan and program throughout conversation. He reports his subjective feeling and mood. By completing a survey based on general information about training technologies, healthy habits, bad habits and routines, he orally submits the information that the therapist should be familiar with during the implementation of the program. The patient's initial resting heart rate is measured. It is referred to the plan and program of the scheduled test.

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The test consists of a cardio and aerobic part. The cardio part of the test uses training machines that simulate natural, non-invasive movement. Treadmills and static bicycles are the training machines of choice in this segment of the test. In the first part of the test, the patient goes through a 12-minute sequence on a treadmill, measuring the pulse every 2 minutes. It is important to point out that the patient should be gradually and accurately introduced to work on the treadmill and bicycles in order to prevent potential injuries and adapt to the proposed motoric task. Also, the subjective feeling of side effects (discomfort, insecurity, dizziness, unusual movement of the surface) is monitored during the entire period of 12 minutes and affects testing and monitoring. In the testing process and exercise programs, we also considered as a significant factor the subjective feeling during the effort, especially in the period of adjustment to the effort, where the motoric and functional value must be adjusted and adopted by patients.

The second part of the initial test consists of shaping exercises, natural movements that encourage adequate redistribution of the oligo-structure acquired during the first cardio test. Shaping exercises are based on natural movement, manual dexterity and motoric compatibility. Through shaping exercises, subjective sensations are also analyzed, which patients mostly express in the form of pain, muscle tension, and a subjective feeling of weakness. Since the exercises themselves are based on natural movement of moderate intensity, it is often concluded that this is an adequate demonstration to the patient, and even to the therapist, about the evident physiological neglect of the whole organism. It should not be forgotten that the dosed load on the muscles is a real indicator of the condition that the patient should be aware of, which also gives the therapist the information, what information he has at his disposal in the further process. After the second part of the initial testing, the pulse is measured. Pulse is measured after exertion and during the period of active rest.

The third part of the initial test is based on repeated cardio testing. With the repeated test, the patient, already familiar with the training machine, was introduced to the process training survey. He or she feels relaxed working on a training machine that is close to him or her through his or hers already motorized natural movement. Pulse is measured every two minutes for a period of 12 minutes. Subjective feeling should not be neglected because the main determinant for status assessment is the moment of functional and motoric failure. The psychological moment of satiety and boredom in this part of testing should not be neglected either. By stimulating the endocrine system in the process of reactivation of the whole organism, patients can compensate for their confusion, with what their physiological accuracy is, by quarrelsome behavior and rhetoric. The speed and load on the training machine are slowly decreasing.

The goal of a non-invasive end to training is to introduce the patient to a relaxing-passive rest. After passive rest-relaxation, oligo-structurally, the patient is inspired by the situation, communicative, physiologically awakened and as such has the first non-professional insight into his physiological state. Functional and motor failure at the end of the third part of the initial test are the clearest demonstrations of physical status. Passive rest-relaxation means reperfusion of the whole organism, bringing the body into the position of the physiological horizontal of the spinal column and stimulating the necessary oligo-structure for complete recovery of the organism. Large muscle groups relax and ventilation and respiration stabilizes. By measuring the pulse at the end of the relaxation and comparing it with the pulse at the beginning of the test, the fatigue of the heart structure after physiological effort is determined numerically.

After completing the first test, the patient is assigned the next date for the continuation of the program, the second initial test (treadmill or static bicycle). In the second session, the patient is partially acquainted with the methodology of work. He has his observations and conclusions, which he explains to the therapist. It is targeted that in agreement with the patient, the interval between the first and second initial test should not be longer than 72 hours.

#### Principles of testing

#### 1. Treadmill

The treadmill simulates a natural movement that the patient is already familiar with. The dosed speed of the machine is adapted to cardiovascular patients. The speed at which the patients, during testing, move on the lane is in the range of 2.0, 2.5, 3.0 to 3.5 km/h, depending on the realistic capabilities of the patient. It is important to emphasize that oscillations from 2.0 to 3.5 km/h are not contra-indicated but are objectively exposed to the assessment of the patient's capabilities.

#### 2. Static bicycle

Levels indicated on a bicycle, depended on the manufacturer of the training machine, range from the basic first level, to the third. The continuity of revolutions should be maintained in the interval from 65 to 70 rpm (revolutions per minute).

#### 3. Shaping exercises

Number of muscle contractions in this segment is over 4000. Contractions were concentrated in the therapeutic order. Small muscle groups that are inactive during daily division are targeted. Number of exercises, proportional to the possibilities, which determines the moment of motoric failure.

#### Adaptation to effort

After the first initial tests, the patient is in the comfort zone. He or she is familiar with the training machines and the exercise program. In this therapeutic part, the patient adapts to his motor and functional capabilities. He practices his own, natural, movements and adapts them to him- or herself. By maintaining the physiological determinant of the organism, recovery occurs, the same as a whole. After completing the program, patients are referred again for consultation with the attending physician at the cardiovascular clinic. The measure of results, the application of training technology programs is depicted by the improvement of the general condition of the patient, as well as the accelerated dilation of blood vessels. Also, in the process of tests, dysfunction of other systems in the body was diagnostically noticed. Locomotor and endocrine system.

#### Results of medical benefit

**Objective values**. Measurement parameters: Having in mind the heterogeneous structure of patients based on age, sex, social status, profession and causes that led to this condition, healthy and bad habits, we used medical documentation for the application of dosed load in the constant presence of a competent doctor, as a consultation. And checking the results achieved. Since these are heart patients who need to improve their physical status and functional values in the body, we used standard tests and methods.

We also measured the complete capabilities of the organism and the mobility of the bone and joint system.

Results of the secondary analysis - 100% problem with the cervical spine in the diagnostic procedure for assessing physical status, we came to significant data that in 100% of cardiovascular patients, there is also a problem with the spine, especially on the cervical spine - kyphotic condition And spondylotic changes in the spine. Since this is important in our training technology, with this method we have achieved that through the program of revitalization of the cardiovascular system we also do the therapeutic part for cervical spondylosis, which is absolutely compatible and without the presence of contraindications.

In 80% of patients we noticed metabolic problems, so in order to solve the problem more completely, we consulted the Department of Metabolic Diseases with Dr. Prof. Vesna Dimitrijević Srećković, who confirms our observation and gives a complete proposal for raising the quality of life through diet (Mediterranean diet), regular endocrinological examinations and consultations, as well as the introduction of new lifestyles. - Complete control of cardiologists During the application of training technology, we had the support and complete logistics of the Institute for Cardiovascular Diseases of Dedinje and the competent doctor, cardiologist for this group of patients Dr. Milijana Balević.

	CARDIO-VASCULAR PATIENTES (CORONARY STENT)								
I.D.	SEX	YEAR OF BIRTH	PROFFESION	POST-OPERATIV DIAGNOSIS	GENERAL DIAGNOSIS	LOCOMOTOR PATHOLOGY			
M.A.	Female	1940	Worker	STENT		SPONDYLOSIS			
S.P.	Male	1950	Pensioner	STENT					
S.K.	Male	1952	Private worker	STENT					
IJ.K.	Male	1949	Pensioner	STENT	INDICATED FOR CARDIO-VASCULAR SURGERY				
M.N.	Male	1951	Worker	STENT					
Ž.B.	Male	1949	Worker	STENT		SPONDYLOSIS			
IJ.Ž.	Female	1950	Educator	STENT		OSTEOPOROSIS			
B.A.	Female	X	Medical doctor	STENT		LARDOSIS			

#### DISCUSSION

This is a group of patients which is very sensitive to physical exertion and where physical exertion often causes cardiovascular complications. In order not to get into the risk and harmfulness of exercise, it is necessary to diagnose the existing realistic condition and the process of motor reeducation and accustoming the patient to the newly created situation. Memories of exercise are extremely strong, powerful and often a problem, especially when there is a subjective assessment of the patient and inspiration for movement. It further complicates the procedure of revitalization of stress, the impact of stress, life habits where stress is present, which is also provided by training technology in the chapter on the importance of exercising in an anti-stress program. It has been proven in our scientific research that motoric skills and functions in the body occur gradually, that in the beginning there is no significant statistical difference, but at a longer distance, a statistically significant result appears, which indicates more complex characteristics. It is that the patient has changed the way,

lifestyle, habits and is in the zone of accepting a healthy life as a need, not an obligation which is the goal. In the assumptions of possible errors in working with such patients, we suggest gradualness, consistency and the exclusive load provided by the training technology.

#### CONCLUSION

Dosed, precise and objectively monitored exercise gives results in both prevention and post-operative rehabilitation of risk target groups. *Restitutio ad integrum* (full recovery) is a possible goal, only with the absolute cooperation of patients, prescribers, therapists and consultants. The correspondence of all the mentioned participants in the process of therapy is important, but the cooperation of the patient stands out as crucial. The methodology would give results through models only if it encounters an adequate response of patients in the form of will, desire and desire. Patients who participated in the project were factors of pathologically homogeneous group, heterogeneous natural status (sex, age, occupation).

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