MINISTRY OF EDUCATION
NATIONAL UNIVERSITY OF PHYSICAL EDUCATION AND SPORTS OF BUCHAREST
DOCTORAL SCHOOL

COMBATING THE EFFECTS OF SEDENTARISM BY USING EMS FITNESS TECHNOLOGY

SUMMARY
THESIS

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Abstract
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Introduction

Educating and training the population must be a priority of the society we live in, which is constantly changing. Because of intellectual overload and stress, which are increasing in every person's daily life, the training of the individual must aim a physical, mental, moral and aesthetic development in harmony with society's requirements.

The main objective of the present paper is to investigate what is known to date on early sports and physical education planning, on population health models and their relationship with young adults.

In this thesis, we aimed to highlight how the use of EMS (Electrical Muscle Stimulation) technology through fitness can influence physical condition. Special attention has been paid to the impact of the environment on the evolution of individuals. The opportunity to use EMS training through fitness exercises depends on the people's standard of living and their general level of knowledge.

Through this scientific approach, we want to highlight the effectiveness of the means of action created by EMS fitness technology to combat the effects of sedentarism and increase interest in the potential of practicing in free time. In addition, we aim to alert decision makers to the possibilities of using EMS fitness equipment in performance sports.

The actuality of the subject

The benefits of EMS Fitness technology for improving physical condition are widely debated in the specialized literature, the influence of physical exercises on the somatic, functional, motor, social and psychological development of the individual being recognized. At the same time, electrical muscle stimulation training through fitness exercises offers unique frameworks for emotional and even spiritual experience, favoring passing through certain postures that cannot be created by other types of activities.

In order for people to enjoy the increased efficiency of EMS technology through fitness exercises, in order to improve their physical condition, it is necessary that the environment in which they live allows such a way of life, both in terms of material funds and human resources.

Physical exercises, in general, can be done regularly, in different forms appropriate to the age of the individuals. In communities where there are no visible differences between populations in terms of education and access to information, the concept of EMS is used in relation to leisure or performance sports, becoming part of people's lifestyle.

In this context, we consider the theme of this thesis to be important and current, in which we aimed to signal the effectiveness of using EMS technology, because, nowadays, individuals no longer have enough time to regularly practice a motor activity. But EMS technology is an advantageous option, because 20 minutes of XBody training is equivalent to 2-3 hours of training in the gym. In Romania, the negative socio-economic repercussions on the accessibility of EMS Fitness programs led by a specialist are a reality that is difficult to combat outside of policies that are required to be implemented at the system level. The initiation of specialists to the training of people in EMS motor activities can be a first step through which XBody physical exercise is a choice for everyone, so that everyone can explore the benefits of EMS technology in performance sports or in sports for all.

The motivation for choosing the theme

The topicality of the theme resides in the need to adopt a healthy lifestyle, in which movement and participation in electrical muscle stimulation training through fitness exercises has a special role. At the same time, our experience in conducting and organizing EMS fitness trainings can help us identify the importance of participating in such trainings.

Practicing physical exercises, in any form, has positive effects on a person's physical and mental health.

The beneficial use of physical exercise should be complemented by the pleasant spending of free time by participating in XBody workouts.

This theme was addressed to emphasize the need for greater attention, from the decision-makers, in the direction of combating the effects of sedentarism in the urban population, through the means of action created by the EMS fitness technology. Also, the thesis author's own experience, as a fitness specialist, physical education and sports teacher, but also as an athlete, supported the motivation for this project.

Part I of the thesis

The theoretical foundation of the work

This part of the work includes four chapters. The first chapter is called *general and specific aspects regarding combating the effects of sedentarism by using EMS fitness technology* and includes two subchapters, the second chapter is titled *EMS fitness technology*, the third chapter describes *sedentarism* and the last chapter includes *the conclusions of the theoretical foundation*.

The word *fitness* is a noun that etymologically comes from the English language, where it means contour (in our case, physical contour), and the term *fit* is an adjective and translates as in shape. This concept entered everyday terminology relatively recently. By fitness, we mean a set of physical exercises, including strength training, stretching and cardio training. "*To be in shape*" means "*to be in good physical condition".* In the general understanding of experts, fitness refers to a system of work tools and physical training, the purpose of which is to acquire a good physical condition. Often, this is stated simply, as the state of well-being that associates a special physical condition with strong and motivated thinking, with a mental state and positive emotional responses, creating self-respect, with an adaptation and continuous social interrelations, generating personal and implicit progress of the entire population.[1]

Electrical muscle stimulation (EMS) has been widely used in physiotherapy for decades with excellent results. Using it as a full body training method provides the perfect combination of high efficiency strength and cardio training.

EMS technology is considered by some authors to be a training method for increasing strength-endurance and maximal strength, and by others, a method of muscle relaxation or a post-traumatic recovery method, from which we can deduce that electrostimulation raises many controversies between its detractors and its followers.[2]

The terms *exercise*, *fitness* and *sedentarism* have been defined and interpreted differently throughout history.

The *sedentarism* is associated with adverse health outcomes that differ from those attributable to a lack of moderate to vigorous physical exercise.[3]

In general, physical exercise is defined as any body movement produced by skeletal muscle that requires energy consumption.

The conclusions of the first part of the thesis are as follows:

- From the specialized bibliographic research related to the topic of the doctoral thesis, we deduced that both the health risks and the health care costs, damaged by the association with overweight and obesity, are considerable.

- The study of the specialized literature confirms that practicing EMS fitness training at most twice a week has an essential role, through

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[1] Hidi, I. (2014). *Fitness – Metodica antrenamentului pe ramură de sport*. Discobolul, p. 34.
[2] Tudor, V., & Crișan, D. I. (2007). *Forța – Aptitudine motrică*. Bren, p. 116.
[3] Tremblay, M. S., Colley, R. C., Saunders, T. J., Healy, G. N., & Owen, N. (2010). Physiological and health implications of a sedentary lifestyle. *Applied Physiology, Nutrition, and Metabolism, 35*(6), 725-740. https://doi.org/10.1139/h10-079

their benefits, in maintaining an optimal state of health and forming a healthy lifestyle.

- We believe that an important role in the development of EMS fitness technology is the online advertising program used both internationally and nationally for every XBody workout with the goal of attracting as many people as possible.

Part II.

Preliminary research on combating the effects of sedentarism by using ems fitness technology

The purpose of the research

Through this research, we want to contribute to the formation, among the population, of frequent participation behaviors in EMS fitness training, which is necessary for a harmonious physical and mental development, the formation of a healthy lifestyle and pleasant leisure time.

Research objectives

In order to realize our project in good conditions, the following objectives were formulated:

- performing a confirmatory research regarding the EMS fitness training mode;
- identifying the main effects of EMS fitness training in combating subjects' sedentary behavior;
- establishing and verifying the possibility of appreciating of the training activity with work tools such as measuring components;
- investigating the level of somatic development of the study participants;
- • analysis and interpretation of the results;
- • carrying out the experiment, which aims to confirm or disprove the research hypothesis;

- highlighting the changes that occurred as a result of our scientific approach.

Research tasks

To fulfill the proposed objectives, the following tasks were established:

- consultation of specialized literature;
- determining the subjects that will be subject to research;
- determining the duration of the experiment;
- determining the parameters to be evaluated: age, weight, waist (structure), BMI, percentage of adipose tissue;
- applying the Squat Jump test to monitor the strength of the lower limbs;
- creating personal files for each participant;
- designing and applying the training program;
- registration, ordering and processing of the obtained results;
- creating tables and graphs.

Preliminary research hypotheses

The use of training based on the implementation of EMS fitness technology can lead to the improvement of the body mass index and the development of the strength of the subjects.

The work started from the hypothesis that, in the case of adults, combating sedentarism is generated by maintaining the body mass index at a normal value, not necessarily associated with intense physical activity, and this ideal or desire can be fulfilled with the help of the XBody technological program.

Stages of preliminary research

The stages of the preliminary research were permanently monitored, at the end of each one, measurements of the monitored parameters were carried out, and the results were recorded, processed and statistically interpreted. These stages were:

1. Selection of participants – in which all subjects included in the preliminary research program were identified and followed.

2. Initial testing stage – in which the first motor and somatic measurements were performed.

3. The period of application of the XBody training programs – during which the participants performed the proposed means of work.

4. Intermediate testing part – intermediate measurements were made based on data interpretation and statistical processing.

The tests took place at the XBody Titan Center in Bucharest, sector 3. As previously mentioned, the study was conducted on 60 people practicing fitness training using the XBody suit. The research took place over a period of 6 months, between November 2020 and April 2021.

Conclusions part II.

The research revealed that the efforts made, combined with the use of XBody EMS technology, led to an improvement in the body mass index, therefore to a (much) better physical condition, according to the results obtained in the Squat Jump test. The confirmatory experiment performed validated the research hypothesis, namely that directing the body mass index to a normal value can be achieved with the help of the EMS XBody equipment.

Our questionnaire survey method indicated that XBody exercise practitioners and Sports Science and Physical Education professionals believe that using EMS fitness technology helps combat the effects of sedentarism.

PART III

Experimental research on the role of using ems technology in improving physical development and motor skills to combat the effects of sedentarism

The purpose of the research

The purpose of this research is to contribute to improving the physical development and motor skills of the population of Bucharest and of the population living around the capital, by using EMS fitness technology and XBody Titan training equipment, and thus helping to combat the effects of sedentarism.

Research objectives

The main objective of the research is to combat the effects of sedentarism by using EMS fitness technology, improving the general condition by reducing body fat (BMI) and body remodeling in sedentary people, using the specific means of XBody trainings.

Research hypotheses

1) The regular use of the XBody Titan programs of leisure activities will determine positive effects at the motor, functional and morphological level, improving at the same time the body mass index of the subjects participating in the research.

2) Completing the XBody Titan programs, which include specific exercises from fitness and gymnastics, depending on the motor and morpho-functional characteristics of the subjects, will lead to physical development and the formation of skills for constant practice of EMS fitness training.

Research methods

The research methods used are the following: *Bibliographic documentation, Observation method, Measurement method, Test method, Experimental method, Statistical-mathematical method, Computer graphic method.*

OPERATIONAL APPROACH OF THE RESEARCH

The experimental research was carried out on 40 subjects, who were selected from sedentary people aged between 21 and 47 years, and who were included in an XBody physical training program with specific means of EMS technology, during which specific exercises from fitness and gymnastics were performed.

The research included tests carried out at the XBody Titan Center, namely: anthropometric measurements, a test to assess the motor quality "strength", called the Wall Test, as well as four tests from the battery of the Optojump device, and at the end, a Research Participant Satisfaction Questionnaire was applied.

The initial testing and the final testing were carried out at the Xbody Titan Studio in Bucharest, using the Optojump technology, which was brought from the Interdisciplinary Research Center "Dr. Alexandru Partheniu" of the National University of Physical Education and Sport of Bucharest.

THESIS CONCLUSIONS

According to specialist studies, using XBody EMS technology is an effective strategy and a good alternative for prevention, re-education and training. After a surgically healed injury or injury, the XBody EMS method contributes to the healing of muscle atrophy, allowing the maintenance of muscle groups.

Our study highlighted the fact that the combined efforts made in XBody training led to an improvement in muscle mass, respectively to a better physical condition.

The XBody EMS programs applied to the research subjects had the effect of improving the muscle strength of the lower limbs and increasing the percentage of active mass, by decreasing the percentage of adipose tissue.

We can state that the general physical condition has improved through the development of physical fitness and its components.

EMS fitness training aimed at combating sedentary behavior, which was applied via the XBody device, led to improvements in lower body strength, having a direct impact on the obtaining of superior results by the subjects participating in our research. Thus, we consider that ***the results obtained in the final testing validate the EMS fitness training program proposed for this doctoral thesis***.

Recognition

The doctoral thesis with the title *Combating the effects of sedentarism by using EMS fitness technology* was developed under the auspices of the National University of Physical Education and Sports of Bucharest, within the UNEFS Doctoral School, during the university doctoral studies.