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FUNCTIONAL TRAINING OF WATER RESCUE GUARDS AND ENDURANCE IN THE COOPER TEST

The dissertation "Impact of the functional training on endurance development" focuses first on the description of functional training, its definition and assumptions. The theoretical part is followed by the description of forms of the functional training, how this training should look like, what accessories and training forms can be applied and foremost why this type of training is worth exercising and what positive changes in our body it can cause. Next part of the dissertation focuses on endurance, its description, different types of endurance and methods which can enhance it. Also the references to the dependence between different types of endurance in different sport disciplines especially focusing on swimming endurance are described in this work. The second paragraph of this dissertation includes the methodological aspects of this work, materials and research method which was applied. The third paragraph analyses the results of the research and presentation of a few dependences between them. The last part of the work gives a summary and conclusions regarding stated earlier research questions and the aim of the work.

***Keywords**: functional training, endurance, swimming endurance, the Cooper test, water rescue guards.*

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1. INTRODUCTION

Swimming and personal training or training at the gym are aspects of sport that are strongly interconnected. In most sports disciplines, it would be necessary to introduce variety into training and have a comprehensive impact on the body and develop all types of necessary motor features that are needed in a given discipline[1, 12]. Training loads appropriately adapted to the athlete should bring positive results and satisfactory improvements in exercise results [2]. Motor skills that are developed during functional training, i.e. muscle sensation, strengthening of deep muscles and stabilization, are perceived by most people as something very easy and not requiring time [1, 3]. However, without mastering the basics to a perfect degree, it is impossible to master more complex movements or movement sequences at an advanced level. The basics of training are very important and by taking care of the basic elements you can improve your sports achievements, even during your sports career [10]

2. A DEFINITIONAL APPROACH TO FUNCTIONAL TRAINING

Functional training had its origins in the United States and was initially derived from forms of physical rehabilitation and was associated with restoring balance and returning the general fitness of the human body [6, 10]. The advantage of using multi-joint exercises in this type of exercise is strengthening the entire muscle corset, which is the basis for the proper and dysfunction-free functioning of our body, reducing susceptibility to injuries, overload, or pain due to proper movement habits and the way of performing these basic activities in a healthy

way for the body...Very often, the use of this type of training has corrective benefits for our posture, which is one of its assumptions [8]. In addition to general improvement in the functioning of the body, we can eliminate or even get rid of contractures, and thus increase our mobility, range of movements and their freedom. In functional training, we do not use heavy loads, we focus mainly on working and coping with the weight of our own body, only supporting ourselves with low-weight devices, because the idea of this training is not to build muscle tissue, but to shape correct movement patterns and muscle sensation, which is the basis for proper performance of exercises, but very often omitted and neglected during strength training [5, 12].

3. FORMS OF FUNCTIONAL TRAINING

One of the forms of functional training is the previously mentioned FMS (Functional movement system), which, apart from testing the level of functionality, is also a form of training, and the seven tests it consists of are the basic exercises performed in this formula [4]. The aim of this form is to assess and improve the quality of movement and movement patterns; joint mobility and neuromuscular coordination are also assessed. FMS, thanks to the use of basic movement patterns, is able to determine the sources of asymmetry and incorrect functioning of the musculoskeletal system and introduce appropriate exercises and variants of these exercises aimed at eliminating these dysfunctions in the muscles and joints. Another form of functional training, the most common one, is circuit training. It is carried out according to the principles described in the previous chapter, where the time for performing a given exercise at a specific station is precisely defined, the method of performing the exercise at each station and the rest time between sets are precisely defined [2, 9, 13]. During this type of activity, many devices are used, which were also mentioned in the previous section, which is intended to maximize the intensification of the exercises, diversify a specific exercise, which precedes a change of the device, or the way of guiding the arms, legs or other positioning of the torso can be performed for many different ways, with each subsequent way of performing this exercise engaging different muscle groups to a different extent and, therefore, engaging specific muscles to a different extent [2, 7]. Another form of functional training may be the so-called "CrossFit" training, which has become increasingly popular in recent years. This is not a typical form of functional training, because many CrossFit exercises are based on working with barbells, kettlebells or other accessories, but there is an equally large pool of exercises based on working with your own body weight, which is a very high-intensity training based on on multi-joint exercises and significantly improving the body's aerobic performance [11].

4. ADVANTAGES OF FUNCTIONAL TRAINING IN EVERYDAY LIFE

Functional training, its impact on the human body, is visible in everyday life in many aspects and on many levels, and therefore brings many advantages that additionally make it attractive and worth recommending to many people. The positive impact of this type of activity can undoubtedly be noticed thanks to external, visual factors. At first glance, thanks to the high intensity and lack of visible expansion of muscle tissue, the level of fat tissue is reduced and muscle contours will appear, hence the positive impact of training on the visual aspects of the person practicing it. Also the issues of the fitness of our body, thanks to the use of multi-joint exercises and the involvement of a large number of muscle groups, and basically our entire body, our basic motor skills are developed, i.e. strength, speed, coordination, endurance, flexibility. Our physical condition and performance abilities of the body improve significantly, and thanks to increased flexibility, our range of motion in the joints increases, existing contractures disappear, the freedom to perform simple everyday activities increases and, most importantly, thanks to the strengthening of the deep muscles and CORE muscles, the functioning of our spine improves significantly, it is less burdened, and thanks to the protective layer of deep muscles, it can perform everyday activities longer with greater freedom and without any discomfort or pain at the end of the day resulting from overloading the spine. All previous spine or back pain was caused by poor development of postural muscles, which are a very important element of healthy functioning.

5. GENERAL ENDURANCE IN RESCUE

A sports discipline that should be considered in the context of developing specific types of endurance is swimming, and especially water

rescue. Generalizing rescue as a discipline without division into styles or distances, it can be said that a high level of each type of endurance described so far is necessary to achieve favorable results. The rescuer should have high endurance due to the type of energy transformations taking place in the body, both aerobic and anaerobic. The same applies to the relationship between endurance and other motor skills; strength, speed, coordination and jumping endurance should be highly developed. Due to the type of muscle work, the swimmer should have extensive dynamic and global endurance, because during swimming, regardless of the preferred swimming style, the entire body works [8, 13].

6. AIM OF THE STUDY

Functional training is not a specific subject of scientific research conducted by physiotherapists and trainers. This results in little knowledge on the subject and little interest among athletes. The health benefits this training offers and the potential to improve athletic performance in almost any sport are not fully explored. One of the assumptions of functional training is to improve human exercise capacity. This allows the respiratory and muscular systems to be adapted to economical work and, consequently, to achieve better performance and endurance results.

The aim of the research was to find the relationship between functional training and the results achieved by lifeguards working at the PARIS swimming pool in Bydgoszcz in the Cooper general endurance test.

7. RESEARCH QUESTIONS

1. Did the use of functional training among lifeguards working at the PARIS swimming pool in Bydgoszcz improve the results in the Cooper general endurance test conducted in water?

2. Did the use of functional training among lifeguards working at the PARIS swimming pool in Bydgoszcz improve the results of the Cooper general endurance test conducted on land?

3. Did the gender of the respondents influence the relationship between functional training and general endurance?

4. Did the sports discipline practiced by the respondents influence the relationship between functional training and general endurance?

8. MATERIAL AND METHODS

The research was conducted on lifeguards working at the PARIS swimming pool in Bydgoszcz. The control group consisted of randomly selected people (5 men, 5 women). These people actively practice various sports, including: athletics (runners and throwers participated in the study), swimming (a person practicing freestyle swimming over medium distances, with preference for 400 meters) and representatives of team sports: volleyball, handball and football. The condition for participation in this study was the current health condition allowing active participation in the training recommended for work and own training related to the trained sports discipline. Therefore, the study did not include people with injuries or leading a sedentary lifestyle. People participating in the research considered activities related to the sport they practiced to be their priority. Participation in functional training was treated as an additional stimulus for the body aimed at improving specific muscle groups and skills related to muscle sensation and movement patterns. The age ranged between 20 and 25.

The study participants were subjected to general endurance tests. All Cooper test results, which were conducted on the treadmill and in the swimming pool, were analyzed.The following statistical methods were used to prepare the data:

– the average of differences in progression between people practicing the same sport was calculated

– the average differences in progression between women and men were calculated

– the average of differences in progression between people practicing different sports disciplines was calculated

9. RESULTS OF OVERALL STRENGTH TEST IN THE COOPER TEST IN WATER

The tests were carried out in a twenty-five-meter swimming pool, the participants had to perform the Cooper test, i.e. cover the longest possible distance in 12 minutes without stopping. They had no guidelines as to the swimming style they had to use, the swimming technique of each participant was at a different level, so they were not subject to any guidelines as to the swimming style.

Tab.1.

Results achieved during water tests

Sex	Distance traveled in meters (before/after training period)	Preferred style during the test	Sports discipline practiced
Men	880 / 930 meters (+50 meters)	Freestyle	Swimming
Men	720 / 720 meters (+/- 0 meters)	Freestyle	Volleyball
Men	680 / 700 meters(+20 meters)	Freestyle	Athletics
Men	660 / 690 meters(+30 meters)	Freestyle	Athletics
Women	610 / 650 meters (+40 meters)	Freestyle	Handball
Men	580 / 610 meters (+30 meters)	Backstroke	Athletics
Women	560 / 580 meters(+20 meters)	Freestyle	Volleyball
Women	550 / 550 meters (+/- 0 meters)	Freestyle	Athletics
Women	480 / 520 meters (+40 meters)	Freestyle	Athletics
Women	460 / 460 meters (+/- 0 meters)	Backstroke	Football

The greatest progress after the period of functional training was achieved by the participant who practices swimming every day. His result improved by a distance of 50 meters over the three weeks.

Tab. 2.

Results of the person who achieved the greatest progress during the water test

Sex	Distance traveled in meters (before/after training period)	Preferred style during the test	Sports discipline practiced
Men	880 / **930** meters (**+50meters**)	Freestyle	Swimming

Two people among the respondents did not make any progress after the period of using functional training, while no one experienced any regression, which can be considered a success of the training.

Tab.3.

Results of people who did not progress during the water test

Sex	Distance traveled in meters (before/after training period)	Preferred style during the test	Sports discipline practiced
Men	720 / 720 meters **(+/- 0 meters)**	Freestyle	Volleyball
Women	550 / 550 meters **(+/- 0 meters)**	Freestyle	Athletics

Most of the respondents decided to cover most of the distance in freestyle and 7/8 people achieved progress in the distances achieved, while the remaining two people decided to cover most of the distance in backstroke, where one of the two people made progress, while the other did not improve their results.

10. RESULTS OF OVERALL COOPER LAND ENDURANCE

The tests were carried out in an open stadium located in the complex of the Academy of Physical Education and Sports in Gdańsk, at a temperature favorable for running, in both cases it was about 18 degrees Celsius, and slightly cloudy. The participants' task was to perform the Cooper test on a treadmill and cover the greatest possible distance in 12 minutes. The subjects could not stop during the test, they had to constantly stay in motion.

Tab.4.

Results achieved by subjects during tests on land

Sex	Distance traveled in meters (before/after training period)	Sports discipline practiced
Men	3400 / 3400 meters (+/- 0 meters)	Athletics
Men	3150 / 3150 meters (+/- 0 meters)	Swimming
Men	3000 / 3100 meters (+100 meters)	Athletics
Women	2800 / 2750 meters (-50 meters)	Athletics
Men	2750 / 2850 meters (+100 meters)	Athletics
Women	2650 / 2650 meters (+/- 0 meters)	Football
Men	2600 / 2800 meters (+200 meters)	Volleyball
Women	2400 / 2500 meters (+100 meters)	Athletics
Kobieta	2300 / 2500 metrów (+200 metrów)	Handball
Kobieta	1800 / 1900 metrów (+100 metrów)	Volleyball

The greatest progress after the period of functional training was achieved by two participants, a man who trained volleyball on a daily basis and a woman who trained handball. Their results improved by a distance of 200 meters over a three-week period.

Tab.5.

Results of people who achieved the greatest progress during the land trial.

Sex	Distance traveled in meters (before/after training period)	Sports discipline practiced
Men	2600 / **2800** meters (**+200 meters**)	Volleyball
Women	2300 / **2500** meters (**+200 meters**)	Handball

Three of the respondents did not make any progress in distance after the period of functional training, and one of the participants regressed.

Tab.6.

Results of subjects who did not progress on the land trial

Sex	Distance traveled in meters (before/after training period)	Sports discipline practiced
Men	3400 / 3400 meters (**+/- 0 meters**)	Athletics
Men	3150 / 3150 meters (**+/- 0 meters**)	Swimming
Women	2650 / 2650 meters (**+/- 0 meters**)	Football
Women	2800 / 2750 meters (**-50 meters**)	Athletics

Functional training did not bring such a visible improvement in results compared to the swimming test, but progress could be seen in more than half of the respondents, which is a satisfactory result.

11. DISCUSSION

The use of functional training can increase the endurance capabilities of athletes. A functional training cycle should last much longer than just three weeks and should be divided into specific features that are priority and necessary to develop despite such a short training period. Despite this, the test subjects achieved satisfactory results. The analysis of the research results showed that the use of functional training improved the results achieved in Cooper tests both on land and in water. Factors that influence the results also include gender and the sports discipline practiced by the respondents in the

control group. Functional training is a very useful form of exercise. It shapes movement habits, motor sensation, improves body mobility and strengthens the strength of postural and deep muscles. Through breathing exercises, the efficiency of exercise is improved. It is worth popularizing and showing it among athletes of many disciplines. People participating in the study, seeing their exercise progress, will start not only to use, but also to recommend functional training to others

12. CONCLUSIONS

1. The use of functional training among rescuers improved the results in the Cooper general endurance test conducted in water.

2. The use of functional training among rescuers improved the results in the Cooper general endurance test conducted on land

3. The gender of the respondents influenced the relationship between functional training and general endurance. Men showed better performance improvement than women. Research has shown that the type of sport practiced affects the relationship between functional training and general endurance in the Cooper test. Team sports players performed best.

4. Functional training has the least impact on improving overall endurance in swimmers.

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Анотація

ФУНКЦІОНАЛЬНА ПІДГОТОВКА ВОДНИХ РЯТУВАЛЬНИКІВ ТА ВИТРИВАЛІСТЬ В ТЕСТІ КУПЕРА

**КОВАЛЬСЬКИЙ Даміан, КРЕФТ Пауліна,
СКАЛЬСЬКИЙ Даріуш В., ЦИГАНОВСЬКА Наталія, ФІЛІПКОВСЬКА Домініка**

Стаття зосереджена насамперед на описі функціонального тренування, його визначенні та припущеннях. Після теоретичної частини слідує опис форм функціонального тренування, як має виглядати це тренування, які аксесуари та форми тренувань можна застосовувати, і перш за все, чому цей вид тренування варто виконувати

та які позитивні зміни в нашому організмі він може викликати . Наступна частина дисертації присвячена витривалості, її опису, різним видам витривалості та методам, які можуть її підвищити. Також у цій роботі описані посилання на залежність між різними типами витривалості в різних спортивних дисциплінах, особливо зосереджуючись на витривалості у плаванні. Другий параграф даної дисертації містить методологічні аспекти даної роботи, матеріали та методику дослідження, яка була застосована. У третьому абзаці аналізуються результати дослідження та представлено декілька залежностей між ними. В останній частині роботи подано підсумки та висновки щодо поставлених раніше питань дослідження та мети роботи.

Ключові слова: функціональна підготовка, витривалість, плавальна витривалість, тест Купера, водні рятувальники.

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