

INTRODUCTION OF SPECIFIC EXERCISES AND DIRECTED RECOVERY TECHNIQUES FOR IMPROVING EFFORT CAPACITY IN TRAINING OF ADOLESCENT BASKETBALL PLAYERS

INTRODUCEREA ÎN CADRUL ANTRENAMENTELOR A EXERCIȚIILOR SPECIFICE ȘI A UNOR TEHNICI DE REFACERE DIRIJATĂ PENTRU ÎMBUNĂTĂȚIREA CAPACITĂȚII DE EFORT LA ADOLESCENȚII CARE PRACTICĂ JOCUL DE BASCHET

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Abstract

Aim: The aim of the study is to show the importance of introducing in training, of some effort exercises, as well as some recovery techniques (global postural exercises and relaxation techniques), in order to increase the effort capacity in adolescents which practices basketball. *Methods:* We included in the study a number of 27 subjects, aged between 14 and 18, who practice basketball, divided into 3 groups: a group that participated in the regular basketball training; a group that, in addition to the regular training, had complete an exercise program aimed to increase the effort capacity; and a group that, in addition to those specified in group 2, followed a recovery program that consisted of global postural exercises (Souchard Method) and Jacobson Relaxation Technique. The effort capacity was assessed by the Harvard Test and the Ruffier Index. *Results:* Group 2 and 3, which had specific exercises for effort training, had superior results compared to the first group, with a slight increase for Group 3, which shows the benefits of directed recovery to increase exercise capacity. *Conclusions:* The introduction of specific exercises increases the capacity of effort in adolescents who practice basketball, to a greater extent than in those who are provided in the training program only with elements of the game of basketball. In other words, the introduction of global postural exercises and relaxation techniques in addition to the exercises for the increase of the effort capacity, determines a positive influence on the efficiency to effort of the adolescents practicing basketball.

Keywords: *basketball, effort, guided recovery, adolescents*

Rezumat

Scop: Scopul studiului este de a arăta importanța introducerii în cadrul antrenamentelor, a unor exerciții de efort, precum și a unor tehnici de refacere (exerciții posturale globale și

Acceptat pentru publicare în 27.12.2021; Publicat pentru prima dată online în 29.12.2021

Pentru citare: Koșa, A. I., Serseniuc Urzică, A. T., Coșarcă, I. C. (2021). Introduction of specific exercises and directed recovery techniques for improving effort capacity in training of adolescent basketball players, *Revista Română de Kinetoterapie*, 27(47), 34-39

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tehnici de relaxare), în vederea creșterii capacității de efort la adolescenții care practică jocul de baschet. *Metode:* Au fost incluși în studiu un număr de 27 de subiecți, adolescenți, cu vârste cuprinse între 14 și 18 ani, care practică baschetul, împărțiți în 3 loturi: un lot care a participat la antrenamentul de baschet propriu-zis, un lot care a urmat pe lângă antrenamentul propriu-zis și un program de creștere a capacității de efort și un lot care pe lângă cele specificate la lotul 2 a urmat și un program de refacere ce a constat în exerciții posturale globale (metoda Souchard) și de relaxare (Tehnica Jacobson). A fost evaluată capacitatea de efort prin proba Harvard și indicele Ruffier. *Rezultate:* Lotul 2 și 3, care au avut exerciții specifice pentru antrenamentul la efort, au avut rezultate superioare față de primul lot, cu un ușor plus pentru lotul 3, ceea ce arată beneficiile refacerii dirijate pentru creșterea capacității de efort. *Concluzii:* Introducerea unor exerciții specifice de efort determină creșterea capacității de efort la adolescenții care practică baschetul în mai mare măsură decât la cei la care sunt prevăzute în programul de antrenament doar elemente din jocul de baschet. Într-o altă ordine de idei, alocarea pe lângă exercițiile de creștere a capacității de efort și a unor exerciții postural globale și a unor tehnici de relaxare determină o influență pozitivă asupra randamentului la efort a adolescentului practicant al baschetului

Cuvinte cheie: *baschet, capacitate de efort, refacere dirijată, adolescenți*

Introduction

For most people who practice, sport is a "way of life" meant to ensure that the person has a certain state of mind, which is generally in line with physical and mental health, safety and self-control, perseverance, etc. Of course, practicing the sport from an early age, in an organized setting, will be an important aspect for the future adult for its further development. Team sports, in general, are more attractive than individual sports, and lately more and more children and young people are attracted to basketball.

The practice of basketball, like other sports, requires the development of motor capacities, and along with them, it is especially important to improve the effort capacity, which, developed during childhood, will provide, later, a good adaptation of all organs and systems (especially cardiovascular) at different types of effort. This is also supported by Mogoș (1990) who says that "sustained physical activity has beneficial consequences on the cardiovascular system, namely: it decreases the workload of the heart and improves its energy metabolism; reduces blood pressure values; improves the degree of exercise tolerance of the individual; it increases the individual's degree of independence of movement and increases his desire for life [1]. Kallos and Tache (2013) also state that in modern basketball, it is necessary to increase the speed of movement and execution, so that there is fatigue of the central nervous system, which is characterized by decreased ability to concentrate and myoarthrokinetic overload. In order to meet these demands, it is absolutely necessary to improve the capacity for effort. [2]

From another point of view, during adolescence, when the capacity for effort is still reduced and the myoarthrokinetic system is not yet mature, it is necessary to introduce elements of directed recovery (along with spontaneous recovery) of the body. "Restoration means the component part of the training process that brings together all the natural or artificial means used to accelerate the processes of rebalancing the body's homeostasis [3]. Drăgan, quoted by Șufaru (2008) says that "directed recovery is that component part of the training, which uses some natural or artificial

physiological means directed, coming from the internal or external environment, in order to restore homeostasis and even overcome this threshold by overcompensating”[4]. In the same context, Şalgău and Mârza quoted by Şufaru (2008) say that “this type of recovery cannot replace, but completes, compensates and accelerates the natural recovery of the organism”[5].

Material and methods

Subjects

The study was conducted on 27 subjects, divided into 3 groups (1, 2 and 3), aged between 14-18 years, following a program of 3 weekly basketball training sessions for 3 months.

Group 1 followed only basketball training, and in groups 2 and 3, in addition to the specific elements of the basketball game, we introduced an exercise program for 3 months to improve the effort capacity. In addition, group 3 also benefited from global postural exercises 3 times a week (Souchard method), as well as an effort relaxation technique (Jacobson technique - short form of 30 minutes) once a week.

Table no.1. Subject data (age, height, weight)

Groups	Age	Height	Weight
Group 1	16.11 ± 1.45	1.78 ± 0.09	76.11 ± 11.83
Group 2	16.32 ± 1.39	1.81 ± 0.07	76.00 ± 12.73
Group 3	16.00 ± 1.50	1.76 ± 0.07	72.44 ± 8.57

The patient groups were selected from the “Constantin Şerban” Theoretical High School of Aleşd being homogeneous in terms of age, height and body weight.

Assessment

In conducting the study, we evaluated the exercise capacity through 2 tests, namely Harvard Test (maximal test) and Ruffier Index (submaximal test).

At the *Harvard test* - the subject performs ascents and descents on the exercise ladder at a rate of 30 times per minute (1 second ascent, 1 second descent), in the rhythm of the metronome. This rhythm must be maintained for a period of 5 minutes timed by the examiner. In the first 30 seconds after the end of the effort, the pulse is measured and marked with P1. In the first 30 seconds of the second minute after the test, the pulse is measured again and marked with P2. In the first 30 seconds of the third minute after the end of the effort, the pulse is measured for the last time and is marked with P3.

The physical fitness index is calculated according to the following formula:

$$\text{Physical fitness index} = [T (\text{effort time} / \text{sec}) \times 100] / [(P1 + P2 + P3) \times 2]. [6]$$

Table no. 2. Harvard test interpretation

Value (physical fitness index)	Qualifying
Over 90	Excellent physical condition
80-90	Good physical condition
55-79	Average physical condition
Under 55	Poor physical condition

In the case of the *Ruffier index* - measure the pulse in the sitting position and mark it as P1. The subject performs 30 squats in 45 seconds. In the first 15 seconds after the end of the effort, the

pulse is measured, the subject being supine, and the value obtained is related to 60 seconds and is marked with P2. After a minute of rest in supine, the pulse is measured again and marked with P3.

The Ruffier index is calculated according to the following formula:

$$\text{Ruffier Index} = [(P2 - 70) + (P3 - P1)] / 10. [7]$$

Table no. 3. Interpretation of the Ruffier Index

Value (Ruffier index)	Qualifying
0 - 2.9	Good index
3-6	Medium index
Over 6	Deficit index

Results

In the Harvard Test, in the initial testing, the 3 groups had a close average of the effort capacity, with a plus for Group 1 in which the average was 76.24 ± 6.34 , compared to 73.18 ± 7.18 in Group 2 and 74.06 ± 7.63 in Group 3. Referring to the grade of the test, all 3 groups were initially classified as "average physical condition", between 55 and 79 points.

In the final assessment, the changes in fitness index tested by the Harvard Test were positive in all groups, but in Group 1 it increased to 76.36 ± 6.07 , compared to Group 2 where the increase was 78.46 ± 7.83 , and in Group 3 at 80.08 ± 7.46 . At the end of the 3 months, Group 3 was in "good physical condition", 80.08 ± 7.46 , the other 2 groups remaining in "average physical condition", with a slight improvement for Group 2 where the increase was 5.71 ± 3.19 , compared to only 0.21 ± 2.47 in Group 1. (table no. 4, figure 1)

Table no. 4. Harvard Test results

Group	Initial	Final	Progress
Group 1	76.24 ± 6.34	76.36 ± 6.07	0.21 ± 2.47
Group 2	73.18 ± 7.18	78.46 ± 7.83	5.71 ± 3.19
Group 3	74.06 ± 7.63	80.08 ± 7.46	6.36 ± 2.61

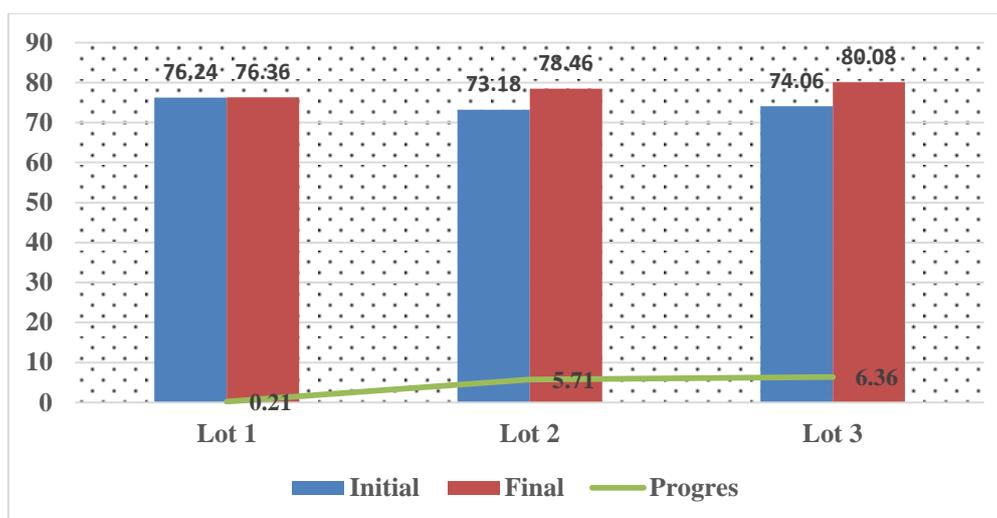


Figure 1. Harvard Test results

The Ruffier Index shows the same tendency to increase the effort capacity higher in Group 3 compared to Group 2, as well as those of Group 2 compared to Group 1. Thus, even if the

interpretation scale of the Ruffier Index includes the 3 groups in the average index (between 3 and 6) in both evaluations, however, in the final evaluation, the progress rate was 2.16 ± 0.92 in Group 3, 1.89 ± 0.67 in Group 2 and only 0.63 ± 0.90 for Group 1. (Table 5)

Table no. 5. The results of the Ruffier Index

Group	Initial	Final	Progress
Group 1	4.69 ± 2.69	4.40 ± 1.29	0.63 ± 0.90
Group 2	5.96 ± 1.40	4.07 ± 1.28	1.89 ± 0.67
Group 3	5.69 ± 1.51	3.53 ± 1.46	2.16 ± 0.92

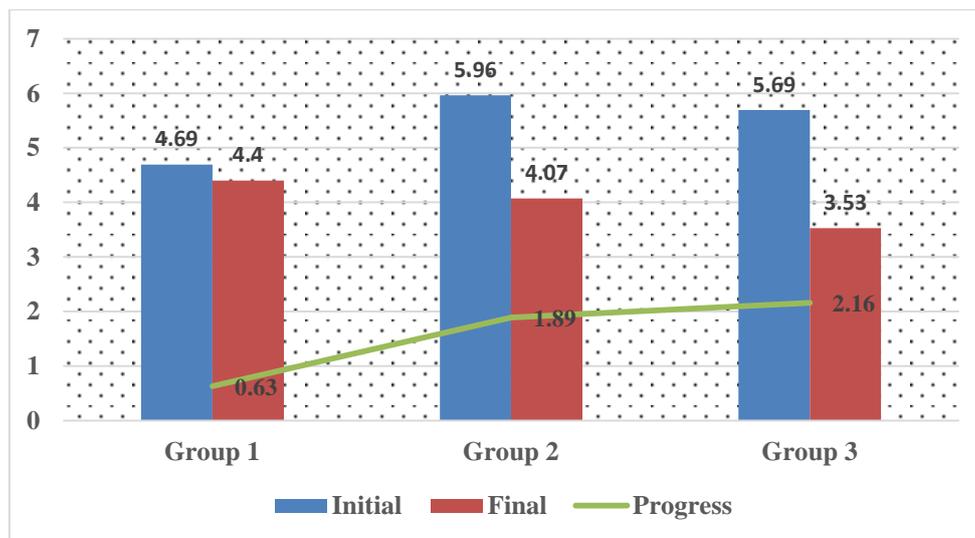


Figure 2. Ruffier index results

Discussions

The game of basketball, as an alternative of practicing exercise in an organized and attractive way for children and adolescents (especially in the current era, dominated by computer and video games), assumes the improvement of motor capacities and effort capacity, as well as an effective dosage of training intensity. This is also stated by other researchers who, in order to improve the posture, coordination and other motor capacities, recommend non-specific means of basketball, which have finally led to progress in practicing this sport [8].

The increase in exercise capacity is influenced by the practice of a sport, a fact highlighted by Crăciun et al. (2008) who states that “physical activity contributes to the development and improvement of vital capacity and endurance, the rate of progress being much higher. great for sporty kids [9]. However, in teams of athletes who practice a particular sport, the increase in effort capacity is also conditioned by specific exercises to improve it. Thus, the study we conducted indicates that the introduction of exercises that increase exercise capacity are beneficial, so that in groups 2 and 3 the results are superior to group 1. Probably, if the study had been extended over time, these results would have been even more obvious. Also, the introduction of global postural exercises (which maintain a balanced level of muscle tone between agonist and antagonist muscles, between the phasic and tonic muscles) and general relaxation techniques (Jacobson technique), have contributed to a positive adjustment of the response to the increase of the effort capacity. This is also confirmed by a study conducted by Chiriac PB, Mihăilescu L and Bărbăcioru C., which used

the Yumeiho technique as a means of relaxation and recovery of the body after exertion. They say the use of the Yumeiho technique accelerates the ability to recover overall after effort. [10]

Conclusions

The introduction of specific exercises increases the capacity of effort in adolescents who practice basketball, to a greater extent than in those who are provided in the training program only with elements of the game of basketball. In other words, the introduction of global postural exercises and relaxation techniques in addition to the exercises for the increase of the effort capacity, determines a positive influence on the efficiency to effort of the adolescents practicing basketball.

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