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THE EFFECT OF SEIKO EXERCISES ON BALANCING THE BASAL SUFFICIENCY OF MUSCLE CELLS AND THE TWO ANAEROBIC ABILITIES OF YOUNG BASKETBALL PLAYERS

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Abstract

The aim of the research is to prepare SEIKO exercises for young basketball players, and to identify the effect of these exercises on the concentration of lactic acid and sodium bicarbonate to achieve basal sufficiency, and the two anaerobic abilities (phosphagenic and lactic) among these young basketball players in Baghdad governorate for the sports season (2020/2021).), who were randomly selected for the research sample from the Electrical Industries Club, which numbered (12) players, with a percentage of (16.667%) from their community, and then divided into two experimental and control groups by adopting the experimental method of this design. The experiment in these exercises was the application of Seiko exercises, which are characterized by kinetic speed and agility in running, handling and receiving exercises among the players at the beginning of the main part of the training unit and for a period of (15) minutes for this training, at a rate of (3) training units, and for a period of (10) consecutive training weeks according to determinants Anaerobic energy system The intensity of the training units ranges between (80-95%), and after completing this experiment, the results were processed using the (SPSS) system to be extracts and applications in that the application of SEIKO exercises in the period of special preparation helps young basketball players to improve the basal sufficiency of muscle cells By balancing a decrease in the concentration of lactic acid at the expense of an increase in the level of sodium bicarbonate (NaHCO3) concentration in the blood, which raises the level of their anaerobic and phosphagenic and lactic abilities, Young basketball players need to take into account the training intensity in the SEIKO exercises that develop and improve the various abilities, and to take into account the duration of each exercise in a manner that ensures the basal sufficiency of the muscle cells and not to stress excessive training with them to achieve the required goals at the expense of the biological organization of their cells, and it is necessary to set goals Reality is achievable in this type of comprehensive training, and the exercises assigned to it must be at the beginning of the main section of the training unit and not overload the young players with high training loads with basketball.

抽象的

本研究的目的是为年轻篮球运动员准备 SEIKO 练习，并确定这些练习对乳酸和碳酸氢钠浓度的影响，以达到基础充足，以及这些年轻球员的两种厌氧能力（磷酸盐和乳酸）巴格达省的篮球运动员参加赛季（2020/2021）。), **他**们从电气工业俱乐部中随机抽取了 (12) **名玩家作**

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为研究样本，其社区成员的比例为 (16.667%)，**然后采用以下**实验方法分为两个实验组和对照组这个设计。这些练习中的实验是精工练习的应用，其特点是运动速度和敏捷性在训练单元主体部分开始时以及持续（15）**分**钟的时间内在运动员之间进行的跑步，处理和**接收**练习对于本次训练，按照 (3) **个**训练单元的比率，并根据决定因素进行连续 (10) **个**训练周 厌氧能量系统 训练单元的强度介于 (80-95%) **之**间，并在完成此训练后实验中，结果用（SPSS）**系**统进行提取和应用，在特殊准备时期应用SEIKO练习帮助年轻篮球运动员提高肌肉细胞的基础充足率，通过平衡浓度的降低乳酸的代价是血液中碳酸氢钠 (NaHCO3) 浓度的增加，从而提高了它们的厌氧和磷化水平以及 l**运**动能力方面，青少年篮球运动员在发展和提高各项能力的精工练习中需要考虑训练强度，并考虑到每次练习的持续时间，以确保肌肉细胞的基础充足，而不是强调与他们进行过度训练以牺牲细胞的生物组织来实现所需的目标，并且有必要设定目标这种综合训练是可以实现的，分配给它的练习必须在开始时训练单元的主要部分，不要让训练负荷高的年轻球员用篮球超负荷。

Research problem and importance: " SEIKO exercises are a training method based on practices and training instructions aimed at developing dynamic balance, improving basic motor skills and controlling body parts." (Mohammed, 2018) SEIKO exercises are also an integrated training system that aims to improve the level of acceleration and the level of coordination between the eyes and hands, as well as explosive ability and speed of response." (Remco & et al, 2009) and that "SEIKO exercises are one of the modern forms of training in the sports field." Its physical and physiological effects extend to young and adult players, with different results due to the different way they are dealt with in the sports field, and the SEIKO training is a modern training system that results in integrated effects for many physical abilities within one training program."

(Velmurugan & Palanisamy, 2011), as the term SAQ is derived from the initial letters of both (Speed, Agility) and Quickness." (Mario & et al, 2011) and "SEIKO training is one of the One of the training forms that contribute to improving some special physical abilities, the most important of which is speed of all kinds." (Zoran & et al, 2011). The gap between traditional resistance training and specific functional movements, and works to increase muscular ability in all explosive movements, and the effectiveness of nerve signals from the brain, sensory _ kinesthetic perception , motor skills and reaction time, and works to gain greater balance and balance, allowing the athlete to maintain the correct position of the body during the performance of different skills, and works to control the intensity of training from low to high, because each athlete has a different level of training and therefore the level of intensity must It coincides with the athlete's abilities." (Ashraf,

2015) as “the nature of the correlation between the three training elements, transitional speed, agility, kinetic speed and transitional speed is the player’s ability to perform similar and sequential movements in the shortest possible time, while agility is the player’s ability to Changing its positions in the air, and the kinetic speed is the maximum contraction or kinetic response of the muscle in the least possible time. (Medhat and Mohamed, 2017) It is clear from the above that the SEIKO exercises are exercises that target the development and improvement of physical and motor abilities of high speed and intensity that fall within the first energy system whose chemical reactions take place without relying on oxidation by oxygen, and as it is known that Any reactions that have metabolic wastes, if they exceed their limits, affect the level of acidity, and since the human body tends to alkaline, this definitely affects the anaerobic capabilities of the effort of basketball players, which is necessary to be at a high level to meet the requirements of this specialized game, “Lactic acid is an honest and direct criterion that expresses the extent of the body’s response to the physical load, and then it becomes clear the degree of fatigue that the player’s body has reached. endurance of the circulatory and respiratory systems” (Abdullah, 2004), and that “the process of releasing energy in the event of increased acidity of the blood is temporarily difficult due to the decrease in the activity of the enzymes responsible for energy production.” (Ahmed and Hussain, 2017) and in “During the rest period after endurance exercise, lactate is oxidized by oxidative muscle fibers, as well as the case with sugar.” (Brooks, 2009) “And that the phosphate buffer system is a mixture of phosphate (HPO4) and phosphoric acid (H2PO4) and it works The work of the bicarbonate system, if a strong acid such as hydrochloric acid (HCl) is added, it is replaced by weak phosphoric acid and changes (pH) towards normal, and when the lactic threshold is exceeded (4 mmol) and thus decreases (pH) in the blood that can become dangerous when the vital organizations are not able to equalize the blood, and the inability of the internal organs and organs to get rid of lactic acid.” Jabbar, 2007) “The Law of Mass Action states that when the final products of a chemical reaction accumulate in the center of the reaction, the rate of the reaction stops almost completely.” (Arthur & John, 2020) Also, “during intense exercise to the upper limit of about (90) s, the muscles can produce (ATP) during the lactic acid system and the cells of rapid contractions become more adapted in their ability to produce (ATP).” (Lee & John, 2020) Brenda, 2007) as "sports training brings about physiological and morphological changes that result in an increase in the efficiency of aerobic and anaerobic capacities and an adaptation to the nature of sports activity and practice with high efficiency with the economy of effort." Emad El-Din, 2007), and through the researcher’s follow-up to the training of young basketball players who are trying to catch up with the world to reach the Olympics or international professionalism, they need to accelerate the development of the two anaerobic capacities that depend on the cellular metabolic system in constantly rebalancing the basal rapid reactions in the sarcoplasm of the muscle cells producing The anaerobic effort quickly, intensely and high within the duration of interactions in this system of vital energy, to form an attempt to experiment in the light of the data of this problem, so that the research aims to prepare SEIKO exercises for young basketball players, and to identify the effect of these exercises in each of the concentration of lactic acid and bicarbonate

Sodium to achieve basal sufficiency, And the two anaerobic abilities (phosphagenic and lactic) of these players of this category, and the researcher assumed that SEIKO exercises had a positive effect in developing both the concentration of lactic acid and sodium bicarbonate for basal sufficiency, and the two anaerobic abilities (phosphagenic and lactic) in the research sample.

Research Methodology: In light of the data of the research problem, the experimental research method was adopted, which is defined as "the approach in which we treat and control an independent variable to see its effect on a dependent variable, noting the resulting changes and doing their interpretation, whether the experiment includes an independent variable and a dependent variable or more than one independent variable." One or more dependent variables." (Magdy, 2019) The experimental design with the two exact experimental and control groups, which is controlled by the pre and posttests, was chosen.

The research community and its sample: The limits of the research community are represented by the players of each of the clubs (electrical industries, housing, Salikh, Air Force, and Civil Defense), who are 72 players participating in the youth basketball league in Baghdad governorate for the sports season (2020/2021), The players of the research sample were randomly selected from them from the Electrical Industries Club, which numbered (12) players (16.667%) from the original community, and according to the determinants of the experimental design, they were divided into two experimental and control groups of equal numbers.

Test measuring devices and research procedures: - The approved tests were the performance of the young basketball players with high physical effort as quickly as possible on the stationary bike to test the anaerobic phosphagenic ability for a period of (30) seconds, and the performance of the anaerobic and lactic ability test for a period of (90) seconds, and after performing the second lactic test (5cc) of blood is drawn directly after the completion of this effort as a laboratory test after (5) minutes have passed directly after this effort, and the experimentation in these exercises was by applying the SEIKO exercises that are characterized by kinetic speed and agility in the jogging, handling and receiving exercises among the players at the beginning of the part The head of the training unit for a period of (15) minutes for this training at a rate of (3) training units, and for a period of (10) consecutive training weeks according to the determinants of the anaerobic energy system, the intensity of the training units ranged between (80-95%) if they were done with high intensity or at a single pace of overloading, Thus, these exercises do not intersect with the principle of gradualness and undulation with the training load in the periodic training of high intensity. As for the players of the control group, they train as followed with them only, and after completing the experiment according to the determinants of the experimental design mentioned, the researcher verified the results with the Social Statistical Bag System (SPSS). Version (V26), to calculate the percentage, mean, standard deviation, t-test for correlated samples, and t-test for uncorrelated samples.

Research results and discussion:

Table 1. ***Results of pretest for the study and control groups***

The tests	Leven	Sig	Experimental Group			Control Group			)t(	Sig	Ass.
			N	Mean	SD±	N	Mean	SD±			
Lactic Aside in blood	**0.774**	**0.4**	**6**	**13.34**	**0.61**	**6**	**13.27**	**0.41**	**0.239**	**0.816**	N. S
$NaHCO_3$ in blood	**1.456**	**0.255**	**6**	**13.54**	**0.94**	**6**	**13.8**	**0.63**	**0562**	**0.587**	N. S
Phosphagen power	**0.062**	**0.808**	**6**	**30.46**	**1.46**	**6**	**30.57**	**1.66**	**0.116**	**0.91**	N. S
Lactic Acid power	**0.425**	**0.529**	**6**	**23.75**	**1.85**	**6**	**24.17**	**1.46**	**0.432**	**0.675**	N. S

Significance level = 0.05; t-test value is significant at p-value ≤ 0.05

Table 2. ***Results of the study and control groups in the pretest and posttest***

The tests	Group	Pretest		Posttest		Mean Differences	SD± Differences	)t(	Sig	Ass.
		Mean	SD±	Mean	SD±					
Lactic Aside in blood	Ex	**13.34**	**0.61**	**10.21**	**0.06**	**3.135**	**0.609**	**12.61**	**0.000**	S
	Co	**13.27**	**0.41**	**12.11**	**0.18**	**1.157**	**0.526**	**5.389**	**0.003**	S
Lactic Aside in blood	Ex	**13.54**	**0.94**	**16.2**	**0.06**	**-2.66**	**0.969**	**6.789**	**0.001**	S
	Co	**13.8**	**0.63**	**15.26**	**0.1**	**1.467**	**0.651**	**5.516**	**0.003**	S
Phosphagen power	Ex	**30.46**	**1.46**	**41.19**	**0.66**	**10.73**	**1.436**	**18.308**	**0.000**	S
	Co	**30.57**	**1.66**	**37.94**	**1.38**	**7.377**	**1.792**	**10.082**	**0.000**	S
Lactic Acid power	Ex	**23.75**	**1.85**	**32.73**	**0.85**	**8.98**	**1.566**	**14.043**	**0.000**	S
	Co	**24.17**	**1.46**	**28.35**	**0.37**	**4.18**	**1.339**	**7.648**	**0.001**	S

Significance level = 0.05; t-test value is significant at p-value ≤ (0.05) df N-1=5

Table 3. ***Results of posttest for the study and control groups***

The tests	Experimental Group	Control Group	)t(	Sig	Ass

	N	Mean	SD±	N	Mean	SD±			
Lactic Aside in blood	**6**	**10.21**	**0.06**	**6**	**12.11**	**0.18**	**25.12**	**0.000**	S
$NaHCO_3$ in blood	**6**	**16.2**	**0.06**	**6**	**15.26**	**0.1**	**20.26**	**0.000**	S
Phosphagen power	**6**	**41.19**	**0.66**	**6**	**37.94**	**1.38**	**5.21**	**0.000**	S
Lactic Acid power	**6**	**32.73**	**0.85**	**6**	**28.35**	**0.37**	**11.6**	**0.000**	S

df(N-2)=10 Significance level = 0.05; t-test value is significant at p-value ≤ 0.05

From the observation of the results of Table (2), it is clear that SEIKO exercises have a clear positive effect in reducing stress on cells through rapid movements with applied exercises for these exercises, which the researcher took into account in legalizing the training load for them to be appropriate to the specifications of the players, their age and gender, which were the internal reactions of the body In reducing the accumulation of (Lactic acid) and cellular balance events by increasing the level of concentration of sodium bicarbonate (NaHCO3), and this confirms the good rationing of the training intensity and duration of each exercise, Which reflected this positive effect on increasing the level of the anaerobic phosphagogenic and lactic abilities, which are among the most important physiological indicators that a basketball player needs and give an indication of the adequacy of his physical effort to challenge fatigue, especially since the nature of the competition requires extreme efforts in transitional speed and jumping, and from the observation of the results contained in the table (3) It turns out that the young players who received SEIKO training have outperformed their peers who trained with the exercises followed by their coach, which was the preference for SEIKO training, which increased their empowerment in improving the body's internal reactions as clear physiological responses in the results of laboratory analysis that showed the factors that helped to raise the level of anaerobic phosphagenic and lactic capacities, This is due to the role of this type of comprehensive training in accelerating the development and progress at the required level, as "a decrease in the concentration of lactic acid in the blood indicates an improvement in the functional state of the athletes, and their ability to continue their physical performance." (Sawka & Other, 2004) "Continuous research has demonstrated that maintaining the concentration of bicarbonate in cells and blood is essential for an athlete to achieve achievement" (Goldberger & Gurney, 2013). "The player's continuity of efficient performance with high training loads confirms that muscle cells still maintain their basal balance and control over acids, and the availability of bicarbonate plays an important role in this event." (Goldberger, 2013) as "the capacity of the muscular systems increases with increasing anaerobic training (special endurance training), which allows for high levels of muscle efficiency and better levels of lactic acid, which allows oxygen to be released from lactic acid and to be electronic, which works to reduce fatigue.") Mufti, 2001) "The biochemical effects of improving anaerobic energy production processes as a result of strength training are summarized in an increase in the activity of energy-releasing enzymes, as well as an increase

in the stores of chemical sources of energy such as (ATP) and (PC) and hormonal responses." (Abu El-Ala and Ahmed, 2003), as "in order to achieve the growth of anaerobic endurance in kinetic sports activities, some of them advise that the intensity of exercise be (90%), and the number of weekly training times should not exceed three or four times." (Abu El-Ala, 1997) and that "continuing at the same intensity used preserves the acquired adaptations and does not develop them, and here the need for training appears with a new and appropriate overload. Training (10) weeks is sufficient to bring about physiological adaptations to the anaerobic system." (Amer Allah, 1999)

Conclusions and applications:

1- The application of SEIKO exercises in the period of special preparation helps young basketball players to improve the basal sufficiency of muscle cells by balancing the low level of concentration of acid (Lactic Aside) at the expense of an increase in the level of concentration of sodium bicarbonate (NaHCO3) in the blood, which raises the level of the two anaerobic phosphagenic abilities And their tactical.

2- Young basketball players need to take into account the training intensity in the SEIKO exercises that develop and improve different abilities, and to take into consideration the duration of each exercise in a manner that ensures the basal sufficiency of the muscle cells and not pressure by excessive training with them to achieve the required goals at the expense of the biological organization of their cells.

3- It is necessary to set realistic and achievable goals in this type of comprehensive training, and the exercises assigned to it must be at the beginning of the main section of the training unit and not to overload the young basketball players with high training loads.

Sources:

1- Ahmed Farhan Ali and Hussein Manati Sajat (2017). Physiology of physical exertion: Babel, Dar Al-Sadiq Cultural Foundation, pp. 154-155.

2- Abdullah Hussein Al-Lami (2004). Scientific foundations of sports training: Al-Qadisiyah, Al-Taif Press for printing, p. 32.

3- Abu El-Ala Ahmed Abdel-Fattah and Ahmed Nasr El-Din Sayed (2003). Physiology of Physical Fitness, 2nd floor: Cairo, Dar Al-Fikr Al-Arabi, p. 88.

4- Mufti Ibrahim Hammad (2001). Modern Sports Training (Planning, Application and Leadership), 2nd Edition: Cairo, Dar Al-Fikr Al-Arabi, p. 123.

5- Emad El-Din Abbas Abu Zeid (2007). Planning and scientific bases for team building and preparation in team games, theories - applications, 2nd floor: Alexandria, Mansha'at al-Maaref, p. 183.

6- Magdy Salah Al-Mahdi (2019). Educational Research Methods: Cairo, Arab Thought House, p. 214.

7- Abu El-Ala Ahmed Abdel-Fattah (1997). Physical training: Physiological foundations: Cairo, Dar Al-Fikr Al-Arabi, p. 51.

8- Medhat Shawky Tosh and Mohamed Ahmed Hammam (2017). The effect of Sakyo training on some harmonic abilities of handball players, Journal of Sports Science and Physical Education Applications, No. 6, p. 67.

9- Ashraf Muhammad Musa Hassan (2015). The effect of Sakyo training on some special physical abilities and individual offensive skills for junior footballers, Egypt, South Valley University, Faculty of Physical Education, Journal of Sports Science Applications, Issue 83, March, Department of Physical Education and Movement Sciences, p. 30.

10- Amr Allah Ahmad Al-Busati (1998). Foundations and rules of sports training and its applications: Alexandria, Al-Intisar Press, p. 83.

11- Muhammad Ali Al-Qatt (1999). Functions of members of sports training, an applied approach: Cairo, Dar al-Fikr al-Arabi, p. 36.

12- Jabbar Rahima Al Kaabi (2007). Physiological and Chemical Basis of Sports Training: Qatar, Doha, Qatar National Press, pp. 207-275.

13- Mohamed Ahmed Abdel Aziz (2018). The effect of Sakyo training on some physical and physiological variables and the digital level of young swimmers, Kafr El-Sheikh University, Egypt, p. 13.

14- Remco Polman, Jonathan Bloomfield, and Andrew Edwards (2009): Effects of SAQ Training and Small-Sided Games on Neuromuscular Functioning in Untrained Subjects, International Journal of Sports Physiology and Performance, 4, 494-505.

15- Velmurugan G. & Palanisamy A. (2011): Effects of Saq Training and Plyometric Training on Speed Among College Men Kabaddi Players, Indian journal of applied research, Volume : 3 ,Issue : 11, 432.

16- Mario Jovanovic, Goran Sporis, Darija Omrcen, Fredi Fiorentini (2011): Effects of speed, agility, quickness training method on power performance in elite soccer players, Journal of Strength and Conditioning Research, 25(5)/1285–1292.

17- Zoran Milanović ,Goran Sporiš, Nebojša Trajković, Nic James, Krešimir Šamija (2011): Effects of a 12 Week SAQ Training Programme on Agility with and without the Ball among Young Soccer Players, Journal of Sports Science and Medicine, 12, 97-103.

18- Brooks, GA (2009) . Cell–cell and intracellular lactate shuttles. The Journal of Physiology ,(23) , p: 600.

19- Arthur C .Guyton & John E. Hall (2020). Textbook of medical physiology : 16th ed, Philadelphia, PA , USA: Library of Congress Cataloging-in-Publication.

20- Lee Lerner.K, and Brenda Wilmoth Lerner (2007). World of sports science, editors. r, LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION.

21- Goldberger, M, & Gurney.(2013), the effects of direct teaching styles on motor skill acquisition of fifth grade children. Regearch Quarterly for Exercise and sport. USA,.P:258.

22- Sawka, M, Knowlion,R, & Miles, P, (2004): Competition Blood lactate concentration in collegiate swimmers Eur., Journal of Appl. Physiology, Vol. 62.p:99.

23- Goldberger.(2013); the effects of direct teaching styles. USA, P:258.