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The effect of lactate resistance training on the performance endurance of defensive skills and the individual rapid attack accuracy index for handball players under (19) years

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ABSTRACT

The efforts made in sports training have achieved a great development in the game of handball, although there are still several existing problems associated with the training process, which require scientific solutions as well as require the search for means, methods and modern scientific devices to raise the level of physical and skill performance of the players, and through the experience and observation of the researcher for handball players, especially the youth category, since the researcher is one of the coaches and academics of handball, the researcher noted the inability of some players to continue with high efficiency and good performance on The course of one half and the entire match, which leads to a loss of focus on good performance and this results mainly through weakness in the physical aspect, so the researcher decided to experiment with lactate resistance training to address this weakness of the defect of developing endurance performance and the skill and physical side, and the research aimed to identify the impact of lactate resistance training and withstand the performance of defensive skills and the accuracy index of individual rapid attack endurance for handball players under the age of (19) years, and to identify the effect of lactate resistance training in the variables Studied, as well as identifying the preference of differences in the post-test of the experimental group in these variables, and the researcher used the experimental design with experimental and control groups, and the research community was determined by the players of Karbala Handball Club under 19 years old, who numbered (16) players without goalkeepers, and they were all selected as a sample for research and in a comprehensive inventory style, and they were randomly and evenly divided into two groups and by (8) players for each group, It was concluded that the development was positive on physical abilities, as the exercises used were similar or more difficult than the conditions of the competition, which increased the players' endurance and improved their performance, and with lactate resistance training had a greater positive impact than the performance of the exercises alone, which enhanced the players' ability to continue to perform with high efficiency.

1- Definition of research

1-1 Research Introduction and Importance

Handball is one of the widespread mass games in most countries of the world, it is a competitive game that arouses the interest of its follower and the emotions of its practitioner, and that the great development that has occurred in the level of this game from all technical, physical and psychological aspects came as a result of the development in the various sports sciences, which serves the training process and upgrading it at all levels, so the coach's use of training methods must be appropriate to the type of qualities that he aspires to develop and upgrade, so the choice of Proper training style is the key to success for the trainer.

The method of lactate resistance is one of the modern training methods that it relies on in the development of endurance The application of contemporary scientific and technological foundations has contributed to the tremendous development that the world has witnessed in many different areas of life today, as this has led to the development of the physical and skill level of sports events in particular and sports performance in general, as there is no doubt that the integration of technologies is what allowed this high-skill and advanced performance, and the benefit of training has led to raising the level of performance of players, The spread of contemporary science and technology in many basic areas of life has led to new qualitative progress in solving many issues and problems related to human activity, including sports training.

As there is no doubt that the use of modern tools and devices in the game of handball has an important and significant role in sports activity, which needs to endure a general and special during performance and launch, as well as the end of the rapid attack ends in accuracy in shooting during its repetition throughout the duration of the match and training, like all skills as it depends on the physical aspect, as what distinguishes the modern handball player is his tolerance to very high performance, which appears clearly in the performance of all skills In general, defensive skills and fast attack in particular by mixing them to get the best performance.

Hence, the importance of the research was evident in working on lactate resistance training in bearing the performance of defensive skills and the individual rapid attack index for handball players under the age of (19) years

1.2 Research problem

Through the researcher's access to previous studies, watching and following it and analyzing a group of official and experimental matches and most of the training units of the Karbala Handball Club, the Sports Talent Center and the Karbala Education Team, the researcher noticed the inability of some players to continue with high efficiency and good performance throughout the same half and on the entire match, which leads to losing control at the end of time by losing focus on good performance, and this results mainly through weakness in the physical aspect, so The researcher decided to experiment with lactate resistance training to address this weakness of the defect in the development of the muscular side and the skill and physical side, hoping that this research will be of help to trainers and those in charge of training in the future.

1.3 Research objectives

1- Identify the effect of lactate resistance training on the performance of defensive skills and the individual rapid attack accuracy index for handball players under (19) years.

2- Identify the preference of differences between the control and experimental groups in bearing the performance of defensive skills and the individual rapid attack accuracy index for handball players under (19) years.

1.4 Research hypothesis

1- There is a positive effect of lactate resistance training in the performance endurance of defensive skills and the individual rapid attack accuracy index for handball players under (19) years.

2- The advantage of the experimental group over the control group in bearing the performance of defensive skills and the individual rapid attack accuracy index for handball players under (19) years.

1.5 Research areas

1-5-1 Human field: Karbala Handball Club players under the age of (19) years for the training season (2024-2025).

1-5-2 Time Range: From 11/1/2023 to 23/3/2025.

3 Spatial area: Karbala Indoor Sports Hall.

Chapter Three

3- Research methodology and field procedures

3.1 Research Methodology

The nature of the problem determines the approach used in the research to obtain accurate information and results and that the experimentation The researcher used the experimental design with experimental and control groups to suit the nature of the problem studied, and below the experimental design that was used in the research.

3.2 Research community and sample

The researcher identified the research community with the players of Karbala Handball Club, the youth category under the age of 19 years, whose number (16) players without goalkeepers, and they were all selected as a sample for research and in a comprehensive inventory method, and they were randomly and evenly divided into two groups and by (8) players for each group, as the experimental group used lactate resistance training, and the control group used coach training.

The researchers homogeneous the members of the research sample were measured variables of height, mass and training age because of their relationship to the variables of the research under study.

3.3 Methods, tools and devices used in research

3.3.1 Means of gathering information

- Objective tests and measures.
- Observation.
- Resolution.

3-4 Field Research Procedures:

3.4.1 Identification of the research variables studied

After referring to the sources scientific and reviewing the theses and theses, and the experience of the researchers, the research variables were determined, as they were agreed upon in line with the problem the research, which is (bearing the defensive skill performance, and bearing the individual rapid attack accuracy index) and the tests represented (test bearing the performance of defensive skills, testing the endurance of the individual rapid attack accuracy index).

3.4.2 Pre-testing:

The pre-test was conducted on the research sample on (Saturday) (2/3/2024), at the Al-Hakim Closed Hall Stadium in Karbala Governorate.

3.4.2.1 Equivalence procedures:

In order to adjust the research variables that affect the experiment and to start from a single starting point, the researchers will find the equivalence of the two research groups for the results of the pre-tests and extraneous variables using Tfor independent samples.

3.4.3 Main experience:

After completing the implementation of the pre-tests, the researcher will enter the exercises prepared by him and the devices within the training program dedicated to the research sample at the beginning of the main section of the training unit, then the main part will be supplemented together with the same exercises as the trainer, and it will be as follows:

1- The start date of the exercises will be on (Monday) 4/3/2024.

2- The exercises will be applied in the special preparation stage.

3- The duration of the experiment was (8) weeks distributed over (24) training units at a rate of three units per week on (Saturday, Monday and Wednesday).

4- They will be given the special exercises scheduled for them together at the beginning of the main part and on the closed hall courts (Al-Hakim Sports Hall) and after completing the special exercises, their training will be completed with the club coach.

5- The researcher determined the intensity of the exercises between (80-90%).

6- The researcher used the method of high-intensity interval training.

7- The date of the end of the experiment was on (Saturday) 27/4/2024.

8- Ripple was adopted (2-1).

3.4.4 Post-test:

The post-test was conducted on the research sample on (Monday) (29/4/2024), at the Al-Hakim Closed Hall Stadium in Karbala, taking into account the same conditions and conditions in the pre-test.

3.5 Statistical means:

The researchers used the statistical bag SPSS, using the following statistical methods:

Arithmetic mean, standard deviation, (T) for symmetrical and independent samples, Levin for homogeneity, Pearson's correlation coefficient, torsion coefficient, median, Ka2 test.

4 - Presentation, analysis and discussion of results :

This chapter included the presentation, analysis and discussion of the results reached by the researchers through conducting the pre-tests for the two research groups and implementing the exercises prepared in the training program and then conducting the post-tests for the research sample (experimental and control groups), and the data were collected, organized and classified in illustrative tables and then processed statistically to reach the final results to achieve the objectives and hypotheses of the research.

4-1 Presentation and analysis of the results of the tests in the pre- and post-measurement of the two research groups :

For the purpose of testing the second hypothesis, the researcher used the (T) test for symmetrical samples to extract the significance of the differences between the results of the tests in the pre- and post-measurement of the two research groups, as shown in the two tables.

Table (1)

Shows the arithmetic means, standard deviation, mean differences, standard deviation of differences, calculated t-value, level of significance, type of statistical significance for pre- and post-tests of the research variables for the experimental group

Indication Type	Moral e level	T value Calculated	p f	P	on	Going to	audition	Variables
Moral	0.000	10.156	0.34674	1.24500	0.27795	59.7700	Tribal	Bearing Defen
					0.30327	58.5250	Post	
Moral	0.000		0.00447	-0.02263-	0.00374	0.0474	Tribal	Quick attack

		- 14.316-			0.00424	0.0700	**Post**	

Under significance level (0,05) and sample size (8)

Table (1) Statistical indicators of the results of the tests in the pre- and post-measurement of the research variables that the members of the first experimental group underwent.

With regard to the variable (repetition of the individual rapid attack index), as the results showed that the values of the arithmetic media were higher in the post-test than the pre-test, and there was a significant difference between the two tests and in favor of the post-test, since the greater the arithmetic mean, the better the level, either variable (bearing the performance of defensive skills), the results showed that the values of the arithmetic means were lower in the post-test than the pre-test, and there was a significant difference between the two tests and in favor of the post-measurement because the measurement is reversed, meaning that whenever The lower the arithmetic mean the better the level, and this is indicated by the significance levels, as they were less than the significance level (0.05), which indicates significant differences between the two tests.

Table (3)

Shows the arithmetic means, standard deviation, mean differences, standard deviation of differences, calculated t-value, level of significance, type of statistical significance for pre- and post-tests of the search variables of the control group

Indication Type	**Morale level**	**T value Calculated**	**p f**	**P**	**on**	**Going to**	**audition**	**Variables**
Moral	0.000	24.034	0.22640	1.92375	0.32049	59.6837	**Tribal**	Bearing Defense
					0.22640	57.7600	**Post**	
Moral	0.000	-16.022-	0.00704	-0.03988-	0.00398	0.0489	**Tribal**	Quick attack
					0.00580	0.0888	**Post**	

Under significance level (0,05) and sample size (8)

Table (3) Statistical indicators of the results of the tests in the pre- and post-measurement of the research variables that the members of the control group underwent.

With regard to the variable (frequency of the individual rapid attack index), as the results showed that the values of the arithmetic media were higher in the post-test than the pre-test, and there was a significant difference between the two tests and in favor of the post-test, since the greater the arithmetic mean, the better the level, either variable (withstand the performance of defensive skills), the results showed that the values of the arithmetic means were lower in the post-test than the pre-test, and there was a significant difference between the two tests and in favor of the post-measurement because the measurement is reversed, meaning that whenever The lower the arithmetic mean the better the level, and this is indicated by the significance levels, as they were less than the significance level (0.05), which indicates significant differences between the two tests.

4-2 Presentation and analysis of test results in the telemetry of the two research groups and discussion

4.2.1 Presentation and analysis of test results in the telemetry of the two research groups

Table (4)

Shows the arithmetic means, standard deviation, calculated t-value, level of significance and type of statistical significance of the post-tests between the experimental and control groups of the research variables

Indication Type	Morale level	T value Calculated	on	Going to	The Collection	Variables
Moral	0.000	5.717	0.30327	58.5250	**Experimental**	Bearing Defense
			0.22640	57.7600	**Adjuster**	
Moral	0.000	-7.380-	0.00424	0.0700	**Experimental**	Quick attack
			0.00580	0.0888	**Adjuster**	

Under the significance level (0.05), sample size (16)

Table (4) shows the arithmetic means, standard deviations and significant differences between the results of the post-tests of the two experimental groups, and through reviewing the results of the tests that have been reached, it becomes clear to us that there are significant differences between the measurement of the post-tests of the two groups in all the variables studied, and for the benefit of the experimental group that used lactate resistance training, since the values of the

significance level were less than the error level (0.05) and this is consistent with what was stated in the hypothesis of the research.

4.2.2 Discussion of test results in the telemetry of the two research groups

The results showed that the use of lactate resistance exercises had a significant impact on improving the performance endurance of defensive skills and the individual rapid attack index of players, and the researchers attribute this improvement to lactate resistance training, which increased the efficiency of the physical aspect through the use of high-intensity and intense exercises that simulate match conditions and the physiological adaptation of the body to the high accumulation of lactic acid, which led to improved the tolerance of defensive skill performance and the individual rapid attack accuracy index.

This is confirmed by (Buchheit) in order for the athlete to develop the ability to endure his own performance, it is necessary to make functional adaptations that help the body to increase resistance to fatigue, and therefore they need to adapt the respiratory circulatory system, and this is also suitable mechanically, physiologically and psychologically to improve the achievement of the specialized effectiveness, and for the events of such adaptations, the stimulus time must be relatively short periods performed repeatedly, while maintaining the level of lactate accumulation (Buchheit M, Laursen PB, 2013, (p43-54)

The researchers also attribute the reason for the development of the research sample to the use of lactate resistance training, which works to pressure the athlete by working by not having oxygen with the intensification of work at this level and trying to work with high efficiency, and this is consistent with what was stated by (Michel Olson et al, 2014) that lactate resistance training is commensurate with the criteria for improving anaerobic capabilities, as it works to produce the maximum amount of energy produced by the body in the absence of oxygen, which is anaerobic capabilities, with greater consumption The amount of oxygen in the recovery period and the work of these two types of abilities positively affects the forms of endurance (Olson, 2014p (1-24).

In addition, training in this type of training works to develop many functional devices and enzymes related to lactate resistance, as (Gareth) pointed out by studying more recent evidence on the mechanisms that support high-intensity exercise and the extent of its impact on the development of the body's ability to withstand neuromuscular fatigue, as it was concluded that these exercises help to increase the ability of vital organizations in the body by increasing carnosine within the rapidly rising muscle fibers, which contributes to increasing the ability of

vital organizations and thus increases of lactate tolerance, which in turn is reflected in the development of performance tolerance (Gareth. N. Sandford, 2021 p 6).

The researchers attribute the reason for these differences to the use of exercises that were directed towards special endurance (performance endurance) being a special requirement in the game and other abilities, i.e. privacy using these exercises in line with what the situation requires in the game of handball, and thus give the ability to resist fatigue despite the increased concentration of lactic acid in the muscle and this is what the results showed, as well as what was indicated by (Michael Wilkinson et al. 2009) that special endurance training must be used (Lactate resistance) inside the handball field and that includes multiple changes in directions and frequent and must be performed according to the motor patterns of sports activity.

Also, I am the nature of lactate resistance training similar to the performance trained by handball players, which had a clear impact on the muscles participating in the performance, and more effective in developing the link between strength and speed and bearing them with the performance of these muscles, by containing these exercises for these elements to develop strength, speed and endurance together because they are consistent with the requirements of the performance of the handball game from the defensive and offensive sides, and are essential elements to develop their skill and achieve the best achievement, and this is consistent with what he mentioned Each of (Ahmed Farhan Ali, Hussein Manati Sajit 2017) "The training methods or special exercises implemented to achieve an effective training effect must be the exercises taken from the game or sports event works to involve the muscles that have the largest space in speed, strength and direction of movement of the skill and repeat it with high efficiency.

As the exercises were applied in a high-intensity interval training method, and the exercises were codified based on the type of lactate resistance training and with different intensities ranging between (80-90%) of the maximum ability of the player, and these exercises helped to improve and develop the research sample positively, which increases the effectiveness of the delivery of the nerve signal to the working muscles by improving the player's ability to perform despite the accumulation of lactic acid and with almost extreme tensions, and this is confirmed by (Abu Ela Ahmed Abdel Fattah 1998) " Special endurance training, which performs strongly close to the athlete's maximum intensity, improves the ability of the central nervous system to deliver nerve signals to the muscle, the effectiveness of these signals, and their role to stimulate the muscle to contract despite the conditions of increased accumulation of lactic acid in the muscles and blood (Abu Al-Ela Abdel Fattah, Muhammad Allawi, 1984, 195).

Chapter Five

5. Conclusions and recommendations

5.1 Conclusions:

1- - Lactate resistance training contributed to improving and developing the performance endurance of defensive skills and the individual rapid attack index for handball players .

2- The study showed that lactate resistance training helped raise physical and skill endurance, which led to improved performance of defensive skills and individual rapid attack accuracy index after improved cardiorespiratory variables .

3- The physiological development of the different body systems reflected positively on the physical abilities, as the exercises used were similar or more difficult than the conditions of competition, which increased the players' endurance and improved their performance.

5.2 Recommendations:

1- Continue to use lactate resistance training as an essential part of handball training programs, given its effectiveness in improving physical and physiological variables.

2- Conduct future studies to compare the effect of lactate resistance exercises with other training methods on physical and skill performance indicators.

3- Apply the exercises used in the study to different age groups to see the extent of their impact on the development of skills and abilities of players at different stages.

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Training Curriculum

Comfort between groups	Totals	Comfort between iterations	Duplicate	Severity %	number Exercises	Days	Weeks
2 min	3	1 D	3	80	11	Saturday	The first
2.30 min	3	1.30min	2	85	8		
2 min	3	1 D	3	80	15		
2 min	3	1 D	3	80	11	Monday	
2.30 min	3	1.30min	2	85	8		
2 min	3	1 D	3	80	15		
2 min	3	1 D	3	80	11	Wednesday	
2.30 min	3	1.30 min	2	85	8		
2 min	3	1 D	3	80	15		
2.30 min	3	1.30 min	2	85	1	Sunday	Second
2 min	3	1 D	3	80	5		
2.30 min	3	1.30 min	2	85	10		
2.30 min	3	1.30 min	2	85	1	Tuesday	
2 min	3	1 D	3	80	5		
2.30 min	3	1.30 min	2	85	10		
2.30 min	3	1.30 min	2	85	1	Thursday	
2 min	3	1 D	3	80	5		
2.30 min	3	1.30 min	2	85	10		
2 min	3	1 D	3	80	2	Sunday	Third
3 min	3	1.45 min	2	90	6		
2 min	3	1 D	3	80	12		
2 min	3	1 D	3	80	2	Tuesday	
3 min	3	1.45 min	2	90	6		
2 min	3	1 D	3	80	2	Thursday	
3 min	3	1.45 min	2	90	6		
2 min	3	1 D	3	80			
3 min	3	1.45 min	2	90	2	Sunday	Fourth
2 min	3	1 D	3	80	6		
2.30 min	3	1.30 min	2	85	12		
3 min	3	1.45 min	2	90	2	Tuesday	
2 min	3	1 D	3	80	16		
2.30 min	3	1.30 min	2	85	20		
3 min	3	1.45 min	2	90	4	Thursday	
2 min	3	1 D	3	80	16		
2.30 min	3	1.30 min	2	85	20		
2 min	3	1 D	3	85	7	Sunday	V
2 min	3	1 D	3	80	14		
2.30 min	3	1.30 min	2	85	19		
2 min	3	1 D	3	85	7	Tuesday	
2 min	3	1 D	3	80	14		

2 min	3	1 D	3	85	19		
2 min	3	1 D	3	85	7	Thursday	
3 min	3	1.45 min	2	90	14		
2.30 min	3	1.30 min	2	85	19		
2 min	3	1 D	3	85	8	Sunday	Sixth
3 min	3	1.45 min	2	90	24		
2 min	3	1 D	3	85	22		
2.30 min	3	1.30 min	2	85	6	Tuesday	
3 min	3	1.45 min	2	90	24		
2.30 min	3	1.30 min	2	85	22		
2.30 min	3	1.30 min	2	85	3	Thursday	
3 min	3	1.45 min	2	90	24		
2.30 min	3	1.30 min	2	85	22		
2 min	3	1 D	3	80	18	Saturday	Seventh
3 min	3	1.45 min	2	90	21		
2 min	3	1 D	3	80	13		
3 min	3	1.45 min	2	90	18	Monday	
2 min	3	1 D	3	80	21		
3 min	3	1.45 min	2	90	13		
3 min	3	1.45 min	2	90	18	Thursday	
2 min	3	1 D	3	80	21		
3 min	3	1.45 min	2	90	13		
3 min	3	1.45 min	2	90	23	Sunday	Eighth
2.30 min	3	1.30 min	2	85	17		
2 min	3	1 D	3	90	9		
2 min	3	1 D	3	90	23	Tuesday	
2.30 min	3	1.30 min	2	85	17		
2 min	3	1 D	3	90	9		
2 min	3	1 D	3	90	23	Thursday	
2.30 min	3	1.30 min	2	85	17		
2 min	3	1 D	3	90	17		

Samples of training modules

Week: First Training Unit: First (Anaerobic Exercises)

Special Goal: Develop Handball Performance Endurance Today: Sunday

Total Time	Comfort between		Performance time	Iteration× group	Intensity	Exercises
	Totals	Iteration				

16.5	**2 min**	**1 D**	50s	**3×3**	**80%**	- From a standing position, wear a vest to weigh the trunk and make jumps with both feet at the maximum possible speed for 40 seconds and then set off to perform the individual quick attack.
14.4	**2.30 min**	**1.30**	45s	**2×3**	**85%**	Make a hesitation with the feet with the ankle weighted for 35 seconds and then set off to make a quick attack with the aiming arm weighted.
16.45	**2 min**	**1 D**	**55s**	**3×3**	**80%**	- The player performs jumps forward on a ground ladder, then go to a sign in the middle of the field, make a turn, then go to the 9 m line and perform deception and correction.
47.35	**Mug**					