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Research Paper

The Effect of a Training Program Using Biometric Exercises on the Development of Some Physical and Skill Variables Among the Basketball Team Players at Palestine Technical University – Kadoorie

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ABSTRACT

The study aimed to examine the preparation of retaliatory force exercises and to identify the impact of strength training exercises to develop the explosive capability and precision scoring in the basketball team players in PTUK, according to the research results, the researchers reached the following conclusions: the polymetric training carried out by the researchers had a positive effect on the PTUK basketball teams physical and skill performance, and the teams overall performance was increased by these exercises, and in light of that the researchers recommend that the biometric exercises carried out by the researchers should be adopted by the PTUK in order to increase the physical and skill performance of the Universities basketball team.

Keywords: Polymeric training, basketball, explosive capability, precision scoring

INTRODUCTION

The sports field has developed rapidly in its various tracks as it is of great importance in the life of the community as one of the important basic pillars which gives the individual the freedom to choose the activities that reflect the abilities and potential. The basketball game is one of the exciting collective games that have witnessed progress in technical terms and the public as a result of the increasing demand for its practice (Gordon and Zuccarini, 2019).

The progress witnessed by the game is a natural and inevitable result of scientific research and sound planning, which was based on objective scientific foundations and the correct method of training in order to reach high levels (Sarlis and Tjortjis, 2020). The technique of retraining training is an important training tool that has a positive effect on the development of physical abilities. It has also been developed to raise the functional and skill level of the players due to the specificity of this technique in training (Bouteraa, Negra, Shephard, and Chelly, 2020).

This is due to the mechanism of muscular action during the strength training. It improves muscle

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elasticity and increases muscle strength. Resulting from decentralized and central muscular contraction (Meszler and Váczi, 2019).

It is known that physical abilities, including muscle strength, have an important role in raising the level of physical fitness of basketball players, especially the youth, through which the player can master all technical skills in the best manner with the correct application of the instructor's instructions and plans on the playground and the explosive capacity of the most important physical abilities of football players The basket being "the special muscular strength of the muscles that operate primarily in the sport of the individual and qualify the muscles mainly in the motor performance of the sport practice (Garbenytė-Apolinskienė, Šiupšinskas, Salatkaitė, Gudas, and Radvila, 2018).

Jumping is one of the most common types of scoring used by a basketball player to get rid of the defender by jumping and thus scoring (Hernández et al., 2018). This skill is based mainly on the vertical jump strength of the target player and his concentration and his ability to avoid the defender who is jumping with him. The strength and height of the jump of the target depends on the length of the defender and the height of his jump and the extent of his reaction towards the movement of the target and after the goal of the basket In light of the advanced, the importance of research lies in the preparation of physical exercises in the form of strength and a reaction to the development of the explosive capacity of the muscles of men and accuracy of the jump for young basketball players (Nikolic, 2018).

Research Problem

From the nature of the researchers work as instructors in the physical education department in Palestine Technical University, they noticed the decrease of the physical and skill abilities in students performance in basketball, this led them to try and study The effect of a training program using biometric exercises on the development of some physical and skill variables among the basketball team players at Palestine Technical University – Kadoorie.

Research Aims

1. Preparation of retaliatory force exercises to develop the explosive capability and accuracy of scoring in the basketball team players in PTUK.
2. To identify the impact of strength training exercises to develop the explosive capability and precision scoring in the basketball team players in PTUK.

Research Hypothesis

1. There are statistically significant differences at the level of significance ($\alpha \leq 0.05$) in the effect of the training program using biometric exercises on developing the physical and skillful performance of basketball among the players of the Palestine Technical University team for the experimental group between the mean of the pre and post measurements and in favor of post measurement.
2. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the pre and post measurements of members of the control group on developing the physical and skillful performance of basketball among the players of the Palestine Technical University Kadoorie team and in favor of the post measurement.
3. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the post measurement of members of the experimental and control groups on the development of physical and skillful performance of basketball among the players of the Palestine Technical University team - Kadoorie and in favor of the experimental group.

Research Methodology and Field Procedures

Research Methodology: The experimental approach was used in the style of equal groups of pre and post testing to suit the nature of the problem.

Research community and its samples: The research community consisted of (20) young basketball players in PTUK.

The research sample was selected in a comprehensive inventory method. The research sample consisted of the research community as a whole. Each team has (5) players and (5) players for the exploratory experience.

Training Program for Plyometric Exercises

The two researchers, through their perusal of similar previous studies related to the subject of the study, and through consulting experts and specialists in basketball, the two researchers designed a training program using plyometric exercises that help improve

the level of physical and skill performance in basketball, as these exercises help to develop the physical side of During repetition on the devices used that simulate the nature of the game in addition to controlling the height of these tools, their distance and proximity to the place of performance, it helps to develop physical characteristics in addition to increasing the element of suspense and will. Also, these tools help in improving the level of skillful performance through accuracy in performing skills and improving skill performance This leads to an improvement in the level of the players, and the researchers formulated the training program in its final form, taking the advice of experts and specialists in basketball, as well as taking into account the intensity, size and intensity where the training program is from exercises Physical and skill by using pleometric exercises. B tests were performed Minimal and skill to see the extent of improvement in the physical and skills aspects. The program included the physical and skill variables of basketball using plyometric exercises.

Regular Program

It is a group of training units and includes a physical and skills aspect and is distributed among the training units within scientific foundations as follows, and it mostly focuses on skill performance with a rate of up to 70% and physical performance 30%. The normal program for the control group was applied in the same period of time. Where the researcher allocated a time period of (12) weeks at the rate of (3) training units per week. The training unit lasted 90 minutes.

Application of the program: The researcher and the assistants applied the training program on the experimental group starting from 9/20/2019 until 12/20/2019.

Dimensional Measurements

After completing the implementation of the program, which lasted for a period of (12) weeks, and the traditional (regular) program, which also lasted for a period of (12) weeks, the researchers took the dimensional measurements of the experimental and control groups during the period between (20/9/2019) - (9/27/2019), where physical measurements were taken in the gymnasium, and skill measurements were taken on the basketball court with the help of three colleagues who are specialists in the field of sports.

Study Procedures

The researcher followed the study procedure according to the following stages:

1. Pre-start of the training program:
   - Determine the population and sample of the study.
   - Determine the physical and skill variables to be studied.
   - Designing a proposed training program using plyometric exercises to develop the physical and skillful performance of basketball for the players of the Palestine Technical University - Kadoorie.
   - Ensure that the validity and consistency factors of the physical and skill tests begin before starting the application of the program, after applying the tests to an exploratory sample from outside the original study sample.
   - Determine the tools used and the assisting team in the measurement process.
   - Ensure the homogeneity of the study sample.
   - Conducting pre-measurements for the physical and skill tests and distributing the study sample individuals randomly into two groups of equal number (experimental and control), and the equivalence between them was ensured on the pre-measurement of all the variables under study.
2. The implementation phase of the training program:
   - Application of the proposed training program using pleometric exercises to develop the physical and skillful performance of basketball among the players of the Palestine Technical University - Kadoorie. For a period of (12) weeks, 3 training units per week for the experimental group members.
   - Application of the traditional (regular) program on members of the control group.
3. The stage after completing the implementation of the training program:
   - Conducting dimensional measurements of the physical and skill variables under study among

Table 1: sample characteristics

Variable	Unit of measurement	Mean	St.dev	Skewness
Age	Year	21.05	1.701	1.626
Weight	Kg	56.35	6.285	0.359
height	cm	161.60	3.858	0.083-

Source: researcher's calculations

Table 2: The coefficient of stability and the self-validity coefficient of the study variables

Variable	Application	Mean	St.Dev	Reliability coefficient	Honesty coefficient	Sig.
Vertical Jump	First	7.625	1.995	0.974	0.987	0.000
	Second	8.250	2.187			
Aim from vertical jump	First	8.692	3.180	0.990	0.995	0.002
	Second	9.459	3.005			
Aim from gradual jump	First	15.750	2.251	0.824	0.908	0.001
	Second	16.000	1.309			
Medical ball push	First	7.775	2.465	0.994	0.997	0.000
	Second	8.874	2.505			

Source: researcher's calculations

members of the experimental and control groups.

- Data were collected, coded, entered into the computer, and analyzed using the Statistical Package for Social Sciences (SPSS) program.

The Program

This proposed program aims to use a set of exercises with plyometric exercises to work on improving the physical and skills of the Palestinian University of Technology's players - in basketball, through a training program that includes some correction skills exercises from jumping and peaceful correction, as the development in these skills will be observed by focusing on some physical and skill variables.

Statistical Analysis

Sample characteristics

It is clear from the Table 1 that the mean of the ages of the study sample is (21.05) years and that the average weight of the students in the study sample is (56.35) and that the average height for them is equal to (161.6), and that the skewness ranges between (-3, +3) and this It indicates that the members of the sample are homogeneous.

Reliability

The reliability of the tests is one of the most important tests that are performed on the pilot sample, and it means that if the test is re-applied on the same sample and in the same circumstances, the results will be similar. These criteria, therefore, the validity is considered relative to each scientific research, and scientific research produces inferences and certain conclusions that have three characteristics: The first is its relevance for research, its meaning, and its utility, and the importance of truthfulness lies in establishing the true evidence that supports these inferences.

The researchers conducted two tests for the survey group consisting of 8 students in the Department of Physical Education at the Palestine Technical University Kadoorie within five days, and they calculated the stability coefficient for the survey sample and the stability and self-validity coefficients for the physical and skill tests were as shown in the following table:

It is evident from Table 2 that all correlation coefficients are statistically significant at a level of significance (0.05) for the physical and skill tests, and the values ranged between (0.824-0.994). This confirms that the skill and physical performance has a high degree of stability. By finding the square root of the stability parameters, this indicates that the skill and physical performance tests have a high degree of validity, which is reassuring to use.

Equality of Members of the Two Groups (Control and Experimental)

Based on the concern for the safety of the results, and to avoid the effects of extraneous factors that must be controlled and limit their effects, the torsion coefficients were calculated for all the study variables to find homogeneity among the sample members in all variables, and the variables (age, weight, height) were adjusted to ensure the equivalence of these variables before Starting with the experiment and (Table 3) shows that:

(Table 3) Arithmetic means, standard deviations, the lowest and largest value, and the skewness of the basic variables and the skill and physical performance of the study sample

It is evident from the previous table that the skewness for the total study sample in the basic variables, skill performance and physical performance ranged between (-3, +3), meaning that there is homogeneity in these variables for the total sample of the study.

Hypothesis Testing

1. There are statistically significant differences at the level of significance ($\alpha \leq 0.05$) in the effect of the training program using biometric exercises on developing the physical and skillful performance of basketball among the players of the Palestine Technical University team for the experimental group between the mean of the pre and post measurements and in favor of post measurement.

To test the validity of the first main hypothesis, a Paired Samples T-test was used, and the results are as shown in the following table:

Table 3: Arithmetic means, standard deviations, the lowest and largest value, and the skewness of the basic variables and the skill and physical performance of the study sample

	Unit	Lower	Higher	Mean	St.dev	Skewness
Age	Year	19	26	21.05	1.701	1.626
Weight	Kg	65	92	56.35	6.285	0.359
height	cm	174	181	161.60	3.858	-0.083
Vertical Jump	cm	49	81	7.350	1.822	0.398
Aim from vertical jump	m	6.52	16.88	11.611	3.503	-0.224
Aim from gradual jump	m	12.50	21.50	16.575	2.172	0.204
Medical ball push	m	4.80	11.20	8.582	1.611	-0.576

Table 4: Paired Samples T-test results between pre and post measurements of the experimental group (N = 20)

Variable	Group	Mean	St.Dev	Deference	Improvement	T-value	Sig.
Vertical Jump	Pre	7.00	1.747	0.700	10%	4.765	0.000
	Post	7.70	1.949				
Aim from vertical jump	Pre	11.258	3.548	0.705	6.2%	6.032	0.000
	Post	11.963	3.476				
Aim from gradual jump	Pre	16.250	2.291	0.650	28.3%	3.115	0.006
	Post	16.900	2.149				
Medical ball push	Pre	8.155	1.619	0.855	10.5%	9.9918	0.000
	Post	9.010	1.626				

*The tabular value of (T) at the degree of freedom (19) and at the level of significance ($\alpha \leq 0.05$) = 2.09. *The tabular value of (T) at the degree of freedom (19) and at the level of significance ($\alpha \leq 0.01$) = 2.86

Table 5: Paired Samples T-test results between pre and post measurements of the control group (N = 20)

Variable	Group	Mean	St.Dev	Deference	T-value	Sig.
Vertical Jump	Pre	6.514	1.744	0.036	0.075	0.941
	Post	6.55	4.468			
Aim from vertical jump	Pre	8.963	2.823	0.097	0.252	0.804
	Post	9.050	3.268			
Aim from gradual jump	Pre	13.8	2.88	1.65	2.657	0.016
	Post	15.45	2.327			
Medical ball push	Pre	7.503	1.458	0.219	2.065	0.053
	Post	7.722	1.753			

*The tabular value of (T) at the degree of freedom (19) and at the level of significance ($\alpha \leq 0.05$) = 2.09. *The tabular value of (T) at the degree of freedom (19) and at the level of significance ($\alpha \leq 0.01$) = 2.86

Table 6: Independent Samples T-test results between the means of the control and experimental group for post measurement (N = 20)

Variable	Group	Mean	St.Dev	Deference	T-value	Sig.
Vertical Jump	Experimental	7.7	1.949	1.15	2.107	0.042
	Control	6.55	1.468			
Aim from vertical jump	Experimental	11.963	3.476	2.913	2.730	0.010
	Control	9.050	3.268			
Aim from gradual jump	Experimental	16.9	2.149	1.45	2.047	0.048
	Control	15.45	2.327			
Medical ball push	Experimental	9.01	1.626	1.28	2.409	0.021
	Control	7.722	1.753			

*The tabular value of (T) at the degree of freedom (38) and at the level of significance ($\alpha \leq 0.05$) = 2.02. *The tabular value of (T) at the degree of freedom (38) and at the level of significance ($\alpha \leq 0.01$) = 2.70

It is evident from the previous (Table 4) that the calculated T values are higher than the tabular T values at a significance level ($\alpha \leq 0.05$), and that all the differences between the post and pre-measurement are statistically significant, and that the difference in the physical performance (Vertical Jump) was (0.7), with a percentage of improvement that reached 10% in favor of post-measurement, and that the difference in physical performance (Medical ball push) was (0.855) with an improvement rate of 10.5% in favor of post-measurement, and that the difference in skill performance (Aim from vertical jump) was (0.705), with an improvement rate of 6.2% in favor of post-measurement, and that the difference in skill performance (Aim from gradual jump) was (0.650), with an improvement rate of 28.3% in favor of post-measurement.

2. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the pre and post measurements of members of the control group on developing the physical and skillful performance of basketball among the players of the Palestine Technical University Kadoorie team and in favor of the post measurement.

To test the validity of the second main hypothesis, a Paired Samples T-test was used, and the results were as shown in the following table:

It is evident from Table 5 that the calculated value of T is less than the tabular T value for each of (Vertical Jump, Aim from vertical jump, Medical ball push) and that the differences are not statistically significant at a significant level ($\alpha \leq 0.05$), and that there are statistically significant differences Between the pre and post measurements of the Aim from gradual jump variable in favor of the post measurement of the control group.

3. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the post measurement of members of the experimental and control groups on the development of physical and skillful performance of basketball among the players of the Palestine Technical University team - Kadoorie and in favor of the experimental group.

To test the validity of the third main hypothesis, an Independent Samples T-test was used, and the results were as shown in the following table:

Table 6 concerning the significance of the differences between the group's post-measurement averages (control and experimental) for the skillful and physical performance of the basketball team at Palestine Technical University Kadoorie shows that the calculated value of T is higher than the tabular value of T for all variables, and it is a statistically significant function at the level of significance ($\alpha \leq 0.05$), and in favor of the experimental group, where the difference in the (Vertical Jump) variable = 1.15 in favor of the experimental group, and the difference in the (Aim from vertical jump) variable = 2.913 in favor of the experimental group, and the difference in the (Aim from gradual jump) variable = 1.45 in favor of the experimental group, and the difference In the variable (Medical ball push) = 1.288 in favor of the experimental group.

CONCLUSION

According to the research results, the researchers reached the following conclusions: the biometric

training carried out by the researchers had a positive effect on the PTUK basketball teams physical and skill performance, and the teams overall performance was increased by these exercises, and in light of that the researchers recommend that the biometric exercises carried out by the researchers should be adopted by the PTUK in order to increase the physical and skill performance of the Universities basketball team.

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