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THE EFFECT OF GIBALA-STYLE EXERCISES ON DEVELOPING SOME BIOMOTOR ABILITIES AND BIOMECHANICAL VARIABLES OF THE SMASH SKILL IN YOUTH VOLLEYBALL

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Abstract

The smash is one of the offensive skills that affect the achievement of volleyball and through obtaining match points, which requires maximum effort from the player with accuracy of performance. The importance of biomechanics and kinetic analysis in knowing the details of movement of body parts, especially fast movements and their mechanical variables, and the relationship of these variables to other elements and variables that affect achievement or performance . Hence, the importance of this study came through preparing exercises using the Gibala method to develop some biomotor abilities and biomechanical variables of the smash skill in volleyball for youth, thus generalizing errors and enhancing positives in mastering the smash skill. The study aimed to prepare exercises using the Gibala method and identify the effect of exercises prepared using the Gibala method in developing some biomotor abilities and biomechanical variables of the smash skill in volleyball for youth.

The research community was represented by (12) youth volleyball players. The research sample was chosen by simple random method and their number was (6) players. The researcher used the experimental method and all the variables under study were extracted through the kinetic analysis of the smash skill through the kinetic analysis program (Kinovea 8.24). The researcher reached a set of conclusions, including: The exercises using the Gibala method contributed to the development of the speed of the last step of the smash skill in volleyball for the research sample members. In addition to the appearance of random differences in the variable of the height of the ball at the moment of hitting it between the pre- and post-tests for the research sample members.

Keywords: Gibala-style, bio meter abilities, biomechanical variables, youth volleyball

1-1 Introduction to the research: -

The feature of the era is the feature of using modern theories in the sports training process, and therefore there must be a link between previous theoretical and practical experiences with the development of scientific and creative aspects with the aim of achieving investment in the players' skill and physical capabilities in addition to the mechanical aspects to be effective in achieving the optimal achievement, and volleyball is one of the games whose performance has developed significantly in recent years and this progress was preceded by a development in analytical and measuring tools and devices, which led to the emergence of skill and technical performance in an advanced way by integrating technological progress with training, anatomical and physiological foundations in addition to the kinetic phenomena of the athlete, the Gibala method is one of the modern methods that is implemented with high intensity to improve the skill and physical capabilities of the players .

The smash is one of the offensive skills that affect the achievement of volleyball and through obtaining match points, which requires maximum effort from the player with accuracy of performance. The importance of biomechanics and kinetic analysis in knowing the details of movement of body parts, especially fast movements and their mechanical variables, and the relationship of these variables to other elements and

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variables that affect achievement or performance, and hence the importance of this study came through preparing exercises using the Gibala method to develop some biomechanical abilities and biomechanical variables for the skill of smashing in volleyball for youth, thus generalizing errors and enhancing positives in mastering the skill of smashing.

The researcher noticed through his experience in volleyball as a player and a volleyball teacher that some coaches do not pay enough attention to the various training methods that meet the ambition to reach the desired goal in the training process, as the use of various training methods and means leads to excitement and suspense among the players, which leads to optimal achievement. Among these methods used is the Gibala method. Therefore, the researcher found it necessary to study this topic to identify the practical obstacles, especially since studying his topic like this contributes to developing many solutions to the problems that volleyball players suffer from in all skills, especially the smashing skill to develop some bio-motor abilities and biomechanical variables for the smashing skill in volleyball for youth.

The research aims to:

1- Preparing exercises using the Gibala method.

2- Identifying the effect of exercises prepared using the Gibala method in developing some biomotor abilities and biomechanical variables of the smashing skill in volleyball for youth.

2- Field research procedures: -

2-1 Research methodology: -

The researcher used the experimental method for its suitability and the nature of the research problem.

2-2 Research community and sample: -

The research community consisted of the players of the 2024 Olympic Champion Volleyball Project under (18) years of age, numbering (12) players, while the research sample consisted of (6) players, who were selected randomly.

2-3 Methods, devices and tools used in the research:

2-3-1 Methods of collecting information: -

- Observation and analysis
- Personal interviews
- Testing and measurement
- Sources and references

2-3-2 Devices and tools used in the research: -

- A drawing scale with a length of (1) m.
- One laptop type (hb)
- A volleyball court
- A video camera with a speed of (120 images/second).
- Volleyballs, a measuring tape, a whistle.

2-4 Field research procedures: -

2-4-1 Determining the biomechanical variables of the volleyball smash skill:

By reviewing many scientific sources and the researcher's experience, some biomechanical variables of the volleyball smash skill were determined, which the researcher aims to study:

1- **The speed of the last step:** It is the result of the horizontal distance between the front of the foot at the beginning of the last step to the front of the foot at the moment of support on the ground over its time, S = (m/n)

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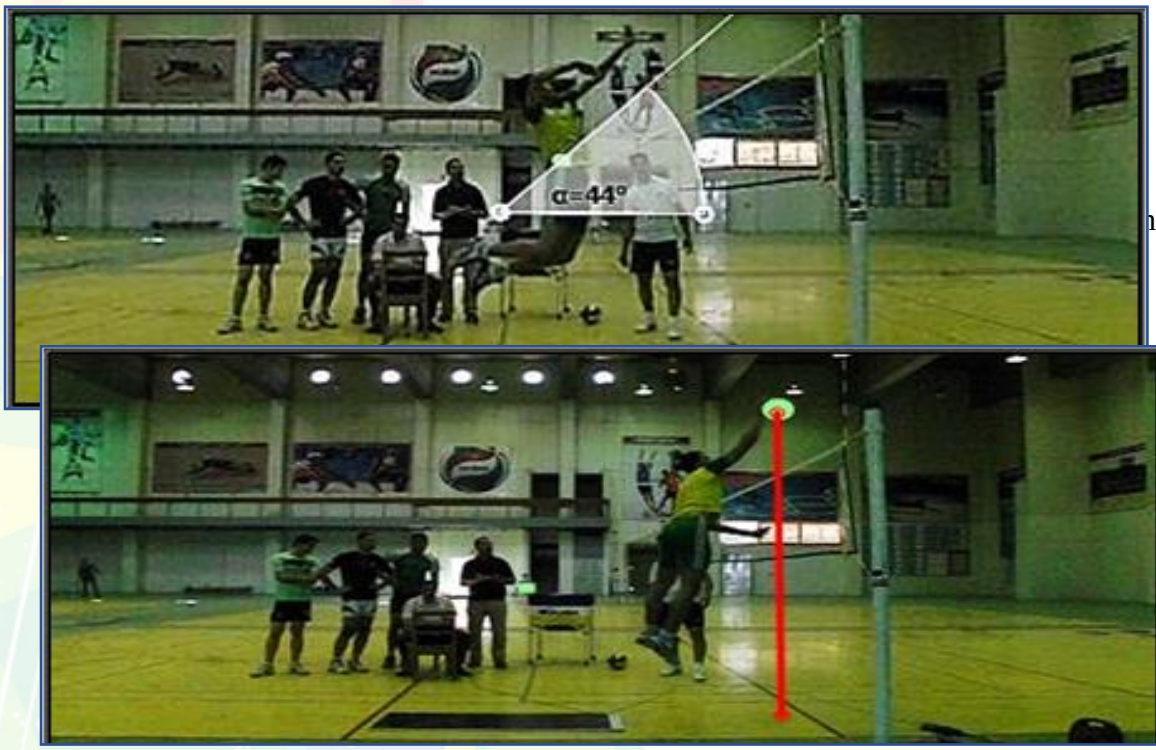
Figure (1)
shows the speed of the last step

2- The body's starting angle: It is the angle between the line connecting the hip joint point after leaving the ground with the line of the hip joint's transition in the air.



3- ne surface of

Figure (3)
shows the height of the ball at the moment of hitting it.

2-4-2 Determining the biomotor capabilities of the volleyball smash skill: -
By reviewing many scientific sources and the researcher's experience, the capabilities were determined Biokinetics of the volleyball smash skill:

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1. Streamlining at the moment of rise: It is calculated from the value of the difference in the vertical and horizontal momentum of the body between the second linear momentum from the moment of rise to the moment of hitting the ball.

2. Kinetic transfer at the moment of hitting the ball: It is calculated by the amount of the flight angle divided by the amount of the total energy decrease (kinetic energy and potential energy).

2-5 Exploratory experiment:

The researcher conducted the exploratory experiment on two players from the research community of youth volleyball players. During this experiment, the technical performance test for the smash skill was applied. The researcher used the kinetic analysis program (Kinovea 8.24) to extract and analyze the research variables.

2-6 Gibala style exercises:

The researcher worked on preparing special exercises in a gradual style within the trainer's training program and in the main section of the training unit in the special preparation stage for (12-13 minutes) with a training intensity (80%-90%) of the maximum capacity of the athlete, and a short rest period (60-75 seconds). The researcher relied on preparing the exercises on the exchange of work on the muscle groups, and the implementation of the exercises continued within the training program for a period of (8 weeks), the number of training units (3 units) weekly, and the total number of units (24 units).

2-7 Main experiment:

After completing the exercises, the researcher repeated the tests and measurements used in the research that were implemented in the pre-measurement and under the same conditions, time and place to obtain the measurements required to be studied.

2-8 Statistical methods:-

In order to achieve the research procedures and reach results, the researcher used the statistical methods extracted from the statistical package Spss.

3- Presentation, analysis and discussion of the results:

3-1 Presentation of the results of the arithmetic means, standard deviations, and the calculated (t) value and their statistical significance for the tests and measurements in the pre- and post-test of the research sample individuals and discussion of them.

Table (1)

shows the values of the arithmetic means, standard deviations, and the calculated (t) value and its statistical significance for the tests and measurements in the pre- and post-test for the research sample individuals.

Variables	Pre-test		Post-test		F	A F	T	Error level	indication
	Arithmetic mean	standard deviation	Arithmetic mean	standard deviation					
Speed up the last step	3.142	0.062	3.750	0.034	0.608	0.142	10.66	0.000	moral
Body departure angle	44.350	2.551	46.420	2.691	2.07	0.301	16.96	0.000	moral

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Height of the ball when hit	**2.452**	**0.120**	**2.510**	**0.101**	**0.058**	**0.121**	**1.208**	**0.082**	**random**
Fluidity at the moment of rising	**221**	**19.54**	**145**	**18.44**	**76**	**14.66**	**11.16**	**0.000**	**moral**
Motion transfer at the moment of hitting the ball	**0.669**	**0.031**	**0.721**	**0.042**	**0.052**	**0.031**	**4.33**	**0.007**	**moral**

Below the significance level (0.05) and degree of freedom (5)

The results in Table (1) showed that the values of the arithmetic means and standard deviations of the variables under study between the pre- and post-tests were in favor of the post-test for all tests except for the height of the ball at the moment of hitting, as the result was random, indicating the effectiveness of the Gibala exercises prepared by the researcher to develop some biomotor abilities and biomechanical variables, as these exercises contributed to increasing the player's speed during the motor performance of the smashing skill by exerting a force proportional to the resistance he faces, which positively affects the skill performance. This is what was indicated by (Mohamed Fawzy 2003) "that practicing repetition and skill preparation leads to a cumulative change in behavior as a result of the gradual growth in the strength of the motor approach to the skill" [(1)]

As for the appearance of random differences in the height of the ball at the moment of hitting it between the pre- and post-tests, despite differences in the values of the arithmetic means, it is due to the fact that Gibala's exercises were not sufficient to show superiority in one of the two groups, because the individuals in the research sample did not perform the necessary force on the ground for the player to obtain a push that qualifies him to reach an appropriate height. Peter M. McGinnis 2017 states, "The player must have the strength to absorb kinetic energy when the ball hits the ground and produce the same amount of energy during the propulsive part, and the player's muscles must be able to produce a large force at a high contraction speed" [(1)].

4- Conclusions and recommendations: -

4-1 Conclusions: Based on the above and within the limits of the study results that could be reached, the researcher concluded the following: -

1- The exercises using the Gibala method contributed to the development of the speed of the last step of the volleyball smash skill for the research sample members.

2- The exercises using the Gibala method contributed to the development of the body's launch angle for the volleyball smash skill for the research sample members.

3- The appearance of random differences in the variable of the height of the ball at the moment of hitting it between the pre- and post-tests for the research sample members.

[(1)] Mohamed Fawzy Abdel-Shakoor, Mohamed Sayed Mohamed Helmy: Foundations and Theories of Motor Learning, 2nd ed., Helwan University, 2003, p. 141.

[(1)] Peter M. McGinnis: (Translation) Abdul Rahman bin Saad Al-Anqari and Muhammad Abdul Aziz Daif, Biomechanics in Sports and Physical Activity, King Saud University Press, Riyadh, 2017, p. 366.

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4- The exercises using the Gibala method contributed to the development of fluidity at the moment of rising for the volleyball smash skill for the research sample members.

4- The use of the Gibala method exercises contributed to the development of the motor transfer at the moment of hitting the ball for the volleyball smash skill for the research sample members.

4-2 Recommendations: Within the limits of the study objectives and results, the researcher recommends the following:

1- Paying attention to Gibala training in the preparation stage for players and its great importance in achieving the ideal achievement and performance of volleyball skills.

2- The necessity of paying attention to the mechanical kinetic analysis of motor skills because of its great role in the training process to achieve the ideal achievement.

3- The necessity of conducting similar studies on other activities and skills.

Sources:-

- Peter M. McGinnis: (Translation) Abdul Rahman bin Saad Al-Anqari and Muhammad Abdul Aziz Daif, Biomechanics in Sports and Physical Activity, King Saud University Press, Riyadh, 2017.
- Muhammad Fawzi Abdul Shakoor, Muhammad Sayyid Muhammad Hilmi: Foundations and Theories of Motor Learning, 2nd ed., Helwan University, 2003.