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The Effect of Special Training in Developing Some Mechanical Variables and Shooting Skill from Jumping for Players Under 19 Years Old in Handball

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Abstract: Biomechanics has an important and fundamental role in the current scientific progress of motor performance in general and the player in particular. Because the basis of biomechanics is the study of the causes of instantaneous movement and interest in studying all the forces that lead to effective movement. This science is one of the very precise sciences that gives an honest and accurate indication of the subject of study and reaching a solution to the current problem in a scientific and accurate manner by describing the movement in a mechanical and accurate description by applying mechanical laws and principles to the course of movements in the human body to reach a movement path adopted by the body. Hence the importance of research in adopting special training in developing mechanical variables and shooting skill from a fixed position for handball players to determine their strengths and weaknesses in each shooting attempt in order for coaches to focus on them to achieve the best results in sports competitions. The research problem was that many coaches do not use skill-specific exercises in the handball training process, so the researcher decided to prepare special exercises to develop some mechanical variables and the skill of shooting from a standstill to know the effect of using these special exercises and their importance and the possibility of real benefit from them in order to develop the training process and save effort and time. The study aimed to prepare special exercises. Identify the effect of special exercises in developing some mechanical variables and the skill of shooting from a standstill. The research hypotheses were there is a positive effect of special exercises in developing some mechanical variables and the skill of shooting from a standstill. The research sample was represented by the players of Al-Qasim Youth Club, numbering (16) players. The researcher used the statistical truth (SPSS) to extract the results and through the statistical results. The researcher concluded that the special exercises had a great effect in learning the skill of shooting from a standstill for the members of the experimental group. The use of new methods, techniques and advanced aids during training sessions played an effective, important and major role in the development process, and this is what we saw from the players' enthusiasm for training and practice due to the presence of incentives, including photography and competition in play.

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1. Introduction

Handball is one of the ancient games that has made progress in reaching the highest levels based on correct scientific foundations. Handball is one of the oldest known games. Handball is one of the games that has special requirements and determinants in addition to its competitive, sporting, social and psychological goals, as it is played within special laws and special organizational rules that govern competition between players. Biomechanics has an effective and fundamental role in the current scientific progress of

motor performance in general and sports in particular. Because the basis of biomechanics is the study of the causes of basic movement and interest in studying all the forces that lead to movement. Each offensive movement has a special mechanical position from which it is performed because this game, like other sports, requires analysis of its basic movements or skills.

In addition to containing a number of important and difficult movements through which the largest possible number of goals can be scored and the best results can be obtained in matches. We cannot obtain good results and good levels without knowing the influencing factors and mechanical variables that are specific to this sports competition. Hence the importance of research in preparing special training in developing mechanical variables and shooting skill from a fixed position to determine the strengths and weaknesses in each of the offensive movements of this skill in order to focus on them by the working coaches to achieve the best results in sports competitions. Handball sport or game requires speed in motor performance on the field and continuous movement and movements for rapid attack and defense, so the player must have the ability to continue mechanical work between body movements and skill movements and with strong muscular ability in one ascent with maximum effort and the least time, reaching the goal, and with high accuracy to score a goal. Therefore, it is necessary to work on introducing special training for this skill and benefit from it in developing the skill used in attack to improve the player's offensive level. This game is closely related to biomechanics like other sports and the extent of benefiting from the finest motor details and basic skills and their paths and importance in developing these basic skills must be studied carefully.

The researcher noted that many coaches do not use modern training in the training process for handball. Therefore, the researcher decided to prepare special training in developing some mechanical variables and the skill of shooting from a fixed position for players to know the effect of using these training and knowing their importance and the possibility of real benefit from them in order to develop training work and save effort and time to come out with the best results.

Research objectives:

- Preparing special training to develop some mechanical variables and the skill of shooting from a fixed position with a handball.
- Identifying the effect of special training to develop some mechanical variables and the skill of shooting from a fixed position with a handball.

Research hypotheses:

There is a positive effect of special training to develop some mechanical variables and the skill of shooting from a fixed position with a handball.

Research areas:

- Human field: Al-Qassim Sports Club handball players.
- Time field: From 6/9/2023 to 11/11/2023.
- Spatial field: Al-Qassim Youth Sports Forum Hall.

2. Materials and Methods

Research Methodology

The researcher used the experimental method to suit the nature of the study problem, which is the design of two equivalent groups "with pre- and post-measurement. This is consistent and compatible with the requirements of his research and achieving the study objectives. As shown in Table 1.

Table 1. The experimental design of the two research groups

Group	Pre-test	Experimental treatment	Post-test
Experimental group	Mechanical variables Shooting skill from a standstill	Special training	Mechanical variables Shooting skill from a standstill
Control group	Mechanical variables Shooting skill from a standstill	Curriculum prepared by the trainer	Mechanical variables Shooting skill from a standstill

Research Community and Sample

The research community was defined as the players of Al-Qasim Sports Club, numbering (16) players. The research sample was chosen randomly, numbering (16) players. The researcher divided the sample randomly into two groups: the experimental group using special training, numbering (6) players, and the control group, numbering (6) players. Table 2 shows this.

Table 2. The distribution of the research community

Research community	Experimental group	Control group	Survey sample	Total
16	6	6	4	16

Methods, Devices and Tools Used

Methods used in the research:

- Arab and foreign references.
- Interview.
- Questionnaire.
- Results collection form.
- Special forms for data collection.
- Observation.

Devices and tools used in the research:

- Laptop (Dell).
- Electronic timers (Casioty) number (3).
- Video camera type (banSony) with a frequency of 300 images/second.
- Measuring tape length (6m).
- Handballs number (15).
- Display device (Data show).
- Drawings with various measurements to display the shooting skill.
- Medical scale to measure weight.
- Legal handball field.

Field research procedures:

The researcher determined the shooting skill from a fixed position due to a clear weakness in it.

Description of the shooting test from a standstill:

- Shooting from a high jump on shooting accuracy squares
- Purpose of the test: Measuring shooting skill

Tools:

- Handball court

- Shooting accuracy squares 50 x 50 cm hung in the upper corners of the goal
- 6 handballs

Performance specifications:

The player performs two or three steps, then jumps from the 9m line and shoots at the shooting accuracy squares from a high jump, and three balls are sent to each shooting accuracy square in succession. Evaluation: The number of successful shooting attempts in which the ball enters completely into the shooting accuracy squares is recorded for the examiner (2 points for each successful attempt).

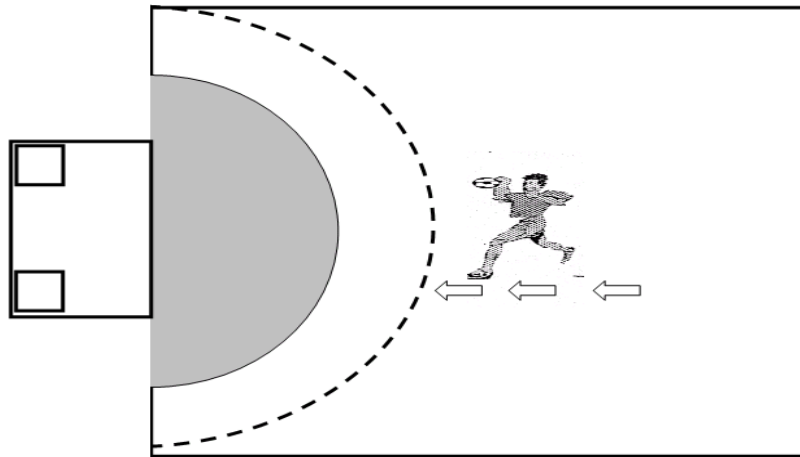


Figure 1. The skill of shooting from a jump

Procedures for determining mechanical variables

By reviewing a set of references and sources, in addition to the interviews he conducted with experts and specialists in the field of biomechanics and handball, a set of mechanical variables related to the research problem were determined. The researcher isolated the biomechanical variables of the skill and measured them individually. They were measured by placing a camera with a frequency of (25) images/second, where the camera was placed in a side view of the playing field and was fixed on a large tripod with a height of (1.70 m) and a distance of (6 m) from the lens. Also, photography was done to the drawing scale and in the place where the shooting skill was performed from a standstill. Also, a camera with the same specifications was placed behind the player performing the skill and a third camera above. All of these cameras are connected to a computer to collect information and cut the necessary images to extract the results and send them to the arbitrators to extract the results and measurements of the mechanical variables of the skill, as shown in the Table 3 below.

Table 3. The skill of shooting from a fixed position and its mechanical variables

Shooting from stability
Mechanical variables
Shoulder speed while shooting
Elbow speed while shooting
Wrist speed while aiming
Torso angle while shooting
The angle of the shoulder joint while shooting
Jumping distance while aiming

Measuring mechanical variables

To measure mechanical variables, the researcher used a Japanese video camera (banySony) with a frequency of (300 fps) for the purpose of photographing the sample in the main experiment. The camera was placed at a distance of (6 m) and a height of (70.1 m).

Analysis by computer

The analysis was conducted by computer:

1. The video material was converted from the video film to the file format (FILES) using a conversion card ((FPS 18 8T VIDEO IN - OUT (MJPEG CARD) and then to (CD) in order to know and facilitate the analysis steps.
2. The video movement of the skill was cut using the program (MAKE MORIE. ITMPSQUENCE) into images to extract the variables under study and store those images in the file folder.
3. After identifying the clips that needed analysis, the images were transferred to the program (AUTO CADE) that was previously installed on a (Dell) computer, where the distances and angles to be analyzed for the shooting pass from jumping were measured.

Exploratory experiment

The exploratory experiment is considered "practical training for the researcher to stand on the negatives and positives that he encounters during the tests To avoid them in the future. The researcher conducted a survey experiment on a sample of (4) players from outside the research sample. The aim of the experiment was as follows:

1. Ensure the efficiency of the devices and tools used
2. Adjust the dimensions of the cameras, their height and the clarity of the image
3. Efficiency of the assistant work team
4. Know the difficulties facing the researcher in order to avoid them in the future
5. Find scientific coefficients for the tests.

Scientific foundations for skill performance evaluation forms

1. Validity of the forms:

The degree of validity is the most important factor for the quality of tests and measures.

The skill performance evaluation forms have gained one of the types of validity, which is content validity, which is one of the most common and used types of validity in the field of physical education and sports sciences.

2. Stability of the questionnaires:

The researcher extracted the stability coefficient of the correctors, which is one of the main sources of variation in the error in the test score in the scales that depend on the corrector's evaluation and not on the correction key when the evaluation of the performance of the players of the exploratory sample of (4) players was adopted through the evaluation of three judges for the performance of the skills by the players. After that, the researcher sought to extract the correlation coefficient (Pearson) between the judges' estimates, as shown in Table 4.

Table 4. The values of Pearson's correlation coefficient (correction stability coefficient) for the skill performance questionnaire.

Skill	1st and 2nd referee correlation values	1st and 3rd referee correlation values	2nd and 3rd referee correlation values
Shooting from jump	0.894	0.903	0.878

Developing the educational program

The researcher prepared special trainings, Appendix (5), which included special trainings for the skill of shooting from a jump, and also included emphasis and reminders of the stages of performing the skill through models of the trainings provided in learning the skill and the effect of mechanical variables on motor performance. The researcher took into account in his selection of trainings that they were consistent with the objectives of the research and that their content was consistent with the capabilities of the sample and that gradualness, excitement, suspense and competition were taken into account, and that they were consistent with the capabilities of the players and that security and safety factors were taken into account. The training criteria (distance, time, repetition) were also determined, which is related to the field work of the skill.

The implementation of the training program continued for (8) weeks, at a rate of three training units per week, thus the number of training units is (24) training units. The units were divided into (3) sections, which are:

1. The preparatory section: It is the preparation and readiness of the body and contains a group of movements: walking, jogging, running, twisting the trunk, foot movement and general warm-up.

2. Main section: The shooting skill is applied through explanation and field application in a way that divides the skill and then integrates it with emphasis on the importance of mechanical variables in achieving the ideal performance of the skill.

3. Final section: It is done through calming down and some recreational games that suit the research sample.

Pre-measurement

The researcher conducted the pre-measurement on the research sample in the Al-Qassim Youth Forum Hall in order to establish the measurements of the studied variables and determine the level of the research sample before implementing the main experiment, as all mechanical variables and shooting skill from jumping were measured.

Equivalence of groups

The researcher made an equivalence table for the two research groups as shown in Table 5.

Table 5. The equivalence of the two research groups in terms of study variables

statistics	measuring unit	Control group		group Experimental		Calculated T value	Sig	Statistical significane
		middle	deviation	middle	deviation			
Tallness	poison	160.3	6.22	161.6	6.19	0.186	2.44	random
Bloc	kg	48.4	5.89	48.95	5.99	0.249	2.44	random
Training age	Sh	19	3.96	19.5	3.85	0.387	2.44	random
Shooting from jump	Dr	4.13	0.5	4.27	0.09	0.53	0.62	random

Shoulder speed while shooting	m / s	0.09	0.01	0.09	0.01	0.59	0.58	random
Elbow speed while shooting	m / s	1.15	0	1.14	0.02	0.47	0.65	random
Wrist speed while aiming	m / s	1.18	0	1.18	0.01	0.11	0.92	random
Torso angle while shooting	Dr	139.25	0.13	139.65	0.35	2.14	0.08	random
The angle of the shoulder joint while shooting	Dr	145.55	0.08	145.85	0.15	3.44	0.01	random
Jumping distance while aiming	poison	38.75	0.96	39	1.83	0.24	0.82	random

Note: Table (T) value at significance level (0.05).

Application of special exercises

The researcher used special exercises on the experimental group sample, while the control group sample kept the exercises prepared by the trainer, where the special exercises were implemented, at a rate of three training units per week, thus the total training units became (48) training units divided into two groups, the experimental group share was (24) training units and the control group share was (24) training units. The training units included exercises for mechanical variables and shooting skill from jumping in line with the capabilities of the study sample, and the researcher was keen that there would be no difference between the individuals of the two groups in all parts of the training unit.

Post-measurement

The researcher conducted the post-measurement on the individuals of the experimental and control groups under the same conditions and specifications of the pre-measurement and obtained the data and recorded it in special forms to be processed statistically.

Statistical methods used

The researcher used the statistical bag (SPSS) to extract the results statistically.

3. Results

Results of the control group

Table 6. The arithmetic means, standard deviations and the calculated (t) value for the pre- and post-tests for the individuals of the control group

Type of significance	sig	t value is calculated	Posttest		Pretest		Statistical features
			A	s	A	s	Variables
moral	0	6.9	0.18	5.92	0.5	4.13	Shooting from jump
moral	0	226	0.02	1.15	0	0.09	Shoulder speed while shooting
moral	0	16.31	0.75	1.71	0.01	1.15	Elbow speed while shooting
moral	0	440.7	0.02	1.79	0	1.18	Wrist speed while aiming
moral	0	105.4	0.18	135.11	0.14	139.25	Torso angle while shooting
moral	0	50.01	0.18	139.9	0.08	145.55	The angle of the shoulder joint while shooting
moral	0	2.71	1.82	40.5	0.95	38.75	Jumping distance while aiming

Table 6 shows that the calculated (t) value was greater than the statistical value and below the significance level (0.05), which indicates the existence of a significant difference between the two tests in favor of the post-test in all the variables studied.

Table 7. The arithmetic means, standard deviations, and the calculated (t) value for the pre- and post-tests of the experimental group members

Type of significance	sig	t value is calculated	Posttest		Pretest		Statistical features
			A	s	A	s	Variables

moral	0	44.38	0.18	7.9	0.1	4.27	from Shooting jump
moral	0	53.12	g070	1.86	0	0.09	speed Shoulder while shooting
moral	0	33.6	0.08	2.5	0	1.14	speed Elbow while shooting
moral	0	228	0.02	2.34	0	1.18	speed Wrist while aiming
moral	0	74.32	0.19	121	0.4	139.7	angle Torso while shooting
moral	0	18.11	1.87	128.8	0.2	145.9	of the The angle shoulder joint while shooting
moral	0	6.11	1.82	48	1.8	39	Jumping distance while aiming

Table 7 shows that the calculated (t) value was greater than the statistical value and below the significance level (0.05), which indicates the existence of a significant difference between the two tests in favor of the post-test in all the variables studied.

Table 8. The arithmetic means, standard deviations, and the calculated (t) value for the post-test for the experimental and control research groups

Type of significance	sig	t value is calculated	Experimental group		Control group		Statistical features
			A	s	A	s	Variables
moral	0	23	0.18	7.9	0.19	5.88	from Shooting jump
moral	0	24.6	0.09	1.86	0.03	1.13	Shoulder speed while shooting

moral	0	14	0.07	2.5	0.78	1.75	speed Elbow while shooting
moral	0	60	0.018	2.34	0.04	1.8	speed Wrist while aiming
moral	0	104.6	0.18	120.61	0.19	134.1	angle Torso while shooting
moral	0	12.5	1.89	128.79	0.15	140.3	of The angle the shoulder joint while shooting
moral	0	8.19	1.76	48	1.9	40.5	Jumping distance while aiming

Table 8 shows that the calculated value of (t) was greater than the statistical value and below the significance level (0.05), which indicates the existence of a significant difference between the two groups in favor of the experimental group in all the variables studied.

4. Discussion

The researcher attributes this to the way the training is presented, which creates a positive and effective atmosphere and excitement during work, and draws a clear and understandable picture of how to perform the skill. "Since any work is not successful without competition, therefore, when the process is devoid of elements of competition and excitement, its results will not be good. In contrast, the player will be more positive when competition is provided and presented to the player, helping him to create a desire to deal with the duties required of him to implement, and forming in him great psychological satisfaction and acceptance, resulting in the creation of a learning process and rapid adaptation to sports movements and activities.

The researcher believes that the reason for the development that has occurred is due to the influence of special training that helped develop the players' performance. It was characterized by diversity and excitement, approaching in its requirements the nature of the skill performance. The difference in speeds among players led to an increase in the accuracy factor and concentration of players during viewing and performance. Also, the suitability of the skill performance of the model to the players' abilities and capabilities and their physical levels played a major role in the development of their skill performance for shooting. The reasons for paying attention to the training process and increasing the speed of learning and building a good training base require us to use the best training means and methods and modern methods, as training or teaching methods and techniques are of great importance in the educational process and these methods and techniques affect increasing the speed of the learner and the degree of satisfaction of the learner.

It is also necessary to keep pace with the events of the current scientific development in various fields of the training process and use what suits the players and their abilities and technical and skill capabilities and other special training and educational curricula and training methods and new tools based on real and purposeful scientific foundations that will raise the training level and achieve the best results in the learning and training process, "as the goal that training curricula seek through practice and repetition of the learning process is to develop and improve the level of technical and skill performance of the games, as the basis of skill learning is the player's acquisition of capabilities The skill that helps him achieve a good level in applying basic skills. There must be a programmed preparation that ensures learning basic skills.

The factor that showed the extent of development of the research variables for the experimental group is the extent of the suitability of the special training and the way it is presented to the level, capabilities and abilities of the players. Choosing the training and training on it continuously and continuously and repeating it gives positive, effective and good results. This is what the researchers confirmed that "using special and purposeful training has a positive effect on the development and improvement of the skill" and that "repeating the training enables the player to master the movements completely, which together represent the skill to be applied and ensures coordination between these skills, which makes their performance in the correct order and appropriate time. Also, taking into account the extent of the suitability of the performance with the level of physical effort exerted, which is one of the important matters that must be taken into account in the stages of applying the basic skill. In this topic, it was confirmed that programmed sports exercises have a great effect in increasing the amount of learning.

5. Conclusion

1. Special training has a good effect on learning the skill of shooting from a standstill for the experimental group sample.
2. Special training units and presentation of the skill to the model had a great effect on the learning process.
3. The use of modern methods and tools and auxiliary tools during the training units had an important role in motivating the players to train.

6. Recommendation

1. Applying special training in learning new offensive skills other than the skill of shooting from a jump.
2. Conducting studies on other samples because we have seen the benefit for the current sample.
3. Training can be developed to include higher age groups and in other games.

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