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The Effect of Ball-Specific Exercises on Developing Maximum Anaerobic Capacity and Moderate Performance Endurance in Young Football Players

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Abstract
Objective of the Research:
- To investigate the effect of ball-specific exercises on maximum anaerobic capacity and moderate performance endurance among young football players.

Research Methodology:
- The researcher employed an experimental design, using a pretest-posttest design with control and experimental groups, suitable for the nature and problem of the research.

Recommendations:
- It is essential to use high-intensity interval training when implementing ball-specific exercises, given its significant role in enhancing performance levels.
- Relying on ball-specific exercises can foster enjoyment and motivation during training, which may lead to improved application of exercises and consequently positively impact the players' physical and technical performance.

Keywords: Anaerobic capacity, Football, Performance endurance, Ball-specific exercises

1 – Research Introduction:

1-1 Introduction and Importance of the Research:

Football is one of the most widely popular sports globally due to its significant educational and physical benefits. Performance in football has evolved, with physical preparation now being a crucial component for success, forming the foundation for high-level technical and tactical play. Scientific and systematic use of sports training plays a significant role in enhancing various aspects of specialized performance. Fundamental skills are among these aspects, with sports training aiming to improve them due to their critical role in elevating performance levels across different sports activities. Football involves various skills such as dribbling, passing, and shooting, which are categorized based on the skills required for specific tasks during play.

Physical aspects are numerous and play a vital role in improving an athlete's overall performance, ensuring that skill requirements are aligned with physical variables to achieve a well-rounded player both physically and skill-wise. Among these physical attributes, endurance in its various forms is particularly emphasized by coaches for its meaningful relationship with other elements of preparation, whether technical, tactical, or physical[1].

Physical attributes are extremely important for football players, including maximum anaerobic capacity, which is fundamental for players in developing anaerobic abilities such as strength, speed, speed-strength, and explosive power. These attributes contribute to enhancing the technical aspects of a player by providing them with the necessary physical variables.

The role of the coach is crucial in adding to the existing qualities of the athlete to elevate their technical level to the highest standards. The importance of the research lies in preparing specific physical exercises for football, relying on training load components, including the intensity level, stimulus duration, and type of rest used, based on dynamic exercises. These could potentially address certain deficiencies in fundamental skills

[1] Bastoisi, Ahmed. "Foundations and Theories of Sports Training." (Cairo: Arab Thought House, 1999), p. 183.

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and improve maximum anaerobic capacity and moderate performance endurance among young football players.

1-2 Research Problem:

Through the researcher's observation and review of the training units at Al-Ghaz al-Shamal Football Club for youth, and based on their experience as a former player and coach for several sports clubs, as well as their specialization in sports training, they noted that during the trial matches of the team, errors in executing basic skills appeared. These errors might be due to deficiencies in specific physical capacities, which in turn reduce the players' movement to the appropriate positions on the field, especially in the last quarter of both halves. Consequently, weaknesses in anaerobic capacities and signs of fatigue become evident. The researcher believes that implementing specific exercises according to the variables being investigated during training units will positively impact the players' performance concerning the physical variables under study.

1-3 Research Aim:

To identify the effect of specific football exercises on maximum anaerobic capacity and moderate performance endurance among young football players.

1-4 Research Hypotheses:

- There are statistically significant differences between the control and experimental groups in the pre-test and post-test results for maximum anaerobic capacity and moderate performance endurance among young football players.
- There are statistically significant differences between the post-test results of the control and experimental groups in maximum anaerobic capacity and moderate performance endurance among young football players.

1-5 Research Scope:

1-5-1 Human Scope: Young players of Al-Ghaz al-Shamal Sports Club football team.

1-5-2 Temporal Scope: From (21/1/2022) to (26/1/2023).

1-5-3 Spatial Scope: Al-Ghaz al-Shamal Sports Club football field.

2. Research Methodology and Field Procedures

2-1 Research Method:

The researcher used the experimental method with a two-group design (control and experimental) with pre- and post-tests, which is suitable for the nature and problem of the research.

2-2 Research Community and Sample:

The researcher defined the research community as young football players from Kirkuk clubs, numbering (36) players. The researcher selected a sample from this community using purposive sampling from players aged (17-19 years) representing Al-Ghaz al-Shamal Sports Club for youth, which is one of the first-division clubs in Kirkuk province for the 2021-2022 football season. The choice of this age group was made because dealing with them yields tangible and impactful results for the future of the players. Goalkeepers (3 players) and injured players, as well as non-compliant players and those from the exploratory sample (10 players) who were randomly selected (by draw/pairing), were excluded. Thus, the final sample consisted of (20) players divided into two equal groups, each with (10) players. This results in a percentage of (55.55%) for the combined control and experimental groups, with the experimental group comprising (27.777%), which is suitable to represent the research community, as detailed below:

Research Population	Number	Percentage
Research Population	36	100%
Control and Experimental Sample	20	55.55%
Experimental Group	10	27.77%
Excluded Players	3	8.33%
Exclusion of Pilot Sample	10	27.77%
Exclusion of Goalkeepers	3	8.33%
Total	36	100%

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2-4 Homogeneity and Equivalence of the Research Groups:

2-4-1 Homogeneity of the Research Groups:

The researcher assessed the homogeneity of the research groups (control and experimental) in terms of variables such as chronological age, training age, height, and weight, using the skewness coefficient (±3), as illustrated in Table (2).

Variable	Unit of Measurement	Mean	Standard Deviation	Mode	Skewness Coefficient
Chronological Age	Years	17.550	0.686	17	0.801
Training Age	Years	2.750	0.966	3	-0.258
Height	cm	167.450	7.163	168	-0.076
Weight	kg	56.045	9.475	53.15	0.305

From Table (2), it can be observed that the skewness coefficients range between (+1), indicating a normal distribution for the sample of both groups. This suggests that the groups are homogeneous with respect to the mentioned variables.

2-4-2 Equivalence of the Research Groups:

The researcher assessed the equivalence between the research groups concerning the research variables under study, as shown in Table (3).

Test	Group	Mean	Standard Deviation	Calculated t Value	Significance Level (sig)	Significance
Average Performance Endurance	Experimental	21.122	1.215	0.237	0.815	Not Significant
	Control	21.008	0.911			
Maximum Anaerobic Capacity	Experimental	529.797	62.303	0.084	0.934	Not Significant
	Control	527.227	73.768			

• Significant at a significance level of ≤ (0.05).

2-5 Equipment, Tools, and Methods Used for Data Collection:

2-5-1 Equipment Used in the Research:

- The researcher used the following equipment to complete the study:
  - Camera
  - Laptop computer
  - Medical scale for measuring weight in kilograms.

2-5-2 Tools Used in the Research:

- Stopwatch
- Measuring tape
- Twenty standard football balls
- Ten training cones
- Fifteen markers
- Two goalposts
- Two whistles
- Training ladder

2-5-3 Methods of Data Collection:

- Arabic and foreign sources and references
- Tests used.

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- Questionnaire form
- Data extraction form
- Observation and experimentation

First: Anaerobic Capacity Test (Rast Test)[1]

- **Purpose of the Test:** To measure anaerobic capacity.
- **Necessary Equipment for the Test:** Field, four stopwatches, electronic scale, two starting whistles, and an electronic pulse measurement device.
- **Test Description:** The test consists of six sprint starts over thirty-five meters, which the subject must complete. There is a rest period of 10 seconds between each sprint, as shown in Figure (1).
- **Recording Method:** The time to cover each thirty-five meters is recorded separately in seconds and hundredths of a second. The anaerobic capacity for each repetition is calculated as follows:
- **Anaerobic Capacity (in watts) = weight ×distance^2 \ time^3**
- **Average Anaerobic Capacity (in watts) = Total Sum of Values / 6.**

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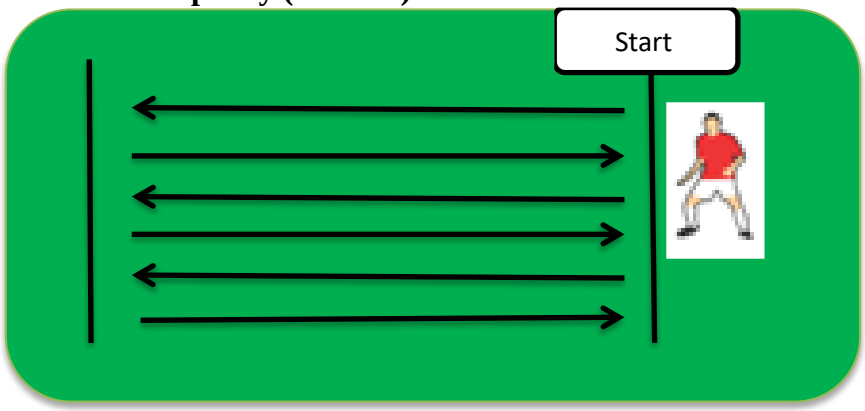

Second: Average Performance Endurance Test

Test Objective: To develop the following attributes and skills: (coordination and direction change (agility), speed, long passing).

Tools Used: Measuring tape, six markers, two round cones, stopwatch, two standard football balls.

Performance Specifications: Three markers are placed with three meters between each marker, and there are three additional markers on the same line (forming a triangular arrangement). The distance between each marker is three meters. The player runs from the first marker to the second marker sideways to the right, then to the third marker on the left side, continuing the sideways run to the sixth marker. Afterward, the player sprints back to the first marker and repeats the performance once more. Then, the player makes a long pass to the coach on the right side of the field and a second long pass to the assistant coach on the left side of the field. Each player is given two consecutive attempts, as shown in Figure (2).

Recording Method: The time is recorded to the nearest hundredth of a second for the best attempt.

[1] **Ahmed Abdul Ghani Al-Dabbagh (et al.):** Effect of Accumulated Anaerobic Effort on Some Blood Variables and Some Functional Variables: Published Research in *Research Journal* (University of Mosul, College of Basic Education, 2006), Volume (3), Issue (3).

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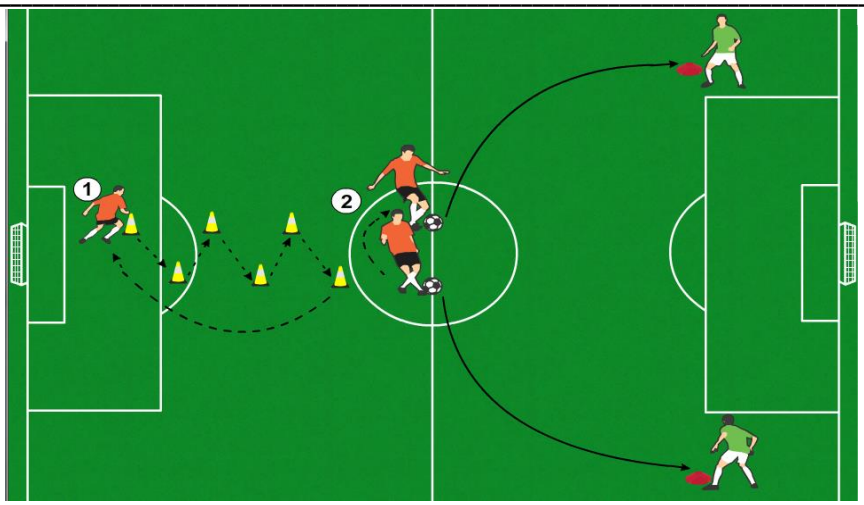

2-6 Field Procedures Used in the Research:

2-6-1 Pilot Studies:

Two pilot studies were conducted with the help of the supporting team to overcome any obstacles that might be faced by the researcher, the supporting team, and the players during the implementation of the training sessions, training units, and tests, and to provide appropriate solutions. Each pilot study had different objectives, as follows:

- **First Pilot Study:**
  - **Date:** June 6, 2022
  - **Participants:** five players from the pilot sample
  - **Objectives:**
    - To establish the scientific basis for the tests under study.
    - To verify the suitability of the tools and equipment used in the tests.
    - To familiarize the supporting team with the test procedures and measurement methods.
    - To identify potential difficulties and attempt to address them.
- **Second Pilot Study:**
  - **Date:** June 13, 2022
  - **Participants:** five players from the pilot sample
  - **Objectives:**
    - To assess the feasibility of applying the specific ball exercises.
    - To determine the time required for each exercise.
    - To understand the rest periods between repetitions and between sets.
    - To identify any obstacles that may occur during the application of the ball exercises and attempt to adjust them.
    - To train the supporting team on the method and process of applying the exercises.

2-7 Scientific Foundations of the Tests:

2-7-1 Test Reliability:

Test reliability refers to the idea that "if the test is administered again to the same individuals, it should yield the same or closely similar results."[1] To find the reliability coefficient of the tests, the researcher used the test-retest method, ensuring conditions were as consistent as possible with the same sample of 5 players. The test was administered from June 16-17, 2022, and retested from June 23-24, 2022, under the same conditions. The reliability coefficient was calculated using Pearson's correlation coefficient, which showed a high degree of reliability, as shown in Table (3).

2-7-2 Test Validity:

[1] **Marwan Abdul Majid:** *Scientific Foundations and Statistical Methods for Tests and Measurement in Physical Education*, 1st ed. (Amman, Dar Al-Fikr for Printing, Publishing, and Distribution, 1999), p. 70.

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Validity is defined as "the ability of the test to measure what it is intended to measure or the attribute it is meant to assess."[1] To ensure the validity of the tests, the researcher employed the following methods:

- **Content Validity:**
  - Content validity was assessed by conducting a comprehensive review of sources and scientific references in measurement, evaluation, and football training to identify tests for physical and skill-related variables, anaerobic capacity, and fatigue indicators for advanced football players.
- **Face Validity:**
  - Face validity was determined by presenting all the proposed tests to experts and specialists (see Appendix 5). It was confirmed that the tests were valid for measuring their intended purposes.
- **Construct Validity:**
  - The researcher used the construct validity coefficient for all tests by calculating the square root of the reliability coefficient, as shown in Table (3).

2-7-3 Objectivity of the Test:

To ensure the objectivity of the tests, two referees ([2]) were relied upon to record the test results simultaneously. The results were calculated using Pearson's correlation coefficient, which showed high correlation coefficients in all the tests used. This confirms the objectivity of the tests, as shown in Table (3).

#	Variables	Tests	Reliability	Validity	Objectivity
1	Physical Attributes	Maximum Anaerobic Capacity Test (RAST)	0.89	0.94	0.91
2	Average Performance Endurance	Lateral Running to Six Markers, then Running Again, followed by Passing the Ball to the Right and Left	0.88	0.93	0.89

2-8 Preparation of Ball-Specific Exercises:

After reviewing the reference framework, scientific sources, and literature in the field of general training and football, the researcher designed ball-specific exercises tailored to the nature of the investigated variables and suited to the level of the research sample. A total of thirteen ball-specific exercises were prepared.

2-9 Final Procedures for the Study:

2-9-1 Pre-Tests:

Pre-tests were conducted for both the control and experimental groups on June 30, 2022, at 4:30 PM at the North Gas Club sports field. The tests included:

- **Day 1:**
  - Average Performance Endurance Test
  - Anaerobic Capacity Test

2-9-2 Ball-Specific Exercises Used in the Research:

After completing all pre-tests, the ball-specific exercises were implemented for the experimental group from July 3, 2022, to August 24, 2022. The control group carried out exercises designed by their coach. The following considerations were observed during the execution of the exercises:

- All training sessions began with general warm-up followed by specific warm-up.
- High-intensity interval training (HIIT) was used for implementing ball-specific exercises.
- Exercises were conducted in two moderate cycles over 8 weeks, with three training sessions per week, totaling twenty-four training units.

[1] **Hassan Ahmed Al-Shafei and Susan Ahmed Ali:** *Principles of Scientific Research in Physical Education and Sports* (Alexandria, Manshat Al-Ma'arif, 1999), p. 20.

[2] The referees relied upon for recording the test results are:

- **Taha Qasem:** Bachelor's degree in physical education, Certified Coach with an Asian (B) License, Coach at Al-Hadaf Academy.
- **Muzaffar Nuri:** Holder of an Asian (B) License, Coach at Khak Football Club.

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- Three exercises were used in each training session according to their objectives.
- A total of thirteen exercises were selected, aligning with experimental variables including dribbling, medium passing, long-distance shooting accuracy, average performance endurance, and maximum anaerobic capacity.
- Rest periods between sets were 2 minutes, determined from the second pilot study.
- Rest periods between repetitions were adjusted based on the exercise's goal and intensity, at a ratio of 1:2, based on the pilot study and suitability for the training method used.
- Repetitions were based on the suitability for the variable and players' capacity, with two repetitions for endurance variables, three repetitions for anaerobic capacity, and four repetitions for basic skills per group.
- Intensity used was 80-90%, appropriate for the nature of the performance and high-intensity interval training.
- Exercise durations were determined based on pilot studies.
- All ball-specific exercises for the experimental group were applied during the main part of the training session.
- A wave-like load pattern was used with a ratio of 3:1.

2-10 Post-Tests:

Post-tests were conducted for the research sample on August 28, 2022, at 4:30 PM at the North Gas Club sports field, after completing the ball-specific exercises. The researcher ensured the conditions were the same as those during the pre-tests.

2-11 Statistical Methods:

The researcher used the SPSS statistical package to analyze the results:

- Mean
- Standard deviation
- Percentage
- Median
- Skewness coefficient
- T-test for related samples
- T-test for independent samples

3 Presentation, Analysis, and Discussion of Results:

3-1 Presentation of the Experimental Group Results for Average Performance Endurance and Maximum Anaerobic Capacity for Pre-Tests and Post-Tests:

#	Physical Variables	Unit of Measurement	Pre-Test Mean (M)	Pre-Test SD (SD)	Post-Test Mean (M)	Post-Test SD (SD)	t-Value	Significance Level (sig)	Significance
1	Average Performance Endurance	Seconds	21.122	1.215	19.305	0.484	6.756	0.000	Significant
2	Maximum Anaerobic Capacity	Seconds	529.797	62.303	500.603	53.594	7.757	0.000	Significant

From Table (4), it is evident that all investigated variables for the experimental group achieved statistical significance between the pre-tests and post-tests, favoring the post-tests. This indicates that the ball-specific exercises applied were properly designed according to the capabilities of the sample group, resulting in

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improved performance in the tests used to measure their levels. The training load components, exercise standardization, and training methods were all appropriate for the sample, which aligns with what Yusuf Lazim (1999) mentioned: "Properly standardizing the training load will lead to improvements in the performance of body organs and systems, thus developing physical and skill attributes to achieve the best athletic performance."[1]

Al-Bassati (1998) mentions that "the correct formulation of training load is the fundamental basis for the player's development. Improving the player's level requires advancement in the training load, as it enhances the player's ability to adapt. Furthermore, the coach's understanding of the relationship between load intensity and volume, and the use of appropriate load levels for training direction, enables effective shaping of the training load."[2]

It is crucial for the coach to understand the reality and significance of rest periods and their risks, as they are as important as understanding the load and its effects. Ignoring or being unaware of the importance of rest can undermine the intended effect of any training load, preventing the coach from improving the players' performance. Rest is always intrinsically linked to the load to ensure adaptation. **Al-Bassati (2016)** emphasizes that "understanding the correct relationship between the load level and the appropriate rest period is the key to improving the player's performance level. This relationship represents one of the fundamental principles of training."[3]

The researcher believes that the exercises used in the training units should closely resemble what occurs on the field. This alignment ensures that the training process yields realistic results in matches, allowing the player to acquire a valuable repository of information applicable to real game situations. The ball-specific exercises were similar in content, reflecting positively on the players' performance during football matches on the field. This view aligns with **Lamp (1984)** and **Peterson & Fisher (1990)**, who state that "the principle of specificity in training means that the training should include movements similar to the nature of the performance in the practiced sport activity."[4][5]

The researcher believes that using exercises characterized by endurance, performed well and for extended periods, exerts pressure on the system that allows the player to gain substantial benefit. Additionally, employing high-intensity interval training plays a crucial role in balancing the load between repetitions, exercises, and sets, as well as maintaining proper balance through appropriate rest periods. All these factors, combined with specific ball exercises for anaerobic capacity, contributed to achieving statistical significance in the post-test results. **Aamer Shughati (2013)** confirms that endurance performance is "the athlete's ability to perform a series of complex physical and skill movements for an extended period without a decrease in performance level."[6]

Muhannad Al-Beshtawi and Ahmad Khawaja (2005) state that "anaerobic capacity is the ability to produce the maximum possible energy or work through the anaerobic phosphagen system. It includes all physical activities performed at maximum speed or force in the shortest possible time."[7]

3-2 Presentation of Results for the Control Group:

[1] **Yusuf Lazim Kamash:** *Fundamental Skills in Football: Teaching and Training* (Amman, Dar Al-Khaleej for Publishing, 1999), p. 31.
[2] **Amr Allah Al-Bassati:** *Foundations and Principles of Sports Training and Its Applications* (Egypt, Alexandria University, Faculty of Physical Education, 1998), p. 53.
[3] **Amr Allah Ahmed Al-Bassati** (2016): *Source previously mentioned*, p. 66.
[4] Fisher G. (Peterson , R . **Scientefic Basis Athlates Conditioning** . :(Lea & Fbigen : Philadelphia . 2009) p136.
[5] Lamp , D : **Physiology of Exercise Response and Adaptations**, :(Macmillan Publishing , New York .1984).p46.
[6] **Aamer Fakhour Shughati:** *Sports Training Science: Youth Training Systems for Advanced Levels* (Amman, Arab Community Library for Publishing and Distribution, 2013), p. 227.
[7] **Muhannad Hassan Al-Beshtawi and Ahmad Ibrahim Khawaja:** *Principles of Sports Training* (Amman, Dar Al-Wael for Publishing, 2005), p. 17.

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For the Intermediate Performance Endurance and Maximum Anaerobic Capacity in Pre-tests and Post-tests:

- **Significant if the significance level (sig) ≤ (0.05).**

Physical Variables	Unit of Measurement	Pre-test	Post-test	Mean (M)	Standard Deviation (SD)	T-value	Significance Level (sig)	Significance
Intermediate Performance Endurance	Seconds	21.008	20.674	20.841	0.911 / 0.959	4.060	0.003	Significant
Maximum Anaerobic Capacity	Seconds	527.227	524.613	526.920	73.768 / 73.214	6.274	0.000	Significant

3-2-1 Discussion of Results

From Table 5, it is evident that all the investigated variables for the control group achieved statistical significance between the pre-tests and post-tests, favoring the post-test results. This indicates that the training designed by the coach was of excellent quality, enabling players to perform well in the tests, which resulted in significant outcomes. It also suggests that the coach used exercises with suitable and varied repetitions. Gibney (2009) emphasizes this point by stating, "The coach should focus on repeating specific exercises to perfect them, which helps in the field and during competition."

Additionally, Mahmoud Hamdoun (2016), citing Morgan (1998), notes that keeping the player engaged with the ball and simultaneously developing skills and physical attributes represents a time and effort challenge. The primary goal for the coach is to achieve a better skill level and physical performance to attain success. Therefore, any improvement in these two areas is fundamental to success in the training process[1].

The researcher finds that the exercises prepared by the coach are as important as those used by the experimental group. In fact, the researcher views this as a challenge to assess the effectiveness of his own exercises in comparison with those used by the control group, which was also trained well by the coach. The control group's exercises were similarly aligned with game performance, demonstrating the effectiveness of their training. The significant differences observed in the control group are evidence of this, as affirmed by Ashraf Abdel Aziz, citing Hanafy Mahmoud (2011), who emphasizes that "it is crucial to train with exercises that resemble what occurs in a match."[2]

Muwafaq Majid Al-Moula et al. (2017): "Comprehensive training means developing all the body's organs and systems of the player and choosing exercises that enhance multiple aspects simultaneously. It is not enough to limit training to just skill and tactical aspects; rather, it should also connect physical, skill, and tactical training aspects."[3]

Mufti (2004): "Motor skills are performed well if the player possesses a high level of physical qualities related to the skills. The possession of physical qualities allows players to perform the skills at a better level"[4]

[1] **Mahmoud Hamdoun Younis Al-Hayali**; *Effect of Different Training Spaces Based on Game Analysis on Complex Motor Performance, Aerobic and Anaerobic Capacities, and Fatigue Index in Young Football Players* (Unpublished PhD Thesis, University of Mosul, College of Physical Education and Sports Sciences, 2016), p. 79.

[2] **Ashraf Abdel Aziz Ahmed**; *The Effect of Competitive Training with Multiple Balls on Improving Speed and Physical and Skill Performance Levels in Five-a-Side Football Players* (Published Research, Egypt, Helwan University, Journal of Scientific Research in Physical Education, Issue 62, Part 2, 2011), p. 76.

[3] **Muwafaq Majid Al-Moula et al. (2017)**: "Modern Methodology in Planning and Training in Football," 1st ed. (Baghdad: Al-Faisal Center for Printing and Publishing, 2017), p. 15.

[4] **Ibrahim Mufti (2004)**: *Physical Fitness: The Path to Health and Sports Excellence* (1st ed.). Cairo: Dar Al-Fikr Al-Arabi, p. 285.

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3-3 Presentation of Results for the Experimental and Control Groups for Skill Variables, Average Performance Endurance, and Maximum Anaerobic Capacity Between Groups for Pre- and Post-Tests:

#	Variables	Unit	Experimental		Control		T Value	Sig Level	SIG
			M	SD	M	SD			
1	Average Performance Endurance	SEC	19,305	0,484	20,674	0,959	4,028	0,001	SIG
2	Maximum Anaerobic Capacity	SEC	500,603	53,594	524,613	73,214	,837	0,415	SIG

- **Significant if the significance level (sig) ≤ (0.05).**

3-3-1 Discussion of Results

The researcher finds that interval training is an effective method for football, particularly for the variables targeted in this study. This is evident from the results concerning the fundamental skills targeted by the researcher, which combined physical and technical ball exercises focusing on agility, speed, and accuracy in passing and shooting.

In this regard, Al-Rubaie and Al-Mawla confirm that "agility is one of the most required physical traits for coordinated and complex movements, as well as movements that involve linking actions with various skills."[1]

This is consistent with what Mu'taz Younis Dhunoon states: "The importance of agility for a football player lies in his ability to change directions, perform cuts, sprint, and make sudden stops, as well as changing body positions while controlling the ball, dribbling, and shooting."[2]

And this was confirmed by (Hiyali, 2007) who stated that "physical fitness is the cornerstone through which various fundamental skills in football are performed."[3]

Here, the researcher finds that the experimental group's superior performance over the control group resulted from using football-specific exercises according to scientifically and methodically regulated training loads that are suitable for the nature of the exercises and repetitions that allow for the development of skills and physical abilities. Naturally, continued training over an extended period helps the player acquire good adaptations that allow for the development of physical attributes.

(Moaffaq Majid Al-Mula and others, 2017) confirm that "progression in training loads means that after the player has performed certain physical exercises for a period of time, they will adapt to these exercises, reducing their impact and effectiveness on the functional systems. This requires changes and moving to new, more intense or less comfortable exercises to create new adaptations to the previously acquired ones... As continuous training without interruption ensures the success of the training process and improves performance levels, because physical, skill, tactical, and psychological development is gained through ongoing training to ensure skill improvement and stabilization or tactical plans."[4]

The researcher finds that the ball-specific exercises, which were continuous for an extended period and like the performance, had a significant impact on developing medium-term endurance. These exercises were applied carefully according to the players' performance levels, which reflected positively on the players' physical levels. The type of rest, in terms of its application method and the training approach used with appropriate manipulation of training load components, all contributed to enhancing the players' physical level.

[1] Kadhim Al-Rubaie and Mowaffaq Al-Mawla; Physical Preparation for Soccer: (University of Mosul, Dar Al-Kutub Printing and Publishing, 1998) p. 67.

[2] Mu'taz Younis Dhunoon Al-Tai. (2001). *The effect of two training programs using compound exercises and play exercises on some physical and skill attributes in football* (Unpublished doctoral dissertation). University of Mosul, College of Physical Education.

[3] **Maan Abdul-Karim Al-Hiyali;** *The Effect of Different Methods of Control in Training Load on Some Physical and Skill Variables of Young Football Players* (Unpublished PhD Dissertation, College of Physical Education / University of Mosul, 2007), p. 35.

[4] **Muwafaq Al-Mawla (et al.),** *The Modern Methodology in Planning and Training in Football*, 1st Edition (Baghdad, Al-Faisal Printing and Publishing, 2017), p. 16.

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Mufeed Al-Mawla (2017) emphasizes that "performance endurance means the player's ability to continue performing during matches without a decrease in the level of performance."[1]

Mohamed Reda Ibrahim (2008) confirms, "The method of using the heart rate can help the coach in calculating training intensity as an objective measure to assess the responses of the athlete's functional organs and systems to training stimuli."[2]

This is consistent with what Jamal Sabri (2019) mentioned that "performance endurance is the ability to resist fatigue in specific sports conditions, and the better the specific endurance, the better the performance in that specific sport."[3]

Hashim Yasser Hassan, 2011, states that "endurance performance refers to the player's ability to execute a set of movement, skill, and tactical tasks continuously over an extended period without feeling fatigued."[4]

4. Conclusions and Recommendations:

4-1 Conclusions:

The researcher concluded the following:

- The specific ball exercises led to a noticeable improvement in both average performance endurance and anaerobic capacity in the experimental group between the pre-test and post-test.
- The specific ball exercises showed positive development between the experimental and control groups in all study variables except for anaerobic capacity.

4-2 Recommendations:

Based on the achieved results, the researcher recommends the following:

- The necessity of using high-intensity interval training when incorporating ball exercises, according to the specific variables under investigation, due to its significant role in enhancing performance levels.
- Relying on ball exercises to bring joy and enthusiasm to training, which may encourage players to perform the exercises better and positively affect their physical and skill levels.
- Ball exercises should be suited to the level of the research sample.
- Using specific ball exercises to develop average performance endurance and anaerobic capacity, given the clear improvements observed in young football players.
- Conducting further studies with various levels and skills not covered in the current study and exploring the use of alternative training methods.

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[1] **Muwafaq** Majid Al-Mawla et al.; previously mentioned source. p. 115.

[2] Mohamed Reda Ibrahim Al-Madama (source previously mentioned), p. 113.

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[4] Hashim Yasser Hassan, *Sport Adaptation and Geo-climatic Variables*, 1st ed. (Cairo: Book Center for Publishing, 2022), p. 13.

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Sample Exercise:

Objective of the Exercise: Maximum anaerobic capacity, dribbling, and shooting

Description:

1. **Grouping:** Divide the experimental group into two groups, each consisting of five players.
2. **Setup:** Place each group behind their respective markers as shown in the image.
3. **Execution:**
    - Each player starts behind the first marker with a ball.
    - The player sprints from the first marker to the second marker, which is ten meters away.
    - After reaching the second marker, the player turns and returns to the third marker.
    - Continue this pattern until reaching the sixth marker.
    - Upon reaching the sixth marker, the player takes a shot at the goal from outside the penalty area.
4. **Markers:** All distances between markers are ten meters.
5. **Maximum Exercise Time:** 35-40 seconds.

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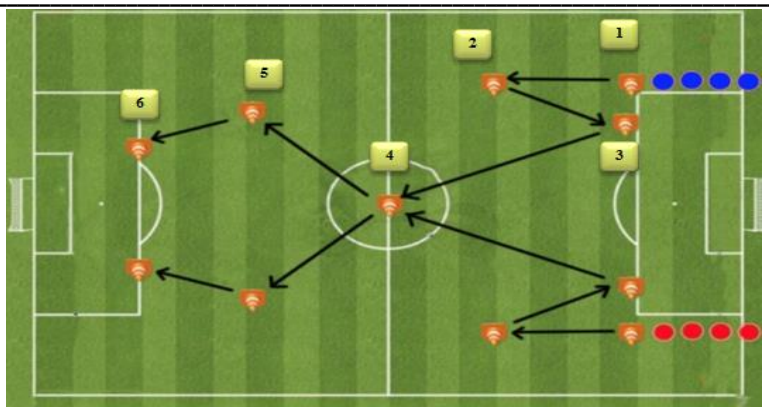
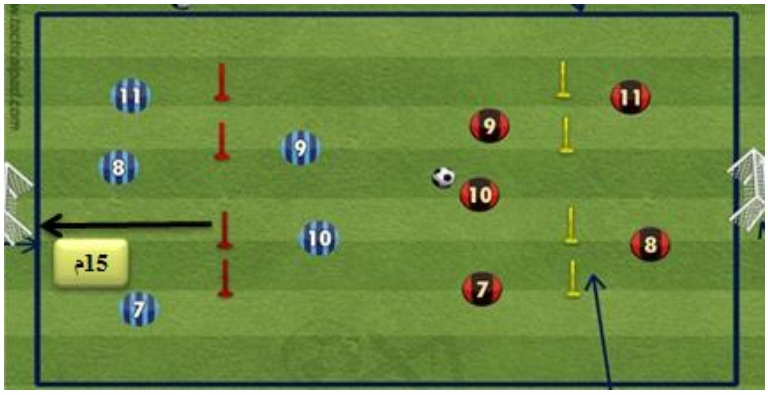


Sample Exercise:
Objective of the Exercise: Medium performance endurance, dribbling, and passing
Description:

1. **Field Dimensions:** 40 x 30 meters
2. **Teams:** Divide the team into two groups, each consisting of five players.
3. **Goals and Markers:**
    - Each team has a goal measuring 2 x 3 meters.
    - Small markers are placed fifteen meters in front of each goal.
4. **Exercise Procedure:**
    - The team in possession of the ball must complete at least five passes among its players.
    - The team can use the entire field except for the area between the goal and the opponent's markers.
    - After completing the required passes, the team attempts to score a goal from outside the markers (15 meters from the goal).
5. **Time:** Maximum exercise time is 3 minutes.



Training Unit Model
Training Method: High-Intensity Interval Training (HIIT)
Training Unit: Fourth + Fifth + Sixth
Intensity: 83%
Duration of Applied Exercises:

- (54 - 56 + 53.76 - 55.36 + 53.7 - 55.63) minutes

Duration of Main Part: 53.7 - 56 minutes
Training Unit Breakdown:

1. **Warm-Up (Duration: 10-15 minutes):**
    - Light jogging
    - Dynamic stretching
    - Mobility exercises
2. **Main Part (Duration: 53.7 - 56 minutes):**

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Date	Exercise	Intensity (seconds)	Number of Repetitions	Rest Between Repetitions (seconds)	Number of Sets	Rest Between Sets (seconds)	Total Rest Time (seconds)	Total Work Time (seconds)	Total Time (seconds)	Total Time (overall)
Sunday 10/7/2022	1	24-27	4	48-54	2	180	648-684	192-216	840-900	3240-3360
	3	24-27	4	48-54	2	180	648-684	192-216	840-900	
	9	150	2	300	2	180	660	900	1560	
Tuesday 12/7/2022	5	27-29	4	54-58	2	180	684-708	216-232	900-940	3226-3322
	7	29-33	3	58-66	2	180	592-624	174-198	766-822	
	10	150	2	300	2	180	660	900	1560	
Thursday 14/7/2022	2	24-27	4	48-54	2	180	648-684	192-216	840-900	3222-3338
	8	33-37	3	66-74	2	180	624-656	198-222	822-878	
	11	150	2	300	2	180	660	900	1560	