

The impact of (Hypoxic) activities in establishing certain particular endurance qualities in basketball players under the age of 18

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Abstract

Basketball is one of the competitive sports that is distinguished by the fluctuating motor performance. Due to the tiny size of the basketball court, the numerous motions, the close closeness of the opponent, and the engagement of all team members in offensive and defensive operations. This requires internal physiological adaptations as well as players acquiring specific physical talents and mastering skills. As a result, coaches have to pay close attention to the use of various workouts and technologies that allow the athlete to undergo physiological changes. As a side effect, particular abilities are developed, skills are acquired and mastered, and the capacity to execute with control, fluidity, and great precision is attained. The study aims to construct hypoxic (hypoxic) exercises and determine the impact of hypoxic (hypoxic) activities on developing specific particular endurance capacities in basketball players under 18. The experimental strategy was chosen by the researcher because it was appropriate for the nature and aims of the study. The research population was drawn from the youth of the Al-Hilla Basketball Club (2022-2023), which had a total of (12) players. The purposeful approach was used to choose the primary sample for the study, represented by the youth of the Al-Hilla Basketball Club in Babil Governorate, who numbered (6) players. The researcher employed certain current methods and instruments to finish the research. The essential finding is that hypoxic workouts are extremely helpful in developing exceptional skills. In terms of hypoxic workouts, it favours the development of endurance above strength and speed. The growth of physiological factors influenced the development of exceptional abilities positively. Among the most important recommendations: The need to use hypoxia exercises by coaches and in all sports to save strength and time and achieve training goals, the use of hypoxic exercises with other biokinetic skills, and the use of hypoxic exercises with advanced players in basketball and other games.

Keywords: Hypoxic, endurance capacities, basketball.

1- Introducing

1-1 Introduction and the Importance of the Research:

Recently, the globe experienced significant progress in numerous disciplines, particularly sports, which was marked by the growth and diversification of training techniques in all sporting activities. The basketball game has been played by many researchers and specialists because it is one of the most exciting and enthusiastic team sports that has made it popular and desired among players and spectators and has its importance all over the world. Because basketball is played on a relatively tiny court with ten players moving in a limited space in order to strike a small goal high off the ground, coaches must employ the right scientific technique to attain the levels. As a result, the game of basketball necessitates a concentration on physical ability. Especially the extraordinary endurance powers to gather great energy through which the player may utilize its varied talents. As a result, the capabilities, physiological factors, and skill performance must all work together to reach the intended aim and achieve success. Hypoxic training is a current and vital strategy for growing athletes' cardiac, pulmonary, neural and energy systems. It improves your stamina, and basketball is one of the games that is defined by speed and strength, as well as requiring a lot of effort from the player, so its use will help strengthen the players' energy systems and increase their endurance. Therefore, the importance of research and reviewing previous studies becomes clear in the absence of a similar study that uses these methods to develop special resistance abilities through the preparation of exercises with special masks to reduce hypoxic oxygen and to know its effectiveness in the development of specific resistances, for which the researcher wanted to dive right into this experiment and find out its results so that it can be a useful fruit at the service of the game of basketball.

1-2 Research Problem:

As the player executes defensive and offensive responsibilities at high speeds, the basic principle of the basketball game is dependent on continuity, speed, and strength. This requires a high level of stamina and performance throughout the game. As a result, the player requires physical, skilled, and functional integration in order to win, and this is demonstrated by the researcher's follow-up to the Youth Basketball League. It was established that the player's performance at the beginning of the competition differed from his performance at the conclusion. Due to weariness and effort expended during the contest, particularly in matches

where the technical performance is high, and the competitor is strong. There will be sluggish skill performance and a lack of attention to hitting the objective. This will result in a significant loss of points, affecting the outcome of the match. The researcher assumed that using hypoxic training would result in the development of physiological factors, which would lead to the growth of exceptional endurance capacities and, as a side benefit, enhanced focus on the performance of offensive skills.

1-3 Research Hypotheses:

- 1- Preparation of exercises using hypoxic
- 2- Identifying the impact of hypoxic exercises on developing the endurance abilities of under-18 basketball players.

1- 4 Research Objectives:

- In basketball, hypoxic exercises are beneficial in developing special endurance abilities under the age of 18.

1-5 Research Fields:

- **The human field:** Young basketball players for Al-Hilla Sports Club for the sports season (2022-2023).
- **Spatial field:** Al-Mawhiba Sports Hall, affiliated with the Ministry of Youth and Sports in the centre of Babil Governorate
- **Time range:** 15/5/2022 to 23/6/2022.

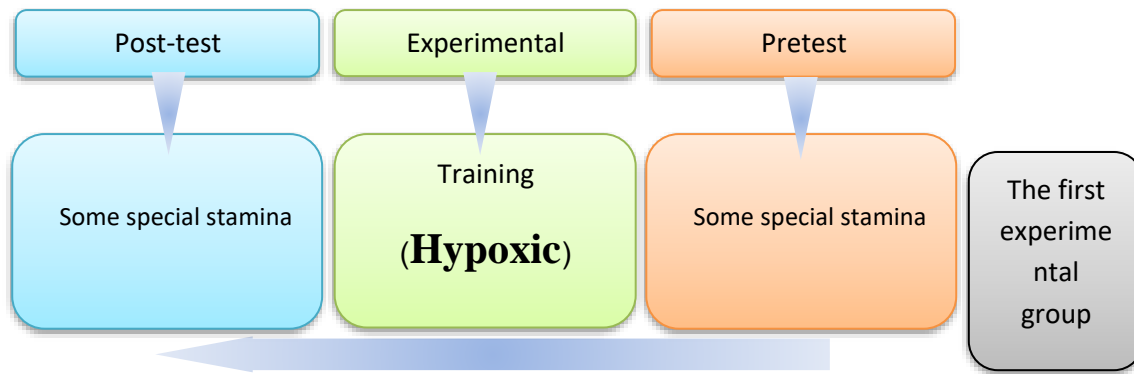
1-6 Define Terms:

Second, HYPOXIA: "The method of hypoxic training is based on continuous physical exertion with a decrease in the amount of oxygen required," which means a drop in the rate of oxygen release to the body's tissues.

2-Research Methodology and Field Procedures

2-1 Research Methodology:

Identifying of approach utilized by the researcher to obtain the required findings is determined by the study problem. As a consequence of its adaptability to the nature and difficulty of the research, the researcher adopted the experimental strategy by designing (the experimental group - for the pre and post-test), as indicated in Figure (1).



2-2 The Research Community and its Sample:

The study community was determined by young basketball under the age of 18 for Al-Hilla Sports Club for the sports season (2022-2023), which is comprised of (12) players. The deliberate approach was used to choose the study sample, a group of (6) players was determined, and the exercises developed by the researcher were presented to the members of the experimental group.

2-3 Field Research Procedures

2-3-1 Define Search Variables

The researcher enlisted the assistance of scientific sources and studies that dealt with the aforesaid issue in order to determine some of the exceptional endurance qualities related to the basketball game that will be addressed here.

- Speed of carrying.
- Endurance strength.
- Carry performance.

2-3-1-1 Tests your endurance capabilities

First: speed endurance test 25 x 8 m.

•**Purpose of the test:** to determine speed tolerance * Equipment required: measuring tape - sticky tape - timer - a 30 m flat yard.

•**Performance:** Draws two parallel lines at a distance of (25 m).

The tester stands at the start line and, at the start signal, sprints to the second line, touches it with his foot, and then turns to return to the start line. This act is performed (8) times, resulting in (25 x 8) distance travelled. The severed kidney (200m).

•**Recording:** The tester records the time it took to go the distance (25 x 8) and its components.



Illustrate speed endurance test (25×8m)

Second: strength endurance test for the muscles of the legs (full dip from a standing position 60 seconds)

- **The purpose of the test:** measure the strength and endurance of the muscles of the legs.
- **Required tools:**
 - Electronic stopwatch, whistle.
- **Recorded:** Recording the number of times the performance (bending and extending the legs fully and calculating the number in 60 seconds).
- Timer / giving the start and end signal with the timing and noting the validity of the test and counting.
- **Performance:** From the standing position, bend the legs and extend them fully, and calculate the number in (60 seconds).
- **Test instructions:** Full knee flexion and extension. Each player is given only one attempt.
- **Recording:** calculate the number of times the correct performance (flexion and extension of the knees fully) for a period of 60 seconds.



Shape (5) Demonstrating strength endurance test for the muscles of the legs (full bench press from a standing position 60 seconds)

Third: Test of strength endurance of the muscles of the arms, bending the arms from oblique supination:

- The purpose of the test: to measure the strength and endurance of the muscles of the arms

Tools needed:

- Recorder: It gives the start signal
- Recorder: recording the number of times the performance

Test specifications: From the inclined frontal prone position, the tester bends the elbows until it touches the ground with the chest, then returns to the initial position. This action is repeated as many times as possible.

Test instructions:

- The player is not allowed to stop while performing the test
- Observe the straightening of the body in all attempts
- The necessity of touching the chest to the ground when performing

Recording: the maximum number that can be performed to bear the strength of the arms.

Fourth: The ability to carry defensive and offensive skill performance:

Test **Name:** Sudair Test for Skill Performance Endurance for Advanced Basketball Players.

- **Test objective:** Measure the player's ability to withstand the skill performance (defensive - offensive) of advanced basketball players similar to the competition.
- Method of performance:** After hearing the whistle of the timer, the test begins from the front yard (the opponent's yard) with the pressing defence towards sign no. (1) Located on the field's final border from the front yard's left side. Which moves away from the sideline (3.75 m) and then to the sign (2) on the left side of the sideline. Who advances away from the finish line (front yard) (3.50m) to perform compression defence, then to the imaginary vertical line that divides the field into two vertical halves to provide defensive aid. It is the same as in the previous example with the sign (3), which travels out from the centre line (backyard) from the left (3.50 m) to perform the compressor defence. Then return to the point under the basket (middle of the diameter of the ring), which is away from the finish line (157.5 cm). After the player reaches the point under the basket, he starts to position no. (1), which is away from the starting point (6.75 m). Where the assistant team that owns the ball defends him against the drum and returns to the starting point (under the basket), and repeats the case with position number (2) and defends against the attacker (assistant team). Which handles and returns to the starting point, which is away from the starting position (6.75 m), from the finish line (5.40 m), and from the sideline (2 m), and repeats the case with site No. (3) The striker aims from beyond the arc (assistant team) and refers

to Starting point which is away from the starting position (6.75 m), from the final line (5.40 m), and from the sideline (2 m). After taking the ball located on the right side of the backyard, which is in front of the sign (1) and which is away from it (1.5 m). The player beats start and talks with the ball (Tabtaba) between the signs to the end of the five signs and is free to pass the sign in any kind of tabba.

However, the last sign must pass the tabtaba by turning, and the distance between the starting line (the final line of the stadium) and the first sign (3.10 m) and the sideline (2.25 m) and between one sign and another (2 m). The position of sign (2) is deviated to the right, ahead of sign (2) (1.5 m) forward. It is away from the sideline (90 cm) and the position of sign (3) is at the same level as sign (1), i.e. deviated on the left for sign (2) and away from it (2 m) and from the sideline (2.25 m) and forward (1.5 m).

As for sign (4), it is on the same level (2), where it is away from the sideline (90 cm), from sign (3) (2 m), and ahead of it (1.5 m). As for sign No. (5), it is at the same level as a sign (1,3), where it moves away from the sideline (2.25 m), and the laboratory moves to the front yard with a rapid high drum. In the event that the ball moves away from the tested player during the performance, he will be handed another ball from the assistant team. After moving to the front yard of the field in Tabtaba, three balls are passed with a chest handling to the handling accuracy measuring tool (made by the researcher), which moves away from the player's chest throw line with (5 m) and from the sideline of the field from the right (7.5 m) and from the centre line with (2 m) and the throwing line moves away (2.5 m) and the height of the ring radius is (1.45 m) and its diameter is (45 cm), where the player receives the ball with a chest handling from the assistant work team and then passes the ball to the tool and in the event that the ball moves away from The tested player during the performance is handed another ball from the assistant team.

Then he obtains a third ball and turns towards the basket from the right side, doing the peaceful correction from within the arc, and may be treated as one number, and then follow the ball and go Baltaba towards position (2), which is outside the three-point arc (in front of the basket) and away from the center of the basket (6.75 m), and perform the peaceful correction, and then follow the ball and go towards position No (3). which is outside the three arcs, distant from the final line (5.40 m) and close to it (2 m) to conduct the adjustment. The ball is followed by the player himself in every successful or failed effort, and if the ball moves away

from the tested player during peaceful shooting, he is provided with another ball by the assistance team nearby and is free with any hand pointed towards the basket.

Following the completion of the peaceful shooting, the player follows the ball and goes to the three specified areas and does the correction by jumping from inside the arc and following the ball and is free from any area that begins and does not repeat the shooting from the same place, and the site (1) is located in front of the basket. The shooting site is by leaping both sides of the region within the arc facing the hoop, which is distant from the centre of the basket (5.5 m) and from the three-point arc (1.25 m) from the site that is on the three-point arc, The ball is followed by the player himself in either successful or unsuccessful effort, and if the ball travels away from the tested player during shooting, he is handed another ball by the assistant team.

After shooting from inside the arc, the player performs the skill of shooting from outside the arc and following the ball to three specific areas and is free to move to any location close to the follow-up, provided that he does not repeat the shooting from the same place, where the side position is away from the finish line (5.40 m) and from the sideline (2 m) on the three-point arc, and the other site is in front of the basket, and that these sites are out (6.75 m) In every successful or unsuccessful effort, the ball is tracked by the player himself, and if the ball goes away from the tested player throughout the shooting, he is handed another ball from the assistant team. The test timer runs out after the third shot from beyond the arc... Figure (3) depicts the laboratory path, whereas Figure (4) depicts the test measurements.

Test Instructions:

- The player must be exposed to effort (warm-up) before doing the test.
- In the event that the ball moves away from the tested player while performing the test, he will be handed a second ball from the assistant team that is close to him.
- The accuracy score is not calculated for any correction (peaceful or jumping from inside or outside the arc) and is given (zero) when the player commits a legal violation.

Test Administration:

- **Timer:** Records the time of the test.

- **Recorder:** Records the accuracy of handling, peaceful aiming, and jumping from inside and outside the bow.
- **Team:** The test is conducted under the supervision of the researcher.
- **Arbitrator:** Monitors the player while performing the test and according to the agreed instructions.

Test Recording Method:

Accuracy: Accuracy scores are calculated and combined for the skill of handling, peaceful correction, and correction by jumping from inside the bow and aiming by jumping from outside the bow, as shown below.

- **Calculation of the accuracy of the pectoral pass skill:**

1. When passing the ball and entering the instrument ring, the score is calculated by two points.
2. When the ball is passed to the instrument ring and it is touched and does not enter, the score counts one point.
3. When the ball is passed to the instrument ring and does not enter and does not touch it, the score is zero.

- **Calculation of the accuracy of peaceful aiming:**

1. Two points are scored when the ball enters the goal.
2. One point is scored when touching the ring and the ball does not enter the goal.
3. A (zero) is scored when the ball does not enter the goal and does not touch the ring.

- **Calculation of the accuracy of aiming by jumping from inside the arc:**

1. Two points are scored when the ball enters the goal.
2. One point is scored when the ball touches the ring and does not enter the target.
3. A (zero) is scored when the ball does not touch the ring and does not enter the goal.

- **Calculation of the accuracy of aiming by jumping from beyond the arc:**

1. Three points are scored when the ball enters the goal.
2. One point is scored when the ball touches the ring and does not enter the target.
3. A (zero) is scored when the ball does not touch the ring and does not enter the goal.

- **Calculation** of the test time: The test begins when the whistle of the assistant (temporary) team blows until the third jump from outside the arc is completed (calculating **the time** in minutes and its parts).
- **Calculation of the final score of the test = total accuracy/time score*30**

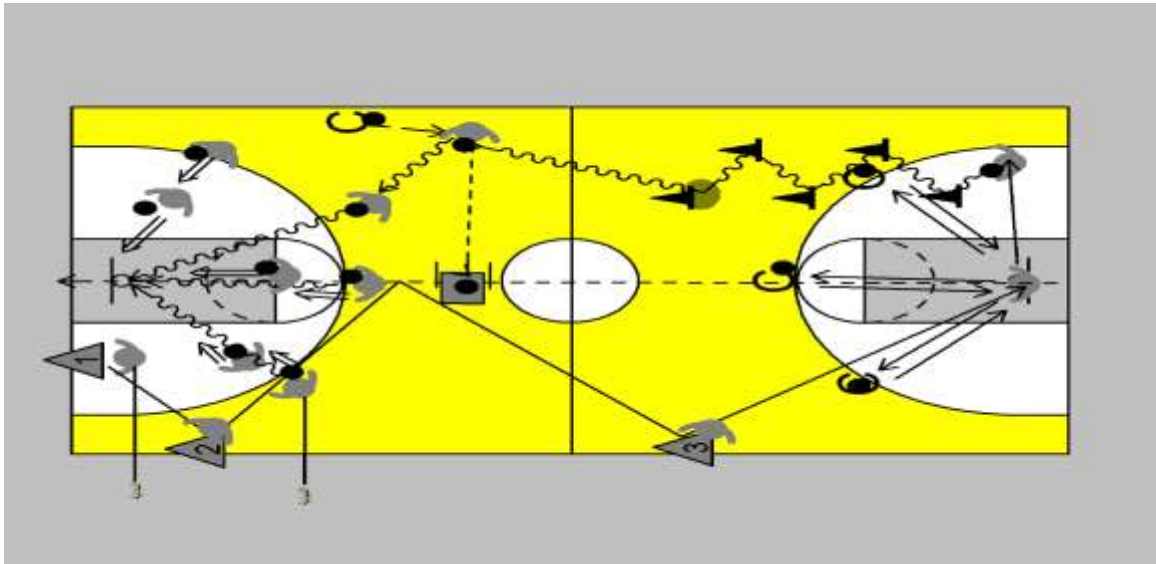


Figure (6) shows the movement path of the tested player in the final version.

3-4-3 Exploratory experience:

The researcher conducted his first exploratory experiment on the day (5-5-2022) on a group of (6) players. The researcher aims from this experiment to the following:

- The effectiveness of (Hypoxic) training masks at any level that begins with exercise.
- Follow the principle of ripple in the training load, as it was as follows.
- Wearing the mask in the first week is on the first valve, which is at a beginner level.
- For the second and third weeks, it is on the second valve, which is at an average level.
- The fourth and fifth week is on the third valve, which is at a good level.
- The sixth week is on the fourth and final valve, which is on a difficult level.
- The training load in the first and second weeks, the pulse will be 160-170, with an intensity of 80%, and it will be interspersed with rest periods, where wearing the mask will be approximately (4-5 minutes), i.e. wearing the mask for each

group of one exercise and leaving it during the rest period between one group and another for each exercise.

- The training load in the third and fourth week, the pulse will be 170-180 with an intensity of 85%, and it will be interspersed with rest periods, where wearing the mask will be approximately (5-7 minutes), i.e. wearing the mask for each group of one exercise and leaving it during the rest period between one group and another for each exercise.

- The training load in the fifth and sixth weeks, the pulse will be 180-185 with an intensity of 90%, and it will be interspersed with rest periods, where wearing the mask will be approximately (5-7 minutes), i.e. wearing the mask for each group of one exercise and leaving it during the rest period between one group and another for each exercise.

3-4-5 Pre-tests:

Pre-tests for special endurance abilities were conducted in the Talent Sports Hall in Babylon, on (13-5-2022).

3-4-6 The main experience:

The researcher prepared the details and requirements of the main experiment as follows:

The exercises will be implemented on Sunday (15-5-2022), and the high-intensity training technique will be employed. The overall training duration is (6) weeks, the number of weekly training units (3 units), and the exercises are applied by (15-25 minutes) from the major portion.

This is due to the research's goal of developing certain particular endurance capacities), in which the research sample wears a training mask throughout the continuous play and removes it during the recovery time, i.e. after each group, with an emphasis on modifying the airflow valves in the training mask. Where the researcher used the instruction booklet as well as some scientific sources in hypoxic exercises, and what he noticed when conducting the exploratory experiment that the researcher carried out on a group of players to adjust the intensity of the valves that are commensurate with the functional and physical capabilities of the sample, which does not affect the safety of the player when performing the exercise. The researcher employed a training unit outside the research curriculum to accustom the players to wear the mask and how to wear it throughout the performance because playing with the training mask was not continuous for the targeted period from the main section of the training unit.

3-4-7 Post-tests:

Post-tests were conducted on 6-25-2022 for physical tests, and all conditions were fixed in terms of place, time, tools, and the Method of implementing the tests as much as possible, as in the pre-tests.

3-5- Statistical means:

The researcher will use the statistical bag (spss) to obtain the results of the research.

4- Analyzing and discussing the results:

Table No. (1): |The arithmetic mean, standard deviations, t-value calculated for correlative samples, the level of test significance, and the significance of the difference for the pre and post-tests of the group.

Statistical milestones Variables Surveyed	Unit of measurement	Tribal		Post		Value (v) Calculated	Test significance level Sig	kind Significance
		Going to	±p	Going to	±p			
Bearing speed	L/min	60.83	1.471	51.50	1.048	18.87	0.00	Moral
Strength tolerance for legs	L/min	40.66	3.669	47.50	1.048	5.149	0.00	Moral
Withstand strength for hands	mmol/L/Blood	25.16	0.983	32.33	0.516	13.20	0.00	Moral
Performance tolerance		3.63	0.240	5.29	0.180	11.373	0.00	Moral

Observing Table (1), which shows the arithmetic mean, standard deviation, and the value of (T) calculated for interconnected samples, the level of significance, and significant differences for the experimental group with hypoxia in the pre and post-tests, we find that the value of (T) calculated for interconnected samples amounted to in the pretest for speed endurance (18.87) The value of the test's level of significance was (0.00), which was less than the threshold of significance (0.05), indicating that the differences were significant and in favor of the post-test. As for the force tolerance of the legs and hands, the value of (T) calculated for the interconnected samples in succession reached (5.14) for the legs and (13.2) for the hands. Either the level of significance of the test was (0.00), which is smaller than the level of significance (0.05), which indicates that the differences were significant In favor of the post-test. While we find the performance tolerance in the pre-test, where the (T) value calculated for the correlated samples was (11.373), the value of the test's significance level was (0.00), which is less than the significance level (0.05), indicating that the differences were significant and favored the post-test.

4-1 Discussing the results of the pre and post-tests for special abilities

The moral differences of the experimental group lack of oxygen for the post-tests and pre-tests and in favor of the post-tests ability to withstand speed and force endurance and performance endurance The researcher attributes the emergence of these results to their application of exercises for lack of oxygen, which helped in good suitability of repetitions and training intensity appropriate to the age and

sex of young basketball players, which were taken into account gradation and ripple in planning according to the foundations and principles of sports training, as well as diversification of these exercises and exchange of muscle groups to enable players To achieve more than one purpose in one work, which was physical skill and similar to the specialized performance in basketball, as well as for physiological adaptations through the increase of red blood cells, which leads to an increase in hemoglobin and thus an increase in the percentage of oxygen reaching the working muscles that have been developed through the mask of lack of oxygen, and the adequacy of the number of training units per training week for a period of six training weeks.

Fox believes that "the use of the appropriate training method within the curriculum used on the basis of performance endurance training and endurance (speed - strength) in a special training method has a significant impact on the development of the level, as the duration of (7-8) weeks and (2-3) training units per week is sufficient to develop the level of achievement and energy systems in particular."

All these reasons led to the development of the special physical abilities of the players , as well as the researcher relied on the gradation in controlling the valves for the masks, which represent different heights from sea level to control the molecular weight of oxygen and not its fixed percentage in the air as defined by (21%), which was strictly controlled by its manufacturer with a special technology for various events and sports to support altitude training in training places at sea level.

As the development in these special abilities came as a result of the development of physical and physiological factors, Osama Riad and Imam Hassan Mohammed believe that "the percentage of oxygen pressure can be reduced during sports performance by training using a mouth and nose covering."

It was performed by lack of oxygen, which is the healing factor of the second energy system to oxidize energy materials and return them effectively to help to continue that performance, as these exercises enabled them with hypoxia (hypoxic) to help improve the work of vital organizations to withstand the accumulated cellular food metabolites from biochemical processes within this lactic system, that is, the orientation of the purpose of these special exercises was to improve these organizations for these biochemical processes.

(Arthur states that "special velocity tolerance is related to changes in biochemical processes and reactions that occur internally in the cellular environment of the muscles, and the more adequately and effectively these changes become, the later fatigue in players."

Essam Abdel Khaleq points out that "speed endurance is the player's ability to maintain high speed in conditions of continuous work by developing the ability to resist fatigue when carrying a high degree of intensity of the individual's ability and overcoming anaerobic breathing to gain energy."

Hypoxic oxygen deficiency training is one of the aids in training in order to accustom the body to performance in these conditions because the development of special endurance capabilities depends on diversification in the use of aids such as making competitive performance situations difficult or training in difficult atmospheres such as low atmospheric pressure, i.e. creating conditions that the player is not accustomed to.

Therefore, the researcher was keen to pay attention to these abilities through exercises of a physical skill nature performed by all players with accuracy and high proficiency "because these exercises aim to raise the physical ability and physiological capabilities of the athlete using skills and kinetic direction close to the type of specialization (similar to the required sport)

Abu Ela believes that the training load on the player and in more difficult conditions than usual requires the disbursement of body energy, which leads to fatigue, which leads to the excitement of recovery processes and as a result the athlete does not reach the recovery only, but up to a state of excess compensation and better than his condition before performance.

5. Conclusions and recommendations

5.1 Conclusions

In light of the results reached by the researcher through the field experiment, he concluded the following:

1. Hypoxic exercises (Hypoxic) are of great importance in developing special abilities.
2. The development of physiological variables reflected positively on the development of special abilities.
3. The use of modern training methods
4. Odds according to energy systems and in line with the capabilities and capabilities of the players has a high positive impact on raising skill performance, achieving training goals and reaching economic training by shortening time and effort.

5.2 Recommendations

In light of the conclusions reached by the researcher, he recommends the following:

- 1- The need to use oxygen deficiency exercises coaches and in all sports in order to save effort and time and achieve training goals.
- 2- Use of hypoxic exercises with other biomotor capabilities.
- 3-

References

- 1- Fatima Abdel Maleh and others: Sports Training, Baghdad, Arab Community Library for Publishing and Distribution, 2011.
- 2- Hussein Karim Al-Lami, Karrar Salah Al-Tamimi: Basketball between theory and practice, 1st edition, Alexandria, Dar Al-Wafaa for the world of printing and publishing, 2020.

- 3- Ali Salman Abd al-Tarfi: Applied tests in physical education (physical - kinetic - skill), ed. 479 al-Tarfi, Baghdad, Bab al-Muazzam, Al-Nour Office, 2013.
- 4- Kamal Yassin Latif and Hazem Nuri Katea: Physical and skill tests in football, Maysan, Ashraf and Khaldoun Press, 2021,
- 5- Mustafa Fadel Khudair: The effect of skill exercises with aid tools in developing special endurance, some motor abilities and offensive skills ending with peaceful shooting for basketball players (under 18 years), University of Babylon, College of Physical Education and Sports Sciences, master's thesis, 2022.
- 6- Osama Riyad and Imam Hassan Muhammad; Sports Medicine and Physiotherapy: Cairo, Al-Kitab Center for Publishing, 1999.
- 7- Essam Abdel-Khalek; Sports Training - Theories of Application, 9th edition: Alexandria, 1999.
- (8- Abu Al-Ela Ahmed Abdel-Fattah: Sports Training, Physiological Foundations, Cairo, Dar Al-Fikr Al-Arabi, 1997.
- 9- Muhannad Hassan Al-Bashtawy and Ahmed Ibrahim Al-Khawaja: Principles of Sports Training, 2nd Edition, Wael Publishing House, 2010.
- 10- Fox . Eletal Borrers R.W Fossn ; The physiological basis for exercise and sport W.C.B. Bron and Bechburk . U.S.A , 1993
- 11-Arthur T. Johnson, BIOMECHANICS AND EXERCISE PHYSIOLOGY: New York, Chic ester, Brisbane , Toronto , Singapore,2012.

Appendix

Appendix 1: Exercises and training curriculum, a training unit model for the basketball team for the youth category in the first week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
From the bottom of the basket, the players stand in two groups and then go to the middle of the field, and then each group makes defensive	80	45s×3×2mg	90 s	135s

<p>movements towards the side line adjacent to each group and quickly return to the end of the field and the work continues for (45s-1d)</p>				
<p>From the end of the field and on one of the sides, player A performs the skill of the drum between the winding poles, and when reaching the middle of the field, he gives handling to the three-point arc and then makes defensive movements on the center line and to the middle of the field, then goes to do the skill of (V.CUT) and then receives the ball and makes peaceful correction, and so he repeats the performance of the second basket</p>	<p>80</p>	<p>30s×4×2mg</p>	<p>60s</p>	<p>90s</p>

Appendix2: A training unit model for the youth basketball team in the second week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
From the end of the field, three players stand and when you hear the whistle, start to a distance of 6 m, then return to the finish line, then start to the middle of the field, return, then start to the three-point arc of the offensive arena and return, then start to the end of the field, and each player has one of the	80	45s×4×2mg	90s	135 s

skills researched and quickly return to the end of the field				
The player performs the skill of the tabtaba between the two men to the side in the middle of the field and then gives handling to the three-point arc and the start to make the skill of (V.CUT) and then receive the ball and peaceful correction and then the player makes the tataba between the signs and when reaching the middle of the field he gives handling to the three-point arc of the other basket and starts to make the skill of offensive booking and receiving the ball and peaceful shooting	80	30s×5×2mg	60 s	90 s

Appendix 3: A training unit model for the youth basketball team for the third week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
From the end of the field, player (A) runs fast to the middle of the field and returns and makes the skill of V.CAT and rotation and then receives handling from player (B) standing next to the field, the player (A)) by performing the drum towards the basket, and then the peaceful correction and then the	85%	45s×3×2mg	90s	135 s

quick departure to the opposite basket and the work of the skill of seizure, rotation and peaceful correction				
From the finish line and on one side of the field make a ground ladder for the two men with the performance of the skill of patting to the middle of the square and give handling to the colleague stop on the line of three points and the work of side defense to the middle of the field and start and receive the ball and perform one of the skills and return the same work on the second basket	85%	30s×4×2mg	60 s	90 s

Appendix 4: A training unit model for the youth basketball team for the fourth week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
The player stands on the end line of the field and the field is divided into four areas, the exercise begins when the player starts quickly towards the first section and returns to the end line of the field and then to the second section and returns to the first section and then to the third section and	85%	45s×4×2mg	90s	135s

<p>returns to the second section and then to the fourth section and back to the third section and then quickly goes towards the basket to receive the ball from the colleague and shoot by jumping. By jumping from any area inside the zone</p>				
<p>From the bottom of the basket, chest handling with the colleague with a medical ball weighing 3 kg for 20 seconds, and then starting to the three-point area, making reservations, rotation, receiving the ball, peaceful shooting, and in succession the second</p>	<p>85%</p>	<p>30s×5×2mg</p>	<p>60 s</p>	<p>90 s</p>

Appendix 5: A training unit model for the youth basketball team for the fifth week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
From the middle of the field, perform the front support exercise with a weight of 2 kg on the back for 20 seconds, and then start and make one of the skills researched	90%	30s×4×2mg	90s	120 s
Player A jumps both legs to the middle of the field from the end of the field, and then pats into the free	90%	30s×4×2mg	90 s	120 s

throw area and makes a Floater shoot				
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Appendix 6: Model training unit for the basketball team for the youth category sixth week

Exercise name	Intensity	Repeatability + Performance Time	Comfort	
			Between duplicates	Between totals
Players at the bottom of the basket, starting to the free throw area, returning to the starting point, then to the middle, returning to the starting point, then starting to the other basket, doing the skill of V.CAT, turning, receiving the ball from the colleague, peaceful shooting , and then	90%	45s×5×2mg	135s	180 s

returning to the other basket quickly and making the skill of booking and rotation, and then peaceful correction				
On the ground ladder, the player performs the skill of the drum, and upon completion of the drum, the player gives handling to the middle of the field and starting, and then the work of the offensive reservation skill and then receiving the ball and peaceful shooting, as well as repeating the performance towards the second basket.	90%	30s×5×2mg	90 s	120 s