

The effect of using hypoxic training (Hypoxic) On some special physical variables, physiology and digital level of 100-meter swimmers in the State of Kuwait

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Doi: 10.21608/isjpes.2024.342155.1103

Abstract

The field of sports training is one of the fields that is witnessing amazing development, and this is evident in the fact that sports are achieving levels that are developing very quickly without...border, the competition of countries has led toon Achieving world records and levels to Using the latest scientific methods in building a sports training strategy and ways to implement it to achieve future goals.

Research objective:

The research aims to identify The effect of using hypoxic training on some physical and physiological variables and the digital level of swimming 100 meters crawl.

Methodology Search:

AThe researcher will use the experimental method using two groups. One of them is experimental and the other is controlled using the pre- and post-measurement method to suit the nature of Search.

community Search:

The research community included:100m freestyle swimmers from Kazma Club in Kuwait, registered with the Kuwait Swimming Federation for the year (2024-2025)Their number reached (16) Swimmer.

sample Search:

The sample was selected intentionally formazan Kuwait Club Swimmers for the year (2024-2025) Their number reached (16) Swimmer, done Divide them to me:

1- (6) swimmer For the experimental group.

2- (6) Control group swimmer

3- (4) A swimmer to conduct the exploratory study of the research from within the research community and from outside the main sample.

Conclusions:

1- There were statistically significant differences between the pre- and post-measurements of the experimental group in some variables. Physiology In favor of dimensional measurement.

2- Hypoxic training using a training mask is an effective alternative to altitude training.

3- The results agree favorably with other studies conducted on training.

Introduction and research problem:

The field of sports training is one of the fields that is witnessing amazing development, and this is evident in the fact that sports are achieving levels that are developing very quickly without...border, the competition between countries has led toon Achieving world records and levels to Using the latest scientific methods in building a sports training strategy and ways to implement it to achieve future goals.

And both of them agreed "Mohamed Shehata" (2005) Larry Kinney (2011) Larry Kenney et al. The foundations of physiology and sports training are the study of the functional status of the respiratory and circulatory systems .importance Maximum for evaluating and tracking the training status of long-distance (endurance) runners in general and the (3000) meter race in particular due to its nature in Skill and digital performance (30:164) (18:16)

And both of them agreed "Abdel Minim Badr" (2012 AD)"Batsakis Ahmed" (2014 AD) said that special endurance means the competitor's ability to face fatigue to achieve the highest level of functional efficiency of the various devices. (15:100) (2:183, 184)

Both "Raisin Khuraibet" and "Abu Al-Ala Abdel Fattah" (2016) indicate that training on training has become a training tool used to simulate many changes that occur in the body by changing the partial pressure of oxygen using a training mask and modified training tents.

(8:673, 674)

This is confirmed by "Saad El-Din El-Shinobi, Abdel Monee Ibrahim"(2001) that hypoxic training has contributed significantly to Strong and clear in achieving digital achievement in Speed Sports (10:27)

Mufti Ibrahim (2001) points out that sports training is a physical process based on selecting training loads so that the process of adaptation occurs physically and physiologically in order to avoid reaching the stage of stress or fatigue and exhaustion from repeated training. (19: 31)

Sofia Abdel Wahab (2014) believes that the goal of training specialists is to combine scientific and technological development with innovation of modern training methods and techniques used to improve the digital level and end the match with the least possible effort. (12:2)

He sees"Arson"Aroussen (2006) Training under hypoxia is beneficial for runners. Distance T-shirt, which in turn improves performance .Anaerobic For the athlete. (25:71)

The study of "Rosch" has proven that ROBACH (2006) The principle of (living in training and training at sea level) is the best way to raise and improve the level of aerobic performance. (32:81)

As both Bertin and Michaud see it, Bertin, Michaud (2011) Training in training under conditions of hypoxia creates many adaptations. (26:183)

From this perspective, he saw and researcher About a new training method that simulates training at altitude It is hypoxic .your And knowing its effect on both physical abilities (ability and endurance) and digital level.100m freestyle swimming Event and some variables Physiology As there is a big gap between the numbers Global And Egyptian numbers (5:4)

Amer Ibrahim (2013) indicates that running for training for the athlete is considered general endurance as it depends on changing speeds according to the nature of the ground, as this type of training is considered one of the strong trainings due to the difficulty of performance, so it is not bound by a special and specific training program (13:140).

Baha' al-Din Salama (2000 AD) believes that the effects of gravity lie in the effect on the weight of the body as well as the decrease in pressure inside the capillaries at the level of the heart. (3: 258)

Hara Dieter son is known as(2010 AD) "The training aims to advance both the physical and mental aspects and increase tactical motor learning" (23:82)

From what I have seen researcher From previous studies such as the study of "Imad Farag Badawi" (2010 AD) (16) and "Yasser Abdomen Suleiman" (2016) (24), and the study of ""Dufour (2005) (28) and "Schmitt" (2014) (33) which indicated the importance of using hypoxic training and anaerobic training (lack of oxygen) in improving some physical variables and some physiological indicators and the digital level. Irrigation searcher The importance of this research lies in the fact that it is an attempt to simulate altitude training by using Hypoxic training you're in The proposed training program is designed to reduce the percentage of air inhaled and thus reduce the percentage of oxygen used in breathing. Hence the idea of this research. Which aimed to the effect of using hypoxic training on some physical and physiological variables and the digital level of swimming 100 meters crawl.

Research objective:

The research aims to identify the effect of using hypoxic training on some physical and physiological variables and the digital level of swimming 100 meters crawl.

Research hypotheses:

1. There are statistically significant differences between the pre- and post-measurement of the experimental group in the level of physical performance and Physiological and Digital level of 100mFree.
2. There are statistically significant differences between the pre- and post-measurement of the control group in the level of physical performance and Physiological and Digital level of 100mFree.
3. There is improvement rate Between the dimensional measurements of the experimental and control research groups in physical performance and Physiological and Digital level of 100mFree.

Terms used in the search:

Hypoxia Yes(hypoxia):

It is one of the modern training methods. It is a word consisting of two syllables: Hypo) means deficiency or less, while the second part (oxie) is an abbreviation for the word (oxygen), so the two words together form the word (hypoxia), meaning deficiency. Oxygen.(5:82)

Training in Highlands:

It is a term used to describe conditions in which the body is exposed to a lack of oxygen (a lack of oxygen content in the blood). This occurs as a result of the body being exposed to an unnatural environment, such as moving to places above sea level or going up to train (7:125).

Plan and procedures Search:

Methodology Search:

Ate researcher will use the experimental method using two groups. One of them is experimental and the other is controlled using the pre- and post-measurement method to suit the nature of Search.

community Search:

The research community included:100m freestyle swimmers from Kazma Club in Kuwait, registered with the Kuwait Swimming Federation for the year (2024-2025)Their number reached (16)swimmer For the age level under (15) years and those who are members of the Kuwait Swimming Federation.

sample Search:

The sample was selected intentionally formazan Kuwait Club Swimmers for the year (2024-2025)Their number reached (16)swimmer, For age group under (15) years It was completed Divide them to me:

- 1- (6)swimmer For the experimental group
- 2- (6) Control group swimmer
- 3- (4) A swimmer to conduct the exploratory study of the research from within the research community and from outside the main sample.

homogeneity And equivalence Sample for research:

The researcher verified the extent of the moderation of the distribution of the research sample individuals in light of the following variables: Age, height, Weight, physiological measurements, Digital level of distance 100mFree and table number (1) Explains that:

Table (1) : Mean, standard deviation and skewness coefficient of growth variables and variables Testing of the total research sample (sample homogeneity) n= 16

M	Variables	Unit of measure	Arithmetic mean	Standard deviation	The mediator	Coefficient of skewness
1	Age	year	14.65	1.05	14.50	0.428
2	height	poison	141.25	3.52	140.00	1.065
3	the weight	kg	51.36	3.68	50.00	1.10
4	Training age	year	6.25	1.98	6.00	0.120
4	Pulse at rest	Pulse/min	71.25	2.54	71.00	0.295
5	Pulse after exertion	Pulse/min	172.02	4.28	170.00	1.415
6	Vital capacity	liter	1.87	0.54	1.80	0.388
7	Maximum For oxygen The	equation	55.14	0.41	55.00	1.024
8	Oxygen in the blood	mm/Hg	94.20	2.69	94.00	0.223
9	Broad jump	meter	1.51	0.22	1.50	0.136
10	NabtaHoblique	Repeat/minute	14.62	1.64	14.60	0.0365
11	Pull up	repetition	4.52	1.11	4.50	0.054
12	100m freestyle	Th	71.25	0.20	70.00	0.75

Table (1) shows the skewness coefficients for the growth variables and the test variables for the total research sample individuals. The skewness coefficient values ranged between (0.295 to 1.10), i.e. they were limited to (3±) This indicates that the total research sample is free of non-normal distributions and indicates the homogeneity of the total sample members in these variables.

Table (2) : Significance of differences between the experimental and control research groups in growth variables and variables Experimental in pre-test (sample equivalence)

N1=N2=6

M	Variables	Unit of measure	Experimental group n=6		Control group n=6		T value and its significance
			S	+A	S	+A	
1	Age	year	20.44	0.28	2.41	0.24	0.98
2	height	poison	160.25	0.24	161.25	0.16	0.87
3	the weight	kg	70.21	0.18	71.26	0.17	0.89
4	Training age	year	6.11	0.12	6.20	0.17	0.61
4	Pulse at rest	Pulse/min	69.25	0.39	68.52	0.26	0.88
5	Pulse after exertion	Pulse/min	173.52	0.34	174.26	0.21	0.97
6	Vital capacity	milliliters	1.88	0.15	1.89	0.18	1.02
7	theMaximumFor oxygen	equation	56.52	0.85	57.32	0.20	1.33
8	Oxygen in the blood	mm/Hg	94.52	0.11	94.14	0.17	0.87
9	Broad jump	meter	1.44	0.36	1.49	0.11	1.08
10	NabtaHoblique	Repeat/minute	15.21	0.24	15.67	0.34	0.97
11	Pull up	repetition	4.50	0.17	4.57	0.15	0.87
12	100m freestyle	Th	78.25	0.11	78.98	0.17	0.54

Tabular t-value at significance level 0.005 (10) = 2.228

Table (2) shows that there are no statistically significant differences at a significance level of (0.05) between the experimental and control research groups in the growth variables and the test variables under study, as the calculated "t" value in all variables is less than the tabular "t" value. This indicates the equivalence of the research sample in those variables.

Tools and means of collection Data:

First: Devices and tools Used:

- stopwatch Stop Watchband a measuring tape.

- Swimming pool.
- Rotamer To measure length (in centimeters).
- Medical scale for measuring weight (in kilograms).
- Smart technology watches.

secondly: Tests Used:

1-Physical tests:

- Test the Broad jump from a standing position to the furthest distance.
- Incline prone and arm push-up test Push -cuspform as many as possible.
- a test Pull up For as many as possible.

Attachment No. (6) Explains the way to perform the testation its measurement.

2- Physiological tests:

- Resting pulse (via smart watches).
- Pulse after exertion (via smart watches).
- Vital capacity (via the college's physiological measurements laboratory).
- Maximum oxygen consumption (by step test to (estimate) **Vo2Mx**).
- Blood oxygen level (via smart watches).

3- 100m freestyle test.

Fourth: Training Suggested:

After examining On foreign and Arab scientific references and articles published on the international information network in addition to electronic interviews And the character For workers in the field Sports training and users of the method (Hypoxic In the training, the researcher did: By suggestion set of exercises in line with the method Hypoxic used and which It is done by wearing a training mask, which has been replaced by a medical mask to reduce the amount of oxygen entering the body outside the water, as well as breath-holding exercises. And organize it inside the water and Contains special exercises To develop muscle strength, strength endurance and cardiorespiratory endurance.

The number of proposed trainings was (28) trainings. Physical exercises were shown. on Experts with experience in swimming training And also Experts in the field Training athlete To get their opinions on the appropriateness of the training. Suggested For the application and its purpose and the number of experts(6)It has been done Exclude number(8)Trip The number of physical exercises in their final form became (20) exercises, and their opinions were also taken regarding Training duration Number of weekly doses Total number of doses.

Implementation steps For search:

Firstly: the study Exploratory:

He did researcher By conducting a survey on sample From within the research community and outside the main sample Its structure (4) Students That day6/10/2023 today9/10/2023 To get to know on me:-

- Validity of place Application of physical exercises and tests.
- Validity of measuring instruments and safety of application Tests.
- Suitable for physical exercises used on sample Search.
- Training of assistant son Search.

Second: The basic experience:

1- Measurement Tribal:

- Pre-measurements were conducted for the control and experimental groups. daily13-14/10/2024The measurements included: And the tests on Variables Next (tests Physical – Physiological tests -Digital level of100m free).

2- Conduct an experiment Search:

- Applied Trainings(Hypoxic) Suggested on Swimmers of the Kuwaiti Kazma Club For the training year 2024-2025(Experimental group) in the period from day 15/10/2024 today 29/11/2024 any For a period of (6) weeks The control group used the skill training followed in the general and special physical preparation periods during the training season.
- Follow the training Water at the club.
- The intensity of training followed (Medium -High).

The table shows (5) Time distribution of the dose Training:

Presentation and discussion of results:

Table (3): Significance of differences between the two measurements tribal And the next one For test variables In the experimental sample n=6

M	Variables	Unit of measure	Measurement tribal		Measurement The dimension		T value and its significance
			S	+ A	S	+ A	
1	Pulse at rest	Pulse/min	69.25	0.39	65.21	0.31	5.28
2	Pulse after exertion	Pulse/min	173.52	0.34	165.58	0.18	7.20
3	Vital capacity	liter	1.88	0.15	2.87	0.52	5.69
4	The Maximum For oxygen	equation	56.52	0.85	69.32	0.32	4.62
5	Oxygen in the blood	mm/Hg	94.52	0.11	99.25	0.28	5.50
6	Broad jump	meter	1.44	0.36	1.64	0.22	4.98
7	NabtaHoblique	Repeat/minute	15.21	0.24	19.68	0.32	5.39
8	Pull up	repetition	4.50	0.17	6.24	0.14	5.82
9	100m freestyle	Th	78.25	0.11	70.21	0.25	4.36

The tabular t-value at a significance level of 0.005, (5) = 2.571

It is clear from the table (4) There are statistically significant differences at a significance level of (0.05) between the two measurements. Tribal And the next one In favor of measurement The dimension For test variables I am looking for Individuals of the experimental research sample. Where She came The calculated t-value is greater than the table t-value.

Table (5): Significance of differences between pre- and post-test measurements of test variables the control sample has n = 6 individuals.

M	Variables	Unit of measure	Measurement tribal		Measurement The dimension		T value and its significance
			S	+ A	S	+ A	
1	Pulse at rest	Pulse/min	68.52	0.26	67.01	0.28	3.52
2	Pulse after exertion	Pulse/min	174.26	0.21	171.21	0.11	3.28
3	Vital capacity	liter	1.89	0.18	2.10	0.36	4.21
4	Maximum For oxygen	milliliters / minute	57.32	0.20	61.52	0.81	3.29
5	Oxygen in the blood	mm/Hg	94.14	0.17	96.25	0.36	2.98
6	Broad jump	meter	1.49	0.11	1.59	0.14	3.49
7	NabtaHoblique	Repeat/minute	15.67	0.34	17.25	0.54	3.52
8	Pull up	repetition	4.57	0.15	5.54	0.36	3.18
9	100m freestyle	Th	78.98	0.17	73.52	0.11	3.21

The tabular t-value at a significance level of 0.005, (5) = 2.571

Table (5) shows that there are statistically significant differences at a significance level of (0.05) between the pre- and post-measurements in favor of the post-measurement of the test variables for the individuals of the control research sample, as the calculated “t” value is greater than the tabular “t” value.

Table (6): Improvement ratios (rates of change) and t-value between pre- and post-measurements For test research variables For the experimental and control research groups.

M	Variables	Unit of measure	Experimental group n=6			Control group n=6			value (t)
			tribal	The dimension	Improvement rate%	tribal	The dimension	Improvement rate%	
1	Pulse at rest	Pulse/min	69.25	65.21	5.83%	68.52	67.01	2.20%	3.58
2	Pulse after exertion	Pulse/min	173.52	165.58	4.57%	174.26	171.21	1.75%	4.29
3	Vital capacity	liter	1.88	2.87	34.49%	1.89	2.10	10.00%	5.36
4	Maximum For oxygen	equation	56.52	69.32	18.46%	57.32	61.52	7.32%	3.74
5	Oxygen in the blood	mm/Hg	94.52	99.25	4.76%	94.14	96.25	2.19%	3.96
6	Broad jump	meter	1.44	1.64	12.19%	1.49	1.59	6.28%	3.41
7	NabtaHoblique	Repeat/minute	15.21	19.68	22.71%	15.67	17.25	9.15%	3.84
8	Pull up	repetition	4.50	6.24	27.88%	4.57	5.54	17.50%	3.64
9	100m freestyle	minute	78.25	70.21	10.27%	78.98	73.52	6.91%	3.97

It is clear from Table (6) that the improvement rates (change rates) for the test variables between the experimental and control groups ranged between (0.19% ,36.19%) in favor of the experimental group.

Discussion of results

It is clear from the table (4) There are statistically significant differences at a significance level of (0.05) between the two measurements. Tribal And the next one In favor of measurement The dimension For test variables I am looking for Individuals of the experimental research sample. Where She came The calculated t-value is greater than the table t-value. The researcher attributes this result to the use of hypoxic training on the swimmers of the experimental research group.

Which was confirmed by Abu Al-Ala Abdel Fattah"(2001) that hypoxic training works by exposing the body's tissues and cells to a lack of oxygen through holding the breath or controlling it, and leads to improving the functional efficiency of vital organs, which is reflected in improving the level of digital achievement. (54:1)

This result is consistent with Baha Religion Ibrahim (2000) that hypoxic training led to an improvement in the digital level of their research samples. (48:3)

Andy The researcher attributed this to the nature of the training provided. Under consideration The way it is organized varies between exercises for different motor abilities arranged in a sequential manner that allows for improving the muscular capacity of different parts of the body by providing...Ingredients Suitable for neurological adaptation Stay Improving the frequency of nerve signals reaching the working muscles.

Table (5) shows that there are statistically significant differences at a significance level of (0.05) between the pre- and post-measurements in favor of the post-measurement of the test variables for the individuals of the control research sample, as the calculated "t" value is greater than the tabular "t" value.

to Sports training leads to physiological and chemical changes within the muscle cell in order to release and produce the necessary energy. For performance Physical and level depends The swimmer On the extent of positivity of chemical changes that achieve adaptation of the body's systems to confront the effort and functional and physical fatigue resulting from training And competitions.(14: 161)

and That the processes of subjecting the body to performance Types Different from physical load during Sports training Changes are happening. "Functional" physiology and "structural" morphology resulting in increased efficiency .trainee, It is attributed to the development of energy, especially aerobic and anaerobic capabilities, and its adaptation to meet the basic functional and structural requirements of the nature of the sporting activity practiced efficiently while saving effort.17: 8)

that There are two types of anaerobic energy production systems., One is the phosphate energy production system. **ATP-PC**It is the fastest system and is responsible for energy production. For activities Physical exercise performed at the highest possible speed within a period not exceeding 30 seconds, and in the event that the period of muscular work increases to one or two minutes, the second anaerobic system, which is the (anaerobic glycogen) system, become she Responsible for energy production, this process produces lactic acid, which affects the muscle's ability to continue performing at the same intensity and causes fatigue.(5:149)

It is clear from Table (6) that there are statistically significant differences at a significance level of (0.05) between the two post-measurements of both the experimental and control research groups in all the test variables under study, and these differences are in favor of the post-measurement of the experimental group.

Both agree "Imad Farag Badawi" (2010) (16) and "Yasser Abdomen Suleiman" (2016) (24) stated that hypoxic training has a positive effect on physical and physiological characteristics if used in a standardized manner within the training program.

This is also indicated by both "Dufour (2005) (28), Schmitt (2014) (33), and Aroussen (2006) (25) stated that hypoxic training has a clear effect in favor of developing physical and physiological qualities when used in a scientifically standardized manner in various training programs.

And Yond coresearcher This result indicates that the application of the proposed program has led to the emergence of statistically significant differences between the pre- and post-measurements of the experimental group in the variables under study, in favor of the post-measurement, as a result of applying the program to them during the proposed training program, which indicates the existence of a positive effect of using the training mask on the physical variables under study using hypoxic training.

This is consistent with what was reached. Researcher From the results and previously displayed in My schedule(8,9) which indicates the presence of statistically significant differences between the pre- and post-measurements of the experimental group in the variables under study, in favor of the post-measurement, as a result of applying the program to them using Hypoxic training your During the proposed training program.

Which indicates the presence of statistically significant differences between the post-test of the control group and the post-test of the experimental group in the variables. Physical and indicators Physiology And the allodigitalin favor of the post-measurement of the experimental group, as a result of applying the program to them using Trainings Hypoxic during The program indicates a positive impact. To practice Sports training on the variables under investigation using hypoxic training than in training.

This is what both agreed upon. "**Daniel Pierce**"(2013) (27) and "Muhammad Zakaria Jazzar" (2005) (21) that hypoxic exercises, which are exercises used with a training mask, always have positive results that are superior to their counterparts from exercises practiced without using the mask.

Likewise, Nasser Mustafa Al-Suwaidi and Mohsen Ibrahim Ahmed (2010) (22) agreed that sports training using Trainings Hypoxic Its results are always superior to those of exercises without using a mask, with a percentage that may reach twice the effect.

And Condole researcher This result indicates the presence of a statistically significant positive effect on the physical variables, physiological indicators and the digital level under study for the training program that was applied to the experimental group as a result of using Hypoxic training This is greater than the effect that occurred on the control group as a result of applying the training program to it in the traditional way..

Nasser Mustafa Al-Suwaidi and Mohsen Ibrahim Ahmed (2010) (22) also agreed that sports exercises using a training mask (hypoxic) are superior in their results to training without using a training mask by a percentage that may reach double the effect.

Conclusions and recommendations:

First - Conclusions:

- 1- There were statistically significant differences between the pre- and post-measurements of the experimental group in some variables. Physiology In favor of dimensional measurement.
- 2- Hypoxic training using a training mask is an effective alternative to altitude training.
- 3- The results agree favorably with other studies conducted on training.

Second - Recommendations:

- 1- Implement the proposed program using Hypoxic training Training For 100m swimmers.
- 2- Use of hypoxic exercises While working on increasing the lung capacity of the competitor, as it has a positive effect on developing the performance of the circulatory and respiratory systems.
- 3- Conduct more research on wearing a training mask with different training methods and programs and also with Different swimming For different age groups.
- 4- The necessity of conducting physical and physiological tests as an indicator of the adaptation of functional systems and evaluating the training status resulting from the use of the training mask as an alternative to training at altitude.
- 5- Providing a training mask for use during the training process, as it has an impact on improving vital functions and the digital level.

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