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The effect of intermittent training "short-short" on some physiological variables (growth hormone and heart rate) in 12-14 year old female swimmers.

A field study conducted at the Star Djelfa Club For swimming

أثر التدريب التبادلي "القصير قصير" على بعض المتغيرات الفسيولوجية (هرمون النمو ونبض القلب) لدى سباحات 12-14 سنة.
دراسة ميدانية أجريت على نادي ستار الجلفة للسباحة

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Abstract:

This study aims to shed light on the effect of short-short intermittent training on some physiological variables (growth hormone and heart rate) in 12-14 year old female swimmers. Therefore, we hypothesized three hypotheses, which were as follows:

-There are statistically significant differences in the dimensional measurements of the experimental group in growth hormone and heart rate.

For this purpose, the researcher applied a set of training units on a sample of 10 swimmers from the Star Club, age group B, in Djelfa. They were chosen intentionally, and the researcher used the experimental method. In order to verify, the researcher conducted a set of field measurements and tests. After presenting the observations and subjecting them to statistical processing, the following was extracted,There were statistically significant differences in the dimensional measurements of the experimental group in growth hormone and heart rate.

Keywords: short-short intermittent training; physiological variables; 12-14 year old female swimmers.

ملخص:

تهدف هذه الدراسة الى تسليط الضوء على أثر التدريب التبادلي "القصير قصير" على بعض المتغيرات الفسيولوجية (هرمون النمو ونبض القلب) لدى سباحات 12-14 سنة وكان الفرض الرئيسي وجد فروق ذات دلالة إحصائية في القياسات البعدية لدى المجموعة التجريبية في هرمون النمو ونبض القلب.

و طبق الباحث مجموعة من الوحدات التدريبية على عينة قوامها 10 سباحات من نادي ستار سن الباء بالجلفة، وتم اختيارهم

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بالطريقة القصدية، واستخدم الباحث المنهج التجريبي في ذلك ومن أجل التأكد قام الباحث باجراء مجموعة من القياسات والاختبارات الميدانية، وبعد عرض للملاحظات واخضاعها للمعالجة الإحصائية

تم التوصل إلى وجود فروق ذات دلالة إحصائية في القياسات البعدية لدى المجموعة التجريبية في هرمون النمو ونبض القلب.

كلمات مفتاحية: التدريب التبادلي "القصير قصير"؛ متغيرات فسيولوجية؛ سباحات12-14 سنة.

I -Introduction:

Swimming is one of the most popular and widely practiced sports among athletes and in international forums. Some consider it the ultimate in fun. To ensure the continued popularity of this sport among fans and in the hope of developing it for the better, specialists have undertaken research and planning through innovation, skill development, and the development of training methods and techniques. Swimming is considered one of the most important sports that relies on a set of physical attributes and most physiological functions(Majid Hamid Al-Hamdani ,2016 ,p. 112).

Swimming has recently gained a prominent and important position among sports physiologists, in terms of studying the responses resulting from the influence of the aquatic environment and training methods. It is considered one of the sports activities with a special character that distinguishes it from other activities and various sports due to the body adopting a horizontal position and the associated difference compared to those other sports activities in terms of its effect on the heart, blood circulation and respiratory system. (Mohamed Al-Hadary ,2004 ,p. 188).

Any physical activity is accompanied by a set of physiological changes that occur at the level of the body's systems. Swimming also has a significant impact on the functional systems, as it increases the capacity of the circulatory system because the slightly cold temperature of the water initially causes some constriction of the blood vessels, and then causes them to expand, as if the blood vessels are being trained. Also, the change in heart rate during rest or during physical effort is one of the basic indicators that the coach relies on when formulating the training load for training programs. As Bastawisi pointed out" , It has been practically possible to use the heart rate to standardize the training load and determine the extent of its suitability to the player's training level and recovery period, and to standardize the rest periods between sessions during cross-training, as well as to determine the appropriate load intensity based on the heart rate. This is due to the relationship between the heart rate and many other

important physiological processes such as the rate of oxygen consumption or the maximum limit of oxygen consumption ".It also affects the growth hormone, which controls the distribution of inter-muscular tissues during cross-training , fat mass, and bone quality. These variables, in turn, affect the numerical achievement of swimmers (Saleh Bashir et al ,2010 ,.p. 210).

is also a training method that includes an important form to improve maximum aerobic capacity in team sports by stimulating mixed aerobic and anaerobic energy . It is a high-intensity alternating effort that allows for improved maximal oxygen consumption and improved anaerobic capacity. Hervé also pointed out that short interval training at a speed similar to maximum aerobic speed clearly stimulates and develops the aerobic system (Tahri Rabah,12 ,2024)

Through the literary review, we find the researcher Haloz Hawaria (2015) studied the effect of a proposed training program on growth hormone, some physiological variables, and the digital achievement of 1500m runners ,and concluded that there was an effect .In the level of growth hormone in the blood after applying the training program , as it touched upon Amer Mohammed Saeed Abdul Rahman Al-Mawla (2004) on the effect of using aerobic endurance in the two methods of low-intensity and continuous cross-training on a number of functional variables and achievement in the 800-meter race . The most important results reached were; The training program implemented on the first experimental group that used low-intensity cross-training improved their 800-meter run performance . Despite the improvement that occurred for both groups in their 800-meter run performance ,the results did not show significant differences between the two research groups in the post-test. However, the rate of improvement proved that the achievement of the group that used low-intensity cross-training was better than the group that used continuous load training.

Through this study, we will attempt to shed light on some physiological variables that may lead to improved numerical performance in swimmers.

Hence ,the following general question can be raised:

Does the proposed short-term interval training program affect some variables such as growth hormone and heart rate in female swimmers?

Hypotheses:

1) no statistically significant differences in the pre-measurement between the experimental and control groups in growth hormone and heart rate.

2) There were no statistically significant differences in pre- and post-test scores between the two research groups in growth hormone and heart rate.

3) There were statistically significant differences in the dimensional measurements of the experimental group in growth hormone and heart rate.

II -Methods and tools the study:

1- The research methodology followed:

In language ,method means the system and arrangement for doing something. In technical terms, it is a set of rules that are established with the intention of arriving at the truth in science. It is the method that the researcher follows in studying the problem ,finding solutions for it, and formulating it into a series of coherent ideas.(Hassan Hisham, 2007, p. 44)

Based on the study problem that seeks to know the impact of exchange training " The short is short "on some physiological variables (growth hormone and heart rate after recovery) in 12-14 year old female swimmers , then the experimental method is the most appropriate method for this study, as Muhammad Hassan Alawi and Osama Kamal Rateb say" :The experimental method is the only research method that can truly test hypotheses of relationships of cause and effect.

As the experimental method indicates in its scientific content to measure a specific effect or a specific factor on a phenomenon and is linked to the time aspect and represents our use of the experimental method in our application of the training program vocabulary, the nature of this study investigates the causal relationship between two variables and it is a relationship of influence and effect, and in line with that we used the experimental method, and in order to issue objective judgments about the effectiveness of the independent variable and its positive effect on the dependent variable, in this study the researcher relied on the experimental design of the pre- and post-tests for two experimental groups, which is based mainly on the pre-measurement “before applying the training program” and the post-measurement “after applying the training program” and the differences found between the pre- and post-measurements prove or deny the validity of the hypotheses, and the scores and results obtained were processed statistically using some appropriate statistical methods.

2- Study sample:

A sample is a portion drawn from the study population. The researcher designs the results he conducts on the sample and generalizes them to the research population(Mundhir Al-Dhamin , 2007 , p. 161), and The research sample will be From 10 swimmers from the Star Club ,age 12, women were selected intentionally , with the total number of members of the study community being 50 swimmers from the Star Club, age 12, women in the state of Djelfa.

***Sample selection criteria :** Sample members were selected based on the following criteria:

- were selected so that the researcher could have good control over the course of the experiment. The team coach helped us with this selection.
- **Selecting a small sample for control.**

-Homogeneity of the study sample:

In this study, we found sample homogeneity in some variables that may affect the dependent variable, which were revealed by the results of other research and previous studies. In this study, we identified the variables that may affect the dependent variable, which are physical variables. In order to achieve this, we conducted homogeneity for the study sample, to control the following variables:

Biological age measured as a percentage.

Length measured in centimeters.

Weight measured in kilograms.

- Training age in years.

-Sample normality : To ensure the normal distribution of the sample, we calculated the skewness coefficient and the Shapiro -Wilk test ,which is used to verify the extent to which the scores are close to the normal distribution.

- Coefficient of twist:

values for the coefficient of skewness are between (2, -2) as the most commonly used criterion.

Table No. (01): Shows the values of the arithmetic mean, standard deviation, and skewness coefficient for the control and experimental samples with respect to age, weight, height, training age, and heart rate test .At a significance level of 0.05

Variables	experimental group		control group		Coefficient of torsion of the experimental sample	Factors Skewness of the control sample
	standard deviation	arithmetic mean	deviation Standard	arithmetic mean		
Chronological age	0.52	13.90	0.40	13.83	-1.14	-2.00
the weight	1.79	60.17	3.50	59.33	-1.33	-2.00
height	0.020	1.67	0.04	1.53	-0.35	0.71
Training age	0.52	4.66	0.52	4.66	-1.13	-1.14
heartbeat	1.55	63.88	1.07	65.25	0.26	1.14-

Through Table No (01) ,which shows the degree of homogeneity of the control and experimental samples in terms of age, height and weight. The training age and heart rate test We note from the table for the control group that the arithmetic mean value was (13.83) and the standard deviation (0.40) and the skewness coefficient (-2.00) for the chronological age ,and for the weight the arithmetic mean value was (59.33) and the standard deviation (3.50) and the skewness coefficient (-2.00) and for the height the arithmetic mean value was (1.53) and the standard deviation (0.04) and the skewness coefficient (0.71) ,and for the training age the arithmetic mean was (4.66) and the standard deviation (0.52) and the skewness coefficient(-1.14) ,as for the heart rate test with an arithmetic mean of 65.25 and a standard deviation of 1.07

As for the experimental group: the arithmetic mean value was (13.90), the standard deviation (0.52 ,(and the skewness coefficient(-1.14)for the chronological age ,and as for the weight , the arithmetic mean value was (60.17), the standard deviation (2.79), and the skewness coefficient(-1.33) ,and as for the height, the arithmetic mean value was (1.67) ,the standard deviation (0.02), and the skewness coefficient (-0.35) ,and as for the training age, the arithmetic mean was (4.66), the standard deviation (0.52), and the skewness coefficient(-1.13) , and as for the reserve heart rate test, the mean was 63.88, the standard deviation was 1.55, and the skewness coefficient was (0.24), and since the skewness coefficient is included in the criterion(-2 ,2) ,the data are close to the normal distribution.

Shapiro - Wilk 's Test : This test is used to check how close scores are to a normal distribution**.**

Table No. (02): Shows the results of the Shapiro -Wilk test for age, weight and height for the control and experimental samples for age, weight, height, training age and heart rate test .At a significance level of0.05

Variables	Shapiro- Wilk test value For the experimental sample	Test value Shapiro Wilk For the control sample	Moral significa nce 1	Significan ce Morale 2	Significa nce level	degree of freedom
the age	0.64	0.50	0.06	0.0 6		
the weight	0.80	0.80	0.06	0.06		
height	0.91	0.91	0.46	0.46	0.05	09
Training age	0.64	0.64	0.06	0.06		
a test heartbeat	0.99	0.99	0.59	0.59		

We note from the table that the value of the Shapiro -Wilk test for the control and experimental samples is) 0.50 .(and) 0.64 (The Shapiro -Wilk test was (0.80) at a degree of freedom (0.9) and the significance was (0.46). The significance was greater than the significance level. Therefore, the Shapiro-Wilk test was not statistically significant for the age variable . As for the weight variable, the value of the Shapiro - Wilk test was (0.80) at a degree of freedom (0.9) and the significance was (0.06). As for the height variable ,the value of the Shapiro- Wilk test was (0.91) at a degree of freedom (0.9) and the significance was (0.46). As for the training age variable, the value of the Shapiro- Wilk test was (0.64) at a degree of freedom (0.9) and the significance was (0.06). As for the significance level, the Shapiro-Wilk test was (0.64). The Shapiro -Wilk test is not statistically significant, and for the variable of the heart rate test , the value of the Shapiro -Wilk test was) 0.99 (at a degree of freedom of (0.9) and the moral significance was) 0.59 .(Since the moral significance is greater than the level of significance ,therefore the Shapiro- Wilk test is not statistically significant. Through the previous results, it can be said that the distribution of the scores of the control and experimental samples does not differ from the normal distribution with a statistically significant difference with regard to the variables of age, weight, height, training age and heart rate test.

3- Research variables:

The independent variable:

is the factor that the researcher wants to measure the extent of its influence on the phenomenon being studied and is generally known as the experimental variable or factor, meaning it is the one that influences the dependent variable (the cause) and is represented in our study in the short training.

The dependent variable :

This variable is the result of the independent factor in the phenomenon, and in our study it is represented by some physiological variables.

4- Research areas:

-Time frame:

The search was conducted in the period from 02/14/2024 to 04/02/2024.

Spatial scope : The field study was conducted at the semi-Olympic complex in Djelfa.

-Human domain :

The study was conducted on swimmers of Star Club, age group B, under 14 years old.

5-Data collection tools:

Our choice of data collection tools depends on our understanding and familiarity with the requirements of the study and what is consistent with its nature. The nature of the problem and the hypotheses control the type of tools used to collect data. In order to collect data from the field about the subject of the study, the researcher must select the appropriate tools for that. From this, it can be said that the research tool is the only means by which the researcher can solve the problem. We used field tests (height and weight tests, heart rate test and growth hormone measurement) and devices and tools to collect data for the research, which are:

1- forms.
2- Support staff
3- Semi-Olympic swimming pool in Djelfa
4- Medical weight measuring device
5- A device for measuring length.
6- heart rate measurement test
7- Growth hormone measurement test
8- Arabic and foreign sources and references, especially regarding the theoretical aspect.

6- Scientific foundations of tests :

Test reliability means that the test gives the same results if it is applied again to the same sample and under the same conditions at different times. To calculate test reliability, we calculated reliability by test and retest method, where we applied the tests to an initial sample, then after a week we applied the same tests to the same individuals and under the same conditions ,by calculating the Pearson correlation coefficient between the results of the initial test and the post-test and then the reliability coefficient α .

Stability coefficient:

It was found that the maximum airspeed test has a high stability coefficient as shown in Table No.(03) .

Test validity :

Self-reliability : Self-reliability was calculated by taking the square root of the reliability coefficient α .Self-honesty = root of reliability coefficient.

Table No. (03): Shows the coefficient of stability and validity of the tests for the teams.

Tests	Self-reliability coefficient of the test	Test reliability coefficient
25m freestyle test	0.94	0.90
100m freestyle test	0.96	0.93

III- Result:

1- Show the results of the first hypothesis, which states:

no statistically significant differences in growth hormone and heart rate in the control group.

Table No. (04): shows A comparative study between the pre-test of the experimental and control samples in the variables of heart rate and growth hormone

	standard deviation	arithmetic mean	N	T Scheduled	T The calculated	degree of freedom	M significance	significance
control sample	0.06 0.05	0.79 200	10	2.33	1.01	08	0.05	Not significant
experimental sample	0.05 0.07	0.81 189	10					

From Table No. (04) it is clear that the control sample achieved an arithmetic mean of (200) and (0.79) respectively and a standard deviation of (0.05) and the experimental

sample achieved an arithmetic mean of (189) and a standard deviation of (0.7) and the calculated T value was (1.01)which was smaller than the tabular T value (2.33) at the significance level (0.05) and a degree of freedom of 0.8. This shows that there is no statistically significant difference between the two samples and this indicates the homogeneity of the samples in the variables of heart rate and growth hormone.

2- Show the results of the second hypothesis, which states:

There were no statistically significant differences in the post-test between the experimental and control groups in growth hormone and heart rate in favor of the post-test.

Table No. (05) Shows a comparative study between the dimensional measurements of the control and experimental samples in the variables of growth hormone and heart rate

	standard deviation	arithmetic mean	N	degree of freedom	M significance	T Scheduled	T The calculated	Significance
control sample	18.55 0.9	200 0.81	10	08	0.05	2.33	3.07	Not significant
experimental sample	14.07 0.7	196 0.98	10					

From Table No. (05), it is clear that the experimental sample achieved an arithmetic mean of (0.98) and (196) respectively and a standard deviation of (14.07)and (0.7) respectively, and the control sample achieved an arithmetic mean of (0.81) and (200) respectively and a standard deviation of (0.9) and ,(18.55) and the calculated T value was (3.07), which was greater than the tabular T value (2.33)at a significance level of (0.05) and a degree of freedom of 0.8.

This shows that there is a statistically significant difference between the two samples in the physiological variable, growth hormone, in favor of the experimental sample, with a small difference when comparing the arithmetic means.

3- **Show the results of the third hypothesis, which states**:

There were statistically significant differences in the dimensional measurements of the experimental group in growth hormone and heart rate.

Table No. (5 :(shows A comparative study between the post-test of the experimental sample in the variables of heart rate and growth hormone

	N	standard deviation	arithmetic mean	T Scheduled	T The calculated	Degree of freedom	M significance
Pre-measurement	10	0.05 0.01	0.81 190	2.33	1.01	08	0.05
Dimensional measurement	10	0.05 0.06	0.98 189				

From Table No. (5) it is clear that the experimental sample achieved a calculation mean of (0.98) and a standard deviation of ,(0.05) also achieved in the heart rate in the post-measurement (189) with a standard deviation of (0.05) and the calculated T value reached (1.01)which was smaller than the tabular T value (2.33) at the significance level (0.05) and a degree of freedom of 0.08. This shows the presence of a statistically significant difference, i.e. not significant ,between the two samples, and this indicates the presence of an improvement in the heart rate among the members of the experimental group.

IV –Discussion:

Through the research hypothesis that there are statistically significant differences in the dimensional measurements of the experimental group in growth hormone and heart rate , Through the research results that we reached in our study in Tables No. (03) (04) (05 ,(there were statistically significant differences in growth hormone and heart rate between the pre- and post-measurement.

Through the results of Table No. (05), we see that there is a development in the concentration of growth hormone in the blood of the experimental group. The results of the table showed significant differences in growth hormone between the pre- and post-tests in favor of the post-test. The researcher can attribute this result to the effectiveness of the training program applied by the experimental group, which included short-term exchange training . Through our study of growth hormone, its concentration increases in the blood through performing the exercises included in the training program.

As for the heart rate variable, Table No. (05) shows differences in favor of the post-test. The researcher supports this by saying that the training the sample underwent led to the functional improvement that occurred in the cardiovascular system, as well as increased economy in the work of the heart muscle and a

decrease in the number of its heartbeats .Because a slow heart rate during rest is one of the phenomena accompanying a good training condition.

Therefore , it can be said that the research hypothesis that indicates that there are statistically significant differences in growth hormone and heart rate has been achieved .

V –Conclusion:

The aim of the study was to know the effect of short-term cross-training on some physiological variables (growth hormone and heart rate) in female swimmers aged 12-14 years, The researcher concluded that there is Improvement in the level of targeted physiological variables, the level of growth hormone in the blood and in the heart rate The research sample is in favor of the experimental sample **.**

IV –References:

1. Ahmed Bastawisi , Foundations and Theories of Sports Training, Cairo, Dar Al Fikr Al Arabi.
2. Hassan Hisham :Scientific Research Methodology, 2nd ed., Al-Nuqta Press, Algeria, 2007.
3. Haloz, Hawariya .(2015) . A study of the effect of the interval training method (short-short (on growth hormone and some physiological and physical variables in 1500m runners .
4. Duraid Majeed Hamid Al-Hamdani ,Scientific Foundations and Modern Scientific Concepts in Swimming Education and Training, 1st ed., Salahaddin University Press, Erbil ,Baghdad, 2016.
5. Abdul Jabbar Tawfiq Al-Bayati: Statistics and its Applications in Educational and Psychological Sciences, 1st ed., Ithraa Publishing and Distribution, Amman , .2008
6. Munther Al-Dhamin: Fundamentals of Scientific Research, 1st ed., Dar Al-Masirah for Publishing, Distribution and Printing, Sultanate of Oman, 2007.

7. Hoda Mohamed El-Hadary, Modern Techniques for Selecting Talented Young Swimmers in Alexandria, Egyptian Library for Printing, Publishing and Distribution.

8. Pelayo , P. (2010). The art of nager in the science of nativity. La review for the history of the CNRS, (26), 18-23.

9. Prétot , C. (2022). Study physical education courses (Doctoral dissertation, ParisTech school).

10. Tahri Rabah, Hassaine Ahmed, Djeridel Ahmed Hocine, (2024), The impact of an intermittent training program on maximum aerobic speed (VMA) and speed-related strength in senior football players, International Journal of Studies & Research in Sport Sciences &Training, Vol : 05 / N°: 01 (2024), p 09-20.

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