International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 04, 2020
ISSN: 1475-7192

A comparative study in estimating the maximum oxygen consumption between the Bruce and Cooper test for young basketball players

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Abstract

The research aims to make a comparison in estimating the maximum oxygen consumption between the tests of Bruce and Cooper for young basketball players aged 17 years. As the tremendous functional variables that basketball players reached led the researchers to investigate and research the finer things in matters by relying on laboratory devices to study functional variables. However, the difficulty of obtaining these devices and how to use them in addition to their high price prompted researchers to find equations for indirect measurement in order to facilitate the provision of information to workers in the sports field in order to determine the levels of their teams on the one hand and evaluate the level of their training curricula on the other hand. As for the second chapter. It included determining the appropriate approach for the research and it was the descriptive approach. As for the research sample, it was 4 young basketball players at the age of (17) years. The process of measuring the research variables was done by using the standardized equations for determining and measuring the maximum oxygen consumption represented by the Bruce and Cooper equations. The researchers also dealt with tools and means of collecting information and exploratory experience, as well as the use of the statistical package (SPSS) to process data. The third chapter included presenting, analyzing and discussing the results of the research sample, as the results showed that there were no significant differences between Bruce and Cooper tests in estimating the maximum oxygen consumption. As for the conclusion, the researchers concluded that there was no significant difference between the Bruce and Cooper tests in estimating the maximum oxygen consumption, and this is evidence of the correctness of the work at any of the rates adopted in the research. Oxygen as well as the necessity of recommending researchers to conduct extensive studies in codifying predictive equations and studying them before working with them in order to ensure their validity and suitability with the Iraqi environment.

Keywords: *Bruce test, Cooper test, oxygen consumption , basket ball*

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I. INTRODUCTION

Reaching and achieving sport achievement has become coupled with many physical education sciences that, without relying on them and applying them optimally. Thus, we cannot climb the podiums of the coronation, and one of these sciences is the science of functional tests, which has become the cornerstone in evaluating the level of performance and finding comparisons. The Researchers and data workers for analyzing the technical and functional reality of sporting events.The maximum oxygen consumption (Maximal Oxygen up Taken) or Maximal Aerobic Power is one of the most common expressions used in the field of physical exertion organs . The measurement and knowledge of the maximum oxygen consumption has become a standard procedure within the physiological evaluation tests for athletes and the general public alike.

And the technical development in the means of physiological tests has led to a shortening of the amount of time and effort expended in the process of measuring it, from the use of (Doglas Bag) bags in the forties until the sixties of the last century to the use of the latest automatic control devices in our time. In fact helped to Making maximum oxygen consumption a necessary and standard procedure in all research studies related to physical performance.Kazem Jaber Amir defines it as the maximum level of oxygen that is entered and used by the muscles during physical exertion or it is the maximum amount of oxygen that a person can consume during physical exertion by using it for muscle groups (Kazem Jaber, 1999)

It was defined by (Scott and Edward-2001) as "the highest rate of oxygen consumed by the body that is measured during muscular-moving work that depends on the maximum cardiac output and the maximum difference in arterial and venous blood oxygenation (Scott and Edward: 2001: 318). As for (Fox and Mathews: 1981: 640), they defined it as "the maximum rate at which oxygen can be consumed per minute. An athlete with the highest oxygen consumption is more successful in stalling activities."The maximum oxygen consumption is one of the important variables in order to identify the best functional indicators in the circulatory and respiratory systems. These are the main engine of the body from a mechanical point of view because they work cooperatively to transport oxygen and food through the blood to the various tissues of the body. And then continue their work, as the use of direct methods The indirect measurement of the maximum oxygen consumption (VO2max) depends on the availability of devices and equipment needed to perform the test. When direct measurement devices are not available, the indirect methods of measurement are used, which are naturally less accurate than the direct method.

The basketball game is one of the activities that require a functional and physical integration in order to reach the application of the best skills that undoubtedly affect achievement during competitions. As the tremendous functional variables . Basketball players have reached have prompted researchers to investigate and research the finer things in reliance on Laboratory devices in the study of modern functional variables, but the difficulty of obtaining these devices and how to use them in addition to their high price prompted. The researchers to find equations for indirect measurement in order to facilitate the provision of information to workers in the sports field in order to determine the levels of their teams on the one hand and evaluate the level of their training curricula . On the other hand, hence the importance of the research and its objectives in conducting a comparative study and identifying it in estimating the maximum oxygen consumption between the

Bruce and Cooper tests for young basketball players in order to identify the extent of the differences between these equations for indirect measurement in order to open new horizons for coaches and workers in our sports field And highlighting the extent to which these equations are adopted or not.

Conducting functional comparison studies between indirect measurement methods in estimating the maximum oxygen consumption will lead to identifying the extent of differences between those equations or not, and thus clarifying the picture for workers in this field. Through surveys of office and field researchers, they noticed the scarcity of functional research for conducting comparative studies between equations for estimating the maximum oxygen consumption (indirect measurement) on the one hand and highlighting these rates for use on the other side. Therefore, the researchers decided the necessity of delving into this field for the sake of Opening new horizons and supplementing the educational process with what is new.

The researchers assumed that there were no statistically significant differences in estimating the maximum oxygen consumption between Bruce and Cooper's test for young basketball players. The research areas were a sample of 17-year-old basketball players, whose number is four players, as the time domain was from 1-10- 2018 to 11-11-2018 As for the spatial domain, it was the physical fitness hall of the College of Physical Education and Sports Sciences - University of Baghdad

II. RESEARCH METHODOLOGY

The researcher used the descriptive approach to suit the nature of the problem being researched

The research sample:

The sample was chosen by an intentional method, represented by youth basketball players from the Specialized School for Sport Giftedness of the Ministry of Youth and Sports, totaling (4) players who were chosen on the basis of achievement and regularity in training.

Devices and tools used in the research:

1. A laptop computer (HP Compaq 615) of Chinese origin.
2. The treadmill of Japanese origin.
3. Stopwatch (Sewan) of Chinese origin.
4. Arab and foreign sources.
5. The information network (the Internet).
6. Data collection and dumping form.
7. Auxiliary work team

The tests and measurements used in the research (Bruce, 1969,371-390) (Kazem Jaber Amir: 1999: 177):

The two researchers approved the following tests to estimate the maximum oxygen consumption (indirect measurement) by using the following two equations:

Maximum oxygen consumption during effort for Bruce's test:

The Bruce test is applied to estimate the maximum oxygen consumption through a maximum physical effort on the moving belt and this estimate as described in one of the reference books depends on the time of walking or running on a moving belt using the well-known Bruce protocol, in which the speed of the moving belt is increased and raised the degree of inclination every three minutes during the seven stages of the test, as follows:

First stage (3 minutes duration) at 2.7 km / hr and 10% inclination

Second stage (3 minutes duration) at 4.7 km / h and 12% inclination

The third stage (duration of 3 minutes) at a speed of 5.5 km / h and an inclination of 14%

Fourth stage (3 minutes duration) at 6.8 km / h and 16% inclination

Fifth stage (3 minutes duration) at 8.0 km / h, inclination of 18%

Sixth stage (duration of 3 minutes) at a speed of 8.8 km / h and an inclination of 20%

Seventh stage (duration of 3 minutes) at a speed of 9.65 km / h and an inclination of 22%

Then the following equation is applied (its correlation coefficient is 0.92):

Maximum oxygen consumption (ml / kg. Min) = -6.7 (gender) + (0.056 * time in seconds)

Gender: Men = 1, Women = 2.

Maximum effort oxygen consumption for the Cooper test:

It is a field test famous attributed to the American doctor Kenneth Cooper, who developed this test standards and derived from numerous experiments conducted by the American soldiers, where he compares their performance during the run 12 minutes continuously (field test) with the real levels of consumption maximum oxygen that has been obtained through direct tests conducted in Almokhtburan by measuring breathing gases during the maximum physical effort, and I factor of streaming link in 12 minutes and the value of the maximum consumption of oxygen .90 and test fit actually for individuals who have the enthusiasm and willingness to make the effort and Imitklon a minimum of health and physical Kariyadien soldiers and fitness, summed up testing procedures account The maximum distance a person can travel within 12 minutes (walking and jogging), and then estimating their maximum oxygen consumption by using the following equation:

Maximum oxygen consumption (ml / kg. Min) = 22,351 * mileage - 11,289

Exploratory experience of the tests and measurements under consideration:

The researchers conducted the reconnaissance experiment on (2) players, without the research sample, on Thursday 8/10/2018, at exactly (9) in the morning, with the help of the assistant work team, to prepare the research requirements of tools and devices, and for the purpose of identifying technology Devices, tools, their work function and what is appropriate to the nature, objectives and tests, and to familiarize the assisting work

team with their use, in addition to identifying the extent to which the research sample accepts the tests and the time taken to perform them and the difficulties that the assisting work team may face.

The researchers concluded from the following exploratory experience:

Appropriateness of test time.

The ability and understanding of the staff to perform the tests well.

The tests are suitable for the research sample, especially the physical tests and the maximal oxygen consumption test

The main research experience:

The application of the main vocabulary of the experiment was started on the day of 11/10/2018 and on the research sample according to the scientific conditions for Bruce's test and on the day of 10/18/2018 according to the scientific conditions of the Cooper test

The researcher used the statistical bag (spss) using the following laws:

- Arithmetic mean.
- standard deviation.
- Mediator.

T-test for independent samples

III. RESULTS AND DISCUSSION

Table (1) between the arithmetic means and standard deviations between the Bruce and Cooper tests

standard deviation	mean	No. of samples	Tests
5.88422	54.1255	4	Bruce test
1.82487	49.0580	4	Cooper tests

Through Table (1), it shows us the arithmetic mean and standard deviations between Bruce and Cooper tests, as the arithmetic mean of Bruce's test was (54.1255) and a standard deviation (5.88422), while the arithmetic mean of the Cooper's test was (49.0580) and a standard deviation (1.82487).

Table (2) The t-test shows the difference between Bruce and Cooper tests of the research sample

Meaning	error	Freedom	T.Test	error	Livin test	units	Variables

		degree					
n/a	0.151	6	1.645	0.098	3.840	Min/kg/ml	Bruce test
						Min/kg/ml	Cooper tests

From Table (2) it can be seen: that the Levin test amount was 3,840, with an error level of 0.098, as it reached a T test 1.645, with an error level of 0.151, and when compared with the significance level, it became clear that there was no significant difference

Through Table No. (2) it became clear that there were no significant differences between the maximum oxygen consumption for the Bruce and Cooper tests. The researchers attribute these reasons to the accuracy of using the equations as the results were not affected by the comparison between the two equations and this is evidence of the validity of using any of these rates, and the researchers believe that there is The relentless efforts by many researchers in order to re-apply the predictive equations and ensure their validity, as well as serious work on codifying them in order to achieve the desired results. The multi-stage distance of 20 meters for young Saudis was reached, and a more reliable equation was reached for students aged 18-25, with a correlation coefficient (0.77) and a very simple error (Hazaa bin Hazzaa: 2009: 501). This is evidence of the relentless pursuit by researchers to achieve this.

IV. CONCLUSION

• The results showed that there were no significant differences between the Bruce and Cooper tests in estimating the maximum oxygen consumption of VO2 max.

Researchers recommend:

• The adoption of the two equations in indirect measurement methods to estimate the maximum oxygen consumption

• The necessity of conducting similar research on samples and other variables.

• Continuous work on the application of non-laboratory tests according to new standardized tests, to ensure their accuracy and their compatibility with the applicable environment.

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