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## MEASURING THE LEVEL OF BODY QUALIFICATION BY INDICATING SOME MUSCLE FATIGUE VARIABLES AS WELL AS FUNCTIONAL INDICATORS VARIATIONS

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### ABSTRACT

Relationship of some variables of muscle fatigue with physical efficiency and some functional indicators .It includes four Chapters, including the first section on the introduction and the importance of research as the state of fatigue is the lack of energy stored in the muscle and increasing in the accumulation of brownic acid, so the problem of the research which impedes the work of muscle contraction by the relationship between some variables of muscle fatigue physical efficiency and some functional indicators for students in the first year on college, The most important results obtained in the study were that there is a correlation between the fatigue index and physical efficiency as well as between the fatigue index and the maximum consumption of oxygen.The Relation between muscles fatigue parameter & Physical Working Capacity & VO2max. The aim of the research is study The Relation between muscles fatigue parameter & Physical Working Capacity & VO2max to the first stage student of the collage we are choose (11) players who play at local competition of the collage & the most texts are PWC 170 & Carlson & VO2max. The most results of this research are there are good relationship between muscles fatigue (Carlson) & Physical Working Capacity & Carlson & VO2max.

**Keywords:**body qualifications , muscle fatigue , functional indicators

### {Chapter one}

#### 1.1 Introduction and Importance of the research

The condition of muscle fatigue is considered as one of the most important physiologic cases of sports science as it works directly in reducing the level of the athletes performance which results in direct decreasing in the level of athletes achievement or impacting feeling of unwillingness to exert effort for training and even unwillingness to continue in competitions and in all of its forms and knowledge's, Mr.Rasan defines fatigue as " A temporarily decline in the amount of continuous working , and it can be measured and I identified by its external appearance [manifestations] by supervising the lack of mechanical work performed(1), It is known that the state of fatigue is the lack of energy stored in the muscle and the increased accumulation of lactic acid which hinders the work of muscle contraction. And it is known That trainers and the players try to reduce the fatigue or make the body continue to work for as long as possible and to do so by increase tiredness state during training times and the intensity of training and this is done throughout a structured curriculum where it includes several units during the weekwithin a planned work program thoughtful and regulated . Muscle fatigue is considered one of the priorities of sports work within the field of physical education, whether for beginners or advanced athletes because it is considered the cornerstone in the performance of sports skills and the development of sports performance. Therefore, the exercise of sports requires high physical efficiency and functional indicators adapted to work for the required performance. The importance of research is to indicate fatigue mark and its relationship to the work and efficiency of the circulatory breathing system through the tests of functional devices, which gives us the ability and level of work of the respiratory system.

Rasankhribit and others, physiological work for body organs and muscle fatigue 1998 page210

## **1.2 The research problem;**

The state of fatigue may occur as a result of a combination of factors and whether these factors combined or separate, they affect the functioning of the organs of the body. And through the multiplicity of these reasons, for example, complete discomfort and some cases of nutrition problems , some psychological factors , stress situations and physiological factors and physiological factors aswell as some other minor issues ,through the study of fatigue, the researchers noted that the sports staff need to diagnose the nearest state of tiredness through fatigue tests and then link them to the level of fitness through Tests of the work of functional devices.

The researchers saw connection state between fatigue and the level of physical fitness in the students of the first year, and this study opens to us wide areas of future studies to know the causes and causatives [affecters]

of tiredness and knowledge of fatigue and its association to The evolution of fitness levels and degrees of knowledge at this link between them which gives us a comprehensive idea of these two variables which are fatigue and level of physical fitness. The two tests are one virtual test and the other a physiological test related to the efficiency of functional devices work.

And this research supports sports training work and those who are digging at the training science even if this research considered through its results as a step that serves the training science and participates with the previous steps .

### **1.3 The research objectives;**

1. Identifying fatigue variables as research samples
2. Knowing some functional parameters for research samples.
3. Knowing relationship between muscular fatigue from physical efficiency and some functional indicators for research sample.

### **1.4 research Hypotheses;**

1. Presence of a relationship contains numerical function between muscular fatigue and physical efficiency.
2. Presence of a relationship contains numerical function between muscular fatigue and some functional indicators.

#### 1.5 research domain;

1. Human domain: A research sample from first stage students from sports Education college, Mustansiriya Division with count of (11) students.
2. Time related Domain: 8-24 / 2 / 2020
3. spacial Domain : Halls of sports Education college-Hall of fitness/ Mustansiriya University Division.

### **Terminology:**

#### ***1.2.1 Fatigue concept:***

Fatigue is considered as the result of changes occur in different organs and systems of the whole body, including organs and systems during the period of performance of physical work which ultimately lead at the end to the impossibility of continuity.

and the state of fatigue is described as the low state of performance that appears in the sense of tiredness, in case of fatigue isn't able to Maintain the level of intensity required or performance tactic or be forced to refuse

to continue the initial activity, which reduces the level of continuity during athlete work, Muscular fatigue is the "inability to retain or repeat muscle contractions with the same muscle strength.

### **1.2.2 Types of fatigue:**

Fatigue is a physiological phenomenon that is strongly related to tolerance, Tolerance can be described as the ability of the individual to resist fatigue for the longest time possible, and the faster the level of the individual's physical fitness decreases, the faster the fatigue is and vice versa, the better the person is specialized with high endurance the better efficiency he has to work out at longer time and accompanied by Fatigue tolerance.

And tolerance is usually described as the time when the individual is able to perform the exercises with the required intensity.

### **Fatigue is classified into four main types**

Mental fatigue: as in chess.-

Sensory fatigue: as in the shooting game.-

Psychological fatigue: occurs in social life or marital or workplace.-

- Physical fatigue: As in physical exercises this type is what we will be describing in this research.

\*Fatigue is divided into three types according to the number of Muscles involved:

1. Local fatigue: The number of muscles working on makes one third of the body mass.
2. Semi fatigue: The number of working muscles forms one third to two thirds of body's muscle mass.
3. General fatigue: The number of working muscles is more than two thirds of the body mass.

## **Chapter three**

### **"Research methodology and field procedures"**

#### **3-1. Research methodology and field procedures**

The method chosen by the researcher should be appropriate to solve a certain problem and the way is the method followed by the researcher himself to determine the steps of his research, which can lead to solving the problem of research.(4)

So research uses the Descriptive method which associates studies to find the relationship between two variables of correlative studies "by which we know the extent of two variables linked with each other and it is important in the analysis of causes and impact and can give an explanation of the relationship analysis by introducing apparent digital logic.(5)

### **3.2 research sample;**

One of the fundamental matters which a researcher should take care of is obtaining a sample represents the fundamental society as a original representation. (6)

And based upon that the fundamental society for the research was First stage students in Sports Training College (Al mustansiriya division)

For the studying year 2008-2009 and it was done by choosing all the students from athletes who have been exercising sports for more than Five years in Clubs or Local areas Teams and they were participated in football

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4- WajihMahjoob , scientific research and its approach, Baghdad ,House of books for copying and publishing , 2002 page 81

5-Wajih Mahjoob , scientific research methods and it approach,Mousil , Mousil university printing , 1958 ,page 23.

championship which was done in sports teaching college and the number of participants as whole was in the beginning 24 students and then after 11 students were chosen from the whole sum of players so as to have them have the conditions of the test.

### **3.2 Methods, Tools and Devices used in research;**

-Arabic and foreign sources and References.

-Experts opinion survey Form.

Tools and Devices:

-A Bench of 40 CM height.

-Stop watch, amount 2.

-Measuring strip.

#### **3.4.1 Physical fitness tests;PWC170**

Physical fitness test PWC170 is considered one of the important functional tests and it is done by giving two efforts each effort lasts for (3) minutes

thus the overall Effort will be (6)minutes and the average rate of beats is measured at the last 10 seconds for each time and then the result is multiplied by 6 to extract the heart rate per minute , and by using this Formula the physical fitness is given :

$$PWC\ 170 = N1 + (N2 - N1) \times (170 - F1 / F2 - F1)$$

N1 = First Effort

N2 = second effort

F1 = First Beat

F2 = Second Beat (7)

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6- jabiribnAbd Al Hamid , Ahmad KhairiKazim : research approach of Education and Psychology , Cairo ; Dar Al talif publisher 1973 page230.

(7) karpman V.L: (op.cit) ,1987 ,p132-134.

And to avoid the effect of this test on the functional evaluation do to the difference in weight between an athlete and another it is found out that it is Relatively connected to the weight of the body and by calculating PWC 170, and it is done by dividing the result on the athlete Body weight to conclude the amount of R- pwc 170 for every (KG) of the body weight (8)

3.4.2 TEST of Maximum limit of consuming Oxygen for maximum oxygen Vo2Max(9) :

Which is Watson Test (1968 Watsons) (R-Vo2Max)

The maximum oxygen consumption is extracted by the PWC170 value and then inserted into the cabman equation as for athletes.

$$Vo2Max = 2.2 \times PWC170 + 1070$$

### **3.4.3 Carlson's Fatigue Test:**

**This Test is done by the following procedures:**

1. Measuring the Average of Heart beats during the relief time before the Fatigue
2. Running in the place at full speed and for a period of (10) seconds.
3. Then stop for ten seconds

4. And the running is frequently repeated for another 10 seconds and for 10 times so Number of repeats is 10 and for 10 seconds each, times between runs is 9.

5. The number of right Leg touching the ground is calculated of during each time of the performance in ten seconds.

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(8) karpman V.L: (op.cit) ,1987 , p132-134.

(9) Watsons H.W: "Physical and athletic performance " London. U.K, 1986, P.193-200.

6. Calculate the pulse after the completion of the last performance of the ten performances and then calculate the pulse after ten seconds passing on the last performance and for ten seconds and then Multiplied by 6.

7. The heart beats rate is calculated after 2 minutes, then 4 minutes, then 6 minutes passed.

8. The number of times the right-Leg touches the ground is added in each of the ten tests, which is recorded every ten second.

9. Then the Number of the five heart measurements is added with each other.

10. After that the Test score is processed for touching the ground and for the heart beats measurements and using the Table from {Methods of Measurement of Physical Effort in Sports}and it will lead us to the athlete level, from this we can conclude the level of the tested Athlete(10).

### **3.6. Exploration Experience;**

The experiment was conducted on 5 students without a research sample in order to identify the strengths and weaknesses as well as for the team to know how to perform the tests and the test time for each laboratory as well as to identify the mechanism of \*\*\*\* and sequence of exploration experience.

And the tests for the Main experience were done in 16/2/2016 in Laboratory of body Fitness, college of sports education AlMustansoriya division.

(10) Muhammad Nasir Aldine Ways of Measuring Physical Fitness in sports, Cairo , Alkitab Center for publishing , 1998 , page 103-107

### 3.7 exploration experience;

The main experiment was conducted on 22-24 / 2/2010 at the same place mentioned above: it included testing the physical efficiency and maximum oxygen consumption and fatigue test for Carlson.

### 3.8 counting Means;

Arithmetic Mean

Standard deviation

Pearson correlation lab(11)

## Chapter Four \

Showing the results, analyzing it and discussing it

### 4.1 Presentation and analysis of the test results related to functional efficiency and maximum consumption of Oxygen and Carlson.

#### TABLE NO.1

Shows the values of arithmetic Means, standard deviations of physical fitness test and maximum oxygen consumption and Carlson

Tests	Measuring Units	Arithmetic mean	Deviation $\pm$
Carlson	Mole / Gram	61.9	8.01
PWC170	MM / KG	11.5	1.33
Vo2Max	Milliliter / KG	48.83	2.13

11. WadiiYassiin Al tikriti and Hassan Muhammad Abd : Arithmetical Applications and using computer in sports Education Research , Mousil , Dar Alkutub for publishing , 1999 , page 123-155

Table 1 shows the values of the arithmetic and standard deviations of the Carlson tests and the physical efficiency ofPWC170 and the maximum oxygen consumption ofVo2Max. The mean of the indicators was respectively (61.9), (11.5) and (48.83). The standard deviation was for the same indicators respectively (8.01) (1.33), (2.13) (12)



**Table NO.2 :**Shows correlation coefficient values between the research indicators

Variables Calculated	Calculated R	Tabled R	Indicator
Carlson- PWC170	0.52	0.946	Moral
Carlson-Vo2Max		0.588	Moral

Table value =  $N - 2 = 11 - 2 = 9 = (0.52)(12)$

Table (2) shows correlation coefficient values between the Carlson test and the physical efficiency test and the calculated value between them (0.946), which is higher than the scale value of (0.52) below the level of 5% and the freedom degree of  $-2 = (9)$  and this leads to a meaningful connection relationship between Carlson test and physical efficiency.

12- AAbidKariim : Introduction to Arithmetic and its applications. AlNajaf , Aldihaa house for publishing ,2009,page 84

The values of the correlation index between the Carlson-Vo2max test and the calculated value between them (0,588), which is higher than the R scale value of (0.52) below the level of leading 5%, and the free degree of  $N-2 = 11-2 = 9$  and this leads to the existence of a significant correlation between the Carlson test. Vo2max.

**4.2 discussing the results;**

Table 2 shows that there are significant correlations between the Carlson index, physical fitness, and Carlson, and the maximum oxygen consumption. The higher the fatigue rate, the greater the physical efficiency, despite the continuous exercise in the lectures as well as the participation of students in more sports, in their friendly games.

Israel noted that the heart rate of the player decreases after minutes after the effort at a rate of 40-60 B / M (beat per minute) and also shows that the body's oxygen input during the potential is completely different from what

absorbed after the effort, although the number of heart beats are equal in both cases(13).

The fatigue as a physiological phenomenon is strongly related to tolerance. Tolerance can be described as the ability of the individual to resist fatigue, and the lower the level of the individual's efficiency, the faster the fatigue and vice versa. The higher the individual is characterized by the higher the load, the longer he can maintain the work efficiency. Endurance is usually at a time when the individual is able to perform the exercises with the required intensity.(14)

Research on oxygen consumption suggests that the effect of functional cooperation on body systems can be reduced in conditions of fatigue. And that various fatigue phenomena depend on the nature of muscle activity and athletic skill.

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13. Ibrahim Albasri: sports medicine,Baghdad, University of Baghdad printing, 1983, page 37-40.

14. RasanKhribat And Ali toorkey, A reference mentioned before , page 210 -220.

### **Chapter Five** ^

## **5. Conclusions and Recommendations;**

### **5.1 Conclusions;**

1. Fatigue can be observed through the level of physical fitness and vice versa.
2. The level of physical efficiency and maximum oxygen limit can be considered an indicator of high fitness, i.e., less fatigue or longer ability to resist fatigue.
3. As we conclude that the existence of high efficiency means bearing the fatigue for longest period.
4. There is a relationship between fatigue and physical fitness index
5. There is a relationship between the fatigue index and the maximum consumption of oxygen.
6. Since fatigue cases are many and multiple and in this research we dealt with physical fatigue, so in order to overcome the cases of physical fatigue we should increase the efficiency of different functional devices.

## **5.2 Recommendations:**

1. Attention to functional indicators in order to know the state of fatigue early.
2. Attention to the physical and functional status of students in the first stage in order to stand on the strengths and weaknesses
3. Conducting other research for other functional indicators on the students of the second and third stage.
4. Attention to the respiratory index as one of the important indicators that reflect the state of fatigue.
5. In order To know the state of fatigue, you should study the causes of fatigue and knowledge of the causes of the fatigue for trainers for noting that fatigue for several reasons.
6. Standards and indicators should be set for each student in the first stage in the faculties of physical education and compared to the level of the last stage (IV) at present. The Faculty of Physical Education formerly called (factory for heroes).

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