The Effect of High Intensity Training on Free Radicals' Level using some Biochemical Indicators such as Glutathione & Malondialdehyde Enzymes for Iraqi National Team Wheelchair Tennis Players

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Abstract

The training process and the followed methods enhanced the athlete's strength to make performance intensity reach more than 100%. In addition, this training process, at the same time, is not free of drawbacks that may be reflected negatively on the athlete's health which may lead to many physiological changes whether at the level of cells or blood through formation of free radicals such as oxygen and hydrogen (…..OH, H, O). These radicals are characterized as being atoms with effectiveness and unstable activity. They search for stability, so they attack the cellular wall and interact with phosphoric fats forming this wall and thus they damage it and then the cell. They may also result in damaging the cell's DNA. As a result, cells and tissues may catch diseases that may start with colds and end with cancer. Therefore, the researcher referred to this destructive effect of free radicals through their high levels over the normal level during practicing wheelchair tennis players the high intensity training units using continuous training method and their reflections on raising the level of glutathione & malondialdehyde enzymes over normal level. The researcher found that high intensity training with continuous method was connected to some negative aspects such as high levels of free radicals. It is known that their rising over normal rates will lead to damages at the cells level and, accordingly, at tissues level. Therefore, the researcher believes that it is necessary to legalize sport training process in terms of intensity, rest and following a diet spontaneous with high intensity training system noting that this diet should include anti-oxidants which reduce activity of the radicals.

Keywords: biochemical indicators, glutathione enzyme, malondialdehyde enzyme, free radicals, high intensity training.

1. INTRODUCTION

Scientific progress played an important role in advancing societies at various fields. The developed countries take responsibility of applying scientific bases and the best ways to improve their societies in various fields. The sports field in these countries had great prestige through their dependence on policies to satisfy their people through the provision of all supplies. These people were pushed forward with achievements that are almost out of mental visualization. This development did not happen by accident, but through continuous experiment, which is not free of mistakes but in the end the result was the prestigious success of these countries. However, these methods were not adopted in Arab countries, including Iraq and all that is known about our countries as the countries of marketing what was done in developed countries and, for example, using high intensity training whether at the special preparation stage or at competitions stage. It is needed to know many aspects to perform such type of training for the purpose for which it was set, or there may be negative factors related to this type of training that should be avoided during application of this training method. These were the reasons that led the researcher conduct this study to determine the negative effect of high intensity training through raising the level of free radicals related to high intensity. Therefore, the researcher performed tests to some enzymes such as glutathione & malondialdehyde enzymes through which he can detect the level of free radicals. The researcher conducted these tests during the tennis national team's performance of training units at the special preparation stage to detect the rise in the level of these radicals at the end of the training unit compared with the beginning of this unit through which he found rise in percentage of these radicals in great percentages at the end of the unit compared with its beginning.

Problem of the Study

The training process took different direction from normal aspects as we can see that there are some training units that reached high level of 100% of performance intensity of the athlete's ability. Sometimes, they exceed physiological abilities of athletic individuals which make the training process not free of mistakes which are reflected negatively on the athlete's health and achievement level. This can be seen during high intensity sport training using continuous method as it leads to a lot of physiological changes such as moving a great percentage of blood to the working muscles during efforts and return back to normal

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functioning after effort to internal organs. These organs include lever, kidneys and others. During the return to these organs, free radicals will be formed such as oxygen OH, H, O. As known, these free radicals have unstable effectiveness and activity and search for a state of stability. These radicals attack many organs such as cellular walls and interact with phosphoric fats that form this wall. Accordingly, this wall is damaged and then the cell and body as a whole with unexpected performance of athletes in future. Here, the significance of this study is clear in detecting the destructive effect of these free radicals through their rising levels over normal level in addition to scientific and applied importance of this study due to lack of studies tackling such type of problems.

Objectives of the Study

1- Defining the level of free radicals with significance of some biochemical indicators such as glutathione & malondialdehyde enzymes in blood for players of Iraqi wheelchair tennis national team.
2- Defining the effect of high intensity training on the level of free radicals with significance of some biochemical indicators such as glutathione & malondialdehyde enzymes in blood for players of Iraqi wheelchair tennis national team.

2. HYPOTHESIS OF THE STUDY:

There are statistically significant differences between findings of pre- and post-tests for the sake of post-test related to high levels of glutathione & malondialdehyde enzymes in blood for players of Iraqi wheelchair tennis national team.

3. METHODOLOGY:

The researcher used the empirical method in solving the problem of the study as it is the best method in solving such problem.

Sample of the Study:

The sample of study was selected purposively from players of Iraqi wheelchair tennis national team (8 male players).

Biochemical Tests:

Blood Separation Tests

This test aims to separate serum from cells.

Tools and appliances: (centrifuge) device, tube, bandage, sterilization and needle cc5.

Describing performance: the researcher supervised the process of blood extraction at the beginning and ending of the training unit from the position of setting on wheelchairs of the disabled by test officials. A quantity of blood (cc5) was extracted through veins.

Degree counting: separating the serum from cells.

Test of Measuring Glutathione Enzyme (Moore, K. & Roberts: 1998, 69 – 71) GsH

The aim of the test: measuring the level of glutathione enzyme GsH in blood (serum)

Appliances and tools: Spectrophotometer (uv – visblespektro-photometer) to measure glutathione enzyme in blood, made in America.

4. PERFORMANCE DESCRIPTION:

After blood is separated in (centrifuge) device, the serum is treated with an amount of 20 micro-liter with chemical materials related to the test: 20 mcro-liter of (nitrobenzoi acid 2), 5 – 5 dithiobis in addition to phosphate buffer solution with amount of 1000 micro-liter to be put in the uv – visblespektro-photometer. The interaction was put inside a glass bottle with a capacity of cc 5 and in another glass bottle we find chemical materials that were normally put together before that. After that, both bottles were put in the appliance as it works on multiple stages. The first stage is operating the device * (see annex 2) and adjust the device on suitable wave length to measure glutathione enzyme (412) nanometer. The device releases the wave length through emitting faint lighting with wave length of (550 nanometer). This wave length passes by what is called (Monochro Motor or Filter) through which we can control the positive length to measure glutathione enzyme. There are two mirrors that reflect the selected wave length by device operator. Next, these mirrors reflect the wave length on bottles in the device and then readings are reflected through two mirrors after each bottle reaching the detector of readings to give us the needed readings.

Counting the degree: what the device shows are indicators of glutathione level measured by mole / L of blood

Note: * normal rate of glutathione is M 0.15-0.1

Test of Measuring Malondialdehyde Enzyme MDA in Blood (Moore, K. & Roberts: 1998, 69 – 71)

The aim of this test is to measure malondialdehyde MDA enzyme in blood

Appliances and tools: Spectrophotometer (uv – visblespektro-photometer) to measure malondialdehyde MDA enzyme in blood.

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Water bath device is used to increase interaction temperature 60 – 70 degrees C.

Performance Description:

After blood is separated in (centrifuge) device, the serum is treated with an amount of 500 micro-liter with chemical material (Trichloro acetic acid) in amount of (7.5 gm) and adding the Thio barrbituric acid TBA with amount of 0.375 gm and then to be put in the water bath device to heat the interaction and reach temperature between 60 and 70 degrees C. After that, a sample is put in the uv – visblespektro-photometer. The interaction was put inside a glass bottle with and the previously mentioned chemical materials in another glass bottle. Both bottles were put in the appliance as the operator adjusts the device on suitable wave length to measure malondialdehyde MDA enzyme (535) nanometer. The device adjusts the wave length through emitting faint lighting with wave length of (550 nanometer). This wave length passes by what is called (Monochro Motor or Filter) through which we can control the positive length to measure malondialdehyde MDA enzyme. There are two mirrors that reflect the selected wave length by device operator. Next, these mirrors reflect the wave length on bottles in the device and then readings are reflected through two mirrors after each bottle reaching the detector of readings to give us the needed readings.

Counting the degree: what the device shows are indicators of malondialdehyde MDA level measured by micromole / L of blood

Note: * normal rate of malondialdehyde MDA is 15-5 micromole / L.

Field Procedures of the Study

The researcher carried out the tests under study during the stage of special preparation. Tests were carried out during the performance of Iraqi national team of wheelchair tennis with a high intensity training unit using continuous method. The researcher did not interfere with items of training and intensity, but his role was restricted to follow-up and watch as the high intensity training is determined through the reflected beats of players ranging between 180 and 190 bp/m. Note that the researcher conducted pre-tests at the beginning of the training unit before effort and post-tests at the end of the training unit.

5. DISCUSSION & ANALYSIS OF FINDINGS:

Table (1): Arithmetic means and standard deviations of glutathione & malondialdehyde enzymes in pre-test

Serial	Variables	Mean	S.D
1	Glutathione	0.0947	0.05732
2	Malondialdehyde	10.9678	3.08234

Through the above table showing arithmetic means and standard deviations under study, the Glutathione enzyme achieved a mean of 0.0947 and a standard deviation of 0.05732, while the mean of Malondialdehyde at pre-test was 10.9678 and a standard deviation of 3.08234.

Analysis of Post-Tests Findings:

Table (2): Arithmetic means and standard deviations of glutathione & malondialdehyde enzymes in post-test

Serial	Variables	Mean	S.D
1	Glutathione	0.3500	0.12767
2	Malondialdehyde	26.4078	4.70338

Through the above table showing arithmetic means and standard deviations under study, the Glutathione enzyme achieved a mean of 0.3500 and a standard deviation of 0.12767, while the mean of Malondialdehyde at pre-test was 26.4078 and a standard deviation of 4.70338.

Findings of Pre- and Post-tests of Variables of the Study:

Table (3): Difference of means, standard deviations and T-counted value of glutathione & malondialdehyde enzymes in pre- and post-tests:

Serial	Variables	Means difference	S.D difference	T Counted Value	T Tabulated Value	Difference
1	Glutathione Pre-Post	0.255	0.158	7.834	2.36	Significant
2	Malondialdehyde Pre-post	15.440	5.147	8.998		Significant

The above table shows difference of arithmetic means and standard deviations between pre and post-tests of the variables under study as well as the T counted value between results of tests of variables under study. It is found that the differences between

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means were 0.255, while differences in standard deviations were 0.158 of glutathione enzyme in addition to the T counted value between results of pre- and post-tests were 4.834.

As for malondialdehyde enzymes, differences between means were 15.440, while differences in standard deviations were 5.147 in addition to the T counted value between results of pre- and post-tests were 8.998. the table also shows that differences between results of pre- and post-tests were both significant for the sake of post-tests.

6. DISCUSSING RESULTS

Through the above tables which show that differences are significant, they achieve the hypothesis of the study that there are significant differences. This result asserts the scientific fact that there is a direct relation between intensity and increasing the level of free radicals. Yet, the research shows the amount of collapse processes due to free radicals that were evidenced through high percentage of glutathione & malondialdehyde enzymes in blood. They showed great increases compared with normal level of both enzymes. The researcher attributes this to the fact that the increase of enzymes is normal because of raising training load intensity to the maximum level as it occurred due to physiological processes controlled by the nervous system. This is done through directing blood to functioning muscles and reducing it in some internal organs such as kidneys and others to ensure directing it towards functioning muscles and then returning blood to organs from which it was absent. As a result, free radicals are formed and they increase with the increase of intensity and period of physical effort. The researcher found that the increase in free radicals is a negative condition reflecting the inconsistency between the training program: (external load) with physiological changes: (internal load). There must be adaptations which cannot be reached only when there is a gradation in training courses. The increase in free radicals percentage may be due to inconsistency of the whole course with the level of sample. Therefore, there was an increase in radicals' percentage that might have been used while using legalized sport training which is against what was mentioned by Abo Elela Abdelfattah (Abo Elela Abdelfattah: 1996: 77) and (Kostaka et al: 1998, 7) as they said that: "moderate and regular training or short-term training affect the increase of antioxidant enzymes with reduction of malondialdehyde rates. In addition, Saad Kamal and Ibrahim Yehia: 2005, 23 said that: "With the increase in the training status of the player, the composition of antioxidants in the body may be often enough to prevent destructive effect for the releasing radical oxygen atoms and then the antioxidants may be a few at the beginning of training seasons, and increase in the end". In addition, the researcher attributes that the reason for high increase in free radicals may not be attributed to the training course unit, but to the diet followed by the player as he may not resort to eating food containing antioxidants, which should have privacy and agree with the training course due to the stability of the effect of food on the free radicals levels.

7. CONCLUSIONS:

1- The increase in free radicals rate in body is reflected through levels of glutathione & malondialdehyde enzymes.
2- Predicting great collapse processes in body is done through high levels of free radicals in body.
3- The followed course by the sample of the study is inconsistent with the sample and the reason may not be due to the course as there may be inconsistency by the sample of the study with the course. This was reflected on the increase of free radicals levels as a result of adaptations in internal systems.

8. RECOMMENDATIONS

There should be gradation in training course without moving from a stage to another unless after making biochemical tests such as glutathione & malondialdehyde enzymes.

1- Adoption of a diet that is consistent with the training course for each stage of training based on the followed intensity.
2- It is necessary to educate players with having foods containing antioxidants to reduce the destructive effect of free radicals.
3- Results of the current study should be approved with conduction of comparative researches between other events to determine the level of free radicals and avoid their negative effects.

9. REFERENCES:

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