

Effect of Exercises Using a Pressing Tool on Some Biochemical and Skilled Variables of Tennis Players

Hussein Ali Hussein Al Kufi

Instructor, College of Basic Education, Al-Mustansiriyah University, Baghdad, Iraq

Abstract

This study aims to identify the effect of exercises using a pressing tool for the arms on some biochemical and skilled variables for tennis players. An experimental design was used to guide this study. The study included a purposive sample of six players from Al-Jaish Sport Club who practice tennis. These players were received the administered intervention. To ensure the subjects' homogeneity and normal distribution, the researcher used the mean, standards deviation, and skewness for the filed survey. The researcher concluded that there were statistically significant, within normal limit increase in the white and red blood cells counts as they include all what lead to increase body toxins and waste-products of harmful cells. The researcher recommends paying attention to the biochemical variables for the players throughout training in order to develop their physiological abilities.

Keywords: *Pressing Tool; Biochemical and Skilled Variables; Tennis.*

Introduction

Athletes' abilities have witnessed a dramatic improvement⁽¹⁾ seen in Olympic events since the launch of the modern Olympic chapter has been accounted for by different mechanisms⁽²⁾. The increase in the rate of participation, professional behavior (of participants and coaches), natural selection, enhanced training, nutrition, and psychological preparation, step forward in technique, and the innovation in technology in terms of the design of equipment and ergonomic aids collectively have served as contributing factors⁽³⁻⁴⁾.

The fact of what happens to the athletic body; due to using training efforts, became one of the most important requirements of training currently. This could be attributed to the scientific revolution that the scientists have made in the sport discipline in terms of advancement in devices and practical and scientific method that fit achieving the sport performance. Thereafter, the performance depends on the level of adaptation of the functional systems on the training work. Such a work is currently measured depending on the response of the different body organs; particularly if we know that the sport training; from physiologic perspective, is "a set of exercises or physical efforts that lead to adaptive goals or functional change in body systems and internal organs in order to achieve high level of achievement".

As such, the training efficiency related to assessment of the response of functional systems and their adaptation drawn the trainers' attention and preparing their method to achieve good and new results the player frequently seeks.

Selecting the exercise in accordance with the specific game, the player's level, the training duration that they are on, and intensity and amount of training are considered as of the most important indicators of direct effect on the systems and tissues of the players' body. Thus, in order to know what happens in the body of tennis players who experience required training for hours. In order to overcome the negative points owing to overload and improving the players' levels, it is crucial to adopt special training in the light of hypoperfusion using a pressing tool over the arms to cause hypoperfusion for the given extremity. As such, the occurrence of hypooxygenation and nutrients consequences, which in turn increase the ability to resist fatigue owing to hypoperfusion during training.

After finishing the training, the pressing tool is removed to shift to the perfusion stage. Thus, the delivery of large amount of oxygenated blood and nutrients. This is a modern method that leads to increase player's ability to perform for as long as possible without the occurrence of muscular fatigue during games and training. The

importance of this study represented in adapting the tennis players on the hypooxygenation statuses and the muscle's tolerance for acids that result from anaerobic system and benefit from adaptations occurred as a result of hypoperfusion for the arms in increasing the tolerance strength of the muscle for physical stress in lack of oxygen and increase blood Ph.

Problem Statement: The main research problem lays in the question "Is the tool pressing over the arms of positive effect in improving the muscles' ability in tolerating the burden of hypoperfusion and in turn the lack of oxygen and nutrients delivered to the muscles and urging the muscles to work much strongly and maximum muscular tolerance? As well, as this training method increases the muscles' dependence on the anaerobic systems to release the energy required for muscular work, so such a method can serve to develop the speed ability irrespective of the compound abilities. This in turn serves to improve the performance of the working muscles; particularly in the forehand and backhand shots in tennis.

Study Objectives: This study aims to identify the effect of exercises using a tool pressing over the arms on some biochemical and skilled variables for tennis players.

Research Hypothesis: The researcher hypothesizes that there are statistically significant differences in the pretest and posttest in terms of some biochemical and skilled variables among tennis players.

Research Dimensions:

The Human Dimension: Al-Jaish Sport Club tennis players

The Time Dimension: The duration from January 12th, 2018 to May 22nd, 2018.

The Spatial Dimension: Baghdad – Al-Jaish Sport Club field for tennis and Al-Shaab Stadium for tennis.

Definition of Terms:

The Pressing Tool: It is a pressing belt (arterial pressing tool) that is tied to the arm over the brachia to impede blood delivery to the arm, lower brachia, and the hand.

Method

The researcher used the experimental design as it fits the research problem, "Controlling over the influencing

factors surrounding the experiment; except for the independent variable in order to measure its effect on the dependent variable⁽⁵⁾.

Sample and Sampling: The study included a purposive sample of six advanced tennis players who were selected from Al-Jaish Sport Club. All these players are exposed to the experimentation (pre-posttests).

Tools:

Observation and experimentation

Information sheet

Personal interview

Resources and references

Exercises

Internet

A tool pressing over the arm

Whistle

Legitimate Tennis racket size (53-58 cm), (n = 10)

Tennis balls (n = 50)

A basket for the balls

Legitimate tennis field

Medical syringes

Devices used in the study:

Timer watch (Chinese-made – Swan, n = 2)

Blood centrifuge

Restameter (to measure height and weight)

Camera (Nikon, n = 2)

Stopwatch (n = 3)

Clinical procedures:

Tests used in the study:

Forehand and Backhand Shots Precision Test⁽⁶⁾

Forehand and Backhand Shots Depth Test⁽⁶⁾

Pilot Study: The pilot study was conducted in Al-Karkh Sport Club field in Baghdad City on January 27th, 2018 on three tennis players who are not included in the final sample size.

Pretests: The pretests were conducted under the researcher's supervision. The study procedures, number

of trials, points counting method and recording, and the conditions of other tests were explained to the study participants on February 3rd, 2018 to conduct the skilled tests.

The Main Experiment: The researcher has prepared exercises that are set in 24 training sessions distributed over three training sessions per week. They include exercises in the main part of the training sessions designated for the tennis players after the thorough reviewing of the literature and experts in tennis in accordance with the training tool that the researcher used for training in hypoperfusion for the arms. This can be implemented via closing the artery in the working brachial muscle for a specific duration and the augmentation of using the pressing tool in line with the exercise duration. The level of oxygen is decreased inside the muscular tissues where the blood stream (unoxygenated blood) is impeded to the cells which leads to hypooxygenation. This process is accompanied by an increase in the accumulation of the lactic acid in the muscles and dilation of the blood vessels. On accomplishing “opening the artery and releasing blood stream”, the blood circulation supplies

the muscles with oxygen and eliminate the cellular waste products that cause arterial dilation, in addition to the elimination of lactic acid through transforming some of its compounds into other compounds. The time of using the pressing tool goes in line with the time of performing the exercises that includes four sessions in a time of one minute for each frequency and 30-second for rest among frequencies. That is, four minutes for using the pressing tool in the exercise and so on. The exercises were initiated on February 10th, 2018.

Posttests: The researcher conducted the posttests at 11:00 a.m. on April 28th, 2018. The same method used in the pretest was used in the posttest, considering the same spatial and time conditions, and the same testing method and devices, and the auxiliary team who helped in conducting the pretest.

Statistical Measures: The statistical package for social sciences (SPSS) for windows, version 24, IL, Chicago was used to analyze data.

Study Results: Results of Ph, hemoglobin, precision of forehand and backhand shots, and the depth of forehand and backhand shots.

Table 1: Mean, standard deviation, t-value, and significance level

List	Variables		Pretest		Posttest		T-value	Sig.	Ass.
			Mean	SD	Mean	SD			
1.	Biochemical	White blood cells g/L	6.980	20.08	9.210	0.760	5.340	0.000	S
2.		Hb	14.640	0.650	14.740	0.890	3.760	0.000	S
3.	Precision of forehand and backhand shots		27.290	1.760	32,460	1,650	9.640	0.000	S
4.	Depth of forehand and backhand shots		25.120	2.180	30.650	1.870	10.760	0.000	S

Ass. = Assessment; Hb = Hemoglobin; SD = Standard deviation; Sig. = Significance; S = Significant
Significance level is at (0.05) and a degree of freedom (df) = 5

Discussion of Pretest and Posttest

Table (1) demonstrates the statistically significant differences and the t-value in favor of the posttest for the variables under investigation. This indicates the development of skills for the learners. The researcher attributes this to the used exercises in the helping tool which effectively contributed to skills development. The researcher explains this to that the tool used works to impede the delivery of oxygen to inside the muscular tissues, where the blood stream (unoxygenated) is impeded from the cells which in turn leads to a decrease of oxygen and the dependence of the muscle in generating the energy anaerobically. When finishing (opening

the artery and allowing the arterial blood to normally pass through, in which the blood supply to the cells is increased, where the blood circulation supplies the muscles with oxygen and eliminates the waste products of the cellular interaction. Furthermore, the lactic acid is eliminated through its oxidation and the transformation of some of its compounds into other compounds. Moreover, the exercises that are applied with the help of the tool contributed to increase the number of white blood cells which is attributed to the increase in the uniting ability of these cells to eliminate what the exercise produce of debris of cell membranes after accomplishing the performance of exercises. This was emphasized by Alexander in that “The modification of exercises that

are performed daily by their practitioners increase the white blood cells numbers owing to the increase of immunologic response⁽⁷⁾. This means that following the player up in the training from the physiologic perspective contributes a lot to know the effect of training on the training sessions. The decrease of oxygen delivery to the working extremities leads to increase the release of red blood cells from their storages. Wang indicates that the exercise greatly increases the red and white blood cells counts owing to their exit of their storages⁽⁸⁾. Using the pressing tool helped in increase the secretion of Erythropoietin from the kidney which is triggered by the decrease of arterial blood saturation with oxygen, which in turn works and triggers the increase of production of red blood cells within few hours. This is cannot be done in an altitude of 2100 feet. Despite of increasing the secretion of hormone, it is observed that no increase in the mass of red blood cells for several weeks⁽⁹⁾. As a result of the biochemical changes and their importance in the physical, anaerobic effort which contributed to the improvement in the precision and depth of the forehand and backhand shots which require incessant physical effort; particularly during competition.

Conclusions

1. The training using the pressing tool have affected the biochemical, anaerobic variables.
2. The increase of white and red blood cells to a statistically significant degree within normal limits owing to their inclusion of all what to lead to increase the bodily toxins or harmful waste products.
3. An improvement in the precision and depth of the forehand and backhand shots in tennis.

Implications:

1. It is necessary to pay attention to the players' biochemical variables throughout the training duration and considering these variables with the goal of improving the players' physiologic abilities.
2. It is crucial to conduct the periodic measurements for the players' biochemical variables in order to identifying the level that these players arrived.
3. There is a need to conduct further studies for the biochemical variables.
4. There is a need to replicate similar studies on different samples of players in different age groups.

Conflict of Interest: The researchers report no conflict of interest.

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Ethical Clearance: A permission to conduct this study was obtained from the ethical committee in the College of Basic Education, University of Mustansiriyah.

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