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Review Of Physiological Responses to Eight-Week Basketball Trainings

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ABSTRACT

Purpose: is to learn the positive effects of regular participation in sports on hematological parameters. In this direction, the current study aims to review the physiological responses to basketball trainings carried out for eight weeks.
Method: 16 volunteer male basketball players with a mean age of 18.40±.51 years and with a mean height of 171.50±2.36 cm were included in the research. The pre-test/post-test design of experimental research was used in the study. For this purpose, the pre-test values of the participants before the trainings started and the post-test values of the participants after eight weeks were collected in laboratory environment by experts (on an empty stomach). The collected data was analyzed via SPSS 2.0 package software, and Wilcoxon Rank Test was applied to compare the descriptive statistics and the pre- and post-training values.
Findings: According to the results obtained from the research findings, a meaningful difference between the Weight, Body Fat Percentage and (Blood Lipids Triglyceride, HDL, LDL and cholesterol) levels before and after the applied training program ($p<0.05$) was found. On the other hand, a meaningful change was identified between the pre-test/post-test AST and ALT values ($p<0.05$).
Conclusion: In conclusion, we can say that the applied basketball training program had positive physiological effects on the participants. It is undeniable that the regular exercising helps better the individuals in terms of mental health, physical health as well as physiologically. Therefore, it would be correct to direct individuals to sports branches for increasing the participation in exercising. Basketball, one of such sports branches and the subject of our study, is an important sports branch as it can easily be played in the street, venues, etc. and in every field.

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INTRODUCTION

Basketball was first created in the USA and was played in the garden of a college. This sport branch, which at first started to become popular among the students and then the society, turned into a tool where people combined sports and fun and shortly become widespread all around the world. Besides requiring advanced level of strength, constitution, balance, flexibility and quickness (Pamuk et al., 2008; Delextratend and Cohen, 2009; Korkmaz, 2021, Gür, 2021), basketball is also known as a physiologically and physically high sports branch also in terms of technical/tactical and biomotoric characteristics (Alemdaroğlu, 2012; Matavulj et al., 2001; Santos and Janeira 2008; Castagna et al., 2008). On the other hand, basketball requires a harmonic combination of personal skill, anthropometric profile, team play, strategy and motivational factors (Trninić and Dizdar, 2000; Tavino, Bowers and Archer, 1995; Özatik, 2022).

The fact that regular exercising has inevitable and visible increase on the hematological and metabolic parameters is a proven truth (Penedo and Dahn, 2005; Talaghir et al., 2018). Besides being one of the metabolic activities that are important in terms of health, it is known that the mobility at the level of liver enzymes that provide insight in terms of liver functions is closely related with exercising. Such that, the organism requires the internal balance to be systematical for sustainability.

KEYWORDS:
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In this context, the effects of exercising on enzyme activities can protect the internal balance and natural reactions against stressors. Alanine aminotransferase (ALT) and aspartate aminotransferase (AST) enzymes are the enzymes that can be found in this reaction process and that are known to be related to liver damage as they are present in a large portion of the river since they are located in a specific location in the body (Hyder et al., 2013). At this point, changes in these enzymes can be observed with the effects of exercising.

On the other hand, the positive effects of exercising are not limited to the balancing of the liver enzymes, and it is known that it has positive effects on the blood lipids (triglyceride, cholesterol, HDL and LDL) (Arslan et al., 2001; Yalın and Gök, 2001). It has been emphasized that the exercise programs affected lipid and carbohydrate metabolism and resulted in reasonable reduction in total cholesterol and triglyceride in body weight and fat storage (Özer et al., 2017; Tran and Weltman, 1985). Low-density lipoprotein (LDL) and high-density lipoprotein (HDL) are known to be as the most effective and widespread parameters for identifying the change in the cholesterol, triglyceride and blood lipid levels. A high level of LDL cholesterol shows the extreme lipid level that increases the risk of cardiovascular complications (Sarıakçalı et al., 2021).

Based on the current information, when it is examined in terms of healthy living, it is an inevitable truth that it has an importance over some physiological parameters. In this context, our study is about the identification of the changes caused by the basketball trainings applied for eight weeks on some physiological parameters.

METHOD

Participants

16 volunteer male basketball players with a mean age of 18.40±.51 years and with a mean height of 171.50±2.36 cm were included in the research.

Research Model

The pre-test/post-test design of experimental research was used in the study. For this purpose, the pre-test values of the participants before the trainings started and the post-test values of the participants after eight weeks were collected.

Data Collection Tools

Before the study started, the volunteer consent form that was prepared by the researcher was filled by all the participants after explaining its details to them. Detailed information regarding the physiological measurements in the study and the blood collected for the body fat analyzer and laboratory measurements are provided in the blood collection procedure section.

Blood Collection Procedure

Participants (n=16) were included in the application through a health report before they started their basketball training program that was to continue for 90 minutes for three days in eight weeks. 12 hours before the measurements, the participants had their full blood count measurements carried out in the morning and on an empty stomach by experts who used Backman Coulther STKS tool at the State Hospital Central Laboratories. This process was carried out for the purposes of examining the GLU, LDL, HDL, AST, ALT, total cholesterol and triglyceride values twice once before the trainings started (pre-test) and once after the eight-week training program was completed (post-test).

Training Program

The basketball training program was directed by a professional basketball trainer.

Weeks	Training Days	Training Protocol	Duration
Week 1	Monday	Warm-up, Stretching, Ball Catching Training, Passing Training, Chest Pass, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 2	Monday	Warm-up, Stretching, Dribble (long-short), Pivot Movement, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 3	Monday	Warm-up, Stretching, Fakes, Stopping with Ball, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 4	Monday	Warm-up, Stretching, Bounce (from the Ground), Overhead, Handoff, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 5	Monday	Warm-up, Stretching, Lay Up (Left Hand, Right Hand), Various Drills, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 6	Monday	Warm-up, Stretching, Free Shots, Shooting Exercises, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 7	Monday	Warm-up, Stretching, Reverse Exercises, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		
Week 8	Monday	Warm-up, Stretching, Attack and Defense General Drills, Match, and Cool Down Exercises	90 min.
	Wednesday		
	Friday		

Data Collection

Blood values measurement, anthropometric measurements (height, body weight, fat ratios in body and extremities) were carried out respectively for the participants. Fat ratios and weight measurements were carried out with the help of Tanita BC418 device.

Data Analysis

Data were analyzed in SPSS 2.0 package software. First, Shapiro-Wilk Test was used to determine whether data displayed normal distribution, and the data that have been determined to not be displaying normal distribution was applied Wilcoxon Ranks Test Analysis. Significance level was identified as $p<0.05$.

FINDINGS

Table 1: Physical Characteristics of Participants

N	Variables	X ± SD
16	Age (years)	18.40±.51
	Height (cm)	171.50±2.36

16 volunteer basketball players with a mean age of 18.40±.51 years and with a mean height of 171.50±2.36 cm were included in the research.

Table 2: Table Regarding the Pre-Test/Post-Test Results According to Some Physiological Values of the Participants

Measurements (cm)	Orders	N	Order Mean	Order Total	Z	p
Weight Pre-Test/Post-Test	Negative Orders	13[a]	7.00	91.00	-3.22**	.000
	Positive Orders	0[b]	.00	.00		
	Equal	3[c]				
Cholesterol mg/dL Pre-Test/Post-Test	Negative Orders	16[d]	8.50	136.00	-3.52**	.000
	Positive Orders	0[e]	.00	.00		
	Equal	0[f]				
TRIG mg/dL Pre-Test/Post-Test	Negative Orders	10[g]	9.70	97.00	-2.10**	.036
	Positive Orders	5[h]	4.60	23.00		
	Equal	1[i]				
HDL mg/dL Pre-Test/Post-Test	Negative Orders	0[j]	.00	.00	-3.51**	.000
	Positive Orders	16[k]	8.50	136.00		
	Equal	0[l]				
LDL mg/dL Pre-Test/Post-Test	Negative Orders	12[m]	10.50	126.00	-2.99**	.003
	Positive Orders	4[n]	2.50	10.00		
	Equal	0[o]				
Fat Percentage % Pre-Test/Post-Test	Negative Orders	15[p]	8.00	120.00	-3.43**	.001
	Positive Orders	0[q]	.00	.00		
	Equal	1[r]				
GLU mg/dL Pre-Test/Post-Test	Negative Orders	16[p]	8.50	136.00	-3.52**	.000
	Positive Orders	0[q]	.00	.00		
	Equal	0[r]				

$p<0.01$**, $p<0.05$*

As it can be understood from the table, it can be argued that statistical significance can be found between the GLU, weight, body fat ratio and blood lipid values of the participants before and after the basketball trainings (Cholesterol, Triglyceride, HDL and LDL).

Table 3: Table Regarding the Pre-Test/Post-Test Results for Some Liver Enzyme Values of the Participants

Measurements (cm)	Orders	N	Order Mean	Order Total	Z	p
AST U/L Pre-Test/Post-Test	Negative Orders	16[a]	8.50	136.00	-3.53*	.000
	Positive Orders	0[b]	.00	.00		
	Equal	0[c]				
ALT U/L Pre-Test/Post-Test	Negative Orders	11[d]	9.41	103.50	-2.06**	.056
	Positive Orders	5[e]	6.50	32.50		
	Equal	1[f]				

p<0.01**, p<0.05*

According to Table 3, it has been identified that eight-week basketball trainings have significantly changed the AST and ALT liver enzyme values of the participants in the study group (p<0.01).

DISCUSSION AND CONCLUSION

This study aimed to examine the physiological responses to the basketball trainings that were carried out for eight weeks (Glu, Trig, Cholesterol, HDL, LDL, AST, ALT, Body Fat Ratio and Weight).

The positive effects of exercising on hematological parameters have been emphasized in many studies (Guyton and Hall, 1996; Çavuşoglu, 1991; Kayhan, 2014), and is important in terms of the quality of the studies for identifying the physiological profile of the athletes. Trainings can only provide positive results in terms of increasing the performance of the basketball player if they are based on this profile and physiological foundations (Güneş, 2008). When the literature is examined, Dündar (2009) has examined the acute effects of the handball trainings in his study and emphasized that a significant difference was identified in the HDL, LDL, AST, ALT and cholesterol, TRIG, GLU values when the values measured before and after the trainings were compared. When our research result is considered, it can be seen that similar results have been identified.

In their study on football and basketball players, Koçyiği et al. (2011) identified that the AST and ALT values had significantly increased after exercising. On the other hand, in their study carried out on the sports sciences faculty students, Sarıakçalı et al. (2021) identified the students who participated in the four-week applied courses (Basketball, Athletism and Gymnastics) as the experimental group and the students who did not participate in the required courses as the control group, and examined the effects on body compositions and hematological parameters. The results of the study showed that the experimental group had no significant difference in parameters such as HDL, LDL, Triglyceride and cholesterol (p>0.05). These study results are not similar to our study results.

While exercises that require endurance significantly improve strength, endurance and flexibility, they also significantly affect the body composition and decrease the cardiovascular system disorders and cause increase in the glucose tolerance and insulin sensitivity. It is known that exercising has positive effects on lipid profiles. On the other hand, it can be observed that exercising has positive effects on blood lipids and carbohydrate metabolism and has significant level of influence over the body composition, cholesterol and triglyceride levels (Çakmakçı and Pulur, 2008).

In the study carried out by Büyükyazı and Sevim (2000) on n=35 male basketball players between the ages of 1 and 16, they identified that there was decrease in the body fat levels of the athletes in the experimental group had (p<0.01). When the differences between the two groups were compared, statistically significant results (p<0.05) were found between the the running group and the control group, and the decrease in the body fat levels of the running athlete group was higher than the widespread training interval group (Hamamioğlu and Kaya, 2008). Many studies demonstrated the positive effects of significant level of exercising on the plasma lipids and lipoproteins. It is known that the intensity of exercise is a determinant of the level of increase in cholesterol. As the intensity of exercise increases, the coronary cases decrease in parallel. In addition, there are studies in which an increase in HDL and a decrease in triglyceride level is observed with the participation in exercise (Ergun, Baltacı and Bayrakçı, 1997; Taşkın, 2007).

In conclusion, we can say that the applied basketball training program had positive physiological effects on the participants. It is undeniable that the regular exercising helps better the individuals in terms of mental health, physical health as well as physiologically. Therefore, it would be correct to direct individuals to sports branches for increasing the participation in exercising. Basketball, one of such sports branches and the subject of our study, is an important sports branch as it can easily be played in the street, venues, etc. and in every field.

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