

Effect of short term match program on certain blood lipids of football players

¹Şebnem Cengiz, ²Vedat Çınar, ²Ragıp Pala, ³Aykut Dündar

¹Harran University, School of Physical Education and Sports, Şanlıurfa, Turkey

²Fırat University, School of Physical Education and Sports, Elazığ, Turkey

³Adıyaman University, School of Physical Education and Sports, Adıyaman, Turkey

Şebnem Cengiz, Vedat Çınar, Ragıp Pala, Aykut Dündar; Effect of short term match program on certain blood lipids of football players

ABSTRACT

Purpose: In this study, it is aimed to determine the effect of match program of 10 days and in chronic medium intensity on the Triglyceride, Cholesterol, HDL and LDL blood values of football players. **Instruments and Methods:** Research is performed on 18 healthy male footballer subjects. All subjects participated in match program for total of 7 days, 90 minutes on one day within the framework of a 10 days match program. Blood samples were taken from all subjects in resting position before starting to the match program and 2 hours after the end of the last match. Triglyceride, Cholesterol, HDL and LDL levels were specified in the blood samples received. **Findings:** According to the data obtained at the end of the match program, triglyceride level has decreased significantly in comparison to the values before the match program ($p < 0.05$). Same result was obtained for the cholesterol levels, similarly blood values taken at the end of the match program as the posttest measurements were lower than the pretest measurements, thus the difference between was statistically important ($p < 0.05$). At the end of the match program, there was a significant decrease in the posttest measurements of LDL in comparison to the pretest measurements ($p > 0.05$). It is determined that HDL values after the match recorded an increase in comparison to the values before the match. Thus, the difference between is statistically significant ($p < 0.05$). **Results:** According to the results of the study, short-term match program caused changes in the Cholesterol, HDL and LDL blood values.

Key words: Blood, Lipids, Football, Match, Training

Introduction

Physical activity, which is closely related with community health care and is one of the ways of improving health, is efficient in maintaining the healthy weight, and has a significant role in enhancement of strength, power and flexibility, and reduces the risk of catching diseases [1]. The effect of exercise on biochemical parameters has become an on-going research area. It is stated that exercise influences lipid and carbohydrate metabolism positively and causes decrease in body weight, fat storage, total cholesterol and triglyceride levels [2].

It is accepted that physical activity causes alteration in the lipid and lipoprotein profiles. Plasma lipid changes observed after the practicing periods can be tied to the changes in the endogenous sex hormones and also to the decrease in the fat weight rather than the physical activity itself [3].

In a study realized on this subject, it is stated that exercises performed in sufficient frequency and intensity have an effect of decreasing the triglyceride, LDL-cholesterol levels and increasing HDL-cholesterol level [4].

A great number of different chemical compounds in the body and in nutrients are classified as lipids. These are classified according to their densities as; lipoproteins with high density (HDL), lipoproteins with low density (LDL), and lipoproteins with very low density (VLDL) (5).

Blood triglyceride amount of a healthy individual is between 40-160 mg/dL [5]. Triglycerides are used to provide energy to various metabolic processes in the body. Besides, some lipids especially cholesterol, phospholipids and triglycerides in small amount are used with the aim to constitute membranes of all cells, and to perform other cellular functions of the body [6]. Cholesterol has important functions in the human body. Bilogenesis, lipid absorption and digestion, production of sex and adrenal hormones are its most important functions [5]. It is the last enzyme of anaerobic glycolysis, and it catalyzes transformation of pyruvate to lactate. In general, it is present in all body cells and fluids, and it is especially prevalent in heart muscle, erythrocytes, skeletal muscle, kidney, liver and lungs. Blood LDL level is between 200-380 U/L [7].

Corresponding Author

Şebnem Cengiz, Harran University, School of Physical Education and Sports, Şanlıurfa, Turkey

Joggings, stretching exercises, sportive activities realized with a ball, regular physical activities and especially aerobic exercises have positive effect on lipid metabolism and lipid profile. It is observed that regular endurance exercises reduce plasma triglyceride level under its initial level. HDL cholesterol level increases in reply to the endurance practices. However, this increase is less in women in comparison to men [1].

High physical activity and physical fitness is associated with low LDL cholesterol, triglyceride and high HDL cholesterol levels. It is indicated that this relation may stem from genetic factors. It is reported that the relation between these three variables is affected by the difference in the biological ripening [8].

In this study, it is aimed to determine effect of match program of 10 days and in chronic medium intensity on the Triglyceride, Cholesterol, HDL and LDL blood values.

Material and Method

Subjects:

18 healthy male sporters whose ages are between 18 and 24 have participated in this study voluntarily. Medical evaluation of all subjects is made and it is determined whether or not there is any adverse state that shall prevent their participation.

Research is performed by means of pretest and posttest model.

All subjects have participated in match program for total of 7 days, 90 minutes on one day within the framework of a 10 days match program. Blood samples were taken from all subjects in resting position before starting to the match program and 2 hours after the end of the last match. Glucose and insulin levels are determined in the blood samples received.

Determination of Triglyceride (mg/dl), Cholesterol (mg/dl), HDL (mg/dl), LDL (mg/dl):

Blood samples of 2 millimeters taken from subjects to tubes with EDTA were processed by utilizing CELL –DYN-3500 R trade mark automatic blood count device.

Statistics:

Statistics were prepared by means of SPSS package program. Verilerin analizinde Bağımsız t-Test uygulanmıştır. Analizde Windows için SPSS 15.0 paket programı kullanılmış ve anlamlılık düzeyi $P < 0.05$ olarak alınmıştır.

T test is utilized to realize the intergroup evaluation. $P < 0.05$ value is considered as statistically significant.

Findings:

Table 1: Parameters of Subjects that are examined.

PARAMETERS	1 st MEASUREMENT	2 nd MEASUREMENT	P
Triglyceride (mg/dl)	96,12±17.80a	87,70±13.10b	0,0422
Cholesterol (mg/dl)	155,60±27.65a	142,70±3.02b	0,0402
HDL (mg/dl)	40,20±6.20 b	46,50±7.65a	0,000
LDL (mg/dl)	98,60±6.15a	87,96±22.12b	0,000

a,b; Differences in the Measurements Having Different Letters in the Same Column are Important ($p < 0.05$).

According to the data obtained, triglyceride level decreased significantly in comparison to the values measured before the match program ($p < 0.05$). When cholesterol levels are considered, similarly blood values taken at the end of the match program as the posttest measurements were lower than the pretest measurements, and this difference was statistically significant ($p < 0.05$). There was a statistically important decrease in the posttest measurement of LDL values in comparison to the pretest measurements ($p > 0.05$). It is determined that HDL values after the match program increased in comparison to the values measured before the match, in this respect the difference between is statistically important ($p < 0.05$).

Discussion:

According to the results of the study, an important decrease in triglyceride values is determined since it was 96.12 before the match program, and 87.70 at the end of the application. Haigh and *et al.* have realized a research on the serum lipid parameters of runners and determined that decrease in the triglyceride levels was significant when total cholesterol and LDL levels were compared with the subjects in the control group [9]. As the intensity of exercises increases, number of coronary events decreases concordantly. Additionally, it is determined that there is decline in triglyceride values together with the physical activity [10].

At the end of the application, cholesterol posttest measurements of blood samples taken at the end of the match program were lower than the pretest measurements ($p < 0.05$). In a similar way, Thompson *et al.* have indicated that there were decrease in the

LDL cholesterol level and increase in the HDL cholesterol level as a result of the exercises they applied intensely [11]. Karacan *et al.* have determined a significant decrease in the body weight, body fat percentage, body mass index, total cholesterol, LDL cholesterol, triglyceride values ($p < 0.05$) at the end of an exercise program of 8 weeks [12]. Enger *et al.* have reported that they noted decrease in total cholesterol, triglyceride and LDL cholesterol and increase in the HDL cholesterol as a result of intense ski exercises [13].

An increase in determined in the values obtained after match in comparison to those received before match in terms of HDL values. Thus, the difference in between is meaningful ($p < 0.05$). It is observed that exercises have decreased the level of destructive blood lipids such as triglyceride and lipoproteins, and increased the level of HDL (useful lipoprotein) [14]. When high level practiced runners are considered, there is an increase in HDL levels not because of increase in the production of HDL but because HDL catabolism is delayed. Also increase in the lipoprotein lipase activity in the fat tissue and serum may play a role by increasing transfer of lipid to HDL. It is known that when exercise is done regularly, it has positive effect both on cardiovascular system, and on blood pressure and lipid profile as cardiac risk factors. As a result, long duration, quick power and aerobic endurance practices decrease total cholesterol, triglyceride, glucose, LDL cholesterol and VLDL cholesterol levels and increase HDL cholesterol level [15].

At the end of the match program, there was a statistically important decrease in the posttest measurement of LDL values in comparison to the pretest measurements ($p < 0.05$). Cullinane *et al.* have reported that they observed decrease in LDL cholesterol at the end of submaximal cycling exercise for 30 minutes [13]; Enger *et al.* have reported decrease in total cholesterol, triglyceride and LDL cholesterol and increase in HDL cholesterol [16]. In another study realized on this subject, it is indicated that exercises done in sufficient frequency and intensity have a triglyceride, LDL cholesterol lowering effect and HDL cholesterol increasing effect [4]. In a study performed by Leaf *et al.*, they revealed that long-duration medium intensity exercise increases HDL-cholesterol together with the increase in the aerobic capacity, and decrease the risk of coronary heart disease [17].

In another study, the importance of the duration of exercise is verified [18]. In this study, obese women have done cycling exercise, general and specific isometric exercises for 1 month, and at the end of the study decrease in triglyceride, total cholesterol and LDL cholesterol and increase in HDL cholesterol were not found to be important [3].

Yanagibori *et al.* [4] have examined the effects of 12 weeks of walking exercise on the serum lipids and lipoproteins and apolipoproteins in middle-aged

women. When they compared the women classified into two groups, they determined a significant increase in HDL-cholesterol and significant decrease in total cholesterol, LDL cholesterol in both of the groups. In similar studies, decrease in LDL cholesterol and increase in HDL cholesterol were determined [18,19,20].

It is the duty of blood to provide the oxygen required for tissues together with exercising. More blood goes to tissues because of the cardiovascular system A-VO₂ difference that is influenced by the exercises. Flow of blood to the muscle tissues also increases. Blood elements cause a significant increase since they are affected by the intense blood flowing to the muscle tissue [21].

As a conclusion, we can say that match period of 10 days decreased total cholesterol, triglyceride, cholesterol and LDL levels and increased HDL cholesterol level.

References

1. Eisenmann, J.C., E. Wickel, G.J. Welk, S.N. Ve Blair, 2005. Relationship between adolescent fitness and fatness and cardiovascular disease risk factors in adulthood: The Aerobics Center Longitudinal Study (ACLS). *Am. Heart J.*,
2. Tran Zv, A. Weltman, 1985. Differential Effects of Exercise on Serum Lipid and Lipoprotein Levels Seen with Changes in Body Weight: A Meta-Analysis. *Jama*, 254: 919-24.
3. Sacks, F.M., 2001. Lipid- Lowering Therapy In Acute Coronary Syndromes. *JAMA*, 285: 1758-1760.
4. Yanagibori, R., K. Kawakubo, A. Gunji, K. Aoki, M. Miyashita, 1993. Effects Of 12 Wk Exercise Walking On Serum Lipids, Lipoproteins And Apolipoproteins In Middle-Aged Women. Does Menopause Status Influence Training Effects? *Japanese Journal Of Public Health*, 40(6): 459-67.
5. Solak, H., N. Görmüş, T.M. Solak, 2007. Sports and Our Hearts, Ankara, pp: 31-40.
6. Adam, B., Y. Ardiçoğlu, 2002. Clinical Biochemistry Analyzing Methods: 1st Edition: Atlas Booktrade.
7. Mehmetoğlu, İ., 2004. Clinical Biochemistry Laboratory Guidebook. Yelken Printing Distribution, 3rd Edition, Konya.
8. Karbek, K., 1990. Biology, Ant. Publications, Ankara.G.U., B.E.S.Y.O. Ankara, 69.
9. Haigh, J.R., C.A. Fruin, 1988. Pinn R, Lea E. J. Lipids and platelet function in runners. *J Sports Medicine*, 22(2): 66-70.
10. Ergun, N., G. Baltacı, V. Bayrakçı, 1997. Effects of Acute Program Exercises on the Serum Apolipoproteins and Lipids of Sedentary Persons. *Sports Medicine Magazine*, 832(3): 129-136.

11. Thompson, P.D., G.J. Tsongalis, R.L. Seip, C. Bilbie, M. Miles, R. Zoeller, T.J. Visich Angelopoulos, L. Pescatello, L. Bausserman, N.N. Mayno, 2004. Apolipoprotein E Genotype and changes in serum lipids and maximal oxygen uptake with exercise training. *Metabolism*, 53: 193-202.
12. Karacan, S., M. Günay, 1999. The effects of aerobic training program on cardiovascular risk factor. 47-50, 145, 223.
13. Enger, S.C., S.R. Stromme, H.E. Refsum, 1980. High density lipoprotein cholesterol, total cholesterol and triglycerides in serum after a single exposure to prolonged heavy exercise. *Scand J. Clin.*, 40: 341-5.
14. Vincent, K.R., S.L. Lennon, 2002. Effects of low intensity aerobic training on skeletal muscle capillary and blood lipoprotein profiles. *J Atheroscler Thromb*, 9(1): 78.
15. Morgan, W.P., 1985. Psychogenic factors and exercise metabolism. A review *MEd. Sci. Sport Exerc.* 17(3): 309-416.
16. Culliane, E., B. Lararus, P.D. Thompson, 1981. Acute effect of a single exercise session on serum lipits in untrained msn. *Clin Chim Acta*, 109: 241-244.
17. Leaf, D.A., M. Jafari, H. Macrae, J. Kasem, P. O'conner, C. Pullinger, 2003. The Effects Of Physical Exercise On Plasma Prebeta-1 High-Density Lipoprotein. *Department Of Medicine, University Of California, Irvine, USA. Metabolism*, 270(19): 4039
18. Arthur, S., Leon, Treva, Rice, Stephen, Mandel, Jean-Pierre, Despres, Jean, Bergeron, Jacquese, Gagnon, D.C., Rao, James, S., Skinner, Jack, H., Wilmore And Claude, Bauchard, 2000. Blood Lipid Response To 20 Weeks Supervised Exercise In A Large Biracial Population. *The Heritage Family Study', Metabolism*, 49(4): 513-520.
19. Kayatekin, B.M., I. Semin, S. Acarbay, G. Oktay, S. Selamoğlu, 1998. A Comparison Of Blood Lipid Profiles Of Professional Sportspersons And Controls. *Indianj. Physiol Pharmacol.*, 42(4): 478-484.
20. Gang, Hu Heihhi, Pekkarinen, Osmo, Hönninen, Huiguang, Tian And Zeyu, Guo, 1998. Relation Between Commuting Leisure Time Physical Activity And Serum Lipid In A Chinese Urban Population. *Annals Of Human Biology*, 28(4): 412-421.
21. Günay, M., 2001. Exercise Physiology. S. 167, Ankara.