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Comparing Women Doing Regular Exercise with Sedentary Women in Terms of Certain Blood Parameters, Leptin Level and Body Fat Percentage

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A B S T R A C T

This study aims to compare the women engaged in doing regular exercise and those having done exercise previously and now not doing it or never done it before in terms of such blood values as leptin, cholesterol, insulin, glucose, triglyceride levels and body fat percentage (BFP) and to investigate the effects of regular exercise on these values. The participants of the study consisted of 35 (sportswomen) women doing regular exercise and 35 healthy and sedentary female university students never involved in doing regular exercise before. With the permission of the ethics committee, measuring was made. The mean ($\overline{X}$) age of those doing regular exercise was 18.03±0.81 years, $\overline{X}$ height was 163.62±5.28 cm, $\overline{X}$ weight was 57.12±5.77 kg, and training background 7.34±1.75 years. $\overline{X}$ age of sedentary group was 18.91±0.72 years, $\overline{X}$ height was 164.45±5.44 cm, $\overline{X}$ weight was 58.15±4.68 kg. Statistically significant differences were found between the two groups in terms of the values of HDL and Triglyceride ($p<0.05$), Total Cholesterol ($p<0.01$), leptin, BFP, and insulin ($p<0.001$). The other variables exhibited no statistically significant difference ($p>0.05$). The increase in serum leptin levels is directly correlated with BFP. It has also been observed that regular exercise, as it reduces BFP, suppresses serum leptin levels. Regular exercise is significant in the regulation of body weight and prevention of obesity. It is concluded that if regular and moderate exercise is supplemented by good nutrition to avoid cardiovascular risk factor, to reduce LDL level, to bring about an increase in the level of HDL, this creates a positive influence on hormones and body fats and that exercise could be an important factor in enhancing the quality of life.

***Key Word**: women, regular exercise, Leptin, blood parameter*

Introduction

It is a well-known fact that with exercise energy consumption goes up, energy balance changes, and fat mass decreases. Further, regular exercise plays an important role in the correct functioning of metabolism and in the prevention of certain illnesses. Research suggests that such health problems as obesity, cardiovascular diseases are mainly caused by sedentary lifestyle[1–6].

Responsible for controlling and regulating the amount of body fat, leptin is known to be a protein in human body that controls the energy expenditure hemostatis and that regulates body weight. It is considered to be a resort in the treatment of obesity and physiological and physiopathological regulation of body weight[7–9].

A new era started with the discovery of leptin, which is a product of obese gene (16kDa, ob), mostly made up of fat tissue, and the amount of which increases proportional to fat tissue[7,10–15]. Released from adipose tissue, leptin actively goes through the blood-brain barrier and reaches the hypothalamus, decreases food intake by binding to specific leptin receptors in certain hypothalamic nuclei and increases the energy expenditure[8,16–19]. However, it does not put an end to the feeling of appetite[20,21]. In addition, it is known that neuropeptide Y, which plays an important role in the enhancement of appetite, is suppressed by leptin[19,22].

Also secreted from skeleton muscles, brain, breast epithelial, stomach, and placenta[19,18,23], leptin is chiefly produced in fat cells[14]. It is correlated with the amount of fat body mass[24]. Research suggests that the blood leptin levels are associated with fat mass[25–27].

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Since the amount of fat is high and the distribution of fat is different in females and testosterone suppresses leptin level, blood leptin levels in females are higher[28].

Epidemiological studies have shown that those engaged in physical activities are less likely to develop coronary heart diseases than sedentary people[29,30]. The main reason for this is the changes occurring with exercise in blood lipids, which are among the risk factors in the development of atherosclerosis[31,32].

Various longitudinal studies have been carried out to identify the effects of physical activities on serum lipoprotein concentrations[33,34]. Most of these studies have concluded that exercise improves lipid profile[34,35].

The increase in the amounts of total cholesterol proportion, triglyceride and low-density lipoprotein (LDL) raises the risk of atherosclerotic vascular diseases and chronic lung diseases. On the other hand, the increases in the amount of high-density lipoprotein (HDL) lowers such risks[36,37]. Furthermore, it is indicated that high blood pressure and obesity are improved with exercise[38–40].

With exercise, it is possible to improve all or some of such motor skills as strength, stamina, flexibility, balance, rapidity, agility, timing, and swiftness of response, depending on the type of exercise[41].

Considering such effects of leptin as decreasing food intake and increasing energy expenditure, this study compares the leptin level of the women engaged in doing regular exercise and those of sedentary women and investigates the relationship between leptin blood lipid values.

This study aims to compare the women engaged in doing regular exercise and those having done exercise previously and now not doing it or never done it before in terms of such blood values as leptin, cholesterol, insulin, glucose, triglyceride levels and body fat percentage (BFP) and to investigate the effects of regular exercise on these values.

Materials and Method

The participants of the study consisted of 35 (sportswomen) women doing regular exercise and 35 healthy and sedentary female university students never involved in doing regular exercise before. The former group was selected from a population, the members of which do 90-minute moderate exercise at least 4 days a week (doing judo). With the permission of the ethics committee, measuring was made.

The mean ($\overline{X}$) age of those doing regular exercise was 18.03±0.81years, $\overline{X}$ height was 163.62±5.28 cm, $\overline{X}$ weight was 57.12±5.77 kg, and training background 7.34±1.75 years. X^- age of sedentary group was 18.91± 0.72 years, $\overline{X}$ height was 164.45±5.44 cm, $\overline{X}$ weight was 58.15±4.68 kg.

Measuring height and weight

Height was measured, when the participant was barefoot, by using a height scale fixed against the wall, and weight was measured, when the participant was wearing T-shirt and short, barefoot, with TANITA BC–418 MA Professional Segmental Body Composition Analyzer.

Measuring body fat percentage (BFP)

The height measurements were entered on the analyzer by personal information. Then, the participants barefoot, wearing t-shirts and shorts were made to stand on the footpads of the analyzer without moving and asked to stay until the results were displayed on the screen. Body fat percentage (BFP) was automatically determined using Bio-electrical Impedance Analysis (BIA) with TANITA BC–418 MA Professional. The results obtained were printed out. As leptin is associated with fat tissue, utmost attention was paid to body mass index's (BMI) being equal between groups.

Measuring biochemical parameters

For the reliability of the test results, the participants in both groups were asked not to engage in any high-intensity exercises, not to have alcoholic drinks and smoke, and not to eat any food prior to the day when they were blood-tested. Following a 12-hour food-free period, venous blood samples were taken from the participants in both groups and Total Cholesterol (Enzymatic method), LDL-C, HDL-C, VLDL-C (used Friedewald Formule), Triglyceride (Enzymatic and point method), Glucose (Hekzokinaz, UVmetod), Insulin (ECLIA method) and Leptin (Eliza method) levels were measured. All blood-tests were taken by Düzen laboratory.

Statistical analysis

Arithmetic $\overline{X}$ and standard deviation were calculated from the collected data. To calculate the differences between the two groups independent t-test was used. When $p<0.05$, the differences between groups were accepted to be significant.

Results

The $\overline{X}$ age of those doing regular exercise was 18.03± 0.81 years, the $\overline{X}$ height was 163.62±5.28 cm, the $\overline{X}$ weight was 57.12±5.77 kg, and training background 7.34±1.75 years. The $\overline{X}$ age of sedentary group was 18.91±0.72 years, the $\overline{X}$ height was 164.45±5.44 cm, the $\overline{X}$ weight was 58.15±4.68 kg (Table 1).

TABLE 1
AGE, HEIGHT, WEIGHT, AND TRAINING BACKGROUND PARAMETERS

Variables	Exercising Group	Sedentary Group
Number of participants (N)	35	35
Age (year)	18.03±0.81	18.91±0.72
Height (cm)	163.62±5.28	164.45±5.44
Weight (kg)	57.12±5.77	58.15±4.68
Training background (year)	7.34±1.75	–

TABLE 2
THE VALUES CONCERNING TOTAL CHOLESTEROL, LDL-C, HDL-C, VLDL-C, TRIGLYCERIDE, GLUCOSE, INSULIN, LEPTIN LEVELS AND BFP AND THE RESULTS OF INDEPENDENT T-TEST

Variables	Exercising Group (N=35)	Sedentary Group (N=35)	t	p
Total Cholesterol (mg/dL)	169.25±30.43	208.70±35.44	–3.52	0.01**
LDL-C (mg/dL)	91.34±29.55	103.99±30.81	–1.24	0.22
HDL-C (mg/dL)	73.75±11.91	65.50±11.71	2.0	0.045*
VLDL-C (mg/dL)	16.75±8.75	22.16±8.60	–1.86	0.72
Triglyceride (mg/dL)	79.00±33,53	102.85±35.86	–2.04	0.049*
Glucose (mg/dL)	84.75±5.67	88.45±6.45	–1.80	0.80
Insulin (mg/mL)	5.91±2.13	9.98±2.15	–5.64	0.00***
Leptin (mg/mL)	8.30±6.57	20.56±6.03	–5.89	0.00***
Body Fat Percentage (%)	17.60±1.58	22.69±3.98	–4.79	0.00**

* $p<0.05$**$p<0.01$***$p<0.001$

Considering Total Cholesterol, LDL-C, HDL-C, VLDL-C, Triglyceride, Glucose, Insulin, Leptin levels and BFP, the values of sedentary group were found to be higher than those of the exercising group. However, while there was no statistically significant difference between groups in terms of the values concerning glucose, LDL-C, and VLDL-C ($p<0.05$), there was a statistically significant difference between groups in terms of the values concerning glucose Total Cholesterol, HDL-C, Triglyceride, Insulin, Leptinand BFP (*$p<0.05$, **$p<0.01$, ***$p<0.001$) (Table 2).

In conclusion, statistically significant differences were found between the two groups in terms of the values of HDL-C and Triglyceride ($p<0.05$), Total Cholesterol ($p<0.01$), leptin, BFP, and insulin ($p<0.001$). The other variables exhibited no statistically significant difference ($p>0.05$).

Discussion

The participants of the study consisted of 70 females divided into two groups as exercising group (N=35) and sedentary group (N=35). The effects of exercise on leptin and certain blood parameters (Total Cholesterol, LDL-C, HDL-C, VLDL-C, Triglyceride, Glucose, Insulin, Leptin levels and BFP) were examined through comparing these two groups (see Table 2).

In consideration of Total Cholesterol, LDL-C, HDL-C, VLDL-C, Triglyceride, Glucose, Insulin, Leptin levels and BFP, the values of sedentary group were found to be higher than those of the exercising group and statistically significant differences were found between the two groups in terms of the values of HDL-C, Triglyceride ($p<0.05$), Total Cholesterol ($p<0.01$), leptin, BFP, and insulin ($p<0.001$). The other variables exhibited no statistically significant difference ($p>0.05$).

Advancing technology is making people more and more passive[43]. The physical inactivity caused by industrialization and modern lifestyle negatively affects individuals at all ages. Sedentary lifestyle unavoidably comes with serious health problems. Such health problems as high blood pressure, obesity, lean muscles, postural disorder, diabetes, and coronary artery risk factors are more commonly encountered especially in the periods of middle-age and over[44,45]. With the changing social and environmental conditions, women have started to be more interested in exercise recently[46].

Studying the effects of different training programs for women on their performance, Lemure et al.[40]. Applied for 16 weeks aerobics to one group (N=12), resistance training to another (N=12), and a combination of the two to the other group (N=12) and as a result found a significant decrease in triglyceride level of those doing aerobics and a significant increase in the level of HDL-C.

Hu et al.[47] examined the relationship between the physical activity level and serum lipids of a sample (1786 male and 1922 female), the ages of which varied from 20 to 49. They divided the participants into three groups to determine their level of physical activity and identified who commuted to and from work by bus, by bike and on foot. As a result, they found a reverse proportion between serum total cholesterol, LDL-C and triglyceride concentration of the male participants commuting to and from work by bike and on foot. In the female participants of the same group, the HDL-C value was found to be higher.

Triglycerides make other lipoproteins iatrogenic by influencing their structures and functions[49]. Therefore, it is accepted that reducing triglyceride levels would be appropriate[47]. The results of similar studies show that regular long-term exercise decreases triglyceride level[31,32,35,50,51].

Halle et al.[50] found that those doing regular exercise had lower levels of serum TG and VLDL-C than sedentary people. This, in parallel to the results in this study, highlights the role of exercise in lowering the risk of hypercholesterolemia and its treatment[50]. However, Williams et al.[52] indicate that the level of VLDL-C does not

change with exercise. This is also supported by other studies[53]. As many other studies do, this study shows that the VLDL-C level of the exercising group decreases significantly[54,55].

Besides others, Nicklas et al.[51] claimed that LDL level decreased with exercise only in obese people. Further, it is indicated that there is a lower level of relationship between LDL-C and exercise[54,55].

Experimental studies demonstrated that blood pressure and the levels of lipid and lipoprotein decreased with moderate aerobics exercise (40–60% maxVO_2), that BFP and blood lipids could not be easily changed with intermittent exercise and training, that HDL-C concentration could be increased with strength training, and that cholesterol and LDL-C concentration could decrease with triglyceride[56].

Lifelong regular physical exercise could be an effective inhibitor against cardiovascular diseases[30], for there occur positive changes in lipid profile with exercise[34,35]. The finding in this study that the values of the exercising group were significantly lower than those of sedentary group is supported by the literature.

Some studies have found that with exercise there occur significant increases in the HDL level of sportspeople doing regular exercise[31,35,51,54,55]. However, other studies have found that exercise does not bring about any statistically significant increases in the level of HDL-C[32,57]. The reason for this could be that long-term regular exercise decreases HDL-C level by increasing fat metabolism and by causing a decline in the amount of body fat.

Leal-Cerro et al.[58] found that leptin level dropped considerably just after marathon. The variation as to leptin level in the studies which investigated the relationship between exercise and leptin might be caused by a number of factors, the most important of which can be listed as intensity and duration of exercise and the time of blood-taking. Ünal et al.[48] found that leptin level was suppressed by regular exercise, which is parallel to the finding of the present study regarding the exercising group.

Nagy et al.[59] discovered that serum leptin concentrations were associated with energy consumption parameters in humans. Many studies point out that exercise does not change leptin levels acutely; however, as a result of long-term exercise fat mass decreases and thus reducing plasma leptin concentrations[60,61].

It is known that exercise alters body composition and insulin levels. Independent of body fat mass, while closely related with plasma leptin concentration, total energy expenditure and physical activity level, resting is not associated with metabolic speed. Such intense exercises as marathon reduce leptin levels; however, it is established that in healthy persons daily physical activity is not related with leptin level[62].

Many studies have not been able to explain the effect of exercise on plasma leptin concentrations in males. On the other hand, moderate aerobics exercise reduces plasma leptin concentrations in females[63]. It is indicated that whilst leptin level is associated with resting and total energy expenditure in females and children, it is not so in males[64,65].

Investigating the effects of various types of exercise on physical and physiological performance in females, Williams et al.[66] and Zorba et al.[67,68] got the female participants to do a combination of step, aerobics and body resistance exercises and found a 5–9% decline in body fat percentage of the exercising groups, indicating that the results were significant in terms of the intensity of exercise.

Jackson et al.[42] classified body fat percentage in women of 20–29 ages as 31% high, 20–28% moderate, 16–19% good, 16% and below very good. The BFP measured in the exercising group in the current study was 17.60± 1.58%, that is, a value between 16–19%, which is in line with Jackson's classification.

Generally speaking, the increase in serum leptin levels is directly associated with BFP. It has also been observed that regular exercise, as it reduces BFP, suppresses serum leptin levels.

In line with the findings in the related literature, the findings of the present study emphasize the significance of regular exercise in the regulation of body weight and prevention of obesity. It is concluded that if regular and moderate exercise is supplemented by good nutrition to avoid cardiovascular risk factor, to reduce LDL-C level, to bring about an increase in the level of HDL-C, this creates a positive influence on hormones and body fats and that exercise could be an important factor in enhancing the quality of life.

REFERENCES

1. HIMAS-HAGEN J, ERICKSON JC, HOLLOPETER G, PALMITER RD, PELLEYMOUNTER MA, CULLEN MJ, BAKER MB, HECHT R, BOONE T, COLLINS F, Science, 276 (1997) 1132. — 2. WEST JB, Best and Taylor's Physiological basis of medical practice. 12th ed. (Williams and Wilkins, Baltimore, 1991). — 3. GUYTON AC, HALL JE. Human Physiology and mechanisms of disease. 16th ed. (WB Saunders, Philadelphia, PA, 1997). — 4. GANONG WF. Review of Medical Physiology – A Lange Medical Book, 17th ed (Appleton Lange, Norwalk, 1995). — 5. TELATAR H, "IM"EK H, Gastroenteroloji (Medikomat Basim Yayim, Ankara, 1993). — 6. ZORBA E, Vücut Yapisi, Ölçüm Yöntemleri ve Sismanlikla Basa Çikma (Morpa Kültür Yayinlari, Ankara 2005). — 7. PRINS JB, O'RAHHILLY S, Clinical Science, 92 (1997) 3. DOI: 10.1042/cs0920003. — 8. SPEDDING M, OVURY C, MILLAN M, DUHAULT J, DOCQUET C, Nature, 380 (1996) 488. DOI: 10.1038/379632a0. — 9. LEE GH, PROENCA R, MONTEZ JM, CARROLL KM, DARVISHZADEH JG, LEE JI, FRIEDMAN JM, Nature, 379 (1996) 632. DOI: 10.1038/379632a0. — 10. ZHANG W, TELEMAGUE-POTTS S, ANDERSAN PR, THOMAS GD, AN J, WANG Z, NEWGARD CB, VICTOR RG, Am J Hypertens, 15 (2002) 1A. DOI: 10.1016/S0895-7061(02)02282-3. — 11. ECHWALD SM, RASMUSSEN SB, SORENSEN TIA, ANDERSEN T, TYPS-HANSEN A, CLAUSEN JO, HANSEN L, HANSEN T, PEDERSEN O, Int Journal of Obesity, 21 (1997) 321. — 12. TUOMINEN JA, EBELING P, HEIMAN ML, STEPHENS T, KOIVISTO VA, Acta Physiol Scand, 160 (1997) 83. DOI: 10.1046/j.1365-201X.1997.00102.x — 13. ZHANG Y, PROENCA R,

MAFFEI M, BARONE M, LEOPOLD L, FRIEDMAN JM, Nature, 372 (1994) 425. — 14. FRIEDMAN JM, HALAAS JL, Nature, 395 (1998) 763. — 15. MAFFEI M, FEI H, LEE GH,DANI C, LEROY P, ZHANG Y, PROENCA R; NEGREL R; AILHAUD G; FRIEDMAN JM, Proc Natl Acad Sci USA, 92 (1995) 6957. — 16. FRIEDMEN JM. Nutr Rev, 60 (2002) 514. — 17. GRIFFITHS M, PAYNE PR, STUNKARD AJ, RIVERS JPN, COX M, Lancet 336 (1990) 76. — 18. AHIMA RS, FLIER JS, Endocrinol Metab, 11 (2000) 327. — 19. HICKEY MS, CALSBEEK DJ, Sports Med, 31 (2001) 583. — 20. MAFFEI M, HALAAS J, RAVUSSIN E, PRATLEY RE, LEE GH, ZHANG Y, FEI H, KIM S, LALLONE R, RANGANATHAN S, KERN PA, FRIEDMAN JM, Nat Med, 1 (1995) 1115. DOI: 10.1038/nm1195-1155. — 21. FAGGIONI R, FEINGOLD KR, GRUNFELD C, Leptin regulation of the immune response and the immunodefiency of malnutrion. In: Proceedings (FASEB, Bethesda-Maryland, 2001). — 22. KOKOT F, FICEK R, Miner Electrolyte Metab, 25 (1999) 303. DOI:10.1159/000057464. — 23. WANG J, LIU R, HAWKINS M, BARZILAI N, ROSSETTI L, Nature, 393 (1998) 684. — 24. CONSIDINE R, SINHA M, HEIMAN M, KRIAUCIUNAS A, STEPHENS T, NYCE M, OHANNESIAN JP, MARCO CC, MCKEE LJ, BAUER TL, CARO JF, N Engl J Med, 334 (1996) 292. DOI: 10.1056/NEJM199602013340503. — 25. KOWALSKA I, STRACZKOWSKI M, GORSKI J, KINALSKA I, J Physiol Pharmacol, 50 (1999) 309. — 26. HICKEY MS, CONSIDINE RV, ISRAEL RG, MAHAR TL, MCCAMMON MR, TYNDALL GL, Am J Physiol Endocrinol Metab, 271 (1996) 938. — 27. GUTIN B, RAMSEY L, BARBEAU P, CANNADY W, FERGUSON M, LITAKER M. Am J Clin Nutr, 69 (1999) 388. — 28. HIMMS-HAGEN J, Crit Rev Clin Lab Sci, 36 (1999) 575. DOI: 10.1080/10408369991239259. — 29. SYTKOWSKI P, KANNEL W, D'AGOSTINO RN, Engl J Med, 322 (1990) 1635. — 30. XR X, QURESHI I, WU X, Chin J Physiol, 39 (1996) 105. — 31. CARDOSO SG, HERNANDEZ LS, ZAMORA GJ, POSADAS RC, Arch Inst Cardiol Mex, 65 (1995) 229. — 32. GINSBURG G, AGIL A, O'TOOLE M, RIMM E, DOUGLAS P, RIFAI N, Jama, 276 (1996) 221. — 33. SEDGWICK A, THOMAS D, DAVIES M, J Clin Epidemiol, 46 (1993) 141. — 34. SEDGYVICK A, THOMAS D, DAVIES M, BAGHURST K, J Clin Epidemiol, 42 (1989) 189. — 35. MING W, CAROLINE AM, CARLTON AH, STEVEN NB. J Clin Epidemiol 50 (1997) 1137. — 36. DUTHIE GG, Biochem Soc Trans, 18 (1990) 1051. — 37. YOKODE M, KITA T, ARAI H, KAWAI C, NARUMIYA S, FUJIWARA M, Prot Nati Acad Sci USA, 85 (1988) 44. — 38. AKGÜN N, Spor Hekimligi Dergisi, 20 (1995) 91. — 39. FOX, BOWERS, FOSS, Translation: CERIT M, Beden Egitimi ve Sporun Fizyolojik Temelleri (Bagirgan Yayimevi, Ankara, 1999). — 40. LEMURA LM, AMDREACCI J, Eur Journal Appl Physiology, 82 (2002) 5. — 41. AÇIKADA C, ERGEN E, Bilim ve Spor (Büro-Tek Ofset Matbaacilik, Ankara, 1990). — 42. JACKSON AS, POLLOCK M, WORD A, Medicine Science in Sports and Exercise, 12 (1980) 175. — 43. ZORBA E, YILDIRIM S, SAYGIN Ö,YAMAN R, YILDIRIM K, Orta Yasli Sedanter Bayanlarda Step Çalismasinin Bazi Fizyolojik, Motorik ve Yapisal Deserlere Etkisi. In: Proceedings (1. Gazi Beden Egitimi ve Spor Bilimleri Kongresi, Ankara, 2000). — 44. UTTER AC, WHITCOMB DC, NIEMAN DC, BUTTERWORTH DE, VERMILLION SS, Medicine Science in Sports Exercise, 32 (2000) 41. — 45. ZORBA E, Herkes Için Spor ve Fiziksel Uygunluk (Neyir Matbaasi, Ankara, 1999). — 46. KALYON, A, Spor Hekimligi. 2. Baski, (GATA Basimevi, Ankara, 1994). — 47. HU G, PEKKARINEN H, HÄNNINEN O,TIAN H, GUO Z, Annals of Human Biology, 28 (2001) 412. — 48. ÜNAL M, ÜNAL DO, BALTACI AK, MOGULKOÇ R, KAYSERILIOGLU A, Neuro Endocrinology Letters, 26 (2005) 148. — 49. BROWN S, GOLDENSTEIN L, The hyperlipoproteinemias and other disorders of lipid metabolism. In: ISSELBACHER J, BRAUNWALD E, WILSON D (Eds) Harrison's Principles of Internal Medicine (McGraw Hill Inc, New York, 1994). — 50. HALLE M, BERG A, KONIG D, KEUL J, BAUMSTARK MW, Metabolism, 46 (1997) 186. — 51. NICKLAS BJ, KATZEL U, BUSBY WJ, GOLDBERG AP, Metabolism, 46 (1997) 556. — 52. WILLIAMS P, KRAUSS R, VRANIZAN K, VRANIZAN KM, ALBERS JJ, TERRY RB, WOOD PD, Arteriosclerosis, 9 (1989) 623. DOI: 10.1161/01.ATV.9.5.623. — 53. THOMAS TR, ZIOGAS G, HARRIS WS, Metabolism, 46 (1997), 1178. — 54. BERG A, FREY I, BAUMSTARK MW, Sports Med, 17 (1994) 21. — 55. LARRYDURSTINE J, HASKELL W, Exerc Sport Sci Rev, 22 (1994) 477. — 56. TAMER K, Beden Egitimi Spor Bilimleri Dergisi, 1 (1996) 1. — 57. BLUMENTHAL J, EMERY C, MADDEN D, Am J Cardiol, 67 (1991) 633. DOI: 10.1016/0002-9149(91)90904-Y. — 58. LEAL-CERRO AP, GARCIA--LUNA ASTORGA L, PAREJO J, PEINO R, DIEGUEZ C, CASANUEVA FF, J Clin Endocrinol Metab, 83 (1998) 2376. DOI: 10.1210/jc.83.7.2376. — 59. NAGY TR, GOWER BA, SHEWCHUK RM, GORAN MI, J Clin Endocrinol Metab, 82 (1997) 4149. — 60. GUTIN B, OWENS S, Am J Human Biol, 11 (1999) 237. DOI: 10.1002/(SICI)1520-6300(1999)11:2<237::AID-AJHB11>3.0.CO;2-9. — 61. ESSIG DA, ALDERSON NL, FERGUSON MA, BARTOLI WP, DURSTINE L, Metabolism, 49 (2000) 399. DOI: 10.1016/S0026-0495(00)90396-2. — 62. MANTZOROS CS, MOSCHOS SJ, Clin Endocrinol, 49 (1998) 551. DOI: 10.1046/j.1365-2265.1998.00571.x. — 63. HICKEY MS, HOUMARD JA, CONSIDINE, RV, TYNDALL GL, MIDGETTE J B, GAVIGAN KE, WEIDNER ML, MCCAMMON MR, ISRAEL RG, CARO JF, Am J Physiol, 35 (1997) 562. — 64. ANKARBERG-LINDGREN C, DAHLGREN J, CARLSSON B, ROSBERG S, CARLSSON L, WIKLAND KA, NORJAVAARA E, Eur J Endocrinol, 145 (2001) 43. — 65. MANTZOROS CS, Ann Intern Med, 130 (1999) 671. — 66. KRAEMER WJ, KEUNING M, RATAMESS NA, VOLEK JS, MCCORMICK M, BUSH JA, NINDL BC, GORDON SE, MAZZETTI SA, NEWTON RU, GÓMEZ AL, WICKHAM RB, RUBIN MR, HÄKKINEN K, Med Sci Sports Exer, 33 (2001) 259. — 67. ZORBA E, BABAYIGIT I., EKICI S, MOLLAOGULLARI H, »The Investigation of Sport Habits and Health in Elderly. In: Proceedings (46th ICHPER-SD Anniversary World Congress Oral Presentation, Istanbul, 2005). — 68. ZORBA E, MOLLAOGULARI UH, AGILÖNÜ A, MUTLU O, Determining the Similarities and differences about the life- styles and physical activities on the representatives of sport for all in provinces. In: Proceedings (Balkan Congress of Sport Medicine, Antalya, 1999).

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USPOREDBA REDOVITE TJELOVJEŽBE SA SJEDILAČKIM NAČINOM ŽIVOTA KOD ŽENA MJEREĆI ODREĐENE PARAMETRE UZORKA KRVI, RAZINE LEPTINA I POSTOTAK MASNOG TKIVA

S A Ž E T A K

Studija uspoređuje žene redovne u tjelovježbi sa ženama vičnim sjedilačkom načinu života mjerivši vrijednosti poput leptina, kolesterola, inzulina, glukoze, triglicerida i postotak masnog tkiva, te istražuje učinke redovitog vježbanja na predstavljenim vrijednostima. Sudionici istraživanja sastojali su se od 35 sportašica vičnih svakodnevnim vježbama i 35 zdravih ženskih studenata koje nisu prakticirale vježbanje. Uz dopuštenje etičkog povjerenstva, izvršeno je mjerenje. $\overline{X}$ dob ispitanika vičnih vježbama iznosi 18,03±0,81 godine, sa $\overline{X}$ visinom 163,62±5,28 i $\overline{X}$ težinom 57,12±5,77 kg, dok je trajanje sudjelovanja u svakodnevnim fizičkim aktivnostima iznosilo $\overline{X}$ 7,34±1,75. $\overline{X}$ starost sjedilačke grupe iznosila je

18,91±0,72 godina, visina $\overline{X}$ je 164,45±5,44 cm, $\overline{X}$ težina bila je 58,15±4,68 kg. Utvrđene su statistički značajne razlike između dviju skupina u smislu vrijednosti HDL i triglicerida ($p<0,05$), ukupnog kolesterola ($p<0,01$), leptina, postotka masnog tkiva i inzulina ($p<0,001$). Ostale varijable ne pokazuju statistički značajnu razliku ($p>0,05$). Porast serumskih razina leptina izravno korelira s postotkom masnog tkiva. Također je primijećeno kako je redovito vježbanje, pošto smanjuje postotak udjela masnog tkiva smanjuje i razinu leptina. Redovito vježbanje je značajno u regulaciji tjelesne težine i sprječavanje pretilosti. Zaključeno je kako redovita i umjerena tjelovježba, dopunjena zdravom prehranom kako bi izbjegli čimbenik rizika, smanjivanjem razine LDL-a, i povećanjem razine HDL, stvara pozitivan utjecaj na hormone i postotak masnog tkiva, i time može važan čimbenik u poboljšanju kvalitete života.