

HİPERLİPİDEMİ YÖNETİMİNDE FİZİKSEL AKTİVİTE

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Giriş

Hiperlipidemi koroner arter hastalığı, serebrovasküler hastalıklar başta olmak üzere metabolik sendrom, hipertansiyon, diyabetes mellitus, glukoz intoleransı ile ilişkilidir (1-3).

Yıllardır hiperlipidemi tedavisinde farmakolojik tedavinin üzerinde durulsa da güvenilirlik ve maliyet göz önüne alındığında nonfarmakolojik diğer tedavi seçenekleri de önem arz eder (2,4). Literatürde yapılan çalışmalar düzenli fiziksel aktivitenin plazma lipid profilini değiştirdiğini; trigliserit düzeyini azalttığını, HDL kolesterol düzeyini arttırdığını, LDL kolesterol düzeyini ise diyet ve kilo değişikliğine bağlı olarak değiştirdiğini göstermiştir (5,6). Bu kitap bölümünün amacı düzenli fiziksel aktivitenin kan lipid ve lipoprotein düzeyine olan etkisini mevcut bilgiler eşliğinde değerlendirmektir.

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Kaynaklar

1. Mann S, Beedie C, Jimenez A. Differential effects of aerobic exercise, resistance training and combined exercise modalities on cholesterol and the lipid profile: review, synthesis and recommendations. *Sport Med.* 2014;44(2):211-221. doi:10.1007/s40279-013-0110-5
2. N H, H Y. Exercise and Hyperlipidemia. In: J X, ed. *Physical Exercise for Human Health*. Vol 53. Singapore: Springer Nature; 2021:882. doi:10.1249/01.mss.0000735220.08496.9d
3. Gronek P, Wielinski D, Cyganski P, et al. A review of exercise as medicine in cardiovascular disease: Pathology and mechanism. *Aging Dis.* 2020;11(2):327-340. doi:10.14336/AD.2019.0516
4. Mestek ML. Physical Activity, Blood Lipids, and Lipoproteins. *Am J Lifestyle Med.* 2009;3(4):279-283. doi:10.1177/1559827609334885
5. da Silva RC, Diniz M de FHS, Alvim S, Vidigal PG, Fedeli LMG, Barreto SM. Physical activity and lipid profile in the ELSA-Brasil study. *Arq Bras Cardiol.* 2016;107(1):10-18. doi:10.5935/abc.20160091
6. LJ D, E A, RR P, X W. Physical Activity, Exercise, and Lipids and Lipoproteins. In: P K, P N, eds. *Cardiorespiratory Fitness in Cardiometabolic Diseases Prevention and Management in Clinical Practice*. Switzerland: Springer Nature; 2019:265-293.
7. Tambalis K, Panagiotakos DB, Kavouras SA, Sidossis LS. Responses of blood lipids to aerobic, resistance, and combined aerobic with resistance exercise training: A systematic review of current evidence. *Angiology.* 2009;60(5):614-632. doi:10.1177/0003319708324927
8. NCDs | What is Moderate-intensity and Vigorous-intensity Physical Activity? WHO. 2018. <http://www.who.int/ncds/prevention/physical-activity/intensity/en/>. Accessed June 4, 2021.
9. Rhee E-J, Kim HC, Kim JH, et al. 2018 Guidelines for the management of dyslipidemia in Korea. *Korean J Intern Med.* 2019;34(5):1171-1171. doi:10.3904/kjim.2019.188.e1
10. OBEZİTE, LİPİD METABOLİZMASI HÇG. *Türkiye Endokrinoloji ve Metabolizma Derneği Dislipidemi Tanı ve Tedavi Kılavuzu*. 7. Ankara: Miki Matbaacılık San. ve Tic. Ltd Şti.; 2019.
11. Muscella A, Stefano E, Marsigliante S. The effects of exercise training on lipid metabolism and coronary heart disease. *Am J Physiol - Hear Circ Physiol.* 2020;319(1):H76-H88. doi:10.1152/ajpheart.00708.2019
12. Lemes IR, Turi-Lynch BC, Caverro-Redondo I, Linares SN, Monteiro HL. Aerobic training reduces blood pressure and waist circumference and increases HDL-c in metabolic syndrome: a systematic review and meta-analysis of randomized controlled trials. *J Am Soc Hypertens.* 2018;12(8):580-588. doi:10.1016/j.jash.2018.06.007
13. Wang Y, Xu D. Effects of aerobic exercise on lipids and lipoproteins. *Lipids Health Dis.* 2017;16(1):1-8. doi:10.1186/s12944-017-0515-5
14. Palazón-Bru A, Hernández-Lozano D, Gil-Guillén VF. Which Physical Exercise Interventions Increase HDL-Cholesterol Levels? A Systematic Review of Meta-analyses of Randomized Controlled Trials. *Sport Med.* 2021;51(2):243-253. doi:10.1007/s40279-020-01364-y
15. Kodama S, Tanaka S, Saito K, et al. Effect of aerobic exercise training on serum levels of high-density lipoprotein cholesterol: A meta-analysis. *Arch Intern Med.* 2007;167(10):999-1008. doi:10.1001/archinte.167.10.999
16. Banz WJ, Maher MA, Thompson WG, et al. Effects of resistance versus aerobic training on coronary artery disease risk factors. *Exp Biol Med.* 2003;228(4):434-440. doi:10.1177/153537020322800414
17. Kelley GA, Kelley KS, Franklin B. Aerobic exercise and lipids and lipoproteins in patients with cardiovascular disease: A meta-analysis of randomized controlled trials. *J Cardiopulm Rehabil.* 2006;26(3):131-139. doi:10.1097/00008483-200605000-00002

18. Woudberg NJ, Mendham AE, Katz AA, Goedecke JH, Lecour S. Exercise intervention alters HDL subclass distribution and function in obese women. *Lipids Health Dis.* 2018;17(1):1-12. doi:10.1186/s12944-018-0879-1
19. Halverstadt A, Phares DA, Wilund KR, Goldberg AP, Hagberg JM. Endurance exercise training raises high-density lipoprotein cholesterol and lowers small low-density lipoprotein and very low-density lipoprotein independent of body fat phenotypes in older men and women. *Metabolism.* 2007;56(4):444-450. doi:10.1016/j.metabol.2006.10.019
20. Yoshida H, Ishikawa T, Suto M, et al. Effects of supervised aerobic exercise training on serum adiponectin and parameters of lipid and glucose metabolism in subjects with moderate dyslipidemia. *J Atheroscler Thromb.* 2010;17(11):1160-1166. doi:10.5551/jat.4358
21. Stefanick ML, Mackey S, Sheehan M, Ellsworth N, Haskell WL, Wood PD. Effects of Diet and Exercise in Men and Postmenopausal Women with Low Levels of HDL Cholesterol and High Levels of LDL Cholesterol. *N Engl J Med.* 1998;339(1):12-20. doi:10.1056/nejm199807023390103
22. Kraus WE, Houmard JA, Duscha BD, et al. Effects of the Amount and Intensity of Exercise on Plasma Lipoproteins. *N Engl J Med.* 2002;347(19):1483-1492. doi:10.1056/NEJMoa020194
23. Varady KA, St-Pierre AC, Lamarche B, Jones PJH. Effect of plant sterols and endurance training on LDL particle size and distribution in previously sedentary hypercholesterolemic adults. *Eur J Clin Nutr.* 2005;59(4):518-525. doi:10.1038/sj.ejcn.1602106
24. Couillard C, Després JP, Lamarche B, et al. Effects of endurance exercise training on plasma HDL cholesterol levels depend on levels of triglycerides: Evidence from men of the Health, Risk Factors, Exercise Training and Genetics (HERITAGE) Family Study. *Arterioscler Thromb Vasc Biol.* 2001;21(7):1226-1232. doi:10.1161/hq0701.092137
25. Nybo L, Sundstrup E, Jakobsen MD, et al. High-intensity training versus traditional exercise interventions for promoting health. *Med Sci Sports Exerc.* 2010;42(10):1951-1958. doi:10.1249/MSS.0b013e3181d99203
26. O'Donovan G, Owen A, Bird SR, et al. Changes in cardiorespiratory fitness and coronary heart disease risk factors following 24 wk of moderate- or high-intensity exercise of equal energy cost. *J Appl Physiol.* 2005;98(5):1619-1625. doi:10.1152/jappphysiol.01310.2004
27. Bakker EA, Lee D, chul, Sui X, et al. Association of Resistance Exercise With the Incidence of Hypercholesterolemia in Men. *Mayo Clin Proc.* 2018;93(4):419-428. doi:10.1016/j.mayocp.2017.11.024
28. James AP, Whiteford J, Ackland TR, et al. Effects of a 1-year randomised controlled trial of resistance training on blood lipid profile and chylomicron concentration in older men. *Eur J Appl Physiol.* 2016;116(11-12):2113-2123. doi:10.1007/s00421-016-3465-0
29. JS W, MD P, JB M, et al. Resistance exercise and lipoproteins in postmenopausal women. *Int J Sports Med.* 2011;32(1):7-13. doi:10.1055/S-0030-1268008
30. Prabhakaran B, Dowling EA, Branch JD, Swain DP, Leutholtz BC. Effect of 14 weeks of resistance training on lipid profile and body fat percentage in premenopausal women. *Br J Sports Med.* 1999;33(3):190-195. doi:10.1136/bjsm.33.3.190
31. Lira FS, Uchida MC, Zanchi NE, et al. Low and moderate, rather than high intensity strength exercise induces benefit regarding plasma lipid profile. *Diabetol Metab Syndr.* 2010;2(1):1-6. doi:10.1186/1758-5996-2-31
32. Lemes ÍR, Ferreira PH, Linares SN, MacHado AF, Pastre CM, Netto J. Resistance training reduces systolic blood pressure in metabolic syndrome: A systematic review and meta-analysis of randomised controlled trials. *Br J Sports Med.* 2016;50(23):1438-1442. doi:10.1136/bjsports-2015-094715

33. Feingold KR. *Obesity and Dyslipidemia*. MDText.com, Inc.; 2000. <http://www.ncbi.nlm.nih.gov/pubmed/26247088>. Accessed June 4, 2021.
34. Sheikhholeslami Vatani D, Ahmadi S, Ahmadi Dehrashid K, Gharibi F. Changes in cardiovascular risk factors and inflammatory markers of young, healthy, men after six weeks of moderate or high intensity resistance training. *J Sports Med Phys Fitness*. 2011;51(4):695-700. <https://pubmed.ncbi.nlm.nih.gov/22212275/>. Accessed June 4, 2021.
35. Drenowatz C, Sui X, Fritz S, et al. The association between resistance exercise and cardiovascular disease risk in women. *J Sci Med Sport*. 2015;18(6):632-636. doi:10.1016/j.jsams.2014.09.009
36. Shaw I, Shaw BS, Krasilshchikov O. Comparison of aerobic and combined aerobic and resistance training on low-density lipoprotein cholesterol concentrations in men. *Cardiovasc J Afr*. 2009;20(5):290-295.
37. Park SK, Park JH, Kwon YC, Kim HS, Yoon MS, Park HT. The effect of combined aerobic and resistance exercise training on abdominal fat in obese middle-aged women. *J Physiol Anthropol Appl Human Sci*. 2003;22(3):129-135. doi:10.2114/jpa.22.129
38. Tan S, Li W, Wang J. Effects of six months of combined aerobic and resistance training for elderly patients with a long history of type 2 diabetes. *J Sport Sci Med*. 2012;11(3):495-501.
39. Yang SJ, Hong HC, Choi HY, et al. Effects of a three-month combined exercise programme on fibroblast growth factor 21 and fetuin-A levels and arterial stiffness in obese women. *Clin Endocrinol (Oxf)*. 2011;75(4):464-469. doi:10.1111/j.1365-2265.2011.04078.x
40. Kazeminasab F, Marandi M, Ghaedi K, Esfarjani F, Moshtaghian J. Effects of a 4-week aerobic exercise on lipid profile and expression of LXRA in rat liver. *Cell J*. 2017;19(1):45-49. doi:10.22074/cellj.2016.4871
41. Butcher LR, Thomas A, Backx K, Roberts A, Webb R, Morris K. Low-intensity exercise exerts beneficial effects on plasma lipids via ppar γ . *Med Sci Sports Exerc*. 2008;40(7):1263-1270. doi:10.1249/MSS.0b013e31816c091d
42. Ghanbari-Niaki A. Treadmill exercise training enhances ATP-binding cassette protein-A1 (ABCA1) expression in male rats' heart and gastrocnemius muscles. *Int J Endocrinol Metab*. 2011;8(4):206-210.
43. Ghanbari-Niaki A, Saghebjo M, Hedayati M. A single session of circuit-resistance exercise effects on human peripheral blood lymphocyte ABCA1 expression and plasma HDL-C level. *Regul Pept*. 2011;166(1-3):42-47. doi:10.1016/j.regpep.2010.08.001
44. Ferguson MA, Alderson NL, Trost SG, Essig DA, Burke JR, Durstine JL. Effects of four different single exercise sessions on lipids, lipoproteins, and lipoprotein lipase. *J Appl Physiol*. 1998;85(3):1169-1174. doi:10.1152/jappl.1998.85.3.1169
45. Kantor MA, Cullinane EM, Herbert PN, Thompson PD. Acute increase in lipoprotein lipase following prolonged exercise. *Metabolism*. 1984;33(5):454-457. doi:10.1016/0026-0495(84)90147-1
46. N D, V T. Lipoprotein Metabolizması ve Ateroskleroz İlişkisi. *SDÜ Tıp Fakültesi Derg*. 1995;2(2):39-44.
47. Kiens B, Lithell H. Lipoprotein metabolism influenced by training-induced changes in human skeletal muscle. *J Clin Invest*. 1989;83(2):558-564. doi:10.1172/JCI113918
48. Thompson PD, Cullinane EM, Sady SP, Flynn MM, Chenevert CB, Herbert PN. High density lipoprotein metabolism in endurance athletes and sedentary men. *Circulation*. 1991;84(1):140-152. doi:10.1161/01.CIR.84.1.140
49. Herbert PN, Bernier DN, Cullinane EM, Edelstein L, Kantor MA, Thompson PD. High-density lipoprotein metabolism in runners and sedentary men. *JAMA*. 1984;252(8):1034-1037. <http://www.ncbi.nlm.nih.gov/pubmed/6748208>. Accessed June 4, 2021.

50. Williams PT, Krauss RM, Vranizan KM, Wood PDS. Changes in lipoprotein subfractions during diet-induced and exercise-induced weight loss in moderately overweight men. *Circulation*. 1990;81(4):1293-1304. doi:10.1161/01.CIR.81.4.1293
51. Peltonen P, Marniemi J, Hietanen E, Vuori I, Ehnholm C. Changes in serum lipids, lipoproteins, and heparin releasable lipolytic enzymes during moderate physical training in man: A longitudinal study. *Metabolism*. 1981;30(5):518-526. doi:10.1016/0026-0495(81)90190-6
52. Yalçın A. Plazma Lipoproteinleri ve Klinik Önemi. *J Fac Vet Med*. 2001;20:123-129.
53. Gupta AK, Ross EA, Myers JN, Kashyap ML. Increased Reverse Cholesterol Transport in Athletes. 1993;42(6):684-690.
54. Marniemi J, Dahlström S, Kvist M, Seppinen A, Hietanen E. Applied Physiology Dependence of Serum Lipid and Lecithin : 1982:25-35.
55. Tsopanakis C, Kotsarellis D, Tsopanakis A. Plasma lecithin: cholesterol acyltransferase activity in elite athletes from selected sports. *Eur J Appl Physiol Occup Physiol*. 1988;58(3):262-265. doi:10.1007/BF00417260
56. Wang N, Silver DL, Thiele C, Tall AR. ATP-binding Cassette Transporter A1 (ABCA1) Functions as a Cholesterol Efflux Regulatory Protein. *J Biol Chem*. 2001;276(26):23742-23747. doi:10.1074/jbc.M102348200
57. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Vol 140.; 2019. doi:10.1161/CIR.0000000000000677
58. Mach F, Baigent C, Catapano AL, et al. 2019 ESC/EAS Guidelines for the management of dyslipidaemias: Lipid modification to reduce cardiovascular risk. *Eur Heart J*. 2020;41(1):111-188. doi:10.1093/eurheartj/ehz455