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**THE SURVEY OF CYCLIST AND BODY BUILDER ATHLETES CARDIO  
VASCULAR RISK FACTORS AND HEPATIC ENZYMES**

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**ABSTRACT**

This research target was the survey of cyclist and body builder athlete's cardio vascular risk factors and hepatic enzymes. The persons who were tested in this research were 30 athlete men (15 cyclists) with age average  $31.60 \pm 3.175$ , size  $172.66 \pm 3.177$ , weight  $79.73 \pm 9.617$  and body mass index  $26.75 \pm 3.077$  and (15 body builders) with age average  $31.20 \pm 6.625$ , size  $176.73 \pm 3.654$ , weight  $88.53 \pm 1.106$  and body mass index  $28.32 \pm 3.103$  that they participated in this research voluntarily. This research was kind of post event and they had at least 3 years record of professional activity.

In one stage, blood samples were taken from them. The statistical analysis of research data was done by T. independent method and meaningful level of test was chosen  $p < 0/05$ . The research results showed that the comparison of studying factors in cyclist and body builder athletes in systole blood pressure ( $p < /024$ ), heart rate ( $p < 0/002$ ) was meaningful but in diastole blood pressure ( $p < /448$ ) hepatic enzyme Aspartataminotransferase ( $p < /374$ ) and Alanin amino transferase ( $p < /078$ ) wasn't meaningful. According to this research results we can conclude that hemodynamic pressure as a result of doing sporty exercises in professional athletes causes heart hypertrophy with reduction in heart rate and blood pressure completely natural. On the other hand, the pressure as a result of doing sporty exercises causes muscle damages, and increasing hepatic

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enzymes. Although athletes can keep these enzymes in normal level with proper recovery during their professional periods.

**Keywords: Hepatic Enzymes, Survey, Cardio Vascular**

## INTRODUCTION

The ability of person in doing sporty exercises depends on body different systems efficiency and operation like cardiovascular system. Regular and long term exercises cause some changes in heart, that are named heart compatibility in response to sporty exercises or physiologic changes. During sporty activities, the structural and operational changes of left ventricle are more than the other parts of heart (2004, Vitartaite). The special exercise principle expresses body natural compatibility after the exercise depends on special kind of exercise. (2000, Kramer). The power exercise causes increasing production power, muscular hypertrophy specially in fast contraction fibers and also stimulation of many motional units with neural shaking (2003, Kramer). While endurance “exercise causes increasing cardiovascular operation aerobics capacity with changing in ratio of muscular fibres. Motional units in this exercise become active and involved alternatively, too (2000, Gravelle). Endurance and aerobic activities follow pattern of extroversion hypertrophy with volume overload effect on heart muscle.

Participant athletes in these activities enjoy diastolic end volume, left ventricular mass, ventricular capacity more bigger and myocardium contraction more stronger (Koc, 2007). On the other hand the changes pattern as a result of doing endurance exercises because of pressure overload happen in the form of introversion hypertrophy, increasing thickness of ventricular septums and non-increasing in ventricular cavities and stroke volume (2008, Henriksen: 2003, D’ Andrea). Exercise and body activity cause special tensions on muscle in different ways and according to the nature of pressure, muscles may be compatible differently (2000, Kramer). On the other hand body exercise as mechanical pressure can cause increasing biochemical changes in body (1999, Fallor).

Doing severe and longtime exercises without attention to time of proper recovery cause to hurt to the muscle fibres during contractions, intra analysis of skeletal muscle and connective tissues and with an inflammational response causes to penetrate macrophages, muscle fibres cytoplasmic and sytuzomic enzymes, releasing ALT and AST enzymes and

following of them the symptoms of pain, motional limitation and biochemical changes and muscle fibres spasm also happen (2004, Krstrup). At the time of incidence of muscular damage the enzymes such as (AST) Aspartat amino trancepheras and (ALT) Alanin amino trancepheras that are in muscular fibres increase in blood (2001, Paddon). There are a lot of AST and ALT enzymes in liver too. Lots of AST exist in other tissues like heart, kidneis, skeletal muscle and red blood cells.

But the ALT density is little in skeletal muscles (2008, Burger).

In fact increasing serum ALT and AST shows entrance muscular and hepatic enzymes to blood flow. So muscular damage can cause changing in density of these enzymes (1998, Nidden).

With due attention to importance of athletes cardiovascular system changes study in long time and muscular damages because of sportive pressure during athletes professional periods and as for few researches that were done in this case, so this research study cardiovascular risk factors and cyclist and body builder athletes hepatic enzymes.

## METHODOLOGY

The method of collecting data in this research is the kind of post event and it's aim is applicational. The persons who were

studied in this research were Jahrom city volunteer athletes that are contained 15 cyclists with age average  $31.60 \pm 3.175$ , size  $172.66 \pm 3.177$ , weight  $79.73 \pm 9.617$  and body mass index  $26.75 \pm 3.077$  and 15 body builders with age average  $31.20 \pm 6.625$ , size  $176.73 \pm 3.654$ , weight  $88.53 \pm 1.106$  and body mass index  $28.32 \pm 3.103$  and with minimum 3 years record of sporty.

## The methods of variables measurement

The weight and size of who were tested, was measured by hand balance and Japanese standard size of measurement set in the form of barefoot and minimum dress. (weight in scale of kg with precision 01 kg, size in scale of centimeter with precision 01 millimeter) and was recorded in data special paper. Then body mass index was counted by the ratio of weight (kg) to square of size. (meter)

Their systolic and diastolic blood pressure was measured by manometer and stethoscope after 10 to 15 minutes rest in the state of sitting on a chair.

## STATISTICAL METHODS

At first their features and research data was used by descriptive statistics in the form of table and graph. After the confirmation of both group data natural distribution (kelmograph smirneph test) the difference of data average was analyzed by T. independent test in meaningful level  $.05$ .

All of the statistical accounts were done by spss 18 software.

### RESEARCH FINDINGS

According to the research results there is meaningful difference between cyclist and body builder athletes systole blood pressure ( $p<.024$ ) and heart rate ( $p<.002$ ). while

there isn't any meaningful difference between cyclist and body builder athletes amounts of diastole blood pressure ( $p<.448$ ), Aspartat amino trancepheras hepatic enzyme ( $p<.374$ ) and Alanin aminotrancepheras hepatic euzyme. ( $p<.078$ )

variable	The average division	t	p
Systolic blood pressure	9.67	2.13	$\leq 0.042$
Diastolic blood pressure	2.33	0.77	$\leq .448$
Heart rate	9.4	3.412	$\leq .002$
AST	5.42	0.904	$\leq .374$
ALT	17.1	1.832	$\leq .078$

### DISCUSSION

Research findings about comparison of body builder group and cyclist group showed that body builder group has more systolic and diastolic blood pressure than cyclist group. Probably this is because of existence aerobic and endurance exercises in cyclists exercisable schedule. Endurance exercises cause to create excess luggage on heart. Although the septum of ventricle is fixed but the volume of heart cavities specially left ventricle increases.

As a result of this the filling volume and ventricular capacity increase while entered pressure in resistive exercises cause to increase the thickness of left ventricle septum and it's a factor of increasing systolic and diastolic blood pressure in comparison with endurance exercises (2008, Baggish) (2003, D'Andrea) (1993, Fleck). On the other hand the results of cyclist athletes resting heart rate was less than the

bodybuilders meaningfully. This probably is related to more amounts of diastolic end volume and strock volume. As a result of participation in endurance exercises, compatibilities such as increasing venus return and vag nerve excellence happen, because of this heart rate decreases (1998, Henriksen) (2005, Makan). The result of this research conformed to the researches of Makanet al (2005) and Henriksen et al (2008), kersu and Arcelanagage (2008), kooch et al (2007). They found that ventricle's dimensions and left atrium of professional and endurance athletes are bigger than the other athletes and others meaningfully. Contrary to these results, Tesk and his colleagues (2009) and Percingane and his colleagues (2007) expressed by cardiogram that despite of being proportional massive left ventricle, they can't find meaningful relationship in

systolic and diastolic blood pressure of intelligent athletes with others.

The results of research showed that there isn't any meaningful differences between hepatic enzymes ALT and AST in cyclist and body builder athletes. The severe sporty exercises outcome specially exercises with extroversion contractions cause muscular damage in skeletal muscles and increasing serum amounts of intramuscular enzymes like AST and ALT. In natural condition, there are a lot of AST and ALT in the cells like hepatic cells but when liver hurts, these enzymes are entered to blood flow (2007, pettersson). Severe sporty exercise causes damage in skeletal muscles and increasing muscular and hepatic enzymes that is defined by increasing serum amounts of their intracellular enzymes (2011, Beat). But because there isn't any meaningful difference between cyclist and body builder athletes and as for being normal in these amounts of enzymes between both comparative groups so we can get this result that probably it is because of being professional both sporty fields athletes and having proper recovery during their professional periods.

The results of research conform to Nissen and his colleagues (2009) and Pettersson and his colleagues (2007) that the efficacy of sever muscular activity (weight lifting)

on clinical chemical indexes representative of liver operation in men was studied and they indicated the ALT/AST indexes increased after sporty activity meaningfully. The research results also conform to Saengsinuwan et al (1998), Mashiko (2004), Clack son (2006), they knew that increasing hepatic enzymes is because of severe sporty activities but these results don't conform to Matsus et al (2006) that they didn't see meaningful changes as a result of such exercises.

## DISCUSSION

As for this research results, professional athletes in different sporty fields have different body factors according to the kind of activity, volume, severity and duration of exercise, increasing or reduction of every these factors shows damage or compatibility to that exercise.

Although hemodynamic pressure as a result of aerobic exercises and reduction of sympatic activity cause improvement of some cardiovascular indexes, blood pressure and heart rate. Pressure and damages as a result of severe and longtime exercises also can effect on indexes of muscle damage like ALT and AST.

Baggish AL, Wang F, Weiner RB, Elinoff JM, Tournoux F, Boland A, et al. Training-specific changes in cardiac structure and function: a prospective and longitudinal

- assessment of competitive athletes. *J Appl Physiol* 2008; 104 (4): 1121-1128.
- Bassett-Frey M, Doerr B, Laubach L, et al. Exercise does not change HDL-C in women after 10 weeks of training. *Metabolism*. 1996; 31; 1342-1346
- D'Andrea A, Caso P, Sarubbi B, Limongelli G, Liccardo B, Cice G, et al. Right ventricular myocardial adaptation to different training protocols in top-level athletes. *Echocardiography* 2003; 20 (4): 329-36.
- Durstine JL, Crouse SF, Moffatt RJ. Lipids in Exercise and Sport. In *Energy Yielding Macronutrients and Energy Metabolism in Sports*. CRC Press. 2000
- Elias BA, Berg KE, Latin RW, Mellion MB, Hofschir PJ. Cardiac structure and function in weight trainers, and runner / weight trainers. *Research quarterly for Exercise and Sport* 1991; 62 (3): 326-332.
- Fleck SJ. Magnetic resonance imaging determination of LV mass. *Med. Sci. Sports Exerc* 1993; 25: 522 – 527.
- Fringham L, Casazza A. Effects of exercise and training on lipid metabolism in young women. *Am J Physiol* 2002; 275 (5): 853 - 63.
- Fontaine K, Effects of amount and intensity of exercise on plasmalipoproteins. John Hopkins Medicine Arthritis Center; 2003
- Gaesser, G. A., Rich, R. G., 1984. Effects of high-ad low intensity exercise training on aerobic capacity and blood lipids. *Med Sci Sports Exercise* 16: 269-574.
- George KP, Gates PE, Birch KM, Campbell IG. Left ventricular morphology and function in endurance-trained female athletes. *J Sports Sci* 1999; 17 (8):633-42.
- Ji LL, Sonia B, Jose L, Sanchez Q, Liliana L. Oxidative stress during exercise: implication o antioxidant nutrients. *Free Radi Biol & Med* 2000; 18(6): 1079-86.
- Jurimae T, Karleson K, and Smirnore T. The effect of a single circuit weight traing session on the blood biochemistry of untrained university students. *Eur J Appl Physiol* 1990 ;61: 344 – 348.
- Kantor MA, Cullinane EM, and Sady SP. Exercise acutely increases high density lipoprotein cholesterol and lipoprotein lipase activity in trained and untrained men. *Metabolism* 1987; 36: 188-192.
- Kokkinos RF, Holland JC, Narayan P, Colleran JA, Dotson CO, Papademetriou V. Miles run per week and high-density lipoprotein cholesterol levels in healthy, middle-aged men .*Arch Intern Med* 1995; 155: 415-420
- Krause WE, Houmard JA, Duscha BD, Knetzger KJ, Wharton MB, McCartney JS. Effects of th Amount and Intensity of Exercise on Plasma Lipoproteins. *The New England J Med* 2002; 374: 1483-92.

- Lakka T, Salonen J. Physical activity and serum lipids: a cross-sectional population study in Eastern Finnish men. *Am J Epidemiol.*1992; 136:806-818
- Lennon DLF, Stratman FW, Shrago E et al. Total cholesterol and HDL cholesterol changes during acute, moderate intensity exercise in men and women. *Metabolism.* 1983; 32; 244-249
- Lemora L, Borillard A, and Andreacci J . lipid and lipoprotein profiles, cardiovascular fitness, body composition, and diet during and after resistance, aerobic and combination training in young women. *Eur J Appl Physiol* 2000;82: 451–458
- Linder CW, Durant RH, and Mahoney OM. The effect of physical conditioning on serum lipid and lipoprotein in white male adolescents. *Med Sci Sports Exerc* 1983;15:232-236.
- Manning J, Dooly-Manning C, White K, et al. Effects of a resistive training program on lipoprotein-lipid levels in obese women *Med Sci Sports Exerc.* 1991; 23; 1222-1226
- O'Donovan, G., 2005. Changes in cardio respiratory fitness and coronary heart disease risk factors following 24 WK of moderate-or high-intensity exercise of equal energy cost. *J Apple Physiol* 98: 1619-1625.
- Olson TP, Dengel DR, Leon AS, Schmitz KH. Changes in inflammatory biomarkers following on year of moderate resistance training in overweight women. *Int J Obesity.* 2007; 31 (6): 996-1003.
- Park DH, Ransone JW. Effects of submaximal exercise on high density lipoprotein cholesterol sub fractions. *J Sports Med* 2003;24: 245-251.
- Perseghin G, De Cobelli F, Esposito A, Lattuada G, Terruzzi I, La Torre A, et al. Effect of the sporting discipline on the right and left ventricular morphology and function of elite male track runners: a magnetic resonance imaging and phosphorus 31 spectroscopy study. *Am Heart J* 2007; 154 (5): 937-42.
- Ready E, Drinkwater D, Ducas J, et al. Walking program reduces elevated cholesterol in premenopausal women. *Can J Cardiol.* 1995;11; 905-912
- Stone, M. H., Fleck, S. J., Triplett, N. T., 1991. Health- and performance-related potential of resistance training. *Sports Med* 11: 210–231.
- Strasser B, Siebert U, Schobersberger W. Resistance training in the treatment of the metabolic syndrome: a systematic review and meta-analysis of the effect of resistance training on metabolic clustering in patients with abnormal glucose metabolism. *Sports Med.* 2010; 40 (19): 397-415.
- Szmedra L, LeMura L, Shearn W. Exercise tolerance, body composition and blood

lipids in obese African-American women following short-term training. *J Sports Med Phys Fitness*. 1998; 38; 59-65

Williams P. High density lipoprotein cholesterol and other risk factors for coronary artery disease in female runners. *N Eng J Med*. 1996; 334; 1298-1303

William, E., 2003. Effects of the amount and intensity of exercise on plasma Lipoproteins. *N Engl J Med* 347: 1483-1462.

Williford HN, and Blessing DL. Exercise training in black adolescents change in blood lipids and vo2 max. *Ethnic Disease*1996; 6(3-4): 279-285.