The effects of two-week program of individually measured physical activity on insulin resistance in obese non-insulin-dependent diabetes mellitus

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Introduction
It is well known that under the influence of regular, individually dosed aerobic physical activity, it is possible to raise insulin sensitivity (M/I) in obese insulin resistant non-insulin-dependent diabetes mellitus (NIDDM) by several mechanisms: increasing the number of insulin receptors and their sensitivity. Activation insulin signaling, at the level of insulin receptors, it is activated phosphatidylinositol-3 kinas (PI3K) activity, increasing glucose transporters GLUT-4 on the level of cell membrane and increasing the metabolism of glucose. The aim of study is to investigate if there is connection between insulin sensitivity increased and increased aerobic capacity (VO2)max after aerobic training program.

Methods
In 10 NIDDM patients 47,6±4,4 years of age (group E), in the 14-days period, program of aerobic training was applied (10 sessions - 35min of walking on treadmill, intensity 60,8±5,7% (VO2)max, frequency 5 times a week), as well as 1600 kcal diet. At the same time, other 10 NIDDM patient 45,9±5,5 years of age (group C) were on 1600 kcal diet. Before and after this period the following was measured in both groups: insulin sensitivity (M/I) by the method of hyperinsulin euglicemic clamp and (VO2)max by Astrand test on ergocycle. Intensity of the load borne was acting by according target heart rate reserve (THRR) method, using Karvonen formula. During sessions of physical activity it was apply, intensity of the load on treadmill which respond 45-55% THRR in the periods of warm and cooling and 55-70% THRR in a periods of main session.

Results
In the contrast to the group C, in the second testing of E group subjects a significant increase was obtained in M/I (1,23±0,78 vs. 2,42±0,95 mg/kg/min/mU p<0,001) as well as the increase of (VO2)max (26,34±4,26 vs.29,16±5,01 ml/kg/min p<0,05).In the correlation analysis it was established that the coefficient of linear correlation was statistical significant between this two parameters (r=0,75 P<0,05). A higher degree of significance was obtained in comparison of increase insulin sensitivity and average intensity of the load borne (r=0,88 p<0,001). Between the intensity of the load borne and the increase in maximal oxygen uptake no statistical significance was established (r= 0,23 p=0,41).

Conclusion
The results show, that 2 - week program of aerobic training had the significant influence on insulin resistance decrease and aerobic capacity increase in NIDDM. Connection between the intensity of the load borne and increase of insulin sensitivity after aerobic training was not dependent of realized increased (VO2)max.

References