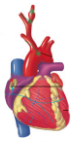

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EXERCISE AND TYPE II DIABETIS

BY:

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ABSTRACT AND INTRODUCTION

BACKGROUNDS: In this study we analyzed the role played by aerobic exercise (AE) and resistance exercise (RE) training in the plasma lipoprotein profile , HDL , ability to remove cholestrol from macrophages, inhibit LDL oxidation in type II diabetes mellitus (DM) patients and control subjects, in the fasting and postprandial states .

METHODS:

Healthy controls (HTC, N 15; 4 M/11 f) and subjects with type II diabetes mellitus (DMT, N=11; 3M/8F) were engaged in a 4 months aerobic, resistance training programs , and compared with a group of sedentary subjects with type II diabetes mellitus (DMT, NO=10; 4M/6F) all groups were submitted to an lab test to analyze all parameters, both at the beginning of the investigation protocol (BASAL) and at the end of the study period (Final).

RESULTS:

EXERCISING improved body weight, body mass index[1-2-7] (BMI), lean body mass, total cholestrol[4] ,decreased LDL, increased HDL , decreased triglycerides (TG), glucose increased[6-9-10-11] insulin , but it reduced (size) waist circumference, in sedentary with type II diabetes no body any changes was happened.

In healthy control with diet all parameters unchanged. our experiences showed diet and combination of (AEROBIC,RESISTANCE) exexcise had excellent results after 4 months of our program.

CONCLUSION:

Our results showed that aerobic exercise could be able to correct many parameter (LIKE) HDL efficiency against LDL oxidation and favors HDL maturation. These findings were in dependent of changes in insulin resistance and of the rise of plasma HDL cholestrol concentration.

KEY WORDS

Diabetes mellitus, type II diabetes, non insulin dependent diabetes mellitus, resistance training, strength training, physical activity and exercise, anaerobic training for diabetes, glucose homeostasis.

Resistance training and type II diabetes

INTRODUCTION:

Aerobic exercise has consistently been shown to improve:

1. Glucose control[1-2-4-5-10-12-16-17].
2. Enhance insulin sensitivity[33].
3. Cardiovascular problems.
4. Improve adiposity.
5. Lipid profile[7-23-24-26].
6. Arterial stiffness.
7. Endothelial function[34-36].

Consistent with this evidence, the American[1-2] diabetes association (ADA) recommends that individuals with type II diabetis perform at least 150/min of moderate – intensity aerobic exercise and / or at least 90 min of vigorous aerobic exercise per week.

Although a life style modification of this nature could have substantial impact on the metabolic and cardiovascular health of this population, it/is/often difficult for those who have been habitually sedentary to adhere to these guidelines. Indeed, a recent population based study found that only %28.1 of individuals with type II diabetes achieve these recommendations. For individuals with severe obesity, arthritis, hypertension, physical disabilities, diabetic foot, psychotic problems, coronary artery disease and over all diabetic complications even walking[43-45-46-47] for 20 – 30 min may be challenging uncomfortable and or painful to perform. With the continued increase in the prevalence of type II diabetes, it is evident that alternate forms of physical activity that produce similar metabolic improvements to aerobic exercise may be beneficial in the management of this disease.

Resistance training has recently been recognized as a useful therapeutic tool for the treatment of a number of chronic diseases and has been demonstrated to be safe and efficacious for the elderly and obese individuals. Similar to aerobic exercise, Resistance training has been reported to enhance[49-50-51-52] insulin sensitivity,blood sugar levels, HB A1c, daily energy expenditure and qualityof life. Furthermore, resistance training has the potential for increasing muscle strength , body mass index (BMI) , lean muscle mass, bone mineral density ,Which could enhance functional status and glycemic control and assist in the prevention of sarcopenia, osteoporosis, bone fracturs, depression, however, unlike aerobic exercise , such as walking , running , resistance

training is dependent on equipment, knowledge of exercise technique, and always requires some initial instruction.

Subsequently, if resistance training is going to be a realistic from of exercise for individuals with type 2 diabetes, research[16-17-52-54] is needed to discover practical, sustainable, and economically viable ways to safely implement resistance training at a population level. There fore, the primary aim of this review was to examine the available literature to investigate whether resistance training is an effective form of exercise for managing glucose homeostasis in individuals with type 2 diabetes. Furthermore, a secondary aim as to also consider strategies and area for future research to assist with the implementation of resistance training at the population level.

MATERIAL AND METHODS

The effect for resistant training appeared after one or two months. Combination of anaerobic exercise, aerobic exercise[5-7-9-10-11-17-24] had better results. RT[1], AEROBIC training (AT) had different results in different people due to age, gender, toleration, resistance, previous history of exercise, body mass index (BMI), obesity, personality, associated diseases, arthrosis, BS levels, loss of 300 to 500 kcal each session or 2000 Kcal /Week was obligation.

Changes in HBA1C, body mass index, Lean body mass, fat mass, HDL, LDL, glucose transferase 4 protein (GLUT4 P)[36-38-56], total body water (TBW), Vo2max, FVC[2], blood sugar levels before and after exercise was important. Erikson et al, demonstrated that 3 months of moderate intensity circuit (RT) decreased A1C due to improvements in lean body mass, as a strong inverse correlation was observed between A1C and muscle crossectional area posttraining. Similarly honkola et al, reported that 5 months of progressive circuit resistance training significantly lowered LDL cholestrol[26] and reduced fasting triglycerides compared with a non exercising comparsion group.

1. RT (Resistance training)
2. Force vital capacity

RESULTS

Early studies offered preliminary evidence for the beneficial effects of resistance training[1] , however, these studies often had significant methodological limitations. Our method showed that 3 month of moderate – intensity circuit resistance training decreased A_1c from 8.8 to 8.2%. This reduction in A_1c was likely due to improvements in lean[54-64] body mass, as a strong inverse correlation was observed between A_1c and muscle crossectional area post training. 5 months of progressive circuit resistance training significantly lowered LDL[23-26] cholestrol and reduced fasting triglycerides compared with a none exercising comparison group. Even though no significant reduction in A_1c was observed, the difference in A1c between the exercise and comparsion groups pre-to post intervention was significant. Moderate- intensity circuit resistance training significantly reduced the plasma insulin response to glucose ingestion during an oral glucose tolerance test, which led to improved self monitored blood glucose measurements.

We demonstrated that the glucose disposal rate measured by hyperinsulinemic – euglycemic clamp increased %48 with high – volume (5 times/week) moderate – intensity resistance training perpormed for 4-6 weeks compared with a nonexercising control. However, no statistical chang in A1c was observed. The nonsignificant change in A1c can likely be explained by the SHORT DURATION of training used, which may not have allowed the full effect of the intervention on A1c to occur, may be due to an INSUFFICIENT INTENSITY or volume of resistance[1-2] training to optimally change body composition. We investigated the effects of a longer, higher intensity resistance training intervention. We randomized 36 overweight older men and women (aged 50 – 75 years) into a progressive resistance training plus moderate weight loss (RT + WL[2]) group or a moderate (WL) control group who only performed flexibility exercise. A great reduction in A1c was observed for RT+WL group compared with weight loss alone.

This finding was observed without any difference between groups for waist circumference or total fat mass. The (WL) only group ended to lose lean body mass while the (RT +WL) group ended to increase lean body mass . In our study in the (RT) group , A1c was reduced from 8.7 to 7.6 % , while muscle glycogen storage increased. In contrast , the control group showed no change in A1c and a 23 % reduction in muscle glycogen storage.

1. Resistance training = RT
2. WL = Weight loss

DISCUSSION

Exercise is very important in managing type II diabetes[1-2-4-6-7-10-11-16]. Combining diet, Exercise and medicine (when prescribed) will help control your weight and blood sugar level. Exercise help control type II diabetes by:

1. Improving your body ´s use of insulin.
2. Burning excess fat[26] , helping to decrease and control weight (decresed body fat results in improved insulin sensitity).
3. Improving muscle strength[26].
4. Increasing bone density and strength.
5. Lowering blood pressure[52].
6. Helping to protect against heart and blood vessel disease by lowering "BAD" LDL cholesterol and increasing "GOOD" HDL cholesterol [4-7].
7. Improving blood circulation and reducing your risk of heart disease.
8. Increasing energy level and enhancing work capacity[1-2].
9. Reducing stress,promoting relaxation and releasing tension and anxiety.

Exercise significantly improves glycaemic control and reduces visceral adipose tissue and plasma triglycerides , but not plasma cholesterol , in people with type II diabetis even without weight loss.

10. Improves baroreflex sensitivity.
11. Improves coponary artery disease by regulating protein (telomers) and by release of nitrous oxide and collateralization[44-45-46].

CONCLUSION

Combined resistance and aerobic training in our experiences got the best results[1-2-5]. Combined resistance and aerobic training would have a synergistic effect on glycemic control in individuals with type II diabetes has been addressed by a number of studies. Maiorana etal, used a prospective randomized cross-over protocol to demonstrate that circuit training, with combined stations of aerobic and resistance training, significantly improved both peak oxygen consumption and muscular strength[10]. Additionally, A1c (8.5 ± 0.4 to 7.9 ± 0.3 %) and fasting glucose were significantly reduced. Data from the same sample in a later publication also showed that combined training enhanced conduit and resistance vessel endothelial[11] function, as demonstrated by improvements in brachial artery flow-mediated dilation and an improvement in the forearm blood flow ratio to acetyl choline. Although these data supplied evidence for the beneficial use of combined training. More specifically, compared with a non exercising comparsion group, A1c was significantly reduced from 8.3 to 7.1 %, fat mass was reduced %2.5, while lean mass was increased %0.4 .

In our studied, fasting blood glucose, LDL[23], cholestrol, total cholesterol were significantly reduced, while HDL[24] cholestrol was increased. Farther more, these finding also identify that longer – duration, more moderate resistance training may be as beneficial as short – term high – intensity programs for maintaining glucose homeostasis and reducing cardiovascular risk factors. Our experiences, American college of sports medicine, sigal et al, all recommended that resistance training should be/ performed with all the major muscle groups three time a week, progressing to 8 – 10 repitation to near fatique. In our idea high – intensity resistance training improve A_1c, whereas studies using lower intensities have not found consistent improvements in this parameter.

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