

## EDITORIAL ARTICLE

## EXERCISE AND DIABETES MELLITUS

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**D**iabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia which is strongly associated with short and long term health complications. This disorder is classified according to its etiology in type I or Insulin-Dependent Diabetes Mellitus (I.D.D.M) and type II or Non Insulin Dependent Diabetes Mellitus (N.I.D.D.M). The etiology of type I diabetes mellitus is the auto-immune destruction of the  $\beta$  cells of the pancreas that secrete insulin, whereas the etiology of type II are insulin resistance and insulin secretory defect.<sup>1,2,3</sup>

Diabetes mellitus consists a growing public health problem in both developed and developing countries. Despite effective drug treatment and improved clinical diagnosis, the incidence of diabetes has dramatically been increased and according to statistics, the number of patients with diabetes mellitus will increase worldwide from 171 million in 2000 to 366 million in 2030.<sup>1,2,3</sup>

According to the literature, the interaction between individual genetic susceptibility and environmental factors, such as adoption of a sedentary lifestyle, obesity, unhealthy dietary choices or excess of energy intake, significantly contributes to the rapid increase of diabetes mellitus worldwide. Treatment of diabetes includes a combination of exercise, proper diet, medication, and daily self-care.<sup>1,2,3</sup>

Regarding exercise, over the last decades, many researchers have concluded that regular structured physical activity, under the supervision of exercise specialists, should be an integral component of diabetes care, since it has potential benefits in the prevention and treatment of this metabolic disorder. Exercise training exerts pronounced effects on glucose control and

tolerance, insulin sensitivity and insulin requirements. Additional benefits of exercise are associated with physiological and metabolic abnormalities related to diabetes such as weight management, blood pressure reduction, physical work capacity, improved lipid profile and improved well-being.<sup>1,2,3</sup>

Complete physical examination and extensive medical evaluation for the cardiovascular, nervous, renal and visual system are fundamental prerequisites before initiating an individually designed regular exercise program. Furthermore, before enrollment in an exercise program, diagnose of retinopathy, microalbuminuria, peripheral and autonomic neuropathy in these patients is of great importance in order to prevent future complications. In such cases exercise protocol should be modified accordingly to the individual's needs.<sup>1-4</sup>

According to the American College of Sports Medicine, the basic elements for exercise prescription are:

Frequency: 3-4 d/wk

Duration: 20-60 minutes

Intensity: 50%-80% $VO_2$ max or heart rate reserve (HRR).

Relevant research studies also suggest that an exercise program should be consisted of moderate intensity aerobic exercise. For resistance training is recommended lower intensity and lower resistance which should only be performed by individuals without proliferative retinopathy or hypertension.<sup>4,5</sup>

The most common risk factor for patients with diabetes who follow an exercise program is hypoglycemia, that may occur not only during exercise but also after its completion. The most essential steps to prevent hypoglycemia, associated to

exercise, is monitoring plasma glucose level prior and following exercise, avoiding insulin into exercising limbs and finally taking into account the consumption of carbohydrates.<sup>4,5</sup>

Regular exercise should be an integral part in the therapeutic target of diabetes mellitus but only when is planned according to each individual's needs. Proper motivation and adherence to such exercise programs are also crucial for the outcome of exercise treatment.

### Bibliography

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