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Diabetes Mellitus Type II

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1. What is Diabetes Mellitus Type II (DM II)? What is the standard treatment protocol for patients with DM II? Based on your research, what percentage of the treatment is exercise-based, and why?

Diabetes mellitus type II (DM II) is a metabolic disorder depicted by high blood sugar (hyperglycemia) that results from insulin resistance or low levels of the hormone (Shimizu et al., 2012). It is different from diabetes mellitus 1 (DM I) that is characterized by absolute lack of insulin resulting from the breakdown of islet cells of the pancreas. The common symptoms include constant hunger (polyphagia), frequent urination (polyuria), and increased thirst (polydipsia) (Shimizu et al., 2012). This condition accounts for about 90% of diabetes cases while gastro-intestinal diabetes and DM I make up the remaining 10%. Obesity is the primary cause of DM II in individuals who are genetically predisposed to the condition (Shimizu et al., 2012).

DM II has no cure, and its treatment focuses on maintaining normal levels of glucose, eliminating symptoms and slowing the development of complications. Blood glucose should be maintained in the range of 90-130 mg/dl while glycated hemoglobin levels should not exceed than 7% (Frier, Heller & McCrimmon, n.d.). Nonetheless, focus on glucose levels alone does not provide an effective treatment for the condition. As such, DM II patients are encouraged to adhere to lifestyle interventions such as proper diet and exercise. Both take up to two-thirds of the treatment plan, in fact, greater amounts of exercise yield better results. For instance, aerobic exercise decreases the amount of glycated hemoglobin and improves insulin sensitivity (Frier, Heller & McCrimmon, n.d.).

2. High-intensity, short-duration cycling was shown in the documentary to increase (i.e., restore) insulin sensitivity in just a few weeks. What other types of high-intensity, short-duration training do you think would be as efficacious? Why?

High-intensity training (HIT) involves strategic and alternating periods of exercise that provide enhanced athletic condition and capacity, glucose metabolism, and fat burning (Sigal, Kenny, Wasserman, Castaneda-Sceppa & White, 2006). It improves insulin sensitivity as well as cardiovascular factors such as endothelial functions, arterial stiffness, and visceral adiposity. Aerobic exercise, running, cycling, swimming and resistance training are some of the common and effective forms of intense workout. According to the American Diabetes Association (ADA), individuals with DM II should perform 90 or 150 minutes of intense or moderate (respectively) aerobic exercise per week (Umpierre et al., 2011). However, it is often difficult for people who have are routinely inactive to follow these guidelines despite the significant impacts on health. For instance, diabetic people with severe arthritis, obesity and physical disabilities, can experience difficulty or pain to walk or train intensively for 20 minutes (Umpierre et al., 2011). Considering the increase in DM II prevalence, alternate forms of high-intensity training will be beneficial in the management of the condition for individuals who are habitually sedentary (Umpierre et al., 2011).

Resistance training offers HIT that has the potential to improve glycemic control and prevent osteoporosis and sarcopenia by increasing lean muscle mass, muscle strength, and bone mineral density (Sigal, Kenny, Wasserman, Castaneda-Sceppa & White, 2006). However, unlike aerobics, resistance training depends on knowledge of exercise technique as well as equipment, and may require initial instructions. As such, there is a need to find practical, sustainable as well as economically feasible ways to implement resistance training efficiently and safely at a

population level for persons with type 2 diabetes, (Sigal, Kenny, Wasserman, Castaneda-Sceppa & White, 2006).

3. Find research data on long, slow walks at night to reduce blood lipid levels. Is this a better, more convenient form of treatment for DM II patients? Why?

Walking, particularly after dinner, significantly helps to reduce the blood lipid and sugar levels in the body (Parpa, 2008). More so, it enhances digestion and burns calories. Recent studies indicate that night walks increase High-density lipoprotein (HDL) cholesterol while reducing artery-clogging Low-density lipoprotein (LDL). Although one can have short (10-20 minutes) walk or long (20-40 minutes), various studies have found that the latter leads to bigger drops in the level of blood lipid. According to Parpa (2008), burning 800 to 1200 calories per week through walking raises the levels of HDL. For instance, walking at a relative pace of three miles per hour can burn approximately 300 calories; if one walks for 40 minutes, three times a week; he or she expends over 1,000 calories (Parpa, 2008). Exercises such as walking and swimming stimulate enzymes that facilitate the breakdown of LDL in the liver, thus, lowering its amounts in the blood. In the liver, cholesterol is converted into bile or excreted. Therefore, the long periods of walking help expel more blood lipids (Parpa, 2008). In addition, exercise increases the size of protein particles that transport lipids through the blood. This increase is important since small dense lipid particles can easily accumulate on the linings of blood vessels. Therefore, night walks provide a convenient alternative for diabetic individuals who have severe conditions that limit them from engaging in intense training activities.

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