209 - MAIN ASPECTS IN THE PHYSICAL EXERCISE PRESCRIPTION FOR TYPE 2 DIABETES MELLITUS

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The word diabetes comes from a Greek word with the meaning of "passing through" and mellitus is the Latin word which meaning is "honey" or "sweet". Reports about the disorder can be accompanied by the first century AD, when Arete of Cappadocia described the body as a chronic disease characterized by intense thirst and bulky and sweety urine: "The flesh is dissolving in urine." It was the discovery of insulin by Banting and Best, in 1922, which changed the natural history of disease (Porth, 2002). The first reports of DM 2 occurred 3000 years BC, with the Egyptians, when it was observed an increase in urination for some individuals. Only later, already in Greece, around the second century it was known as diabetes. In the centuries V and VI Indians discovered a urine with a high sugar content, to realize that the secretion drew the ants (Porth, 2002). For the Brazilian Consensus on diabetes (2003), DM is considered a syndrome of multiple etiology, due to lack of insulin and or the insulin inability to properly exercise its functions and effects. Characterized by hyperglycemia with chronic disorders of the metabolism of carbohydrates, lipids and proteins, is closely linked to chronic complications and failure of several organs, particularly the eyes, kidneys, nerves and peripherals blood vessels and often is accompanied by other diseases such as hypertension, dyslipidemia and endothelial dysfunction.

According to WHO (2006), it is estimated that, throughout the world, 987,000 deaths in 2002 occurred on account of diabetes, representing 1.7% of overall mortality. The DM 2 is the third cause of mortality in the world, or else, it is believed that, 7.6% of the population suffer from the disease.

In Brazil, according to Melo, Giannella and Souza (2003), there are currently about 12 million Brazilians diabetics. It is estimated that these, 7.8 million people have the diagnosis confirmed and another 4 million are undiagnosed. During 1997, the mortality rate for diabetes in Brazil was 17.24%, it represents 27,515 people who died for this pathology.

According Wild and Collaborators cited by Lyra, and Oliveira Cavalcanti (2006), which currently say the diabetes affects approximately 171 million individuals across the globe, could have a projection to reach 366 million people in the year of 2030, the prevalence jumping the current 2.8% in 2000 to 4.4%.

For Pinhas-Hamiel cited by Gabbay, Cesarini and Dib (2003), reported that there is a large increase in the incidence of diabetes in adolescents, with similar features of DM 2 of the adult population. Recorded an increase of ten times in the incidence of DM from 1982 to 1994 among adolescents in urban areas of Cincinnati (USA). In 1994 the DM 2 corresponded to 33% of cases of newly diagnosed DM in individuals aged between 10 and 19 years.

To try an improvement in these incidents, studies report that preventive measures are effective in reducing the unfavorable impact on mortality in diabetic patients, mainly due to be able to avoid the cardiovascular complications. According to the Brazilian Consensus on Diabetes (2003), prevention also means more effective efficiently health care. This can be done by preventing the start of DM (primary prevention) or its acute or chronic complications (secondary prevention). Primary prevention protects individuals susceptible to develop DM. She has an impact by reducing or delaying both the need for health care and to treat the complications of DM 2.

According to Knowles and Collaborators (2002), emphasize in particular that the adoption of healthy lifestyle, with balanced diets and regular exercise, can reduce the incidence of DM 2 in 58% of people with high risk for the development of diabetes, but reported that 60% to 80% of individuals with diabetes do not follow the minimum requirements for health maintenance.

The DM 2 is an endocrine disease. It is characterized by high levels of blood glucose. This hyperglycemia is due to poor uptake of glucose, consequent to the tissue to insulin resistance is closely linked to android obesity, pre-provision inherited, unhealthy living habits and sedentary lifestyle (Vancini and Lira, 2004). As Forjaz and Collaborators (1998), secretion of insulin from pancreatic tissue to increase glucose, or even delay in its synthesis promoting a state of transition and prolonged hyperglycemia. It is known that there are still many situations, including obesity, which affects the peripheral muscle sensitivity to insulin secreted, or else, delayed response to glucose intake by the body.

Another proposed theory is that the insulin resistance and increased production of glucose in obese people and bearers of DM 2, occurs by increasing the concentration of FFA (free fatty acids). The slight increase in insulin can lead to activation of the lipase of fat cells and therefore increase the concentration of FFA in the bloodstream. With so many consequences may occur as the stimulation of increased secretion of insulin. This is because FFA act at the level of beta cells, reducing the glycogen synthase and reduce the synthesis of glycogen. The FFA are mobilized by lípase lipoprotein. Acting at the level of peripheral tissues, the increase in FFA prevents the uptake of glucose because it complicates the addition of insulin to its receptor. As the circulating glucose is not captured by the liver it is converted into glycogen, the hepatocytes believes that lack glucose and starts the process of synthesis of glucose further increasing blood glucose and its repercussions (Bodero said Porth, 2002).

One of the main factors that influence the development of cardiovascular disease is the DM 2, where the cells can not use glucose efficiently transforming it into an energy source, but, instead, seek energy into fat for prevention of use of glucose available. These lipids mobilized increase the chance of deposition in the arterial wall leading to the process of atherosclerosis and impairment of the fundamental principle of life that is the vascular permeability and maintaining uninterrupted movement of the noble organs (Silverthorne, 2003).

Since the early 50's, the first therapy for individuals with DM 2 is the exercise and weight loss. The exercises reduce hyperglycemia once in exercising skeletal muscle becomes more efficient uptake of glucose in circulating through the mobile complementary. In many people the DM 2 are not expressed by symptoms, or else, it is asymptomatic in the process of diagnosis, with that people who develop the disease do not usually make drastic changes in lifestyle and food, waiting for symptoms to seek aid and most significant behavioral changes.

The care of individuals with DM 2 includes the following strategies: feed re-education, changes in living habits, suspension of smoking, if the individual smokes, regular physical activity and in case of making the use of medicine, to measure the glycemic index before and after each session of exercises (Brazilian Consensus on Diabetes, 2003).

As Cambria and Collaborators (2006), argue that the treatment of DM 2 also can come through changes in eating

habits, drug treatment and use of insulin and regular physical activity. They argue that physical exercise, most recommended are the aerobic, because we know that they are more specific to the use of fatty acids.

For Vívolo and Ferreira (2002), are also under the care for treatment in diabetic individuals, through the use of medicines, food balanced diet and regular physical activity, emphasizing that these principles are critical in the success of treatment. They argue further that regular exercise can bring many benefits to the life of the individual patient as: reduction in weight, reducing the need for oral anti-diabetes, decreased insulin resistance, improvement in glycemic control, and consequent reduction of major complications.

However, a large proportion of the population is inactive or their exercise levels are insufficient to achieve satisfactory results. About 60% to 80% of people with diabetes do not follow the minimum requirements for health maintenance, without emphasizing individuals who is given training programs in the early months of accession (Vancini and Lira, 2004).

The practice of physical exercise is very important to any individual. The sedentary lifestyle is detrimental to health, a fact that proved scientifically. Exercise, be it aerobic or endurance with weight, has advantages in improving the physical abilities, such as muscle strength, bone density, body flexibility, cardiovascular endurance, metabolic fitness, in addition to the improvement of cognitive and emotional capacities. The additional benefits for individuals with DM 2, which are scheduled to practice habits of physical exercise may be the short-term and long-term. In short term we can cite increased action of insulin, increasing the uptake of glucose by muscle, the glucose uptake in the post-exercise; decline in the rate of glucose and increased sensitivity to insulin cell (Katz, 2007). The American College says that the benefits of physical activity whether acute or chronic are very significant, but the benefits of exercise are much more numerous chronic (ACSM, 2003).

The stimulus to the practice of physical exercise is extremely important, because in addition to facilitating the control of weight, increases the sensitivity to insulin, increasing its anti-lipemiantes, lowering the levels of triglycerides and enhancing the values of HDL-C. Activities must be individualized, promoting satisfaction and well-being, to promote a decrease in body weight and normal blood glucose levels. The stress associated with a pre-depressive provision may be an imminent risk in the onset of DM 2 (Lyra, and Oliveira Cavalcanti, 2006).

The regular aerobic exercise significantly improve the metabolic and hormonal changes for both healthy subjects and in ill of DM 2. During the exercise the muscle contraction increases the translocation of GLUT4 independent of the availability of insulin or not. The hypothesis can be better understood when you understand the depolarization of myofilaments of myosin and actin, a mechanism that also has the function mediator in the transport of glucose into the cells (Gomes, Roger and Tirapegui, 2005).

According to Hayashi and colleagues (1997), in recent years there has been considerable progress in understanding the molecular basis for the significant effects of exercise on glucose uptake in skeletal muscle. We know that the GLUT-4 has a primary role in regulating the transport of glucose in the muscles during the exercise, although in the exercise-induced translocation through the mechanism of GLUT-4 was not very clear, we are starting to gain an understanding of this phenomenon. It is clear that exercise and insulin use different paths that lead to the activation of glucose transport in the skeletal muscle, while perhaps explaining why patients with insulin resistance normally can enable the transport of glucose into muscle with exercise, but not with insulin.

The moderate-intensity exercise can improve the results of glycated hemoglobin examinations, the more glucose there is in the blood of the individual greater will be the glycated hemoglobin, these effects can help in the maintenance of body mass. The glycated hemoglobin remains 3 to 4 months in the movement, important parameter to monitor blood glucose of the individual bearer of DM 2 after a period of regular training. Levels of glycated hemoglobin, must be kept below 7% in people with type 2 DM. The levels are below the suggested upper limit of normal (Curuá and Collaborators, 2002).

The benefit of exercise on the insulin sensitivity is demonstrated in both aerobic exercise and the resistive exercise. The mechanism by which those rules of exercises to improve sensitivity to insulin seems to be different, making believe that the combination of the two types of exercise can be beneficial in maintaining health. (Guimaraes and Ciolac, 2004).

As ACSM (2003) soon after finishing the physical activity, the muscle continues to capture glucose, with efficiency, in order to reconstitute the muscle and liver glycogen and return the balance of the body, hypoglycemia may occur up to 48 hours after finalization of the exercise.

The effect of exercise on the insulin sensitivity has been shown between 12 and 48 hours after the session of physical exercise, but back at pre-activity in three to five days after the last session of physical exercise, which reinforces the need to practice physical activities frequently and regularly. (Guimaraes and Ciolac, 2004).

However the man has not used the available time for maintaining the physical mobility necessary to preserve the plastic body and health. So we can say that the man still did not understand the principle of maintaining the health body. The physical mobilization, so, physical exercises are so necessary for the health and livelihood healthy as the air we breathe.

This immobility has as a consequence, obesity which in turn leads to degenerative diseases such as diabetes, dyslipidemia, hypertension and atherosclerosis.

The only effective way to prevent diabetes is regular physical activity to maintain a balance with metabolic body weight maintenance. The diet and medication up the current therapeutic scheme. What we note is the people are aware of the importance of physical activity, but the permanence of regular exercise is no more than 10%. There are still distortions in the direction of appropriate exercise for professionals who are not properly trained.

It is important to denounce the lack of a political project in the area of physical activity that might involve people and maintain a practice of regular physical activity. There is no doubt that this is a political lack of vision in public health. It is very interesting and cheaper to maintain the healthy individual, and therefore active and especially productive, than limited and weak from the fifth or sixth decade of life resulting degenerative diseases.

Technically physical activity in diabetic requires some care especially in the prevention of hypoglycemia. It is known that, as it exercises, there is a tendency to metabolize more quickly the glucose, which reduces by 30% in the need for medications. These facts place us in front of a fundamental responsibility in guiding the correct exercise in diabetic. As any student who starts a program of physical activity, we need a medical evaluation and physical ability, aimed at appropriate prescribing and consistent as their needs, in addition to the prevention of unpleasant and embarassing situations as lipothymia and syncope.

Key words: Type 2 Diabetes Mellitus, Aerobic Exercise, Resistance Exercises with Weights and Prescription.

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MAIN ASPECTS IN THE PHYSICAL EXERCISE PRESCRIPTION FOR TYPE 2 DIABETES MELLITUS
SUMMARY:

The purpose of this review is literary highlight the main concepts of type 2 diabetes mellitus (DM 2) and the main physical activities recommended. The DM 2 is currently a major problem for public health in their diagnosis, treatment and control. The DM 2 causes serious health complications among them: hypertension, cardiovascular disease and dyslipidemia. There are several factors to trigger the pathogenesis between them the main are: racially, hereditary, sedentary lifestyle and stress. It is known that regular physical activity, whether aerobically or resisted weighing, in association with a balanced diet, are important factors for the control and maintenance of glycemic levels of the individual. Recent research prove that the regular practice of moderate aerobic physical activity and resisted weighing associated with a balanced diet reduces the incidence of DM 2.

Key words: Type 2 Diabetes Mellitus, Aerobic Exercise, Resistance Exercises with Weights and Prescription.

ASPECTS IMPORTANTS DANS LA PRESCRITION DE L´EXERCICE PHYSIQUE POUR LE DIABÈTE MELLITUS TYPE 2

RÉSUMÉ:

L´objectif de cette révision littéraire, c´est de mettre en relief les principaux concepts du Diabète Mellitus type 2 (DM2) et les principales activités physique recommandées. Actuellement le DM2 est un grand problème pour le salut public concernant son diagnostic, contrôle et traitement. Le DM2 provoque des sérieuses complications à la santé comme la hypertension artérielle, les maladies cardio-vasculaires et la dislipidemie. Il y a plusieurs facteurs qui peuvent déclancher la pathogénie, et les principaux sont: les raciaux, les héréditaires, la vie sédentaire et le stress. On sait que la régularité de l'activité physique, soit l'aérobie soit la résistée à poids, alliée à une diète balancée, sont des facteurs importants pour le contrôle et le maintien des niveaux glycémiques de l'individu. Des récentes recherches ont démontré que la pratique régulière de l'activité physique aérobie moderée et la résistée à poids, associée à une diète équilibrée diminuent l'incidence du DM2.

Mots-clés: Diabète Mellitus type 2, Exercice aérobie, Exercice Résisté à Poids et Prescription.

ASPECTOS IMPORTANTES EN LA PRESCRIPCIÓN. DEL EJERCICIO FÍSICO PARA EL DIABETES MELLITUS TIPO 2

RESUMEN:

El objetivo de esta revisión literaria es estar parados de los principales conceptos del Diabetes Mellitus tipo 2 (DM 2) y las actividades físicas recomendadas. El DM 2 es actualmente un problema importante de salud pública en su diagnóstico, tratamiento y control. El DM2 causa graves complicaciones de salud, entre ellas: hipertensión arterial, enfermedades cardiovasculares y dislipidemia. Hay varios factores que desencadenan la patogénesis, entre ellos los principales son: raciales, hereditarios, estilo de vida sedentario y el estrés. Es sabido que la actividad física regular, sea ella aeróbia ou resistida com peso, junto con una dieta balanceada, son factores importantes para el control y el mantenimiento de los niveles de glucemia de la persona. Investigaciones recientes muestran que la práctica regular de actividad física aeróbica y resistencia con peso moderada asociados con una dieta equilibrada reduce la incidencia de la DM2.

Palabras clave: diabetes tipo 2, ejercicio aeróbico, de resistencia ejercicio con pesas y prescripción.

ASPECTOS IMPORTANTES NA PRESCRIÇÃO DO EXERCÍCIO FÍSICO PARA O DIABETES MELLITUS TIPO 2

RESUMO:

O objetivo desta revisão literária é ressaltar os principais conceitos do Diabetes Mellitus tipo 2 (DM 2) e as principais atividades físicas recomendadas. O DM 2 é atualmente um grande problema para saúde publica no seu diagnóstico, controle e tratamento. O DM2 provoca serias complicações a saúde, dentre elas: hipertensão arterial, doenças cardiovasculares e dislipidemias. São vários os fatores desencadeantes para a patogêneses, dentre eles os principais são: raciais, hereditários, sedentarismo e estresse. Sabe-se que a regularidade da atividade física, seja ela aeróbia ou resistida com peso, associada a uma dieta balanceada, são fatores importantes para o controle e manutenção dos níveis glicêmicos do indivíduo. Pesquisas recentes comprovam que a pratica regular de atividade física aeróbia moderada e a resistida com peso associada a uma dieta equilibrada diminuem a incidência do DM2.

Palavras-Chave: Diabetes Mellitus tipo 2, exercício aeróbio, exercício resistido com peso e prescrição.