

Horse riding and diabetes

(Jazda konna a cukrzyca)

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Abstract – According to the *International Diabetes Federation* (IDF), diabetes mellitus constitutes one of the greatest health challenges of the 21st century. As reported by the latest research publications, physical activity is an important component of the patient therapy. Given the nature of activity, horse riding is considered to bring positive health effects during the diabetes treatment. Already 3500 years ago horse riding was known as a remedy for diabetes – it alleviated nagging symptoms, suggesting significant improvement of the amount of glucose in blood. Beneficial effects of such activity were found by Japanese researchers, who observed an increase in sensitivity to insulin and faster primary metabolism in type-2 diabetes patients after three-months' training sessions on JOBA horse riding exercise machine. Attempts made to determine what effects regular horse riding can bring to type-1 diabetes patients indicated a lower demand for insulin with comparison to less frequent activities or other type of physical exercise, as well as a significant increase in insulin sensitivity. As a combination of aerobic effort, involving virtually all muscle groups, and motor coordination, balance and strength exercises, horse riding may bring invaluable health effects for diabetics.

Key words - physical activity, horse riding, diabetes, insulin sensitivity.

Streszczenie – Według Międzynarodowej Federacji Diabetyków (IDF) cukrzyca stanowi jedno z największych wyzwań w obszarze zdrowia w XXI wieku. Jak wynika z najnowszych publikacji, wysiłek fizyczny stanowi ważny element terapii chorych. Ze względu na charakter wysiłku, pożądane efekty zdrowotne w leczeniu cukrzyca może przynosić jeździectwo. Już ponad 3,500 lat temu jazda konna była „lekarstwem” na cukrzycę, koila męczące objawy, sugerując u pacjentów znaczną poprawę wartości glikemii. Pozytywne efekty tego rodzaju aktywności zanotowali japońscy badacze, obserwując zwiększenie wrażliwości na insulinę oraz podniesienie poziomu podstawowej przemiany materii u pacjentów z cukrzycą typu 2 w wyniku trzymiesięcznych sesji treningowych na symulatorze Joba. Próby określenia wpływu regularnej jazdy konnej na organizm diabetyka z cukrzycą typu 1 wskazują spadek zapotrzebowania na insulinę w porównaniu do okresów mniejszej lub innego rodzaju aktywności oraz znaczące zwiększenie insulinowrażliwości. Jeździectwo będąc połączeniem wysiłku aerobowego, angażującego praktycznie wszystkie grupy mięśniowe, z ćwiczeniami koordynacji ruchowej, równowagi oraz

sily może w efekcie dać diabetykom nieocenione rezultaty zdrowotne.

Słowa kluczowe - aktywność fizyczna, jazda konna, cukrzyca, insulinowrażliwość.

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I. A STEP BACK IN HISTORY...

According to the *International Diabetes Federation* (IDF), diabetes mellitus constitutes one of the greatest health challenges of the 21st century, although its problem was known already in the Antiquity [1].

First records concerning diabetes go back to the Antiquity. Supposedly the oldest trace of its symptoms comes from the Ebers Papyrus dating to 1550 BC. Later records about the disease characterised by excessive urinary were made by Apollonius of Memphis. Descriptions of diabetes are also found in the notes of medical practitioners from ancient China, India and later Arabia. The first use of the

word diabetes derived from Greek is attributed to Demetrius of Apamea (the end of the 2nd century BC), whereas a detailed description of its symptoms is credited to Aretaeus of Cappadocia (1st c. BC) [2].

II. ...AND PRESENTLY

Today we know that diabetes mellitus belongs to a group of metabolic diseases characterised by hyperglycemia, which results from defective insulin secretion or its faulty activity (insulin resistance), or both. Chronic hyperglycemia entails long-term impairment, dysfunction or failure of various organs, in particular eyes, heart, blood vessels and nerves. Diabetes is a social disease with constantly growing prevalence, which already exceeds 1%. It is estimated that in 2030 there will be more than 360 m diabetics. In Poland, the number of people with diabetes is estimated at 2 m [3].

The two types of diabetes to distinguish are:

- Type-1 diabetes, resulting from the damage of beta-cells islets in the pancreas, which leads to absolute insulin deficiency and may be either
 - autoimmune in nature; a precipitating factor, such as a virus, toxic substance or a food protein, triggers an autoimmune reaction and causes inflammation of pancreatic islets. The process results in the emergence of antiislet and anti-insulin antibodies, which in turn causes the pancreas to lose its secretion capacities.
 - A rapidly progressing type-1 diabetes,
 - Latent autoimmune diabetes of adults (LADA)
 - idiopathic in nature.
- Type-2 diabetes related to insulin secretion disorders in the pancreas or tissue insulin resistance induced by a genetic and/or environmental factor (e.g. abdominal obesity being the essential risk factor for diabetes).
- Other specific types of diabetes: diabetes caused by malnutrition or faulty nutrition, pancreatic diseases, endocrinopathies (hypercortisolemia, acromegaly, primary hyperaldosteronism, hyperthyroidism) drug-induced diabetes, abnormalities in insulin structure and its receptors, some genetic disorders, maturity onset diabetes of the young (MODY)).
- Gestational diabetes defined as carbohydrate imbalance, which first emerges during pregnancy. It concerns approximately 3% of the total number of

pregnancies, develops and exacerbates in the second and third trimester, respectively [3].

The primary objective of the diabetes treatment, regardless of presence and types of complications, is to achieve the optimum metabolic control. A diet-based treatment, drug therapies and optimised schemes of physical activities are implemented in order to normalise blood sugar.

The research publications reveal that physical activity plays an important role in the diabetics' therapy, comprising an integral and indispensable part of the diabetes treatment [4,5,6].

Glucose homeostasis depends on glucose delivery to blood and its use in cells, and metabolic processes in skeletal muscles significantly help to maintain it. Insulin is one of the crucial hormones participating in the regulation of these processes. Red muscle fibres are more sensitive to insulin than the white ones, they also have more insulin receptors and glucose transporters (GLUT4). The glucose use in red muscle fibres depends specifically on insulin, which is why physical activity materially increases the number of its transporters [7].

Direct influence of physical exercises on the glucose transport in human skeletal muscles is relatively short-term (2-4 h), but an increase in sensitivity to insulin-induced glucose transport was observable more than 48 h after exercises.

These observations became the basis for using physical exercises in the treatment of diabetes. Physical exercise also positively affects blood circulation as it favourably modifies lipid metabolism, reduces insulin resistance and clotting processes, and increases the activity of antioxidative system. During physical activity oxygen blood saturation also significantly increases [8].

Due to the fact that physical activity is related to oxygen consumption and engages virtually all muscle groups, horse riding may bring desirable health effects in the treatment of diabetes. Already 3500 years ago horse riding was considered a remedy for diabetes, it alleviated nagging symptoms, indicating significant improvement of the glucose level in one's blood.

Japanese researchers from Hosaka Medical Clinic (Fujiyoshida) observed positive effects of this type of activity already when the horseback riding movements were passively imitated with the use of the Joba exercise machine. They noted significantly higher sensitivity to insulin and material increase of primary metabolism in the case of the middle-aged type-2 diabetes patients following 30-minutes' long training sessions undergone on an everyday basis for the period of three months. These findings suggest that every-

day, even passive exercises can potentially help raise insulin sensitivity and resting metabolism in diabetic patients. The Joba horse riding exercise machine may prove especially useful as an alternative to horse riding in the case of the middle-aged patients unable to exercise actively [9,10]

Attempts made to determine the influence of regular horse riding on the type-1 diabetes person indicate that by following regular 60-120 minutes' rides seven days a week the demand for insulin falls even by 40% in comparison to the periods characterised by less frequent or different exercises, whereas insulin sensitivity significantly increases (even to 70%). Thanks to this type of activity diabetic persons may escape dangerous insulin resistance [11]. Insulin resistance in persons with type-1 diabetes is caused by the body mass growth and can be fought off through physical exercise [12].

At this point it is worth mentioning about a young show jumper, Lisa Chrzanowska, who is ambassador of the "Together We Conquer Obstacles" campaign of the CUD Foundation which promotes horse riding among children and teenagers ill with diabetes. Numerous projects are addressed to people with diabetes under which they are being encouraged to take the challenge of sports activities, in particular horse riding. The foundation believes that horse jumping competitions may symbolise living with diabetes. The founder of CUD Foundation, Ms Monika Chrzanowska, initiated „Together We Conquer Obstacles” project to show and prove that children and teenagers with diabetes can not only live a normal life, but can also be professionals in numerous sports and compete with their peers [13].

III. REFERENCES

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