Planning Physical Activity for the Diabetic

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DIABETES IS A HEREDITARY disease characterized by an impaired ability of the body to properly metabolize or utilize food. Such improper functioning in the diabetic is associated with insufficient amounts of insulin because of a disturbance in the function of the islets of Langerhans of the pancreas, or, interference with the action of insulin in the tissues. The hormone insulin is necessary in the metabolic process for the conversion of glucose to glycogen for storage in the liver and other body tissues, and for the conversion of glycogen to glucose for use by the body tissues.

When an insufficient supply of insulin is produced, glycogen cannot be properly stored in the body. Instead, it accumulates in the blood stream as glucose, causing blood sugar levels to rise above normal (hyperglycemia) and loss of sugar into the urine (glycosuria). The diabetic compensates for the loss of this primary source of energy by increasing the utilization of protein and fat. Overuse of the latter as a source of energy produces acidosis which may lead to the development of diabetic coma.

Since work or exercise requires energy and since sugars are the chief source of energy in the body, exercise has a direct influence on blood sugar levels. Further, since food intake and insulin influence blood sugar levels and the production of energy, the amount of exercise must be coordinated with these factors. If a diabetic receives too much insulin, ingests too little food, or exercises to excess, blood sugar levels become abnormally low (hypoglycemia). Such influences lead to the development of insulin shock.

Planning Guidelines

It is important to stress that diabetics are generally able to participate in most physical activities. Indeed, many of our top professional athletes are diabetics. There are, however, some guidelines which should be considered in planning and conducting safe and successful programs for the diabetic.

First, individual physical activity tolerance levels should be established. The physical educator should have access to and be familiar with the medical report of the child. Physical activity tolerance levels should be established on the basis of this report with medical consultation. Subsequently, the capabilities and limitations of the child should be thoroughly explained to him.

Second, participation in physical activity should be coordinated with insulin and food intake. Exercise is of greatest benefit when it is uniform in amount and is taken regularly at a planned time each day. Activity periods should progress from short mild sessions to longer and more strenuous sessions, preferably scheduled after a small meal or snack. Many physicians recommend that diabetics have immediate access to quick energy such as candy, orange juice, coke, or ice cream. Because of the possibility of insulin shock during muscular work, it is vitally important that swimming be carefully supervised.

Third, since bodily infections (1) may increase the need for insulin by either increasing metabolism generally or by interfering with the utilization of insulin, (2) may diminish the output of insulin by the islets of Langerhans and (3) may increase the poison or toxins absorbed by the blood stream bringing about acidosis, precautions should be taken to prevent their overuse. In fact, a person on the verge of developing diabetes may become a diabetic as a result of an attack of an infectious disease.

Thus, contact sports such as boxing and wrestling which make the body vulnerable to bodily injury and subsequent infections should be included in physical education programs for the diabetic only with the advice of a physician. To further prevent the occurrence of infections, it is important that cuts, abrasions, and blisters be immediately treated; that diabetics avoid walking in bare feet especially in

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locker rooms; that they avoid rubbing with a towel (gentle blotting with a towel is preferred); that foot powder be utilized for the prevention of "athlete's foot"; and that towels be available for showering following physical activity.

Fourth, care must be taken to avoid circulatory restrictions. In diabetes there is a strong tendency for arteries and blood vessels to become hardened and thickened resulting in a narrowing of passageways to such an extent that circulation is reduced in larger vessels and prevented in smaller vessels. Inadequate circulation reduces nourishment to tissues and subsequently leads to the death of tissue known as gangrene. In severe cases, amputation of affected areas is necessary. It is particularly important, therefore, that the physical educator guide students in regard to this phenomena. Tight fitting gymsuits, sneakers, and socks should be prohibited. Tight and adhesive bandages are generally not recommended for diabetic pupils.

Fifth, since skin disorders may lead to infections, it is important that attention be given to proper skin care. In this regard, it is recommended that diabetics avoid soaps containing phenol, strong antiseptics, and iodine since they freqently increase skin dryness. Further, temperature extremes should be avoided. Diabetics should avoid sudden and severe sunburn and water temperature for showers and baths should be about the same as the temperatures of the body. Since the sense of feeling in the skin of extremities is lessened in the diabetic, it is advisable for a responsible individual to check the water temperature.

Sixth, since psychic stresses may influence metabolism and result in changes in blood sugar levels, ketone production, and urinary excretion, highly competitive activities should be engaged in only after qualified, medical consent is received.

Finally, it is important for the diabetic to maintain proper body weight. As is well known, an individual overweight generally possesses a greater than normal amount of fat. Excess fat is "dead weight" which must be carried and such loads place undue strain on the heart, blood vessels, liver, and pancreas. Strain of the pancreas causes an impairment of the secretion of insulin and subsequently contributes to the severity of diabetes.

Values

If the above guidelines are followed in planning programs for the diabetic, participation in physical activity will not only be safe but extremely beneficial. Scientific evidence is available indicating that less insulin is required to reduce blood sugar levels when an individual exercises than when insulin is taken without exercise. Evidence indicating that exercise increases the pancreatic production of insulin is also available. In addition, exercise is beneficial because it helps to maintain muscle tone, improve circulation to extremities, and because it helps to keep body weight under control. Thus, exercise may be the diabetic's most pleasing activity.

Bibliography

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