

OBESITY & DIABETES

OBESITY

The amount of time people spend performing demanding physical exercise has decreased vastly over the last 100 years, and it is still further decreasing today. This has been attended by a rapid increase in the relative occurrence of obesity and obesity-related health risk factors.

If you are overweight you are more likely to develop health problems such as heart disease, stroke, diabetes, certain types of cancer, gout (joint pain caused by excess uric acid), and gallbladder disease.

Being overweight can also cause problems such as sleep apnoea (interrupted breathing during sleep) and osteoarthritis (wearing away of the joints); and the more overweight you are, the more likely you are to have these health problems.

For adults, overweight and obesity ranges are determined by using weight and height to calculate a number called the “body mass index” (BMI). BMI is used because, for most people, it correlates with their amount of body fat.

- An adult who has a BMI below 18.5 is considered underweight
- An adult who has a BMI between 18.5 and 24.9 is considered normal
- An adult who has a BMI between 25 and 29.9 is considered overweight
- An adult who has a BMI of 30 or higher is considered obese

Your body-mass index ("BMI") measures your height/weight ratio. It is your weight in kilograms divided by the square of your height in metres. For instance, if your height is 1.82 metres, the divisor of the calculation will be $(1.82 * 1.82) = 3.3124$. If you weigh 70.5 kilograms, then your BMI is 21.3 $(70.5 / 3.3124)$.

Tennis and Obesity

Whether or not you're trying to lose weight or simply stay fit, tennis is a great way to have fun, socialise and burn calories.

All physical activity burns calories, even activities like standing, sitting and sleeping. The more vigorous an activity, however, the more calories you'll burn. Changes in body weight are related to both the duration and intensity of play. Playing singles tennis at average intensity expends 300-600 kcal/h, while high intensity tennis training expends 450-900 kcal/h.

DIABETES

The incidence of diabetes worldwide of persons aged 20 or above in 1995 was 4% (approx. 135 million), a figure that will increase to approx. 5.4% (300 million people) by 2025. Women are more often affected than men (by a ratio of 1.4:1).

It is not the diabetes as such that puts a considerable strain on health but the resulting secondary diseases. The resulting diseases play a major role in life expectancy and the quality of life of the diabetic. More than 75% of all diabetics die of their resulting vascular disease, of which:

- Over 50% are heart-related
- About 12% are cerebrovascular (i.e. stroke)
- Almost 10% are renal (i.e. kidney failure)

Diabetes mellitus is a life-long disease characterised by high glucose levels of the blood, due to either deficiency or diminished effectiveness of insulin. These high glucose levels may damage many of the body's systems, in particular the blood vessels and nerves. There are two major types of diabetes mellitus:

Type 1 diabetes

- Most common in those aged below 30
- Primarily caused by decreased or total lack of insulin secretion from the pancreas
- Incidence of 10-15% of total diabetics

Type 2 diabetes

- Found in up to 80% of patients obese individuals middle age or older.
- Causes of type 2 diabetes range from a primarily insulin resistance with relative insulin deficiency to a mainly insulin secretion disturbance accompanied by insulin resistance.
- Is far more prevalent than type 1 diabetes (85-90% of total diabetics)
- Insulin resistance cannot only result in diabetes mellitus but also excess weight, fat metabolism disturbances and hypertension (“deadly square”). These are characterised as the metabolic syndrome.

Tennis and Diabetes

Regular physical activity is commonly used as a therapeutic intervention with type 2 diabetes and the metabolic syndrome. However, the success rates can be limited by a lack of willingness and unreliability of the patient in adhering to the sport program offered.

Suitable sports activities include those requiring general aerobic endurance with sub maximal intensity (e.g. 50-65% maximum heart rate with an exercise period of more than 20-30 minutes).

Activities such as walking, jogging, swimming and cycling are all advantageous. However, many people find these activities repetitive, technically- or organisationally-demanding or physically strenuous, and are thus given up after a short period.

Tennis has the advantage over many other sports since it can be fun and pleasurable to play and can last at least 60 minutes. Additionally, tennis offers ideal conditions for diabetics since it fulfils the requirements of diabetics significantly more than many other sports and can be enjoyed even in middle age and beyond.

This latter point is promoted further by the possibility of training in groups or playing individually against chosen partners. In addition, tennis can be played of the patient’s own accord, and it is intrinsically more motivating for regular- and long-term interest to carry out one’s own sporting activities.

Intrinsic motivation is increased further from the pleasure in mastering a variety of techniques and tactics.

The objective of tennis training for type 1 diabetics is not to reduce the required daily dose of insulin but rather to optimise the complete metabolism, and if possible, to limit late effects and complications.

The main advantage of regular tennis training for type 1 diabetics are that the performance capacity is increased whilst taking one's mind off daily work and private stress. This leads to an improvement of physical well-being and quality of life.

Positive Health Benefits on Diabetes from Playing Tennis

The positive health effects on diabetes when regularly playing tennis can be summarised as follows:

- Reduction of insulin hyper secretion and improvement of insulin sensitivity (particularly important for type 2 diabetics)
- Decrease of simultaneously existing risk factors such as obesity, fat metabolism disturbances and hypertension, which in combination contribute to the overall picture of metabolic syndrome. This also has a significant preventive effect regarding threatening macro- and microangiopathy, which often end fatally
- Strengthening of the immune system, which is often weakened by diabetes, thus reducing the incidence of infection
- Improvement of the general physical performance capability, particularly with regards to endurance and start-up speed
- Cultivation of contacts on the social and sporting level with partners of similar motivation and the same disease

Risks of Exercise

Low blood sugar level is the major problem for athletes with type 1 diabetes. Symptoms include sweating, nervousness, tremor and hunger. If the low blood sugar level is not corrected, confusion, abnormal behaviour, loss of consciousness and convulsions may occur. Particularly for tennis playing type 1 diabetics, the following blood glucose control checks are recommended:

- Before, during and immediately after the tennis match
- A few hours after a tennis match, before going to sleep and on the following morning
- During acute drop-offs in performance, and/or on suspicion of hypoglycaemia
- Continuous availability of glucose as emergency ration
- Instruction for the tennis partner about necessary measures against hypoglycaemia

Tennis should not be played under the following conditions:

- Glucose values >300 mg/dl (> 16.6 mmol/l)
- Acetone in urine
- Fever or infections

Tennis training for diabetics

The most important aim of tennis training in diabetics is to develop and maintain the pleasure in playing so that the diabetic is motivated to remain active on a lifelong basis.

For optimal realisation of the benefits of tennis play in diabetics, the following objectives should be pursued when playing tennis:

- Increase in calorie consumption
- Improvement of physical performance capacity (fitness), in particular speed, strength, endurance and flexibility
- Refinement and perfecting of tennis technique and tactics (including doubles)
- Promotion of the fun element when playing tennis and pleasure in the tennis fellowship after the match (wellness)