

Type 1 diabetes and exercise

Type 1 diabetes mellitus (T1DM) is a condition in which the cells in the pancreas (beta cells) that produce insulin are destroyed by the body's own immune system. This process leads to insulin deficiency (1). Insulin is a hormone that lowers blood glucose (sugar), and allows us to use energy from the food we eat. Without insulin, high blood glucose levels occur. T1DM often runs in families. However, what triggers the disease process is still largely unknown (1).

Why is it important to manage blood glucose levels?

When blood glucose levels are chronically elevated, there is increased risk of:

- Kidney disease and possible kidney failure
- Problems with vision, and possible blindness
- Changes in pain sensation (neuropathy)
- Loss of muscle control and balance
- Heart disease and stroke.

Other factors that increase risk of complications are: early onset of T1DM, family history of diabetes-related complications, high blood pressure, high blood cholesterol, and lifestyle factors including smoking, obesity and physical inactivity (1).

How does exercise benefit people with type 1 diabetes?

Maintaining effective management of blood glucose levels can be challenging for people with T1DM. Regular exercise helps to manage diabetes better, decreases risk of cardiovascular disease, and improves quality of life for those with T1DM. The beneficial effects of exercise include the following:

- Improves how insulin works in the body
- Decreases the doses of insulin required
- Improves cardiovascular health and fitness
- Decreases the risk of diabetes-related complications
- Improves quality of life
- Reduces the symptoms of depression

How does exercise produce these benefits?

Exercise cannot reverse the damage to the cells in the pancreas that leads to the decreased production of insulin. Exercise can, however, improve the blood supply and glucose delivery to muscles. This leads to better diabetes management and more effective use of energy from the diet. Exercise can decrease risk of vascular complications by improving risk factors such as high blood pressure and high cholesterol.

What type of exercise is best?

People with T1DM who do not have diabetic complications can be involved in most types of exercise and physical activities at low, moderate or high intensities. Aerobic exercise increases heart and lung fitness, while resistance training maintains muscle and bone strength. An accredited exercise physiologist can design a suitable exercise program for you. Below is a summary of exercise recommendations for people with T1DM (2), although exercise can be done in shorter session of 10 minutes accumulated throughout the day:

Type of exercise	Intensity	Duration	Frequency
Aerobic exercise (e.g. walking, running, cycling)	Moderate or Vigorous	20-60 minutes per session	Minimum 3 days a week with no more than 2 consecutive days without exercising
Resistance training (e.g. lifting weights)	Vigorous (50-80% 1-RM*)	30 – 45 minutes	2 or more times per week (2-4 sets of 8-12 reps)

* 1-RM = 1 Repetition Maximum - the maximum weight you can lift for one repetition

References and further information

1. Lancet, 2014; 383: 69 – 82.
2. ACSM's guidelines for exercise testing and prescription (8th ed, pp. 225-71)

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