

Physical activity & type 1 diabetes

Physical activity is any activity that gets your body moving, makes your breathing become quicker, and your heart beat faster. There are different types of physical activity but all offer benefits to your diabetes and your overall health.

What are the benefits?

For people with type 1 diabetes, physical activity helps to:

- > improve the body's response to insulin which can lower blood glucose levels
- > assisting with maintaining a healthy weight or weight loss if needed
- > increase strength, power and balance
- > improve mood, reduced stress and tension
- > improve sleep
- > lower blood pressure and cholesterol levels, reducing the risk of heart attack and stroke
- > increase circulation in lower limbs
- > slow age-related loss of muscle mass, preventing osteoporosis and reduce risk of falls.



What is physical activity?

Physical activity includes planned exercise and day to day activity. There are two main types of physical activity: aerobic and resistance.

Aerobic activity is any activity that involves large muscle groups working at a pace that can be sustained for more than a few minutes. It gets your body moving, makes your breathing quicker and your heart beat faster.

Moderate or intense aerobic activity includes running, walking, dancing, exercise classes, cycling and swimming.

Light aerobic activity includes gardening, housework, golf, yoga, lawn bowls and choosing to walk up the stairs rather than take the lift.

Resistance activity involves working your muscles against a load or resistance. This can be your own body weight (such as moving from sitting to standing or doing squats or wall push-ups) or using equipment (such as machine weights, dumb bells, cans of food or resistance bands).

Physical activity does not have to be organised or competitive to be helpful. Whether on your own, or with family and friends, it can be fun.

How much is enough?

Doing any physical activity is better than doing none. If you are inactive, start by doing something, and slowly build up to match (or better) the national recommendations.

The Australian Physical Activity Guidelines for Adults aged 18 - 64 years suggest that you:

- > be active on all or most days every week

- > do up to 150 to 300 minutes (2½ to 5 hours) of moderate intensity physical activity or 75 to 150 minutes (1¼ to 2 ½ hours) of vigorous intensity physical activity, or combination of both moderate and vigorous activities, each week
- > use muscle strengthening activities on at least 2 days each week
- > minimise the amount of time spent in prolonged sitting
- > break up long periods of sitting as often as possible.

Keeping a log of your physical activity can help you assess what you do, what you don't do and what you may be able to do more of. You can use this information to make healthier choices, monitor your progress and celebrate your successes.

Are there any risks?

Overall, the benefits of physical activity outweigh the risks. Diabetes can put you at risk of certain conditions that could be affected by physical activity.

If you are new to physical activity, have other health problems, or are concerned about the safety of being (more) active, speak with your doctor or health professional about the best activities for you.

Before starting any new activity, your doctor will consider your blood glucose levels, any diabetes complications and the condition of your heart and blood vessels.

As most physical activity involves using your feet, seeing a podiatrist, doctor or credentialed diabetes educator before you start your program for a foot risk assessment and advice on suitable footwear is needed.

How can I manage my diabetes during physical activity?

Each person's response to physical activity is different. It is important to work out your way of balancing your physical activity with your diet and insulin. Your doctor, credentialed diabetes educator or dietitian will be able to assist you.

Carbohydrate (CHO)

The intensity and duration of your activity will affect the amount of energy you need. The type of activity, and its timing with main meals/snacks and dose of rapid-acting insulin is likely to affect the type and amount of carbohydrate (CHO). As a guide:

- > **ensure energy stores before exercise** such as eating a meal containing CHO, fats protein 3 - 4 hours before physical activity will enable energy stores to be available
- > **extra CHO may also be needed** if physical activity is unplanned, of high intensity, last a long time and if the insulin dose cannot be reduced. Extra CHO should be matched as far with the predicted CHO need (e.g. during the time of peak insulin action, the typical amount of CHO needed is 1.0 - 1.5g of CHO per kg of body weight per hour).

It is also important to stay well hydrated. Drink enough water to avoid thirst and remember you will need a bit more than usual while being active. Your dietitian or credentialed diabetes educator will be able to assist you with any questions and concerns.

Insulin therapy

The intensity and duration of your physical activity will affect your insulin needs. If you are increasing your activity level to reduce your weight, your insulin dose/s may need to be reduced before, during or after. This avoids the risk of low blood glucose levels (hypoglycaemia).

Insulin pumps offer flexibility in insulin adjustment and general recommendations are to:

- > reduce the basal rate for 1 - 2 hours before planned physical activity
- > reduce the basal rate by 30 - 50% for the duration of the activity
- > suspend insulin delivery for up to 2 hours
- > reduce overnight basal rate by 20 - 30% or sometimes more, after vigorous and prolonged activity.

Multiple daily injections (e.g. basal-bolus insulin therapy) offer flexibility in insulin adjustment and the general recommendations are based on the time of day and duration of the physical activity:

Time of prolonged/intensive physical activity	Basal-bolus insulin dose considerations
Early in the morning, before breakfast:	<ul style="list-style-type: none"> > reduce previous evening basal (intermediate or long-acting) insulin dose by 20 - 50% > reduce pre-breakfast bolus (rapid-acting) insulin dose after physical activity by 30 - 50% > reduce evening dose of basal insulin on the day of the physical activity.
After a meal:	<ul style="list-style-type: none"> > try to delay exercise until at least 1 - 2 hours after the meal > reduce pre-meal bolus insulin dose by 30 - 50% if physical activity lasts up to 4 hours; for all day activity, reduce all meal bolus doses across the day by 30 - 50% > reduce previous evening basal insulin by 50%, and the basal insulin dose by 10 - 20% up to 24 hours after all-day activity (e.g. bush walking, cycling).
Intermittent high intensity physical activity (e.g. team sports)	<ul style="list-style-type: none"> > reduce pre-meals bolus insulin by 70 - 90% if physical activity starts within 1 - 3 hours of the meal.

Your doctor or credentialed diabetes educator can discuss and insulin dose changes required.

Blood glucose levels

Blood glucose levels in your target range will assist you with any form of physical activity.

Testing your blood glucose levels before, during and after physical activity will check how your blood glucose levels are affected. It will also confirm that your planning has worked or will identify that further changes are needed. Your doctor or credentialed diabetes educator can assist you.

Is there any precautions?

Hypoglycaemia – low blood glucose can occur during, when you stop and in the hours after physical activity. The responses to low blood glucose levels such as sweating and palpitations may be confused with your body's response to being active.

Always carry your blood glucose meter and 'hypo' treatment. Your doctor or credentialed diabetes educator can discuss risk, provide advice for prevention (e.g. CHO requirements, changes to insulin dose/doses), a *Hypo Action Plan and Hypo Kit*.

Hyperglycaemia – high blood glucose can result if you have not been able to match your insulin dose and CHO foods with very intensive or long duration activity.

If high blood glucose, and no ketones, it is not necessary to stop. Your doctor or credentialed diabetes educator can discuss risk and provide advice (e.g. CHO needs, changes to insulin dose/doses), a *High Blood Glucose/Sick Day Action Plan* which includes an instruction for insulin adjustment/s (e.g. correction insulin).

Retinopathy – if you have retinopathy you may need to avoid strenuous activity until your eye specialist says that your condition is stable.

Neuropathy – if you have lost sensation in your feet you should talk to your doctor, podiatrist or credentialed diabetes educator about what activity is safest for you to do.

Is there any reason to stop being active?

Stop your activity if you get chest, abdominal, neck or arm pain, tightness, palpitations or irregular heart rate, breathlessness, feel lightheaded or have any other unusual symptoms. These symptoms require urgent assessment at the nearest hospital emergency department.

If you get any other pain, stop until the pain goes away then re-start your activity. Make sure your doctor or diabetes specialist knows about what has happened. Over time you should be able to extend your activities.

If you are getting symptoms of a 'hypo', check blood glucose levels and treat as per your *Hypo Action Plan*. Do not continue until your symptoms have gone and your blood glucose level has returned to your target range.

If your blood glucose level is above 15.0mmol/L (not directly after eating), and you have ketones, then your activity should be postponed. The high blood glucose and low insulin levels can cause diabetic ketoacidosis.

Any other considerations?

- > Wear your medical identification (e.g. Medic Alert).
- > Wear sunscreen, protect your head and layer your clothing so you can add or remove clothes as needed.
- > Check your feet after exercise or at least once a day looking for signs of redness, blisters, cracks and calluses. If your feet perspire, change into dry socks.
- > Each time you reach your goal, reward yourself then set a new goal to stay motivated.
- > Illness – do not be physically active if you are unwell.

Important points to remember

- > Think of physical activity as an opportunity, not an inconvenience.
- > Be active every day in as many ways as you can.
- > Put together at least 30 minutes of moderately intensive physical activity on most, if not all, days.
- > Wear suitable foot wear, consult your podiatrist, doctor or credentialed diabetes educator.
- > As you are at risk of low blood glucose (hypoglycaemia), be prepared and have a *Hypo Action Plan*.
- > If you have a blood glucose level above 15.0mmol/L (not directly after eating), and you have ketones, delay your activity and refer to your *High Blood Glucose/Sick Day Action Plan*.
- > Discuss the need for adjusting your CHO foods and/or insulin with your doctor, dietitian or credentialed diabetes educator.

Personal Goals

Where can I go for more information?

Diabetes Australia	www.diabetesaustralia.com.au
National Diabetes Services Scheme	www.ndss.com.au
Dietitians Australia	www.dietitiansaustralia.org.au
Australian Podiatry Association	www.apodc.com.au
Physical Activity Australia	www.physicalactivityaustralia.org.au

For more information

**Diabetes Service
Rural Support Service**
PO Box 287, Rundle Mall
ADELAIDE SA 5000
Telephone: (08) 8226 7168
www.chsa-diabetes.org.au
www.sahealth.sa.gov.au/regionalhealth

