

Type 1 diabetes and exercise

This resource is for people with Type 1 diabetes (T1DM) and helps to explain how your blood glucose levels (BGLs) can change with exercise.

How does exercise change my blood glucose levels (BGLs)?

Exercise can cause your BGLs to increase or decrease. It is important to learn how exercise changes your BGLs, so that you can exercise safely. Recording your BGL's before, during and after each type of exercise can help you understand how exercise changes your BGLs. This will help you develop a plan with your diabetes team that suits you.

BGLs may drop during or after activity because:

- Your glucose is being used as a fuel during exercise
- Your body is more sensitive to insulin during and after exercise
- Your cells need to replace their glucose stores after exercise.

BGLs may go up during or after the activity because:

- High intensity exercise or competitive sport can raise BGLs. This is due to the release of stress hormones.
- BGLs will usually fall again after the exercise. Be careful not to correct high BGLs until you have checked your BGL pattern after exercise.
- If your BGL is high **BEFORE** exercise (>15.0mmol/L) this may be a sign of not enough insulin. Check for **ketones**. If ketones are present (>0.6mmol/L), you **should not exercise**.

How do I manage my blood glucose levels when exercising?

For good BGL control, you may need to adjust your insulin dose, eat extra carbohydrate food or change both insulin and carbohydrate. Below is a summary of how you might do this. Talk to your diabetes team to make sure this is right for you.

Adjusting insulin dose

- How to change your insulin depends on your fitness level, the duration and intensity of the exercise and your insulin pattern. Your diabetes team can help to guide you with these changes.
- For planned exercise the short acting insulin dose may need to be reduced by 20-50% if the exercise is within 2 hours of a meal.

Eating extra carbohydrate food

Extra carbohydrate food may be needed for exercise lasting >30 minutes. This is even more likely if the pre-exercise insulin has not been reduced.

As a general guide consider:

- 1 x 15g (15g) carbohydrate serve for each hour of gentle exercise
- 2 x 15g (30g) carbohydrate serve for each hour of moderate exercise
- 3 x 15g (45g) carbohydrate serve for each hour of intense exercise

See table for examples of carbohydrate serves.

1 serve carbohydrate (15g)
<ul style="list-style-type: none">• 1 slice of bread• 1 piece of fruit (e.g. banana, apple)• 1 cup (250ml) plain milk• 1 tub (150-200g) yoghurt• 2 plain sweet biscuits (e.g. Nice, Arrowroot)• 250ml Gatorade/Powerade• 200ml fruit juice

Changing both insulin and carbohydrate

You can choose to both adjust insulin and eat extra carbohydrate to manage BGL when exercising. This may be needed for moderate or high intensity or longer duration exercise. You may also need to reduce your long acting insulin and/or eat carbohydrate before going to bed. This will minimise the risk of hypoglycaemia overnight. Your diabetes team can help to guide you with these changes.

BGLs can fall several hours or even up to 24 hours after exercise. It is important to continue monitoring your BGLs after exercise.

This is a consensus document from Dietitian/ Nutritionists from the Nutrition Education Materials Online, "NEMO", team.

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Exercise tips

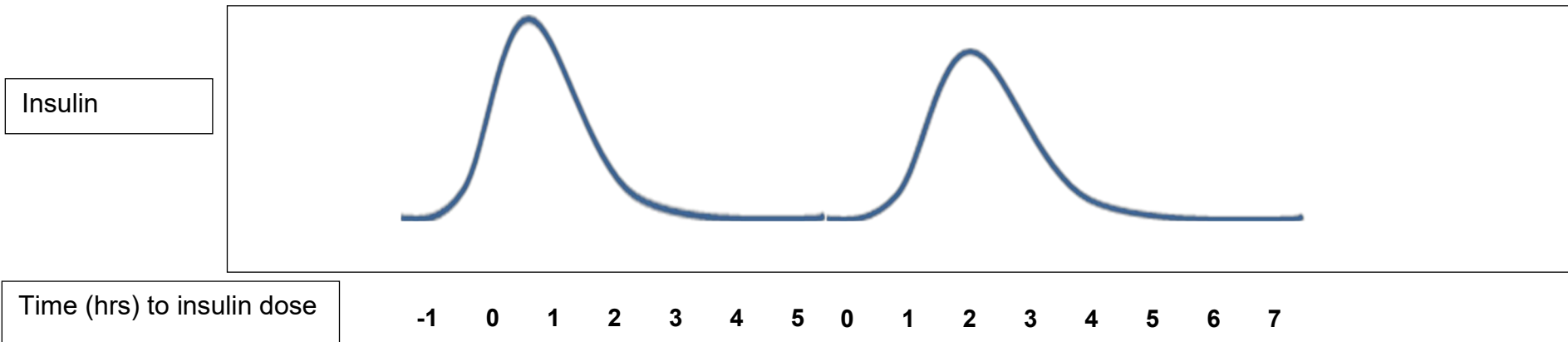
- Always carry fast acting carbohydrate to treat a hypo if needed (see table below for details).

Fast-acting carbohydrate 1 serve (15g carbohydrate)
<ul style="list-style-type: none">• 100ml Lucozade• 7 jellybeans• 150ml soft drink (non-diet)• 200ml fruit juice• 3 teaspoons sugar or honey• Glucose gel or glucose tablets equal to 15g (talk with your diabetes team)

- Children should be supervised by an adult who is aware they have diabetes and can assist if they have a low blood glucose level.
- Avoid injecting insulin into the arms, legs and buttocks before exercise. It is usually better to use the abdomen.
- Exercise lasting 30 minutes or more is likely to need adjustments to your insulin dose, carbohydrate intake or both.
- Extra carbohydrate may not be needed before exercise but may be needed after to prevent delayed hypoglycaemia.
- Talk to your diabetes team about reducing insulin at the meal after exercise.

For further information, contact your Dietitian or Nutritionist

Consider the timing of your quick acting insulin dose when managing your BGLs and exercise



Time (hrs) to insulin dose

-1 0 1 2 3 4 5 0 1 2 3 4 5 6 7

The body makes hormones to raise BGLs in the early morning. Therefore, exercising before breakfast can reduce the risk of hypos.

Exercising within 2 hours of an insulin dose is the highest risk of hypos. If exercising in that time, talk to your diabetes team about reducing your insulin dose.

If relying on increased carbohydrate, you may need 15-30g for every 30 minutes.

Exercising before the next meal, when there is little quick acting insulin in your body, will have less impact on BGLs.

Consider eating additional carbohydrate (try 15g every 60 minutes).



Exercise and BGL diary

Keep a record of the:

- Time of exercise in relation to insulin and food
- Duration, type and intensity of exercise
- BGLs before, during and after exercise

	12 am	3 am	6 am	7 am	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm	
Blood Glucose																					
Carbohydrates																					
Bolus Insulin																					
Basal Insulin																					
Exercise (duration, type & intensity)																					
Ketones (Check if high BGL (>15mmol/L) before exercise)																					
Notes																					