

PAEDIATRIC DIABETES MANAGEMENT

Managing exercise for children and young people

with Type 1 diabetes

Patient Information Leaflet

August 2018



Can I still exercise when I have diabetes? - **YES!**

Frequent and regular physical exercise is recommended for **everyone** of all ages as it:-

- Improves mental health and cuts risk of stress and depression
- Boosts self esteem/confidence
- Boosts immune system
- Enhances sleep
- Improves energy levels
- Keeps your heart healthy,
- Helps with better weight control

The good news is that **exercise is free**, and can be carried out anywhere at anytime and has an immediate effect. The NHS says that regular exercise for children is completing **1 hour a day** of physical activity.

When you have diabetes, we encourage you to be physically active on every day for better blood glucose control. The more you exercise the more your body will respond to insulin.

What you need to remember when you are newly diagnosed with diabetes or taking up a new activity/sport/exercise?

Hydration - are you drinking enough?

Energy/carbohydrates – have I eaten enough carbs for the type of exercise **and** length of exercise

Blood glucose – have you checked your blood glucose level?

Insulin – do I need to adjust my insulin for the exercise?

Here are some helpful hints:-

- Wear a form of ID
- Ensure everyone knows how to help you if need it
- Always carry glucose in a pocket
- Drink plenty of water before, during and after exercise to stay well-hydrated
- Try to spot patterns in your blood glucose levels before, during and after exercise (make sure you write down the readings so that you can look back at them) . The patterns may change with different types of activity.
- Ask yourself - Do I need to adjust my insulin doses before or after I exercise? (see below)
- Ask yourself – Do I need extra carbohydrate for this activity? (see below)
- Think about the after effects of exercise (see below)

Writing things down can seem like an extra job, but it really will help you to understand more about your diabetes. Try to write down:

- Your blood glucose levels before, during and after activity
- What you did
- How long you did it for

Later we will discuss in more detail how to maintain ideal blood sugars when exercising

Preventing highs and lows during and after exercise

Hypoglycaemia

Hypoglycaemia (low blood glucose) can occur if you have:

- Eaten too little carbohydrate for the amount of exercise
- Taken too much insulin for the amount of exercise
- Food and insulin imbalances relative to the exercise

Physical activity can cause hypoglycemia in two differing ways:

- Blood glucose can go low during exercise
- Blood glucose levels can also drop several hours after

Different people respond differently to activity. Checking blood glucose levels before during and after exercise can help anticipate and prevent hypos.

Always carry a fast-acting carbohydrate food such as glucose tablets when exercising in the event blood sugar drops too low and hypoglycemia symptoms develop during exercise.

Hyperglycemia (with or without ketoacidosis)

Hyperglycemia (or high blood glucose) can occur when:

- Too little insulin is available to help glucose enter muscle cells quickly during exercise
- There is not enough insulin to cover the extra sugar released by hormones in the body when you exercise
- Too much fat is used for exercise when glucose is unavailable
- Ketones levels rise in the blood.

If your blood glucose level is above 15 mmol/l before exercise, check your ketone levels as the exercise can increase the production of ketones.

- If there are ketones present, you will need to avoid any activity until these have gone (Diabetes UK, 2018). This will require additional insulin.
- If there are no ketones, think about giving additional insulin if it is more than 3-4 hours since the last injection (Diabetes UK, 2018).

Exercising could result in higher blood glucose levels and lead to diabetic ketoacidosis.

Exercise can result in high blood glucose levels (hyperglycaemia), particularly after short bursts of strenuous activity. This type of activity causes a stress response which sees the body producing a hormone to raise blood sugar levels.

Remember:-

Too much insulin = blood glucose may drop too low
Too little insulin = your muscles can't use the glucose for energy



If you have been exercising your legs, an injection into the thigh will be absorbed much more quickly

REMEMBER your blood glucose will increase during exercise if there is not enough insulin.

What happens to my diabetes when I exercise?

This depends on type of exercise, the length of time it will take and if there are any additional stresses, (eg competitions):-

Type of Exercise

The more strenuous an activity, the more energy (fuel) you will use. For example, 40 minutes of football has a higher energy requirement than for a 40 minute walk.

Low intensity

e.g. walking

Medium intensity

e.g. football, swimming

High intensity

e.g. sprinting



Duration of Exercise

The longer you exercise, the greater the effect on your blood glucose.

Aerobic activity tends to **lower blood glucose** both during and after exercise (usually 20-60 minutes from starting the activity)

Aerobic exercise involves **lower** intensity of muscle work usually for longer periods of time:

- ❖ Running
- ❖ Cycling
- ❖ Rowing
- ❖ Swimming
- ❖ Endurance sports

Anaerobic activities can cause the **blood glucose to increase**. The body produces substances that work against the insulin causing blood glucose levels to rise.

Anaerobic activities are characterised by **higher** intensity of muscular work for short bursts:

- ❖ Sprinting

- ❖ Squash
- ❖ Weight lifting
- ❖ Hockey

Many activities can be a combination of **aerobic and anaerobic** activity (football, basketball). This can result in a rise in blood glucose for a short period of time (eg 30-60mins) and can be followed by hypos later on after finishing exercise.

After exercise the muscles will have increased insulin sensitivity for 1-2 days which may mean you could have hypos up to 24 hours after exercise. Sometimes the increased insulin sensitivity is delayed and you could have hypos 4-6 hours after exercise

Stress

As adrenaline is released before or during a competition blood glucose levels will increase, reducing risk of hypo and the potential need for extra carbs.

What you need to remember when you are newly diagnosed with diabetes or taking up a new activity/sport/exercise

Hydration

You should drink 250-500mls fluid about 20 minutes before you exercise then approximately 500mls each hour of exercise (best taken as sips throughout your activity) to keep hydrated



Remember, by the time you feel thirsty you are already dehydrated.

Energy/Carbohydrates

It is recommended that around half of your energy comes from carbohydrate on a daily basis. Not eating enough carbohydrate leads to feeling tired, not performing as well and inhibits growth and development.

Ideas on how to increase your carbohydrate intake:

- At meals have larger portions of pasta, basmati rice, noodles
- Include extra fruit e.g. banana
- Have a glass of fruit juice/milk-shake with a meal
- Include a pudding at meals e.g. fruit and yoghurt/ice-cream, fruit crumble, bread and butter pudding
- Eat a substantial supper before bed e.g. large bowl of cereal and low-fat milk, 3 – 4 slices of toast
- 2 – 3 slices malt loaf and glass of low-fat milk



The following are suggestions on how to increase the amount of carbohydrates before during or after activity.

15g carbohydrate	30g carbohydrate
2 Jaffa cakes 250ml sports drink 1 breakfast cereal bar (check the label) 20g sweets e.g. jelly beans/jelly beans/fruit pastilles 125ml fruit juice mixed with 125ml water	4 Jaffa cakes 500ml sports drink 2 breakfast cereal bars (check the labels) 40g jelly type sweets e.g. jelly beans/jelly babies/ fruit pastilles 250ml fruit juice mixed with 250ml water 3 morning coffee biscuits

These foods are all high GI as this allows the body to absorb the glucose quickly which will provide rapid energy and allow muscle uptake of glucose.

Blood glucose

Your thinking ability and reaction time is affected by low and high blood glucose levels, you should begin with checking your blood glucose level prior to activity, during and after. Depending on the length of activity you may need to check more than once during it. This will help you to manage your activity and your diabetes effectively.

Some find that lowering pre-meal insulin may cause an initial rise in blood sugar, which impairs performance. If you find this is the case, discuss with diabetes team what changes may be required.



Check your Blood Glucose before Exercise

If blood glucose is less than 7mmol at the start, it is likely to fall during exercise. You should have a snack before you start (approximately 15 grams carbs unless advised differently by diabetes team). See table above.

If your blood glucose is above 10mmol you do not need a snack at the start but may need something if the activity lasts more than 45 minutes.

If your blood glucose is > 15mmol pre activity:-

If you did not have insulin with your last meal then it is NOT safe to exercise. See below.

When was your last meal?

If meal in last 1-2 hours

- Check blood for ketones- see below

If meal in last 2-3 hours

- Check blood for ketones- see below
- If no ketones, consider a reduced correction dose (half correction dose advised by

meter) prior to starting the activity

If meal 3-4 hours ago or longer

- Check for ketones – see below
- If no ketones - correction dose is required. Consider reduced dose if prolonged activity planned, and discuss with diabetes team regarding your individual requirements
- discuss with team as may need adjustment of meal insulin dose

How to prevent this happening next time:

- **Did you use the exercise 2 function? If yes use exercise 1 function next time**
- **If exercise 1 used, then do not use exercise function next time**
- **If you did not use exercise function but had insulin with meal then discuss with team as may need adjustment of meal insulin dose**

If you do not have access to exercise functions (e.g. if you are on an Omnipod insulin pump), please discuss your individual requirements with the diabetes team.

Ketones

If your blood glucose is above 15 mmol/l, you should check for blood ketones. If you have ketones, you should not take part in any activity until the ketones have gone (Diabetes UK, 2018). You will need to take some insulin for this to happen. See the advice above regarding how much insulin to take.

The information in this leaflet is a starting point when managing exercise when you have diabetes.

Please contact the team and we will be happy to provide you with a personalised plan for you

Personal activity plan

Additional cautions					
Fluid					
Insulin					
Carbs					
Blood glucose check					
Activity					

