



PATIENT INFORMATION

EXERCISE AND TYPE 1 DIABETES



Introduction

Regular exercise is an important part of a healthy lifestyle. All children and young people should do at least one hours activity every day. Adults should aim for at least 30 minutes of exercise five times per week.

Effect of Exercise on Blood Glucose Levels

Exercise may affect your blood glucose, during and after any sport you do.

When you exercise your muscles need glucose for fuel, and insulin is needed to move the glucose into the muscles. It is important to get the balance just right.

Too much insulin and your blood glucose may fall too low during your sport. Too little insulin and your muscles will not be able to use glucose for energy. If this happens your blood glucose may go up, not down.

Different activities will affect your blood glucose differently. High intensity sports for example sprinting and weight lifting may cause blood glucose to rise. Endurance sports such as distance running are more likely to cause a fall in blood glucose.

Interval training can be a useful strategy to reduce the risk of hypoglycaemia. For example a 10 second sprint at the end of a jog, or doing weights before aerobic training.

Use the information in this booklet as a guide to what to do with your food and insulin to enable you to control your diabetes and enjoy your sport.

Checking your blood glucose levels will help you to learn how different activities affect your blood glucose.

THINGS TO CONSIDER WHEN EXERCISING

- Type, duration and intensity of activity
- Blood glucose levels
- Timing of insulin injection/ pump bolus
- Injection / pump infusion sites
- Always carry hypo treatment with you

What is your blood glucose before the exercise?

Your blood glucose before exercise is a good guide to how much insulin is working.

If your blood glucose is within the target range you have enough insulin to lower your blood glucose during your exercise.

If your blood glucose is above 15 mmol/l you may not have enough insulin working, and exercise will not lower your blood glucose (see next page for more information).

When did you last have an insulin injection?

If you exercise within 2 hours of a quick acting insulin injection or bolus your insulin is working at its peak effectiveness so it is more likely your blood glucose will fall.

Where did you do your injection?

If your exercise is just after your insulin, you need to be careful about your injection site. Taking insulin in an arm or leg that is going to be active increases the risk of your blood glucose dropping.

BLOOD GLUCOSE PRIOR TO EXERCISE

7-15 mmol/l is a safe range for your blood glucose before you start exercise.

Below 4 mmol/l – If you have had a hypo during the day then any exercise is likely to cause another hypo. It would be safer not to exercise

4 to 7 mmol/l – Take some carbohydrate to get you above 7mmol/l before you start to exercise

7 to 15 mmol/l – a safe range to begin exercise

Above 15mmol/l – you should check for ketones. If you have a small amount of ketones (0.6-1.5 mmol/l in blood) you could do up to 30 minutes of gentle exercise.

If you have high levels of ketones (above 1.5 mmol/l) you should not exercise until your blood glucose is under 15 mmol/l and you no longer have ketones.

You should give a correction dose of quick acting insulin and recheck your blood glucose levels.

Remember these guidelines are a starting point. Check your blood glucose levels to see how your activity affects you.

WAYS TO MANAGE BLOOD GLUCOSE

You can prevent hypoglycaemia by;

- Reducing insulin doses,
- Increasing carbohydrate intake,
- A combination of increasing carbohydrate intake and reducing insulin doses.

Reducing insulin dose is the best strategy for;

- Planned activities
- When weight loss is desired

Increasing carbohydrate intake is the best strategy for;

- Activities that are unplanned
- If weight loss is not a priority
- If on a mixed insulin regimen

A combination of reduced insulin and additional carbohydrate

- This approach is great for activities of longer duration. For example a days shopping or hiking

Remember– each person is an individual.

These guidelines are a starting point.

Check your blood glucose before, during and after your activity to see what works for you.

HOW DO I REDUCE MY INSULIN DOSE?

Quick Acting Insulin

Adjusting at the meal before or after exercise

- An injection or bolus of quick acting insulin peaks at 90-120 minutes after it is given and then the effect tails off.
- Therefore if exercise is within 2 hours of this dose it should be reduced by approximately 50%.
- This can be tailored according to intensity and duration of activity using the following table.

| % Dose Reduction | | |
|--------------------|--------------------|--------------------|
| Exercise Intensity | 30 min of exercise | 60 min of exercise |
| Low | 25 | 50 |
| Medium | 50 | 75 |
| High | 75 | 100 |

An injection or bolus given within 2 hours after the exercise should also be reduced by 50% or tailored according to the table above.

Adjustments to Quick Acting insulin apply to corrective doses in addition to doses calculated for the carbohydrate consumed.

My exercise plan

Is my exercise within 90-120 minutes of quick acting insulin?

How long am I exercising for?

How intense is my activity?

I plan to reduce my quick acting insulin by.....

Do I eat within 2 hours of finishing my exercise?

Basal insulin (BI)

Your blood glucose may fall while your muscles are recovering from the activity you have done. **This can take up to 20 hours or more.**

If you use an insulin pump or inject Levemir you can reduce basal insulin.

My basal insulin is pump / levemir / other

Pump Basal Rates

Pump basal rates can be reduced by 20-50% from 1 hour before activity starts until 1 hour after it finishes, to reduce hypoglycaemia during the activity.

If you tend to experience hypoglycaemia following the activity, continue the reduced basal rate until blood glucose levels are more stable. For example you may continue a reduced basal rate over night.

Other Basal Insulins

(Tresiba, Toujeo, Lantus, Abasaglar, Semglee)

Other basal insulins cannot be adjusted on a day by day basis as they are too slow to respond. You should consider further reductions in quick acting insulin and/ or increasing carbohydrate to reduce hypoglycaemia during and after exercise.

If you cannot reduce basal insulin you should eat additional carbohydrate after sport and before bed.

Rapid acting carbohydrate, such as sugary drinks or jelly babies, are very useful taken at regular intervals during the activity. (See following pages). Longer acting carbohydrate such as milky drinks, fruit, cereals, sandwich or toast will help to maintain blood glucose levels overnight.

LEVEMIR- When to consider a reduction in basal insulin when it is injected twice a day (on getting up and going to bed)

| | 50% reduction in BI on getting up <u>before</u> exercise | 50% reduction in BI on going to bed <u>after</u> exercise | 20% reduction in BI on going to bed <u>after</u> exercise | 20% reduction in BI on getting up <u>after</u> exercise |
|---|--|---|---|---|
| If the exercise occurs after 16:00 | | | √ | |
| If a new exercise is tried for the first time | | | √ | |
| If the exercise is 2-4 hours in duration | | | √ | |
| High intensity exercise has occurred at any time of day | | | √ | |
| Prolonged exercise (eg a day shopping or a moderate walk for 4 hours or more) | √ | √ | | |
| A days hike or wall papering all day | √ | √ | | √ |

CARBOHYDRATE INTAKE

Carbohydrate (glycogen) stores in the muscles and liver are used up during exercise. Extra carbohydrate may therefore be needed before, during and/ or after exercise to provide fuel for the body.

How much carbohydrate?

As a general guide use you may need 1g of carbohydrate per kg that you weigh for every hour of your activity. For example if you weigh 60kg you may need 60g carbohydrate for one hour of activity. Monitor how this works as it will also be influenced by intensity and duration of the activity.

What type of carbohydrate?

Using rapid acting carbohydrate to top up blood glucose throughout exercise can be useful, especially if the exercise is prolonged. This is known as the drizzle effect. For example 60g carbohydrate in the example above could be taken as 20g at 20 minutes, 40 minutes and at the end of one hour of activity.

My weight = kg

Remember- Additional carbohydrate may not be required for planned activities of short duration if you have made adjustments to your insulin dose.

ADDITIONAL CONSIDERATIONS

Tournaments/Consecutive Training Days

When there is insufficient time to refuel properly between events blood glucose is more likely to fall. Also the effects on blood glucose may be different on match days or competitions due to nerves and/ or excitement.

It is important to monitor blood glucose levels carefully and you may need to increase your carbohydrate intake or reduce your insulin doses further.

Drinks for Sport

It is also important when you are being active that you have plenty to drink. Drink at a rate that is comfortable and practical to replace any fluids lost during the activity.

Hypoglycaemia after Exercise

If your blood glucose does fall after exercise, it may take more hypo treatment to bring your blood glucose back above 4mmol/l.

Use at least 20g carbohydrate. For example

- 240ml of Lucozade Energy,
- 5-7 glucose tablets
- 4 jelly babies
- 200ml orange juice

Once blood glucose is above 4mmol/l follow this with some longer acting carbohydrate to treat exercise related low blood glucose levels.

Always carry hypo treatment with you.

Correcting high blood glucose after exercise

If you normally give correction doses of insulin, be extra cautious following exercise. It is advisable to give only 50% (half) of the correction dose you would normally give.

MY EXERCISE PLAN

What activity do I do?

How intense is it?

How long does it last?

How often do I do it?

My quick acting insulin

Do I inject/ bolus within 2 hours before I exercise?

Do I eat within 2 hours of finishing exercise?

Where do I inject/ infusion site used?

Is this area also used in the activity?

Do I plan to reduce my quick acting insulin dose?

My basal insulin

Can I alter basal insulin? (pump or Levemir)

Blood glucose levels

How often do I check my blood glucose levels?

Have any changes I have made worked?

What will I do differently next time?

Carbohydrate intake

My weight is

Do I need to increase my carbohydrate intake?

The following websites may help you with planning your exercise.

Useful Websites

www.runsweet.com

Www.extod.org

Www.excarbs.com

Also remember to ask your diabetes team for further advice and support.

Given out by:-

Registered Dietitian/ Diabetes Specialist Nurse

Name: _____

Telephone No: _____

If your symptoms or condition worsens, or if you are concerned about anything, please call your GP, 111, or 999.

Feedback

Feedback is really important and useful to us – it can tell us where we are working well and where improvements can be made. There are lots of ways you can share your experience with us including completing our Friends and Family Test – cards are available and can be posted on all wards, departments and clinics at our hospitals. We value your comments and feedback and thank you for taking the time to share this with us.

Patient Advice and Liaison Service (PALS)

If you have any concerns or questions about your care, we advise you to talk with the nurse in charge or the department manager in the first instance as they are best placed to answer any questions or resolve concerns quickly. If the relevant member of staff is unable to help resolve your concern, you can contact the PALS Team. We offer informal help, advice or support about any aspect of hospital services & experiences.

Our PALS team will liaise with the various departments in our hospitals on your behalf, if you feel unable to do so, to resolve your problems and where appropriate refer to outside help.

If you are still unhappy you can contact the Complaints Department, who can investigate your concerns. You can make a complaint orally, electronically or in writing and we can advise and guide you through the complaints procedure.

How to contact PALS:

Telephone Patient Services: 0300 123 1732 or via email at: wah-tr.PET@nhs.net

Opening times:

The PALS telephone lines are open Monday to Thursday from 8.30am to 4.30pm and Friday: 8.30am to 4.00pm. Please be aware that a voicemail service is in use at busy times, but messages will be returned as quickly as possible.

If you are unable to understand this leaflet, please communicate with a member of staff.