

## Exercise management for children and young people with Diabetes

Exercise or physical activity is part of a healthy life style. It makes you feel and look good, improves circulation, reduces blood fats and improves blood glucose levels. Diabetes should not prevent anyone from doing exercise!

During exercise, your muscles require extra energy in the form of glucose. This energy is taken firstly from glycogen (the way your body stores glucose) in the muscles and liver, then from the blood and finally from fat stores.

Different types of exercise have different effects on blood glucose levels:-

**Anaerobic Exercise** is the type of exercise which involves short bursts of intense energy expenditure, for example sprinting or weight lifting. During this type of exercise, blood glucose levels tend to rise and generally do not require an exercise snack.

**Aerobic Exercise** is the type of exercise described as being of constant low level intensity, for example long distance running, cycling, swimming and football. During this type of exercise, blood glucose levels tend to fall.

Some activities however, are a combination of anaerobic and aerobic exercise for example tennis, squash, badminton, basketball and dance. During these types of activities there may be an overall lowering of blood glucose levels due to the duration of the exercise.

In most cases extra activity lowers blood glucose levels and so your blood glucose should be measured before, during (every 30 – 45 minutes) and after exercise.

**How to prevent hypos during and after exercise:-**

- Plan to eat a meal containing low GI carbohydrate 1-3 hours before exercise.
- Eat a meal containing carbohydrate and protein within 2 hours after exercise. If the exercise lasted a long time, you may need to reduce your insulin dose by up to ½ with the next meal. E.g. if you usually take 10 units of rapid acting insulin with your meal take only 5 units.
- Eat a supper before you go to bed (without any rapid acting insulin) if you have done any exercise that day.

## Measure Blood Glucose Levels

Check your blood glucose levels before and during exercise (every 30–45 minutes), and if they are:-

- **less than 4mmol/l** Treat your hypoglycaemia (hypo) **and** eat 15-30 grams of carbohydrate for every ½ hour of planned exercise.
- **4 - 6.9mmol/l** Eat 15-30 grams of carbohydrate for every ½ hour of planned exercise/physical activity.
- **7-14mmol/l** No snack needed, but stop and check blood glucose levels after 30-45 minutes. If levels have fallen to less than 7mmol/l, follow the advice above. If levels have risen to more than 14mmol/l, follow the advice below. Otherwise carry on.
- **more than 14mmol/l** **Check blood ketone level:-**

**Ketones less than 0.6mmol/l** - it should be OK to take part in exercise, but stop after 30-45 minutes to check blood glucose and ketone levels. If these levels have fallen it should be OK to continue with exercise. However, if these levels have risen, **stop** exercising and take a correction dose of rapid acting insulin (e.g. NovoRapid, Humalog or Apidra).

**Ketones over 0.6mmol/l** – **do not** exercise and take a correction dose of rapid acting insulin (e.g. NovoRapid, Humalog or Apidra).

### Example exercise snacks

#### 15 grams of carbohydrate (suitable for a child)

2 jaffa cakes™

250ml isotonic sports drink  
(e.g. Lucozade sport™)

1 cereal bar (check labels)

20 grams of jelly type sweets  
(e.g. jelly babies™ or fruit pastels™)

150ml fruit juice

2 Hob Nobs™ or Rich Tea biscuits™

1 small carton of Ribena™

#### 30 grams of carbohydrate (suitable for a teenager or adult)

4 Jaffa cakes™

500ml isotonic sports drink  
(Lucozade sport™)

2 cereal bars (check labels)

40 grams of jelly type sweets  
(e.g. jelly babies™ or fruit pastels™)

300ml fruit juice

4 Hob Nobs™ or Rich Tea biscuits™

2 small cartons of Ribena™

These snack sizes are only a guide and will need to be adjusted to suit your age/size based on blood glucose levels during and after exercise. If blood glucose levels are too high, reduce snack size. If blood glucose levels are too low, increase snack size.

## Children under five

This age group are active most of the time. Nursery sessions can be considered as part of the normal routine and require no special precautions, but ensure children don't miss snacks. Days out tend to increase activity levels, but treats e.g. ice cream can help to prevent hypos. If swimming, following the advice above. If up late at a party/on holiday, extra snacks may be needed as the body will use more energy than if asleep in bed.

## Primary School Children

Physical education (PE) lessons are often short at this age and so do not generally require an exercise snack, but for activity/sport out of school it may be necessary to follow the precautions above.

## Teenagers

This age group often do competitive sport, and to perform well it is important to maintain blood glucose levels between 4-7 mmols/l during exercise. The advice above should help to achieve this. The diabetes team can give further advice on specific sports if necessary.

## Tips!

- Don't inject over an exercising muscle.
- Always carry sugary food/drinks to treat a hypo and longer acting carbohydrate.
- If you are treating a hypo during exercise, use double the amount of fast acting carbohydrate normally used.
- Tell others you have diabetes i.e. teacher, lifeguard, friend, sports coach.
- Don't exercise if you have ketones above 0.6mmol/l in your/their blood.
- Drink plenty of sugar free fluids.
- Remember blood glucose levels can be affected for up to 24 hours after strenuous exercise.

### Contact details for more information

#### Monday to Friday 9am-5pm

Diabetes doctors: Dr McCrea, Dr Sakremath and Dr Cowley can be reached via the paediatric secretaries on 01952 641222, extension 5981 or 5980

Diabetes nurses: Amanda Stephenson, Sean Petett, Suzanne Digwood, Michelle Taylor, Debbie Turner and Laura Bird on 01743 450855

Diabetes Dietician: Lynn Mander, 01952 641222 extension 4874

#### In an emergency/out of hours

In an emergency during working hours when you cannot reach one of the team above or for out of hours support i.e. after 5pm or at weekends:

All patients requiring advice should contact the Princess Royal Hospital switchboard on 01952 641222 and ask to speak to the paediatric registrar for diabetes advice.

## References

ISPAD Clinical Practice Consensus Guidelines 2014 Compendium –Exercise in Children and Adolescents with Diabetes. Paediatric Diabetes (2014), 15 (suppl. 20): 2003-223

Runsweet.com (2018). Accessed at <http://www.runsweet.com/starting-sports/avoiding-hypos/>