

Recommended Dietary Carbohydrate Intakes (g) Before Exercise

Exercise Intensity and Duration	Blood glucose (mmol/l)	Dietary CHO (g)	Fluid
Brief high-intensity (<30minutes) (e.g. Weights, sprints)	6-10	No food required	Maintain good hydration over the day
Light (30-60mins) (e.g walking 30 minutes), easy pace aerobic exercise 60mins)	<6 >6	15 No food required	Maintain good hydration over the day
Moderate (<45 minutes) (e.g swimming, jogging, tennis, basketball, netball)	<6 6-10 10-14 14+	30-45 15 No food required See note below	Always aim for good hydration before and after exercise but replacing extra fluid during exercise is not essential and will not affect performance.
Moderate (>60 minutes) (e.g. football, cycling)	As above	As above + 10-15g per hour	Replacing fluids during exercise vital Drink 75-200ml for every 15-20 minutes of exercise (age dependant)
Strenuous (<60 minute) (e.g. cycling, canoeing, triathlon, running)	<6 6-10 10-14 14+	45 30-45 15-30 See note below	Replacing fluids during exercise vital Drink 75-200ml for every 15-20 minutes of exercise (age dependant)
Strenuous (>60 minutes)	<6 6-10 10-14	As above + 50g/hour 25-30g/hour 10-15g/hour	Replacing fluids during exercise vital Drink 150-300ml for every 15-20 minutes of exercise (age dependant)

NOTE: Avoid exercising if blood glucose levels are >14mmol/l and ketones are present, use caution if glucose levels are >17mmo/l and no ketones are present

Nutrition and Young Athletes with Type 1 Diabetes

The recommended diet for an athlete with diabetes is no different to that of one without. Although it is not necessary for an athlete with diabetes to follow a rigid pattern of food intake, a reasonably consistent eating routine facilitates diabetes management. Maintaining consistent training and eating routines on a day-to-day basis assists in the establishment of insulin dosage and fine tuning of food intake.

Nearly all forms of activity lasting more than 30 minutes will likely require some adjustment to food and/or insulin. Type of exercise, duration, intensity and when you do it are all factors to consider in carbohydrate requirements and insulin adjustment.

Note: Strength training may not require carbohydrate prior to the activity but may be best taken after.

Maximum performance is achieved when exercising at blood sugars between **4-10mmol/l** (Regular blood sugar testing is vital)

Hyperglycaemia

Athletes with diabetes tend to over-consume food or CHO beverages before or during training or competition to avoid hypoglycaemia. They are more frequently hyperglycaemic which can affect performance and long term control.

- Strength training and short intense exercise (anaerobic) can cause hyperglycaemia due to the hormonal (adrenaline, glucagon) response to training. This is usually only short term lasting typically 30-60mins and can be followed by hypoglycaemia in the hours after finishing the exercise.
- Pre-event nerves can also a rise in blood sugar levels.

Hypoglycaemia and Late Hypoglycaemia

In people with type 1 diabetes, the body cannot reduce insulin levels for exercise like in does in someone who doesn't have diabetes. Exercise increases insulin sensitivity for several hours afterwards. Therefore pre and post exercise insulin reductions may be needed around exercise. Discuss all insulin adjustments with your diabetes team prior to commencing moderate/strenuous exercise. Delayed hypoglycaemia can occur 4-48 hours post exercise.

Choice of Carbohydrate

- Choice of carbohydrate is important to the young athlete.
- Even though they may require more calories a day than their peers, attention must be paid to the type of carbohydrate consumed.
- The glycaemic index is a useful tool for sports advice.
- High GI immediately before, during and after;
- Low GI throughout the rest of the day.

Using Glycaemic Index

- High GI carbohydrate sources before and during exercise provides an almost immediate fuel source for exercising muscles.
- Immediately post exercise a high GI carbohydrate source can help aid muscle recovery.
- Diluted Fruit Juice can be used as the basis of a sports drink effectively despite its lower glycaemic index.
- Watch high fat and high fibre foods (generally low GI) prior to activity, as they may cause abdominal discomfort.
- Meals consumed before (1-3 hours) and after exercise should be based on more slowly released forms of carbohydrate – low GI meals.

When to eat Carbohydrate

- Eating 3 meals a day helps ensure an adequate carbohydrate intake.
- Regular snacks also contribute to achieving total carbohydrate intake as well as maintaining blood sugars levels.
- Pre exercise an easily digested carbohydrate snack 20-30mins before will ensure carbohydrate is available for the activity.
- Eating a good supper on exercise days helps to prevent night time hypoglycaemia and refill the fuel tanks.

.Fluid and Sports

An athlete who exercises at high blood sugars is at high risk of dehydration. Thirst is not a reliable indicator of hydration levels

- Dehydration is dangerous and impairs performance
- Poor glycaemic control and dehydration during exercise should be avoided.
- Young athletes require more fluid than adults as they are less efficient at transferring heat from muscles to skin.

A drinking plan

- Drink at least 500ml in the hour before you exercise.
- Have another 200ml to drink at the beginning of exercise.
- Drink 150-200ml approx 15yr olds (75-100ml for approx 10 year olds) for every 15-20 minutes of exercise Sports drinks can be helpful as this helps hydration and provides fuel.
- Drink at least another 500ml after the exercise is finished.
- Keep drinking until you don't feel thirsty.

Post exercise muscles need to recover.

- Essentially this means replacing glycogen stores and rehydration.
- This is a period which carries increased risk of hypoglycaemia for the young athlete with diabetes.
- Carbohydrate should be eaten consumed within an hour of finishing exercise as well as replace fluids.
- A meal should be eaten ideally within 2 -4 hours of finishing sport, and this should include low GI carbohydrate. Post exercise carbohydrate may or may not need insulin due to increased insulin sensitivity, generally reduction in insulin is required at meal times
- Pre bed a substantial low GI snack is usually necessary to reduce the risk of overnight hypoglycaemia.

Examples of CHO that can be consumed Pre and during exercise:

30g carbohydrate	15g carbohydrate
1/3 cup (45g) dried fruit	20g dried fruit
500ml sports drink	250ml sports drink
2 breakfast cereal bars (check the labels)	1 breakfast cereal bar (check the label)
40g jelly type sweets eg. jelly beans/jelly babies/ fruit pastilles (4 small snakes, 8-10 wine gums/jelly babies)	20g sweets eg. jelly beans/jelly babies etc
250ml fruit juice mixed with 250ml water	125ml fruit juice mixed with 125ml water
2 slices bread	1 slice bread

If you are serious about your sport see your Dietitian to get a specialised food plan to suit your needs and your training!