MEDICATION

t·r·e·n·d™ DIABETES

MANAGING MEALTIME INSULIN

WHY IS THIS LEAFLET FOR YOU?

The blood glucose level in someone who does not have diabetes keeps remarkably steady despite variable meal sizes and amount of activity. This is achieved by the body always producing the right amount of insulin. Learning how to use your mealtime insulin injections correctly can help you to achieve better blood glucose control, reduce your risk of diabetic complications, and to keep feeling well:

- **What is "good blood glucose control" and why is it important?**
- **What is the impact of blood glucose variation?**
- **Getting the most out of your mealtime insulin**
- **Finding the right dose for meals**

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WHAT IS "GOOD BLOOD GLUCOSE CONTROL" & WHY IS IT IMPORTANT?

The blood glucose level in someone without diabetes remains very steady. It does not drop too low, even during fasting, and does not rise too high, even after consuming a large amount of sweet food. This is achieved by the action of insulin, a hormone produced by the pancreas. Insulin lowers blood glucose by moving it into the cells that make up the tissues and organs of the body.

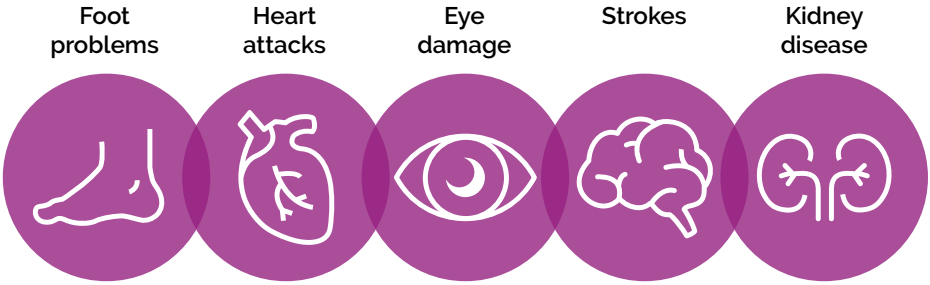
Insulin is produced continuously, even during sleep, to supply cells with glucose for energy. After a meal, greater amounts of insulin are produced to deal with the rise in blood glucose resulting from the digestion of carbohydrates (sugary and starchy foods).

Having diabetes means your body is unable to produce the right amount of insulin to control your blood glucose levels. You can learn how to use your insulin injections to mimic how your natural insulin used to work.

Keeping your blood glucose levels as near as possible to the levels seen in someone without diabetes will keep you feeling well and help to prevent you developing the long-term complications of diabetes. Both your home blood glucose tests and the tests taken by your diabetes team will show how well your diabetes is controlled. For more information on the difference between the tests, see page 6 of this leaflet. You should agree the ideal targets for you with your diabetes team.

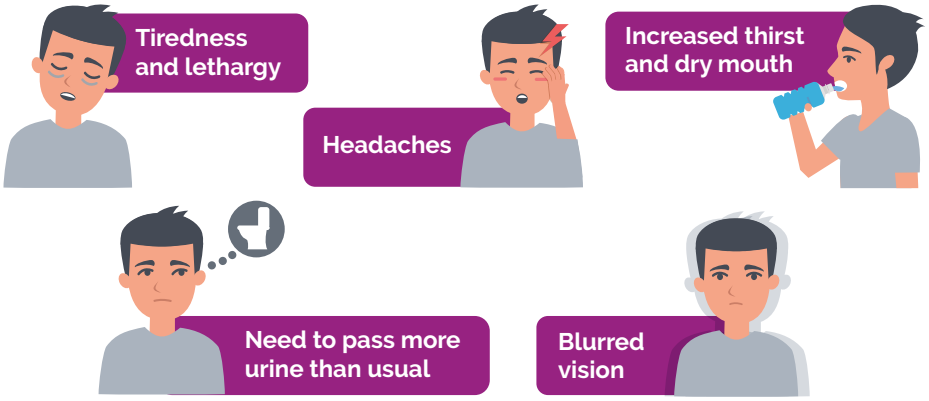
WHAT IS THE IMPACT OF BLOOD GLUCOSE VARIATION?

Keeping your blood glucose levels in target can reduce your risk of long-term diabetes complications. These include:



Although HbA1c results give you and your diabetes team a summary of your overall blood glucose control, they do not show how well it is controlled on a daily basis. Having very variable blood glucose levels, even if your HbA1c is in target, can affect your everyday well-being and increase your risk of diabetes complications.

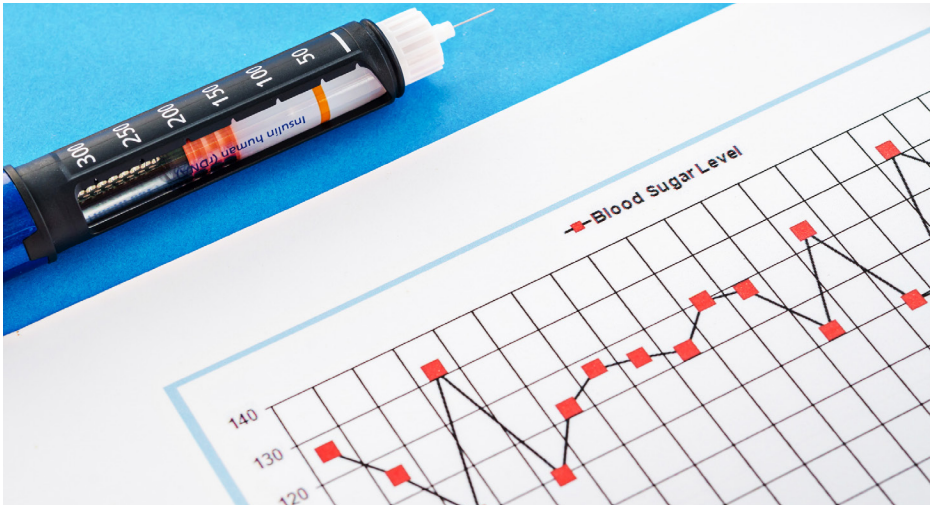
Postmeal hyperglycaemia (high blood glucose levels after meals) can make it difficult to achieve your HbA1c target. Symptoms of hyperglycaemia might include:



Studies show people with diabetes may spend **50% of the day in a postmeal hyperglycaemic state**. Testing your blood glucose levels after eating can identify if you are experiencing hyperglycaemia – something that, without testing, you may be unaware of.

GETTING THE MOST OUT OF YOUR MEALTIME INSULIN

Your mealtime insulin injection is designed to mimic the bursts of insulin your body used to produce in response to food. Its purpose is to control your postmeal glucose level. Testing before and 2 hours after a meal will show you if the dose you have injected has worked effectively. Keeping a record of your blood glucose levels with information about doses, meals and activity levels will help you to learn what works for you.



Other factors that will help your mealtime insulin to work well:

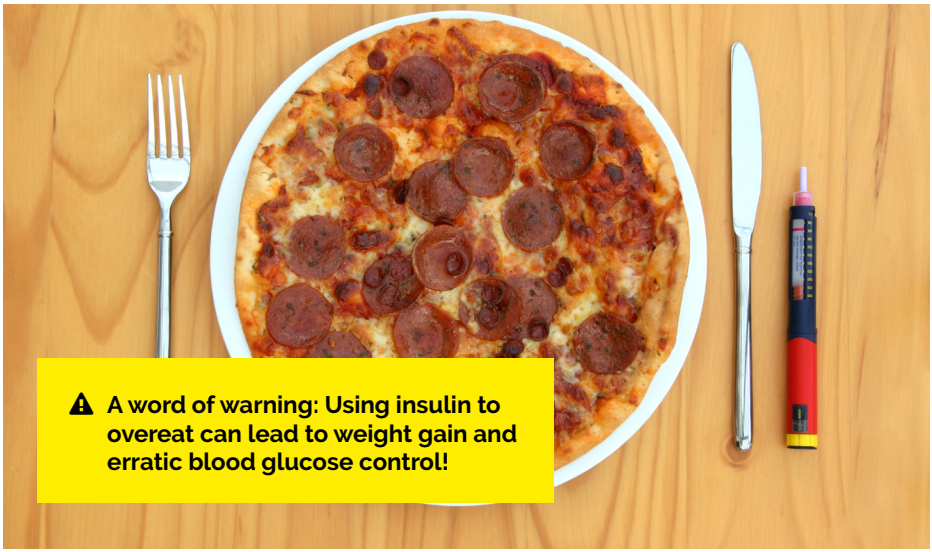
- Good injection technique - www.injectiontechniquematters.org.uk
- Injecting at the correct time (this is usually just before a meal).
- Suitable injection sites (into fat under the skin, usually in the abdomen, thighs and buttocks. Ask your diabetes nurse to advise).
- Varying your injection sites so you do not get a build up of fat and scar tissue. Sites should be checked at least annually at your diabetes review.
- Using an appropriate needle length (4 mm is right for most people).
- Accurate carbohydrate counting (see next page).
- Adjusting the dose adequately to compensate for physical activity.

Finally, most people using mealtime insulin will also be using long-acting (basal or background) insulin once or twice daily. The purpose of this insulin is to keep the blood glucose steady and in target between meals and overnight. It is important the dose, timing of the injection, and type of this insulin is right, so your mealtime insulin dose can work effectively.

FINDING THE RIGHT DOSE FOR MEALS

The foods we eat are classified as fats, proteins and carbohydrates. Carbohydrates include all sugary and starchy foods including fruits. These are digested in the gut to release glucose, which passes into the bloodstream causing a rise in blood glucose levels. Even "healthy" carbohydrates like wholegrain bread and high-fibre cereals increase blood glucose levels. The larger the amount of carbohydrate consumed, the larger the amount of glucose is released into the bloodstream. In someone without diabetes, the amount of insulin their body produces after a meal adapts to the size of the meal consumed so the blood glucose level remains steady. This ability is lost in someone with diabetes.

Mealtime insulin injections are designed to mimic the mealtime bursts of insulin your body used to produce. With suitable education, you may be able to learn how to adjust your insulin doses to match the amount of carbohydrate you wish to eat, or be aware of the foods that cause postmeal hyperglycaemia and be able to vary your portion sizes to improve your blood glucose levels. Matching insulin doses to specific amounts of carbohydrate consumed is called carbohydrate counting (or carb counting). You will need a referral to a dietitian or a structured education course to learn how to count carbohydrates properly. There are a number of carb counting apps and smart meters available to support this skill. Other factors like activity levels, presence of illness, fibre and fat content of the meal, and your premeal blood glucose level need to be taken into account when calculating your dose of insulin.



BLOOD GLUCOSE TESTS

- **Fasting plasma glucose (FPG):** A measure of your blood glucose level taken after not eating or drinking for at least 8 hours (usually before breakfast)
- **Postmeal (or postprandial) glucose (PPG):** A measure of your blood glucose level taken 1 to 2 hours after a meal
- **Glycated haemoglobin (HbA1c):** Gives a summary of your blood glucose levels before and after meals for the preceding 3 months. It is measured in mmol/mol, not the mmol/L units used by your blood testing meter. If you have type 1 diabetes, you should aim to achieve 48 mmol/mol or lower. If you have type 2 diabetes, 48 to 53 mmol/mol (depending on type of medication) is ideal. However, the right target for you should be discussed with your diabetes team, with a focus on minimising the risks of hypoglycaemia
- **Time in target:** If you are using continuous glucose or flash monitoring, you can see what proportion of each day you are within your glucose target range

YOUR NOTES

SUMMARY:

- Having diabetes means your body is not able to produce the right amount of insulin to control your blood glucose levels, particularly after meals.
- Poorly controlled diabetes can affect your daily well-being and can increase your risk of developing diabetes complications.
- Regular glucose testing before and after meals and learning to use your insulin correctly will help you to get good blood glucose control and minimise your risk of diabetes-related complications.

USEFUL RESOURCES:

Trend Diabetes: www.trenddiabetes.online
Diabetes UK: www.diabetes.org.uk
Diabetes UK: 0345 123 2399
Carbs & Cals: www.carbsandcals.com

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