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NHS
Sherwood Forest Hospitals
NHS Foundation Trust

A guide for insulin pump users
Food bolus options

Information for patients

Aim

The aim of this leaflet is to give you information on the different insulin pump bolus settings available, plus guidance on which bolus to use for the type of food you are eating.

Introduction

When using an insulin pump, you need to give insulin to cover the carbohydrate (CHO) in meals and snacks you eat. This is called a bolus dose.

Different food will have different effects on you blood glucose levels. Changing the type of bolus you give to match the carbohydrate in your meal or snack will help to keep you blood glucose levels in control. However, make sure that you count the CHO content of your meal correctly.

Before using the bolus options on your pump, make sure that you have turned on the bolus function (also known as the bolus calculator or bolus wizard). You can access this through settings > system set up / bolus wizard. Please ask your dietitian or diabetes specialist nurse to support you with this if you are unsure.

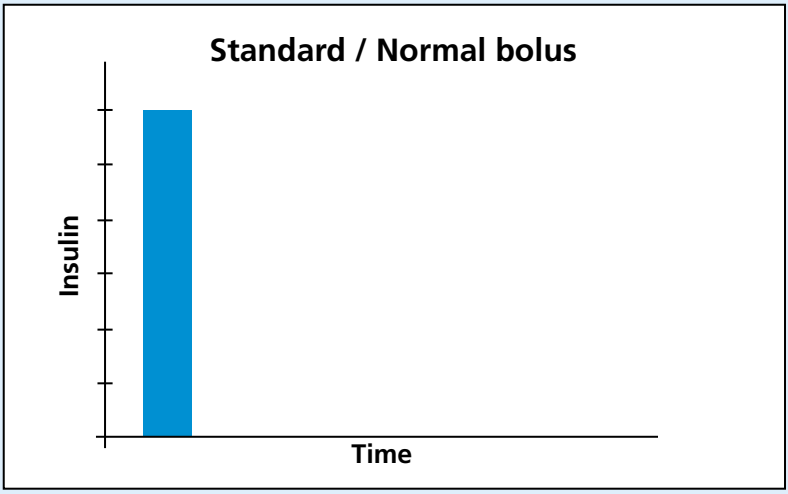
Your insulin pump gives different bolus options, e.g. standard, extended, combo or dual wave bolus, and the names will depend on the pump that you are using. The best one to choose will depend on the food that you are eating.

The different bolus options will be explained individually.

Choosing the type of bolus to use

1. Normal or standard bolus

This option delivers the full amount of insulin straight away.



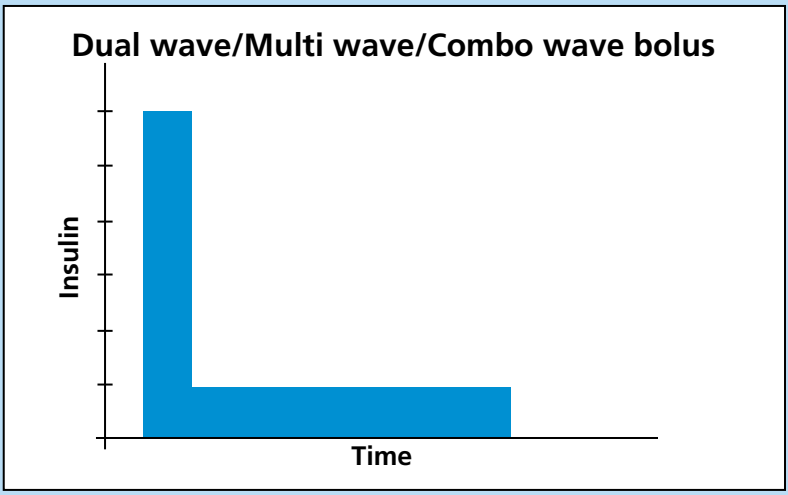
A standard bolus is the best option for foods which release glucose quickly into the bloodstream.

This includes food with a high glycaemic index (GI), e.g. white toast and jam or refined breakfast cereals. It is also used for snacks less than 25g carbohydrate and correction doses.

If you are using Novorapid, Humalog or Apidra in your pump, giving your bolus 15 – 20 minutes before eating will help minimise the rise in your blood glucose levels when eating a high GI food.

2. Dual wave/multiwave/combo bolus

This bolus option means that the insulin is delivered in two stages. The first stage is when some of the insulin is delivered as a standard (normal) bolus and the second stage is where the rest of the insulin dose is delivered over a period of time chosen by you (1-8 hours).



You will therefore need to consider the composition of the food you are eating, e.g. is it higher in fat/protein, therefore requires a longer duration?

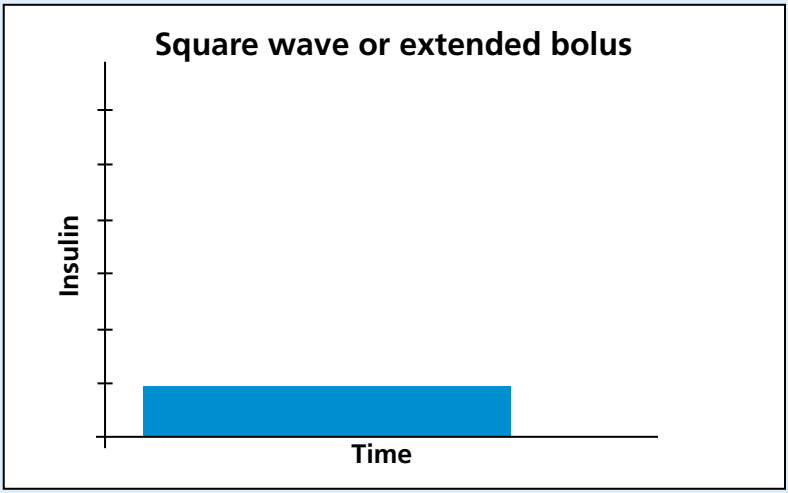
Example

A suitable starting point is: 60/40 split where 60% of the bolus is delivered up front as a standard bolus, and 40% is extended over a chosen duration most suitable to match the glucose absorption from the meal.

This type of bolus should be used for mixed meals where you are eating carbohydrate, protein and vegetables, e.g. meat, potato and vegetables or pasta with a cheesy sauce.

3. Square wave or extended bolus

This bolus gives you the option of delivering the insulin required for your meal gradually, over a longer period of time.



It can be useful to choose this option if you are eating over a long period of time, e.g. a buffet style restaurant, parties, or when snacking while watching a film.

You may also be advised to use this type of bolus if you are having problems with delayed stomach emptying related to your diabetes (a condition called gastroparesis).

The period of time you should deliver the insulin depends on your individual response to the food you eat.

Two hours is a useful starting point but large carbohydrate meals which contain a lot of fat may need up to six hours.

If you require more guidance on bolus options please contact your diabetes specialist dietitian or diabetes specialist nurse.

Factors that affects the blood glucose response to meals include:

1. Glycaemic index (GI)

The GI is a guide to how carbohydrate foods affect your blood glucose levels. A high GI food increases the blood glucose levels quickly for a shorter amount of time, whereas a low GI food results in a slower and more prolonged rise in your blood glucose levels, therefore two meals with the same carbohydrate content can affect your blood glucose levels differently depending on their glycaemic index.

Food	Low GI	High GI
Starches	Multi-grain bread, chapatti, noodles, pasta, basmati rice, sweet potato	Crumpet, bagel, white bread, baguette, white rice, mash potato
Cereals	Porridge, All Bran	Rice Krispies, Cornflakes, Cheerios, Cocopops
Fruit	Apple, banana, orange, mango, peaches	Grapes, watermelon
Vegetables and pulses	Sweetcorn, peas, carrots, beans, lentils, plantain	Swede
Confectionary	Yoghurts, ice cream, chocolate,	Rice crackers, pancakes, donuts

2. Fat and protein

The presence of fat (fried food, butter, cream, cheese) and protein (meat, fish, eggs) as part of a meal will slow down the time of digestion which will cause the glucose to be released slower into the bloodstream.

3. Fibre

Food high in fibre such as granary breads, wholegrain or bran cereals, fruits, vegetables, beans, pulses and potato skins are digested and released more slowly.

4. Meal size

A large amount of carbohydrate will take longer to digest than a smaller amount.

5. Processing

Easy cook rice has a higher GI than basmati rice and rolled oats has a higher GI than whole jumbo oats. This is due to the processing methods.

6. Cooking method

Mashed potato has a higher GI than boiled new potato in the skin.

7. Ripeness

A riper banana will have a higher GI than an unripe banana as the starch naturally breaks down into sugar and is digested and absorbed more quickly.

Meal or snack type	Example of meal	Bolus option	Time
High GI snack	Biscuits, crisps, fruit, cereal bars	Standard	Deliver 15-20 minutes before eating unless using Fiasp/Lyumjev.
High GI breakfast	White toast or Cheerios, Coocpops	Standard unless pairing with additional high protein/fat sources.	Deliver 15-20 minutes before eating unless using Fiasp/Lyumjev.
Breakfast with mixed high and low GI and protein	Egg, bacon, sausage, baked beans with white toast.	Multi wave/dual wave start with a 60/40 split	Deliver 15-20 minutes before eating unless using Fiasp/Lyumjev. Extend over **1-2 hours**
Small carbohydrate meal with high GI, low fat.	White bread sandwich	Standard or multi wave/dual wave 60/40 split	Deliver 15-20 minutes before eating unless using Fiasp/Lyumjev. If multi wave/dual wave over **30-60mins**
Low fat, high GI mixed meal, large CHO load	Fish fingers with mash potato and peas or Chicken with easy cook rice and vegetables	Consider multi wave/dual wave Start with a 60/40 split	Deliver 15-20 minutes before eating, unless using Fiasp/Lyumjev. Extend over **1-2 hours**
High fat, high GI mixed meal	Bacon sandwich with yoghurt, crisps and choc bar or roast dinner	Consider multi wave/dual wave Try a 60/40 or 50/50 split	Deliver 15-20 minutes before eating, unless using Fiasp/Lyumjev. Extend over **1-3 hours**
Low fat, low GI mixed meal	Pasta with tomato sauce	Consider multi wave/dual wave Start with a 60/40 or 50/50 split	Deliver 15-20 minutes before eating, unless using Fiasp/Lyumjev. Extend over **1-3 hours**
High fat, low GI mixed meal	Pasta with cheese sauce Pizza Indian takeaways	Multi wave/dual wave 50/50 or 40/60 split	Deliver 15-20 minutes before eating, unless using Fiasp/Lyumjev. **4 + hours**

How does the GI effect my choice of bolus?

When eaten in large quantities, foods with a lower GI may require you to extend your bolus for longer, therefore knowledge of GI and carbohydrate quantity of your foods will help you to decide the most suitable bolus option.

What do I do if I decide to have more food such as a pudding, while the bolus is still running?

It is possible to deliver a standard bolus (top-up) while a dual or multi-wave bolus is running. This is useful if you decide to eat extra food.

The delivery of insulin can also be stopped if necessary e.g. if you made a mistake or do not eat as much as expected.

How do I know if the bolus is working?

To check if the standard bolus worked, check your blood glucose levels two hours after eating. This reading should be no more than 2-4 mmol above your pre-meal reading.

For a dual-wave, multi-wave or combo bolus, you should check your blood glucose levels every 2 hours for the duration of the bolus, and 2 hours after.

For example, if you used a dual-wave bolus option over two hours, check your pre-meal blood glucose level, then again two hours after eating and again at 4 hours after eating.

You will be able to assess if the chosen bolus worked for the food eaten or if you need to try something different. Your dietitian or specialist nurse can help you with this.

Accounting for fats and proteins

Some people will find that they need to allow for fats and protein when giving their insulin bolus, particularly if the meal has more than 30g of fat, or 40g of protein.

If you find that your blood glucose levels are still above target range two to three hours after your meal, then you may wish to consider adding additional insulin to the bolus, as well as altering the way in which the insulin is delivered.

Rather than counting fats and proteins gram for gram, you may wish to trial a 20-25% increased bolus at the meal while ensuring that you split your insulin dose, again starting with a 60:40 split over two to three hours. Based on your after meal tests you can increase you insulin in 5-10% increments if your blood glucose remains raised; but do not increase above 40%. If the 60:40 split does not work well, consider a different split or extension duration, dependent on blood glucose trend.

It is essential to ensure that you monitor regularly when you are trialling this to ensure safety.

Please note these are starting suggestions, please discuss with your diabetes team before and during trying these additions.

Notes

Nutrition and Dietetics Department

Clinic 5, King's Treatment Centre, King's Mill Hospital
Mansfield Road, Sutton in Ashfield, Nottinghamshire, NG174JL
01623 622515, extension **6025**

Further sources of information

NHS Choices: www.nhs.uk/conditions
Our website: www.sfh-tr.nhs.uk

Patient Experience Team (PET)

PET is available to help with any of your compliments, concerns or complaints, and will ensure a prompt and efficient service.

King's Mill Hospital: 01623 672222
Newark Hospital: 01636 685692
Email: sfh-tr.PET@nhs.net

If you would like this information in an alternative format, for example large print or easy read, or if you need help with communicating with us, for example because you use British Sign Language, please let us know.
You can call the Patient Experience Team on 01623 672222 or email sfh-tr.PET@nhs.net.

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