

Insulin Pump Bolus Options

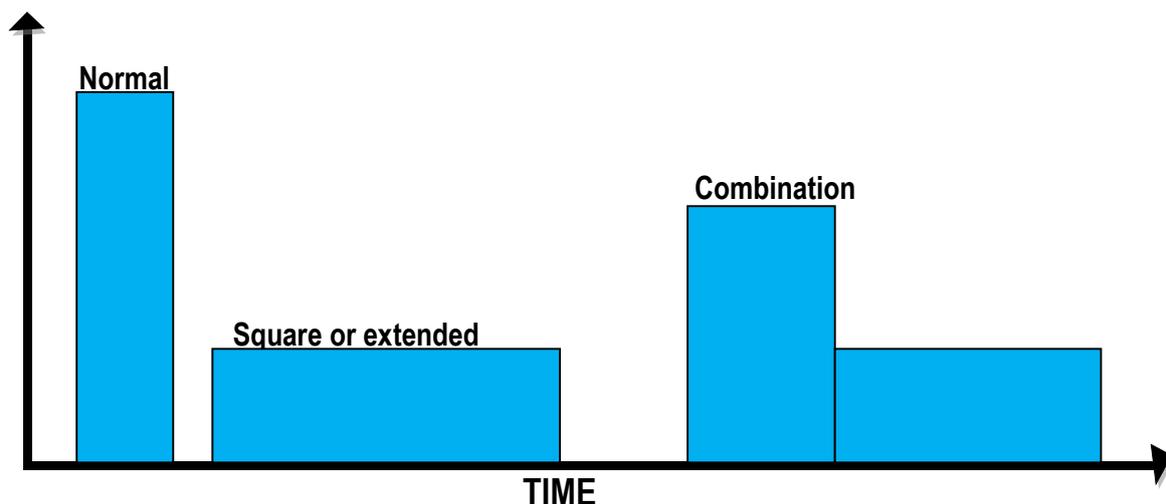
Paediatric Diabetes Department

When you use an insulin pump, the insulin given to cover food is called an insulin bolus. Different foods and meals have different effects on your blood glucose levels, depending on the glycaemic index (GI), fat and protein content and meal size. The same meal can have different responses in different people.

Using the different bolus options will allow you to match insulin delivery to post-meal blood glucose responses. 2-3 hours after a meal, the blood glucose should be below 9mmol/l.

Currently available bolus insulin delivery options using insulin pumps:

Insulin dose



A **normal** bolus is similar to an injection of insulin, where all of the insulin for the meal is given in one go. The other types of bolus deliver the insulin over a period of time.

A **square** bolus is where the total bolus of insulin is evenly spread out over time. It can be used for long spread-out meals such as buffets.

A **combination** bolus is a normal bolus and a square bolus. Some of the bolus is delivered immediately and the rest is delivered slowly over a period of time. You can choose how much is given upfront and how much time the bolus is extended over. This type of bolus matches mixed meals better than a normal bolus.

Start with a combination type bolus for all mixed meals eaten in the evening. Give 50% of the insulin as the immediate part of the bolus and the remaining 50% over 2.5 hours.

Use the normal bolus for breakfast, snacks and small meals. If you are going to be active within 2 hours of eating, you may find that you are better using a normal bolus.

Each insulin pump has its own terminology to name the bolus options:

Bolus Type	Medtronic	Roche	Omnipod
Normal	Normal	Normal	Bolus
Square or extended	Square	Extended	Extended
Combination Bolus	Dual Wave	Multiwave	Extended

Very high fat/protein meals

Meals that contain large amounts of fat (20g or more) and/or large amounts of protein (25g or more) may cause high blood glucose levels 3 - 5+ hours after eating.

Smaller amounts may impact the blood glucose levels of younger children. If high fat and or/protein meals cause high blood glucose levels 3 – 5 hours after eating, try extending the bolus for longer, for example, over 3 hours.

Some meals may also require larger doses of insulin - *Speak to your dietitian for more guidance.*

Tricky meals



Fish and chips
Pizza
Pasta with creamy sauces

Indian takeaway
Chinese takeaway
Fast food meals

Try starting with giving 50% of total dose now and 50% over 2 hours.

How to monitor if it's working

Keep a record of the type of bolus given then adjust the insulin delivery according to the blood glucose levels. You should find over time that you recognise the impact of certain meal types on the blood glucose levels.

With blood glucose monitoring (finger prick checks)

- Test blood glucose level pre- meal
- Test blood glucose level after 2 hours
- Test blood glucose level after 6 hours

With CGM or flash glucose monitoring

Download your sensor and look at the glucose profile over 6 hours after the meal has been eaten.

After 2 hours – this test tells us if the initial insulin dose % needs adjusting:

If blood glucose level > 4mmol/l higher than pre meal:

Increase initial split by 10% - e.g. from 50% now and 50% extendedto 60% now and 40% extended.

If blood glucose level lower than pre-meal:

Reduce the initial split by 10% - e.g. from 50% now and 50% extendedto 40% now and 60% extended.

After 6 hours – this test tells us if you need to extend for longer or need more insulin.

If blood glucose level at 6 hours is 2 - 6mmol/l higher than before meal:

Consider extending the bolus for longer than 2 hours.

There has been research to suggest that any excess fat and protein in meals will get converted to glucose by the liver - therefore, may require more insulin.

Therefore if extending the length of time the bolus does not work, consider giving additional insulin by inputting additional carbs - *Speak to your dietitian for more guidance.*

Other Considerations

- The combination type bolus can be useful for young children for all meals. Try 50% upfront and 50% over 1 hour for breakfast and lunch. The bolus can be stopped if the meal is not finished.
- Ensure the pump is not disconnected while the bolus is running. For example, consider when the meal is in relation to bath time or showering.

Speak to the Dietitians if you would like further advice and support.

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Further Information

We endeavour to provide an excellent service at all times, but should you have any concerns please, in the first instance, raise these with the Matron, Senior Nurse or Manager on duty. If they cannot resolve your concern, please contact our Patient Experience Team on 01932 723553 or email asp-tr.patient.advice@nhs.net. If you remain concerned, the team can also advise upon how to make a formal complaint.

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