Mersey and West Lancashire Teaching Hospitals NHS Trust

Preventing post-meal glucose spikes on an insulin pump

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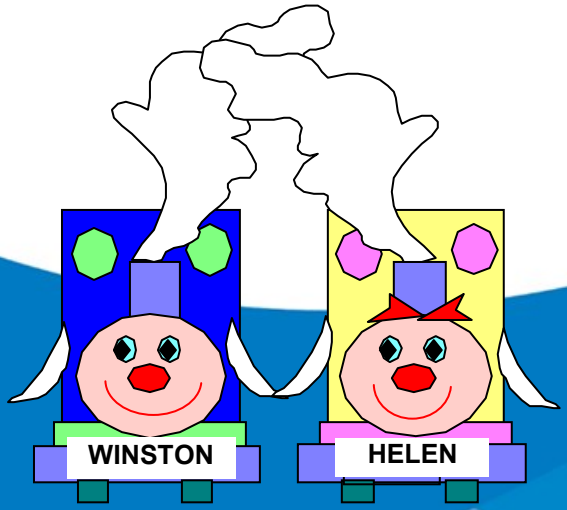

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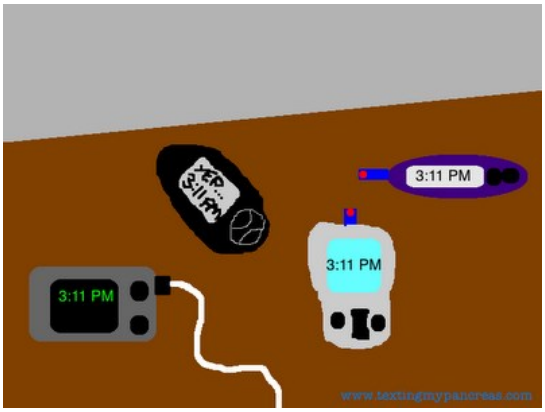
Introduction

This leaflet provides information on:

- What can cause spikes after meals
- How to reduce spikes after meals
- What glycaemic index (GI) is
- What a Superbolus is
- When to consider using a Superbolus.



What causes blood glucose spikes after meals?

There are several factors that might contribute to a blood glucose spike after meals including:

- **Giving insulin too late:** As a general rule rapid-acting insulin (Novorapid, Apidra, Humalog) should be given 15-20 minutes before meals or snacks as this time is required for the insulin to work. On Fiasp, just before eating is fine.
- **Inaccurate insulin to carbohydrate ratio:** If your glucose levels always spikes within 2 hours of a meal, no matter what you eat then your insulin to carbohydrate ratio likely needs adjusting.
- **Inaccurate carbohydrate counting:** If you underestimate the carbohydrate portion in your food this will cause your glucose levels to spike. If you overestimate the carbohydrate in your food this will cause your glucose levels to drop. Doublecheck foods by weighing and speak to your dietitian if you need any support with carbohydrate counting.
- **Eating high GI food:** high GI foods are foods containing carbohydrate that raise blood glucose levels quickly. Blood glucose spikes are common after eating high GI carbohydrate when it is eaten alone. Such as:
    - Toast/bread alone or with jam, lemon curd etc. (e.g. white bread, French roll)
    - Highly processed breakfast cereals such as cornflakes, coco pops, rice-based cereals etc.

See table on page 4 for GI values of different foods.

How can I reduce post-meal spikes?

You can often reduce spikes after meals by altering your food choices. Some of the tips below can help you to “strike the spike”:

- **Give insulin before** all meals and snacks.
- Choose healthy sources of **low glycaemic index (GI) carbohydrates** in place of high GI carbohydrates (see GI table on page 4).
- **Include fibre** in your meals such as: wholegrains, fruits, vegetables, beans, pulses, nuts and seeds.
- **Include a source of protein** with your meals such as: eggs, meat, fish, beans/pulses, tofu, yoghurt and low fat cheese.
- **Include heathy fats** with your meal such as: nuts, seeds, avocado, olive oil, oily fish.
- **Keep active**. Being physically active increases insulin sensitivity for many hours afterwards which can help to keep blood glucose levels in target range. Try to be physically active every day.

What is Glycaemic Index (GI)?

The glycaemic index (GI) is a scale (from 1-100) of how quickly individual carbohydrate-containing foods raise blood glucose levels.

Pure glucose is used as a reference and is given a value of 100 as it very rapidly raises blood glucose levels.

- High GI foods are given a value greater than 70 and raise blood glucose levels quickly.
- Low GI foods are given a value of less than 55 and these give a slower rise in blood glucose levels that lasts for longer.

See page 4 for the GI values of different foods.

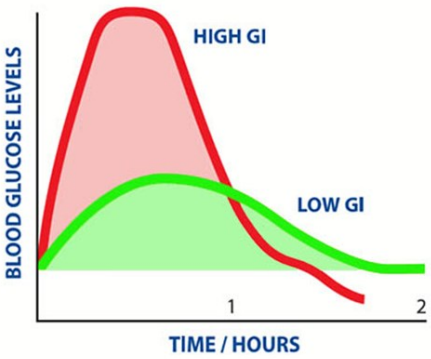


Table: GI of foods

	Low GI (less than 55)	Medium GI (55-70)	High GI (over 70)
Breakfast cereals	All bran, muesli, porridge	Some muesli, instant porridge, shredded wheat, weetabix	Coco pops, cornflakes, rice crispies, cheerios
Bread	Rye bread, soy & linseed bread, multigrain bread, pumpernickel bread, some sourdough	Wholemeal bread, malt loaf, pitta bread, sourdough	White bread, baguette, bagel
Potatoes and grains	Pasta, soba noodles, basmati rice, quinoa, bulgur wheat	Sweet potato, new potato, brown rice, rice noodles, cous cous	Mashed potatoes, baked potatoes, french fries, instant mashed potato, white easy cook rice
Beans/Pulses	Baked beans, blackeye beans, chickpeas, butter beans, kidney beans, lentils, peas		Broad beans
Fruits	Apple, apricot, banana, orange, peach, pear, cherries, berries, nectarine, strawberries, grapes	Mango, pineapple, raisins/sultanas, melon, papaya	Watermelon
Vegetables	Carrots, peas	Sweetcorn	Pumpkin, parsnip
Dairy & alternatives	Milk, soy milk, fromage frais, crème fraiche, yoghurt, probiotic drinks	Some sweetened yoghurts, oat milk	Rice milk
Confectionary	Chocolate, jam	Ice cream, crisps	Pancakes, sweets

When to consider doing a Superbolus

A Superbolus may be something to consider on occasions when eating high glycaemic index (GI) foods where:

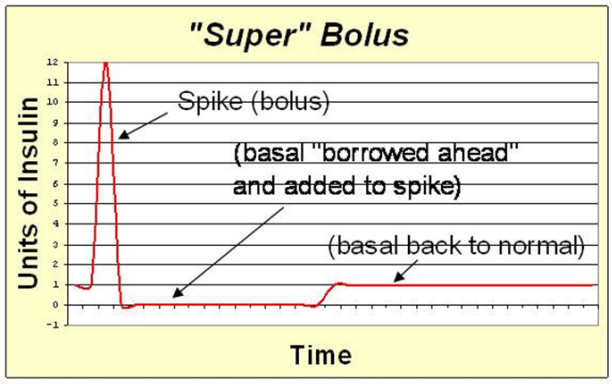
- Blood glucose spikes 1-2 hours after meal and
- Blood glucose drops back to target a few hours later before next meal (with no correction).

What is a Superbolus?

A Superbolus is where you hit the glucose spike hard by giving more insulin where you need it to help reduce the spike.

You do this by:

- Borrowing some basal insulin, usually two hours and add this to the meal insulin bolus
- You then set a 0% temporary basal for 2 hours
- So effectively no extra insulin is given overall, you are just giving more where you need it and less where you do not.



Example:

Bart is having cornflakes for breakfast which always causes him to have a spike afterwards, despite giving his insulin bolus 20 minutes before eating and carbohydrate counting accurately. So Bart would like to do a Superbolus.

Bart is having 40g carbohydrate in his cornflakes and he is on 1:10g ratio (4 units)

Bart's basal insulin at that time is 1.0 units/hour

So 2 hours basal insulin is (1.0 x 2 = 2.0 units)

So Bart's total bolus to be given for the meal would be insulin for cornflake (4units) + insulin

for 2 hours' borrowed basal (2 units) = 6.0 units

He then puts a 0% temporary basal on, at the start of the meal, for 2 hours.

Please note that if you are on a hybrid-closed loop pump such as:

- **Medtronic 670G in Automode**
- **Medtronic 780G in Smartguard**
- **T:Slim with Control IQ**
- **CamAPS FX**

then the information regarding superboluses in this leaflet does not apply to you.

If you would like any support with reducing spikes in blood glucose after meals or Superboluses, or if you have any further questions please contact your diabetes team.

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