



Whittington Guide to fat and protein insulin dosing using Multiple Daily Injections (MDI) and Insulin Pumps

This information sheet is based on the principles from OzDAFNE

When does Carbohydrate Counting work well?

- When you weigh foods regularly.
- When you convert weighed portions into household measures – Saves time!
- When you inject insulin 15-20 minutes before eating.
- When you plan ahead before eating out.
- When you eat your usual well-balanced meals.

When is Carbohydrate Counting not so effective?

- When you eat meals that are **high in fat and protein**, much higher than your usual well-balanced meals.
- Your insulin to carbohydrate ratio will calculate an accurate insulin dose to cover your usual well-balanced meals. But it may not calculate enough insulin if your meal is very high in fat and protein.

Why?

Research has shown that high protein and high fat meals cause delayed hyperglycaemia in some people with type 1 diabetes. This delayed rise in blood glucose can occur up to five to six hours after eating high protein and high fat meals despite accurate carbohydrate counting. High fat and protein meals delay digestion and absorption of carbohydrate and cause some insulin resistance after the meal.

**Questions to ask before considering insulin for fat and protein?

- 1) Is your background insulin dose correct? (E.g., do your blood glucose levels stay relatively steady over a 24hour period if no carbohydrates eaten / carb free meal?)
- 2) Are your carbohydrate ratios correct? (E.g., do you blood glucose levels return to pre meal levels by 3-4 hours post meal?)
- 3) Is your carbohydrate counting accurate?
- 4) Have you ruled other causes that can increase your glucose e.g., illness, infection, stress, extra carbohydrates after meals?
- 5) We do know from research that not everyone needs supplemental insulin for high protein/fat meals and there are large individual differences in requirements. So, ask yourself – have I noticed a pattern that after certain meals my blood glucose levels remain high?



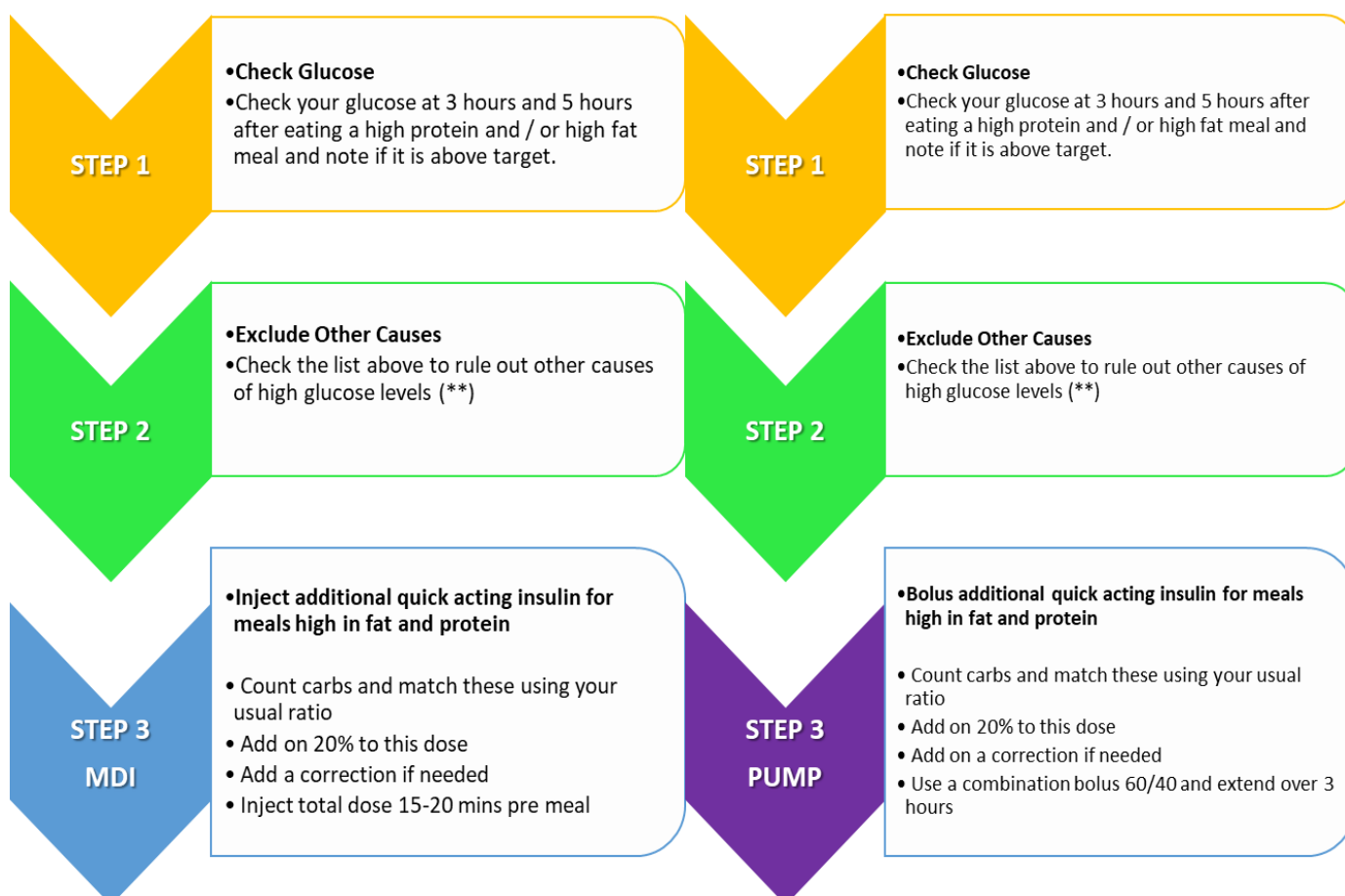
A safe starting point is to review your blood glucose results after meals on multiple occasions and identify meals that cause a delayed rise in glucose levels for you personally.

What might this look like in a real meal?

- Creamy or cheesy pasta dishes
- Fast food e.g., pizza, burger and fries
- Fish and chips
- Curries or other Asian dishes
- Pastries
- Desserts

The effect of fat and protein on glucose is very individual. A general guide is that more than 30 g of fat in a food or meal is classed as high fat. A general guide is that more than 40 g of protein in a food or meal is classed as high protein.

How to add-on an insulin dose for fat and protein: Recommendations



Example:

Half a large deep pan pepperoni pizza weighing 305g has 85g carbohydrates, 41g protein and 46g of fat.

Adding a protein/fat supplement:

- 1:10g ratio for carbohydrate in pizza = 8.5 units
- 20%* supplement for the fat and protein in the pizza = 1.7 units of additional insulin
- 10 units given for the pizza
- Inject 15-20 mins prior to meal
- You can try splitting into 2 doses but limited evidence to support this
- If using pump therapy deliver as a combination bolus (approximately 15-20 mins pre meal) 60% / 40% and extend over 2.5-3 hours



*You may find you need to increase up to 30% however, if you feel you need more than a 30% increase, please speak with your diabetes team.

If you are drinking alcohol with or after the meal, it may be safer not to use an add on fat / protein insulin dose and wait to see a pattern.

Be cautious with add-on fat / protein insulin doses that are larger than normal for you. Remember that larger quick acting insulin doses can work for longer than expected.

The above is a safe starting point. For pump users you may find you need to increase up to 40% extra insulin. Depending on glucose results at 3 and 5 hours post meal you may find you need a 70% / 30% split and increase/decrease the extension by 1 hour.

Insulin dosing – high protein only

More than 50g protein when eaten without carbohydrate may also need to be dosed for.

- Count a carb free high protein meal as 10g for the whole meal
- Calculate your quick acting dose using your usual ratio
- Inject / give a normal or standard bolus pre meal.



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