

# Adjusting Insulin Using an Insulin Pump (Child)

Good glucose control means you have to make regular, small adjustments to your basal rates and bolus insulin. Routine meal and snack times, monitoring your blood glucose at least 4–6 times a day, and keeping a record gives you the information you need to make adjustments based on patterns in your readings.

## Basal Insulin Adjustment

Your total basal insulin should be about 50% of your total daily dose (TDD) of insulin. Review your pump history and compare total bolus to total basal insulin for the past week.

### Do I need a change?

- If your morning blood glucose pattern is *higher* than your target 3 days in a row or *lower* than your target 2 days in a row, adjust your night time basal rates based on the midnight, 3 a.m., and morning blood glucose results.
- See what your basal rates are by skipping a meal and checking your blood glucose every 2 hours. For example, check your blood glucose at your normal wake up time then again every 2 hours through the morning. If the basal rate is correct the glucose should not change more than 2.0 mmol/L when no food is eaten. This test is best done when the blood glucose is 5.0–9.0. If you are hungry you can eat small amounts of protein or any amount of carbohydrate-free foods such as diet Jell-O® or “free” vegetables. Do the test again another day to confirm that you have a basal profile that seems to be working.
- It may be hard for you to skip a meal. Instead, skip snacks and eat 3 meals (with 4–5 hours between them). Check the blood glucose before, and 2 hours after meals and record. If the blood glucose reading is in range (5.0–10.0) after the meal but rises before the next meal time, your basal rate needs to be increased.
- Your basal rate may be too high if you have a pattern of low blood glucose at night, when you delay or miss meals or snacks, or you have a lot of lows.
- Your basal rate may be too low if you have a pattern of high blood glucose when you delay or miss meals or snacks, your blood glucose is often high and needs correction boluses, or your total basal insulin is less than 50% of your TDD.

### How do I make a change?

- Start the basal rate change at least 2 hours before the rise or fall in blood glucose level was noted. For example if your blood sugar at noon was 5.8 mmol/L and then steadily rose to 9.2 mmol/L by 4 p.m., then start the increase in basal rate at 10 a.m.

- If your current basal level is 0.0–0.35 units/hr, adjust the rate by 0.05.
- If your current basal level is 0.4–1.0 units/hr, adjust the rate by 0.1.
- If your current basal level is more than 1.0, adjust the rate by 0.2.

### **Tips**

- Don't do an unusual activity during the basal rate assessment.
- A temporary basal rate change helps when you are sick to prevent hypoglycemia and hyperglycemia without changing your basal settings.
- Try setting up an Alternate Basal Profile to test out basal changes you are thinking about or use the Temporary Basal feature on your pump.
- Record your new basal rates.

## **Meal Bolus Insulin Adjustment**

Insulin delivered for meals and snacks is calculated using Insulin to Carbohydrate Ratios (I:C). Assess your ratios at all meals and snacks as they can be very different. Take your bolus before eating to see what your I:C really is. You **must** be exact when counting carbohydrates.

### **Do I need a change?**

- I:C can be checked by testing blood glucose before and 2 hours after eating.
- Plan to do this 2-hour check when your pre-meal blood glucose is target.
- Aim for blood glucose 2 hours after eating between 5.0–10.0mmol/L.
- Other ways for you to reach your post-meal targets include giving bolus insulin 10–15 minutes before your meal unless you have low blood glucose.

### **How do I make a change?**

- For a low blood glucose after a meal, adjust your I:C ratio for that meal. For example, if your lunch ratio is 1:10 and at 2 hours after lunch your blood glucose is 3.8, you would change the lunch ratio to 1:12.
- For high blood glucose after a meal adjust your meal ratio for that meal. For example, if your supper ratio is 1:18 and 2 hours after supper your blood glucose is 17.8, you would change your supper ratio to 1:15.

## Insulin Sensitivity Factor (ISF)

The ISF (also known as a Correction Factor) is how much the blood glucose drops when you give 1 unit of insulin. For example: An ISF of 3 means 1 unit of insulin would drop the blood glucose by 3 mmol/L. An accurate ISF helps you predict the correction of high blood glucose back to your target. Your ISF will need to change over time as your TDD increases as you grow.

### Do I need a change?

- The ISF is calculated by dividing your average total daily dose of insulin in to 100. For example, if your average total daily dose of insulin is 20, then your ISF would be 5 (100 divided by 20). Check your Pump History for your average total daily dose.
- Test your ISF by correcting a blood glucose over 10, after making sure your ketones are negative and there has been no insulin on board for 4 hours or carbohydrate for 4 hours.
- Check your blood glucose every hour for 4 hours after giving the correction bolus. Do not eat for 4 hours unless your blood sugar goes low.
- An accurate ISF will bring high readings down to your target within 3–4 hours.

### How do I make a change?

- If your blood glucose stays high for the 4 hours after giving the correction bolus then the ISF is too high. For example if the ISF is 3.5 and after the correction your blood glucose is over 10 mmol/L then change the ISF to 3.0.
- If your blood glucose drops to less than target within 4 hours after the correction bolus then the ISF is too low. For example if the ISF is 3.5 and after the correction your blood glucose is 3.8 mmol/L then change the ISF to 4.0.

#### Tip

- Assess your pump settings when you are well and at a normal stress and activity level.

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*This material is for information purposes only. It should not be used in place of medical advice, instruction and/or treatment. If you have questions, speak with your doctor or appropriate healthcare provider.*