

Making Adjustments for Exercise

Physical activity can cause your blood sugar to vary. It is important to check your blood sugar before, during, and after exercise to get to know your body's response to exercise. The effects of exercise on your diabetes will depend on how well-trained you are in the particular sport, and the duration and intensity of the activity. General guidelines are offered below, but adjustments must be individualized.

- Check your blood sugar before you begin any exercise. If your blood sugar is between 70 - 100 mg/dl, eat a snack with 10-15 grams of carbohydrate. See "Snacking to Prevent Hypoglycemia." Optimum pre-exercise blood sugar levels depend on the age of the child and the planned activity. Please check with your provider to fine tune your plan.
- If your blood sugar is above 300 mg/dl, check your urine for ketones. If you have ketones, you need insulin. Do not exercise until you have given an insulin correction and your blood sugar is coming down. Even if you do not have ketones, you may need some insulin to improve blood sugar and maximize performance.

Physical activity causes muscles to become more sensitive to insulin. This means you may need less insulin during the activity and likely afterwards. You may also need to snack during the activity to prevent low blood sugar. Over time, your body can become more conditioned to exercise and you may need to make changes to the amount of insulin and snacks you take. Below are recommendations for insulin adjustments for exercise. These insulin reductions apply to the Humalog or Novolog that would be peaking during the exercise following a meal, and assumes that no extra snack was eaten before the exercise. Calculate your mealtime dose based on the grams of carbohydrate and the blood sugar level and then reduce your total dose based on the table below.

Insulin adjustments for meal dose:

Reduce Meal Dose: for activity within 2 hours after meal

Duration	Intensity		
	Low	Moderate	High
60 min of Exercise cut your insulin by:	10 – 20 %	20 – 40 %	30 – 60 %
90 min of Exercise cut your insulin by:	15 – 30 %	30 – 55 %	45 – 75 %
120 min of Exercise cut your insulin by:	20 – 40 %	40 – 70 %	60 – 90 %

Insulin adjustments if you are on a pump:

You can use the meal bolus adjustment on the previous page or you can do an adjustment with your basal rate as shown below. (Or you may want to do a combination of both meal and basal adjustments).

Basal Adjustments for Insulin Pumps

- If your pump will be **on** during the activity, program a temporary basal rate at 50% starting 1 hour prior to the activity, keep it running at 50% during the activity and for 2-4 hours after the activity (and sometimes longer).
- If you **disconnect from your pump** during the activity, program a temporary basal rate at 50% one hour prior to the activity, disconnect during the activity, and reconnect hourly and bolus 50% of your usual hourly basal rate. A temporary basal rate reduction may be needed for 2-4 hours after the activity (and sometimes longer) to prevent delayed low blood sugar.
- Decreasing the basal rate to 50% is a starting point and may need to be adjusted.

- Strenuous or long duration exercise may cause delayed low blood sugar reactions. This is due to two things. First, insulin works better during and after exercising. Second, exercise can use up the sugar stored in your muscles and liver (called glycogen). When glycogen stores are depleted, the glucose in the blood is drawn into the muscles to refill the stores. Blood sugar levels can drop for up to 24 hours after strenuous or prolonged activity. This can cause unexpected hypoglycemia.
- Some forms of physical activity may cause a brief rise in your blood sugar. This is due to a surge of adrenaline. This hormone sends a message to the liver to release stored sugar into the bloodstream. Activities that may cause this include: competitive events, weight lifting (especially with high weight and low repetition), and sports that involve short bursts of activity such as sprints, swimming, wrestling, baseball, etc. Most of the time, “training” and “playing for fun” tend to decrease blood sugar. However, if the stress of competition, or sports with brief bursts of activity, causes your blood sugar to rise, then you may need a **partial** bolus of insulin prior to the activity to help keep your blood sugar closer to target range.
- Exercise may require both an insulin adjustment and extra carbohydrate snacks. If your child’s activity is before or between meals, a small snack, not covered with insulin, both prior to the activity, and during the activity would be appropriate. See Snacking to Prevent Hypoglycemia (next page).

Snacking to Prevent Hypoglycemia

- If your blood sugar is less than 70 mg/dl prior to exercise, first treat the low blood sugar with 15 grams of fast acting carbohydrate (such as 4 ounces of fruit juice), wait 15 minutes and recheck your blood sugar. If the blood sugar is still below 100 mg/dl, take another 15 grams of fast acting carbohydrate. Do not exercise until your blood sugar is above 100 mg/dl.
- If your blood sugar is between 70 - 100 mg/dl prior to exercise, eat 10-15 grams of carbohydrate before exercising and do not cover this carbohydrate with insulin.
- Eat 10-15 grams of carbohydrate *per hour* for prolonged activity. For higher intensity exercise you may need to increase the number of grams of carbohydrate. Remember you may also need an insulin adjustment for higher intensity and prolonged activity. Choose fast acting forms of carbohydrate like sports drinks, diluted juice, fruit, or crackers.
- If blood sugar is between 70 - 100 mg/dl after exercise, you may need a 10-15 gram carbohydrate snack without insulin coverage to prevent delayed-onset hypoglycemia. This snack will help to replenish muscle and liver glycogen stores. Adding a small amount of protein to this snack could also be beneficial.
- If you experience a low blood sugar during or after your activity, you stand the risk of having another low blood sugar later. You should check your blood sugar during the middle of the night and treat low blood sugar levels as needed.

These are guidelines, record keeping and frequent blood sugar checks are important for you to learn your child's response to exercise.