

Ready, Set, Go!

How to Manage Exercise and Diabetes

Effects of Exercise on Blood Sugar

Low Blood Sugars

Most people experience a drop in blood sugar from exercise. In order to manage your blood sugars, it is important to understand how and why your blood sugar may drop from exercise. During exercise your muscles use glucose for their fuel. Glucose enters the muscle cells through receptors. Insulin is the key to opening the glucose receptors. When you exercise, the receptors on your cells become more sensitive to insulin, which allows glucose to enter the muscle cells more quickly. Because of the increased sensitivity, your blood sugar can get low if you don't make a change in insulin or eat or drink extra carbohydrates. The effects of exercise can last for many hours after the activity has ended. You can see a drop in blood sug-

ar up to 12 to 24 hours later. On the other side you will find some tips on how to prevent low blood sugars during or after exercise.

High Blood Sugars

While exercise usually causes a drop in blood sugar, it can also cause blood sugars to rise. Blood sugars can rise after exercise if you do not have enough insulin around before you start exercising and your blood sugar is already high. Because of the lack of insulin, the glucose will remain in the blood stream instead of entering the muscle cells. Also, adrenaline can be released during exercise and that

causes the liver to release glucose to the blood stream. As a result the blood sugar rises and you can have a higher blood sugar at the end of exercise than you did at the beginning. Anaerobic exercise like weightlifting or sprinting can cause high blood sugars as well. If your blood sugar is consistently running >300 and you wish to exercise, talk with your health care provider about getting your blood sugars in better control before starting an exercise program.



Be Prepared!

In order to have a safe and fun time playing or exercising, it's important to have the following with you:

Extra snacks that contain carbohydrates:

- Fruit
- Crackers
- Granola bars
- Gatorade

Foods to treat low blood sugar:

- Juice
- Glucose Tablets
- Regular pop

Water:

It is important to drink lots of water to stay hydrated. Cool, plain water is recommended for fluid replacement before, during and after exercise.

ID Bracelet or necklace

Tips for Preventing Low Blood Sugars

If your blood sugar before exercise is:	Before exercise:	During exercise
Less than 90 mg/dl	10-20 gm carb	15 gm carb per hour**
90 -124 mg/dl	10-20 gm carb	15 gm carb per hour**
125-180 mg/dl	0 gm carb	15 gm carb per hour**
181-250 mg/dl	0 gm carb	
>250 mg/dl	*check ketones if high bg is unexplained	



*If blood ketones are >0.6, actions are required before starting any exercise.

**See below for more recommendations on extra carbohydrates.

Testing, Testing, Testing!

Since exercise affects each person differently, the most important and helpful tool in managing exercise and blood sugars is testing or using CGM data. If you are not using a CGM, we recommend that you test your blood sugar before, during (if of long duration) and after exercise to determine how exercise affects you and how your adjustments in carbohydrates and insulin are working. Keeping records is also an important tool in helping you see your patterns and know what adjustments to make for future exercise of the same type.

Extra Carbohydrates

Do you always need extra carbohydrates for exercise? Well that depends on a number of factors. These factors include the duration of the activity, the intensity of the workout, the time and size of your last meal or snack, active insulin and the type of exercise you do. If the activity is long in duration (30 minutes or more), you will usually need extra carbohydrates. If the activity is strenu-

ous (running, cycling, soccer, football, hockey, basketball or skiing) you will need extra carbohydrates. If you recently ate a larger meal or snack than usual, needing an extra snack will depend on the exercise length and intensity. Above is a chart that can help you with carbohydrate adjustments for exercise. Remember though, that everybody reacts to exercise differently and this chart is just a guide and may need to be adjusted for your personal situation. The amount of carbohydrates you need also depends on your size. Testing blood sugars before, during and after exercise or using your CGM data will tell you how these adjustments are working.

When you need extra carbohydrates will depend not only on what your blood sugar is before you exercise, but also on when you experience blood sugar drops. For example, if you experience drops in blood sugar during exercise, then add extra carbohydrates before exercise;

if your blood sugar drops right after exercising then add carbohydrates during the activity; if your blood sugar drops hours after an activity, then add extra carbohydrates after exercising.

Less Insulin

Insulin often needs to be reduced to prevent a low blood sugar during or after exercise. You will need to reduce the insulin that is having its main effect at the time you will be exercising. For example, if you are going to be exercising after a meal, then your rapid acting (Humalog, Novolog or Apidra) insulin may need to be reduced. If you are going to be exercising all day, then both rapid and long acting insulins (Lantus, Levemir, Basaglar) may need to be reduced. Pump patients may disconnect from their pumps, decrease or use temporary basal rates and/or decrease boluses. Doses may need to be reduced by **10-50%** depending on the intensity and duration of the exercise. To determine if and how much to reduce your dose, talk to your diabetes care provider before the planned exercise.