

# Exercise and Diabetes

(This is information only. These guidelines were written by Shirley Powell, PA-C. They do not replace your provider's recommendations. Check with your provider before using)

## Benefits of exercise

- Helps lower blood sugar levels
- Helps people feel better
- Reduces stress
- Helps people maintain proper body weight or loose weight loss
- Lowers the bad cholesterol and triglycerides and raises the good cholesterol
- Lowers blood pressure and heart rate (pulse)
- Helps maintain normal blood circulation to the feet
- Improves insulin sensitivity
- Reduces the need for insulin or other drugs.

## Getting started:

- **Types of exercise**
  - The best exercise is the one you like
  - Aerobic exercise helps heart fitness. Aerobic exercise includes jogging, walking, swimming, or bicycling, etc. Aerobic exercise is usually for 30 minutes or more.
  - Anaerobic exercise is short burst of exercise with rests. These included weight lifting and other strength building.
  - Flexibility exercises such as yoga and stretching are important also. These maintain body tone.
  - Exercise to avoid is boxing due to eye or brain damage, heavy weight lifting if eye damage present and dangerous sports (such as scuba diving) if blood glucose is uncontrolled.
- **When to exercise**
  - Exercise can be done at any time of the day. Your diabetes management can be adjusted to suit your lifestyle. Your life style does not have to be adjusted to fit your diabetes,
  - If blood or urine ketones are elevated exercise should not be done. Exercise can raise the ketone level higher.
- **Getting started**
  - Start slow and gradually extend the time.
  - Goal is 5 times per week for at least 30 minutes of aerobic exercise

- Determine your goal of exercise: (Maximum hear rate is 220 minus your age)
  - Reduce risk of heart disease
    - Exercise 5 times per week, 30 minutes at 40% maximum heart rate
  - Get physically fit
    - Exercise 5 times per week, 30 minutes at 70-90% maximum heart rate
  - Lose weight
    - Exercise 5 times per week, 60 minutes at 45-60% maximum heart rate

### **Suggestions for exercising safely:**

- Prevent low blood glucose
  - Check blood glucose before, during and after exercise
  - Adjust insulin
  - Have snacks available
- Evaluate for delayed hypoglycemia
  - Delayed hypoglycemia refers to a low blood glucose that can occur 12-24 hours after exercise. Occurs because extra surge in the blood goes back into muscle storage while asleep
    - Requires
      - Monitoring of blood glucose and evaluate for low blood glucose
    - Prevented by
      - Eat extra carbohydrate at the next meal or snack (even if blood glucose is above range)
      - Eat a longer acting snack (including solid carbohydrate, protein and fat) at bedtime
      - Reduce insulin bolus at dinner or basal insulin at night
- Wear ID bracelet
- Choose proper socks and shoes for the type of activity
- Drink plenty of water
- Exercise with a friend who knows about low blood glucose reactions. Also tell coaches and other instructors about low blood glucose and treatment.
- Carry treatment for hypoglycemia (rapid acting sugar) with you at all times of exercise
- Do not exercise if ketones are present
- Eat before heavy exercise
- Try to have blood glucose above 180 mg/dl for heavy exercise
- Have extra snacks available during exercise, some people use Gatorade 4-8 ounces for every 30 minutes of vigorous exercise
- Reduce insulin dose, basal or bolus as appropriate.
- Consider changing the injection site of insulin; use the stomach for most strenuous exercise.

**Extra food to cover exercise**

**Extra food to cover moderate degree of exercise**

<b>Expected length of exercise</b>	<b>Blood Glucose in mg/dl</b>	<b>Examples of food</b>
<b>Short duration (15-30 minutes)</b>	< 80 mg/dl	8 oz Gatorade or milk (15 to 20 gm carbohydrates)
	80-150 mg/dl	A fresh fruit (15 gram of carbohydrate)
	> 150 mg/dl	None
<b>Longer duration (30-120 minutes)</b>	< 80 mg/dl	8 oz Gatorade or milk, plus ½ sandwich (20 to 50 gm carbohydrates)
	80-150 mg/dl	8 oz Gatorade or milk plus fresh fruit (30 grams carbohydrate)
	> 150 mg/dl	½ sandwich (15 gm carbohydrates)
<b>Longest duration (2-4 hours)</b>	< 80 mg/dl	8 oz Gatorade or milk, plus whole sandwich (45-50 gm carbohydrates)
	80-150 mg/dl	Fresh fruit plus a whole sandwich (25-50 gm carbohydrates)
	> 150 mg/dl	Whole sandwich (30 gm carbohydrates)

**Examples of food to add for exercise (each equals 10-15 gm carbohydrate)**

<b>Food</b>	<b>Amount</b>	<b>Beverages</b>	<b>Amount</b>
Chewy granola bars	½ bar	Juice	4 ounces
Dried fruit	¼ cup	Regular soda	4 ounces
Fig bars	1 bar	Gatorade or sports drinks	8 ounces
Fruit and cereal bars	½ bar		
Fruit rolls	1		
Fruit snacks	½ pouch		
Grapes	15		
Raisins	2 tbsp		

## Exercise and insulin adjustments

### Exercise and insulin adjustments

<b>Exercise Duration (minutes)</b>	<b>Intensity</b>	<b>Blood glucose level (mg/dl)</b>	<b>Possible decrease in basal insulin (% decrease)</b>	<b>Possible decrease in bolus insulin (% decrease)</b>
< 30 minutes	Mild (e.g., walking)	> 180 mg/dl	0-50 %	50%
30- 60 minutes	Moderate (e.g., tennis)	Approximately 150 mg/dl	50-100%	50-75%
> 60 minutes	Intense (e.g., jogging)	Approximately 120 mg/dl	80-100%	75-100%

**See other table for insulin dosing with exercise  
Attached**

**Exercise and diabetes:**

**How your blood glucose affect performance**

<b>How your blood glucose affect performance</b>		
<b>BLOOD GLUCOSE</b>	<b>EFFECTS ON GLUCOSE AND INSULIN ON METABOLISM</b>	<b>IMPACT ON PERFORMANCE</b>
<b>&lt;70 mg/dl</b>	Too much insulin and not enough glucose available to the cells	Fatigue and poor performance
<b>70-80 mg/dl</b>	Efficient fuel flow	Maximum performance
<b>&gt;180 mg/dl</b>	Insulin level is okay, blood sugars come down	Performance may be reduced, exercise is okay
<b>&gt; 250 mg/dl</b>	Insulin level determines whether glucose rises or fall (usually falls)	Fatigue, poor performance, check ketones. No exercise if have ketones. Consider taking insulin bolus before exercise.

**How your insulin level affects performance**

<b>How your insulin level affects performance</b>				
<b>INSULIN LEVEL</b>	<b>LEVEL OF STRESS HORMONES</b>	<b>EFFECON ON GLUCOSE AND FAT STORES</b>	<b>EFFECT ON BLOOD GLUCOSE</b>	<b>EFFECT ON PERFORMANCE</b>
<b>LOW</b>	Increased	Less glucose enters muscles, more release and fat stores	High and rising	Poor performance possible ketosis
<b>IDEAL</b>	Normal	Glucose enters muscles, glucose and fat are released as fuel normally	Level	Optimal performance
<b>HIGH</b>	Decreased until hypoglycemia begins	More glucose enters muscles, less release from, glucose and fat stores	Low or falling	Poor performance probable hypoglycemia

