

## Diabetes and Exercise

Exercise has many benefits for everyone, but it is especially important for individuals with diabetes. Regular exercise benefits both Type 1 and Type 2 diabetes. Here are some of the advantages of regular exercise:

- Exercise improves cardiovascular fitness to decrease your risk of developing coronary artery disease which is by far the most common complication of diabetes.
- Regular exercise decreases the LDL cholesterol (“bad” cholesterol) and increases the HDL cholesterol (“good” cholesterol).
- Exercise improves blood sugar control by allowing your muscles to use insulin more effectively, by maintaining or reducing your weight and by increasing muscle to promote glucose use. This may decrease the amount of insulin or oral hypoglycemic agent you need.
- Exercise reduces blood pressure and may reduce your chances of developing the complications of diabetes.
- Finally, exercise improves your strength, self-image and feeling of well being.

### Some suggestions for beginning an exercise program

- Check with your doctor before starting an exercise program, especially if you are over 40.
- Make exercise a habit by choosing activities that you enjoy and that you can incorporate easily into your daily schedule. Begin slowly and gradually to increase the intensity and duration of exercise. Exercise aerobically up to 6 times per week.
- Aerobic exercise is recommended, including fast walking, jogging, swimming, skiing, cycling, jumping rope, aerobic dance, and water aerobics.

### **Precautions for Persons with Type 1 Diabetes**

The primary concern is the risk for hypoglycemia and/or hyperglycemia.

Hypoglycemia can be caused by:

- Too little food
- Exercising without increasing food intake
- Exercising when your insulin is peaking

Hyperglycemia can occur if blood glucose is high before exercising.\*

\* If you start exercising without enough insulin (blood glucose reads high) blood glucose and ketones will rise higher. Exercise does not help your muscles use glucose if there is not enough insulin. Muscles use glucose to meet the demands of exercise. Your liver will produce more glucose to meet your muscles need for glucose, but since insulin levels are low the additional glucose produced by the liver acts to increase the blood glucose further. Your blood glucose must be in good control before exercising.

## Your Exercise Prescription

Your exercise should follow a prescription that includes how long (duration), how often (frequency) and how much (intensity) exercise you'll do to meet your specific goals. Each of these areas (duration, frequency and intensity) should be based on your present activity level, age and goals. Here are general recommendations:

**Duration** - A minimum of 20 minutes is needed to improve your fitness level. 30-40 minutes is a good goal and you may want to go longer – up to 60 minutes – if weight loss or weight control is a concern.

**Frequency** – Three times a week is the recommended minimum number of exercise sessions, but for good blood sugar control daily exercise is best.

**Intensity** – You need to exercise vigorously enough to increase your heart rate and breathing to sufficient levels, but not so hard as to cause exhaustion. The intensity of an activity can be judged by using two methods – your *heart rate* or your *perception of effort*.

The first method of judging the intensity of your exercise effort is to measure your exercise heart rate.

**To calculate your target heart rate... Target Heart Rate =  $(220 - \text{Age}) \times 0.6$  to  $0.8$**

### Example:

**Bridget is a 45 year old woman who calculates her maximum heart rate at**

$$220 - 45 \text{ years old} = 175$$

Multiply the maximum heart rate by the factors 0.6 and 0.8 to get the range for your target heart rate.  $175 \times .60$  (or 60%) = **105** and  $175 \times .80$  (or 80%) = **140**

Bridget's target heart rate is between **105** and **140**

The second method for gauging the intensity of your exercise is to use your rating of perception of effort or RPE (see chart at right). A rating of “fairly light” to “somewhat hard” during activity is recommended. At this level you should be able to talk in short sentences, be breathing a little harder and getting warm.

You should modify your activities according to your heart rate and RPE guidelines. Ask your specialist for assistance in determining the proper intensity for you.

#### Perceived Exertion Scale

- 6
- 7 Very, Very Light
- 8
- 9 Very Light
- 10
- 11 Fairly Light
- 12
- 13 Somewhat Hard
- 14
- 15 Hard
- 16
- 17 Very Hard
- 18
- 19 Very, Very Hard
- 20

| Guidelines for Exercise                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type 1                                                                                                                                                                                                                                                                                                                                                                                                                | Type 2                                                                                                                                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>Exercise after meals, not before</li> <li>Monitor blood glucose levels before and after exercise</li> <li>May need to increase food intake before exercise</li> <li>May need to adjust insulin</li> <li>Make sure blood glucose is in good control; do not exercise if blood glucose is greater than 250 mg/dl</li> <li>Inject insulin into non-active muscle group</li> </ul> | <ul style="list-style-type: none"> <li>Start slowly with mild exercise—gradually increase intensity</li> <li>Aim to exercise 3-4 times per week</li> <li>Low impact to prevent bone injury is best</li> <li>Extra snacks are often not required</li> <li>Strengthening and flexibility activities are encouraged</li> <li>Avoid strenuous exercise and high intensity weight-lifting</li> </ul> |

## Guidelines for Adjusting Food Intake During Exercise

| <i>Type of exercise</i>                                                                              | <i>If blood glucose is</i> | <i>Increase food intake by</i>                                                      |
|------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------|
| <b>Short duration</b><br>30-45 minutes,<br>walking ½mile; leisurely<br>biking 1 mile                 | Less than 100 mg           | 10-15g carbohydrate per hour<br>1 fruit or 1 starch serving                         |
|                                                                                                      | 100mg/dl or above          | Not necessary to eat more                                                           |
| <b>Moderate intensity</b><br>30-60 minutes<br>tennis, swimming, jogging,<br>leisure cycling, golfing | Less than 100 mg           | 20-50g carbohydrate per hour<br>2 fruit or 2 starch, 1 meat and 1<br>milk serving   |
|                                                                                                      | 100-180 mg/dl              | 15g carbohydrate per hour<br>1 fruit or 1 starch serving                            |
|                                                                                                      | 180-250mg/dl               | Not necessary to eat more                                                           |
| <b>Strenuous</b><br>60 minutes<br>football, hockey, soccer,<br>swimming, snow shoveling              | Less than 100 mg/dl        | 50g carbohydrate per hour<br>2 starch, 1 fruit, 1 milk and 1-2<br>meat servings     |
|                                                                                                      | 100-180mg/dl               | 25-50g carbohydrate per hour<br>2 starch or 2 starch, 1 fruit and<br>1 milk serving |
|                                                                                                      | 180-250mg/dl               | 10-15g carbohydrate per hour<br>1 fruit or 1 starch serving                         |

### Important

- If your blood glucose is greater than 250 mg/dl, do not exercise until it is under control.
- If you use insulin or take pills, always carry some emergency sugar source with you such as glucose tablets or hard candy.
- If you have insulin-dependent diabetes, carry identification with you at all times indicating you have diabetes.

If you have more questions please contact UW Health at one of the phone numbers listed below.

Nutrition Clinic Room 193  
University Station  
2880 University Avenue  
Madison, WI 53705  
(608) 263-5012

Nutrition Clinic Room 1296  
UW Health West Clinic  
451 Junction Road  
Madison, WI 53717  
(608) 265-7526

Nutrition Clinic Room 2085  
UW Health East Clinic  
5249 East Terrace Drive  
Madison, WI 53718  
(608) 265-0963