An Ounce of Prevention: Exercise and Fitness with Diabetes

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Objectives

- Give healthcare providers the motivation and ability to teach patients the role of exercise in management of diabetes.
- Address barriers
  - Bariatric patients
  - Poor mobility
  - Pain
  - Limited means
  - Poor weather
  - Apathy toward exercise

Exercise = Better Management of Blood Sugar

- Glucose without insulin is the primary source of fuel used during exercise
- Muscles get the glucose they need and blood glucose decreases
- This effect happens regardless of if the patient is insulin resistant or does not produce enough insulin.
- For Type 2 DM and prediabetes, exercise enhances sensitivity to insulin—increasing cellular uptake of glucose from the blood
- Cells utilize glucose more efficiently/improved glucose tolerance

Management of Blood Sugar, Continued...

- In individuals with Type 1 DM and those with Type 2 DM using insulin, regular exercise reduces insulin requirements.
- Important exercise benefits for individuals with either Type 1 or Type 2 DM or prediabetes include improvement in CVD risk factors, i.e.
  - Lipid Profiles
  - Blood Pressure
  - Body Weight
  - Functional Capacity
  - Well-Being
- Regular exercise may prevent or delay transition from prediabetes to Type 2 DM

Improved Circulation!

- Increasing heart rate through aerobic exercise strengthens the heart, increasing blood flow through vessels.
- This effect decreased blood pressure, making arteries more elastic.
- Which helps alleviate Peripheral Vascular Disease (narrow vessels to legs & feet).
- Prevent damage to feet and legs—diabetes is responsible for 60% of lower limb amputations not caused by trauma. This is due to nerve damage and decreased blood flow from plaque build-up in arteries.
- Exercise helps lower cholesterol, decreasing risk of heart attack by reducing blockages in arteries (atherosclerotic).
Exercise Recommendations & Barriers

- The American Diabetes Association (ADA) recommends that individuals with Type 2 diabetes perform at least 150 min of moderate-intensity aerobic exercise and/or at least 90 min of vigorous aerobic exercise per week.
- Although a lifestyle modification of this nature could have substantial impact on the metabolic and cardiovascular health of this population, it is often difficult for those who have been habitually sedentary to adhere to these guidelines.
- Indeed, a recent population-based study found that only 28% of individuals with type 2 diabetes achieve these recommendations. Unfortunately, it is frequently those who would benefit the most from aerobic exercise that have the greatest difficulty performing it.

Exercise Recommendations, Continued...

- For individuals with severe obesity, arthritis, physical disabilities, and/or diabetes complications, even walking for 20–30 min may be challenging, uncomfortable, and/or painful to perform.
- Alternate forms of physical activity that produce similar metabolic improvements to aerobic exercise may be beneficial in the management of this disease.
- The Bottom Line: Everyone can participate in some form of exercise!

Resistance Training

- Resistance training has recently been recognized as a useful therapeutic tool for the treatment of a number of chronic diseases and is safe and efficacious for the elderly and obese individuals.
- Similar to aerobic exercise, resistance training enhances insulin sensitivity, daily energy expenditure, and quality of life.
- Furthermore, resistance training increases muscle strength, lean muscle mass, and bone mineral density.
- Enhances functional status and glycemic control and assists in the prevention of sarcopenia and osteoporosis.

Alternative Exercise

- In addition to aerobic exercise and strength training, patients may benefit from:
  - Range of Motion/Stretching and Mobility for improved circulation
  - Breathing Exercises to improve lung capacity and utilization of oxygen
- Emphasize activities that use large muscle groups in a rhythmic and continuous fashion. Personal interest and desired goals of the exercise program should be considered.

Exercise Recommendations

- Goal: 30 minutes of physical activity per day.
- The options for aerobic exercise are endless... walking the dog, elliptical, hiking, swimming, water aerobics, tennis, etc...
- Fitlife program at the Meyer Center working with a team of trainers, nutritionist and nurses to develop a wellness plan and have weekly check-ins for accountability.
- Join a local cycling or hiking meet-up group
- Don’t belong to a gym with weight machines? No problem! You can use hand-held weights, resistance bands, or even your own body weight to build muscle.

Increasing Activity in Daily Life

- Activities of Daily Living/finding opportunities for exercise without hitting the gym:
  - Parking farther away
  - Taking the stairs instead of the elevator
  - Taking a 10 minute walk after every meal
  - Doing 10 squats, stretches, etc. while watching TV or during commercial breaks
  - Don’t sit on the bench while your kids, grandkids, etc. play! Get up and walk around, and use the bench as an exercise prop!
  - Find activities you enjoy!
  - Add variety to prevent boredom!
Special Considerations

- Adjust carbohydrate intake and/or medications before & after exercise based on blood glucose levels and exercise intensity to prevent hypoglycemia associated with exercise.
- For individuals with Type 1 DM using insulin pumps, insulin delivery during exercise can be markedly reduced or the pump can be disconnected depending on intensity and duration of exercise. Reducing basal delivery rates for up to 12 hours post-exercise may be necessary to avoid hypoglycemia.
- Continuous glucose monitoring can be very useful to detect patterns in blood glucose across multiple days and evaluate both the immediate and delayed effects of exercise.

Special Considerations, Continued...

- Dehydration resulting from polyuria (common occurrence of hyperglycemia) may contribute to a compromised thermoregulatory response. Thus a patient with hyperglycemia should be treated as having an elevated risk for heat illness requiring more frequent monitoring of signs and symptoms.
- Individuals with DM and retinopathy are at risk for retinal detachment and vitreous hemorrhage associated with vigorous intensity exercise. However, risk may be minimized by avoiding activities that dramatically elevate blood pressure.

Part 2: Hands On!

- Learning and teaching use of resistance bands!
- Exercises for every body!
- Options that can be done while seated, standing, or lying down.