Exercise to Prevent and Treat Diabetes

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Objectives

- Review the benefits of exercise related to diabetes
- Learn the recommendations to prevent and treat diabetes
  - Aerobic exercises
  - Resistance exercises
  - Balance exercises
Exercise and Physical Activity

- A cornerstone of diabetes management, along with meal planning, medications and monitoring
Exercise and Physical Activity

- What is physical activity?
- What is exercise?
- Which is better?
Benefits of Exercise and Physical Activity

- Lowers blood glucose
  - Use glucose for energy
  - Decrease insulin resistance
- Improves cardiovascular parameters: blood pressure, lipids
- Reduces body fat
- Assists with weight loss/maintenance
- Improves fitness
- Reduces stress/improves sense of well being
- Maintains bone health
- Improves balance
- Prevents/delays onset of type 2 diabetes
Recommendations to Prevent Diabetes

- Diabetes Prevention Program (DPP)
  - Pre-diabetes: Lifestyle intervention, metformin, control
  - Goal: ≥150 mins/wk moderate exercise combined with modest caloric restriction for 7% wt loss
- Lifestyle intervention ↓ the onset of type 2 diabetes by 58%
Recommendations to Prevent Diabetes

- Pre-diabetes
  - Diet-induced weight loss of 5-7% body weight
  - Increasing physical activity to 150 mins/week of moderate activity (i.e., walking) to vigorous activity
  - Follow-up counseling
  - Metformin
Recommendations to Treat Diabetes

- Aerobic/cardiovascular exercise
  - Sustained exercise that stimulates and strengthens the heart and lungs, thereby improving the body's utilization of oxygen
  - Examples: walking, jogging, rowing, swimming, cycling, or dancing
Recommendations to Treat Diabetes

- Aerobic/cardiovascular exercise
  - For blood glucose control, weight maintenance, decrease risk of cardiovascular disease (CVD)
    - ≥150 min/wk moderate-intensity
    - and/or
    - ≥ 90 min/wk vigorous
  - In ≥10 min bouts
  - At least 3 days/wk; no more than 2 consecutive days w/o aerobic
  - Large muscle groups and causes sustained ↑HR
Recommendations to Treat Diabetes

- **Resistance training**
  - A type of physical activity where you exercise a muscle or muscle group against outside resistance
  - Using body weight, free weights (dumbbells and barbells), weight machines, medicine balls, or exercise bands.
Recommendations to **Treat Diabetes**

- **Resistance training**
  - Improves glucose control ($\downarrow$A1c, $\uparrow$muscle glycogen stores)
  - $\uparrow$muscle mass and strength (slows changes of aging)
  - $\downarrow$trunk fat mass
  - $\downarrow$dose of diabetes meds
  - $\downarrow$systolic blood pressure
  - Improves balance to prevent falls (lower extremity exercises)
  - Improves bone density
  - Improves ability to do normal activities
Recommendations to Treat Diabetes

• Resistance training
  • In the absence of contraindications:
    • At least 2 times/wk, non-consecutive days (ideally 3 times/wk)
    • Intensity of moderate or vigorous
    • All major muscle groups (5-10 exercises)
    • Start at 1 set of 10-15 reps to fatigue and progress to 3-4 sets of 8-10 reps of 8-10 repetition maximum (RM)
Recommendations to Treat Diabetes

- **Weight Loss/Maintenance**
  - 1 hr/day moderate aerobic exercise can ↓ weight but small amounts (<11 pounds)
  - Most successful with caloric restriction and behavior management for weight loss; higher intensity
  - Sustain weight loss, 7 hr/wk moderate to vigorous intensity
  - Improved CVD risk factors even w/o weight loss
  - Consider resistance training to build muscle mass and improve metabolism
Recommendations for Balance Exercise

- Balance
  - Challenges increase as we age, with vision changes, if sensation in the feet is not normal, with certain medications, etc.
  - Specific balance exercises, along with certain strength exercises, can help prevent falls by improving your ability to control and maintain your body's position, whether you are moving or still
Recommendations for **Balance Exercise**

- Balance exercises
  - Balance exercises can be done as an exercise session/in a class or throughout your day
Recommendations to Treat Diabetes

- Decrease Sitting
  - Evidence that all individuals, including those with diabetes, should be encouraged to limit time being sedentary by breaking up extended amounts of time (>90 min) spent sitting
What are your goals?

- Lower blood glucose
- Prevent/delay diabetes
- Lose weight
- Improve heart health
- Lower blood pressure
- Improve cholesterol
- Feel stronger and move better
- Do things with others
- Feel better
What can you do?

- Exercise
- Physical activities
  - House chores
  - Yard activities
  - Recreation
  - Work activities
- Add steps to your day
  - Pedometer or activity tracker
How much should you do?

- Total minutes per week: 150
- Minutes at a time: 5-60
- Times per day: 0-6
- Days per week: 3-7
How hard?

- **Easy/leisurely pace**: Many, many minutes per week
- **Moderate pace**: About 150 minutes per week
- **Vigorous pace**: About 90 mins/wk
Getting Started

- Choose a goal: What do you want to gain/lose?
- Make a plan
- Pick your time
- Add a friend/family member; share your plan
- Think of a reward for meeting a goal
- Make it fun
- Start slowly/safely
- Get help if you have barriers such as pain
Overcoming Barriers

- Choose the right activity
- Get support from others
- Exercise early in the day if possible
- Have a “bad weather” plan
- Don’t feel guilty about helping yourself
Sticking to it

- Use a log/calendar
- Avoid “all or nothing” attitude
- Make it fun; mix it up
- Increase minutes from your starting point
- Add a friend/family member
- Monitor how you feel
- Get your reward and set a new goal
Specific Exercises

• Aerobic exercises
  • Walking
  • Bicycling (outdoor or stationary)
  • Elliptical/glider/arc trainer
  • Swimming/water exercise
  • Dancing/dance aerobics
  • Exercise video
  • Exercise class
Specific Exercises

- Resistance exercises
  - Incline push-ups
  - Biceps/triceps isometrics
  - Abdominal isometrics
  - Chair rises
  - Heel raises
Specific Exercises

- Balance exercises
  - Static
    - Hold for 30 seconds
    - Normal stance
    - Narrow stance
    - Semi-tandem
    - Tandem
    - Single limb
  - Dynamic
    - Walk on a tightrope
    - Sidestepping
    - Cross-overs
    - Carioca
    - Head turns
      - Right/left
      - Up/down

You should feel safe but wobbly as you perform the exercise.
Questions?