Diabetes Fundamentals
Nutrition and Exercise

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Diabetes Fundamentals

- Nutrition guidelines
- Describe current MNT recommendations
- List 3 teaching strategies to help patients succeed
- Exercise Guidelines
- Discuss exercise goals for people with diabetes
- Describe safety precautions

Good Resources

- Review Exchange List
- Review ADA Standards of Care:

**Nutrition Therapy Recommendations for the Management of Adults With Diabetes**

**Exercise and Type 2 Diabetes**


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Assess Knowledge, Self Management Skills

- Eating Patterns
  - Preferences, portion sizes, timing on meals and snacks, eating environment, disordered eating

Medical Nutrition Therapy – ADA 2014

- No ideal percentage of calories from protein, carbohydrate and fat for people with diabetes.
- Macronutrient distribution should be based on an individualized assessment of eating patterns, preferences and metabolic goals.

Medical Nutrition Therapy – ADA 2014

- Focus on the Individual
- Maintain pleasure of eating
- Provide positive messages about food
- Limit food choices only when backed by science
- Provide practical tools
- Refer to a RD and Diabetes Education – Lowers A1c by 1-2%
Medical Nutrition Therapy – What Medicare Covers

- 3 hours initial benefit in first calendar year
- 2 hours follow-up annually
- Must be ADA/AADE Recognized
- MNT for diabetes and renal

Approach Depends on Patient

- New Type 2
  - Portion Control
  - Plate Method
  - Record Keeping
  - Education
- On Insulin?
  - Carb counting
  - Post prandial checks

Sodium, Fat and Fiber

- Sodium – Try and keep less than 2,300 mg a day
- Vitamin and mineral supplements not recommended -lack of evidence.
- Fat - same as recommended for general population
  - Less than 10% saturated fat,
  - Limit trans fats
  - Less than 300 mg cholesterol daily
  - Mediterranean Diet looks like good option
- Fiber 25 -38 gms a day
Average American Consumes
25 teaspoons of sugar a day (400 cals)

- Warning label on sodas proposed
- One soda has 12 teaspoons sugar
- On avg, 1 person consumes 40 gallons of soda each year
- ADA guidelines “limit sodas and beverages with sugar, High Fructose Corn Syrup, (HFCS)

ADA recommendation
Eat Less Junk Food & Sugary Drinks –

- Less Processed Foods
- Less Sugary Beverages
  - increase visceral adiposity
  - With sugar or
  - High fructose corn syrup

- Soda Tax?
- Junk Food Tax?

Teaching About Eating Healthy

Major food groups
  “Handy Diet”
  Plate Method
  Exchange Lists
  Food Diaries / Glucose Records
  Carbohydrate Counting

Assess what is best for the situation.
Move toward the Tomato

Losing 2-8kg Early in diagnosis Type 2 Helpful

- Weight Loss —
  - The optimal macronutrient intake to lose weight not known
  - The literature does not support one particular nutrition therapy to reduce weight, but rather a spectrum of eating patterns that result in reduced energy intake.

- To lose one pound – avoid 3,500 cals
  - Decrease intake 250-500 cals daily + exercise

Successful weight loss strategies include

- Weekly self-weighing
- Eat breakfast
- Reduce fast food intake.
- Decrease portion size
- Increase physical activity
- Use meal replacements
- Eat healthy foods
**Bariatric Surgery**
- Consider for adults with BMI 35 or greater
- Increases gut hormone availability
- Need life long support and monitoring
- More likely to cause remission* with recently diagnosed diabetes (more beta cell mass)
  - 68% remission within 5 years
  - 35% redeveloped diabetes
- Long term benefits still under investigation
  *remission = BG levels normal without meds

**USDA  www.myplate.gov**

*Balancing Calories*
- Enjoy your food, but eat less.
- Avoid oversized portions.

*Foods to Increase*
- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

*Foods to Reduce*
- Compare sodium in foods like soup, bread, and frozen meals — and choose the foods with lower numbers.
  - Drink water instead of sugary drinks.

**Another plate example**

*Mi planificador de plato*
*Una comida saludable se ve mas animada*
How nutrients affect blood sugar

Carbs affect Post meal Blood Glucose
- Starch
- Fruit
- Milk
- Desserts

Carbohydrate Needs for Most Adults

<table>
<thead>
<tr>
<th></th>
<th>Grams</th>
<th>Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Meal</td>
<td>45-60 gm</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Snacks</td>
<td>15-30 gm</td>
<td>1- 2</td>
</tr>
</tbody>
</table>

Carbs affect Post Meal Blood Glucose
RDA – at least 130 gms of Carb a day
**Carb Counting - Starch**

Each Food has:
- 80 Calories
- 15 grams carb

- 1/2 cup cooked beans
- 1 small ear of corn or 1/2 cup corn
- 3/4 cup cooked pasta
- 3/4 cup cold cereal
- 1 small potato
- 1/2 English muffin
- 1 small tortilla
- 5-6 small crackers
- 1/3 cup cooked rice
- 3/4 cup cold cereal
- 1 small tortilla
- 5-6 small crackers

**Carb counting - fruit**

Each Food has:
- 60 Calories
- 15 grams carb

- 1 small fresh fruit
- 1/2 cup fruit juice
- 1/2 banana
- 1/2 cup uncooked apple sauce
- 1 cup melon
- 1 1/4 cup strawberries
- 1 slice bread
- 17 small grapes
- 1/2 cup dried fruit
- 2 tbsp raisins

**Carb Counting - Milk**

Each Food has:
- 90-150 calories
- 12-15 grams carb

- 8 oz buttermilk
- 1 packet of hot cocoa
- 1 slice bread
- 8 oz milk
- 6 oz plain yogurt
- 8 oz soy milk
- 6 oz light fruit yogurt
Carb Counting - Sweets

<table>
<thead>
<tr>
<th>Each Food has: Calories vary</th>
<th>15 grams carb</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch square cake or brownie, unfrosted</td>
<td>1 slice bread</td>
</tr>
<tr>
<td>½ cup dark pudding</td>
<td>1 tbsp light syrup</td>
</tr>
<tr>
<td>2 small cookies</td>
<td>1 tsp syrup, jam, jelly, table sugar, honey</td>
</tr>
<tr>
<td>½ cup ice cream or frozen yogurt</td>
<td>2 tbsp light syrup</td>
</tr>
</tbody>
</table>

Choose Healthy Carbs

- Carbs have fiber, vitamins, minerals and phytonutrients
- 25 gms of fiber a day
- Power Carbs include:
  - Beans
  - Veggies
  - Fruits
  - Whole grain foods

10 Superfoods

- Beans
- Dark Green Leafy Veggies
- Citrus Fruit
- Sweet Potatoes
- Berries
- Tomatoes
- Fish High in Omega-3 Fatty Acids
- Whole Grains
- Nuts
- Fat-Free Milk and Yogurt
Nutrition Facts

Serving Size 1/2 cup (114 g)
Servings Per Container 4

Amount Per Serving
Calories 90
Calories from Fat 30

% Daily Value*
Total Fat 3g 5%
Saturated Fat 0g 0%
Cholesterol 0g 0%
Sodium 300mg 13%
Total Carbohydrate 13g 4%
Dietary Fiber 3g 12%
Sugars 3g
Protein 3g

Vitamin A 80%
Vitamin C 60%
Calcium 4%
Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

<table>
<thead>
<tr>
<th>Calories</th>
<th>2000</th>
<th>2500</th>
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<tbody>
<tr>
<td>Less than</td>
<td>65g</td>
<td>80g</td>
</tr>
<tr>
<td>Less than</td>
<td>20g</td>
<td>25g</td>
</tr>
<tr>
<td>Less than</td>
<td>300mg</td>
<td>300mg</td>
</tr>
<tr>
<td>2400mg</td>
<td>2400mg</td>
<td></td>
</tr>
<tr>
<td>300g</td>
<td>375g</td>
<td></td>
</tr>
<tr>
<td>25g</td>
<td>30g</td>
<td></td>
</tr>
</tbody>
</table>

Fooducate App – gives grade and nutrition info.

1 tsp sugar = 4 gms

Dietary Fat and Cholesterol Guidelines

- Avg Calorie distribution for PWD
  - 45% of calories from carbs
  - 30-40% from fat,
  - 16-18% from protein
- Guidelines from ADA
  - Saturated fats <10% of calories
  - Limit trans fat as much as possible
  - Limit total dietary cholesterol to 300 mg/day

Fats - 9 calories per gram

- Monounsaturated - healthy
  - Olive & canola oils, Nuts, Avocado
  - Lowers total cholesterol and LDL
  - Raise HDL, high in omega 3 fatty acids
- Polyunsaturated - healthy
  - Corn, walnut, safflower, soybean
  - Lowers total cholesterol and LDL
- Saturated fats (limit <10%) 
  - Animal products – meat, chicken, pork, fish, skin, cheese butter, dairy
  - Plant products include; palm, coconut, palm kernel oil
  - Solid at room temp

Serving sizes
- 1 tsp butter, margarine, oil, mayonnaise
- 1 Tbsp salad dressing, cream cheese, seeds
- 2 Tbsp avocado, cream, sour cream
- 1 slice bacon
Unhealthy Dietary Fats

- Trans Fat – strong link between diet high in trans fat and heart disease
  - Lowers HDL
  - Increases LDL
  - May increase weight gain and abdominal fat
  - May contribute to type 2 diabetes
  - Look on label and look for words “hydrogenated” or “partially hydrogenated”.

Diabetes Prevention Program

Focus on fat = wt loss success

To help you lose weight and improve your health, stay as close as possible to your fat and calorie goals. Find your starting weight below. Your fat and calorie goals are in the same row. Circle your fat and calorie goals.

<table>
<thead>
<tr>
<th>Weight (lb)</th>
<th>Fat Goal (grams)</th>
<th>Calorie Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-174</td>
<td>33</td>
<td>1,200</td>
</tr>
<tr>
<td>175-219</td>
<td>42</td>
<td>1,500</td>
</tr>
<tr>
<td>220-249</td>
<td>50</td>
<td>1,600</td>
</tr>
<tr>
<td>&gt;250</td>
<td>55</td>
<td>2,000</td>
</tr>
</tbody>
</table>


Protein Recommendations -2014

- For people with diabetes and no diabetes kidney disease, evidence is inconclusive for ideal amount of protein; therefore, goals should be individualized.
- RDA – 0.8gm good quality protein/kg/day
  - Protein seems to stimulate insulin response, do not use to treat hypoglycemia
  - For those with kidney failure, reducing the amount of dietary protein is not recommended. Does not improve outcomes.
Protein – 4 cals per gram

- Choose lean protein
  - Poultry, fish, egg, lean beef
  - Plant sources- beans, lentils, nuts
  - Low fat cheese- cottage cheese, mozzarella cheese

- Limit high fat protein
  - Bacon & sausage
  - High fat cuts of beef
  - Whole milk cheese

- Serving size
  - 1 oz = ¼ cup
  - 3 oz = deck of cards

Using Alcohol Safely

- Women- 1 or fewer alcoholic drinks a day
- Men 2 or fewer alcoholic drinks a day
  - 1 alcoholic drink equals
    - 12 oz beer, 5 oz glass of wine, or 1.5 oz distilled spirits (vodka, gin etc)
- If drink, limit amount and drink w/ food.
- Can cause hypo and worsen neuropathy

Ms. Gonzales’ Daily Meal plan

<table>
<thead>
<tr>
<th>Break</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg BG 120’s</td>
<td>Avg BG 200’s</td>
<td>Avg BG 200’s</td>
<td>Avg BG 180’s</td>
</tr>
<tr>
<td>5 corn tortillas, 1/2 c. beans, salsa, peppers, egg beaters</td>
<td>Sandwich, low fat potato chips, 1c. juice, 2-4 low fat cookies</td>
<td>Lg bowl low salt soup, 1c. rice, BBQ meat, salad &amp; cooked vegs</td>
<td>1 bowl of cereal</td>
</tr>
</tbody>
</table>
Celiac Disease

- Type 1 – Affects ~10% 
- Immune reaction to gluten - affects function of villi in intestine, decreasing nutrient absorption 
- S/S: bloating, malabsorption, wt loss, fatty stools, diarrhea, muscle tenderness, failure to thrive 
- Diagnosis: measure either anti-endomysial antibodies (EMA) titers or tissue transglutaminase. 
- If positive, refer to GI specialist for endoscopy and biopsy of small intestine to confirm diagnosis.

Treatment – Gluten Free for Life

- Avoid 
  - Wheat (einkorn, durum, faro, graham, kamut, semolina, spelt), 
  - Rye 
  - Barley 
- Refer to a dietitian

ASSOCIATED AUTOIMMUNE DISORDERS

- Insulin-dependent Type 1 Diabetes Mellitus, Liver diseases, Thyroid Disease-Hashimoto’s Thyroiditis, Lupus (SLE), Addison’s Disease, Chronic Active Hepatitis, Rheumatoid Arthritis

Ex of Gluten Containing Foods

- Brown rice syrup 
- Breading & coating mixes 
- Croutons 
- Energy Bars 
- Flour or cereal products 
- Imitation bacon 
- Imitation seafood 
- Marinades 
- Pastas 
- Processed luncheon meats 
- Sauces, gravies 
- Self-basting poultry 
- Soy sauce or soy sauce solids 
- Soup bases 
- Stuffings, dressing 
- Thickeners (Roux) 
- Communion wafers 
- And more!
Gastroparesis

- Gastroparesis: affects 20 – 30% of pt’s w/ longstanding dm
- Delayed emptying of stomach contents due to nerve damage
- S/S include early satiety, fullness, postprandial hypo, vomiting
- Diagnosis: gastric emptying studies, post-prandial hypoglycemia
- Tx: improve BG, small, low fat & fiber meals meds: reglan, erythromycin

Disordered Eating

- “DiaBulimia”
- People with type 1 diabetes give themselves less insulin than needed to lose weight
- Tends to start in adolescence, more likely to occur in women than men.
- Signs: unexplainable spikes, A1c, weight loss, lack of marks from fingerpricks, lack of prescription refills for diabetes meds, records that don’t match A1c.
- Treatment – Mental health specialist and team

Physical Activity – Key areas

- ADA and American College of Sports Medicine recommendations
- Benefits, barriers precautions
- Exercise and activity plan (aerobic, resistance training, etc)
- Adjustment and monitoring of food and/or meds
Physical Activity - Kids

- Children should be encouraged to engage in at least 60 minutes of physical activity a day.

Physical Activity - ADA

- Adults with diabetes –
  - 150 minutes a week of moderate-intensity aerobic physical activity
  - spread over at least 3 days/wk
  - Don’t miss more than 2 consecutive days of exercise.
- In absence of contraindications, type 2 adults should engage in resistance training 2x’s a wk

Definitions

- Physical activity
  - Bodily movement produced by the contraction of skeletal muscle that requires more energy than when resting
- Exercise
  - Subset of physical activity that is planned, structured and includes repetitive body movements
  - Performed to improve or maintain physical fitness
- Sedentary behavior
  - Little on no movement or physical activity
Progressive Resistance exercise

- Improves insulin sensitivity
- Goal is 2 sessions a week
- Examples include:
  - Exercise with free weights, wt machines
- Each session consisting of least:
  - One set of five or more resistance exercises using large muscle groups

Benefits of Exercise

- Improve BG
- Improves insulin sensitivity
- Reduce CV Risk factors
- Maintain wt loss
- Contribute to well being
- Muscle strength
- Slows decline in mobility

Importance of Exercise with Diabetes

- Vital component of prevention as well of the management of type 2 diabetes
- Greatest impact in improving metabolic abnormalities in type 2 when started early in progression from IR to Pre Diabetes to DM
- Type 1 – emphasis on adjusting insulin to allow for safe participation in all forms of activity.
Pre-exercise Eval

- Use clinical judgment when making physical activity suggestions and check in with provider if unsure.
- Encourage high risk pts to start with low intensity and short time.
- Increase duration and intensity slowly
- Contraindications to certain types of exercise:
  - Uncontrolled HTN, severe autonomic or peripheral neuropathy, history of foot lesions, unstable proliferative retinopathy.
  - Pt w/ complications require a more thorough assessment.

Patients to discuss symptoms with provider before starting exercise

- Chest pain and/or shortness of breath
- Leg cramps that go away with rest
- Head, shoulder, neck and or back aches.
- Any unexplained pain above the belt line should be considered cardiac in origin until proven otherwise.

Hormone Response – Type 1

- Exogenous insulin remains high
- Increased insulin sensitivity
- Increased insulin absorption

What is this group at risk for?
What strategies to stay safe before, during and after exercise?
**Hormone Response – Type 2**

- Decreased secretion of endogenous insulin
- Increased insulin sensitivity
- Increased glucose disposal

What is this group at risk for?

What strategies to stay safe before, during and after exercise?

**Duration of Hypoglycemia Risk**

- During exercise
- Immediately after exercise
- Post exercise late onset hypo
  - More often in type 1
  - More often at night
  - Moderate to high intensity exercise
    - > 30 min
  - 4 to 15 hours following an exercise session

**Hypoglycemia Prevention Strategies**

- If planned activity, adjust insulin in anticipation of activities
- Reduce insulin in post exercise period
- Frequent monitoring in post exercise period
- Pt to keep log to determine how responds to different activities, duration and intensity.
Hypoglycemia Prevention Strategies

- Carry fast acting carb/glucagon ER Kit
- Extra CHO in post exercise period
- Caution with alcohol post exercise
- Adjust carbohydrate prior to planned activity:
  - If BG < 100 prior to exercise
  - If using insulin and/or secretagogues
    - 15 gms carb snack

Hypoglycemia Prevention

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Duration</th>
<th>Carbohydrate Replacement</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild to Moderate</td>
<td>&lt;30 min</td>
<td>May not be needed</td>
<td>N/A</td>
</tr>
<tr>
<td>Moderate</td>
<td>30 to 60 minutes</td>
<td>15 grams</td>
<td>Each hour</td>
</tr>
<tr>
<td>High</td>
<td>&gt;60 min</td>
<td>30 to 50 grams</td>
<td>Each hour</td>
</tr>
</tbody>
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Behavior Change and Smart Goals

- Julie currently walks her dog 3 times a week around the block.
- Is this exercise?
- What new and revised SMART Goal could you set with her?
Setting SMART Goals

- Specific
- Measurable
- Attainable
- Realistic
- Timely

Behavioral Goal –
- Walk the dog around the block 4 days a week.
- Walk the dog around the block two times.
- Do 10 minutes of weight bearing activity on 2 of the days you don’t walk the dog.

Help Patients Prepare for Setbacks

“The greatest glory in living lies not in never falling, but in rising every time we fall.”
—Nelson Mandela

Thank You

- Questions?
- Email bev@diabetesed.net
- Web www.diabetesed.net