2014 Today's Dietitian SPRING SYMPOSIUM
MAY 18-20, 2014 LAS VEGAS, NEVADA

Diabetes: Common But Complicated

INSTRUCTOR
Jill Weisenberger, MS, RDN, CDE

Diabetes: Common But Complicated

Suggested CDR Learning Codes: 5190, 5370; Level 2

Learning Objectives:

1. Define advanced glycation end products (AGEs).
2. Identify at least three ways to help patients with diabetes reduce their AGE intake.
3. Identify when snacks are appropriate and inappropriate for patients with diabetes.
4. Identify the benefits and limitations of weight loss among patients with diabetes.
5. Identify at least one advantage and one disadvantage of using the glycemic index among patients with diabetes.

Jill Weisenberger
MS, RDN, CDE

Session Description

Although diabetes is common and widely reported on, the disease and strategies to control it are more complicated than many understand. RDs frequently have questions about current diabetes research and literature. For instance, can weight loss cure type 2 diabetes? What are advanced glycation end products, and how do they affect diabetes? Is blood glucose monitoring helpful for people who don't use insulin? This session identifies several aspects of diabetes care that can be confusing for health professionals and/or patients, and reviews the science and practical applications surrounding these topics.

Advanced Glycation Endproducts

What are AGEs?

- Compounds made of sugars bound to proteins or fat.
- Common in the diet
  - Cooking and additives
- Form spontaneously in the body
  - Controlled by natural defenses
- Partly responsible for complications

NCI

Maillard Reaction

Oral AGEs

Consumed: **15 AGE Eq** (15,000,000 U CML/day)

100%

Absorbed:
10%

Excreted/Urine:
NL: 3%
D-CKD: < 3%

Stool: ~ 90%

Tissues:

NL: 7% or 1 Eq

D-CKD: 10 % or 1.5 Eq U AGE /day

H.Vlassara: ***PNAS*** ;1996
Compliments of Helen Vlassara

Effects of AGEs

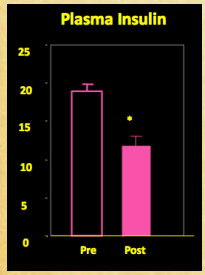
- Promote oxidation and inflammation
- Lead to:
  - Insulin resistance
  - Type 2 diabetes
  - Heart disease
  - Complications of diabetes
    - Peripheral nerves of pwd

NCI/Len Rizzi

- AGE-Rich Meal in type 1 and type 2
  - Increased inflammatory markers
  - Decreased endothelial function

Journal of Evidence-Based Complementary & Alternative Medicine 2012. 18(1) 50-66

AGE Restriction Improves Insulin Resistance



Diabetes Care 34:1610–1616, 2011

Compliments of Helen Vlassara, MD

- 12 pwd, type 2
  - 4 months on isocaloric AGE-restricted diet (< 10 AGE Eq/d)
- Lowered insulin levels, markers of insulin resistance, oxidative stress, and inflammation
- 26 pwd, type 2
  - ½ changed cooking techniques, 44% fewer AGEs
- Reduced inflammation & oxidative stress

J Clin Biochem Nutr 52:22-26 2013

Basic Principles to Reduce AGEs

1. Limit high-AGE foods
2. Choose cooking methods that limit AGE formation
3. Use ingredients to inhibit AGE formation

NCI/Len Rizzi

Reducing AGEs

Increase	Decrease
Fish	Solid fats
Legumes	Fatty meats
Low-fat milk products	Full-fat dairy products
Vegetables	Added sugars
Fruits	Processed foods
Whole grains	

High-AGE Foods

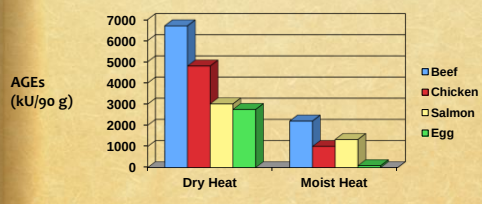
Meat	Beef > poultry > fish > eggs Roasted, grilled, broiled, fried > poached, steamed, stewed, braised, etc. High-fat > lower-fat
Cheese	High-fat, aged, processed > lower-fat
Fats, oils	Butter, cream cheese > margarine, mayonnaise, oils, nuts

JADA 2010;110:911-916

Compliments of Sandra Woodruff, MS, RD, LD/N

AGE Content of Foods

Dry vs. Moist Heat

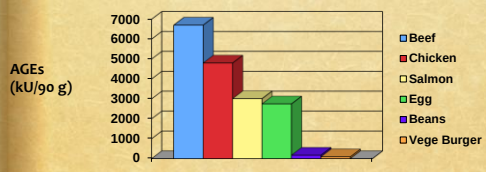


Compliments of Sandra Woodruff, MS, RD, LD/N

JADA 2010;110:911-916

AGE Content of Foods

Animal vs. Vegetable Protein



Compliments of Sandra Woodruff, MS, RD, LD/N

JADA 2010;110:911-916

AGE Content of Selected Cheeses

Cheese	AGE (kU/30 g)
Parmesan	5070
American	2603
American, low-fat	1212
Cheddar	1657
Cheddar, 2%	737
Cottage, 1%	436

JADA 2010;110:911-916

Compliments of Sandra Woodruff, MS, RD, LD/N

AGE Content of Selected Fats

Fat	AGE (kU/15 g)
Butter	1890
Margarine	540
Olive oil	450
Avocado	235

JADA 2010;110:911-916

Compliments of Sandra Woodruff, MS, RD, LD/N

Lower-AGE Foods

Grains	Crackers, chips, cookies > breads, oatmeal, boiled/steamed grains
Fruits, Veggies	Roasted, grilled > fresh, steamed
Milk	Hot cocoa mix, evaporated milk > milk, yogurt, ice cream, pudding

JADA 2010;110:911-916

Compliments of Sandra Woodruff, MS, RD, LD/N

Choose Cooking Methods that Inhibit Formation of AGEs

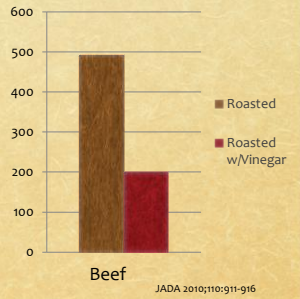
Chicken	AGEs (kU per 90g)
Raw	700
Poached / boiled / steamed	1,000
Roasted	4,850
Broiled / grilled	4,800
Chicken nuggets	7,760

JADA 2010;110:911-916

Compliments of Sandra Woodruff, MS, RD, LD/N

Use Ingredients to Inhibit AGE Formation

- Water
  - Moist heat
  - Poach
  - Stew
  - Braise
- Acid
  - Lemon juice, vinegar, wine, tomato juice
  - Marinades
  - Cooking liquids



JADA 2010;110:911-916

NCI/Renee Comet

Rice vs Crisped Rice

Tips

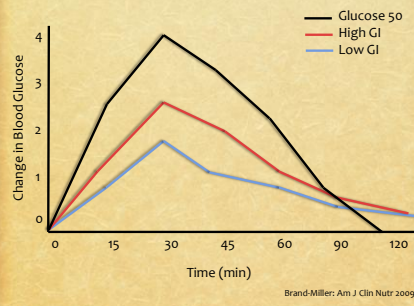
- Cook low and slow
- Cook with moisture
- Cook with acids
- Grill breads, fruits, vegetables, not meats
- Shrink the meat
- Go Lean
- More fruits, veg, whole grains
- Prepare it yourself

Glycemic Index

Glycemic Index

- Relative area under glucose curve of 50g digestible carbohydrate compared to 50g of a standard food
  - Pure glucose = 100
- Theory:
  - Low GI foods are better
  - Low GI foods don't cause BG to rise and fall greatly
  - Low GI foods are better for diabetes

Glycemic Index



Brand-Miller: Am J Clin Nutr 2009;89:97–105

	Food	GI
Low-GI: ≤ 55	Carrots, raw, diced	35
	Chickpeas, boiled	36
	Apple, raw	40
	Ice cream, low-fat, vanilla	46
	Chocolate, plain	49
	Brown rice, steamed	50
Medium-GI: 56-69	Sweet corn, boiled	60
	Marshmallows	62
	Milky Way bar	62
	Cantaloupe, raw	65
	Pineapple, raw	66
High-GI: ≥ 70	Watermelon, raw	72
	Rice cake	82
	Baguette, white, plain	95
	Baked potato w/out skin	98

GlycemicIndex.com

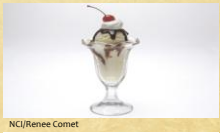
Diabetes and Low-GI Diet

- Meta-analysis[1]
  - 14 studies, 356 subjects with types 1 and 2 diabetes
  - 12 days – 12 months
  - GI = 83 and 65
- Conclusion: Lower GI reduces A1C by 0.43% more than high-GI diet
- Drug Comparison: 0.5% - 2.0%
- 2013 ADA Position Paper:[2] 0.2 – 0.5%
  - Substituting low–glycemic load foods for higher–glycemic load foods may modestly improve glycemic control.

[1]Brand-Miller et al. Diabetes Care 2003 26:2261–2267
[2]Evert et al. Diabetes Care 2013 36:3821-3842

Nutritional Trouble

- Give up nutrient-dense foods
- Choose ice cream (37) for dessert vs. grapes (59)
- Pile on low GI foods
- Limit food choices



NCI/Renee Comet

Glycemicindex.com

Variability of GI Score

- **Physical form of the food**
  - Mashed potato vs whole potato
- **Variety**
  - Fettuccini vs. macaroni
  - Basmati grain vs Jasmine grain rice
- **Degree of cooking/processing**
  - Overcooking increases GI
  - Vinegar slows stomach emptying
  - Cooling starches increases resistant starch content
- **Total meal or snack**
- **Ripeness of food**
  - Under-ripe bananas contains more resistant starch

ADA on Diet & Glycemic Control

"Based on the research, for most people with diabetes, the first tool for managing blood glucose is some type of carbohydrate counting."

Diabetes.org

Glycemicindex.com

GI Variability

Food Name ↑ ↓	GI ↑ ↓
White bread, wheat flour	69
White bread, wheat flour	75
White bread, wheat flour	87
White bread, wheat flour	88
White bread, wheat flour	89
White bread, wheat flour, homemade	89
White bread, wheat flour	70

Glycemicindex.com

Consider Portions

50 g ice cream

1+ cup

50 g carrots

1.5 pounds

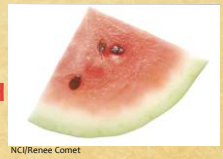
Glycemic Load

(GI x grams of CHO)/100

- Low GL: ≤ 10
- High GL: ≥ 20

GI of watermelon = 72 H

GI of lima beans = 32 L



NCI/Renee Comet

Glycemic Load

- Lima beans: 1-cup contains 35 g carbohydrate
- GI = 32 L
  - ***GL = (32 x 35)/100 = 11.2*** H
- Watermelon: 1-cup melon balls contains 12 g carbohydrate
- GI = 72 H
  - ***GL = (72 x 12)/100 = 8.6*** L

Mixed Meals

- Weighted contribution of carb-containing foods
- Pan-fried chicken, sweet potatoes, peas, carrots, tomato sauce (25 g CHO)
  - + 25 g CHO potato, rice or spaghetti
- Overestimate GI of meals by 22-50%
  - Potato meal: 63/53
  - Rice meal: 51/38
  - Spaghetti meal: 54/38

Dodd et al. Am J Clin Nutr 2011;94:992–6

Individual Response

- Pre-meal
- 2 hour post-prandial
  - Difference – 40 -50 mg/dl
  - Blood glucose before eating: 104 mg/dl
  - Blood glucose two hours after the first bite: 137 mg/dl
    - 33 mg/dl
- ADA target: < 180 mg/dl (1 – 2 hours)

High GI Foods Did Not Increase Appetite

- **Isoenergtic servings of 38 foods**
- **Satiety ranking every 15 minutes for 2 hours**
- **Protein, water & fiber correlated with satiety score**
- **Ad libitum consumption following the 2 hours test period was negatively correlated**

FOOD	SI SCORE
Potatoes	323
Orange	202
Popcorn	154
All Bran	151
Lentils	133

Holt et al. Eur J Clin Nutr. 1995 Sep;49(9):675-90.

25 Studies Looking at GI & Weight Loss

- Ranged from 8 days to 18 months
- 19 NS
- **4 low GI performed better than high GI**
- 1 low GI performed better than low fat
- 1 high GI performed better than low GI

From Katherine Beals, PhD, RD, FACSM, CSSD, WM

University of Utah

Symposium March 2014

Practice Pearls

- Master carb counting or other method first
  - Fine-tuning
- Avoid simple and complex carb terminology
- Focus on the greatest contributors
  - Breakfast cereals, breads, sweets
- Compare within the same food category
- Combine high and low GI foods
  - Don't avoid nutritious foods!
- SMBG

Instead of this...	Eat this!
White bread	Sourdough or rye bread
Baked white potato without skin	Baked white potato with skin
White rice	Lentils
Soft Spaghetti	Al dente spaghetti
Corn chips	Nuts
Raisins	Grapes
Cornflakes	Rolled oats

SMBG in Non-insulin Treated Patients

Is SMBG Worth the Expense?

- Medicare Part B (2002)
- $465 million
- Strips
- Lancing devices
- Lancets
- Meters
- Batteries
- Calibration solutions

- Guide treatment decisions
- Evaluate individual response to therapy
- Detect/prevent hypoglycemia
- Influence food choices
- Identify patterns
- Guide physical activity

Cefalu WT Diabetes Care 2013 36 ;1 176

Is SMBG Worth the Expense?

- Meta-analysis[1]
  - 0.25% at 6 months
- Cochrane Review[2]
  - No effect by 12 months
  - More reported hypoglycemia
  - No QOL effects

"When prescribed as part of a broader educational context, SMBG results may be helpful to guide treatment decisions &/or patient self-management for patients using less frequent insulin injections or noninsulin therapies."

ADA Clinical Practice Guidelines 2014

[1]Cefalu WT Diabetes Care 2013 36 ;1 176
[2]Cochrane Database Syst Rev. 2005 Apr 18;(2)

In Practice

Martha

- 64 y o f, type 2 x 1 year
- Metformin
- A1C 6.9%
- Fearful

Jean

- 59 y o f, type 2 x 8 years
- Glyburide
- A1C 8.6%
- Fearful

Lisa's Surprise

A1C goal: < 7% (eAG = 154 mg/dl)
Actual A1C: 8.5% (eAG = 197 mg/dl)

	SUN	MON	TUES	WED	THURS	FRI	SAT
FBG	95	99	128	103	98	105	119
HS	110			129		119	

Pattern Management

Day	FBG	After Breakfast
SUN	116	150
MON	119	188
TUES	117	181
WED	128	198
THURS	98	144
FRI	129	201
SAT	99	188

What the Patient Must Know

- Pathophysiology of diabetes
- Mechanisms of action of medications
- Target BG levels
- Schedule for SMBG
- Foods most likely to affect BG
- Role of exercise

	Fasting	2 Hrs After B	Before Lunch	2 Hrs After L	Before Dinner	2 Hrs After D	HS
Sun	√	√					
Mon			√	√			
Tues					√	√	√
Wed	√	√					
Thurs			√	√			
Fri					√	√	√
Sat	√	√					

Are Snacks Required?

America Snacks

Adults (1997-2006)
- 200 to 475 calories from snacks
- 1765 to 2164 calories daily
- Approximately 400 additional calories daily
- Every 3 hours

©Manon Ringuette I Dreamstime.com

National Cancer Institute Daniel Sone

Children (1997-2006)
- 250 to 500 calories from snacks
- 1830 to 2020 calories daily
- Approximately 200 additional calories daily
- Every 3.5 hours

Popkin BM and Duffey KJ. Am J Clin Nutr 2010. 91(5):1342-1347

Why Snack?

- **Healthy:**
  - Satisfies hunger (esp. important for children)
  - Meets nutritional needs (esp. important for children)
  - Controls appetite later
- **Less healthy:**
  - See others eating
  - Participating in social events
  - It's a habit
  - Erases boredom or anxiety
  - Keep kids busy
  - Sleep? Hormones?
    - 221 extra snack calories

Nedeltcheva AV, Kilkus JM, et al. 2009. Am J Clin Nutr. 89:123-133

Out with Old Dogma About Snacking and Diabetes

- Do people with diabetes *have to* snack to manage diabetes?
- Is snacking necessary to prevent hypoglycemia?
- Does one set of guidelines fit everyone?
  - HS
  - Assess medication schedules
    - Proper dose, proper timing
    - Other medications

Meet Rose

- 48 years
  - Type 2 diabetes
  - 70/30 a.m. and p.m.
- Daily hypoglycemia following exercise
  - Snacked before exercise/treated hypoglycemia after
- Small, consistent weight gain
- Solution: Basal-bolus

BG Lowering Medications Effects

Unlikely to Cause Hypoglycemia

- **Biguanides:** *metformin(Glucophage)*
- **Thiazolidinediones(TZDs):** *pioglitazone (Actos), rosiglitazone (Avandia)*
- **Alpha-glucosidase inhibitors:** acarbose (Precose), miglitol (Glyset)
- **DPP-IV inhibitors:** *sitagliptin (Januvia), saxagliptin (Onglyza)*
- **Injectables:** *Exenatide (Byetta), Pramlintide (Symlin)*

Can Cause Hypoglycemia

- **Sulfonylureas:** *glipizide (Glucotrol), glyburide (DiaBeta, Micronase), glimepiride (Amaryl)*
- **Meglitinides:** *nateglinide (Starlix), repaglinide (Prandin)*
- **Insulin:** *all types*

Does eating frequently *really* boost metabolic rate?

International Journal of Obesity (2001) 25, 519–528

www.nature.com/ijo

PAPER

Compared with nibbling, neither gorging nor a morning fast affect short-term energy balance in obese patients in a chamber calorimeter

MA Taylor[1]* and JS Garrow[2]

OBJECTIVE: To test if a diet of 4.2 MJ/24 h as six isocaloric meals would result in a lower subsequent energy intake, or greater energy output than (a) 4.2 MJ/24 h as two isocaloric meals or (b) a morning fast followed by free access to food.
DESIGN: Subjects were confined to the Metabolic Unit from 19:00 h on day 1 to 09:30 h on day 6. Each day they had a fixed diet providing 4.2 MJ with three pairs of meal patterns which were offered in random sequence. They were: six meals *vs* two meals without access to additional foods (6*vs*2), or six meals *vs* 2 meals with access to additional food (6+*vs*2+), or six meals *vs* four meals (6+*vs*AMFAST). In the AMFAST condition the first two meals of the day were omitted to reduce daily intake to 2.8 MJ and to create a morning fast, but additional food was accessible thereafter. Patients were confined in the chamber calorimeter from 19:00 h on day 2 until 09:00 h on day 4, and then from 19:00 h on day 4 to 09:00 h on day 6. The order in which each meal pattern was offered was balanced over time.
CONCLUSIONS: In the short term, meal frequency and a period of fasting have no major impact on energy intake or expenditure but energy expenditure is delayed with a lower meal frequency compared with a higher meal frequency. This might be attributed to the thermogenic effect of food continuing into the night when a later, larger meal is given. A morning fast resulted in a diet which tended to have a lower percentage of energy from carbohydrate than with no fast.
International Journal of Obesity (2001) **25**, 519–528

Potential role of meal frequency as a strategy for weight loss and health in overweight or obese adults

Michelle G. Kulovitz Ph.D. [a,*], Len R. Kravitz Ph.D. [b], Christine Mermier Ph.D. [b], Ann L. Gibson Ph.D. [b], Carole A. Conn Ph.D. [c], Deborah Kolkmeyer M.S. [d], Chad M. Kerksick Ph.D. [b]

Improved dietary strategies for weight loss are necessary to decrease metabolic disease risk in overweight or obese adults. Varying meal frequency (MF; i.e., increasing or decreasing eating occasions beyond the traditional pattern of three meals daily) has been thought to have an influence on body weight regulation, hunger control, and blood markers of health. It is common practice for weight management clinicians to recommend increasing MF as a strategy for weight management and to improve metabolic parameters. However, limited research exists investigating the effect of MF during controlled hypocaloric dietary interventions. Furthermore, MF literature often speculates with regard to efficacy of MF treatments based on research using normal weight, overweight/obese, or some combination, where much diversity exists within these various populations. In this review, we suggest that normal-weight and overweight/obese populations, as well as free-living versus investigator-controlled research trials, should be studied independently. Therefore, the objective of the present review is to survey the literature to assess whether the alteration of MF influences body weight regulation, hunger control, and/or blood markers of health in overweight/obese participants undergoing a controlled hypocaloric diet to induce weight loss. Findings of this review indicate that there is uncertainty in the literature when interpreting the optimal MF for obesity treatment, where reduced MF may even show more favorable lipid profiles in obese individuals compared with increased MF. Furthermore, the simple relationship of comparing MF with body fatness or body mass index should also consider whether eating frequency is associated with other healthy factors (e.g., increased physical activity).

Kulovitz et al. Nutrition Vol. 2014 30; 4

Nutrition & Dietetics 2011; **68**: 60–64 DOI: 10.1111/j.1747-0080.2010.01497.x

VIEWPOINT

To Snack or Not to Snack: What should we advise for weight management?

Michelle A. PALMER,[1] Sandra CAPRA[2] and Surinder K. BAINES[3]

[1]Griffith University, Gold Coast, [2]University of Queensland, Brisbane, Queensland, and [3]University of Newcastle, Callaghan, New South Wales, Australia

Abstract

Aims: Although our current weight management guidelines suggest eating regularly, speculation about whether snacking assists with managing weight occurs widely among the media, weight loss clients and health professionals. We aim to examine whether there is adequate scientific evidence available to support the manipulation of eating frequently for improving body weight, diabetes and cardiovascular risk markers, and theories that link eating frequently with weight management.

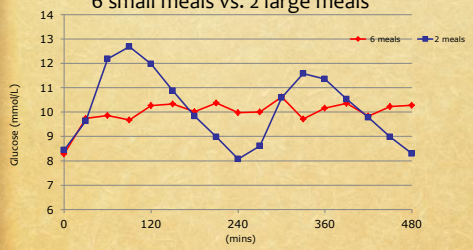
Methods: Relevant papers from nutrition and dietetics journals and other sources were used to assess the association between eating frequency and weight and health.

Results: Longer-term evidence suggests eating frequency does not affect weight, glucose, insulin control, hunger or energy expenditure in intentional weight losers and maintainers. There is consistent short-term evidence of an inverse association between blood lipid levels and eating frequency during weight maintenance. Many of the common theories that suggest manipulating eating frequency for weight management are not supported by the literature. Sustaining a change to eating frequency also may be challenging over the longer term.

Conclusions: Overall current evidence does not suggest that manipulating eating frequency greatly benefits weight and health. Health professionals may not need to manipulate eating frequency for weight management.

Metabolic Effects

1-day study, 12 subjects with type 2 diabetes, 6 small meals vs. 2 large meals



Bertelsen JC et al.. Diabetes Care. 1993 16 (1):4-7

Metabolic Effects

1-day study, 11 subjects with type 2 diabetes,
"nibbling diet" (13 snacks) vs. 3-meal diet (plus 1 snack)

	Nibbling Diet	3-meal Diet	% Reduction
Blood Glucose	9.6 mmol/L	11.11 mmol/L	12.7%
Serum Insulin	276 mmol/L	336 mmol/L	20.1%
Serum TG	3.32 mmol/L	3.63. mmol/L	8.4%

Jenkins DJA, et al . AJCN.1992 55:461-467.

Metabolic Effects

4-week study, 13 subjects with type 2 diabetes,
3 meals (plus 1 snack) vs. 9 meals

Conclusions: No advantages, No adverse events

	3-meals/d	9-meals/d
A1C (%)	7.56	8.08
Glucose (mmol/L)	7.48	7.58
Insulin (mU/ml)	21.53	21.01
T. Chol (mmol/L)	5.88	5.88
LDL-chol (mmol/L)	3.98	4.03
HDL-chol (mmol/L)	1.09	1.05
Triglyceride (mmol/L)	1.86	1.85

Arnold L et al. Diabetes Care. 1997 20 (11):1651-1654

Snack Options

15 g CHO (1 carb choice)

- Triscuit Thin Crisps, 11
- Light yogurt
- Small fruit (tennis ball size)
- Vegetable juice, 12 ounces

Very low carbohydrate

- 2% cottage cheese
- Lettuce wraps w/vegetables & turkey
- Edamame beans
- Nuts
- Hard-boiled egg w/veggies

Substantial Snack Options

- ½ - 1 sandwich (nut butter, tuna, chicken) on high-fiber, whole-grain bread
- Hummus, veggies and pita
- 2% cottage cheese, salsa, veggies
- English muffin or portobello "pizza"
- Vegetable-bean soup
- Apple with nut butter

Snacking: It's a Choice

- Pros:
  - Fill in nutritional gaps
  - Control or stave off hunger
  - Possibly prevent hypoglycemic/hyperglycemia
- Cons:
  - Pack on extra calories
  - Increase medication needs
  - Displace nutritious foods at meals
  - Discourage listening to hunger cues
  - Possibly contribute to hypoglycemic/hyperglycemia

The Effects of Weight Loss

What Does Weight Loss Do?

- Lowering of high blood pressure
- Lowered LDL cholesterol
- Reduced risk of CVD
- Improved blood glucose
  - May reduce meds, prevent increased meds
- Reduced risk of type 2 diabetes
  - 58% in 3 years,[1] 34% in 10 years[2]
- More fun/active
- ENERGY
- Fun clothes
- Confidence
- Comfort
- Better Sleep

[1]Diabetes Prevention Program Research Group N Engl J Med 2002; 346:393-403
[2]Diabetes Prevention Program Research Group Lancet 2009; 373: 1677-1686

Early Weight Loss

"In a retrospective cohort study, a weight loss pattern after the new diagnosis of type 2 diabetes predicted improved glycemic and blood pressure control despite weight regain."

- ADA Guide to Nutrition Therapy for Diabetes

Feldstein et al. Diabetes Care 2008 31:1960-1965

Bariatric Surgery

- Diabetes Remission
  - Varies with definition
  - ADA consensus group: FBG < 100 mg/dl and A1C < 6%, 1 year, no meds
- Complete remission: 34% of 209 subjects
  - Roux-en-Y Gastric Bypass (RYGB): 40.6%
  - Vertical Sleeve Gastrectomy (VSG): 26%
  - Adjustable Gastric Band (AGB): 7%
- Much greater remission rates compared to intensive lifestyle therapy

Vetter et al. Diabetes Spectrum 2012 25:4
Pournaras et al. Br J Surg 99:100-103, 2012

Surgery vs Conventional Therapy in Type 2 Diabetes

- 137 patients, mean age: 48 years
  - BMI: ≥ 35, A1C: ≥ 7%
  - MNT (with conventional medical therapy), RYGB or Sleeve Gastrectomy
- Endpoint: A1C < 6.0% with or without diabetes medications at 3 years post randomization
- Results:
  - RYGB: 38% at 3 years, 24% relapse since year 1
  - SG: 24% at 3 years, 50% relapse since year 1
    - Average combined A1C decrease: 2.5%
  - MNT: 5% at 3 years, 80% relapse since year 1
    - Average A1C decrease: 0.6%

Schauer et al. NEJM March 31, 2014

Predictors of Remission

- Greater weight loss
- Medical treatment without insulin
- Smaller preoperative waist circumference
- Shorter duration of diabetes
  - < 8 – 10 years
- Greater glycemic control

Vetter et al. Diabetes Spectrum 2012 25(4
Schauer et al. NEJM March 31, 2014

Weight Loss & Meds

- Fear of medications
  - Extreme dieting
  - Extreme carbohydrate restriction
- Medications with weight loss effects
  - Victoza & Byetta
  - Metformin
  - Lowers A1C by 1 – 2%, FBG by 60 – 70 mg/dl
  - Modest weight loss
  - Improved endothelial function, insulin resistance, dyslipidemia
  - Persistent benefits: diabetes-related endpoints, all-cause mortality, MI (UKPDS)

Lahiri. Clinical Diabetes. 2012 30:2. Rojas and Gomes Diabetology & Metabolic Syndrome 2013, 5:6

Nutrition Therapy Recommendations for the Management of Adults With Diabetes

ALISON B. EVERT, MS, RD, CDE[1]
JACKIE L. BOUCHER, MS, RD, LD, CDE[2]
MARJORIE CYPRESS, PHD, C-ANP, CDE[3]
STEPHANIE A. DUNBAR, MPH, RD[4]
MARION J. FRANZ, MS, RD, CDE[5]
ELIZABETH J. MAYER-DAVIS, PHD, RD[6]
JOSHUA J. NEUMILLER, PHARMD, CDE, CGP, FASCP[7]
ROBIN NWANKWO, MPH, RD, CDE[8]
CASSANDRA L. VERDE, MPH, RD[9]
PATTI URBANSKI, MED, RD, LD, CDE[9]
WILLIAM S. YANCY JR., MD, MHSC[10]

A healthful eating pattern, regular physical activity, and often pharmacotherapy are key components of diabetes management. For many individuals with diabetes, the most challenging part of the treatment plan is determining what to eat. It is the position of the American Diabetes Association (ADA) that there is not a "one-size-fits-all" eating pattern for individuals with diabetes. The ADA also recognizes the integral role of nutrition therapy in overall diabetes management and has historically recommended that each person with diabetes be actively management of diabetes complications and gestational diabetes mellitus is not addressed in this review.

A grading system, developed by the ADA and modeled after existing methods, was utilized to clarify and codify the evidence that forms the basis for the recommendations (1) (Table 1). The level of evidence that supports each recommendation is listed after the recommendation using the letters A, B, C, or E. A table linking recommendations to evidence can be reviewed at http://professional.diabetes.org/nutrition. Members of the Nutrition Recommendations Writing Group in order to improve overall health and specifically to:

- Attain individualized glycemic, blood pressure, and lipid goals. General recommended goals from the ADA for these markers are as follows:*
  - o A1C <7%.
  - o Blood pressure <140/80 mmHg.
  - o LDL cholesterol <100 mg/dL; triglycerides <150 mg/dL; HDL cholesterol >40 mg/dL for men, HDL cholesterol >50 mg/dL for women.
- Achieve and maintain body weight goals.
- Delay or prevent complications of diabetes.

■ To address individual nutrition needs based on personal and cultural preferences, health literacy and numeracy, access to healthful food choices, will-

Weight Loss Outcomes

- 11 study review
  - 70% completions rate, ≥ 1 year
  - Weight loss: 1.9 – 8.4 kg at 1 year
- Mediterranean-style diet: 6.2 kg (3.8 kg at 4 years)
  - A1C -1.2%
- Intensive Lifestyle Therapy/Look AHEAD: 8.4 kg (4.7 kg at 4 years)
  - A1C: -0.64%
- 5 trials compared varying macronutrient percentages: 1.9 – 4.0 kg, NS
  - All eating plans are equally effective
- CALORIE RESTRICTION RULES OVER THE SCALE

Franz Diabetes Spectrum 2013 26;3

Jill Weisenberger, MS, RDN, CDE

jillweisenberger.com

jill@jillweisenberger.com

757-969-8385

Upcoming Books

The Overworked Person's guide to Better Nutrition

21 Things You Need To Know About Diabetes And Your Heart