Nutritional Considerations for Teens Undergoing Bariatric Surgery

Susan Sewell, MS RD LD CSOWM

Marysusan.sewell@cchmc.org

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Objectives

- Identify pre-operative nutrition evaluation practices for teens with severe obesity
- Identify post-operative nutritional intake goals of teens with severe obesity
- Identify differences in adolescents' development and how this may impact use of information presented

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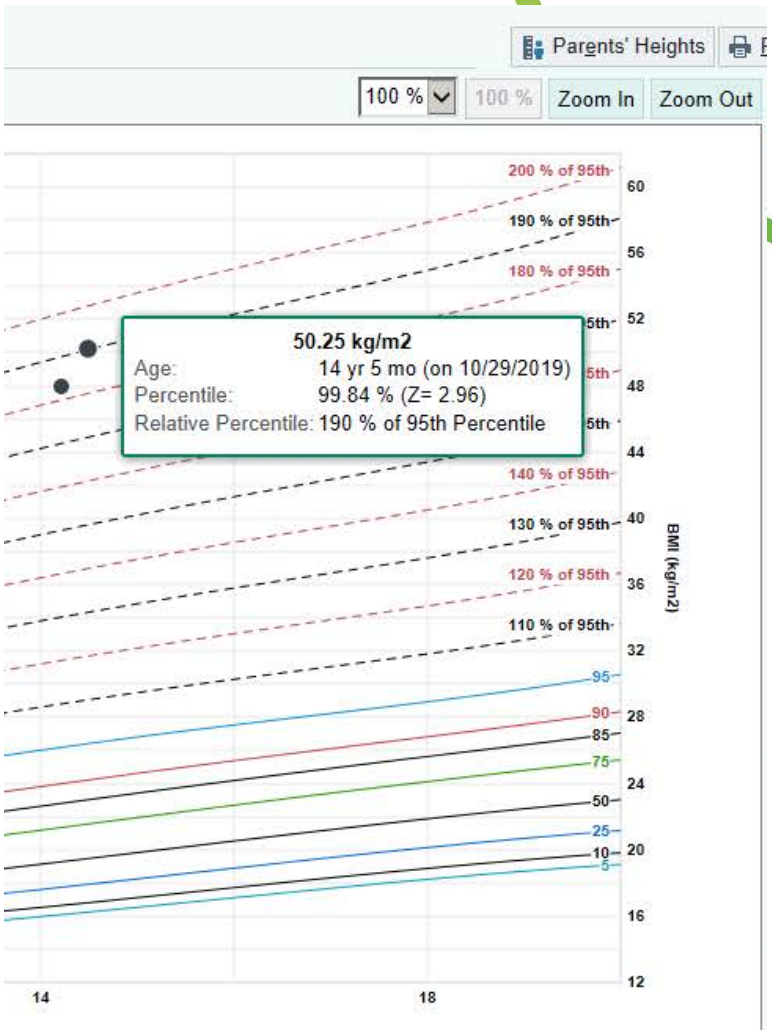
Pre Operative Nutrition Assessment

- Baseline Height, Weight, BMI
- BMI%ile of the 95th %ile
- Qualify for Surgery:
  - BMI ≥ 35 or 120% of the 95th %ile for age
  - BMI ≥ 40 or 140% of the 95th %ile for age



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Pre Operative Nutrition Assessment

- BMI 85th Percentile for Age
- Ideal Body Weight
- Expected Weight at 85th %ile

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Pre Operative Nutrition Assessment

- Lab Data
  - Nutritional Deficiencies
    - Iron: Serum Iron, Serum Ferritin, TIBC
    - Vitamin B12: Serum B12 or MMA
    - Zinc: Serum Zinc
    - Vitamin D: Serum vitamin D 25-OH; PTH
  - Other Chemistries
    - Insulin
    - Fasting Glucose
    - Total Protein

Pre Operative Nutrition Assessment

- Nutrition Focused Physical Exam
  - Overall Appearance
    - Body fat distribution
  - Skin:
    - Acanthosis nigricans
    - Excessive acne or hirsutism
    - Skin irritation and/or inflammation

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Pre Operative Dietary Assessment

- Weight History
- Previous Weight Management Strategies
- Current Food Intake/Eating Patterns
  - Meal skipping
  - Go To: Drinks, Snacks and Meals
  - Who shops, cooks meals?
  - Where does the teen typically eat?
  - Patient's: "Nutrition Concern"
  - Patient's: Expected weight loss goal

Special Considerations for Working with Adolescents

- Group Identity vs. Alienation
  - Teens feel a need for belonging vs. a need to be a unique individual
  - Peer pressure
  - Obesity can result in peer rejection
- Brain development in frontal cortex
- Begin to shift from concrete to formal operational thought (Piaget)

Newman, B. M. & Newman, P. R. *Development through life: A psychosocial approach* (10th ed.)

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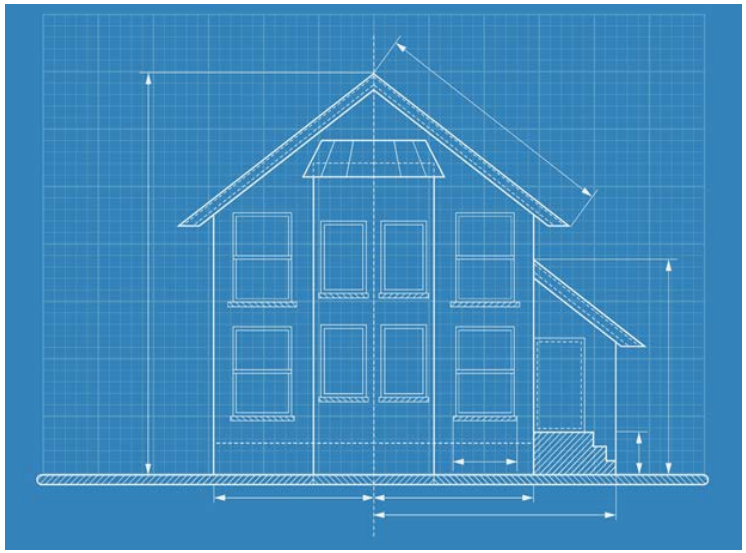
Weight-Proofing the Home

Social Support

- **Family buy-in**
- Peer mentoring and online support
- Resource needs/concerns

- Apply a person-in-environment perspective
- Identifying the “problem”
  - The adolescent’s weight is NOT the problem
- Individual blame vs family ownership
- How can the family come together to make changes to the home environment?



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Pre-Operative Nutrition

Food Choice
- Drinks
- Meals and Snacks

Food Pattern
- School Days
- Weekend and Vacations

Food Portions
- Increasing Protein and Plant Choices
- Decreasing “Refined Food” Choices

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Pre-Operative Nutrition

Food Choice

- Drinks
- Meals and Snacks

Drink Choices

Coffee Drinks
Sweet Tea
Fruit Juices
Sports Drinks
Lemonades
Fruit Waters

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Pre-Operative Nutrition

Food Pattern

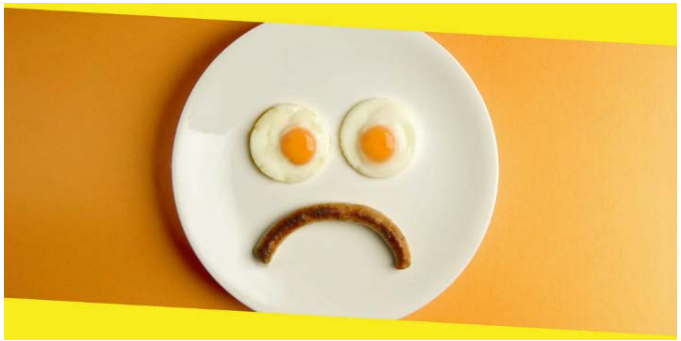
- School Days
- Weekend and Vacations

Meal Skipping

Late afternoon snacking

Late evening snacking

Overnight eating



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Pre-Operative Nutrition

Food Portions

- Increasing Protein and Plant Choices
- Decreasing “Refined Food” Choices

Reliance on prepared foods

Limited knowledge of cooking whole foods

“Selective” Eating Preferences

After school: Increased portions or frequent grazing due to early day meal skipping

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Case Study: 2

- African-American female
- Age 19
- Medical diagnoses:
  - Insulin resistance
  - Elevated liver enzymes
  - Hypertriglyceridemia
- Psychosocial history:
  - Diagnoses of depression, anxiety, and learning disorder
  - Lives with maternal grandmother, brother, and maternal uncle
  - Graduated high school at age 18; not currently working
  - Has struggled with self-esteem and independence

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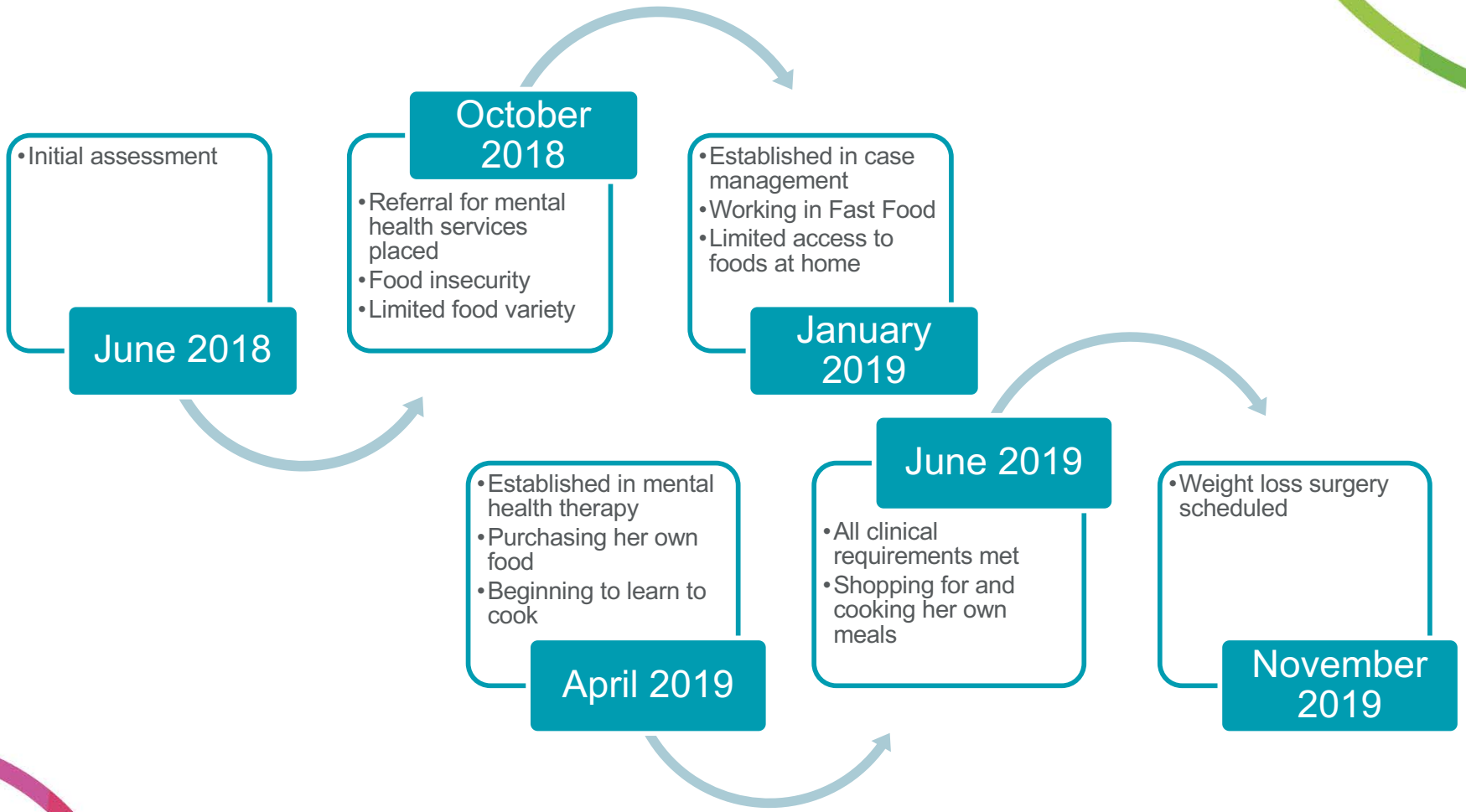
Case Study



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Pre-Operative Weight Loss

- ASMBS Position Statement
  - "No published RCT, systematic review or retrospective review has identified any post-operative outcomes benefit after insurance mandated pre-operative weight loss."
  - "Nor is there any precedent for requiring weight loss or proof of lifestyle compliance before authorization of any other elective procedure."

Kim JJ et al. ASMBS updated position statement on insurance mandated preoperative weight loss requirements. SOARD 12 (2016) 955-959

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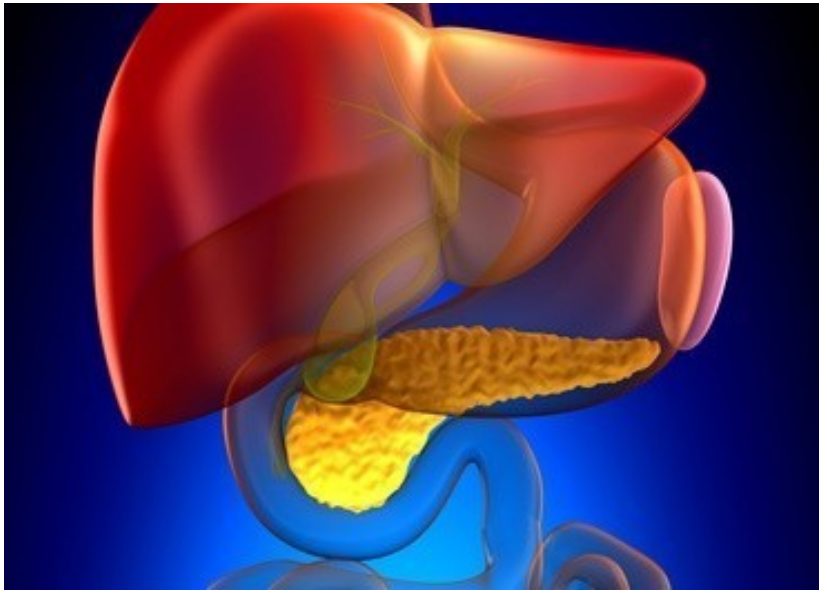
Pre-Operative "Liver Shrinking" Plan

- Surgery requires exposure of the gastroesophageal junction

- Hepatomegaly and excessive omental fat provides additional technical challenges



Colles SL Preoperative weight loss with a very-low-energy diet: quantitation of changes in liver and abdominal fat by serial imaging. AJCN 2006;84304-11

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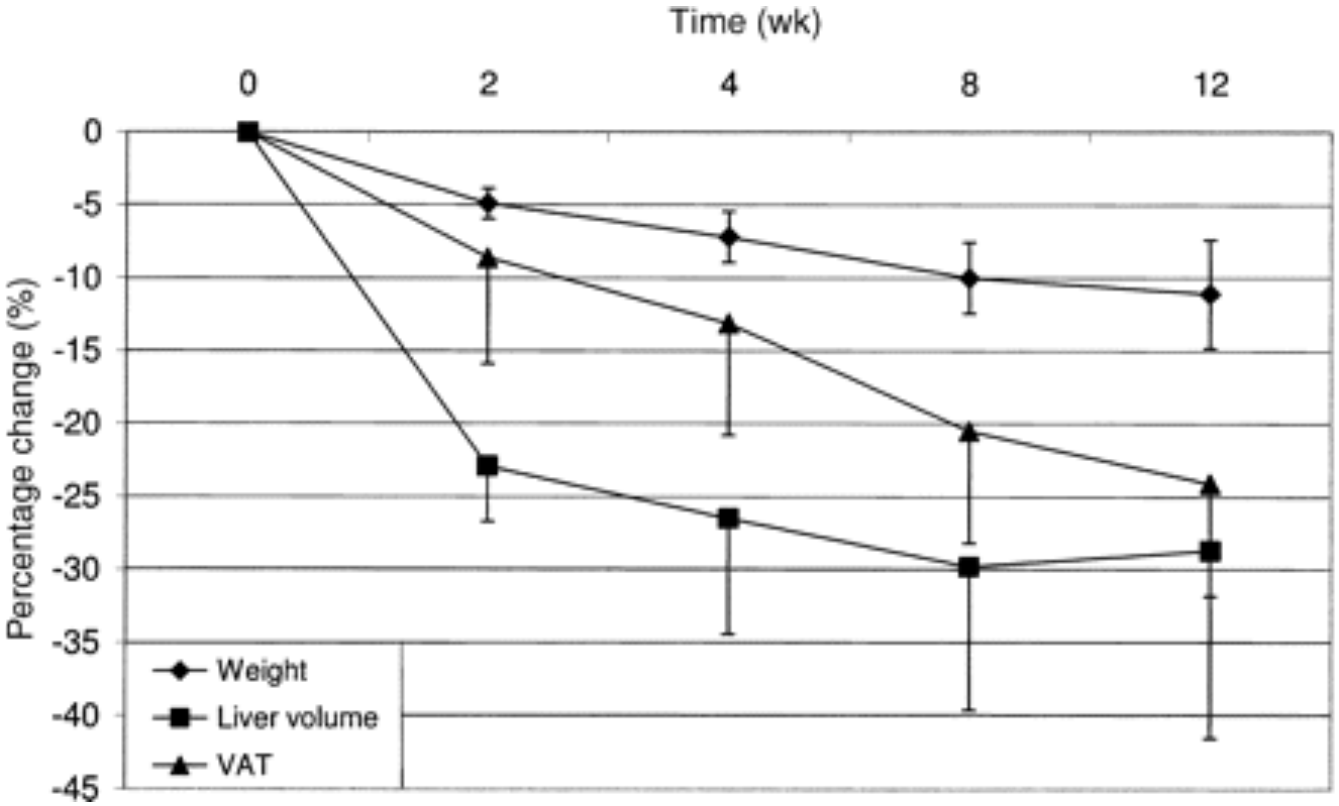
FIGURE 2. Relative change in liver volume, visceral adipose tissue (VAT) area, and body weight during a 12-wk ...



The American Journal of Clinical Nutrition, Volume 84, Issue 2, August 2006, Pages 304–311, https://doi.org/10.1093/ajcn/84.2.304

Pre-Operative "Liver Shrinking" Plan

- 50 g Carbohydrate
- 1000 to 1200 Calories
- 3 meals of: Protein Shakes or Protein Bars or 3 oz very lean meat
- 1 Meal: Less than 20 grams Carbohydrate
- Addition of "non-starchy" vegetables
- 64-80 oz. Water
- 2 Weeks Ahead of Surgery

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Post Operative Dietary Stages

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Water, room temperature **Sugar-free clears**	**Full Liquids** **High Protein** Start with 2-4 oz per meal Limit drinking to 30 minutes. Eat 4-5 times per day	**Soft Protein Foods** Start with 1-2 TBS of soft food. Continue full liquid, high protein drinks Eat 4 to 5 times per day	**Soft Protein Foods & Add Soft Fruits, Well Cooked Vegetables** **Add salad & raw vegetables 2 weeks later**	**All textures** **Can add starchy based foods once protein and vegetable, fruit targets consistently being met.**
48-64 oz/day	**64+ oz/day non carbonated, caffeine-free, sugar-free fluids** **1.0 to 1.2 g Protein/kg IBW**			
Day of surgery thru POD 3	POD 3 thru 14	POD 15 thru 28	Week 5 thru 11	Week 12 on

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BariatricMealPrep.com Kristin Willard, RD

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Meal	Time	Day 1
Fluids	6:45 AM	**Water**
Supplement	6:45 AM	**Zantac/Rinitidine**
Meal #1	7:00 to 7:30AM	¼ to ½ cup Protein Shake
NOTHING To Drink or Eat	7:30 to 8:00 AM	
Fluids	8:00 to 9:30 AM	**Water**
Supplements	8:00 AM	**Prenatal Vitamin**
Meal #2	9:30 to 10:00 AM	¼ to ½ cup Protein Shake
NOTHING To Drink or Eat	10:00 to 10:30 AM	
Fluids	10:30 to Noon	**Water**
Supplements	10:30 AM	**Calcium Citrate**
Meal #3	Noon to 12:30 PM	2 TBS to ¼ cup smooth Greek Yogurt (< 10 g sugar/serving)
NOTHING To Drink or Eat	12:30 to 1:00 PM	
Fluids	1:00 to 2:30 PM	**Water**
Meal #4	2:30 to 3:00 PM	¼ to ½ cup Protein Shake

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Nutrition-Related Complications

- **Dehydration**
  -Dizziness, nausea, fatigue, dark urine
  -Weight early indicator
    - >2 lb/d = dehydration; monitor hypertension medications
- **Nausea or vomiting**
  - Most likely related to drinking/eating patterns
    - Eating too fast; eating too much; not chewing thoroughly; trying food textures to early in post op care
  - Rule out: Dehydration, ketosis, pregnancy, leak or stenosis
- **Diarrhea**
  - Think lactose intolerance first, then dumping, or post cholecystectomy

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MEAL PLANNER Post-Op: Weeks 3 and 4

	Container Color		Day 1	Day 2	Day 3
Meal 1	Orange 2 TBS	Blue 1/3 cup	P3 Pack Serve ONE square of the 3 pack.	1 scrambled egg with ¼ piece of chopped turkey sausage Serve HALF of this	Deviled Eggs (Mix yolk of hardboiled egg with Lite Mayo and spices) Serve HALF Egg
Meal 2			High Protein Meal Replacement Shake	High Protein Meal Replacement Shake	High Protein Meal Replacement Shake
Meal 3	Orange 2 TBS	Blue 1/3 cup	String Cheese wrapped with very thin sliced turkey lunch meat or ham Serve 1/3 of this	Shredded Chicken mixed with Wing Sauce	Tuna or Tilapia or Salmon shelf stable pouch, mix with Lite Mayo No crackers.

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Need more ideas about where to start eating? Here are some. The **orange cup** holds 2 Tablespoons of food. Serving yourself in small cup like this takes the guess work out of figuring out "how much to eat" until your body gets used to eating again.

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Post Operative Nutrition Priorities

Fluids:

- 64 to 72 ounces of fluid a day

Protein (1.0 to 1.2 g/ kg IBW)

–Minimum 3 – 5 times a day

Fruits and vegetables daily

- Limit starches until protein needs are met

Daily Vitamins and minerals

MV, Ca Citrate, B12, vitamin D, Thiamin

Energy Needs

Decrease in RMR after RYGB and SG

Indirect Calorimetry

Mifflin St. Jeour Equation **

Molnar Equation for Youth

Andromalos, L et al. JAND 2019: 119 (4); 678

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Routine Nutrient Supplementation

Supplement	Dosage
Multivitamin	1-2 daily
Thiamin	12 mg/d (minimum) 50 mg/d from B-complex or Multi vitamin (preferred)
Calcium Citrate X 2-3/day Divided doses	1,200- 1,500 mg/d
Vitamin D3	3,000 IU/day
Folic Acid	400 mcg/d in multivitamin
Elemental iron not to be taken with calcium	45-60 mg/d (menstruating females) 18 mg/d (low risk of post-op iron deficiency; in multivitamin)
Vitamin B12	350- 500 mcg/d orally/sublingual, nasal or 1,000 mcg/mo intramuscularly

Mechanick et al, *SORD* 2013; Parrot J, et al. SORD 2017

Post- op Labs (6m, 1yr, annual)

- CBC w/diff
- Renal/electrolytes
- Liver (including albumin)
- Lipid profile
- Fasting Insulin
- Fasting Glucose
- Hgb A1C (if indicated)
- Iron, ferritin
- Vitamin D 25-OH
- Vitamin B-12 (1yr and annual appts)
- Folate (RBC)
- Whole Blood Vitamin B-1 (thiamine)
- PTH (1yr / annual)

Perioperative bariatric guidelines. AACE/TOS/ASMBS Guidelines. Obesity 2009;17: supplement 1, S1-70 (S18).

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Nutrition Supplement Concerns

- **Documentation of non-compliance of vitamin and mineral supplementation**
  - In a cohort of 34 adolescents who underwent RYGB, only 13% took recommended supplements
  - In a cohort of 85 adolescents who underwent RYGB, adherence ranged between 52% to 61% (for specific nutrients)
  - Increased micronutrient intake (diet and supplement) at 5 years compared to control group, except for calcium.

Towbin et al, *J Pediatr* 2009; Pratt et al, Obesity, 2009; Coupaye et al. *Obesity Surgery*, 2009 Michell et al. *JPGN*; Rand CS et al. *South Med* J 1994 Henfridsson P et al. SOARD 2019,

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Protein Requirements

- **RDA – 46-56 g/d for normal adults**
- **Post-WLS exact needs unclear**

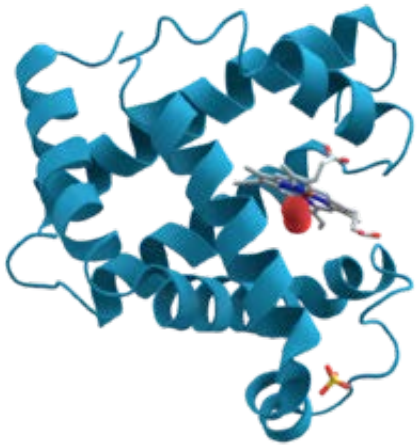
- Case studies reveal early post-op patients tend to take in less than the 60-90 grams most commonly recommended
- No statistically significant relationship between postoperative macronutrient distribution and postoperative weight loss.

Complete protein concentrates (essential/indispensible amino acids)

- egg white, soy, milk (casein/whey fractions).
  - -Whey: contains varying amts of lactose
  - -Whey protein isolates are lactose free

Soy

Pea Protein



Giusti et al, Obes Surg 2004
Michell et al, JPGN
Castellanos et al Nutr Clin Pract 2006;21:485-504
Brolin, et al. J Gastrointest surg 2002
Andromalos, L et al. JAND 2019: 119 (4); 678

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Difficulty Finding Time for Post-Op Lifestyle

- Small frequent, high protein meals
- Drinking during the day
- Juggling eating schedule when working
- Lack of control over school and work schedules

Childerhose JE et al. Adolescent bariatric surgery: a qualitative exploratory study of US patient perspectives Clinical Obesity 8, 345-354, October 2018

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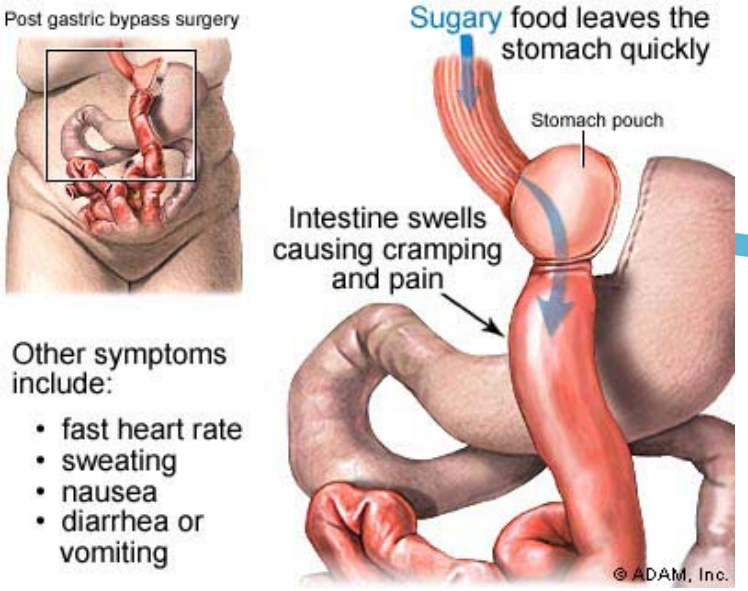
RYGB: Special Considerations

- **Dumping Syndrome:**

- Caused by a sudden distention of the jejunum by hypertonic solids or fluids.

- Symptoms occur shortly after eating and can last for 30-60 minutes.

- Symptoms include nausea, dizziness, weakness, rapid pulse, cold sweats, feeling very tired, cramps and diarrhea.



Fluids VERY slowly and keeping sugar <25 grams per serving may prevent dumping

Nutrition Facts

Serving Size 172 g

Amount Per Serving	
Calories 200	Calories from Fat 8
	% Daily Value*
Total Fat 1g	1%
Saturated Fat 0g	1%
Trans Fat	
Cholesterol 0mg	0%
Sodium 7mg	0%
Total Carbohydrate 36g	12%
Dietary Fiber 11g	45%
Sugars 6g	
Protein 12g	
Vitamin A 1% • Vitamin C 1%	
Calcium 4% • Iron 24%	

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

NutritionData.com

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Mallory et al *Obes Surg* 2005

Reactive Hypoglycemia Post-bypass or sleeve

Possible Etiologies:

- **Beta cell hyperfunction**
- **Underlying familial hyperinsulinism syndrome unmasked by weight loss**
- **Excessive secretion of GLP 1**

How to Manage with Nutrition Strategies:

- 6 small meal; protein at each
- Avoid refined CHO; high sugar foods

de Heide, et al . *JCEM* 2012

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Surgical Weight Loss Program for Teens

Bariatric Surgery Weight Loss Predictor

To know on average how much weight you can lose in the three years following bariatric surgery, enter your pre-surgery weight, age and gender.

Pre-Surgery Weight (lbs):

295

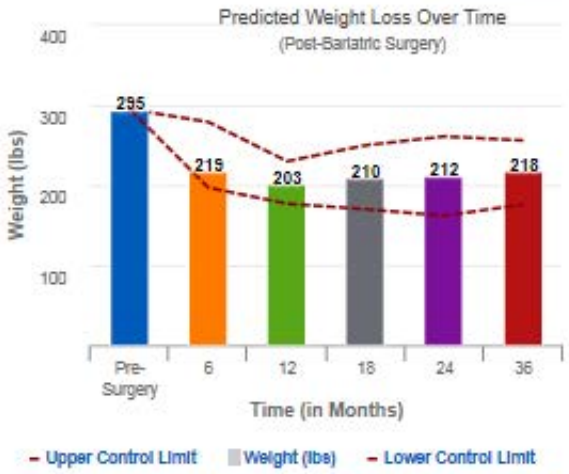
Age (years):

15

Gender:

Female

Refresh Chart



Disclaimer: Prediction tool is based on the patient visits pre- and post-surgery at Cincinnati Children's Hospital Medical Center. Tool meant for informational needs only.

Notes

Insufficient Weight Loss and Weight Regain

- **Potential Contributors:**
  - **Change in Energy Adaptations**
    - Decrease in resting energy expenditure of -548 kcal/d at 12 M postoperatively . Not significantly different between RYGB and SG
    - Greater reduction in REE at 12 M associated with smaller % TWL at 12 M
  - **Behavioral:**
    - Lifestyle factors (Sleep, Activity, Stressors)
  - **Eating pattern and food choices**
    - Unstructured meals
    - Grazing: consuming multiple small meals with feelings of loss of control with eating
    - Binge Eating
    - Food intolerances
    - Hunger/satiety cues are altered
    - Decrease in active monitoring: Food records and Journaling

Chu L. Resting Energy Expenditure and Metabolic Adaptation in Adolescents at 12 Months After Bariatric Surgery J Clin Endo Metab 2019 104(7):2648-2656

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Insufficient Weight Loss and Weight Regain

WATCH Questionnaire

W: Weight:
Have you lost more or less weight than medically expected?

A: Adhering:
Fluids Macronutrients Exercise

T: Thinking:
Are you spending an excessive amount of time thinking about your weight, shape or food?

C: Control:
Are you feeling a sense of Loss of Control while eating?

H: Harmful:
Are you engaging in any Harmful behaviors to lose weight?

Coughlin JW et al. JH Clin Psychol Med Settings (2013) 20:456-463

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Maladaptive Coping

- Alcohol is most frequently used substance among adolescents
  - 10% of teens report drinking alcohol prior to WLS
  - 30% of adolescents report consuming alcohol in second postoperative year (age-related trends)
  - Routinely screen and counsel on risk of alcohol misuse and abuse
- Smoking and vaping with nicotine should be strongly discouraged after WLS
- Marijuana use needs more research

Pratt et al., SOARD, 2018; Newman, B. M. & Newman, P. R. *Development through life: A psychosocial approach* (10th ed.)

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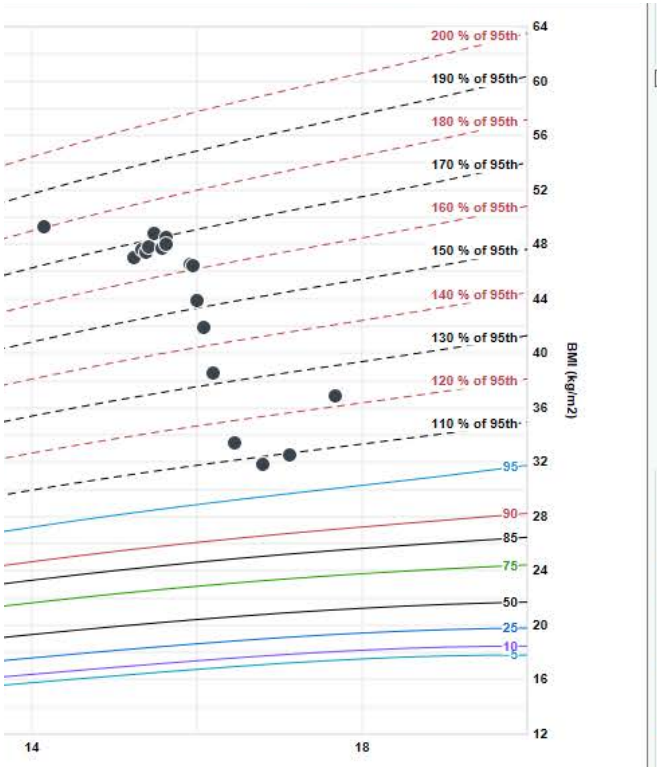
Case Study

16 year old African American Female

Wt: 112.4 kg (247 lbs)
HT: 153 cm (60 in)
BMI: 47.8

- Severe Obesity
- Insulin Resistance

Nadir Weight: 75.4 kg (166 lbs)
Weight Regain: +12 kg (+26.4 lbs) / 9 months



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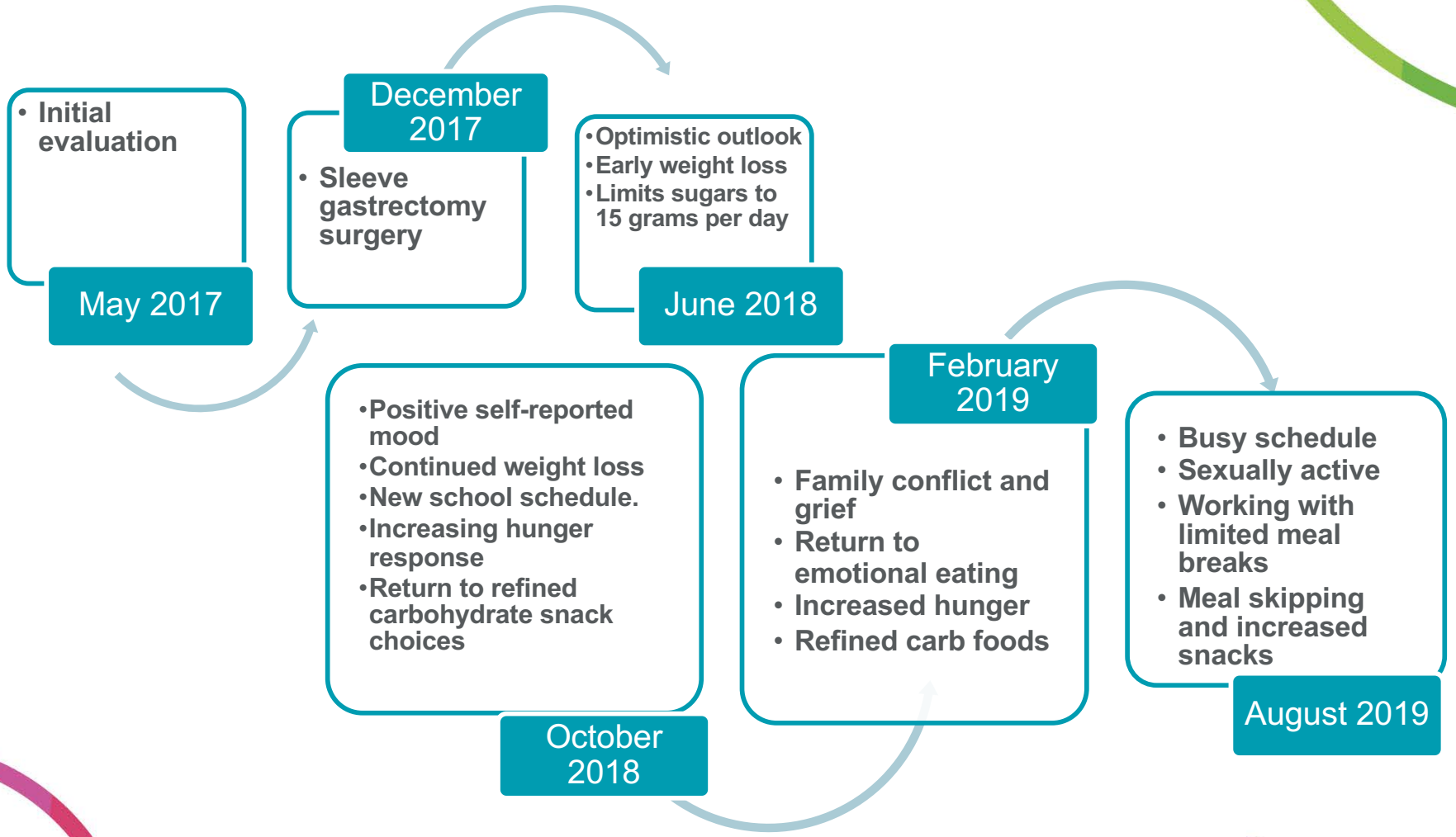
Case Study: 5



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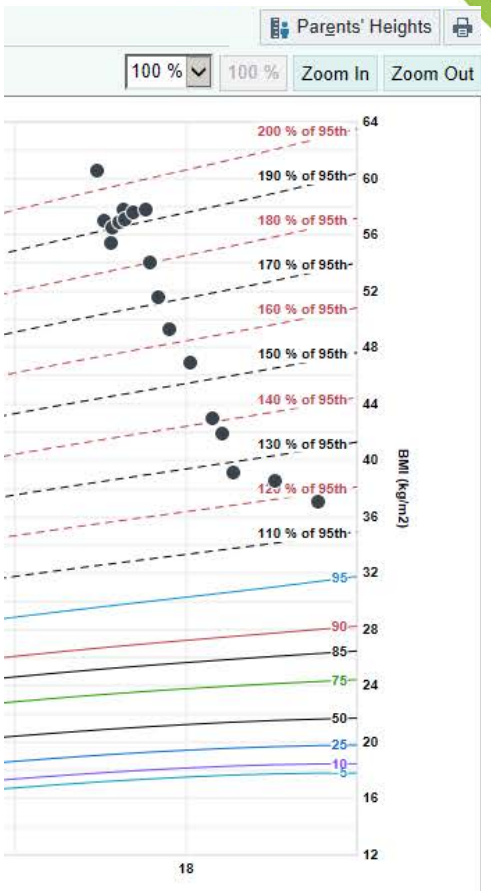
Case Study: 6

17 year old Caucasian
Female

Wt: 179.2 kg (391 lbs)
Ht: 176.1 cm (71 in)
BMI: 58

Dyslipidemia
Elevated blood pressure
Insulin Resistance
Elevated Liver Enzymes



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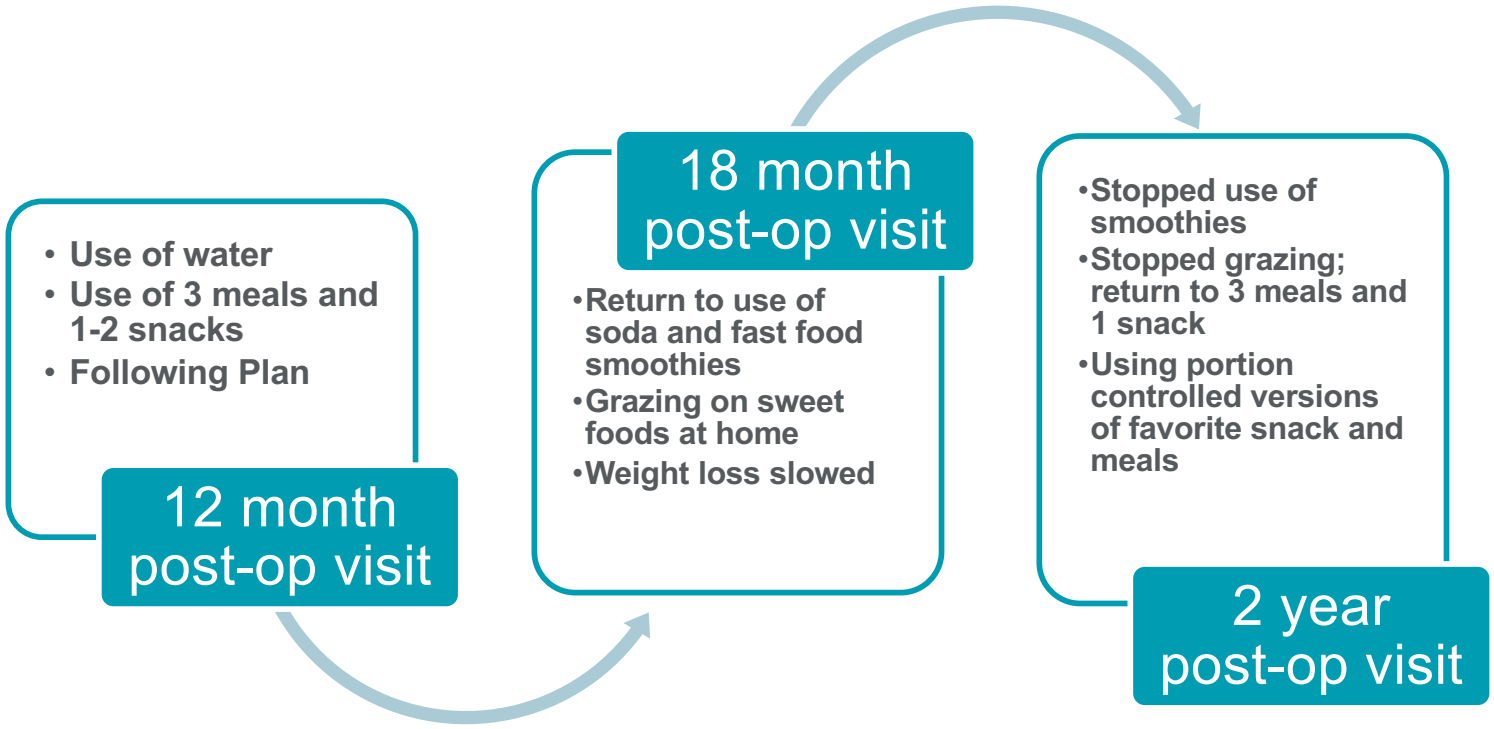
Case Study



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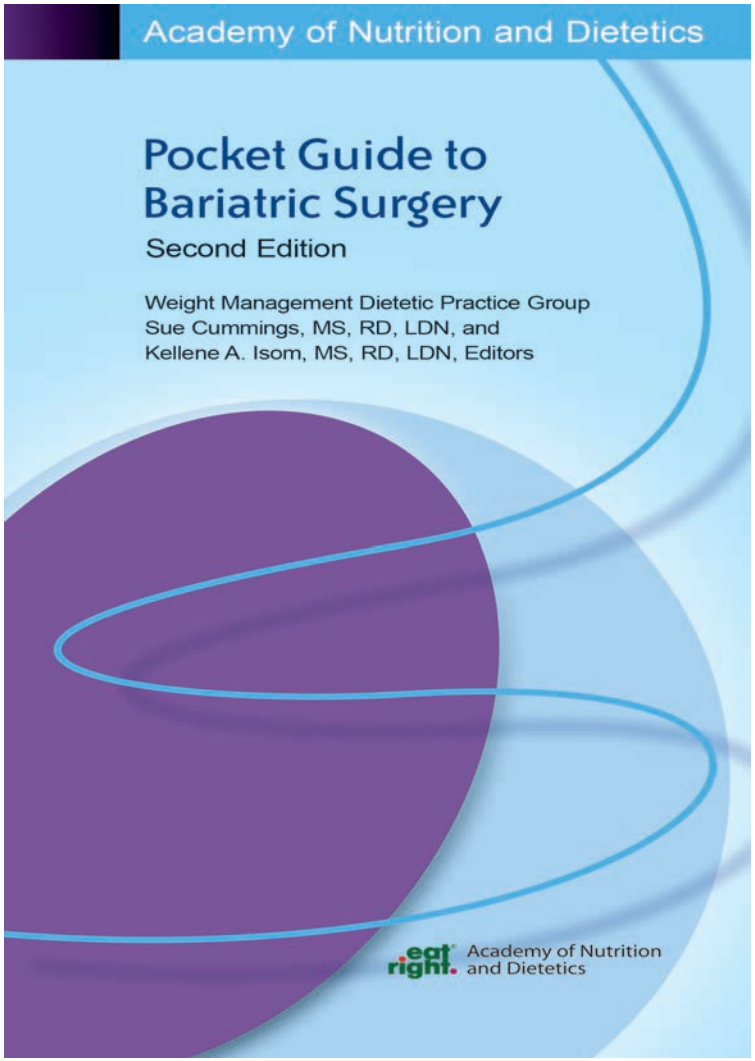
The 2nd Edition of the Academy of Nutrition and Dietetics 2014



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