Chapter 5

Diets for Weight Management

Overweight or Obesity

Prevalence in USA
Adults ≥ 20 years

Survey results:

1999-2000

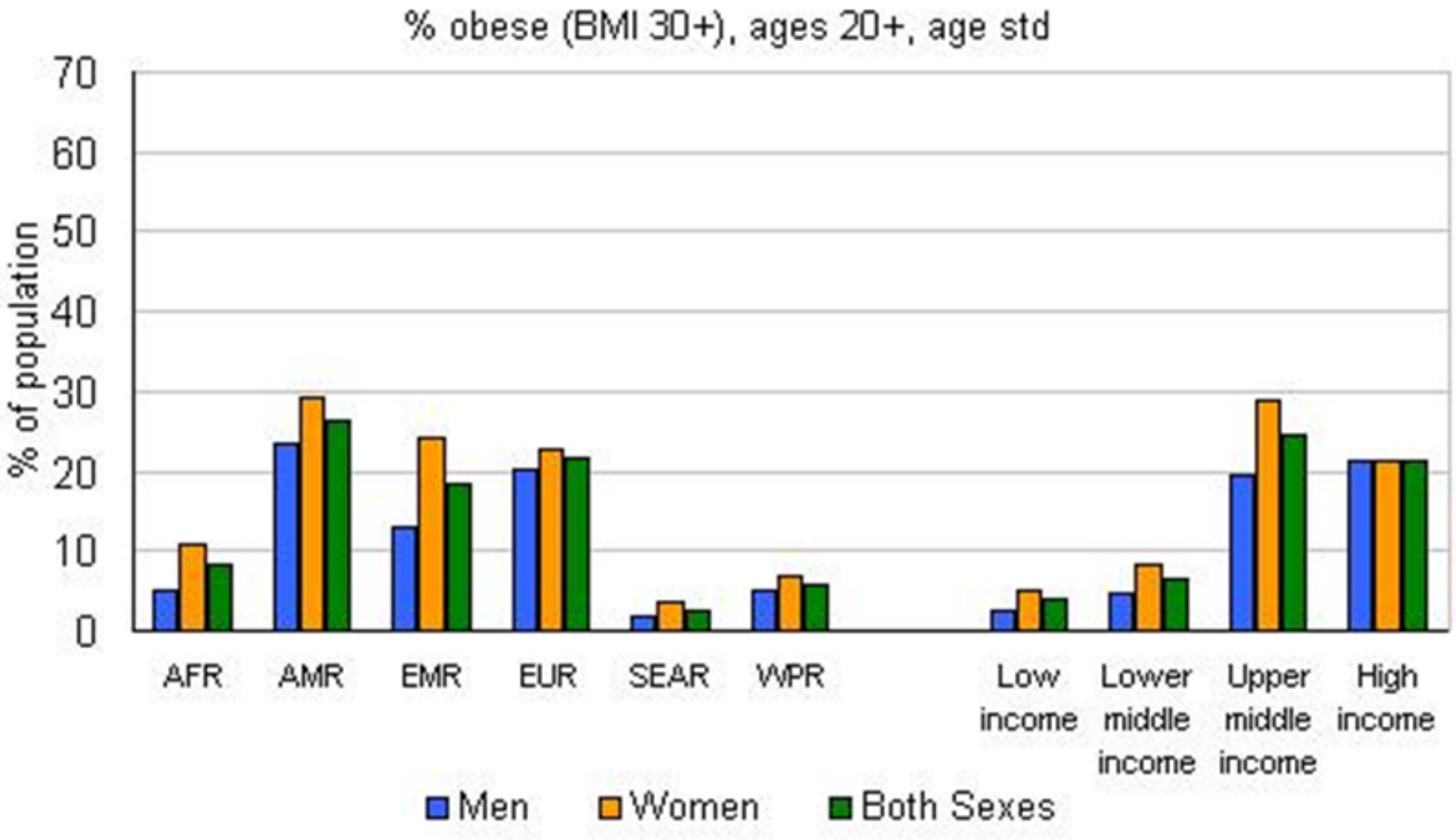
- 66% overweight.
- 30.5 % obese.

2009-2010 [From CDC (Centers for Disease Control and Prevention)]

- 69.2% overweight.
- 35.9% obese.

Prevalence of Obesity among Women and Men in WHO Regions

In 2008, 10% of men and 14% of women in the world were obese (BMI ≥30 kg/m2), compared with 5% for men and 8% for women in 1980.



Countries marked in yellow in the map are outside the WHO African Region.

Eastern Mediterranean Region

Americas Region

Europe Region

South East Asia Region

Complications of Obesity

- Type II diabetes : Adult onset or non-insulin dependent,
- Hyperlipidemias,
- Hypertension,
- Cardiopulmonary disease,
- Osteoarthritis,
- Some forms of cancer.

Complications of Obesity Cont'd.

- Sleep apnea: temporary cessation of breathing during sleep,
- Complications of pregnancy,
- Irregular menses: irregular menstrual cycle,
- Hirsutism : excess body and facial hair especially in women,
- Stress incontinence: involuntary loss of urine that occurs during stress, such as coughing, sneezing, laughing, or exercise,
- Depression,
- Increased ↑surgical risk.

Benefits of Weight Reduction

Decreasing body weight by ↓10% of current weight

- Helps in ↓ lowering:
  1) Blood glucose level,
  2) Cholesterol level, and
  3) Blood pressure [hypertension]
- Prevents complications,
- Improves overall health,
- Improves body image (psychology).

Weight Status

- Healthy Weight (Ideal Body Weight).
- Overweight.
- Obesity.

Ideal Body Weight Formulas

1) The history of the formulas for calculating ideal body weight began in 1871 when Dr. P.P. Broca (a French surgeon) created the following formula (known as Broca's index):

- IBW(in kg) =

  Women: Height(in cm) — (100) = Normal weight ± 15%

  Men: Height(in cm) — (100) = Normal weight ± 10%

Ideal Body Weight Formulas

2) Dr. BJ Devine published the following formula in 1974 for medical use (to calculate the dosage of certain medications):

- IBW in kg =

  Men: 50kg + 2.3 kg per inch over 5 feet.

  Women: 45.5 kg + 2.3 kg per inch over 5 feet.

Ideal Body Weight Formulas

3) In 1983, Dr. JD Robinson published a modification of the formula, and Dr. Miller published a different modification.

- Robinson (Robinson: gives middle value):

  Men: IBW(in kg) = 52 kg + 1.9 kg per inch over 5 feet.

  Women: IBW (in kg) = 49 kg + 1.7 kg per inch over 5 feet.

- Miller (Miller: gives the highest value):

  Men IBW: (in kg) = 56.2 kg + 1.41 kg per inch over 5 feet.

  Women: IBW (in kg) = 53.1 kg + 1.36 kg per inch over 5 feet.

4) Hamwi (Hamwi: gives the least value):

Men: IBW (in kg) = 48 kg + 2.7 kg per inch over 5 feet.

Women: IBW (in kg) = 45.5 kg + 2.2 kg per inch over 5 feet.

Ideal Body Weight Formulas

5) In 2005, Harry Lemmens came up with a different formula:

Ideal Body Weight (kg) = 22 x (height meter)^2

For example:

Height of 1.83 meters.

22 x (1.83 meters) ^{2} = 73.67 kilograms.

This formula: there is NO variations for men and women.

IBW
Simple Rule (General Formula)

- *Women*: Allow 100lbs for the first 5 feet and 5lbs for each additional inch.

- *Men*: Allow 110lbs for the first 5 feet and 5lbs for each additional inch.

Example:

Women
Height = 160 cm / 30.48 = 5.249 feet,
.249 X 12 = 2.988 inches X 5 = 14.94 + 100 = 114.94 / 2.2 = 52.245 kg.
Men
160 cm / 30.48 = 5.249 feet,
.249 X 12 = 2.988 inches X 5 = 14.94 + 110 = 124.94 / 2.2 = 56.79 kg.

IBW Charts
Height in both (ft. & in.), and in cm.
Weight Range for Body Frame

Height			Weight																
			Small Frame						Medium Frame						Large Frame				
(ft)	(in)	(cm)	(lbs)		(lbs)	(kg)		(kg)	(lbs)		(lbs)	(kg)		(kg)	(lbs)		(lbs)	(kg)		(kg)
4	10	147	102	-	111	46	-	50	109	-	121	49	-	55	118	-	131	54	-	59
4	11	150	103	-	113	47	-	51	111	-	123	50	-	56	120	-	134	54	-	61
5	0	153	104	-	115	47	-	52	113	-	126	51	-	57	122	-	137	55	-	62
5	1	155	106	-	118	48	-	54	115	-	129	52	-	59	125	-	140	57	-	64
5	2	158	108	-	121	49	-	55	118	-	132	54	-	60	128	-	143	58	-	65
5	3	160	111	-	124	50	-	56	121	-	135	55	-	61	131	-	147	59	-	67
5	4	163	114	-	127	52	-	58	124	-	138	56	-	63	134	-	151	61	-	68
5	5	165	117	-	130	53	-	59	127	-	141	58	-	64	137	-	155	62	-	70
5	6	168	120	-	133	54	-	60	130	-	144	59	-	65	140	-	159	64	-	72
5	7	170	123	-	136	56	-	62	133	-	147	60	-	67	143	-	163	65	-	74
5	8	173	126	-	139	57	-	63	136	-	150	62	-	68	146	-	167	66	-	76
5	9	175	129	-	142	59	-	64	139	-	153	63	-	69	149	-	170	68	-	77
5	10	178	132	-	145	60	-	66	142	-	156	64	-	71	152	-	173	69	-	78
5	11	180	135	-	148	61	-	67	145	-	159	66	-	72	155	-	176	70	-	80
6	0	183	138	-	151	63	-	68	148	-	162	67	-	73	158	-	179	72	-	81

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Ideal Body Weight Chart in both Systems

HEIGHT	WEIGHT	KGS	HEIGHT	WEIGHT	LBS
(CMS)	MEN	WOMEN	INCHES	MEN	WOMEN
147	-	45-59	58	-	100-131
150	-	45-60	59	-	101-134
152	-	46-62	60	-	103-137
155	55-66	47-63	61	123-145	105-140
157	56-67	49-65	62	125-148	108-144
160	57-68	50-67	63	127-151	111-148
162	58-70	51-69	64	129-155	114-152
165	59-72	53-70	65	131-159	117-156
167	60-74	54-72	66	133-163	120-160
170	61-75	55-74	67	135-167	123-164
172	62-77	57-75	68	137-171	126-167
175	63-79	58-77	69	139-175	129-170
177	64-81	60-78	70	141-179	132-173
180	65-83	61-80	71	144-183	135-176
182	66-85	-	72	147-187	-
185	68-87	-	73	150-192	-
187	69-89	-	74	153-197	-
190	71-91	-	75	157-202	-

Anthropometrics
%IBW

%IBW = (current wt. ÷ IBW) X 100

80-90% mild malnutrition,

70-79% moderate malnutrition,

60-69% severe malnutrition,

< 60% non-survival,

Example: 56 kg ÷ 65 kg X 100 = ≈ 85 % of IBW.

Anthropometrics

- % UBW: usual body weight
  = (current wt. ÷ UBW) X 100
  85-95% mild malnutrition,
  75-84% moderate malnutrition,
  0-74% severe malnutrition,
  Example: 60 kg/70kg X 100 = 85.7 = ~86%.

- % Weight Change = usual weight – current weight/usual weight X 100
  Example (weight loss in 1 month): (70 kg – 65 kg ÷ 70 kg) X 100 = ~7%.

- Significant weight loss:
  >5% in 1 month,
  >10% in 6 months.

Body Mass Index (BMI) is Currently Used

BMI = weight (kg) ÷ height $(m)^2$

Example:

BMI = 67 kg ÷ $(1.65\ m)^2$ = $\approx 24.6\ kg/m^2$

BMI = [weight (lb)x 703] ÷ height $(in)^2$

Example:

BMI = [147.71lb x 703] ÷ 64.96 $(in)^2$ = $\approx$ 24.6

BMI and Weight Status

BMI	Weight Status
< 18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30-34.9	Obese Class I
35-39.9	Obese Class II
≥40	Obese Class III (extreme or morbid obesity)

Measuring Body Frame Size (BFS)

Use a tape measure to measure your wrist around the widest point.

Formula:

r = ht. cm ÷ wrist circumference cm

BFS Classification

r = ht. (cm) ÷ wrist circumference (cm)

Gender	Large frame	Medium frame	Small frame
Female	r = < 10.1	r = 10.1-11.0	r = > 11.0
Male	r = < 9.6	r = 9.6-10.4	r = > 10.4

Calculating IBW using BMI

IBW = Ht $(m)^2$ x BMI (for normal weight range) taking into consideration body frame size (BFS)

BFS = ht (cm) ÷ wrist circumference(cm)

Gender	Large frame	Medium frame	Small frame
Female	Ht $(m)^2$ x 23 (BMI)	Ht $(m)^2$ x 22 (BMI)	Ht $(m)^2$ x 21 (IBM)
Male	Ht $(m)^2$ x 24 (BMI)	Ht $(m)^2$ x 23 (BMI)	Ht $(m)^2$ x 22 (BMI)

Energy Balance

- In order to maintain daily energy balance:
  - Food energy intake = body energy output (weight maintenance),
- Intake > output = weight gain (extreme: obesity),
- Intake < output = weight loss (extreme: anorexia).

Factors Influencing Basal Metabolic Rate (BMR)

- ↑ Lean body mass (muscles and organs) →↑ BMR
  - Greater metabolic activity in lean tissues
- Growth periods
  - Growth hormone stimulates cell metabolism →↑ BMR
- Stress Factors such as: Body temperature - Fever →↑ BMR
- Hormonal status
  - Hypothyroidism = ↓ BMR
  - Hyperthyroidism = ↑ BMR

Factors Influencing Basal Metabolic Rate (BMR) Cont'd.

Life Cycle

- Growth periods:
  - Extra energy per unit of body weight is necessary to build new tissue,
  - Infancy, adolescence, pregnancy,
- Adulthood:
  - Energy needs level off,
- Aging:
  - With aging, energy needs decline,

Average Caloric Allowances (Birth to 18)

TABLE 6–3 Approximate Caloric Allowances from Birth to 18 Years

Age (years)	Kcal/lb
INFANTS	
0-0.5	33.4
0.6-1.0	35.6
CHILDREN	
1-2	36.2
Males	
3-8	32
9-13	26.3
14-18	24
Females	
3-8	29.7
9-13	23.8
14-18	19.3

Data from Food and Nutrition Board, Institute of Medicine: *Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids,* Washington, DC, 2002, National Academies Press.

Measurement of BMR (RMR)

- General (Metabolic) Formula
- Mifflin equation or Formula
- Harris-Benedict Equation
- Schofield Equation

Measurement of BMR (RMR)

1st Equation

General Formula or metabolic formula

Simple Formula:

1 kcal / kg IBW per hour

Reduce by 2% for every decade above 25 years of age.

Gradual ↓Reduction of Kcal Needs/ kg of Body Weight

Gradual Reduction of Kcal Needs during Adulthood	
Age	Kcal reduction (%) for maintenance of ideal body weight
25-35	≈ 2
25-45	≈ 4
25-55	≈ 6
25-65	≈ 8
25-75	≈ 10

2nd Equation
Harris-Benedict Equation (1919)

BMR or BEE

- Women = [(9.56 x wt.) + (1.85 x ht.) – (4.67 x A)] + 655.1
- Men = [(13.75 x wt.) + (5.0 x ht.) – (6.77 x A)] + 66.5

wt.= current weight in kg
ht. = height in cm
A = age in years

3rd Equation

Schofield Equation (1985) for the Healthy

BMR is calculated using the following table

W = Body weight in kilograms

Age range	Women	Men
15-18 years	13.3 x wt. + 690	17.6 x wt. + 656
19-30 years	14.8 x wt. + 485	15.0 x wt. + 690
30-60 years	8.1 x wt. + 842	11.4 x wt. + 870
Over 60 years	9.0 x wt. + 656	11.7 x wt. + 585

4th Equation
Mifflin Equation (1990)

BMR or BEE

- Women = (10 x wt.) + (6.25 x ht.) - (5 x A) - 161
- Men = (10 x wt.) + (6.25 x ht.) - (5 x A) + 5

Wt.= current weight in kg
Ht. = height in cm
A = age in years

Thermic Effect of Food (TEF)

- After eating, food stimulates metabolism,

- Extra energy is required for digestion, absorption, and transport.
  - This stimulating effect is called the thermic effect of food (TEF).
  - 5%-10% of the body's total energy expenditure is used for using meals.
  - TER or DIT (thermic effect of food or diet induced thermogenesis) is embodied in BMR equations.

Physical Activity

- Energy expenditure for physical activity goes above and beyond energy used for resting energy needs.

- Energy output during physical activity varies widely across individuals.

Energy Expenditure / Pound / Hour

TABLE 6–2 Energy Expenditure per Pound per Hour during Various Activities*

Activity	Kcal/lb/hour†	Activity	Kcal/lb/hour†
Aerobics, moderate	2.95	Sports	
Bicycling		Boxing, in ring	5.44
Light: 10-11.9 mph	2.72	Field hockey	3.63
Moderate: 12-13.9 mph	3.63	Golf	2.04
Fast: 14-15.9 mph	4.54	Rollerblading	4.42
Mountain biking	3.85	Soccer	3.85
Daily activities		Skiing, downhill, moderate	2.72
Cleaning	1.36	Skiing, cross country, moderate	3.63
Cooking	0.91	Swimming, moderate pace	3.14
Driving a car	0.91	Tennis, doubles	2.27
Eating, sitting	0.68	Tennis, singles	3.63
Gardening, general	1.81	Ultimate Frisbee	3.63
Office work	0.82	Volleyball	1.81
Reading, writing while sitting	0.70	Walking	
Sleeping	0.41	Moderate: ~3 mph (20 min/mile), level	1.50
Shoveling snow	2.72	Moderate: ~3 mph (20 min/mile), uphill	2.73
Running		Brisk: ~3.5 mph (17.14 min/mile), level	1.72
5 mph (12 min/mile)	3.63	Fast: ~4.5 mph (13.33 min/mile), level	2.86
7 mph (8.5 min/mile)	5.22	Weight training	
9 mph (6.5 min/mile)	6.80	Light or moderate	1.36
10 mph (6 min/mile)	7.26	Heavy or vigorous	2.72

Modified from Nieman DC: *Exercise testing and prescription: a health-related approach,* ed 5, New York, 2003, McGraw-Hill.

*Energy expenditure depends on the physical fitness (i.e., amount of lean body mass) of the individual and continuity of exercise.

†Multiply activity factor by weight in pounds by fraction of hour performing activity.

Example: A 150-lb person plays soccer for 45 minutes, as follows: 3.18 (Factor) × 150 (lbs) × 0.75 (Hours) = 357.75 calories burned

Rollerblading = Roller Skating

PAL Factors for Healthy Adults

- Categorize physical activity level (PAL) according to standard values:
  - PAL ranges from 1.2 to 2.4, depending on lifestyle), then
  - Multiply PAL by resting metabolic rate (RMR) or (BMR).

TER = BMR x PAL

Or

TEE = BEE x PAL

Physical Activity (PAL) for Healthy Adults

Physical Activity Status or level	+ % of BMR	PAL Factor
Extremely inactive Cerebral Palsy patient; sitting in chair	20%	1.2
Sedentary Office worker getting little or no exercise	37.5%	1.375
Moderately active Office work; moderate exercise/sports 3-5 days/week	55%	1.55

Physical Activity (PAL) for Healthy Adults

Physical Activity Status	+ % of BMR	PAL Factor
Very active Agricultural worker (non mechanized); or Construction worker; or person swimming two hours daily; or person running one hour daily.	75%	1.75
Extremely active Competitive athletes who train for hours every day.	90 % or more	1.9 or higher

Treatment of Overweight and Obesity

- Diet therapy: Calorie restricted diet
  ↓ energy intake.

  ✓ Diet should be based on the general diet recommendations.

- ↑ physical activity.

- Behavioral therapy: lifestyle (therapy or modification).

- The dietitian should evaluate the patient's understanding of:

  - Causes of Obesity,
  - Complications of Obesity,
  - Patient motivation.

Encourage

- ✓ Gradual body weight reduction because:
  - ➢ Very low Calorie diets will not be nutritionally adequate, and
  - ➢ Will be hard to follow,
  - ➢ Leads to more muscle loss.
- ✓ Diet plan should be based on the general or regular diet recommendations.

Discourage

- < BMR level of energy expenditure,
- < 1200 Calories/day for women, and
- < 1500 Calories/day for men.

When Planning a Calorie Controlled Diet

Aim at:

- ✓ Reducing weight by 1/2kg to 1 kg/week
- ✓ Encouraging exercise [physical activity]: at least 30 minutes/day, 5 days/week
- ✓ Monitoring food intake: food diary
- ✓ Choosing nutritious [healthy] foods over empty calorie foods [calorie dense nutrient low]
- ✓ Choosing smaller portions especially from the high Calorie foods
- ✓ Spreading meals and snacks to prevent hunger
- ✓ Including small amounts of healthy fats
- ✓ Encouraging liquid drinking especially water [8 c per day]

❖ Give a Maintenance diet: after reaching desired body weight.

Energy Deficit for Weight Loss

An energy deficit of ≈ 7700 Kcal results in a weight loss of ≈ 1 kg of body weight on the scale.

Encourage:

- ✓ Reducing Calorie intake by 500-1000 Calories/day,

Or

- ✓ Reducing weight by ≈ 1/2kg to 1 kg/week.

- ❖ Lower end of the range → more fat loss.

The Exchange System used for Energy (kcal) Controlled Diets

Based on the amount of energy - containing nutrients in foods that are listed in each food group.

Content of Macronutrients in One Exchange Unit

Food Group	CHO (gm)	Protein (gm)	Fat (gm)	Energy (Calories)
Carbohydrate Foods				
Starches (grains): breads, cereals and grains, crackers, snacks	15	3	1	80
Starchy vegetables such as corn and green peas, potatoes	15	3	1	80
Legumes: Beans, yellow split peas, and lentils [count as 1 CHO and 1 meat]	15 (15+) Varies	7 (7+) Varies	3 (3-) Varies	✓ 115 Varies

Content of Macronutrients in One Exchange Unit

Food Group	CHO (gm)	Protein (gm)	Fat (gm)	Energy (Calories)
Carbohydrate Foods				
Non-starchy Vegetables	5	1	---	25
Fruits	15	---	---	60
Sweets, desserts, and other carbohydrates	15	varies	varies	varies

Content of Macronutrients in One Exchange Unit

Food Group	CHO (g)	Protein (g)	Fat (g)	Energy (Calories)
Milk				
Fat-free	12	8	~0	80
Low-fat, 1%	12	8	2	100
Reduced- fat, 2%	12	8	5	120
Whole	12	8	8	150

Content of Macronutrients in One Exchange Unit

Food Group	CHO (gm)	Protein (gm)	Fat (gm)	Energy (Calories)
Proteins Foods: Meat + meat substitutes				
Lean	---	7	2 (0-3)	45
Medium-fat	---	7	5 (4-7)	75
High-fat	---	7	8 (8+)	100
Plant-based proteins	15 (15+) Varies	7 (7+) Varies	3 (3-) Varies	115 Varies
Fats	---	---	5	45
Alcohol	Varies	---	---	100

≈ Quantity of Food / Exchange Unit
in each of the Food Groups
(Look up Appendix in Text)

Vegetables:

Contain 25 kcal and 5 g carbohydrate and 1 g protein per exchange unit (serving).

One exchange unit (serving) equals:

Quantity	Food
½ C	Cooked vegetables (no added fat) such as: carrots, green peas in pod, broccoli, zucchini, cabbage, green beans, etc.
1 C	Raw vegetables or salad greens.
½ C	Vegetable juice.

Fruits:

Contain 15 grams of carbohydrate and 60 kcal per exchange unit (serving).

One exchange unit (serving) equals:

Generally

- ½ C fruit: fresh, canned, frozen, and juice (no added sugar).
- 1 small fresh fruit ≈ 120 gm.
- ¼ C dried fruit.

Fruits:

Contain 15 grams of carbohydrate and 60 kcal per exchange unit (serving).
One exchange unit (serving) equals:

Quantity	Food
1 small (≈ 120 gm) or ½ c sliced fruits	Apple; Banana; Orange; Nectarine Fresh, canned, or frozen (no added sugar)
≈ 90 gm	Grapes (≈ 15-17 grapes)
2 med.	Figs
1 large (≈ 24 g)	Date
1	Kiwi
½	Grapefruit
½	Mango
1 med.	Fresh peach

Fruits:

Contain 15 grams of carbohydrate and 60 kcal per exchange unit (serving).

One exchange unit (serving) equals:

Quantity	Food
1 C	Fresh berries (strawberries, raspberries, or blueberries)
1 C	Fresh melon cubes
1 C or 1/8th	Honeydew melon
½ C (4 oz.)	Unsweetened juice
1/3 C	Grape juice
¼ C	Dried fruits
4 tsp	Jelly or jam

Milk:

Exchange unit usually = serving size.

One serving provides 12 g CHO, 8 g protein, (0-8) g fat, and (80- 150) kcal per serving.

One serving equals:

Quantity	Food
1 C [8 oz.]	Whole milk, yogurt [plain whole milk], buttermilk, soy milk
¾ C [6 oz.]	Yogurt, plain nonfat or [low-fat (1% and 2%)]
1 C	Yogurt, artificially sweetened
½ C	Evaporated milk
1/3 C	Dry milk
2 Tbsp. heaped	Labaneh

Starches:

contain 15 g carbohydrate, 3 g protein, 1 g fat, and 80 kcal per exchange unit (serving). One exchange unit (serving) equals:

Quantity	Food
1 oz. (≈30 g) 1 cm thick slice	Bread such as: white, pumpernickel, whole wheat, rye;
¼	Pita bread that weighs ≈120 gm.
½ C cooked (no added fat)	Cereal grains such as wheat, burghol, friekeh, semolina, (smeed), wild rice, oats, etc.,
⅓ C cooked (no added fat)	Rice (brown or white), pasta, couscous , barley, polenta, quinoa, etc.
½ C cooked (no added fat)	Starchy vegetables such as: potatoes, corn, green peas
3/4 oz.	Snack foods prepared without added fat such as pretzels
3 C	Popcorn (no added fat)
3 Tbsp.	Flour, semolina, wheat germ
¾ C	Dry ready to eat cereals (unsweetened)
1 ½ C	Puffed ready to eat cereals

Meat Lists
Generally 1 oz. = One Exchange Unit

1. Lean Meat Foods List
2. Medium Fat Meat Foods List
3. High Fat Meat Foods List
4. Plant Based Protein Foods List

Lean Meat Foods:
Provide 7 g protein, 2 g fat, and 45 kcal.

Quantity	Food
1 oz.	Poultry such as chicken, turkey, and duck [skin removed]
1 oz.	Fish such as tuna [fresh or canned in water or oil but drained]
1 oz.	Shellfish such as lobsters and shrimp [no fat added]
1 oz.	Cheeses that contain ≤ 3 gm fat per oz. [≈ 10%]
1 oz.	Hot dogs and sausage with ≤ 3 gm fat per oz. [≈ 10%]
¼ C	Cottage cheese
2	Egg whites
¼ C	Egg substitutes [plain]

Lean Meat Foods:
Provide 7 g protein, 2 g fat, and 45 kcal.

Quantity	Food
1 oz.	Beef, the leanest cuts such as round, sirloin
1 oz.	Pork: (certain cuts such as ham, very well trimmed);
1 oz.	Lamb: (roast, chops, and leg);
1 oz.	Fatty Fish: (salmon, sardines, tuna canned in oil and drained);
1 oz.	Organ meats: Liver and heart, Kidney (high in cholesterol)

Medium Fat Meat Foods:
Provide 7 g protein, 5 g fat, and 75 kcal

Quantity	Food
1 oz.	Most beef products such as ground beef, corned beef, lower grade beef cuts trimmed of fat such as prime rib.
1 oz.	Pork such as pork chops
1 oz.	Lamb such as ground and rib roast
1 oz.	Veal: (ground or cubed, un-breaded)
1 oz.	Poultry: dark meat with skin such as chicken or turkey
1 oz.	Fish: (fried)

Medium Fat Meat Foods:
Provide 7 g protein, 5 g fat, and 75 kcal.

Quantity	Food
1 oz.	Cheeses: with 4-7 gm fat per oz. ≈ (13-23)% such as mozzarella, ricotta, feta, white cheese
1	Eggs (whole): 1 , limit to 3 per week because high in cholesterol
1 oz.	Sausage: with 4-7 gm fat per oz. ≈ (13-23)%

High Fat Meat Foods:

Provide 7 g protein, 8 g fat, and 100 kcal; these food items are ↑ SFAs and ↑ cholesterol and may raise blood cholesterol level if eaten regularly except peanut butter

Quantity	Food
1 oz.	Pork: ground, pork sausage
1 oz.	Cheeses: all regular cheeses such as cheddar, Swiss etc.
1 oz.	Processed sandwich meats: with 8 gm fat per oz. (≥ 26%) such as bologna, salami, hot dogs (1 weighing 45 gm)
1 Tbsp. leveled	Peanut butter

Plant Based Protein Foods:
Provide varied amounts of CHO, protein, fat and kcal depending on preparation method.

Quantity	Food
½ C	Legumes cooked [no added fat] such as lentils, beans, peas, chickpeas, etc. provide 115 kcal, varied amounts of CHO and protein. + 6 gm fiber on average
1/3 C	Hummus dip, provides 160 kcal
3 patties (about 5 cm across) ≈17 g each	Falafel, provide 160 kcal
1 Tbsp.	Nut spreads such as peanut butter, provides 100 kcal
1 [1 ½ oz.]	Hot dogs [soy based] provide 75 kcal

Fat Lists

One exchange unit contains 45 kcal =

- 1 tsp oil or butter or regular margarine;
- 1 Tbsp regular salad dressing

Fats are divided into 3 fat lists.

MUFs list (45 kcal/ Exchange Unit)

Quantity	Food
1 tsp	Olive oil; Canola oil; Peanut oil
8-10 large	Olives
6	Almonds
2	Pecans
10	Peanuts
1/2 Tbsp.	Peanut butter
2 Tbsp. [1/8th] medium	Avocado

PUFs List (45 kcal/ Exchange Unit)

Quantity	Food
1 tsp	Oils such as sunflower oil, corn oil, soy oil; Mayonnaise [regular]
1 Tbsp.	Mayonnaise [reduced fat]; Salad dressings [regular]; Seeds [peeled]; Pine nuts
2 Tbsp.	Salad dressings [reduced fat]
2	Walnuts
½ Tbsp.	Sesame seeds
1/2 Tbsp.	Tahini paste

SFs List 45 kcal/ Exchange Unit

Quantity	Food
1 tsp	Butter; Lard; Shortening; Coconut oil
1 Tbsp. = 15 gm	Cream cheese [regular]
1.5 Tbsp. = 22.5 gm	Cream cheese [reduced fat]; Coconut milk;
2 Tbsp.	Cream [half & half]; Sour cream [regular]; Coconut [sweetened, shredded]
3 Tbsp.	Sour cream [reduced fat]
1 slice ≈ 20 gm	Bacon

Pharmacotherapy
Use of Anti Obesity Drugs

Anti-obesity drugs operate through one or more of the following mechanisms

- Suppress ↓ appetite
- Increase ↑ metabolism
- Interfere with the absorption of specific nutrients in food
- Inhibit digestion and lower ↓ caloric absorption

❖ Should not be used unless advantages outweigh disadvantages

Examples of Anti Obesity Drugs

1. Orlistat: inhibits pancreatic and gastric lipase

2. Sibutramine: an ↓appetite suppressant through promoting a sense of satiety,

- There are many anti obesity drugs but some of them have severe or life threatening side effects, and they should be taken under medical supervision.

- Prescription weight loss drugs are approved only for those with a BMI of ≥ 30 or ≥ 27 if they have other risk factors such as high blood pressure or diabetes etc.

Bariatric Surgery

Gastric Bypass

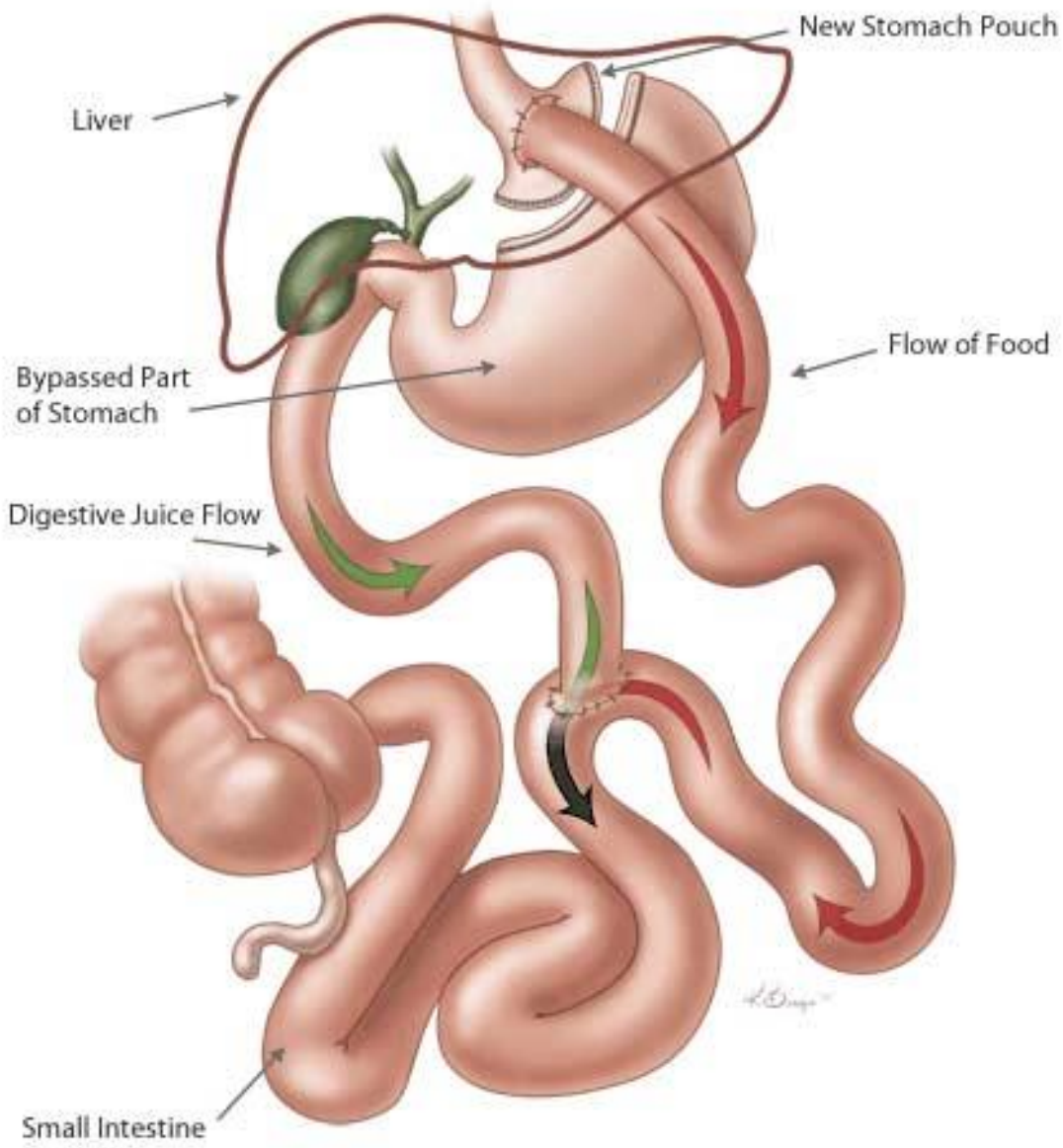
Indication:

- ✓ Used only when other methods are not effective
- ✓ For the morbidly obese

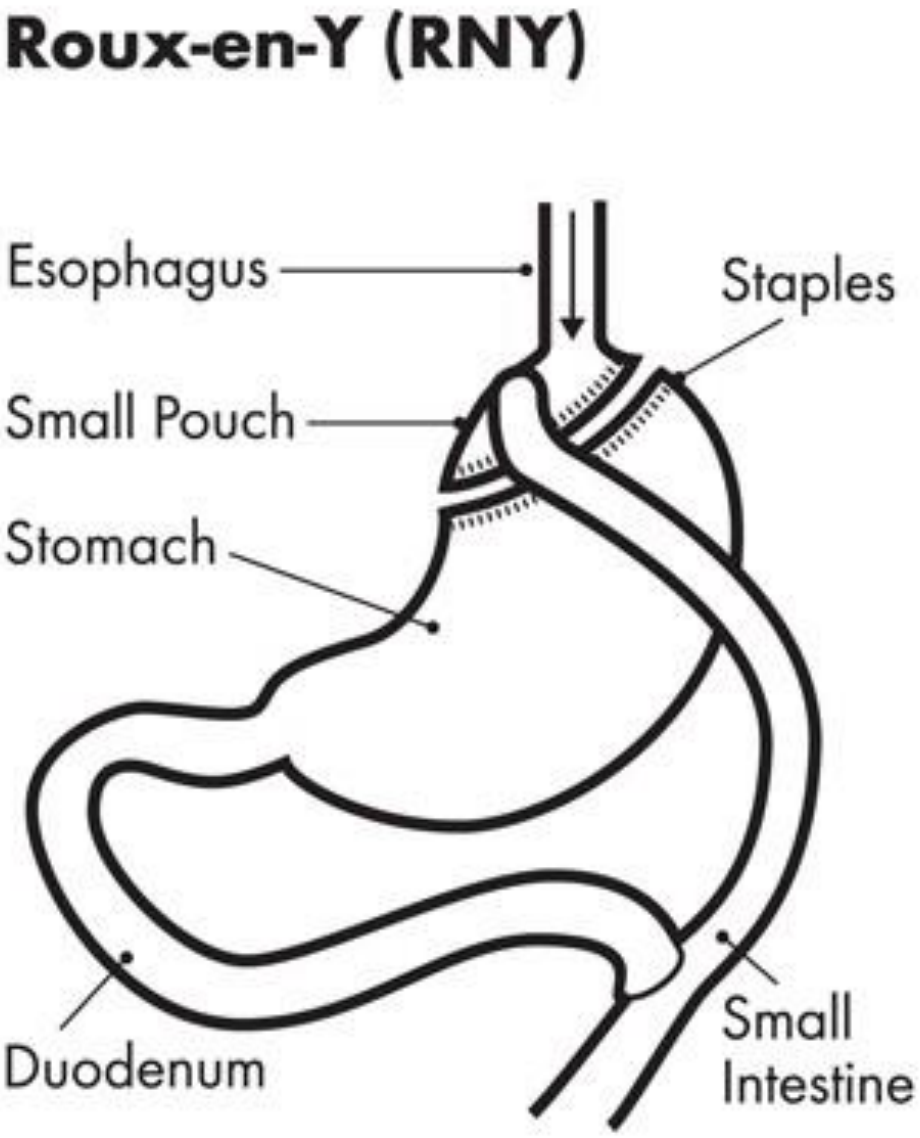
After surgery

- ➢ Patients can eat only small portions of food, amount is very limited so diet is inadequate in nutrients without supplementation
- ➢ There is less ↓intestinal area for absorption of nutrients
- ➢ High protein supplements may be required for 4-6 months
- ➢ Lifelong vitamin and mineral supplements are usually needed by patients especially Ca, Fe, and sublingual Vitamin B12 supplements.

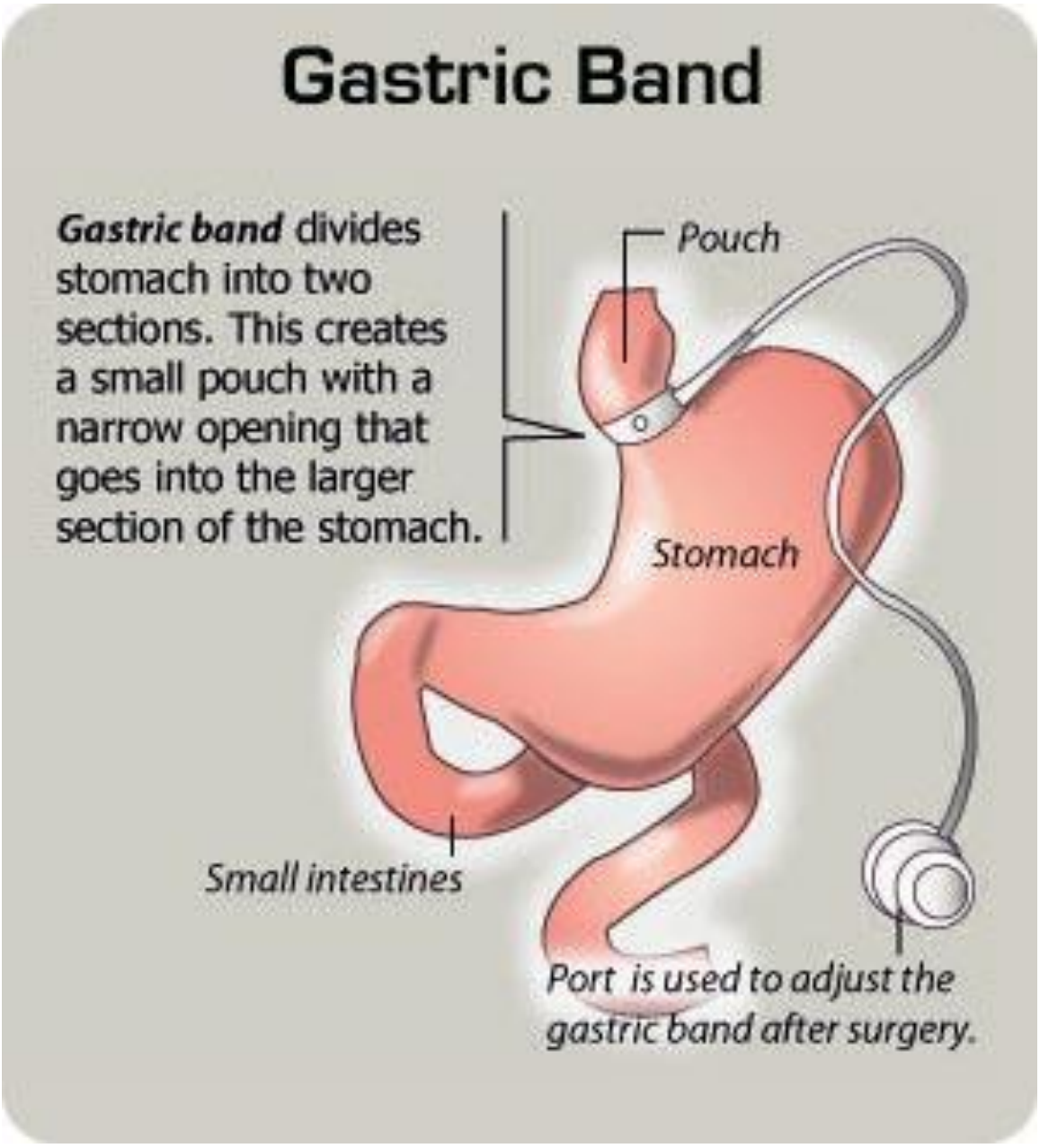
GASTRIC BYPASS



A surgical procedure
to decrease the reservoir capacity of the stomach, the duodenum is skipped, so fat absorption is substantially ↓↓ reduced

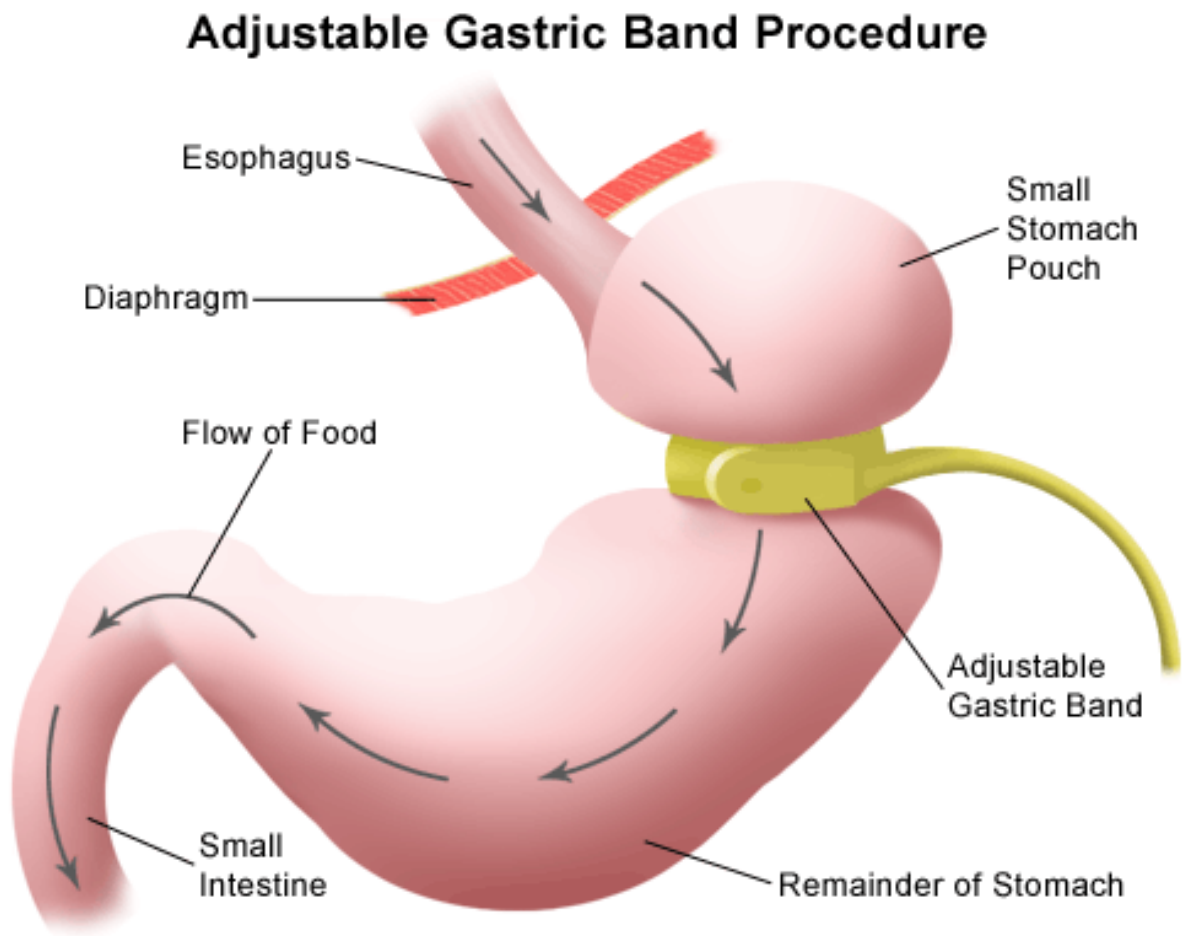


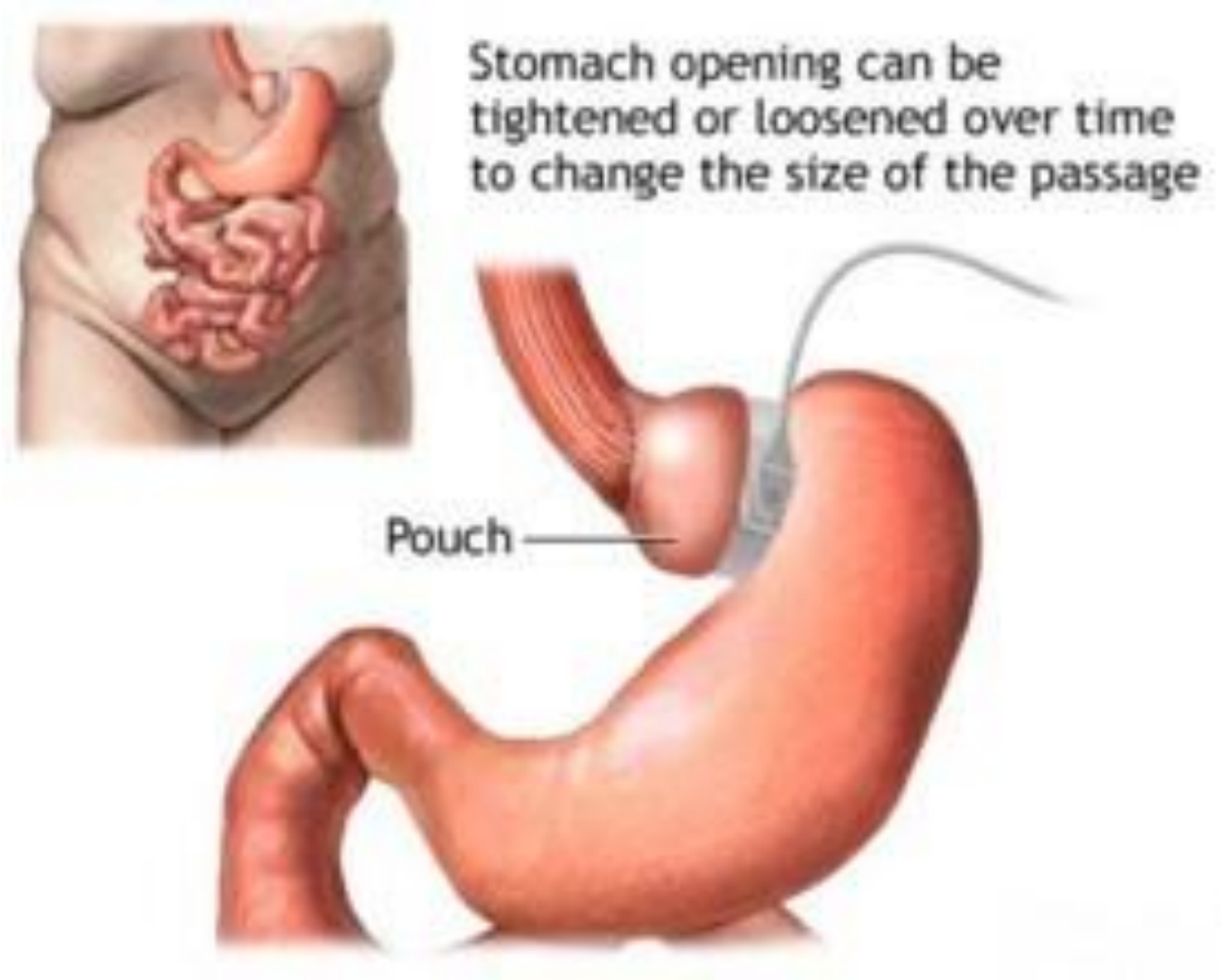
Gastric Band



Laparoscopic Adjustable Gastric Band (LAGB)

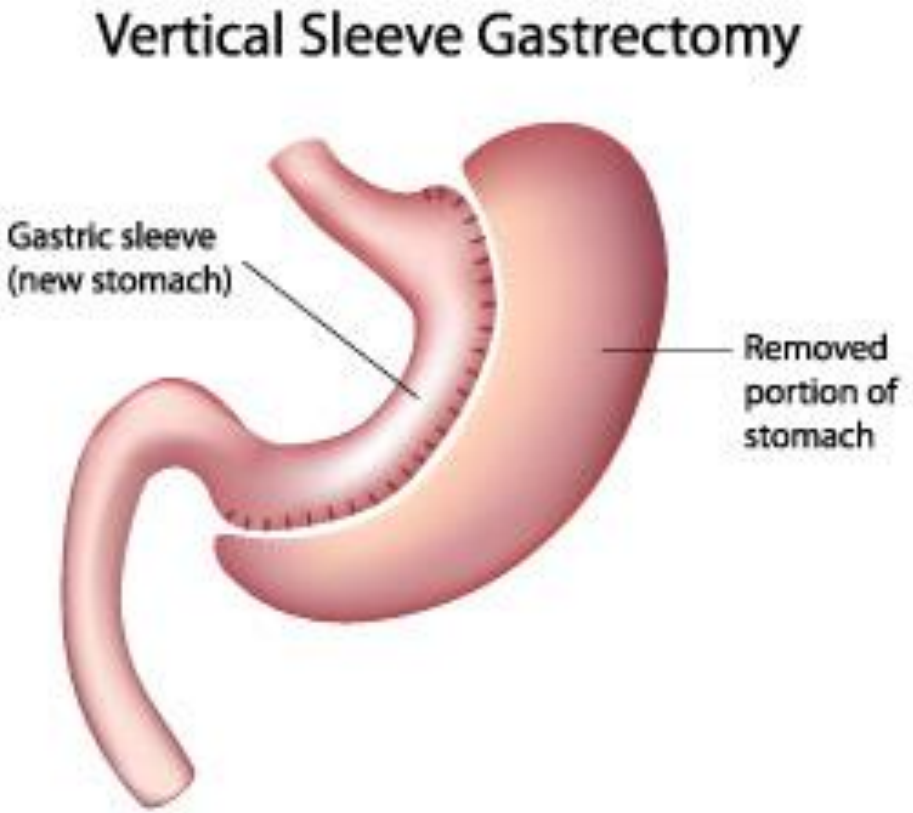
- It is done with a few tiny abdominal cuts (1 cm), instead of with one large cut.
- The surgeon puts instruments through the cuts.
- One of those instruments is a laparoscope, a tool with a tiny camera.
- The small pouch means that you feel full after eating only small amounts of food.



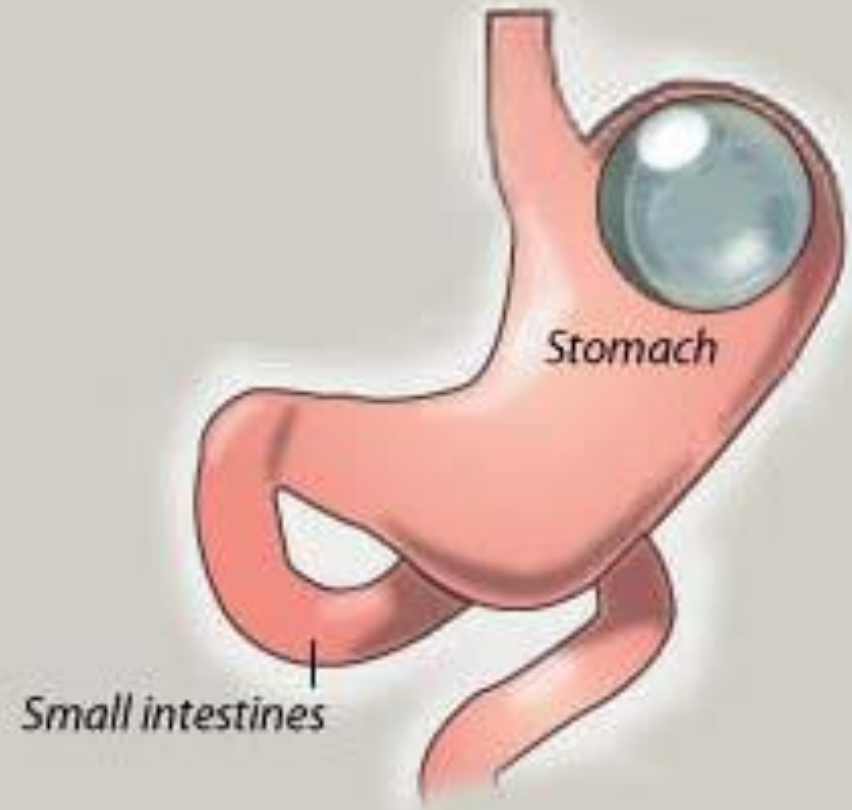


Vertical Sleeve-Gastrectomy (VSG)

Removes the majority of the stomach.



Gastric Balloon



The purpose of the balloon is to give you a feeling of fullness, which naturally makes you eat less and lose weight.

Diet Principles after Bariatric Surgery

- Eat 3 meals per day and maintain adequate protein,
- Consume 2-4 Tbsp / meal (can be tolerated directly after surgery),
- Take small bites,
- Chew each bite 25-30 times,
- Consume a minimum of 60 g protein per day,

Diet Principles after Bariatric Surgery Cont'd.

- Consume protein foods first
- Consume no liquids with meals and 10 minutes before and 40 minutes after eating solids
- Do not use straws (brings in air which might decrease appetite for solid food)
- Consume 8 c of water each day.

Diet Progression following Bariatric Surgery

1. Day 1-2: Clear liquid diet [sugar free]; + Isopure protein supplement (contains no CHOs)

2. Day 3-14: Full liquid diet; + Whey protein supplements (≥ 60 g/day)

3. Day 15-30: Pureed diet; + Whey protein supplements (≥ 60 g/day)

4. Day 30 and on: Soft diet gradually to regular diet

Supplement Facts

Serving Size 1 Bottle (237mL)

Amount Per Serving	% Daily Value*
Calories 60	
Total Fat 0g	0%*
Total Carbohydrate 0g	0%*
Dietary Fiber 0g	0%
Sugars 0g	†
Protein 15g	30%*
Vitamin E 7.5IU	25%
Niacin 5mg	25%
Vitamin B6 .5mg	25%
Calcium 20mg	2%
Sodium 20mg	1%

*Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Foods to Avoid
8 weeks after Bariatric Surgery

8 weeks after bariatric surgery patient:

- ✓ Can gradually return to eating firmer foods.
- ✓ May find it difficult to eat:
  - Spicy foods
  - Or foods with crunchy textures.

❖ Start slowly with regular firmer foods to see what foods can be tolerated

Foods to Avoid
8 weeks after Bariatric Surgery

Even after 8 weeks of surgery, avoid these foods:

- Nuts and seeds
- Popcorn
- Dried fruits
- Sodas and carbonated beverages
- Granola
- Stringy or fibrous vegetables, such as celery, broccoli, corn or cabbage
- Tough meats or meats with gristle
- Breads.

❖ These foods typically aren't well tolerated and might cause gastrointestinal symptoms.

❖ Over time, some of these foods can be tried, with guidance from health service provider.

Supplementation for Bariatric Surgery Patients

- ✓ All surgical candidates should be screened for vitamin D deficiency preoperatively.
  - If vitamin D is deficient:
    - ✓ Take a corrective dose of 50,000 IU (1.25 mg or 1250 mcg) ergocalciferol (D2) (calcideol or) (a pharmaceutical supplement) taken orally once weekly for 8 weeks.

Immediately Postoperatively

- Continue goal of ≥ 60 g protein /day; whey protein, (whey isolate is preferred, lactose free is also desirable)
- Chewable multivitamin complete,
- Chewable calcium citrate 1000 mg/day with vitamin D for LAGB.
- Chewable multivitamin complete, chewable calcium citrate 1000 mg/day with vitamin D; sublingual B12 :500 mcg/day for VSG and RYGB.

- A whey protein isolate (often whey isolate) is a highly bioavailable dietary supplement.

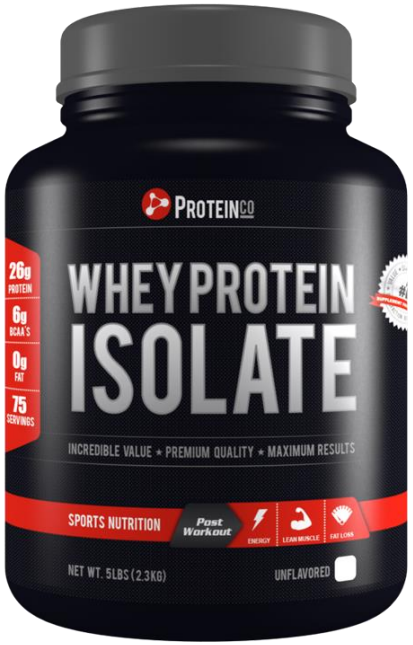
- Whey is a by-product of the cheese-making process.

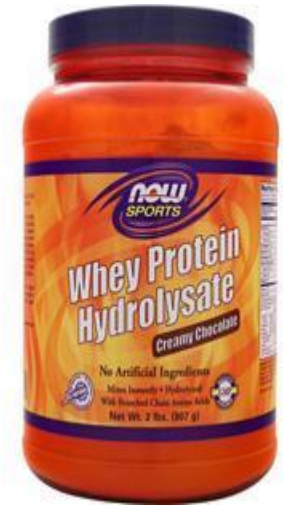
- Whey can be processed to yield whey protein in three forms:

1. Whey concentrate

2. Whey isolate (more purified than-whey-concentrate)

3. Whey hydrolysate (in amino acid form.





Dietitian's Visits

1. Preoperatively: 1-2 weeks

2. Postoperatively: 1-2 weeks, 1, 2, 3, 6, 9 months

3. Annually
   - ✓ Vitamin levels should be monitored annually.

Screening Potential Bariatric Surgery Candidates

Preoperative Assessment:

- The patient should be evaluated by a multidisciplinary team to determine if they are appropriate candidates for bariatric surgery.
- The patient should have comprehensive medical, physical, biochemical, and psychological assessments.
- The patient's weight history, commitment level, and ability to comply should be explored.

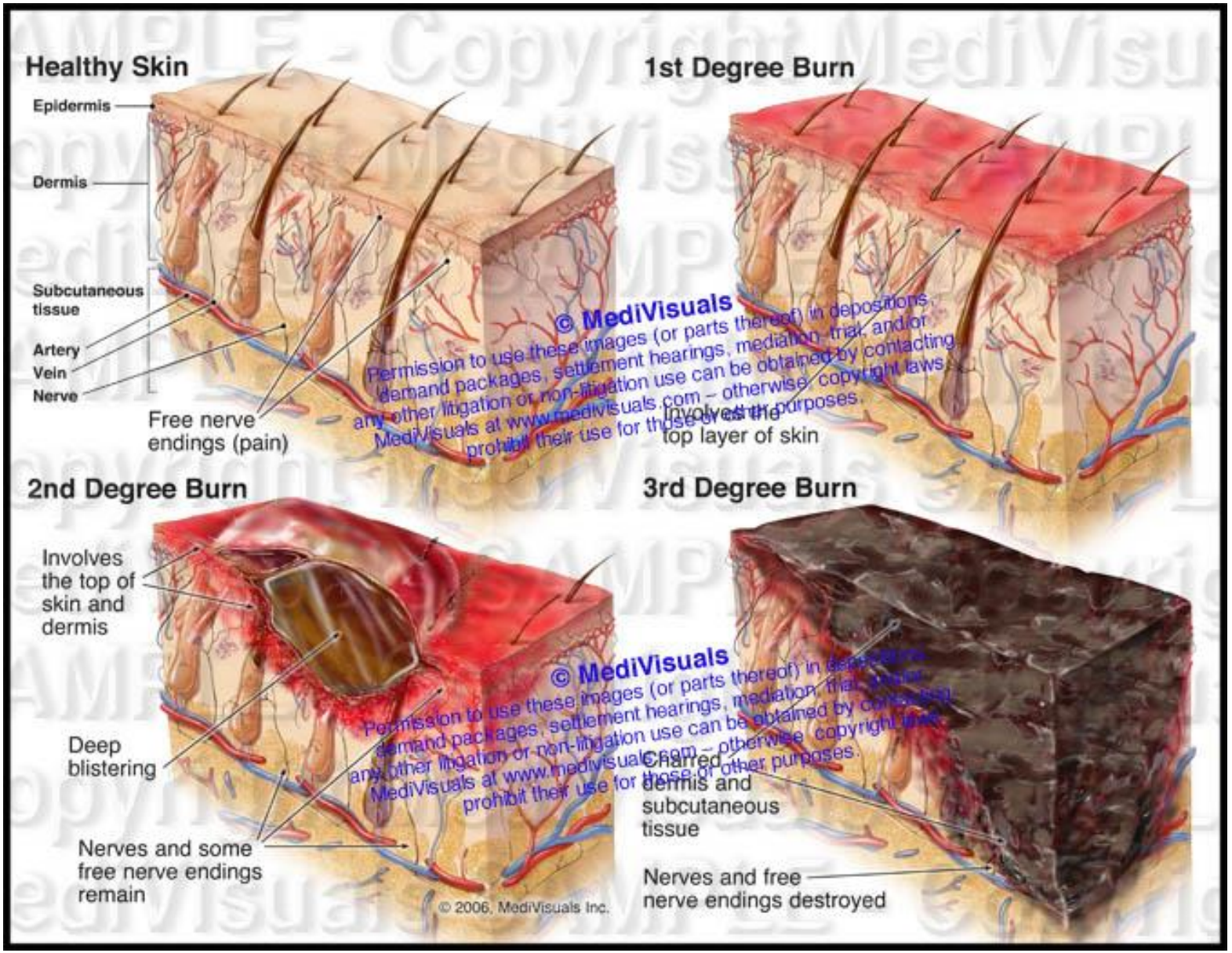
Adults
Body mass index (BMI) ≥ 40 kg/m^2 with no comorbidities.
BMI ≥ 35 kg/m^2 with obesity-associated comorbidities
Weight loss history
Failure of previous nonsurgical attempts at weight reduction, including nonprofessional programs (eg, Weight Watchers International Inc, Jenny Craig)
Commitment
Expectation that patient will adhere to postoperative care
Follow-up visits with physicians and team members
Recommended medical management, including the use of dietary supplements
Instructions regarding any recommended procedures or tests
Exclusion
Reversible endocrine or other disorders that can cause obesity
Current drug or alcohol abuse
Uncontrolled, severe psychiatric illness
Lack of comprehension of risks, benefits, expected outcomes, alternatives, and lifestyle changes required with bariatric surgery
Caution must be used when language or literacy issues are present
Severe food allergies or intolerances must be addressed before surgery

Determining Total Energy Requirement for Inpatients Depending on the Case

		BMR using Schofield equation
TER =	+	Stress factor
	+	Mobility status factor
	+	Body Temperature factor
	±	Weight Status factor

Energy Requirement for Inpatients

- S. Stress factor:
  - Severe sepsis (infection) → (10-30) %
  - Extensive surgery → (10-30) %
  - Fractures/trauma → (10-30) %
  - Burns/wounds → (50-150) %
  - RDS (respiratory distress syndrome) → (20) %



Energy Requirement for Inpatients

- Mobility Status factor:

  - ✓ 20% if immobile,
  - ✓ 30% if bed bound but mobile,
  - ✓ 40% if mobile in ward.

- Body Temperature factor (fever):
  - ✓ 10-14 % increase in BMR for each 1°C rise in body temperature,
  - ✓ or 7% increase for each 1°F rise in body temperature.

Energy Requirement for Inpatients

- Weight status factor if applicable:

  - ✓ ± 600 kcal (extra energy) depending on weather weight increase or reduction is required (not applicable to critically ill patients).