Chapter 9
Weight Control: Overweight and Underweight
Obesity Statistics

According to the Center for Disease Control:

- Over 68% of adult Americans are considered overweight or obese based on having a BMI > 25
- Approximately 34% of adult Americans are clinically obese with BMI > 30
- There has been a 61% increase in US adult obesity from 1991 to 2000
- This coincides with a 49% rise in Type 2 Diabetes among adult Americans
- According to the WHO, obesity affects 1.5 billion adults worldwide.
- 43 million children under the age of 5 are overweight or obese
Increasing Prevalence of Obesity among US Adults

**1995:** No state had a prevalence rate less than 10%, all states had prevalence rates between 10–19%, and no state had a prevalence rate greater than or equal to 20%.

**2000:** Only Colorado had a prevalence rate less than 15%, the other states had prevalence rates between 15–24%, and no state had a prevalence rate greater than or equal to 25%.

**2005:** No state had a prevalence rate less than 15%, most states had prevalence rates between 20–29%, and 3 states had a prevalence rate greater than or equal to 30%.

**2010:** No state had a prevalence rate less than 20%, most states had prevalence rates between 20–29%, and 12 states had a prevalence rate greater than or equal to 30%.

**Key:**
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥ 30%

SOURCE: [cdc.gov/obesity/data/trends.html](http://www.cdc.gov/obesity/data/trends.html)
Distribution of Body Weights in U.S. Adults

- Overweight (BMI 25–29.9)
- Obesity (BMI 30–39.9)
- Healthy weight (BMI 19–24.9)
- Underweight (BMI <19)
- Extreme obesity (BMI ≥40)
Weight Gain Patterns During Adulthood

Weight increases progressively with each decade until about age 60 and then decreases at older ages.
Fat Cell Development

- Energy in > Energy out = Stored Energy
  - Stored in fat cell of adipose tissue
- Amount of fat reflects both **number** and **size** of fat cells
- The number of fat cells increases during growing years of childhood and puberty
- Obesity occurs when your fat cells increase in numbers, size, or both
  - Obese people have more fat cells and larger ones
- Energy out > Energy in
  - Decrease in fat cell size, but not number
Fat Cell Development

During growth, fat cells increase in number.

When energy intake exceeds expenditure, fat cells increase in size.

When fat cells have enlarged and energy intake continues to exceed energy expenditure, fat cells increase in number again.

With fat loss, the size of the fat cells shrinks, but not the number.

Fat cells are capable of increasing their size by 20-fold and their number by several thousand fold.
Overweight and Obesity

- Hyperplastic Obesity
  - Increase in the number of fat cells

- Hypertrophic Obesity
  - Increase in the size of the fat cells
• Excess fat fill adipose tissue first
• Additional excess is deposited in organs such as heart and liver
Fat Cell Metabolism

- Lipoprotein lipase (LPL)- enzyme mounted on fat cell membranes
- Removes triglyceride from the bloodstream
- Promotes fat storage in adipose and muscle cells
- The more fat cells, the more LPL activity
  - so obese people have more LPL activity
- The higher the LPL activity, the more efficient at storing fat
“Apple” and “Pear” Body Shapes Compared

Men have higher LPL activity in the abdomen

Women have higher LPL activity in hips, breasts, thighs
Fat Cell Metabolism

- After weight loss, adipose LPL activity increases
  - More so in those that were heaviest prior to weight loss
- This explains why people regain their weight loss so easily
Set Point Theory

- After a weight gain or weight loss, the body adjusts its metabolism to restore the original weight
  - Regulatory centers constantly monitor and adjust conditions to maintain homeostasis
  - The body tends to maintain a certain weight by its own internal controls
Causes of Obesity - Genetics

- Both parents obese: 80% chance child will be obese
- Both parents not obese: <10% chance child obese
- Adopted child: Similar weight to biological parents
- Twin Studies: Identical twins are twice as likely to weigh same as fraternal twins. (Even if reared separately.)

- Genetics plays a role in susceptibility to obesity
Causes of Overweight and Obesity - Genetics

**Obesity Gene (ob)**

- Expressed in the adipose tissue and codes for the protein **Leptin**.
  - Acts as a hormone in the hypothalamus to:
    - Increase energy expenditure
    - Decrease appetite
- Also released from stomach cells in response to food
- Serves as an internal control
- Genetic deficiency is rare
Mice with and without Leptin Compared

Without leptin, this mouse weighs almost three times as much as a normal mouse.

With leptin treatment, this mouse lost a significant amount of weight, but still weighs almost one and a half times as much as a normal mouse.
Genetics

- Adiponectin
  - Protein produced by fat cells
  - Inhibits inflammation and protects against type 2 diabetes and heart disease
  - Lean people have higher amounts
Genetics

**Ghrelin:**
- Produced in stomach cells
- Acts as a hormone in hypothalamus
- Triggers the desire to eat
  - Stimulates appetite
  - Promoting energy storage
- Increases with lack of sleep
### Causes of Obesity – Genetics & Epigenetics

#### TABLE 9-1 Proteins Involved in Regulation of Food Intake and Energy Homeostasis

<table>
<thead>
<tr>
<th>Protein</th>
<th>Concentration</th>
<th>Secreted from</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adiponectin</td>
<td>Lower in obesity</td>
<td>Adipose tissue</td>
<td>Increases insulin sensitivity</td>
</tr>
<tr>
<td>Ghrelin</td>
<td>Increases with fasting Decreases after a meal</td>
<td>Stomach</td>
<td>Stimulates appetite</td>
</tr>
<tr>
<td>Leptin</td>
<td>Higher in obesity</td>
<td>Adipose tissue</td>
<td>Suppresses appetite Increases energy expenditure</td>
</tr>
<tr>
<td>Oxymotomodulin</td>
<td>Increases after a meal</td>
<td>Central nervous system GI tract</td>
<td>Suppresses appetite</td>
</tr>
<tr>
<td>Pancreatic peptide (PP)</td>
<td>Increases after a meal</td>
<td>Pancreas</td>
<td>Suppresses appetite</td>
</tr>
<tr>
<td>PYY</td>
<td>Lower in obesity Increases after a meal</td>
<td>Small intestine</td>
<td>Suppresses appetite</td>
</tr>
<tr>
<td>Resistin</td>
<td>Higher in obesity</td>
<td>Adipose tissue, bone marrow, and immune system cells</td>
<td>Provides short-term satiety Opposes insulin</td>
</tr>
<tr>
<td>Visfatin</td>
<td>Higher in obesity</td>
<td>Adipose tissue (specifically visceral)</td>
<td>Mimics glucose-lowering effects of insulin</td>
</tr>
</tbody>
</table>

Causes of Obesity-Environment

**Overeating:**

- Both present and past eating habits influence current body weight
- Our environment-Food is everywhere!
  - High calorie, high fat, readily available, cheap, heavily advertised, tasty, convenient
  - “Supersizing” to get a better value offers much more food than is needed
- Fast food is often high in fat
- Fat Intake: High fat diet promotes obesity
- Food industry spends $30 billion per year on advertising
McDonald's (USA) serves 27 million people every day, 1 million more every year since 2003.

A large portion of fries delivers 500 calories and 25 grams of fat.
In and Out Burger

Double-Double at In and Out is 670 calories, 41 grams of fat

French fries are 400 calories and 18 grams of fat
- Costco Muffin Blueberry:
  - 610 kcalories
  - 32 grams fat

- Chocolate chip
  - 690 kcalories
  - 38 grams fat
Causes of Obesity - Environment

Physical Inactivity: Major contributor to obesity

- Modern technology has replaced physical activity at home, work, and transportation
- Inactivity contributes to weight gain and poor health
- TV, Video games, computers
  - Require little energy
  - Replace time spent in vigorous activity
  - TV influences food purchases and between meal snacking
Causes of Obesity - Environment

Physical Inactivity: Major contributor to obesity

- Obesity may be related to “moving too little”, not just overeating

- DRI recommends an accumulation of 60 minutes of moderately intense exercise daily to prevent weight gain
Problems with Obesity

Health risks are evaluated using 3 Indicators:

Health Risks Indicators

- BMI (>25 = overweight, >30 = obese)
- Waist Circumference
  - >35 for women
  - >40 for men
- Disease risk profile; family history, life-threatening diseases, risk factors for disease

Overweight people who are in good health may not benefit from weight loss
Health Risks

- Obese or overweight people (or with a high waist circumference), with 2 or more risk factors require treatment for weight loss.
- Risk factors include:
  - Hypertension
  - Cigarette smoking
  - High LDL
  - Low HDL
  - Family history of heart disease
  - Impaired glucose tolerance
  - Men ≥ 45 years, women ≥ 55 years
Problems with Obesity

- Health Risks
  - Obese or overweight people with the following life-threatening-conditions require aggressive treatment.
    - Heart disease
    - Type 2 diabetes
    - Sleep apnea
Problems with Obesity

- Perceptions and Prejudices
  - Social Consequences
    - Prejudices and discrimination
    - Judged on appearance rather than character
    - Stereotyped
  - Psychological Problems
    - Feelings of rejection, embarrassment and depression are common.
    - Ineffective treatments can lead to a sense of failure.
The Psychology of Weight Cycling

- I am fat and unhappy.
- I want to be happy.
- If I lose weight, I will be happy.
- I try too hard to reach an unrealistic goal.
- I lose a little weight, but then regain it (and sometimes more).
Problems with Obesity

- An estimated 59% of all U.S. adults are trying to lose weight at any given time.
- Up to $33 billion dollars a year is spent on weight control.
- Obesity problems depend on many factors such as the extent of overweight, age, health status and genetic makeup.
- Risk factors may differ among individuals.
Dangerous Interventions

Fad Diets:
Popular eating plans that promise quick weight loss
<table>
<thead>
<tr>
<th>Diet</th>
<th>Major Premise Promoted</th>
<th>Strong Point(s)</th>
<th>Weak Point(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 4-Hour Body</td>
<td>• Less is more, and small, simple changes produce long-lasting effects.</td>
<td>• Quick results.</td>
<td>• Restricts carbohydrates.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• All fruit and milk (except cottage cheese) are excluded and vegetables are</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>limited.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Encourages eating the same small meals repeatedly.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Recommends a weekly binge.</td>
</tr>
<tr>
<td>The 17 Day Diet</td>
<td>• Changing the way you eat every few days creates “body confusion,” which prevents</td>
<td>• Quick results.</td>
<td>• No scientific evidence that changing the diet creates “body confusion.”</td>
</tr>
<tr>
<td></td>
<td>metabolism from settling into homeostasis.</td>
<td>• Prevents boredom by alternating</td>
<td>• No individualized kcalorie goals.</td>
</tr>
<tr>
<td></td>
<td>• You can boost metabolism by “eating clean,” which means no sugar, no</td>
<td>between cycles.</td>
<td>• Promotes its own processed foods.</td>
</tr>
<tr>
<td></td>
<td>processed food, and no fried foods.</td>
<td>• Fairly well-balanced diet that</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>promotes healthy eating.</td>
<td></td>
</tr>
<tr>
<td>Atkins Diet</td>
<td>• People are overweight or obese because they have metabolic imbalances caused by</td>
<td>• Quick, short-term weight loss is</td>
<td>• Restricts carbohydrates to a level that induces ketosis which can cause</td>
</tr>
<tr>
<td></td>
<td>eating too many carbohydrates; by restricting carbohydrates, these imbalances can</td>
<td>achieved.</td>
<td>nausea, light-headedness, and fatigue and can worsen existing medical</td>
</tr>
<tr>
<td></td>
<td>be corrected.</td>
<td></td>
<td>problems such as kidney disease.</td>
</tr>
<tr>
<td></td>
<td>• You can lose weight without lowering kcalorie intake.</td>
<td></td>
<td>• A diet high in fat such as Atkins can increase the risk of heart disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and some cancers.</td>
</tr>
<tr>
<td>Diet</td>
<td>Major Premise Promoted</td>
<td>Strong Point(s)</td>
<td>Weak Point(s)</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cheater's Diet</td>
<td>Successful weight loss depends on eliminating boredom and allowing indulgences. Cheating on weekends “stokes your metabolism.”</td>
<td>Meals are proportioned one-half fruit or vegetables, one-fourth lean protein, and one-fourth whole grains.</td>
<td>No scientific data on cheating boosting metabolism or supporting weight loss.</td>
</tr>
<tr>
<td>The Dukan Diet</td>
<td>A high-protein, low-kcalorie diet promotes rapid weight loss and will keep it off for good.</td>
<td>Encourages daily exercise, moderate salt intake, and lifelong weight management. Provides a highly structured plan.</td>
<td>Restricts carbohydrates to a level that induces ketosis which can cause nausea, light-headedness, and fatigue and can worsen medical problems such as kidney disease. Not suited for vegetarians and others who prefer not to emphasize animal proteins.</td>
</tr>
<tr>
<td>Glucose Revolution</td>
<td>Low glycemic index foods satisfy hunger, control blood glucose, and promote weight loss.</td>
<td>Emphasizes fiber-rich vegetables, legumes, fruits, and whole grains. Minimizes saturated fat intake.</td>
<td>Difficult to know the glycemic index of some foods.</td>
</tr>
<tr>
<td>Ornish Diet</td>
<td>By strictly limiting fat (both animal and vegetable), you eat fewer calories without eating less food.</td>
<td>High-fiber, low-fat foods in this plan can lower blood cholesterol and blood pressure.</td>
<td>So little fat that essential fatty acids may be lacking. Limits fish, nuts, and olive oil, which may protect against heart disease.</td>
</tr>
<tr>
<td>South Beach Diet</td>
<td>Eating “good carbohydrates” such as vegetables, whole-wheat pastas, and brown rice will maintain satiety and resist cravings for “bad carbohydrates” such as white rice and potatoes.</td>
<td>Encourages consumption of vegetables, lean meats, and fish, and the use of unsaturated oils when cooking. Restricts fatty meats and cheeses as well as sweets.</td>
<td>Starchy carbohydrates and all fruits are completely excluded during the first two weeks.</td>
</tr>
<tr>
<td>Ultimate Weight</td>
<td>Foods that require great effort to prepare and eat are nutrient-dense; eating these kinds of foods (raw vegetables, vegetable soups, whole</td>
<td>Encourages consumption of lean meats and fish; whole grains; vegetables; fruit; and low-fat milk, yogurt, and cheese. Restricts fatty meats and cheeses as well as sweets.</td>
<td>Confusing as to exactly what to eat or how much.</td>
</tr>
<tr>
<td>Solution Diet</td>
<td>grams, beans, meats, poultry, and fish) will lead to weight loss. Foods that take little effort to prepare and eat provide excess kcalories relative to nutrients; eating these kinds of foods (fast foods, puddings, high-kcalorie convenience foods, processed foods) leads to uncontrolled eating and weight gain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone Diet</td>
<td>Eating the correct proportions of carbohydrates, fat, and protein leads to hormonal balance, weight loss, disease prevention, and increased vitality.</td>
<td>Promotes weight loss because it is a low-kcalorie diet.</td>
<td>The diet is rigid, restrictive, and complicated, making it difficult for most people to follow accurately. The overblown health claims of the diet’s proponents are based on misinterpreted science and remain unsubstantiated.</td>
</tr>
</tbody>
</table>
How to Identify a Fad Diet

- Overemphasizes one food group or single nutrient.
- Does not teach controlled eating or sensible meal planning.
- Promises quick and easy weight loss
- Eliminates an entire food group
- Can be dangerous as they often restrict or eliminate necessary nutrients.
- Requires you to buy special foods
- Claims to reset your genetic code
- Fails to mention risks
Dangerous Interventions

Dietary supplements do not require FDA approval
Manufacturers do not need to test the safety of effectiveness

So many promises, so little success.
<table>
<thead>
<tr>
<th>Product</th>
<th>Claims</th>
<th>Research Findings</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter orange® <em>(Citrus aurantium, a natural flavoring that contains synephrine, a compound structurally similar to ephedrine)</em></td>
<td>Stimulates weight loss; provides an alternative to ephedra</td>
<td>Little evidence available</td>
<td>May increase blood pressure; may interact with drugs</td>
</tr>
<tr>
<td>Chitosan® (pronounced KITE-oh-san; derived from chitin, the substance that forms the hard shells of lobsters, crabs, and other crustaceans)</td>
<td>Blinds to dietary fat, preventing digestion and absorption</td>
<td>Ineffective</td>
<td>Impaired absorption of fat-soluble vitamins</td>
</tr>
<tr>
<td>Chromium (trace mineral)</td>
<td>Eliminates body fat</td>
<td>Ineffective; weight gain reported when not accompanied by exercise</td>
<td>Headaches, sleep disturbances, and mood swings; hexavalent form is toxic and carcinogenic</td>
</tr>
<tr>
<td>Conjugated linoleic acid (CLA; a group of fatty acids related to linoleic acid, but with different cis- and trans-configurations)</td>
<td>Reduces body fat and suppresses appetite</td>
<td>Some evidence in animal studies, modest fat loss in human studies</td>
<td>None known</td>
</tr>
<tr>
<td>Ephedrine® (amphetamine-like substance derived from the Chinese ephedra herb ma huang)</td>
<td>Speeds body's metabolism</td>
<td>Short-term weight loss and dangerous side effects</td>
<td>Insomnia, tremors, heart attacks, strokes, and death; FDA has banned the sale of these products</td>
</tr>
<tr>
<td>Fucoxanthin® (derived from seaweed)</td>
<td>Speeds metabolism; burns fat</td>
<td>No evidence available</td>
<td>None known</td>
</tr>
<tr>
<td>Hoodia (derived from cactus)</td>
<td>Suppresses appetite</td>
<td>Little evidence available</td>
<td>None known</td>
</tr>
<tr>
<td>Hydroxycitric acid® (active ingredient derived from the rind of the tropical fruit Garcinia cambogia)</td>
<td>Inhibits the enzyme that converts citric acid to fat; suppresses appetite</td>
<td>Ineffective</td>
<td>Toxicity symptoms reported in animal studies; headaches, respiratory and gastrointestinal distress in humans</td>
</tr>
<tr>
<td>Pyruvate® (3-carbon compound produced during glycolysis)</td>
<td>Speeds body's metabolism</td>
<td>Modest weight loss with high doses</td>
<td>GI distress</td>
</tr>
<tr>
<td>Yohimbine (derived from the bark of a West African tree)</td>
<td>Promotes weight loss</td>
<td>Ineffective</td>
<td>Nervousness, insomnia, anxiety, dizziness, tremors, headaches, nausea, vomiting, hypertension</td>
</tr>
</tbody>
</table>

* Marked under the trade names Xenadrine EFX, Metabolife Ultra, NOW Diet Support.
* Marked under the trade names Chloride, Exofat, Fat Breaker, Fat Blocker, Fat Magnet, Fat Trapper, and Fatsoin.
* Marked under the trade names Diet Fuel, Metabolife, and Nature's Nutrition Formula One.
* Marked under the trade name FucoThin.
* Marked under the trade names Ultra Burn, Citralean, CitriMax, Citrin, Slim Life, Brindlestem, MediStim, and Beer Belly Busters.
* Marked under the trade names Exercise in a Bottle, Pyruvate Punch, Pyruvate-C, and Provat.

NOTE: The FDA has not approved the use of any of these products; most products are used in conjunction with a 1000- to 1800-kcalorie diet.

Table 9-3, p. 281
Problems with Obesity

- **Dangerous Interventions**
  - **Weight-Loss Products**
    - Ephedrine-
      - Banned by the FDA due to potential health risks.
      - Implicated in heart attacks, seizures, and about 100 deaths
  - **Dieters tea**-
    - Herbal laxatives do not prevent absorption
    - Cause nausea, vomiting, diarrhea, cramping
    - Death of 4 women

- Current laws do not require manufacturers to conduct safety and effectiveness tests for these products.
- Not regulated by the FDA
Dangerous Interventions

- **What is Hoodia?**
  - Succulent plant grown in South Africa
  - Chemical in it called P57 that is thought to act on the hypothalamus to trigger satiety
  - 13 types of hoodia plants; only hoodia gardonii contains the chemical
  - NO published randomized, controlled clinical trials in humans
  - Do not use if you have diabetes, heart disease, hypertension, pregnancy or lactating
Dangerous Interventions

- What happened to Hydroxycut?
  - FDA recalled it in May 2009
  - 23 reported cases of serious liver injuries
    - Including 2007 death of 19 year old male
    - Liver failure, jaundice, seizures, cardiovascular problems
  - Symptoms include: brown urine, nausea, fatigue, stomach pain, itching
Other Gimmicks

Other Gimmicks Don’t work:
Creams, wraps, belts, massages, steam, saunas DON’T MELT OFF THE FAT

After drying off from your shower, generously apply the hemorrhoid cream to the cellulite afflicted area. After applying the cream, wrap the area with plastic wrap.
Cellulite

Fatty areas of the body that appear lumpy when the connective tissue that attach the skin to the underlying muscles pull tight where the fat is thick.

- Cellulite is caused by fibrous connective cords that connect the skin to the underlying muscle. The cords tether the skin to deeper structures, with the fat lying in between. As the fat cells accumulate, they push up against the skin, while the long, tough cords are pulling down. This creates an uneven surface or dimpling.
Weight Cycling Effect of Repeated Dieting

Subsequent diet results in slower weight loss

Diet

Regain

Weight gain

Time
# FDA Approved Drugs for Weight Loss

## TABLE 9-1 FDA Approved Drugs for Weight Loss

<table>
<thead>
<tr>
<th>Product</th>
<th>Action</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orlistat (OR-leh-stat)</td>
<td>Inhibits pancreatic lipase activity in the GI tract, thus blocking digestion and absorption of dietary fat and limiting energy intake</td>
<td>Cramping, diarrhea, gas, frequent bowel movements, reduced absorption of fat-soluble vitamins; rare cases of liver injury</td>
</tr>
<tr>
<td>Phentermine (FEN-ter-mean), diethylpropion (DYE-eth-ill-PRO-pee-on), phendimetrazine (FEN-dye-MEH-tra-zeen)</td>
<td>Enhances the release of the neurotransmitter norepinephrine, which suppresses appetite</td>
<td>Increased blood pressure and heart rate, insomnia, nervousness, dizziness, headache</td>
</tr>
</tbody>
</table>

NOTE: Weight-loss drugs are most effective when taken as directed and used in combination with a reduced-kcalorie diet and increased physical activity.
Aggressive Treatments of Obesity

- Surgery
  - 200,000 performed annually
  - Surgery is an option for those:
    - Unsuccessful in weight loss programs
    - BMI $\geq 35$ with a weight related health problem
    - Have a BMI $> 40$
    - No medical or psychological contraindications
    - Understanding of risks and strong potential for compliance
Gastric Surgery

- Reduces the capacity of the stomach
- Suppresses hunger by reducing production of the hormone ghrelin
- Lose 20-32% of body weight
- Improvement in diabetes, blood lipids, and blood pressure
- Complications include nausea, vomiting, dehydration, diarrhea
- Potential for deficiencies of Iron, B_{12}, Calcium, Folate and Vitamin D
- Requires **lifelong** medical supervision
Gastric Surgery Used in the Treatment of Severe Obesity

In **gastric bypass**, the surgeon constructs a small stomach pouch and creates an outlet directly to the small intestine, bypassing most of the stomach, the entire duodenum, and some of the jejunum. (Dark areas highlight the flow of food through the GI tract; pale areas indicate bypassed sections.)

Advantages:
- No foreign object in abdomen or need for adjustments
- More durable, reliable, and effective

In **gastric banding**, the surgeon uses a gastric band to reduce the opening from the esophagus to the stomach. The size of the opening can be adjusted by inflating or deflating the band by way of a port placed in the abdomen just beneath the skin.

Advantages:
- No malabsorption
- More flexible, less invasive, safer

http://www.bariatricedge.com/dtcf/pages/3_GastricBypass.htm?pgn=3
Weight Loss Strategies

- Successful strategies
  - Small changes and moderate losses
  - Reasonable goals
    - $\frac{1}{2}$ - 2 pounds per week
    - 10% of body weight over six months.
  - Incorporation of healthy eating
  - Physical activity
  - Permanent lifestyle changes
**Reasonable goal weight**
(10% below initial weight by 6 months and maintained for 1 year)

- Actual weight
- Disappointing weight
- Acceptable weight
- Happy weight
- Dream weight

**Suggested healthy weight range**

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Weight-Loss Strategies

- **Eating Patterns**
  - **Be Realistic about Energy Intake**
    - 500-1000 kcalories/day reduction
    - 1200 kcalories for women, 1600 for men
    - Eat breakfast
  - **Nutritionally adequate**
    - Difficult to achieve on less than 1200 kcalories a day
    - May need a supplement
  - **Smaller portions**
### Daily Amounts from Each Food Group

<table>
<thead>
<tr>
<th>Food Group</th>
<th>1200 kCalories</th>
<th>1400 kCalories</th>
<th>1600 kCalories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>1 c</td>
<td>1½ c</td>
<td>1½ c</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1½ c</td>
<td>1½ c</td>
<td>2 c</td>
</tr>
<tr>
<td>Grains</td>
<td>4 oz</td>
<td>5 oz</td>
<td>5 oz</td>
</tr>
<tr>
<td>Protein foods</td>
<td>3 oz</td>
<td>4 oz</td>
<td>5 oz</td>
</tr>
<tr>
<td>Milk and milk products</td>
<td>2½ c</td>
<td>2½ c</td>
<td>3 c</td>
</tr>
<tr>
<td>Oils</td>
<td>4 tsp</td>
<td>4 tsp</td>
<td>5 tsp</td>
</tr>
</tbody>
</table>
Weight-Loss Strategies

- **Eating Patterns**
  - Eat slowly
  - Lower energy density
  - Water
    - Increases fullness and reduce hunger.
  - **Focus on fiber**
    - Fresh fruit, vegetables, whole grains
    - Provide vitamins, minerals and fiber with little fat.
  - Choose fats sensibly
  - Select Carbohydrates Carefully
  - Avoid empty kcalories from sugar and alcohol.
Weight-Loss Strategies

Lower energy density
High in fiber, high in water and low in fat.

Selecting grapes with their high water content instead of raisins increases the volume and cuts the energy intake in half.

Even at the same weight and similar serving sizes, the fiber-rich broccoli delivers twice the fiber of the potatoes for about one-fourth the energy.

By selecting the water-packed tuna (on the right) instead of the oil-packed tuna (on the left), a person can enjoy the same amount for fewer kcalories.
A 16 oz cafe mocha delivers 400 kcalories, $\frac{1}{2}$ of them from fat
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Recommended Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>kCalories</td>
<td></td>
</tr>
<tr>
<td>For people with BMI ≥35</td>
<td>Approximately 500 to 1000 kcalories per day reduction from usual intake</td>
</tr>
<tr>
<td>For people with BMI between 27 and 35</td>
<td>Approximately 300 to 500 kcalories per day reduction from usual intake</td>
</tr>
<tr>
<td>Total fat</td>
<td>30% or less of total kcalories</td>
</tr>
<tr>
<td>Saturated fatty acids&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8 to 10% of total kcalories</td>
</tr>
<tr>
<td>Monounsaturated fatty acids</td>
<td>Up to 15% of total kcalories</td>
</tr>
<tr>
<td>Polyunsaturated fatty acids</td>
<td>Up to 10% of total kcalories</td>
</tr>
<tr>
<td>Cholesterol&lt;sup&gt;a&lt;/sup&gt;</td>
<td>300 mg or less per day</td>
</tr>
<tr>
<td>Protein&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Approximately 15% of total kcalories</td>
</tr>
<tr>
<td>Carbohydrate&lt;sup&gt;c&lt;/sup&gt;</td>
<td>55% or more of total kcalories</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>No more than 2400 mg of sodium or approximately 6 g of sodium chloride (salt) per day</td>
</tr>
<tr>
<td>Calcium</td>
<td>1000 to 1500 mg per day</td>
</tr>
<tr>
<td>Fiber&lt;sup&gt;c&lt;/sup&gt;</td>
<td>20 to 30 g per day</td>
</tr>
</tbody>
</table>

<sup>a</sup>People with high blood cholesterol should aim for less than 7 percent kcalories from saturated fat and 200 milligrams of cholesterol per day.

<sup>b</sup>Protein should be derived from plant sources and lean sources of animal protein.

<sup>c</sup>Carbohydrates and fiber should be derived from vegetables, fruits, and whole grains.

### TABLE 9-6  Weight-Management Strategies

**In General**

- Focus on healthy eating and activity habits, not on weight losses or gains.
- Adopt reasonable expectations about health and fitness goals and about how long it will take to achieve them.
- Make nutritional adequacy a high priority.
- Learn, practice, and follow a healthful eating plan for the rest of your life.
- Participate in some form of physical activity regularly.
- Adopt permanent lifestyle changes to achieve and maintain a healthy weight.

**For Weight Loss**

- Energy out should exceed energy in by about 500 kcalories/day. Increase your physical activity enough to spend more energy than you consume from foods.
- Emphasize foods with a low energy density and a high nutrient density.
- Eat small portions. Share a restaurant meal with a friend or take home half for lunch tomorrow.
- Eat slowly.
- Limit high-fat foods. Make legumes, whole grains, vegetables, and fruits central to your diet plan.
- Limit low-fat treats to the serving size on the label.
- Limit concentrated sweets and alcoholic beverages.
- Drink a glass of water before you begin to eat and another while you eat. Drink plenty of water throughout the day.
- Keep a record of diet and exercise habits; it reveals problem areas, the first step toward improving behaviors.
- Learn alternative ways to deal with emotions and stresses.
- Attend support groups regularly or develop supportive relationships with others.

**For Weight Gain**

- Energy in should exceed energy out by at least 500 kcalories/day. Increase your food intake enough to store more energy than you expend in exercise. Exercise and eat to build muscles.
- Expect weight gain to take time (1 pound per month would be reasonable).
- Emphasize energy-dense foods.
- Eat at least three meals a day.
- Eat large portions of foods and expect to feel full.
- Eat snacks between meals.
- Drink plenty of juice and milk.
Weight Loss Strategies – Physical Activity

- Best approach to weight management
  - Moderate physical activity plus activities of daily life
- Combination of diet and physical activity
  - Lose more fat
  - Retain more muscle
  - Regain less weight
- Reduction of abdominal fat
Weight-Loss Strategies - Physical Activity

- Activity and energy expenditure
  A 150# man walking 3 ½ miles in 60 minutes burns about the same as running 3 miles in 30 minutes.

- Activity and Metabolism
  - Metabolic rate increases
  - Helps develop more lean body tissue

- Activity and Body Composition
  - Lean mass increases, fat decreases
  - Activity may help to curb appetite.
  - Activity can reduce stress and improve self-esteem.
Weight-Loss Strategies

- Physical Activity
  - Choosing Activities
    - Choose activities that you
    - Low to moderate intensity for long duration is recommended.
    - Daily routines can incorporate energy activities.
  - Spot Reducing
    - Aerobic exercise helps with abdominal fat
    - Strength training can improve muscle tone.
    - Stretching can help flexibility.
Weight Loss Strategies

- Environmental Influences
  - Atmosphere
  - Accessibility
  - Socializing
  - Distractions
  - Multiple choices
  - Package and portion size
  - Serving containers
Weight-Loss Strategies - Behavior and Attitude

- **Behavior Modification**
  - Awareness of behavior is the first key
  - Changing behaviors one at a time works best.
    - Do not grocery shop when hungry.
    - Eat slowly.
    - Exercise while watching television.
    - Smaller plate
  - Become aware of your personal attitudes toward food
  - Support groups may be helpful for some people.
Secrets of Successful Losers
Weight Maintenance

- Vigorous exercise (2500 kcalories weekly))
- Consume reduced calorie diet, small portions
- Eat breakfast
- Frequent self-monitoring
- Lifestyle change
- Develop good coping skills

Review of the research studies suggest that only 20% of people who intentionally lose weight are able to maintain it for 5 years
Weight-Loss Strategies

- Prevention is the best strategy for weight control
  - Eat regular meals and limit snacking.
  - Drink water in place of high-kcalorie beverages.
  - Select sensible portion sizes and limit daily energy intake to energy expended.
  - Limit sedentary activities and be physically active.
Underweight

Weight Gain Strategies
- Energy-dense foods
- Regular meals
- Large portions--Extra cheese, larger glass or bowl
- Snacks
- Beverages--Juices, Milk
- Exercise--strength training
End of Chapter 9