Chapter 9
Weight Control: Overweight and Underweight
Overweight and Obesity

Increasing Prevalence of Obesity Among U.S. Adults

1993: Most states had prevalence rates less than 15 percent, with a couple reporting rates less than 10 percent; no state had prevalence rates greater than or equal to 20 percent.

1998: Most states had prevalence rates less than 20 percent, with none reporting rates less than 10 percent; seven states had prevalence rates greater than or equal to 20 percent.

2003: More than half the states had prevalence rates greater than 20 percent, with four states reporting prevalence rates greater than or equal to 25 percent.

2008: Only one state had prevalence rates less than 20 percent; more than half the states had prevalence rates greater than 25 percent, with six states reporting prevalence rates greater than or equal to 30 percent.

Key:
- No Data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥ 30%

SOURCE: CDC Behavioral Risk Factor Surveillance System.
Obesity Statistics

According to the Center for Disease Control:

- Over 66% of adult Americans are considered overweight or obese based on having a BMI > 25
- Approximately 33% 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 300 million adults worldwide.
- 33% of children are overweight or obese
Distribution of Body Weights in U.S. Adults

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

Age (years)

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

Body mass index (BMI)

20-29  30-39  40-49  50-59  60-69  70-79  >80
Fat Cell Development

• Energy in > Energy out = Stored Energy
• Amount of fat reflects both number and size of fat cells
• Obesity occurs when your fat cells increase in numbers, size, or both
• 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
In healthy weight people, some fat is stored around the organs of the abdomen.

In overweight people, excess abdominal fat increases the risks of diseases.
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.
Overweight and Obesity

• After weight loss, 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
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
Genetics

Leptin

- Produced by fat cells under the direction of the ob gene
- Acts as a hormone in the hypothalamus to increase energy expenditure and decrease appetite
- Also released from stomach cells in response to food
- Serves as an internal control
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.
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 Overweight & 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</td>
<td>Stomach</td>
<td>Stimulates appetite</td>
</tr>
<tr>
<td></td>
<td>Decreases after a meal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leptin</td>
<td>Higher in obesity</td>
<td>Adipose tissue</td>
<td>Suppresses appetite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Increases energy expenditure</td>
</tr>
<tr>
<td>Oxyntomodulin</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</td>
<td>Small intestine</td>
<td>Suppresses appetite</td>
</tr>
<tr>
<td></td>
<td>Increases after a meal</td>
<td></td>
<td></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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>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!
  - "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
“Careful... I had an uncle who got hooked on fast food.”
## U.S. Trend Toward Colossal Cuisine

<table>
<thead>
<tr>
<th>Food</th>
<th>Food Guide Pyramid</th>
<th>Typical 1977</th>
<th>Super 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>cola</td>
<td>—</td>
<td>10 oz bottle, 120 cal</td>
<td>40–60 oz fountain, 580 cal</td>
</tr>
<tr>
<td>bagel</td>
<td>½ bagel, 90 cal</td>
<td>2–3 oz, 230 cal</td>
<td>5–7 oz, 550 cal</td>
</tr>
<tr>
<td>french fries</td>
<td>10, 160 cal</td>
<td>about 30, 475 cal</td>
<td>about 50, 790 cal</td>
</tr>
<tr>
<td>hamburger</td>
<td>2–3 oz meat, 240 cal</td>
<td>3–4 oz meat, 330 cal</td>
<td>6–8 oz meat, 650 cal</td>
</tr>
<tr>
<td>steak</td>
<td>2–3 oz, 170 cal</td>
<td>8–12 oz, 690 cal</td>
<td>16–22 oz, 1,260 cal</td>
</tr>
<tr>
<td>pasta</td>
<td>½ cup, 100 cal</td>
<td>1 cup, 200 cal</td>
<td>2–3 cups, 600 cal</td>
</tr>
<tr>
<td>baked potato</td>
<td>3–4 oz, 110 cal</td>
<td>5–7 oz, 180 cal</td>
<td>one pound, 420 cal</td>
</tr>
<tr>
<td>candy bar</td>
<td>—</td>
<td>1½ oz, 220 cal</td>
<td>3–4 oz, 580 cal</td>
</tr>
<tr>
<td>popcorn</td>
<td>—</td>
<td>1½ cups, 80 cal</td>
<td>8–16 cup tub, 880 cal</td>
</tr>
</tbody>
</table>

**NOTE:** Calories are rounded values for the largest portions in a given range.

Causes of Obesity

Environment

Physical Inactivity: Major contributor to obesity

- Modern technology has replaced physical activity at home, work, and transportation
- TV, Video games, computers
  - Require little energy
  - Replace time spent in vigorous activity
  - TV influences food purchases
Causes of Obesity

Environment

Physical Inactivity: Major contributor to obesity

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

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

• Health risks are evaluated using:

• 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.
I am fat and unhappy.

I lose a little weight, but then regain it (and sometimes more).

I try too hard to reach an unrealistic goal.

I want to be happy.

If I lose weight, I will be happy.
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.
Fad Diets: Popular eating plans that promise quick weight loss
Dieting Dilemma

Fad Diets:
Popular eating plans that promise quick weight loss

- South Beach
- The Zone
- Sugar Busters
- Cabbage Soup Diet
- Scarsdale Diet
- Blood Type Diet
- Fat Trapper
Fad Diets

- Overemphasizes one food group or single nutrient.
- Do not teach controlled eating or sensible meal planning.
- Can be dangerous as they often restrict or eliminate necessary nutrients.
- Creates paranoia that the scientific community is withholding important research.
- Offer poor preparation for a lifetime of eating ahead!
<table>
<thead>
<tr>
<th>Diet</th>
<th>Major Premise Promoted</th>
<th>Strong Point(s)</th>
<th>Weak Point(s)</th>
</tr>
</thead>
</table>
| Atkins Diet           | • People are overweight or obese because they have metabolic imbalances caused by eating too many carbohydrates; by restricting carbohydrates, these imbalances can be corrected.  
• You can lose weight without lowering kcalorie intake. | • Quick, short-term weight loss is achieved.                                     | • Restricts carbohydrates to a level that induces ketosis.                      |
|                       |                                                                                        |                                                                                 | • Ketosis can cause nausea, light-headedness, and fatigue.                      |
|                       |                                                                                        |                                                                                 | • Ketosis can worsen existing medical problems such as kidney disease.          |
|                       |                                                                                        |                                                                                 | • A diet high in fat such as Atkins can increase the risk of heart disease and some cancers. |
| Cheater’s Diet        | • Successful weight loss depends on eliminating boredom and allowing indulgences.  
• Cheating on weekends “stokes your metabolism.”                              | • Meals are proportioned one-half fruit or vegetables, one-fourth lean protein, and one-fourth whole grains.  
• Encourages as much exercise as possible.                                     | • No scientific data on cheating boosting metabolism or supporting weight loss. |
| Eat Right 4 Your Type  | • Your blood type determines which foods you should eat or not eat.                   | None                                                                           | • Food groups or individual foods are excluded, depending on blood type.        |
|                       |                                                                                        |                                                                                 | • No scientific data on the relationship between blood type and food choices.   |
| Glucose Revolution    | • Low glycemic index foods satisfy hunger, control blood glucose, and promote weight loss. | • Emphasizes fiber-rich vegetables, legumes, fruits, and whole grains.          | • Difficult to know the glycemic index of some foods.                           |
| Ornish Diet           | • By strictly limiting fat (both animal and vegetable), you eat fewer kcalories without eating less food. | • High-fiber, low-fat foods in this plan can lower blood cholesterol and blood pressure. | • So little fat that essential fatty acids may be lacking.                      |
|                       |                                                                                        |                                                                                 | • Limits fish, nuts, and olive oil, which may protect against heart disease.    |
| Pritikin Program      | • By eating low-fat, mainly plant-based foods, you can eat more food and still feel satisfied. | • No food group is completely eliminated in this high-fiber, low-fat diet program.  
• Some use of foods rich in omega-3 fatty acids is encouraged. | • For some people, very low-fat diets may be unsatisfying and therefore difficult to adhere to. |

Table H9-2a, p. 307
<table>
<thead>
<tr>
<th>Diet</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma Diet</td>
<td>- Enjoying portion-controlled Mediterranean-style foods supports weight loss and promotes good health.</td>
</tr>
<tr>
<td></td>
<td>- Emphasizes nutrient-dense foods.</td>
</tr>
<tr>
<td></td>
<td>- Initial phase restricts fruits and limits milk products.</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>
</tr>
<tr>
<td></td>
<td>- Encourages consumption of vegetables, lean meats, and fish, and the use of unsaturated oils when cooking.</td>
</tr>
<tr>
<td></td>
<td>- Restricts fatty meats and cheeses as well as sweets.</td>
</tr>
<tr>
<td></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 grains, beans, meats, poultry, and fish) will lead to weight loss.</td>
</tr>
<tr>
<td>Solution Diet</td>
<td>- Foods that take little effort to prepare and eat provide excess calories 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>
</tr>
<tr>
<td></td>
<td>- Encourages consumption of lean meats and fish; whole grains; vegetables; fruit; and low-fat milk, yogurt, and cheese.</td>
</tr>
<tr>
<td></td>
<td>- Restricts fatty meats and cheeses as well as sweets.</td>
</tr>
<tr>
<td></td>
<td>- Encourages exercise.</td>
</tr>
<tr>
<td></td>
<td>- Confusing as to exactly what to eat or how much.</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>
</tr>
<tr>
<td></td>
<td>- Promotes weight loss because it is a low-kcalorie diet.</td>
</tr>
<tr>
<td></td>
<td>- The diet is rigid, restrictive, and complicated, making it difficult for most people to follow accurately.</td>
</tr>
<tr>
<td></td>
<td>- The overblown health claims of the diet’s proponents are based on misinterpreted science and remain unsubstantiated.</td>
</tr>
<tr>
<td>The Claim</td>
<td>The Truth</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>You can lose weight “easily.”</td>
<td>Most fad diet plans have complicated rules that require you to calculate protein requirements, count carbohydrate grams, combine certain foods, time meal intervals, purchase special products, plan daily menus, and measure serving sizes.</td>
</tr>
<tr>
<td>You can lose weight by eating a specific ratio of carbohydrate, protein, and fat.</td>
<td>Weight loss depends on expending more energy than you take in, not on the proportion of energy nutrients.</td>
</tr>
<tr>
<td>This “revolutionary diet” can “reset your genetic code.”</td>
<td>You inherited your genes and cannot alter your genetic code.</td>
</tr>
<tr>
<td>High-protein diets are popular, selling more than 20 million books, because they work.</td>
<td>Weight-loss books are popular because people grasp for quick fixes and simple solutions to their weight problems. If book sales were an indication of weight-loss success, we would be a lean nation—but they’re not, and neither are we.</td>
</tr>
<tr>
<td>People gain weight on low-fat diets.</td>
<td>People can gain weight on low-fat diets if they overindulge in carbohydrates and proteins while cutting fat; low-fat diets are not necessarily low-kcalorie diets. But people can also lose weight on low-fat diets if they cut kcalories as well as fat.</td>
</tr>
<tr>
<td>High-protein diets energize the brain.</td>
<td>The brain depends on glucose for its energy; the primary dietary source of glucose is carbohydrate, not protein.</td>
</tr>
<tr>
<td>Thousands of people have been successful with this plan.</td>
<td>Authors of fad diets have not published their research findings in scientific journals. Success stories are anecdotal and failures are not reported.</td>
</tr>
<tr>
<td>Carbohydrates raise blood glucose levels, triggering insulin production and fat storage.</td>
<td>Insulin promotes fat storage when energy intake exceeds energy needs. Furthermore, insulin is only one hormone involved in the complex processes of maintaining the body’s energy balance and health.</td>
</tr>
<tr>
<td>Eat protein and lose weight.</td>
<td>For every complicated problem, there is a simple—and wrong—solution.</td>
</tr>
</tbody>
</table>

Table H9-1, p. 306
How to rate a weight loss diet

• Is the diet based on sound principles of nutrition?
• Is the diet based on a “secret” no one has discovered?
• Could you eat like this the rest of your life?
• Is the author credible?
• Has the author supported “success” claims?
• Personal testimonies.
• How much will it cost you?
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(^a) (Citrus aurantium, a natural flavoring that contains synephrine, a compound structurally similar to ephedrine)</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(^b) (pronounced KITE-oh-san; derived from chitin, the substance that forms the hard shells of lobsters, crabs, and other crustaceans)</td>
<td>Binds 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(^c) (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>Fucoid (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>Hydroxyxycitric acid(^d) (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(^f) (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>

\(^a\) Marketed under the trade names Xenadrine EFX, MetaboLife Ultra, NOW Diet Support.
\(^b\) Marketed under the trade names Chittorich, ExoFat, Fat Breaker, Fat Blocker, Fat Magnet, Fat Trapper, and FatSorb.
\(^c\) Marketed under the trade names Diet Fuel, MetaboLife, and Nature's Nutrition Formula One.
\(^d\) Marketed under the trade name Fucosynth.
\(^e\) Marketed under the trade names Ultra Burn, Citralan, Citrimax, Citrin, Slim Life, Brindleslim, Medislim, and Beer Belly Busters.
\(^f\) Marketed under the trade names Exercise In a Bottle, Pyruvate Punch, Pyruvate C, and Pruvate.

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

• 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 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 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

- Weight gain
- Diet
- Regain
Drug Treatment

Sibutramine (Merida)
- Pulled from market Oct 2010
- Increases risk of heart disease and stroke in those with history

Orlistat (Xenical)
- Inhibits pancreatic lipase activity
- Blocks fat digestion and absorption by 30%
- Most effective with reduced-calorie lowfat diet
- Side effects include gas, frequent bowel movements, reduced absorption of fat soluble vitamins
- OTC version - Alli

Phentermine
- Appetite suppressant
Aggressive Treatments of Obesity

- Surgery
  - 200,000 performed annually
  - Surgery is an option for those:
    - who have tried weight loss programs and failed
    - have a BMI $\geq 35$ with a weight related health problem
    - Have a BMI $> 40$
    - No medical or psychological contraindications
  - Liposuction is a popular procedure that is primarily cosmetic but poses risk.
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, B₁₂, Calcium, Folate and Vitamin D
- Requires *lifelong* medical supervision
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.)

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.

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

• Successful strategies
  – Small changes and moderate losses
  – Reasonable goals
    • ½ -2 pounds per week or 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
Weight-Loss Strategies

- **Eating Plans**
  - 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
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.
Weight-Loss Strategies

• **Eating Plans**
  – **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**
  – **Careful with Carbohydrates**
  – **Avoid empty kcalkories** from sugar and alcohol.
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 9-5 Daily Amounts from Each Food Group for 1200- to 1600-kCalorie Diets

<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>Meat and legumes</td>
<td>3 oz</td>
<td>4 oz</td>
<td>5 oz</td>
</tr>
<tr>
<td>Milk</td>
<td>3 c</td>
<td>3 c</td>
<td>3 c</td>
</tr>
<tr>
<td>Oils</td>
<td>3 tsp</td>
<td>3 tsp</td>
<td>4 tsp</td>
</tr>
</tbody>
</table>

NOTE: The USDA Food Guide patterns for 1200 and 1400 kcals were designed for children and provided 2 cups milk. They were modified here to include an additional cup of milk, as 3 cups per day is recommended for all adults. The discretionary kcalorie allowance for these patterns is about 100 kcals.
<table>
<thead>
<tr>
<th>In General</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Focus on healthy eating and activity habits, not on weight losses or gains.</td>
</tr>
<tr>
<td>• Adopt reasonable expectations about health and fitness goals and about how long it will take to achieve them.</td>
</tr>
<tr>
<td>• Make nutritional adequacy a high priority.</td>
</tr>
<tr>
<td>• Learn, practice, and follow a healthful eating plan for the rest of your life.</td>
</tr>
<tr>
<td>• Participate in some form of physical activity regularly.</td>
</tr>
<tr>
<td>• Adopt permanent lifestyle changes to achieve and maintain a healthy weight.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For Weight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 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.</td>
</tr>
<tr>
<td>• Emphasize foods with a low energy density and a high nutrient density.</td>
</tr>
<tr>
<td>• Eat small portions. Share a restaurant meal with a friend or take home half for lunch tomorrow.</td>
</tr>
<tr>
<td>• Eat slowly.</td>
</tr>
<tr>
<td>• Limit high-fat foods. Make legumes, whole grains, vegetables, and fruits central to your diet plan.</td>
</tr>
<tr>
<td>• Limit low-fat treats to the serving size on the label.</td>
</tr>
<tr>
<td>• Limit concentrated sweets and alcoholic beverages.</td>
</tr>
<tr>
<td>• Drink a glass of water before you begin to eat and another while you eat. Drink plenty of water throughout the day.</td>
</tr>
<tr>
<td>• Keep a record of diet and exercise habits; it reveals problem areas, the first step toward improving behaviors.</td>
</tr>
<tr>
<td>• Learn alternative ways to deal with emotions and stresses.</td>
</tr>
<tr>
<td>• Attend support groups regularly or develop supportive relationships with others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 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.</td>
</tr>
<tr>
<td>• Expect weight gain to take time (1 pound per month would be reasonable).</td>
</tr>
<tr>
<td>• Emphasize energy-dense foods.</td>
</tr>
<tr>
<td>• Eat at least three meals a day.</td>
</tr>
<tr>
<td>• Eat large portions of foods and expect to feel full.</td>
</tr>
<tr>
<td>• Eat snacks between meals.</td>
</tr>
<tr>
<td>• Drink plenty of juice and milk.</td>
</tr>
</tbody>
</table>
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

• 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 burns about the same amount
• 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
    • Regular aerobic exercise and weight loss will help trouble spots.
    • Strength training can improve muscle tone.
    • Stretching can help flexibility.
Weight Loss Strategies

• Environmental Influences
  – Atmosphere
  – Accessibility
  – Socializing
  – Distractions
  – Presence of food
  – Variety
  – Package and portion size
  – Serving containers
Weight-Loss Strategies

• Behavior and Attitude
  – Behavior modification requires time and effort.
  – 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 (2000-2500 kcal per week)
• Consume reduced kcalorie diet, small portions
• Eat breakfast
• Frequent self-monitoring
• Lifestyle change
• Develop good coping skills
• Almost 50% of people who intentionally lost weight have successfully maintained the loss for 1 year.
• 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
High-Protein, Low-Carbohydrate Diets

- Laboratory studies have shown that, when energy intake is the same, there is no difference in weight loss on a high-protein, low-carbohydrate diet compared to a lower-protein, higher-carbohydrate diet.
Popular High-Protein, Low-Carbohydrate Diets

- Clinical studies in which energy intakes varied (continued)
  - 12 month study: weight losses were greater on a low-carbohydrate diet, especially during the first three months
    - At 6 months the weight loss gap between low-fat and low-carbohydrate diets narrowed
    - At 1 year: both groups regain weight; the weight gain was more rapid for those who had been on the low-carbohydrate diet; those on the low-fat diet exhibited a more stable weight
Problem with Low Carb Diets

• Not a balanced diet providing all needed nutrients.
• Too much protein
• Too much and too high in saturated fat and cholesterol.
• Does little to alter overall eating behavior.
• Too rigid to follow over long period of time.
Fad Diets

• Adverse side effects of low-carbohydrate, ketogenic diets
  – Nausea
  – Fatigue
  – Constipation
  – Low blood pressure
  – Elevated uric acid
  – Stale, foul taste in the mouth
  – Fetal harm and stillbirth
Popular High-Protein, Low-Carbohydrate Diets

• Clinical studies in which energy intakes varied (continued)
  – 12 month study: weight losses were greater on a low-carbohydrate diet, especially during the first three months
    • At 6 months the weight loss gap between low-fat and low-carbohydrate diets narrowed
    • At 1 year: both groups regain weight; the weight gain was more rapid for those who had been on the low-carbohydrate diet; those on the low-fat diet exhibited a more stable weight
Popular High-Protein, Low-Carbohydrate Diets

• Greater initial weight loss on high-protein diet may be due to
  – Water and glycogen loss
  – People on low-carbohydrate diets consuming fewer calories

• Most people who lose a substantial amount of weight and keep it off do so on low-fat, high-carbohydrate diets
Popular High-Protein, Low-Carbohydrate Diets

Calorie balance is the major determinant of weight loss.

Diets that reduce caloric intake, regardless of macronutrient content (Carb, protein, and fat), result in weight loss.