Chapter 13

Body Composition and Weight Management

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11.17.14
What You Will Learn in this Chapter

1. Basic physiologic concepts about body composition
2. Laboratory & field methods to determine & interpret body composition
3. Physiologic, environmental, & behavioral factors that influence weight control
4. Practical strategies that can be used for effective weight control with your clients
5. Basic terminology related to body composition & weight control
Introduction to Body Composition and Weight Management

• Although overweight- & obesity-related problems are reported mostly in adults
  • Health problems also occur in children & adolescents who are overweight
    • More likely than normal weight children & adolescents to become overweight or obese adults

• They are developing adult health problems, like
  • Type 2 diabetes, high blood lipids, hypertension, orthopedic problems, & a multitude of cancers
  • Psychosocial problems
    • Depression, self-isolation, & social discrimination
Introduction to Body Composition and Weight Management

- **Body composition**
  - Distribution of fat, lean mass (muscle & bone), and organs.

- **Weight management**
  - Understanding physiologic influences
  - Environmental challenges
  - Behavioral strategies
  - That all impact ability to maintain a healthy weight for functional health & wellness
Body Composition Models

- Compartment models have been developed to evaluate body composition
  - Range from 2 to 5 compartments:
    1. Elements
    2. Molecular
    3. Cellular
    4. Functional
    5. Whole-body compartments
Primary Considerations before Accessing Body Composition

- “Why are you measuring body composition of your client?”
  - Is it to improve health, control disease, rehab, or to improve athletic performance?
  - How will you interpret results & provide your client with clear messages about how to maintain or change body composition?

- “Which method should you use?”
  - It will be based on cost of procedure, procedure’s ease of use, accuracy of procedure, & whether procedure measures fat distribution
Essential vs. Storage Fat

**Essential Fat**

Needed for normal physiological functions. Constitutes about 3% of the total fat in men and 12% in women.

**Storage Fat**

Found in adipose tissue, mostly beneath the skin and around major organs.

Has three basic functions

- Insulator to retain body heat
- Energy substrate for metabolism
- Padding against physical trauma to the body.

Does not differ between males and females.
Primary Considerations before Accessing Body Composition

• **Ideal body fat**
  • Term used to describe hypothetical optimal percentage of BF a person should have

• **Ideal body weight**
  • Term often used to describe hypothetical optimal body weight a person should have
Primary Considerations before Accessing Body Composition (Inherent Somatotype)

- **Ectomorph**
  - Body type associated with low BF, small bone mass, & small amount of muscle mass & size

- **Mesomorph**
  - Body type characterized by low-to-medium BF & medium-to-large bone size, & is muscular & well proportioned

- **Endomorph**
  - Body type characterized by large quantities of BF & large bone size, & is muscular but not as well proportioned as the mesomorphs
Somatotyopes

**MESO**-morph

**ECTO**-morph

**ENDO**-morph

Somatotype is genetically determined
Body Composition and Client Health

- All-cause mortality (or overall health risk)
  - Highly related to measures of body weight
- Next slide…
  - Shows relationship between all-cause mortality & BMI
BMI and Mortality

- Underweight
- Recommended weight
- Overweight
- Obesity
Body Composition and Client Health

• **Overfat individuals**
  - Men = > 28% of body fat
  - Women = > 32% of body fat

• **These individuals are at increased mortality risk from:**
  - Diabetes, hypertension, CV disease, sleep apnea, & osteoarthritis
  - Some cancers, gallbladder disorders, respiratory problems
Laboratory Models Used to Evaluate Body Composition

- **Densitometry**
  - Estimation of body composition from body density, which is determined from body mass & volume

- **Hydrometry**
  - Measurement of TBW, which can be determined from stable isotope dilution techniques

- **Dual-energy X-ray Absorptiometry (DEXA)**
  - Uses 2 low doses of X-rays that differentiate between total body bone mineral, lean soft tissue, & fat in a 3-C model
Densitometry

• Next slide illustrates hydrostatic weighing
  • Based on Archimedes’ principle
    • “A body immersed in a fluid is buoyed up by a force equal to the weight of the displaced fluid”
  • **Hydrostatic weighing**
    • SEE = ± 1-3% when residual volume (RV) measured
    • SEE = ± 3-6% when RV not measured
    • Remain motionless for several seconds
      • Hydrostatic tank system costs about $10,000 to $15,000
      • Requires regular hygiene maintenance
Hydrostatic Weighing
Densitometry

- Air displacement plethysmography
  - Become a commonly used laboratory method (via the Bod Pod) to determine volume & density

- Next slide shows air displacement technique
  - Easy to administer
  - Expensive (about $20,000 to $30,000)
  - SEE of 3% when compared with DEXA
The BodPod
Hydrometry

- Measurement of TBW using stable isotopes
  - Used to determine body composition in more rigorous exercise science research studies
- A common TBW technique is doubly labeled water method
  - Subject drinks 2 forms of water that have been labeled with stable isotopes
  - Standard for estimating total energy expenditure by measuring
    - Elimination of O₂ & H+ isotopes from body as water & CO₂
Dual-Energy X-ray Absorptiometry

- DEXA whole body technique (next slide)
  - Has become current gold standard

- Provides precise information about
  - %BF
  - Bone mineral density

- DEXA
  - Expensive (about $100,000)
  - Minimal error (≤1%)
Field Models Used to Evaluate Body Composition

- **Most common field methods for measuring body composition include:**
  1. Weight-to-height ratios (BMI)
  2. Circumferences or girths (WHR)
  3. Skinfold measurements (%BF)
Field Models to Evaluate Body Composition

- **Underweight**
  - Refers to low weight for a given height

- **Overweight**
  - Refers to excess weight for a given height

- **Obesity**
  - Refers to excessive accumulation of body fat
Body Mass Index

- Used in public health settings as
  - Large population assessment tool
  - Used by life insurance companies to assess risk for morbidity & mortality

- **BMI = weight (kg) ÷ height (m)^2**
- **BMI = weight (lbs) × 703 ÷ height (in)^2**
# Disease Risk According to BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>Disease Risk</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>Increased</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.6–21.99</td>
<td>Low</td>
<td>Acceptable</td>
</tr>
<tr>
<td>22.0–24.99</td>
<td>Very Low</td>
<td>Acceptable</td>
</tr>
<tr>
<td>25.0–29.99</td>
<td>Increased</td>
<td>Overweight</td>
</tr>
<tr>
<td>30.0–34.99</td>
<td>High</td>
<td>Obesity I</td>
</tr>
<tr>
<td>35.0–39.99</td>
<td>Very High</td>
<td>Obesity II</td>
</tr>
<tr>
<td>≥40.00</td>
<td>Extremely High</td>
<td>Obesity III</td>
</tr>
</tbody>
</table>
Issues with Body Mass Index

• Does not consider
  • Person’s inherent somatotype
  • Amount of lean tissue a person has

• Athletes or your more muscular clients can easily be:
  • Misclassified as being overweight or obese

• Health professionals should consider
  • Using additional body composition methods that partition LBM vs fat weight
Body Circumferences or Girths

- Most common current methods
  - Waist circumference in adults & youths
  - Waist-to-hip ratio in adults

- Waist circumference provides
  - Most practical measure of abdominal fat for adults & youth
Obesity Patterns and Health Risk

“Apple vs. Pear” Shape

Male (apple)
Higher Health Risk
(Android Adiposity)

Female (pear)
Lower Health Risk
(Gynoid Adiposity)
Regional Fat Deposition

- Abdominal body fat poses greater health risks than fat stored in other regions of the body.
- Males store more fat centrally and therefore frequently will have increased health risks associated with excessive body fatness.
Body Circumferences or Girths

- Excessive upper body fat is associated with:
  - Increased risk for development of chronic diseases
    - Heart disease, stroke, diabetes, metabolic syndrome, & some types of cancer

- Measure an adult client’s waist circumference
  - Using cloth measuring tape
  - Record girth in centimeters
  - Evaluate client’s health risk from next slide…
Disease Risk According to Waist Circumference in Inches

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
<th>Disease Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;35.5</td>
<td>&lt;32.5</td>
<td>Low</td>
</tr>
<tr>
<td>35.5–40.0</td>
<td>32.5–35.0</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;40.0</td>
<td>&gt;35.0</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 13.2
Waist to Hip Ratio

In males, a WHR $\geq 0.95$ indicates android adiposity.

In females, a WHR $\geq 0.85$ indicates android adiposity.

Measure waist at narrowest point

$\text{WHR} = \frac{\text{waist circumference}}{\text{hip circumference}}$

Measure hips at widest point
Body Circumferences or Girths

• **Waist-to-hip ratio can be**
  - Used to evaluate distribution of BF in adults
  - Health risk increases as waist-to-hip ratio increases
  - Standards vary by age & sex

• **Low health risk**
  - Young adult men < 0.95
  - Young adult women < 0.86
  - Older adult men (60-69 yr) < 1.03
  - Older adult women (60–69 yr) < 0.90
Skinfolds

- Based on concept that
  - Approximately 50% BF is subcutaneous tissue
- By measuring numerous body sites
  - Body composition can be calculated from a number of formulae that require an estimate of
    - Sum of skinfold thickness
    - Age
    - Sex
- Accuracy = SEE ± 3%
  - Need trained evaluator in proper site selection
  - Proper measurement technique
It is important to consider the following factors when deciding which skinfold equation to use:

- What type of client is being measured?
  - (Athlete or non-athlete? Adult or child?)
- Is equation based on a large representative study sample?
- How has equation been validated?
- Has equation been cross-validated across laboratories & investigators?
- How accurate is equation compared with other methods?
Skinfolds

• Sum of 3 sites & age are now more commonly recommended for use based on gender

• **Sum of 3 sites**
  • **Men** = Chest, abdomen, & thigh
  • **Women** = Triceps, suprailium, & thigh

• Once sum of 3 skinfold sites is measured & age of your client has been determined
  • Use formula or the tables 13.4 a–c to obtain estimated %BF
Standards for Evaluating Body Composition in Adults

<table>
<thead>
<tr>
<th>Body Composition Category</th>
<th>&lt;30</th>
<th>30–39</th>
<th>40–49</th>
<th>Over 50</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>&gt;28%</td>
<td>&gt;29%</td>
<td>&gt;30%</td>
<td>&gt;31%</td>
</tr>
<tr>
<td>Moderately high</td>
<td>22–28%</td>
<td>23–29%</td>
<td>24–30%</td>
<td>25–31%</td>
</tr>
<tr>
<td>Optimal range</td>
<td>11–21%</td>
<td>12–22%</td>
<td>13–23%</td>
<td>14–24%</td>
</tr>
<tr>
<td>Low</td>
<td>6–10%</td>
<td>7–11%</td>
<td>8–12%</td>
<td>9–13%</td>
</tr>
<tr>
<td>Very low</td>
<td>≥5%</td>
<td>≥6%</td>
<td>≥7%</td>
<td>≥8%</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>&gt;32%</td>
<td>&gt;33%</td>
<td>&gt;34%</td>
<td>&gt;36%</td>
</tr>
<tr>
<td>Moderately high</td>
<td>26–32%</td>
<td>27–33%</td>
<td>28–34%</td>
<td>29–35%</td>
</tr>
<tr>
<td>Optimal range</td>
<td>15–25%</td>
<td>16–26%</td>
<td>17–27%</td>
<td>18–28%</td>
</tr>
<tr>
<td>Low</td>
<td>12–14%</td>
<td>13–15%</td>
<td>14–16%</td>
<td>15–17%</td>
</tr>
<tr>
<td>Very low</td>
<td>≥11%</td>
<td>≥12%</td>
<td>≥13%</td>
<td>≥14%</td>
</tr>
</tbody>
</table>

Table 13.6
## Standards for Body Fatness

(Percent Body Fat - average for all ages)

<table>
<thead>
<tr>
<th>Category</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Fat</td>
<td>5%+</td>
<td>8%+</td>
</tr>
<tr>
<td>Borderline low</td>
<td>5% - 8%</td>
<td>8% - 11%</td>
</tr>
<tr>
<td>Desirable for Performance</td>
<td>8% - 13%</td>
<td>11% - 18%</td>
</tr>
<tr>
<td>Desirable for Good Health</td>
<td>13% - 23%</td>
<td>18% - 28%</td>
</tr>
<tr>
<td>Marginal Zone</td>
<td>23% - 28%</td>
<td>28% - 33%</td>
</tr>
<tr>
<td>Overfatness</td>
<td>&gt;28%</td>
<td>&gt;33%</td>
</tr>
</tbody>
</table>
Calculating Desired Body Weight

Desired Weight = \frac{Wt. - (Wt. \times \%Fat / 100)}{(1 - \text{desired} \%Fat)}
Calculating Desired Body Weight

(Example: female age 20)

Current weight = 160
Current body fat% = 30%
Desired body fat% = 22%

Desired Weight = \[
\frac{160 - (160 \times 0.30)}{1 - 0.22} \]

Desired Weight = \[
\frac{160 - 48}{0.78} = \frac{112}{0.78} = 143.6
\]
Bioelectrical Impedance (BIA)

- **Total body electrical conductivity (TOBEC)**
  - Based on concept that water & lean body tissue (like muscle) conducts electricity faster than fat tissue
Bioelectrical Impedance

- **Bioelectrical impedance (BIA)**
  - More simplified method
  - Easy to use (portable)
  - Noninvasive
  - Low cost
Bioelectrical Impedance

- Can be as accurate as skinfold (3% error)
- Some devices are less accurate (5-7%) (below)
  - Reliability of method can be low
- **Highly dependent on following factors:**
  - State of hydration
  - Effects of recent eating
  - Effects of recent drinking of fluids
  - Effects of recent bouts of exercise
  - Same instrument used for multiple measures
## Comparison of Methods Used to Estimate Body Composition

<table>
<thead>
<tr>
<th>Method</th>
<th>Accuracy</th>
<th>Practicality and Portability</th>
<th>Ease of Use</th>
<th>Time</th>
<th>Cost</th>
<th>Subject Comfort and Effort</th>
<th>Technician Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwater (hydrostatic) weighing</td>
<td>SEE = ±2.7%</td>
<td>Practical in exercise physiology laboratories or large fitness centers; not portable</td>
<td>Requires subject to submerge, exhale, and hold breath</td>
<td>~30 minutes because the procedure should be repeated 5 to 10 times</td>
<td>Initial purchase of equipment is expensive</td>
<td>Subject may be uncomfortable wearing a bathing suit, submerging in water, and exhaling air</td>
<td>Training is needed but is not difficult</td>
</tr>
<tr>
<td>Plethysmography</td>
<td>SEE = ±2.7-3.7%</td>
<td>Requires 8’ × 8’ space; can be moved with proper equipment, but takes effort</td>
<td>Requires subject to sit quietly</td>
<td>~5 minutes</td>
<td>Initial purchase of equipment is expensive</td>
<td>Subject may be uncomfortable wearing a bathing suit and cap and sitting in an enclosed space</td>
<td>Minimal training needed</td>
</tr>
<tr>
<td>Skinfold measurements</td>
<td>SEE = ±3.5%</td>
<td>Practical in settings that have a private area; very portable</td>
<td>Requires subject to be still; measurement sites must be determined and marked</td>
<td>&lt;5 minutes</td>
<td>Initial purchase of equipment is relatively inexpensive</td>
<td>Subject may be uncomfortable partially disrobing; some skinfolds are difficult to grasp</td>
<td>Training and consistency are critical; technique improves with experience</td>
</tr>
<tr>
<td>Bioelectrical Impedance Analysis [BIA]</td>
<td>SEE = ±3.5%</td>
<td>Practical in most settings; very portable</td>
<td>Easy to use</td>
<td>&lt;5 minutes</td>
<td>Initial purchase of equipment is moderately expensive</td>
<td>Procedure is simple but pre-measurement guidelines require substantial subject compliance</td>
<td>Minimal training needed</td>
</tr>
<tr>
<td>Dual-Energy X-ray Absorptiometry [DEXA]</td>
<td>SEE = ±1.8%; more research needed to verify SEE</td>
<td>Practical in imaging centers, physicians’ offices, or research facilities; not portable</td>
<td>Easy to use</td>
<td>~5 to 10 minutes</td>
<td>Initial purchase of equipment is very expensive</td>
<td>Simple procedure; subject is exposed to a very small amount of radiation; use prohibited during pregnancy</td>
<td>Training is needed; license to operate is required</td>
</tr>
<tr>
<td>Computed Tomography Scans (CT) and Magnetic Resonance Imaging [MRI]</td>
<td>Not yet established</td>
<td>Practical in imaging centers and research facilities; not portable</td>
<td>Requires subject to be still throughout the entire procedure</td>
<td>~30 minutes</td>
<td>Initial purchase of equipment is very expensive</td>
<td>Procedure is relatively simple with some subject discomfort</td>
<td>Training is needed; license to operate is required</td>
</tr>
</tbody>
</table>

*Table 13.5*
Weight Management: Genetic Factors

• Genetics of your clients affects:
  • Basal metabolic rate (BMR)
  • Thermic effect of food intake
  • Spontaneous exercise
  • Fat cell development
  • Fat cell metabolism
  • “Set point” for weight control

• People who are genetically best able to survive famine & starvation
  • Also most prone to gain weight when food is plentiful
Weight Management: Genetic Factors

- Amount of fat in an individual’s body is
  - Due to both number & size of fat cells

- Number of fat cells
  - Increases rapidly during childhood & early puberty

- After growth ceases
  - Fat cell number may continue to increase whenever energy balance is positive

- Obese people have
  - More fat cells & larger fat cells than those individuals who are at a healthy weight
Weight Management: Genetic Factors

- When fat cells enlarge
  - They also stimulate an increase in number of cells again
- Therefore, when individuals become obese
  - They may increase both number of & size of their fat cells
- When energy expenditure exceeds energy intake
  - Fat cells decrease in size, but not number
- See next slide...
Hypertrophic and Hyperplastic Growth of Adipose Tissue

During weight gain, adipocytes increase in size and/or number.

Central core of triglycerides

Cytoplasm

During hypertrophic growth, the size of adipocytes increases.

During hyperplastic growth, the number of adipocytes increases.

During weight loss, adipocytes decrease in size.

During weight loss, the size of the adipocytes decreases but the number remains constant.

Figure 13.11
The Energy-Balance Equation

- **Positive Energy Balance**
- **Neutral (Balanced)**
- **Negative Energy Balance**
Environmental Factors Believed to Promote Excess Energy Intake and Reduced Energy Expenditure

Figure 13.17

- Portion size
- High energy density
- High glycemic index
- Soft drinks/“junk” food
- Added sugar
- Easy food access
- Low cost
- Variety
- Convenience
- Great taste
- Ads/marketing

- Sedentary workplaces
- Sedentary schools
- Activity “unfriendly” community design
- Automobiles
- Drive-through conveniences
- Elevators/escalators
- Remote controls
- Sedentary entertainment
- Labor saving devices

Energy intake vs. Energy expenditure leads to Obesity.
Weight Management: Genetic Factors

- Individuals with extra fat cells
  - Tend to regain lost weight more rapidly
- Those with more average number of fat cells
  - Have more success at maintaining weight loss
- Why?
- When their cells shrink
  - Both cell size & number become normal
- Prevention of excessive weight gain between
  - Adolescence & adulthood is critical, when fat cells are increasing in number
Weight Management: Genetic Factors

• Set-point theory
  • Control or maintenance of a specific body weight by an individual’s internal controls (primarily hypothalamus)
    • After weight gains or weight losses, body attempts to adjust its metabolism to restore original weight

• Weight cycling
  • Losing weight & then regaining lost weight & even more over time
Weight Cycling

• Can permanently alter one’s basal metabolic rate
• Can lead to increased resistance to weight loss
• Can lead to increased efficiency of weight gain
The Psychological Effects of Dieting

I am fat and unhappy.

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

I want to be happy.

If I lose weight, I will be happy.

I try too hard to reach an unrealistic goal.
Environmental Factors

- American societal environment has become obesogenic
  - It is abundant in food availability & encourages a sedentary lifestyle
The Obesity Epidemic in America

Prevalence of Obesity
Behavioral Risk Factor Surveillance System (BRFSS)
Data from U.S. Center for Disease Control

1985

Weight.com

no data  <10%  10-14%  15-19%  >20%
Increases in Obesity Prevalence
Developing an Effective Weight Management Plan

• Should consider the following client factors:
  • Current body composition
  • Current eating & exercise behaviors
  • Environmental lifestyle
  • Personal goals
  • Mental stress
  • Occupation
  • Recreational behaviors
  • BMR

• What else should we consider?
  • Genetics
  • Self-image
  • Body image
  • Peer influence
Developing an Effective Weight Management Plan

• **Weight loss**
  • At least a 5% loss of body weight

• **Weight maintenance**
  • A weight change of < 3%
  • Also known as *weight stability*

• **Prevention of weight regain**
  • Consistent with a change in weight of 3% to < 5%
General Weight Management Strategies

<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>
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 diet 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.
Dieting

- **Some weight-loss diets are:**
  - Successful, at least initially
  - Although dieting without regular exercise
    - Does not allow lean muscle mass to be maintained
    - Fat loss is also accompanied with muscle mass loss

- **Fad diets**
  - Usually fail because they are not sustainable for clients (too restrictive, repetitive, mundane)
Which Diet is Best or Most Effective?

• **Current research literature suggests**
  - *Mediterranean diet, Atkins diet, Zone diet, South Beach diet, Weight Watchers*
    - Work at varying levels but depend on your ability to tolerate & adhere to requirements of each plan

• **As long as plan does not jeopardize your client’s good health, it may be:**
  - Helpful for initial weight loss & success
  - However, after initial weight loss via dieting
    - Educate your clients about physically active lifestyle
    - Teach about how to adopt healthy eating behaviors
Medications and Bariatric Surgery/Banding

- One aggressive treatment is with drugs
  - Appetite suppression (Sibutramine®)
  - Inhibit fat absorption (Orlistat®)
  - Combination of appetite suppressants & metabolism-boosting agents

- Although some medications have had limited success, there are side effects:
  - Gas, frequent bowel movements, reduced vitamin absorption, rapid HR, & increased BP
Medications and Bariatric Surgery/Banding

- Aggressive treatment for obesity
  - Bariatric surgery (*gastric bypass*)
  - Bariatric banding (called *gastric banding*)

- Considered to be a last alternative for many obese individuals who cannot lose weight via
  - Normal behavioral change strategies or medication
Medications and Bariatric Surgery/Banding

- **Bariatric**
  - Refers to treatment of obesity or obesity-related problems

- **Bariatric bypass surgery**
  - Alters digestive tract so that only small amounts of food can be consumed or digested

- **Bariatric banding surgery**
  - Makes stomach very small & increases level of satiety for individuals
  - Consuming much less food
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.
Medications and Bariatric Surgery/Banding

- Both types of bariatric procedures have numerous specific adverse effects including:
  - Nausea & diarrhea
  - Approximately 20% of people who have procedures experience complications

- In addition, bariatric surgeries carry an:
  - Approximately 1-3% death rate depending on
    - Age
    - Sex
    - Health status
A Regular Program of Exercise

• For effective long-term weight management success
  • Exercise regularly
  • Even with successful dietary changes

• Next slide illustrates
  • Caloric intake
  • Caloric expenditures between those who are
    • Physically active
    • Sedentary
Influence of Physical Activity on Discretionary Kilocalorie Allowance

Figure 13.19
Be Aware of Fad Diets, Programs, Supplements, and Equipment
Eating Disorders and Body Image Disorders

• **Disordered eating**
  • Abnormal and potentially harmful eating behaviors that do not meet the specific DSM IV criteria for eating disorders
    • The problem has a profound effect on millions.
    • Difficult to estimate the extent of the problem.

• **Eating disorder**
  • Diagnosed abnormal eating behaviors that compromise a person’s physical and/or psychological health

• **Anorexia nervosa (AN)**
  • Refuses to maintain normal body weight
  • Has a distorted view of body shape & weight
Eating Disorders and Body Image Disorders

- **Bulimia nervosa (BN)**
  - Eating disorder where a person has repeated episodes of binge eating
  - Usually followed by self-induced vomiting, misuse of laxatives or diuretics, or engaging in excessive exercise

- **Binge eating/purging**
  - Eating extreme amounts at one meal/self-induced vomiting
Eating Disorders and Body Image Disorders

• **Muscle dysmorphia**
  - Lay term is “Bigorexia”
  - Body image disorder where individuals think that their muscles are too small
  - They workout excessively to obtain a “perfect” physique
Signs/Symptoms for Muscle Dysmorphia

- Distorted self image
- Missing social events, skipping work and cancelling plans with family/friends to workout
- Never being satisfied with the muscular mass of one’s body
- Maintaining a strict, high-protein and low-fat diet
- Using excessive amounts of food supplements
- Frequently looking at one’s self in the mirror
- Steroid abuse, unnecessary plastic surgery, and even suicide
- Avoiding situations where one’s body might be exposed
- Working out even despite an injury
- Maintaining extreme workout methods
Prevention/Treatment Approaches for Muscle Dysmorphia

- Any treatment for MDD normally involves psychological care that is long term.
  - Counseling
    - Coping with stress and managing depression
  - Psychiatric medications
  - Intentional support from family members and friends while in therapy.
- The community of weightlifting has been very slow to recognize MDD
- Today there is an increasing awareness of the situation that has led some gyms to form support groups and buddy coordination in order to catch MDD in the early stages and to support individuals while in recovery.
How Are Eating Disorders Treated?

- Multidisciplinary teams is most effective approach
  - Psychological, medical, and nutrition professionals
- Nutritional approaches include:
  - Identifying binge triggers, safe and unsafe foods, hunger and fullness cues using food journals
  - Meal plans to ensure intake of adequate calories and nutrients for anorexia nervosa and to help avoid overeating with bulimia nervosa and binge eating disorder
- Recovery can be slow; no “quick fix”
  - Greater success if treated in early stages
The End