Fitness
Chapter 6

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What Is Fitness?

- **Physical fitness**: ability of the body to respond to physical demands
- **Skill-related fitness**: ability to perform specific leisure or sport skills
- **Health-related fitness**: ability to perform daily living activities with vigor
Benefits of Physical Activity and Exercise

- **Physical activity**: activity that requires any type of movement
- **Exercise**: structured, planned physical activity, often used to improve fitness levels
- People who are active are healthier than those who do not exercise
- Benefits from exercise include:
  - **Physical benefits** of improved functioning of body systems
  - **Cognitive benefits** of processing information more quickly
  - **Psychological and emotional benefits** of reducing stress levels and influencing mood
  - **Molecular-level benefits** of stabilizing blood glucose levels
Physical Inactivity

- Less active people are at greater risk for developing high blood pressure than active people.

- People who are inactive are more likely to develop coronary heart disease than active people.

- Physical inactivity may lead to feelings of anxiety and depression.

- Physical inactivity is associated with certain types of cancers.

- People who are overweight or obese can significantly reduce their risk for disease by being physically active.
Physical Activity

**Brain** General feeling of well-being
- Decreased depression and anxiety
- Reduced stress and tension
- Improved sleep
- Increased oxygen and nutrients to the brain

**Heart** Greater volume of blood pumped to body

**Liver** Increased high density lipoproteins (good cholesterol)
- Lowered triglycerides

**Pancreas** Improved muscle sensitivity to glucose
- Reduced risk of diabetes

**Muscles** Increased muscle mass
- Increased strength, endurance, speed, coordination, and balance
- Increased blood circulation

**Thyroid** Increased metabolism (aids in weight control)

**Lungs** Strengthened chest muscles
- Increased depth of breathing

**Gastrointestinal** Fewer gastrointestinal disorders
- Reduced risk of colon cancer

**Kidneys** Diminished blood flow during exercise
- Increased output of hormones

**Joints** Increased joint range of motion
- Reduced pain and swelling due to arthritis

**Bones** Increased bone density
- Decreased risk of osteoporosis
General Guidelines for Physical Activity

• The American College of Sports Medicine (ACSM) issued guidelines for promoting and maintaining health and preventing chronic diseases

• Recommendations include:
  • Minimum of 30 minutes of moderate-intensity aerobic activity on 5 days per week, or 20–25 minutes of vigorous-intensity aerobic activity 3 days a week
  • Guidelines also include recommendations for improving muscle strength and endurance
# Examples of Activities

<table>
<thead>
<tr>
<th>Light</th>
<th>Moderate</th>
<th>Vigorous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow walking</td>
<td>Walking 3.0 mph</td>
<td>Walking 4.5 mph</td>
</tr>
<tr>
<td>Canoeing</td>
<td>Cycling leisurely</td>
<td>Cycling moderately</td>
</tr>
<tr>
<td>Golf with cart</td>
<td>Golf, no cart</td>
<td>Jogging 7 mph</td>
</tr>
<tr>
<td>Croquet</td>
<td>Table tennis</td>
<td>Tennis singles</td>
</tr>
<tr>
<td>Fishing—sitting</td>
<td>Slow swimming</td>
<td>Moderate swimming</td>
</tr>
<tr>
<td>Billiards</td>
<td>Boat sailing</td>
<td>Volleyball</td>
</tr>
<tr>
<td>Darts</td>
<td>Housework/gardening</td>
<td>Basketball</td>
</tr>
<tr>
<td>Playing cards</td>
<td>Calisthenics</td>
<td>Competitive soccer</td>
</tr>
<tr>
<td>Walking the dog</td>
<td>Tennis doubles</td>
<td>Rope skipping</td>
</tr>
<tr>
<td>Grocery shopping</td>
<td>Yoga</td>
<td>Martial arts</td>
</tr>
<tr>
<td>Laundry</td>
<td>Playing with children</td>
<td>Snowboarding</td>
</tr>
</tbody>
</table>
Components of Health-Related Fitness

• Fitness training programs can improve:
  • Cardiorespiratory fitness
  • Musculoskeletal fitness (muscular strength, muscular endurance, flexibility)
  • Body composition

• **Overload**: amount of exercise
  • Too little, your fitness level won’t improve
  • Too much, you can become susceptible to injury
Components of Health-Related Fitness

• **FITT:**
  - Frequency (number of sessions per week)
  - Intensity (level of difficulty)
  - Time (duration of each session)
  - Type (type of exercise in each session)
Cardiorespiratory Fitness

• Ability of the heart and lungs to efficiently deliver oxygen and nutrients to the body’s muscles and cells via the bloodstream

• Benefits include:
  • Increase in oxygen-carrying capacity of the blood
  • Improved extraction of oxygen from blood to muscles
  • Increase in the amount of blood the heart pumps with each heartbeat
  • Increased speed of recovery to resting heart rate
  • Decreased resting heart rate, heart rate at any work level, and blood pressure
  • Improved muscle and liver function
Cardiorespiratory Training

- **Frequency:** exercise at least twice, ideally three times a week; more if weight control is a primary concern
- **Intensity:** *target heart rate (THR) zone:* point at which you stress your cardiorespiratory system for optimal benefit without overdoing it
  - *Heart rate reserve (HRR):* difference between maximum heart rate and resting heart rate
  - Maximum heart rate formula
  - Breathing test
  - Perceived exertion test
## Target Heart Rate Formulas

### Table 6.2

<table>
<thead>
<tr>
<th>Aimed at:</th>
<th>Standard Fitness Guideline</th>
<th>Gulati Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men/Women</td>
<td>Subtract age from 220</td>
<td>Women Only</td>
</tr>
<tr>
<td>To find maximum heart rate:</td>
<td>Subtract 88% of your age from 206</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example, for a 20-year-old</th>
<th>220 − 20 = <strong>200</strong></th>
<th>206 − 18 = 188 (88% of 20 = 17.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target low for a 20-year-old</td>
<td>200 × 0.70 = <strong>140</strong></td>
<td>188 × 0.70 = 132 (rounded)</td>
</tr>
<tr>
<td>Target high for a 20-year-old</td>
<td>200 × 0.85 = <strong>170</strong></td>
<td>188 × 0.85 = 160 (rounded)</td>
</tr>
</tbody>
</table>
Cardiorespiratory Training

- Time: sessions should last 30 minutes on average
- Type: two types of aerobic exercise:
  - Those that require sustained intensity with little variation in heart rate response (running, rowing)
  - Those that involve stop-and-go activities (basketball, soccer, tennis)
- For maximum benefit, level of activity must be altered (duration and intensity)
  - High-Intensity Interval Training (HITT)
- Start out slowly to avoid injury, and gradually build up endurance
  - Select activities you enjoy
Muscular Fitness

• *Muscular strength* is the capacity of a muscle to exert force against resistance

• *Muscular endurance* is the capacity of a muscle to exert force repeatedly over a period of time

• Strength training is a type of exercise in which the muscles exert force against resistance
  • Free weights
  • Exercise resistance machines
Types of Muscle Work-Outs

- **Isometric** – Muscle tenses, but doesn’t shorten
- **Isotonic** – Muscle contracts and shortens to move a load

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Strength Training

• Frequency: two to three resistance training sessions a week
  • Exercise each muscle group during a session
• To develop strength, exercise at a higher intensity for a shorter duration
• To develop endurance, exercise at a lower intensity for a longer duration
  • Measured in repetitions
Gender Differences in Muscle Development

• Muscle mass growth is influenced by the hormone testosterone
• Women produce testosterone at about 10 percent of the levels seen in men
  • Women’s increase in muscle mass is less than that achieved by men
• Also wide range of individual variability
  • Somatotype: body type
    • Mesomorphic: stocky, muscular; higher levels of testosterone than other types
    • Ectomorphic: tall, thin
    • Endomorphic: short, fat
Muscular Fitness and Training

- **Muscular power**: amount of work performed by muscles in a given period of time
- Train for muscular power by performing any exercise faster
- **Plyometrics**: program that trains muscles to reach maximum force in shortest period of time
  - Crouching and jumping
- **Core-strength training**: strength training that conditions the body torso from the neck to the lower back
  - *Pilates*
Muscular Fitness and Training

- Many exercise programs use *unstable surfaces* such as balance boards, tilt disks, trampolines
  - Forces you to make sudden, inconsistent motions; produces co-contraction of different muscles
    - *Resistance cords*
    - *Stability balls*
- Bear in mind increased risk of injury
Drugs and Dietary Supplements

• Some people attempt muscle gain through drugs and supplements; most are expensive and ineffective, some are dangerous, and some are illegal
# Drugs and Dietary Supplements

## Table 6.3

<table>
<thead>
<tr>
<th>Substance or Dietary Supplement</th>
<th>Effects</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anabolic steroid, testosterone</td>
<td>Promotes muscle growth by improving ability of muscle to respond to training and to recover.</td>
<td>Masculinization of females; feminization of males; acne; mood swings; sexual dysfunction.</td>
</tr>
<tr>
<td>Human growth hormone</td>
<td>Promotes muscle growth.</td>
<td>Widened jawline and nose, protruding eyebrows, buck teeth; increased risk of high blood pressure, congestive heart failure.</td>
</tr>
<tr>
<td>Ephedrine</td>
<td>Boosts energy, promotes weight loss (stimulates metabolism).</td>
<td>High blood pressure; irregular heartbeat; increased risk of stroke and heart attack.</td>
</tr>
<tr>
<td>Androstenedione (Andro)</td>
<td>Promotes muscle growth.</td>
<td>Decreased good cholesterol (HDL); increased levels of estrogen, breast enlargement in men; increased risk of pancreatic cancer; may significantly increase testosterone levels in women (little known about Andro effects in women).</td>
</tr>
<tr>
<td>Dehydroepiandrosterone (DHEA)</td>
<td>May promote muscle growth.</td>
<td>Body hair growth; liver enlargement; aggressive behavior; long-term health effects not known.</td>
</tr>
<tr>
<td>Creatine monohydrate</td>
<td>May increase performance in brief high-intensity exercises; promotes increased body mass when used with resistance training.</td>
<td>Diarrhea; dehydration and muscle cramping; muscle tearing; long-term health effects not known.</td>
</tr>
<tr>
<td>Chromium picolinate</td>
<td>May build muscle tissue, facilitate burning of fat, and boost energy.</td>
<td>Chromium buildup with large doses and possible liver damage and other health problems; long-term health effects not known.</td>
</tr>
</tbody>
</table>

Strength Training

• Guidelines for strength training:
  • Warm up
  • Do not hold your breath or hyperventilate
  • Hold weights close to your body, and do not arch your back
  • Make sure equipment pins and collars are correctly in place
  • Lift weights with a slow and steady cadence
  • Use a spotter when using free weights
  • Allow 48 hours between training sessions using the same muscle groups
Flexibility

• Ability of joints to move through the full range of motion
  • Maintains posture and balance
  • Makes movement easier and more fluid
  • Prevents low back pain and injuries
• Much of the loss of flexibility that results from aging can be reduced by stretching programs
Flexibility

• Four types of stretching programs:
  • *Static stretching*: stretching until you feel tightness and holding stretch for 30-60 seconds
  • *Passive stretching*: partner applies pressure, producing a stretch beyond what you could do on your own
  • *Ballistic stretching*: stretching the muscle by bouncing rapidly; recommended for experienced athletes only
  • *Proprioceptive neuromuscular facilitation*: therapeutic exercise causing a stretch reflex in muscles
<table>
<thead>
<tr>
<th>Static</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passive</strong></td>
<td><strong>Passive</strong></td>
</tr>
<tr>
<td>Static-passive calf stretch</td>
<td>Dynamic-passive calf stretch</td>
</tr>
<tr>
<td><strong>Active</strong></td>
<td><strong>Active</strong></td>
</tr>
<tr>
<td>Static-active calf stretch</td>
<td>Dynamic-active stretch</td>
</tr>
</tbody>
</table>
Flexibility

• ACSM recommends stretching for all the major joints
  • Neck, shoulders, upper back and trunk, hips, knees, ankles
  • 2 to 3 days a week or more
  • To a point of mild discomfort (not pain), hold for 15 to 60 seconds; 4 or more repetitions

• Greatest improvement in flexibility is seen if stretching done after other exercise
Body Composition

- Relative amounts of fat and fat-free mass in the body
  - Recommended proportion = percent body fat
- The relative amount of body fat has an impact on overall health and fitness; too much can have the following effects:
  - Overweight and obesity
  - Heart disease
  - Diabetes
  - Different forms of cancer
- Increased physical activity can help you control body weight, trim body fat, and build muscle tissue
## Summary of Physical Activity Recommendations for Adults

<table>
<thead>
<tr>
<th>Physical Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aerobic (endurance) activity</strong></td>
<td>150 minutes of moderate-intensity aerobic activity per week. OR 75 minutes of vigorous-intensity aerobic activity per week. OR A combination of moderate- and vigorous-intensity physical activity that meets the recommendation.</td>
</tr>
<tr>
<td><strong>Muscle-strengthening activity</strong></td>
<td>8 to 10 exercises that stress the major muscle groups on 2 or more nonconsecutive days per week. Do two to four sets of 8 to 12 repetitions for each exercise using sufficient resistance to fatigue the muscles.</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td>Stretching exercise for all major joints, at least 2 to 3 days per week. Stretch to the point of tension, hold for 10 to 30 seconds, repeating 2 to 4 times, to accumulate 60 seconds per stretch.</td>
</tr>
<tr>
<td><strong>Weight management</strong></td>
<td>To prevent unhealthy weight gain, 150 to 300 minutes of moderate- to vigorous-intensity physical activity per week. For substantial weight loss or to sustain weight loss, 300 minutes or more of moderate- to vigorous-intensity exercise a week.</td>
</tr>
</tbody>
</table>

Making Daily Activities More Active

• Walking: 10,000 steps per day controls weight
  • Inactive people take 2,000 to 4,000 steps per day
• Stairs: excellent for improving leg strength, balance, and fitness
  • Twice as taxing to heart and lungs as walking
• Exergaming: can track calories burned and progress over time
  • Comparable to moderate-intensity walking
  • Should not be considered a substitute for active outdoor play and physical activity
Health and Safety Precautions

• Begin with proper warm-up and cool-down activities
• Recognize forms of fatigue and overexertion
• Know how to treat soft tissue injuries by using the acronym, R-I-C-E
  • Rest
  • Ice
  • Compression
  • Elevation
Effects of Heat and Cold on Exercise and Physical Activity

• How to adjust for environmental conditions that affect physical activity:
  • Heat: wet head or body with cold water, take in extra fluids before activity
  • Cold: dress in several thin layers, take in extra fluids before activity
# Heat-Related Disorders

<table>
<thead>
<tr>
<th>Heat Disorder</th>
<th>Cause</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat cramps</td>
<td>Excessive loss of electrolytes in sweat; inadequate salt intake</td>
<td>Muscle cramps</td>
<td>Rest in cool environment; drink fluids; ingest salty food and drinks; get medical treatment if severe.</td>
</tr>
<tr>
<td>Heat exhaustion</td>
<td>Excessive loss of electrolytes in sweat; inadequate salt and/or fluid intake</td>
<td>Fatigue; nausea; dizziness; cool, pale skin; sweating; elevated temperature</td>
<td>Rest in cool environment; drink cool fluids; cool body with water; get medical treatment if severe.</td>
</tr>
<tr>
<td>Heat stroke</td>
<td>Excessive body temperature</td>
<td>Headache; vomiting; hot, flushed skin (dry or sweaty); elevated temperature; disorientation; unconsciousness</td>
<td>Cool body with ice or cold water; give cool drinks with sugar if conscious; get medical help immediately.</td>
</tr>
</tbody>
</table>

Exercise for People with Disabilities

• Importance of physical activity for people with disabilities
  • Counteract detrimental effects of bed rest and sedentary living patterns
  • Maintain optimal functioning of body organs or systems
Class Discussion

Should Insurers and Employers Reward Healthy Behaviors and Punish Bad Ones?
Physical Activity for Life

• Several key factors help people make physical activity a lifetime behavior

• Make a commitment to change
  • Assess yourself
  • Set achievable and sustainable goals
  • Maintain lifestyle

• Use social and community support
Wrap - UP