Chapter 7 - Fitness
Musculoskeletal System

• Functions:
  – Supporting Framework
  – Protect internal organs
  – Bones provide attachment sites for muscles
  – Bones provide mineral storage – calcium, phosphorus
  – Bone marrow – site for red blood cell production, aka hemopoiesis/hematopoiesis
Musculoskeletal System

- Bones connect to each other at Joints
- Cartilage covers ends of bones at joints
- Ligaments connect bone to bone
- Tendons connect muscle to bone
Muscles – Highly Organized
Muscular System

• Cardiac (Heart) – involuntary, self-excitatory

• Skeletal – voluntary

• Smooth – involuntary
Skeletal System

- 206 bones (organs)
- Axial Skeleton
  - Skull (29)
  - Vertebral column (26)
  - Thorax (1 sternum, 24 ribs)
- Appendicular Skeleton
  - Pectoral Girdle (4)
  - Upper limbs (60)
  - Pelvic Girdle (2)
  - Lower limbs (60)
Bone Tissue:
- Long
- Short
- Flat
- Irregular
What is Physical Fitness?

• The ability of the body to adapt to the demands of physical effort
• The more you ask of your body the stronger and more fit it will become
• The opposite is also true... *Use it, or lose it!*
• Goal: younger physiological age
Health Risks and Physical Activity

- Each 2-hour increment in TV watching was associated with a 23% increase in obesity and a 14% increase in Type-2 diabetes.
- Inactivity over 6 months resulted in significant gains in abdominal fat.
- Active people were nearly 20% less likely to be diagnosed with depression.
- At least 1 hour of walking per week predicted lower risk of coronary heart disease in women aged 45 years or older.
- Highly active people had a 27% lower risk of stroke than low-active people.
- Midlife physical activity was associated with a decreased risk of dementia and Alzheimer's disease later in life, even in genetically susceptible individuals.
5 Fitness Components

- Cardiorespiratory endurance
- Muscular strength
- Muscular endurance
- Flexibility
- Body composition

What are major benefits of exercise and physical fitness?
Health Benefits of 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
Cardiorespiratory Endurance

• Ability for heart and lungs to deliver oxygen and nutrients to the body’s cells
• Prolonged, sustained activity (> 6 or 7 minutes)
• Large muscles (to keep HR elevated)
• Benefits:
  – Strengthens heart muscle
  – Develops lung function
  – Decreases risk for heart disease
  – Increases endurance, stamina, energy
“Fat-Burning” Myth
Muscular Strength

• Maximum force produced
• Power = strength/time
• Benefits:
  – Prevents injuries
  – Improves posture and joint stability
  – Enhances sport, leisure, work, and fitness activities
  – Maintains or increases metabolism
The Perfect Squat

- Noggin in neutral position
- Upright torso
- Knees tracking over (but not beyond) toes
- Feet shoulder width
- Weight on heels
- Crease of hips below parallel
- Strong lumbar
Muscular Endurance

• Sustain repeated submaximal muscular contractions over time

• Benefits:
  – *Virtually the same as for Muscular Strength*
Flexibility

• Ability for a joint to move through its full range of motion

• Benefits:
  – Improves posture and joint balance
  – Prevents injuries
  – Improves function in daily life
Body Composition

• Relative amounts of fat-free mass and fat mass in the body

• Benefits:
  – Decreases risk of disease
  – Increases metabolism (with increase in muscle)
  – Improves appearance
Exercise Principles

Green Ogres Play Frisbee

• Goal
• Overload
• Progression
• FUN 😊
#1: Have a Goal

Health*
Fitness*
Performance

*Weight Loss
#2: Overload

- Increase workload as fitness capacity improves
- How can I increase my workouts?
- Use the FITT Principle (Rx for Ex)
  - Frequency – how often
  - Intensity – how difficult
  - Time – how long
  - Type – what type of exercise
## FITT applied to *Aerobic Exercise*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Frequency</th>
<th>Intensity (p. 137)</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>3-5</td>
<td>Low-High</td>
<td>20-50 min/day</td>
</tr>
<tr>
<td>Fitness/Performance</td>
<td>3-5</td>
<td>Moderate-High</td>
<td>30-70 min/day</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>4-7</td>
<td>Moderate-High</td>
<td>25-75 min/day</td>
</tr>
</tbody>
</table>
FITT applied to:

**Weight Training**

- **F**: 2-3 d/w, alternate days
- **I**: 8-12 Repetition Maximum
- **T**: Time to complete 1-3 sets of 8-12 exercises
- **T**: Body weight, Free weights, machines, Core, Stability equipment, medicine balls, kettle bells, CrossFit style......
#3: Progression

• Rules of thumb:
  – Be consistent
  – Increase 5-10% every 1-2 weeks
  – DON’T do too much, too soon for “faster” results
#4: Exercise should be FUN!!

The BEST exercise you can do is...

...the exercise that you enjoy the most!
- Activates Pleasure-Reward Circuit
- Built-in motivation
Designing Your FITTness Program

• Think “FITT”
• Cardiorespiratory Endurance Exercises
• Resistance Exercises, including Core Exercises
• Flexibility Exercises
  – 3-7x week target all major joints
  – Hold for 4-10 breaths
  – REPEAT stretches
• Movement Prep and Cool-down