Section II: Concept 05

How Much Physical Activity is Enough?

PT 100
Wellness and Lifestyle

Mahmoud Alomari, PhD
Principles of Physical Activity

- Overload
  - Tissue improvements in performance result from repeatedly exposing it to a load to which it's not normally accustomed to.
  - Ex. Prescription components used to overload different body systems
    - Intensity
    - Duration
    - Frequency
Principles of Physical Activity

Specificity:

Training effects of exercise training are specific (limited) to each:

1. Component of fitness and health or wellness benefits desired
   - CV endurance exercise: cause muscle change that result in improvements in endurance with no/little effect on strength
     - i.e. number of mitochondria

2. Body part trained
   - Stretching shoulder joint will improve flexibility of shoulder joint only with minimum effect on hip joint
Principles of Physical Activity

- **Principle of progression**
  - Overload should be increased periodically and gradually (not too fast or slow) in order to induce further adaptations

- **Reversibility**
  - Gains are lost when overload is removed
  - But still can maintain gained benefits with less exercise
Dose-Response relationships
- More gains are achieved with more exercise
  » i.e. higher intensity, longer duration, more frequent
Principles of Physical Activity

- Principle of diminishing returns
  - Amount of adaptations diminish as we get fitter and fitter (gaining benefits become more difficult)

- The curve indicate that most of the benefits are gained at lower level of fitness
Principles of Physical Activity

- Individualization
  - Different gains from exercise training weighs differently to different individuals
    » Personal goals
    » Sedentary person at risk for premature chronic disease adapting a moderately active lifestyle may provide important health benefits and represent a more attainable goal than higher VO₂ max.
FIT Formula

**F**requency

**I**ntensity

**T**ime

See “On the Web” 05-1 for interactive FIT prescriptions for exercise.
FIT Formula

Adaptations and gained benefits are achieved by overloading the body with:

- **Intensity**: how hard should we exercise
- **Time (duration)**: how long each exercise session should be
- **Frequency**: how often should we exercise
**Physical Activity Target Zone**

<table>
<thead>
<tr>
<th>TT: Minimal level for meaningful benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal extra adaptations are obtained</td>
</tr>
<tr>
<td>Target Zone: most adaptations occur</td>
</tr>
<tr>
<td>Adaptations below this level are minimum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High</th>
<th>Too Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Activity</td>
<td>Threshold of Training</td>
</tr>
<tr>
<td>High</td>
<td>Target Zone</td>
</tr>
<tr>
<td>Low</td>
<td>Inactivity</td>
</tr>
<tr>
<td>“Normal Activity”</td>
<td>Not Enough</td>
</tr>
</tbody>
</table>

Optimal Level
Benefits of Moderate and Vigorous Activity

Most of the adaptations occur when exercising at low to moderate intensity.
Too little exercise leads to "hypokinetic" diseases (i.e. CV diseases). Too much exercise can also bring about "hyperkinetic" conditions (i.e. CV diseases, orthopedics).
Optimal Training: Intensity, Duration, & Frequency

Minimal additional adaptations are achieved when exercising over optimal training; more is not necessarily better!
<table>
<thead>
<tr>
<th>Activity Level</th>
<th>MET Level</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest</td>
<td>1</td>
<td>Resting</td>
</tr>
<tr>
<td>Very Light</td>
<td>2 - 2.5</td>
<td>Typing</td>
</tr>
<tr>
<td>Light</td>
<td>2.5 - 4 2/3</td>
<td>Normal Walk</td>
</tr>
<tr>
<td>Moderate</td>
<td>4 2/3 - 7</td>
<td>Brisk Walk</td>
</tr>
<tr>
<td>Hard</td>
<td>7 - 10</td>
<td>Run 8 k/h</td>
</tr>
<tr>
<td>Very Hard</td>
<td>10 - 12</td>
<td>Run 13.6 k/h</td>
</tr>
<tr>
<td>Maximum</td>
<td>12+</td>
<td>Run 16 k/h</td>
</tr>
</tbody>
</table>

See “On the Web” 07-2 to see how ranges vary by fitness level.
Current ACSM/CDC Recommendations

- “Every U.S. adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week”.

Surgeon General’s Report on Physical Activity and Health:
http://www.cdc.gov/nccdphp/sgr/sgr.htm
Physical Activity Pyramid

Each level provides different benefits and adaptations.
Lifestyle Physical Activity

- Provides important health benefits and promotes weight control
Active Aerobics and Sports

- Provides additional health but it is designed to improve fitness
Stretching Exercises

- Promotes full range of motion in joints, improves flexibility and decreases risk of injuries and back pain
Muscular Fitness Exercises

- Maintains lean body mass, improves strength and promotes functional fitness.
- Also decreases risks of back pain and osteoporosis.
Resting, sleeping, and relaxing is important

– Never underestimate the power of resting
– Time for recovery, replenishment, and rebuilding
  » Not having time for these things might cause injury during subsequent exercise session
– To avoid boredom

Sleeping shouldn’t be done too frequently or for too long times

– i.e. healthy sleeping is 8 hours
Principles from the Activity Pyramid

- **No single activity provides all the benefits**
  - Importance of well-rounded exercise program
    - i.e. aerobic, stretching, resistance exercise

- **In some cases, one type of activity can substitute for others**

- **Something is better than nothing**

- **Activities from level 3 (flexibility and resistance exercise) provide benefits that are especially important for elderly**
Improving performance requires more physical activity than the amount needed to improve fitness or obtain health benefits.
How Much is Enough: Summary

- Some activity is better than none
- More activity is not necessarily better
- Estimate the number of days that you have performed exercises for the 3 lower levels of the pyramid in the last 2 weeks
- Reflect on the consistency and nature of your activity patterns