The Exercise Prescription

Elizabeth Pegg Frates, MD
Assistant Director of Medical Education
Institute of Lifestyle Medicine
Clinical Instructor
Department of Physical Medicine and Rehabilitation
Spaulding Rehabilitation Hospital
Harvard Medical School
Questions to be answered

1. What are the definitions of basic exercise terms?

2. What are the current exercise recommendations?

3. How do you perform risk stratification on patients before writing an exercise prescription?

4. What is an exercise prescription and how do you write one?
Question #1

1. What are the definitions of basic exercise terms?
   - Physical activity
   - Exercise
   - Lifestyle exercise

Definitions

- What is physical activity?
  - Bodily movement produced by the contraction of skeletal muscles
  - The result is an increase in energy expenditure

Definitions

What is exercise?

1) A subset of physical activity

2) Planned, structured and repetitive bodily movement

3) Performed with the goal of improving or maintaining physical fitness


Definitions

What is lifestyle exercise?

Physical activity that you do while performing your routine activities at work, at home or in your travels throughout the day.
**Lifestyle Exercise**

- taking the stairs
- parking in a space furthest from the door
- bicycling to work
- walking during your lunch break
- walking your dog
- walking to the train or bus stop
- raking the leaves
- vacuuming the house

**Question #2**

What are the current exercise recommendations?
US Department of Health and Human Services: 2008

- Completed two year review of physical activity literature (~8,600 articles).
- First Federal guidelines were released October 7, 2008
- Background report completed

USHHS Physical Activity Guidelines for Americans: Adults

- 150 minutes of moderate intensity physical activity per week OR
- 75 minutes of vigorous physical activity
  (In bouts of at least 10 minutes)

For more extensive health benefits:
- 300 minutes of moderate intensity physical activity OR
- 150 min vigorous physical activity

Resistance (muscle strengthening) at least twice per week.
Moderate vs. Vigorous

- **Moderate:**
  - Walking briskly, water aerobics, ballroom dancing, and general gardening

- **Vigorous:**
  - Race walking, jogging, running, swimming laps, jumping rope, and hiking uphill or with a heavy backpack

“Median” Shape of the Dose-Response Curve

Question #3

How do you perform risk stratification on patients before writing an exercise prescription?

Risks

- Musculoskeletal
- Cardiovascular
Relative risk of MI associated with vigorous exertion (≥6 METs) according to habitual frequency of vigorous exertion

Risk Stratification

- **American College of Sports Medicine**
  - Low
  - Moderate
  - High

Review Health/Medical History for Known Disease, Signs/Symptoms, CAD Risk Factors

Known CV, Pulmonary, Metabolic Disease?

Yes

Major Signs or Symptoms Suggestive of CV, Pulmonary, Metabolic Disease?

Yes

Number of CAD Risk Factors

≥ 2

Low Risk

No

High Risk

Moderate Risk

No

Cardiovascular: Cardiac, peripheral vascular, or cerebrovascular disease
Pulmonary: COPD, asthma, interstitial lung disease or cystic fibrosis
Metabolic: Diabetes mellitus types 1 and 2, thyroid disorders, renal or liver disease

Pain, discomfort in the chest, neck, jaw, arms, or other areas that may result from ischemia
Shortness of breath at rest or with mild exertion
Diabetes or abnormal fasting glucose
Orthostatic or daytime diastolic blood pressure
Ankle edema
Palpitations or atrial fibrillation
Atrial fibrillation
Rheumatic fever
Unusual fatigue or shortness of breath with usual activities

Asymptomatic individuals:

Men < 45 and Women < 55 and

Those who meet no more than one risk factor
Risk Factors: Positive

- 1) Family History
- 2) HTN
- 3) Smoking
- 4) Dyslipidemia
- 5) Impaired fasting glucose
- 6) Obesity
- 7) Sedentary Lifestyle

Risk Factors: Negative

- HDL $\geq 60$
Moderate Risk

Men $\geq 45$ and Women $\geq 55$

OR

Those who meet the threshold for two or more risk factors

High Risk

- Individuals with one or more signs/symptoms suggestive of cardiovascular and pulmonary disease

OR

- Individuals with known cardiovascular, pulmonary or metabolic disease
Signs and Symptoms

- Angina
- Shortness of breath at rest or with mild exercise
- Dizziness or syncope
- Orthopnea or paroxysmal nocturnal dyspnea

Signs and Symptoms

- Ankle edema
- Palpitations or tachycardia
- Intermittent claudication
- Known heart murmur
- Unusual fatigue or SOB with usual activities
Review Health/Medical History for Known Disease, Signs/Symptoms, CAD Risk Factors

Known CV, Pulmonary, Metabolic Disease?

Yes  No

Major Signs or Symptoms Suggestive of CV, Pulmonary, Metabolic Disease?

Yes  No

Number of CAD Risk Factors

≥2  <2

High Risk  Moderate Risk  Low Risk

Clinical**  Professional*  None required

Type of supervision recommended

Need further medical clearance before exercising at a LOW or MODERATE intensity?

Yes  No  No

Need further medical clearance before exercising at a VIGOROUS intensity?

Yes  Yes  No

Supervision required?

Yes  Yes  No

Low Risk  Moderate Risk  High Risk

<table>
<thead>
<tr>
<th>Need further medical clearance before exercising at a LOW or MODERATE intensity?</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Need further medical clearance before exercising at a VIGOROUS intensity?</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supervision required?</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Often recommended - depends on the reason for falling into this category</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of supervision recommended</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>None required</td>
<td>Professional*</td>
<td>Clinical**</td>
<td></td>
</tr>
</tbody>
</table>
Sedentary Lifestyle as Risk Factor

- The American Heart Association (1992) recognized “sedentary lifestyle” as a primary controllable cardiac risk factor. The prevalence of sedentary lifestyle is at least twice that of smoking, hypertension and elevated total serum cholesterol.

Risks of Sedentary Behavior

- Reduced functional capacity
- Osteoporosis
- Obesity
- Anxiety and depression
- Hypertension
- Cardiovascular disease
- Colon cancer
- Thromboembolic stroke
- Breast cancer
- Type 2 diabetes mellitus

Question # 4

What is an exercise prescription and how do you write one?

Exercise Prescription

- The four parts of the exercise prescription
  - F-frequency
  - I-intensity
  - T-time
  - T-type
Frequency

- How many days a week should the patient exercise?

Intensity

- At what level of intensity should the patient exercise?
  - Low
  - Moderate
  - Vigorous
Intensity Using Heart Rate

- Target Heart rate
  - Maximal heart rate = 220-age

- Based on level of intensity a heart rate range is selected.

Intensity Using Heart Rate

- Very light = <50 % of maximal heart rate
- Light = 50-63 % of maximal heart rate
- Moderate = 64-76 % of maximal heart rate
- Vigorous = 77-93 % of maximal heart rate
- Very Hard = >94 % of maximal heart rate
- Maximal = 100% of maximal heart rate
The Borg Rating of Perceived Exertion Scale

9 = Very Light
11 = Light
13 = Somewhat hard
15 = Hard
17 = Very hard
19 = Extremely hard
20 = Maximal exertion

www.cdc.gov/nccdphp/dnpa/physical/measuring/perceived_exertion.htm

Intensity Using Internal Monitoring

- Monitoring level of perspiration, respiratory rate, heart rate, muscle fatigue, level of exhaustion
Intensity Using the Sing Test

- Sing Test
  - Moderate intensity
    - You can talk while exercising but not sing.

Time

- How long should the patient exercise?

- Accumulate 150 minutes a week of low or moderate intensity physical activity
  - OR

- Accumulate 75 minutes of vigorous intensity physical activity
Time

- Key Points
  - Some time is better than no time
  - Sessions can be split in am and pm workouts
  - Sessions can be as little as 10 minutes long to start
  - Make sure the patient agrees with the amount of time

Type

- The list is endless
  - Walking
  - Jogging
  - Stationary bicycle
  - Elliptical
  - Bicycling
  - Swimming
  - Basketball
  - Soccer
Example: John Doe

- Frequency: three days a week
- Intensity: moderate 64% - 76% of max HR
  - so you can talk but not sing
- Time: a half hour each session
- Type: jogging

Summary # 1

- There are many different types of exercise including lifestyle exercise to enjoy.
Summary # 2

The latest exercise recommendations from the U.S. Department of Health and Human Services: October, 2008 are

- 150 minutes of moderate intensity physical activity per week OR
- 75 minutes of Vigorous physical activity
  (In bouts of at least 10 minutes)

For more extensive health benefits:

- 300 minutes of moderate intensity physical activity OR 150 min vigorous physical activity
- Resistance (muscle strengthening) at least twice per week.

Summary # 3

- The ACSM has an easy to use risk stratification system.
- For healthy individuals the risks associated with sedentary behavior are far greater than the risks associated with physical activity.
Summary # 4

- The Exercise Prescription has four basic parts
  - F-Frequency
  - I-Intensity
  - T-Time
  - T-Type

Resources

- Exercise is Medicine©
  - www.exerciseismedicine.org
- Institute of Lifestyle Medicine
  - www.instituteoflifestylemedicine.org
- American College of Sports Medicine
  - www.acsm.org
Resources

- Physical Activity Guidelines, U.S. Department of Health and Human Services (HHS)
  - www.health.gov/paguidelines
- Center for Nutrition, Policy, and Promotion My Pyramid, USDA
  - www.mypyramid.gov/pyramid/physical_activity.html

Resources

AHA: www.justmove.org

NIH: www.nhlbi.nih.gov/health

CDC: www.cdc.gov/nccdphp/dnpa
Thank you

Harvard Medical School
Department of Physical Medicine and Rehabilitation
Spaulding Rehabilitation Hospital
Boston, Massachusetts
www.instituteoflifestylemedicine.org