Every Patient is an Athlete: Using Exercise as Medicine

Carlin Senter, M.D.
Primary Care Sports Medicine
UCSF Medicine and Orthopaedics
February 10, 2015

Outline

1. Why every person should be an athlete
2. The prescription for physical activity
3. Motivation

Case

• 55 y/o woman presents for routine annual exam. No complaints but she is shocked that she gained 10# since she saw me last year. Takes no medications.
• BP 140/80, HR 80, Height: 5’3”, weight 170# (BMI 30)
• Labs:
  – Fasting blood glucose 104
  – Total cholesterol 192, Triglycerides 110, HDL 50, LDL 118

Definitions

• Physical activity: any body movement that results in energy expenditure (exercise, gardening, biking to work)
• Exercise: physical activity that is planned, structured, repetitive with objective to improve or maintain physical fitness.

Physical inactivity in the US, 2008

What % of adults in California did no leisure-time physical activity in 2008?

- A. 5%
- B. 10%
- C. 15%
- D. 20%
- E. 25%

Women less active than men

Percent of no leisure time physical activity in the United States
- Women: 26.2%
- Men: 21.7%


Why every person should be an athlete

- Numerous health benefits
  - Strong evidence
  - Moderate evidence

Strong evidence that physical activity associated with lower risk of

- Heart disease
- Stroke
- High blood pressure
- High cholesterol
- Type 2 diabetes
- Colon cancer
- Breast cancer
- Falls


What is heart disease?

Cardiovascular disease
1. Heart attack (blood flow to heart blocked)
2. Stroke (blood flow to brain blocked)

http://watchlearnlive.heart.org/CVML_Player.php?moduleSelect=hrtatk
Heart Disease #1 Killer of Women in US

- 1 in 4 women dies from heart disease
- Approximately the same number of women and men die from heart disease each year
- Only 54% of women recognize that heart disease is their #1 killer
- 2 of every 3 women who die of heart disease have no warning symptoms

Heart disease risk factors

- Physical inactivity
- Obesity
- Family history
- Age
- Male gender
- Smoking
- High cholesterol
- High blood pressure
- Diabetes

Physical Activity Lowers Heart Disease Risk in Women

- Women’s Health Initiative Observational Study
  - Prospective
  - 74,000 postmenopausal women
  - Ages 50-79, diverse racial and ethnic backgrounds
  - Walked briskly or exercised vigorously at least 2.5 hours/week
  - 30% lower risk of heart attack and heart failure

Physical activity lowers heart disease risk in dose-dependent fashion

- Compared to people with no physical activity
  - 150 min/week of moderate-intensity physical activity → 14% lower risk heart disease
  - 300 min/week → 20% lower risk


What is Type 2 Diabetes?
http://pixshark.com/type-2-diabetes-pictures.htm

Women with Diabetes

- 1/11 people in US has diabetes
- 50% of these are women
- Women with diabetes have shorter life expectancy than women without diabetes
- Greater risk blindness than men with DM
- Increased health risk during pregnancy (eye problems, kidney problems, higher blood sugar levels)


Exercise as Medicine: immediate benefits CVD, Diabetes

Blood pressure
- Exercise session 50-100% of maximum intensity
  - ↓ Systolic blood pressure 18-20mmHg
  - ↓ Diastolic blood pressure 7-9mmHg
  - lasting 12-16 hours after exercise

Blood sugar
- Exercise at 55-75% of maximum intensity
  - ↓ blood sugar 20-40 mg/dL
  - lasting 2-3 days

Kesaniemi et al. Medicine & Science in Sports & Exercise, 2001

Breast cancer

- Cancer: cells growing out of control
- Breast cancer: when the out-of-control cells are in the breast
- After skin cancer, the most common cancer affecting US women
- The most common cause of death from cancer in Hispanic women in the US
- The 2nd most common cause of death from cancer in non-Hispanic US women

http://www.cdc.gov/cancer/breast/basic_info/index.htm
Physical Activity Lowers Risk of Breast Cancer

- Lowers risk
  - Breast cancer
  - Breast cancer recurrence
  - Death from breast cancer
- Mechanisms
  - Leaner body weight → lower risk
  - Possibly lower estrogen levels → lower risk
  - Possibly boost in immunity → lower risk

Moderate evidence that physical activity associated with

### Lower risk of...
- Depression
- Hip fracture
- Lung cancer
- Endometrial cancer

### Improved...
- Bone density
- Sleep quality
- Weight maintenance after weight loss
- Cognitive ability

http://ww5.komen.org/BreastCancer/LackofExercise.html

US Dept Health and Human Services. Physical Activity Guidelines Advisory Committee Report, 2008:

Bone density

- Bone density peaks around onset of adulthood
- Bone density declines after menopause
- Osteopenia
- Osteoporosis

Physical activity effects on bone density

- Cochrane - Overall small effect but statistically significant improvement in bone density
  - Progressive resistance strength training for legs increases bone density of hip
  - Combination exercise programs increase bone density of spine
- Expert consensus — may not increase bone density but slow the rate of loss

Bone density


---

Physical activity lowers fall risk

- Benefits for fall prevention:
  - Weight control
  - Balance
  - Strength
  - Mobility
  - Reaction time
  - Improved bone, muscle, joint health

Physical activity lowers risk of fracture

- Back strengthening program decreased vertebral fractures in 50 postmenopausal women (Sinaki, 2002)
- Nurses’ Health Study: Risk of hip fracture was reduced by 55% in those who did about 6 hours brisk walking/week compared to sedentary (Feskanich, 2002)
What’s better: daily exercise or avoiding a sedentary lifestyle?

Benefits of walking at lunch

- Group of 56 physically inactive employees
  - Avg age 48, 93% female
- Randomized
  - Walking: 30 min 3x/week x 10 weeks
  - No walking group
- Walking group demonstrated more enthusiasm, relaxation and less nervousness at work


What matters more: Fitness or Fatness?

http://well.blogs.nytimes.com/2012/03/07/getting-fat-but-staying-fit/?scp=5&sq=exercise&st=cse

The exercise prescription: What’s the right dose of activity?

Physical activity recommendations: 4 types of activities

- CV fitness
- Balance
- Flexibility
- Strength

Physical activity recommendations: components of each activity

- **Frequency**
- **Intensity**
- **Time**
- **Type**

Estimating exercise intensity

<table>
<thead>
<tr>
<th>HR</th>
<th>Low</th>
<th>Moderate</th>
<th>Vigorous</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50% max</td>
<td>50-70% max</td>
<td>&gt;70% max</td>
<td></td>
</tr>
</tbody>
</table>

Talk test

- Can talk and sing
- Can talk but not sing
- Can only say a few words before a pause for breath

Borg rating of perceived exertion

<table>
<thead>
<tr>
<th>9 - very light (slow walk)</th>
<th>13 - somewhat hard</th>
<th>15 - hard (very heavy, tired)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 - light</td>
<td>17 - very hard</td>
<td>19 - extremely hard (max)</td>
</tr>
</tbody>
</table>

Exercise prescription: Combine activity with components

- **Frequency**
- **Intensity**
- **Time**
- **Type**

CV fitness recommendations

- Adults ages 18 and older
- Frequency: 5x/week
- Intensity: Moderate
- Time: 30 minutes
- Type: Major muscle groups

OR

- Frequency: 3x/week
- Intensity: Vigorous
- Time: 25 minutes
- Type: Major muscle groups

http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html

Balance recommendations

- Frequency: 2-3x/week
- Intensity: Unknown
- Time: 20 minutes
- Type: Tai Chi, tennis, yoga, surfing

Strength recommendations

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Intensity</th>
<th>Time</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3x/week</td>
<td>Novice: 40-50%</td>
<td>Unknown</td>
<td>All major muscle groups</td>
</tr>
<tr>
<td></td>
<td>Experienced: 80%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flexibility recommendations

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Intensity</th>
<th>Time</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3x/week</td>
<td>Stretch to feeling of tightness</td>
<td>Hold 10-30 seconds</td>
<td>All major muscle-tendon units</td>
</tr>
</tbody>
</table>

Case

- 55 y/o woman presents for routine annual exam. No complaints but shocked that she gained 10# since she saw you last year. Takes no medications.
- BP 140/80, HR 80, Height: 5’3”, weight 170# (BMI 30)
- Labs:
  - Fasting glucose 104
  - Total cholesterol 192, TG 110, HDL 50, LDL 118

What treatment would most benefit this patient now and in the long run?

Exercise

Case: Exercise Rx

- **F**: 3x/week
- **I**: moderate
- **T**: 15 minutes
- **T**: brisk walking

Motivation


http://i.telegraph.co.uk/multimedia/archive/02776/fitbit_2776647b.jpg
What makes a successful exercise program?

- Program characteristics
  - Moderate intensity
  - Supervised activity by experienced leader
  - Group support
  - Pedometers

- Individually tailored program
  - Goal-setting
  - Reinforcement: social support for behavioral change
  - Problem-solving

Should I Wear a Fitbit?

- What do they track?
  - Steps
  - Sleep
  - Inactivity (with alert)
  - Food, water, caffeine intake
  - Heart rate
  - Connect with smart phone apps

Can activity trackers change behavior?

- Fitbit, Jawbone, Nike products use behavioral change techniques associated with increased physical activity
  - Goal setting
  - Problem solving
  - Self-monitoring
  - Feedback on behavior
  - Prompts/cues
  - Rewards

Limitations of activity trackers using only an accelerometer

- Best for walking, running
- Not good for exercise that is more stationary
  - Yoga
  - Weight lifting or strength work
  - Cycling (though other measures can be used)
- Can be improved if using heart rate data as well
- Most useful for general day to day activity measurement compared to days prior
  - Weekends to weekdays

Do activity trackers improve health?


Physical activity apps

Feeling ready for action?
First check with your doctor

- Discuss
  - Heart problems
  - Arthritis
  - Joint replacement history
  - Diabetes
  - Osteoporosis

- May recommend pre-exercise testing or exercise modifications

Come visit us!
UCSF Sports Medicine
UCSF Orthopaedic Institute at Mission Bay

Appointments
415-353-2808

“All parts of the body if used in moderation and exercised in labors to which each is accustomed, become thereby healthy and well developed, and age slowly; but if unused and left idle, they become liable to disease, defective in growth, and age quickly.”
Hippocrates
Thank you

Carlin Senter, M.D.
Primary Care Sports Medicine
UCSF Medicine and Orthopaedics

CV fitness: 150 minutes/week

Strength*
- Major muscle groups
- 8-12 repetitions
- Intensity of 5-8 on a scale of 0-10
- *Modify if fracture history

Balance
- Daily x 15-20 minutes
- Tandem walk, walking heels or toes, Tai Chi


Osteoporosis exercise Rx:
Fall prevention


Osteoporosis exercise Rx:
Safe movement