THE FACTS AND FALLACIES OF PHYSICAL FITNESS, ACTIVITY AND HEALTH

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LEARNING OBJECTIVES

• Gain knowledge of the difference between physical activity and physical fitness and evidence-based methods versus popular practices intended to improve fitness levels.

• Learn and recognize the physiological basis of chronic disease prevention through cardiovascular fitness and muscular strength and endurance.

• Gain the skills to implement an exercise program designed to improve physical fitness.
A STATEMENT FROM AMERICAN HEART ASSOCIATION...

• “Health professionals should personally engage in an active lifestyle to familiarize themselves with the issues involved in maintaining lifelong physical activity and to set a positive example for patients and the public”.

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PHYSICAL ACTIVITY, EXERCISE, AND FITNESS... IS THERE A DIFFERENCE?

Myth: I’m active enough. My job requires me to be on my feet all day.
• Physical Activity
  "Any bodily movement produced by skeletal muscles that results in energy expenditure above resting (basal) levels."
  Physical activity broadly encompasses exercise, sport, and activities of daily living, occupation, leisure, and active transportation.

• Exercise
  "Physical activity that is planned, structured, and repetitive and [that] has, as a final or intermediate objective, the improvement or maintenance of physical fitness."
• **Physical Fitness**
  
  - a set of fundamental, measurable health and skill-related attributes:
    - cardiorespiratory function
    - muscular strength, endurance and flexibility
    - body composition
  
  - a set of advanced, measurable skill-related attributes:
    - balance, agility, reaction time and muscular power.
Physical Fitness\textsuperscript{3}

“When an individual’s fitness attributes meet or exceed specified thresholds, it is reflected in their ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy [leisure] pursuits and to meet unforeseen physical challenges and emergencies\textsuperscript{3}.”

See “ACSM’s Guidelines for Exercise Testing and Prescription” for normative fitness data and specified fitness thresholds.
IMPORTANCE OF PHYSICAL ACTIVITY WITHOUT INCREASING FITNESS

• Promotes an increase in daily energy expenditure
  • Contributes to healthy weight management
• Combats the negative health effects of sedentary behavior (sitting time).
  • Sitting time impairs the body’s ability to deposit fat from the blood stream into fat cells and impairs the HDL cholesterol function.
• FACT: “there is a strong relationship between sitting and all cause mortality, even if people are meeting the minimum physical activity guidelines.”
ACSM- GENERAL RECOMMENDATIONS

• “The scientific evidence demonstrating the beneficial effects of exercise is indisputable, and the benefits of exercise far outweigh the risks in most adults.”

• FACT: “A program of regular exercise that includes cardiorespiratory, resistance, flexibility, and neuromotor exercise training beyond activities of daily living to improve and maintain physical fitness and health is essential for most adults.”
THE LAWS OF FITNESS TRAINING

Myth: No pain, No gain
• **Overload**
  - forcing a physiological system, a muscle or a group of muscles to perform against an applied workload that is greater than routinely encountered
    - FACT: the overload must not exceed the stress threshold of the tissues.

• **Adaptation**
  - the gradual change in function by a physiological system, a muscle or group of muscles in response to applied workloads.
THE LAWS OF FITNESS TRAINING

Myth: When it comes to exercise, more is *always* better
• **Recovery**
  - the time allowed for trained systems to partially recover between successive bouts of exercise or physiologically adapt between training sessions.
  - FACT: fitness gains are achieved during rest intervals between training sessions, *NOT during your exercise session*

• **Progression**
  - periodic adjustments to the workload resulting in higher levels of fitness and function
• **SAID** principle of training\(^4\)- **Specific Adaptation to Imposed Demands**
  
  • A.k.a- **Specificity of training**- A physiological system adapts only to those stressors to which it is directly exposed. Specificity applies to:
    
    • Intensity, training modality, speed of muscular contraction and joint angle

• **The bottom line**: You get what you train for!
Adaptations that Prevent Disease
CARDIORESPIRATORY FITNESS (CRF) TRAINING ADAPTATIONS

The following beneficial changes have been reported in middle-aged and older persons exercising within the volumes and quality of exercise recommended (by the ACSM guidelines), even during weight regain³

- Improves HDL function, resting and exercise BP, cardiac output and avO₂ dif⁢³
- Uses up by-products of the stress response⁵,⁶
  - Promotes glucose and lipid utilization⁢³
  - Counters insulin resistance⁢³
  - Decreases systemic inflammatory markers⁢³
CRF TRAINING ADAPTATIONS

• “The benefits of (cardiorespiratory) exercise on cardiometabolic risk factors are acute (lasting hours to days) and chronic, highlighting the value of regular exercise participation on most days of the week.” ³
MUSCULAR STRENGTH AND ENDURANCE TRAINING ADAPTATIONS

- Lowers all-cause mortality risk
- Significantly improves cardiometabolic risk factor profile
  - Decreases RBP and blood glucose levels
  - Increases HDL concentration and insulin sensitivity
  - Increases BMR and Kcal expenditure at rest
  - Fewer CVD events
- Significantly lower risk for musculoskeletal injury and development of functional limitations
MUSCULAR STRENGTH AND ENDURANCE TRAINING ADAPTATIONS\textsuperscript{3,6}

- increases bone mass (bone mineral density and content) and bone strength of the specific bones stressed
- may prevent and improve depression and anxiety, increase "energy" levels, and decrease fatigue
- Stress management
  - Reduces Muscular Tension by utilizing energy stores and returning muscles to normal resting state
  - encourages more restful sleep
MUSCULAR FLEXIBILITY

Myth: Stretching before exercise helps prevent injuries.
MUSCULAR FLEXIBILITY

• Chronic increases in joint ROM incurred through flexibility training enhances postural stability and balance when accompanied by resistance training\(^3\)

• FACT: Increased flexibility has not been proven to reduce risk for injuries\(^3\)
Myth: I’ll just walk an extra 10 minutes to make up for eating that big mac.
Total Calories = 1372 calories
FACT: WE ARE PROGRAMMED TO CONSERVE ENERGY

- “Efforts to achieve weight loss through physical activity alone generally produce an average of a 2-3% decrease in BW or BMI.”

- So, to burn off your “value” meal...
  - A 150 lb. person, walking at an average speed of 3.5 miles/hr, would burn approximately 280 total calories in one hour.
    - You would have to walk for approximately 5 hours straight (or nearly 18 miles) to burn off this meal!
  - Even if you decided to run at a vigorous pace (5mph), you would still need run for 2 ½ hours to burn off the calories in this meal.
IF YOU DON’T LOSE WEIGHT, WHY DO CRF TRAINING?

• Counters decreases in RMR\textsuperscript{8} associated with:
  • \textbf{Age}- helps maintain current weight
  • \textbf{weight loss}- helps prevent weight regain after weight loss

• Improves QOL\textsuperscript{8}
  • improves mood, self-esteem, and physical function in activities of daily living.

• Prevents the comorbidities associated with obesity even without weight loss\textsuperscript{9}
MUSCULAR STRENGTH AND ENDURANCE

Myth: Lifting weights makes you gain weight cause muscle weighs more than fat
RESISTANCE TRAINING FOR WEIGHT LOSS MAINTENANCE

• FACT: “There is evidence that RT promotes gain or maintenance of lean mass and loss of body fat during energy restriction.”
  • Counters decreases in RMR associated with weight loss.
DESIGNING AN EXERCISE PROGRAM

Evidence-based methods for improving physical fitness
FITNESS TRAINING PRESCRIPTION

• Use the FITT Principle⁴:
  • **Frequency**: how many times per week
  • **Intensity**: imposed demand or overload
    • CRF training = % of THR OR % of VO₂max
    • Muscular strength or endurance = % 1RM
  • **Time**: length of each exercise session
    • CRF training = time/distance
    • Muscular strength or endurance = # of reps/sets
  • **Type**: specific modality for desired outcome
    • CRF fitness: activities that require repetitive movements of large muscle groups
    • Muscular flexibility, strength and endurance: exercises that target major muscle groups
THE RELATIONSHIP BETWEEN INTENSITY AND TIME

Intensity

90% HRM/1RM
85% HRM/1RM
80% HRM/1RM
75% HRM/1RM
70% HRM/1RM
65% HRM/1RM
60% HRM/1RM
55% HRM/1RM

Time

10m/3-5 Reps
15m/3-5 Reps
20m/6-10 Reps
25m/6-10 Reps
30m/8-12 Reps
35m/8-12 Reps
40m/8-12 Reps
45m/10-15 Reps
**MEASURING CRF TRAINING INTENSITY**

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Relative Intensity</th>
<th>Absolute Intensity in Healthy Adults (Age), METs</th>
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<tbody>
<tr>
<td></td>
<td>( \dot{V}_{O_2} ) max, %</td>
<td>Maximum Heart Rate, %</td>
</tr>
<tr>
<td>Very light</td>
<td>&lt;20</td>
<td>&lt;35</td>
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<tr>
<td>Light</td>
<td>20–39</td>
<td>35–54</td>
</tr>
<tr>
<td>Moderate</td>
<td>40–59</td>
<td>55–69</td>
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<tr>
<td>Hard</td>
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<td>70–89</td>
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<tr>
<td>Very hard</td>
<td>≥85</td>
<td>≥90</td>
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<tr>
<td>Maximum‡</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
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*Based on 8 to 12 repetitions for persons <50–60 years old and 10 to 15 repetitions for persons aged ≥50–60 years.†Borg rating of Relative Perceived Exertion (RPE), 6–20 scale.
MEASURING CRF TRAINING INTENSITY\textsuperscript{1}

- Rate of perceived exertion (RPE): “The subjective rating of the intensity of exertion perceived by the person exercising.”\textsuperscript{1}
- Moderate Intensity =
  - You are breathing harder than normal
    - If you can sing a song, you’re not working hard enough
    - If you can’t speak at least a couple of words between deep breaths, then you are working TOO HARD!
  - You body feels warmer than normal
    - You may even be sweating
CRF TRAINING

• **Adults (aged 18–64)**
  
  • Frequency, Intensity and Time:
    • Moderate intensity = 2 hours and 30 min/wk
    • Vigorous intensity = 1 hour and 15 min/wk
    • Combination of the 2
  
  • Frequency and Time:
    • Aerobic activity should be performed in episodes of at least 10 minutes, preferably spread throughout the week.
  
  • Type: PA using major muscle groups (walking, biking, etc.)
# CRT PROGRESSION: WALKING PROGRAM

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<td>Intensity: Mod.</td>
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<td>4</td>
<td>Intensity: Mod.</td>
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MUSCULAR STRENGTH TRAINING

- **Frequency**: 2 days/wk. is sufficient
- **Intensity**:
  - Sedentary persons beginning a resistance training program: 40%–50% of 1RM/10-15 repetitions
  - Active novice to intermediate exercisers: 60%–70% of 1RM/8–12 repetitions
- **Time**: 1 set of each exercise = health benefits, 2 or more is even better
- **Type**: a variety of resistance exercises that match your skill level involving each major muscle group.
# RT PROGRESSION: CHEST PRESS

|------|------|-------|------|--------|------|------|------|
| 2    | Intensity: 50lbs  
Time: 1 set/10 reps | Intensity: 50lbs  
Time: 1 set/10 reps | Intensity: 50lbs  
Time: 1 set/10 reps | Intensity: 50lbs  
Time: 1 set/10 reps | same | same | same |
| 3    | same | same  | same | same   | same | same | same |
| 4    | Intensity: **55lbs**  
Time: 1 set/10 reps | Intensity: **55lbs**  
Time: 1 set/10 reps | Intensity: **55lbs**  
Time: 1 set/10 reps | Intensity: **55lbs**  
Time: 1 set/10 reps | same | same | same |
MUSCULAR FLEXIBILITY TRAINING

- **Frequency-**
  - \( \geq 2-3 \text{ days/wk.} \) is effective in improving joint range of motion, with the greatest gains occurring with daily exercise.

- **Intensity-**
  - Stretch to the point of feeling tightness or slight discomfort.

- **Time-**
  - Holding a static stretch for 10–30s is recommended for most adults.

- **Type-**
  - A series of flexibility exercises for each of the major muscle–tendon units is recommended.
THANK YOU FOR YOUR TIME AND ATTENTION

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REFERENCES


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