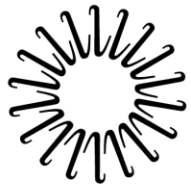
Benefits of Exercise

The Reality of How Much Is Enough



Lifespan Cardiovascular Institute

Rhode Island Hospital • The Miriam Hospital
Newport Hospital

Delivering health with care.®

Center for Cardiac Fitness

Pulmonary Rehab Program

The Miriam Hospital

Physiological Effects of Lung Disease

- Oxidative Stress = Cumulative damage to cells and tissue resulting in an inflammatory process
  - See in many chronic diseases: Lung, heart, Parkinson's, Cancer, Alzheimer's
  - Smoking is a big culprit in starting the process
  - Exercise and antioxidant rich foods combat the process

Physiological Effects of Lung Disease

LUNGS

- Damage to lung tissue
- Decrease elasticity to lungs
- Increase dead air space
- Increase size of mucous glands and goblet cells, ie, increase sputum
- Enlargement of alveoli, ie, decreases air exchange
- Oxidative stress results in scarring and remodeling of airways, decreasing size of airways

Physiological Effects of Lung Disease

Heart

- Increased HR and BP = increased oxygen demand
- Oxidative Stress
  - damage to endothelial lining of arteries, ie, promotes plaque build up
  - Promotes changes to the skeletal muscle cell increasing risk of diabetes, which increases risk of heart disease
- Right sided heart stress from increased pulmonary artery pressures = prone to arrhythmia's

Physiological Effects of Lung Disease

MUSCULOSKELETAL SYSTEM

- Osteoporosis
- Oxidative Stress = Decrease in the number of mitochondria
  - Mitochondria = cellular respiration, therefore, oxygen is needed to produce energy for the muscles to contract
  - Mitochondrial changes also increase insulin resistance, ie, increased blood sugar leading to diabetes
- Decrease in muscle mass (even if weight is ideal or above)
  - Muscle atrophy
  - Muscle weakness

Continuum of Misinformation

Only vigorous activity promotes health

Light, daily activities are enough

<u>The correct amount of activity and exercise is not based on your disease process but by your individual needs and goals</u>

Defining Exercise & Physical Activity

- **Physical Activity: Bodily movement produced by skeletal muscles that expend energy above resting state**

- **Exercise: Subset of physical activity**
  - Planned, structured, repetitive, and purposeful. Heart rate increases for a period of time

- **Physical Fitness: Combination of cardiovascular fitness, muscle strength, flexibility, and body composition**

GENERAL EXERCISE GUIDELINES

- INTENSITY = Oxygen >= 90% and RPD 4-6 (ie, workloads may vary day to day).

- Health Promotion (4-5x/wk, accumulating 30-40 min)
  - 150 min/wk OR
  - 750 – 1000 cals/wk OR
  - 8000-10000 steps per day

- Weight Management and Physical Fitness (5-6 x/wk, accumulating 45-60 min)
  - >250 min/wk OR
  - >2000 cals/wk OR
  - >12,000 steps/day

Health Promotion Benefits

- CARDIORESPIRATORY SYSTEM
  - Decrease ventilation rate which results in decreased dead space
  - Training effect – decreased HR and BP (less oxygen demand)
  - Increased blood vessel function (more oxygen being pulled from bloodstream into working muscle
  - Improves cholesterol
  - Decrease in arrhythmias
  - Improved heart pumping action = improved movement of oxygen rich blood

Health Promotion Benefits

- MUSCULOSKELETAL SYSTEM
  - Increased strength and endurance
  - Increased number and function of mitochondria = improved ability to use oxygen at the cellular level and convert it to energy to contract muscles.
  - Decrease in insulin resistance (even in non diabetics)
- OTHER
  - Decreased hospital admission rates
  - Improved immune function
  - Improved balance
  - Decrease in anxiety/depression

BENEFITS FROM HIGHER VOLUME OF EXERCISE

- Increased bone density
- Weight management
- Physical fitness

BENEFITS FROM LOWER VOLUME OF EXERCISE (<3days)

- Increased self esteem
- Improved sleep
- Increased quality of life
- Improved ability to perform ADLs
- Desensitization to dyspnea

Cardiorespiratory Exercise Benefits

Worthy of note…..

- **Pulmonary**
  - **Prognosis improves when muscle mass is increased via nutrition and exercise**
  - **Strength training by itself will improve QOL regardless of endurance**
  - **Decreased exercise capacity has weak relation to lung function and medications that increase lung function do not have an effect on exercise capacity.**

Cardiorespiratory Exercise Benefits

Worthy of note…..

- **Cardiac**
  - **CAD rates of exercisers are half sedentary, independent of other risk factors**

- **Diabetes**
  - **The 1% decrease in A1C with exercise is associated with a decrease in macro & microvascular complications similar to what is produced with medication**

- **Blood pressure**
  - **Decreases in BP are not related to duration or frequency, ie, any extra movement can be good for blood pressure**

Cardiorespiratory Exercise Benefits

Worthy of note…..

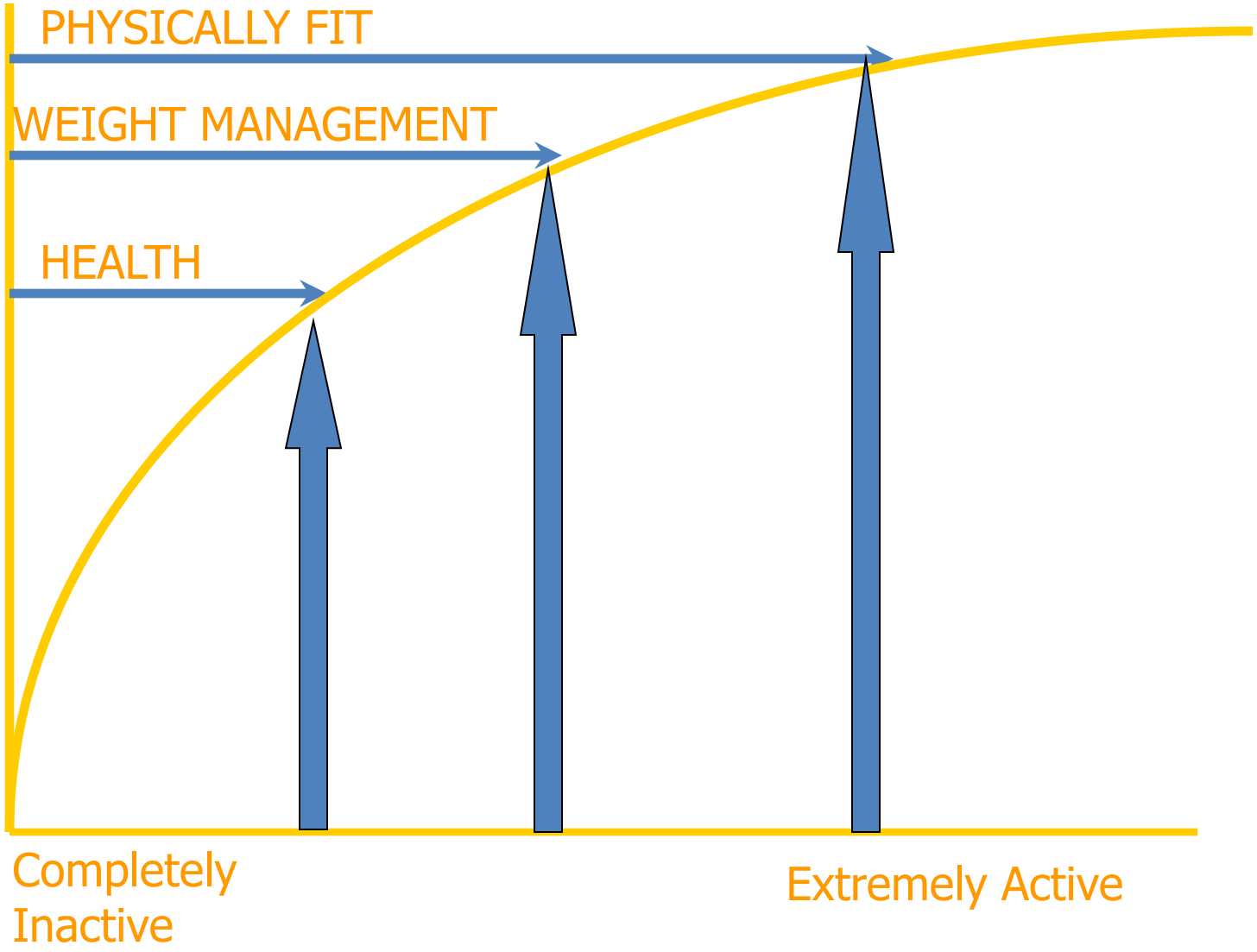
- **Weight Control**
  - **National Weight Control Registry has found that most weight loss maintainers expended between 2,445 – 3,298 calories per week**
    - **Equates to 60-90 minutes per day but…. Can be cumulative**
  - **Schoeller et al, found 80 min/day of moderate OR 35 min / day of vigorous exercise most days of the week can elicit weight loss**
  - **A weight loss of as little as 2-3% has shown to a more pronounced improvement in LDL, HDL and triglycerides**
  - **Exercise at <150 min per week has showed no change in weight**

"Appropriate Physical Activity Intervention Strategies for Weight Loss and Prevention of Weight Regain for Adults"; MSSE. 2009; 459-471

"Physical Activity and Public Health;" Circulation. 2007;1161081-1093

Steps To Achieving Your Exercise Goals

1. Assess how active you currently are and what you would like to accomplish



2. Use guidelines to determine how much exercise you need

3. Be Realistic!

4. Evaluate your day… where are you pockets of time?

5. Monitor

- **Calories**
  - **Most equipment will track your calories**
  - **You can use a website that will estimate calories burned for an activity, e.g,**

www.prohealth.com/weightloss/tools/exercise/calculators_2.cfm

  - ***Remember*** **~1000 calories / week for health**

    >2000 calories / week for weight loss

5. Monitor continued

- **Minutes**
  - **Track the amount of time you are doing moderate exercise**
    - **In general moderate = >3 mph walking, 75 watts on bike or <10mph, Water aerobics, line dancing, singles badminton, swimming**
    - **Newest research: 3000 steps in 30 minutes**
  - ***Remember*** **>150 minutes / week for health**
    > 250 / week for weight loss

5. Monitor continued

- **Steps: (10, 000 steps/day??)**
  - **Using a pedometer**
    - **Has shown increases of 2000-4000 steps per day *(over baseline)* = extra 20-40 minutes of activity**
    - **Results in 2-3 % weight loss in one year**
    - **In all studies pedometer monitoring increased physical activity from baseline**
    - **Studies with 10000 steps as the intervention show the greatest improvement**

"Pedometer Based Walking Interventions and Weight Loss." Annals of Family Medicine. 2008: 6(1)

"Effects of Pedometer-Based Physical Activity Interventions: A Meta Analysis;" RQES; 2009; 80(3); 648-655

6. Track

- **Write it down**

7. Assess Barriers

- **Look at your past exercise attempts – why did you stop?**
  - **e.g. Time, physical limitations, lack of enjoyment, weather, kids, expense, etc**

Remember…..

- One “pill” doesn’t always work
- What worked for your friend may not work for you
  - Cardiovascular exercise
  - Resistance training
  - Core training (ball, pilates, etc)
  - Circuit training