



**Orange County  
Fire Authority**

# **Orange County Fire Authority WEFIT Program**

**Academy 33  
Health and Wellness  
Lecture**



# Definitions

- Health: physical and mental condition; freedom from disease or abnormality
- Fitness: health or physical condition, as the result of exercise and proper nutrition
- Wellness: soundness of body and mind; overall physical and mental health maintained by proper diet, exercise and lifestyle habits



# Physiological Benefits of Exercise

- Improves and strengthens the cardiorespiratory system
- Increases and maintains muscle tone, strength and endurance
- Improves flexibility
- Helps maintain recommended body composition
- Improves functioning of the immune system
- Decreases mortality rate from chronic diseases
- Improves sleep quality
- Helps prevent lower back pain
- Improves physical stamina and energy level



# Psychological Benefits of Exercise

- Improves mental alertness, perception and information processing
- Improves self-esteem and increases sense of self-reliance and self-confidence
- Reduces feelings of stress and tension
- Helps reduce anxiety
- Often has anti-depressive effects



# Proper Nutrition

- Provides nutrients
  - Crucial for maintaining healthy cells in the body
  - Essential for building and maintaining enzymes, tissues and muscles
- Provides energy
  - Supplies energy to working muscles during exercise
  - Provides mental energy (fuel to the brain)
- Provides protection
  - Protects against heart disease, hypertension, arthritis and other degenerative diseases, and certain types of cancer



# Carbohydrates

- Carbohydrates are the body's primary source of fuel
  - Vital for energy production
  - Especially important in exercise metabolism
- Two types of carbohydrates
  - Simple
  - Complex
- Glucose vs. Glycogen
  - Glucose: transport form
  - Glycogen: storage form
- A performance diet should consist of 55 – 65% carbohydrates





# What does this mean to me?

- Not eating enough carbohydrates could result in
  - Hypoglycemia
  - Muscle fatigue
  - Impaired performance
  - Impaired recovery
  - Impaired mood state
  - Inability to think clearly
- Aim for 5 -7 g carbohydrate/kg/day





# Proteins

- Proteins are vital to the growth, maintenance and repair of tissues, cells and major components of muscle
  - Composed of smaller units called amino acids
  - Two types of amino acids
    - 9 essential
    - 11 non-essential
  - Two types of proteins
    - Complete
    - Incomplete
  - Approximately 10 – 15% of your daily caloric intake





# How much protein do I really need?

- Active adults: 0.8 g/kg/day
- Endurance athletes: 1.2 – 1.4 g/kg/day
- Resistance-trained athletes: 1.6 – 1.7 g/kg/day

0.8 g of protein/kg of healthy body weight

154 lb. = 70 kg

2.2 kg/lb

70 kg x 0.8 g protein = 56 g high-quality protein/day



# Is a high-protein diet harmful?

- A high protein diet:
  - Is usually low in plant foods (fiber) and vitamins
  - Increases risk for heart disease because of increased intake of saturated fat found in animal protein
  - Increases risk of colon cancer due to excessive intake of red meat
  - Increases risk of dehydration
  - Places excessive burden on the kidneys
  - Increases calcium loss
  - Can result in decreased energy
  - Can result in difficulty concentrating



# Fats

- Fat is a stored energy source
  - Helps meet daily energy demands
  - Provides energy when other sources are not available

- Good fat vs. bad fat
  - Which is which?
    - Saturated fats
    - Monounsaturated fats
    - Polyunsaturated fats



- A low fat diet – not a zero fat diet – is recommended
- Approximately 20 – 35% of your daily caloric intake



# What about calories?

- How much should I eat?
- How should I change my diet if I am trying to lose weight/gain weight?
  - Weight loss: decrease daily caloric intake to accumulate approximately 3,500 calories a week. Healthy weight loss is about 1 – 2 lbs per week
  - Weight gain: increase daily caloric intake to accumulate approximately 2,500 calories a week. Healthy weight gain is about .5 – 1 lb per week (lean body weight)



# Nutritional Guidelines

- Eat a variety of foods
- Include plenty of wholesome foods, vegetables and fruits
- Choose a diet low in fat
- Choose a diet moderate in sugars
- Avoid processed foods
- Limit the high calorie/low nutrient foods you eat





# Water and Fluids

- Hydration is critical for optimal performance
- Benefits of proper hydration
  - Assists in removal of waste products
  - Regulates temperature
  - Lubricates joints
  - Stabilizes plasma volume
- Monitor your urine color
  - Clear or the color of light lemonade = good
  - Dark or mustard colored = bad





# Hydration

- Signs of dehydration

- Fatigue
- Muscle soreness
- Muscle cramps
- Increased resting heart rate
- Strong smelling or dark urine
- Loss of appetite



- Recommended fluid Intake

- 1-2 hours prior to exercise: 16 ounces
- Every 15 minutes during exercise: 4-6 ounces
- Immediately after exercise: 16 ounces per pound lost



# Hydration (cont.)

- Drink before you get thirsty!
- When exercising  $< 60$  minutes, water is sufficient
- When exercising  $> 60$  minutes, it is important to consume carbohydrates to help the body replace fluids lost in sweat and to replenish muscle glycogen stores



# Exercise

- **Physical activity**
  - Exercise
    - Type of PA, planned, structured, and repetitive to improve or maintain physical fitness.
- **Components of fitness**
  - Cardiorespiratory fitness
    - Ability to perform large muscle, dynamic, moderate-to-high intensity exercise for prolonged period of time.
  - Muscular strength
    - Ability of the muscle to produce force.
  - Muscular endurance
    - Ability of the muscle to produce force over a prolonged period of time.
  - Flexibility
    - The range of motion that you can achieve at any joint through any particular movement
  - Body composition
    - The relative percentage of body weight that is fat and fat-free tissue.



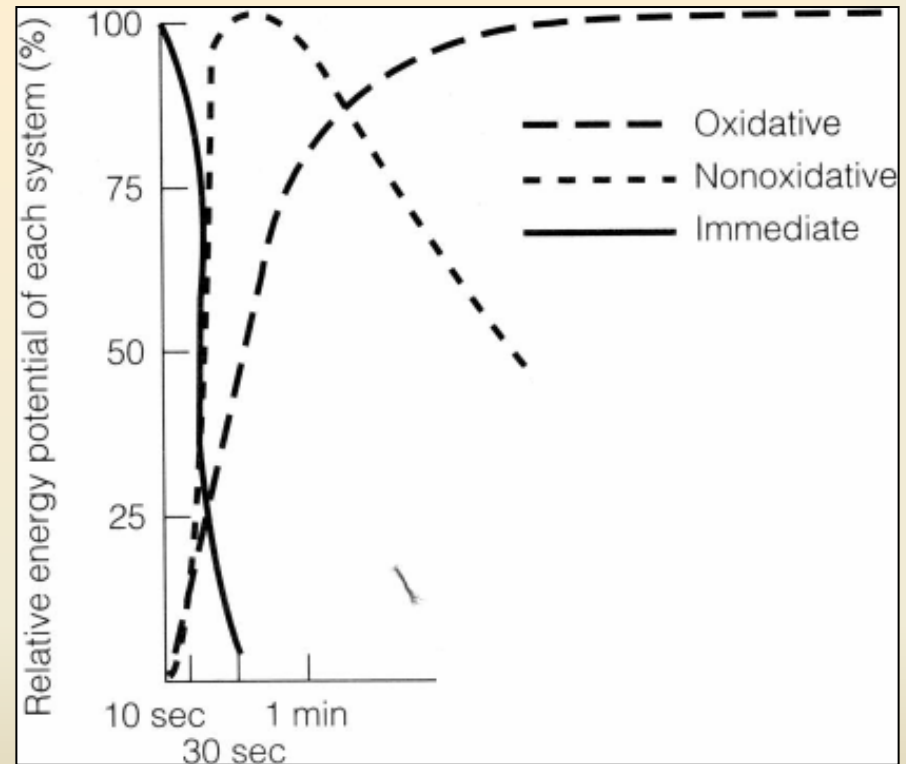
# Exercise Principles

- **Overload**
  - A greater than normal stress or load on the body is required for training adaptation to take place
- **Progression**
  - Implies that there is an optimal level of overload that should be achieved, and an optimal timeframe for this overload to occur
- **Specificity**
  - States that training must go from highly general training to highly specific training
  - Implies that to become better at a particular exercise or skill, you must perform that exercise or skill
- **FIT Principle**
  - Frequency, Intensity, Time
- **Use/Disuse**
  - “Adaptations to training”
  - Don’t use it...You lose it!



# Energy Systems

- 3 sources of energy
  - Immediate (ATP,PC)
  - Non-oxidative (Glycolysis)
  - Oxidative





# Types of workouts

- Functional training
  - A continuum of exercises that teach athletes to handle their own body weight in all planes of movement
  - Emphasis is on developing the movement & balance. Not strength! (pushing, pulling, twisting, squat, lunge)
- Core training
  - Refers to the progressive training of the musculature of the lumbo-pelvic-hip complex (mid section)
  - Mid-section allows you to transfer movement and power from the lower body to the upper body and vice versa
- Interval training
  - A training session that involves repeated bouts of high-intensity exercise, separated by bouts of low-intensity. Depending of the length of the high and low-intense periods, it may be anaerobic or aerobic training.
- Circuit training
  - A training session that takes an athlete through a series of exercise stations, with relatively rest intervals between each station



# Heart Rate Training

- **Benefits of heart rate training:**
  - Helps you to find the right pace and to train at the right intensity
  - Instant feedback provided motivation
  - Help you monitor exercise activities to be:
    - More effective and time efficient
    - Safer
    - Enjoyable
- **The four training zones**

– Very light or daily activity	50–60%
– Exercise for health	60-70%
– “Aerobic” training	70-85%
– “Anaerobic” training	85-100%



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# Maximum Heart Rate

Before we can begin training in these zones, we must know what our Maximum Heart Rate (MHR) is.

$$\text{MHR} = 220 - \text{age (in years)}$$

Example: 35 years old

$$\text{MHR} = 220 - 35$$

$$\text{MHR} = 185$$

## Training Zones for the above individual

Zone 1 50-60% (185 x .5/.6) = 93 – 111 bpm

Zone 2 60-70% (185 x .6/.7) = 111 – 130 bpm

Zone 3 70-85% (185 x .7/.85) = 130 – 157 bpm

Zone 4 85-100% (185 x .85/1.0) = 157 – 185 bpm



# Heart Rate Training (cont.)

Karvonen's Formula or Training Heart Rate Reserve (THRR)

More accurate; takes your Resting Heart Rate (RHR) into account

$$\text{THRR} = [(\text{MHR} - \text{RHR}) \times \% \text{ of exercise intensity}] + \text{RHR}$$

Per the previous example of the 35 y/o

$$\text{THRR} = [(185 - 38) \times .70] + 38$$

$$\text{THRR} = [147 \times .70] + 38$$

$$\text{THRR} = 103 + 38$$

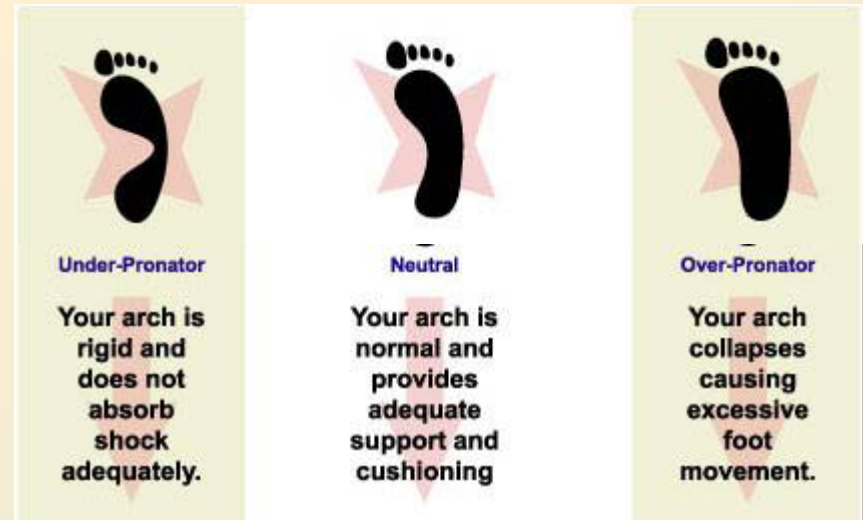
THRR = 141 (increase of 11 bpm for that training zone)

	<u>Previous</u>	<u>New</u>
Zone 1:	93 – 111 bpm	111 – 126 bpm
Zone 2	111 – 130 bpm	126 – 141 bpm
Zone 3:	130 – 157 bpm	141 – 163 bpm
Zone 4:	157 – 185 bpm	163 – 185 bpm



# Running Shoes

- **Determine:**
  - Foot type
  - Biomechanical tendencies
  - Body type
- **Tips for buying running shoes**
  - Shop for a “running shoe” at a “specialty store.”
  - Be prepared to take your shoes with you
  - Fit comes first
  - Test run
  - Try on at least 6-8 pairs
  - Don’t fall for gimmicks



- **American Academy of Podiatric Sports Medicine**  
<http://www.aapsm.org/runshoe.html>
- **Road Runner Sports**  
[www.roadrunnersports.com](http://www.roadrunnersports.com)
- **Snails Pace**  
[www.runasnailspace.com](http://www.runasnailspace.com)



# Putting it all together

- What does this mean to me as a firefighter?
  - At the station and on the fireground, you will be constantly
    - working within all of the training zones
    - utilizing all the energy systems
- It is important to regularly train in these zones and properly train all the energy systems to prepare your body for the job demands of a firefighter



# OCFA Physical Training

- 14 weeks
  - Train all energy systems
  - Train in each Training Zone
- PT Program
  - Movement Prep (Warm up)
  - Strength Exercises
  - Interval Workouts
  - Circuit Workouts
  - Functional Movements



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# Summary

- Eat a well-balanced diet
- Stay hydrated
- Get plenty of sleep
- Train hard
- Have fun
- Complete the Academy successfully and injury free