WARRIOR ATHLETE

READINESS & RESILIENCE

TRAINING FOR PERFORMANCE

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OVERVIEW

- 5 Components of Fitness
- F.I.T.T Principle
- Fitness Principles
- Periodization

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WHAT IS PHYSICAL FITNESS?

"Fitness is an essential component of Marine Corps Combat readiness."

-MCO P6100.13

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5 COMPONENTS OF FITNESS

- Body Composition
- Cardiovascular Fitness
  - Aerobic
  - Anaerobic
- Muscular Strength
- Muscular Endurance
- Flexibility

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BODY COMPOSITION

WHAT IS IT?

The ratio of lean body mass (structural and functional elements in cells, body water, muscle, bone, heart, liver, kidneys, etc.) to body fat (essential and storage) mass.

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BODY COMPOSITION

Increased Body Composition or "obesity" puts a person at risk for:

- Heart Disease
- Diabetes
- Hypertension
- High Cholesterol
- Some Cancers

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CARDIORESPIRATORY FITNESS

CARDIORESPIRATORY

- “CARDIO” = HEART
- “RESPIRATORY” = PROCESS OF OBTAINING O_2 AND EXPELLING CO_2 AND OTHER WASTE

THE EFFICIENCY IN WHICH THE HEART AND LUNGS CAN PROVIDE ADEQUATE AMOUNTS OF OXYGEN TO THE WORKING MUSCLES OVER LONG PERIODS OF TIME.

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CARDIORESPIRATORY FITNESS:

AEROBIC

WHAT IS IT?

- STEADY-STATE DISTANCE TRAINING OF LONG DURATION AND LOWER INTENSITY EXERCISE

- TARGET HR~70%-80% HR_{MAX}

- RUNNING, SWIMMING, CYCLING, ROWING, SKIING, ETC.

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CARDIORESPIRATORY FITNESS:

AEROBIC

- Benefits of Aerobic Conditioning
  - Increases cardiorespiratory endurance
  - Increased strength of muscles (slow-twitch) and connective tissue
  - Increased blood volume and stroke volume
  - Larger capacity for storage of muscle glycogen
  - Increases capillary development and increases mitochondria
  - Decreases resting heart rate
  - Improves temperature regulation
  - Decreases body fat

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CARDIORESPIRATORY FITNESS:

ANAEROBIC

- What is it?

  - High-intensity, intermittent bouts of exercise

  - Target HR~80%-90% Hr_{max}

  - Includes weight training, plyometrics, interval training, speed and agility training.

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CARDIORESPIRATORY FITNESS:

ANAEROBIC

- Benefits of anaerobic exercise:
  - Increases muscular strength
  - Increases power
  - Improves local muscular endurance
  - Decreases body fat
  - Helps improve flexibility
  - Increases aerobic capacity
  - Improves motor performance

ENERGY SYSTEMS

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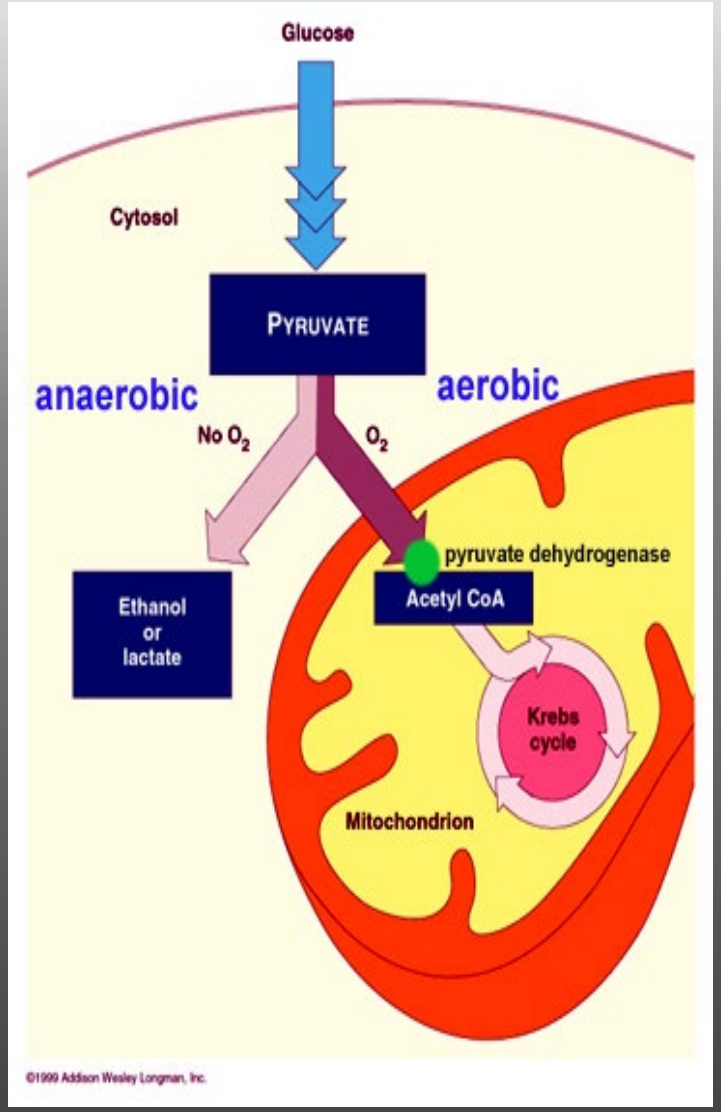
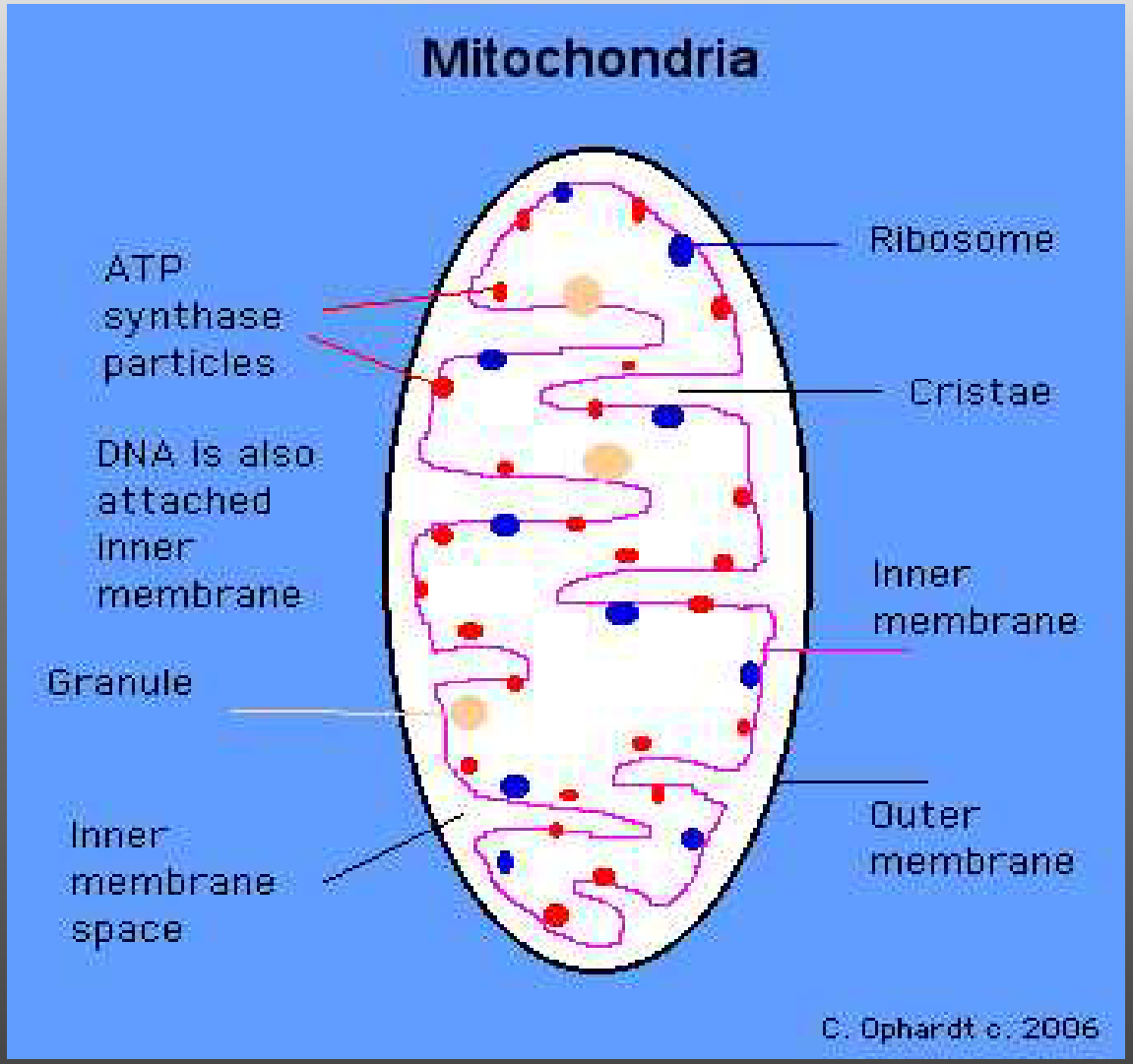
- **ATP-PCr System**
  - •Anaerobic system
  - •0-10 seconds
- **Glycolytic System**
  - •Anaerobic system
  - •Activity up to 2 minutes
- **Oxidative System**
  - •Aerobic System
  - •Activity lasting more than 2 minutes



ENERGY SYSTEMS



- Mitochondria are the energy factories of the cells

- They contain the enzymes required for the citric-acid cycle, ATP synthesis, and the oxidation of fatty acids

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ATP-PCR SYSTEM

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- Fuel used is stored ATP (1-3sec) and stored PCr (3-5sec)
- Muscle stores little of both
- Used in high intensity short duration activities less than 10 seconds
- Shot putt, vertical jump, first few seconds of a sprint

GLYCOLYTIC SYSTEM

- Fuels used is glycogen (muscle glucose store). Process is called glycolysis.
- Muscle glycogen - 2 lactic acid+3ATP
- Lactic acid is a by product and causes fatigue
- High intensity short duration maximal activities up to 2 minutes
- 400-meter run

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OXIDATIVE SYSTEM

- Fuels used are fatty acids, blood glucose and muscle glycogen
- Depletion of muscle glycogen will cause fatigue
- Long duration less intense activities longer than 2 minutes
- Sub max running and cycling

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TESTING & ENERGY SYSTEMS

- **PFT**
  - 3 mile run — Oxidative System-Cardiovascular
  - Crunches — Glycolytic System
  - Pull-Ups/Flexed Arm — Glycolytic System
- **CFT**
  - 880 run — Glycolytic System-Speed
  - Ammo Lift — Glycolytic System-Power
  - Man Under Fire — ATP-PCr & Glycolytic
    - Agility, Speed, Power, Strength

MUSCULAR FITNESS:

STRENGTH & ENDURANCE

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MUSCULAR FITNESS

Muscular Strength

- Maximal force that can be generated by a muscle group (1 rm)

Muscular Endurance

- Ability of a muscle group to execute repeated contractions or isometric contraction for time

Muscular strength and endurance is determined by amount of Type I,IIa, IIb muscle fibers

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MUSCLE FIBER TYPES

- **Slow Twitch (Type I)**
  - Efficient, fatigue resistant, high capacity for aerobic energy supply
  - Limited potential for rapid force development
- **Fast Twitch (Type II)**
  - Type II a / Type II b
    - High in anaerobic power and rapid force development
    - Aerobically inefficient and fatigable

FLEXIBILITY

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What is it?

- Flexibility is a measure of ROM (range of motion)
- Factors affecting flexibility
  - Joint structure
  - Age and sex
  - Connective tissue
  - Resistance training with limited ROM
  - Muscle bulk
  - Activity level

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F.I.T.T. PRINCIPLES

THE F.I.T.T. PRINCIPLES

- Frequency (how often)
- Intensity (how hard)
- Time (duration)
- Type (method)

- *Progression (the next step in improvement)*

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THE F.I.T.T. PRINCIPLES:

CARDIO

- **Frequency**
  - Improvement – 4-5 aerobic workouts/week
  - Maintaining – 3 aerobic workouts/week
- **Intensity**
  - 60-80% Max Heart Rate
- **Time**
  - 20-60 minutes, or longer
- **Type**
  - Skiing, Jogging, Biking, Swimming, Running

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THE F.I.T.T. PRINCIPLES:

STRENGTH TRAINING

- **Frequency**
  - 3 x week - for most gains
  - 2 x week - offers 90% of benefits of 3 x week

Intensity	**Rest Times**
Basic fitness/Hypertrophy	
8-12 reps	30sec-2min
Endurance	
12-15 reps, light weight	>30sec
Strength	
3-6 reps, heavy weight	2-3 min
Power	
1-3 reps	2-3 min

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THE F.I.T.T. PRINCIPLES:
FLEXIBILITY TRAINING

- **Frequency**
  - Minimum of 2-3 days per week
- **Intensity**
  - To a position of mild discomfort
- **Duration**
  - Hold for 20-30 seconds. Longer if needed.
- **Progression**
  - To achieve a full functional range of motion in all major muscle groups

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THE F.I.T.T. PRINCIPLES: PROGRAM PROGRESSION

Rules of Progression

1. Frequency
2. Time / Type
3. Intensity

- Only progress one F.I.T.T. principle at one time

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CONDITIONING PRINCIPLES

- Specificity
- Overload
- Progression
- Individuality
- Recovery
- Principle of Reversiblity

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SPECIFICITY

- **Specific to the exercise done and the muscles involved**

  - The training program must be relevant to the demands of the event for which the athlete is being trained

  - Includes training the energy systems and movement patterns

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OVERLOAD

- Increasing the resistance to movement, or the frequency or duration of activity, to levels above those normally experienced

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PROGRESSION

- Increase load to improve
  - Reps
  - Sets
  - Frequency
  - Weight
  - Time

- 10% rule

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INDIVIDUALITY

- People respond differently to the same training stimulus.

- Training response affected by:
  - Pretraining status
  - Gender
  - Genetic predisposition

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RECOVERY

Providing the time and environment for the body to adapt to the demands that have been placed upon it

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REVERSIBILITY

- When the training stimulus is removed or reduced, the ability to maintain performance at a particular level is also reduced, and eventually the gains will revert back to their original level.

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DETRAINING

- **Strength and Power**
  - Magnitude of decline dependent upon
    - Training background
    - Length of training period prior to detraining
    - Specific muscle group
  - 2-week non-training period in strength athletes = 3% decrease in strength

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DETRAINING

- **Endurance Exercise**
  - Decreases in aerobic capacity (4-6%) after only 2 weeks of detraining
  - 2-4 weeks of detraining results in a 12% decrease in stroke volume

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PERIODIZATION

The process of varying a training program at regular time intervals to bring about optimal gains in physical performance, while reducing the risk of overtraining.

Goal: maximize performance at the appropriate time of year

Basic principle is a shift from an emphasis of high volume and low intensity to an emphasis of low volume and high intensity.

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PERIODIZATION CYCLES

- **Microcycle**
  - Daily and weekly variation in volume, intensity and exercise selection
- **Mesocycle**
  - Major training phase within a year that lasts between 4 weeks to 3 months
  - Collection of microcycles
  - Where variation in volume and intensity occur
- **Macrocycle**
  - An entire training year

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PERIODIZATION

MESOCYCLE I OBJECTIVES	MESOCYCLE II OBJECTIVES	MESOCYCLE III OBJECTIVES	MESOCYCLE IV OBJECTIVES
Reverse the effects of disuse lose fat begin getting rid of your weaknesses noted in your last competition period establish a serious training mentality begin aerobic training	build on all your muscles' limit strength continue losing fat maximize your progress in eliminating perceived weaknesses start to train seriously for anaerobic strength (hill training)	maximize anaerobic strength in your sport-specific movements final phase of fat removal get serious about your speed training your weaknesses all gone, now you maximize skill train at altitude if possible	exclusively aerobic threshold training most on your mind are the skills of your sport strategize concentrate on your strengths train at altitude if possible

Note: Shading represents increasing or decreasing intensity level and training emphasis

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PERIODIZATION

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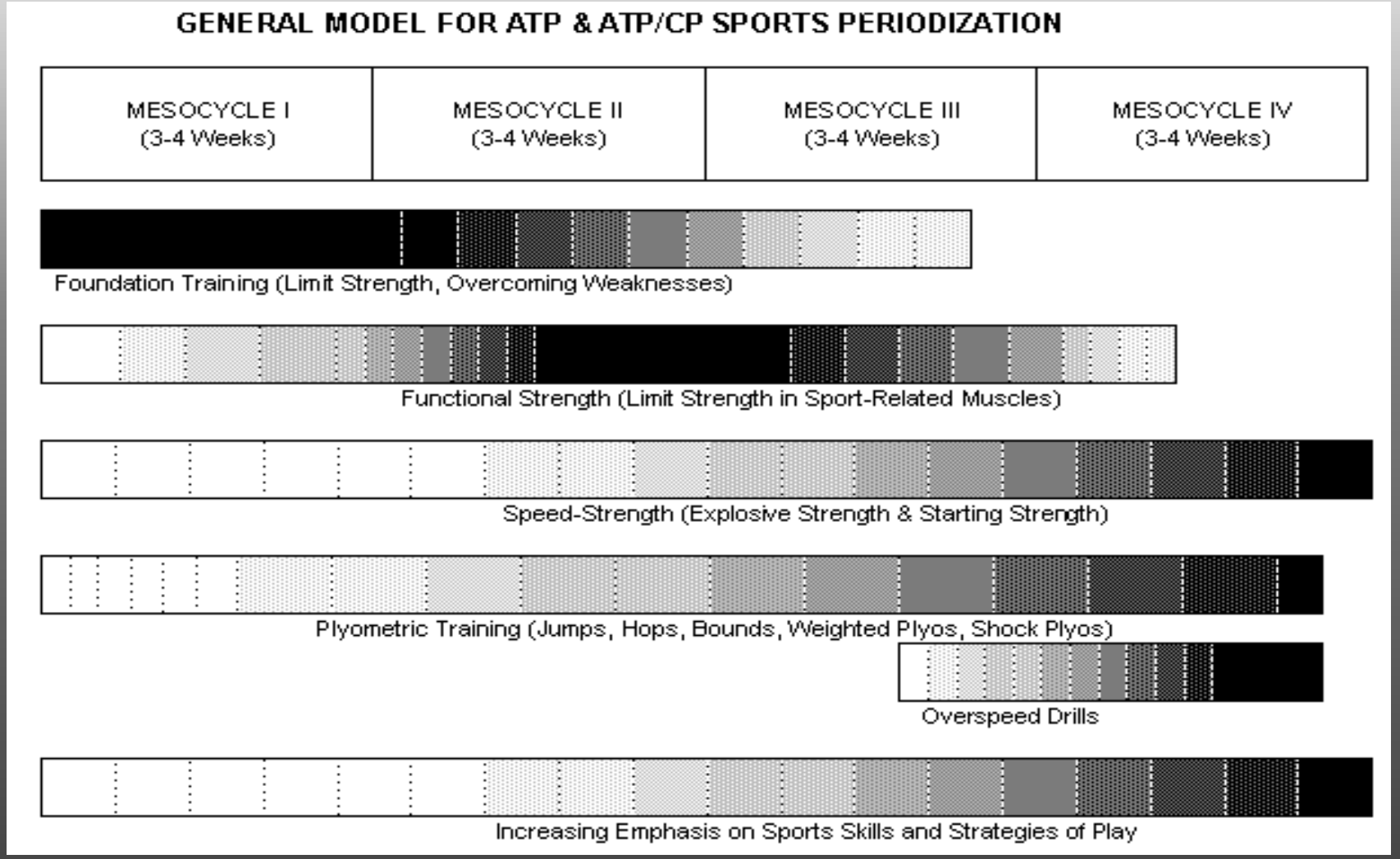

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QUESTIONS?

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