Anaerobic Training

- Improving ATP-PC system
  - short high-intensity intervals; 5-10 sec
  - power exercises
  - rest interval between 30-60 sec

Result: increase PC stores and increase enzyme activity (i.e. speed of ATP-PC system)
Anaerobic Training

• Improving Glycolysis
  • short high-intensity intervals; 20-60 sec
  • strength exercises
  • eventual glycogen depletion possible

• Result:
  • increase glycolysis enzyme activity
  • increase buffering of lactic acid
Figure 1: Oxygen Transport

- Ventilation
- \( \text{O}_2 \) Affinity
- Diffusion
- Cardiac Output
- Peripheral Circulation
- \( \text{O}_2 \) Extraction
- Metabolism
- Substrate Delivery
- Muscle Mass
- Energy Stores
- Myoglobin
- Mitochondria

Aerobic Training
Aerobic Training

1. Long, slow distance training
2. High intensity, continuous training
3. Interval training
Aerobic Training

- LONG, SLOW DISTANCE TRAINING
  - Lower intensity level (~70% HRmax)

- Outcome
  - Increase capillaries
  - Increase myoglobin
  - Increase mitochondria
Long Slow Distance Training

Muscle Cell: Before training

Mitochondrion

100 Units [ADP] → \( \dot{V}O_2 = 2 \text{ L/min} \)

Muscle Cell: After training

Mitochondria

100 Units [ADP] → 1 L/min → \( \dot{V}O_2 = 4 \text{ L/min} \)
What affect does aerobic training have on fat utilization?

Why?
Long Slow Distance Training

- Slower blood flow in muscle
- Increase uptake of FFA and O2
- Capillary density
- Mitochondria number
- FFA utilization
- Fatty acid cycle enzymes and carnitine transferase
- Spares plasma glucose
Long Slow Distance Training

What affect does aerobic training have on glycogen levels?

What affect does aerobic training have on glycogen utilization?

Why?

   Increase fat oxidation

Why is this significant?
Aerobic Training

- **HIGH-INTENSITY, CONTINUOUS TRAINING**
  - Increase lactate threshold
  - Increase lactate removal
  - Decrease lactate production
High Intensity, Continuous Training
High Intensity, Continuous Training

Decrease lactic acid production. Why?
Lactate Monitoring
Lactate Monitoring

Blood lactate (mmol/L)

High Intensity Continuous

Aerobic: LSD

Interval Training

OBLA

LT

Running Speed (mph)

4 5 6 7 8 9 10 11