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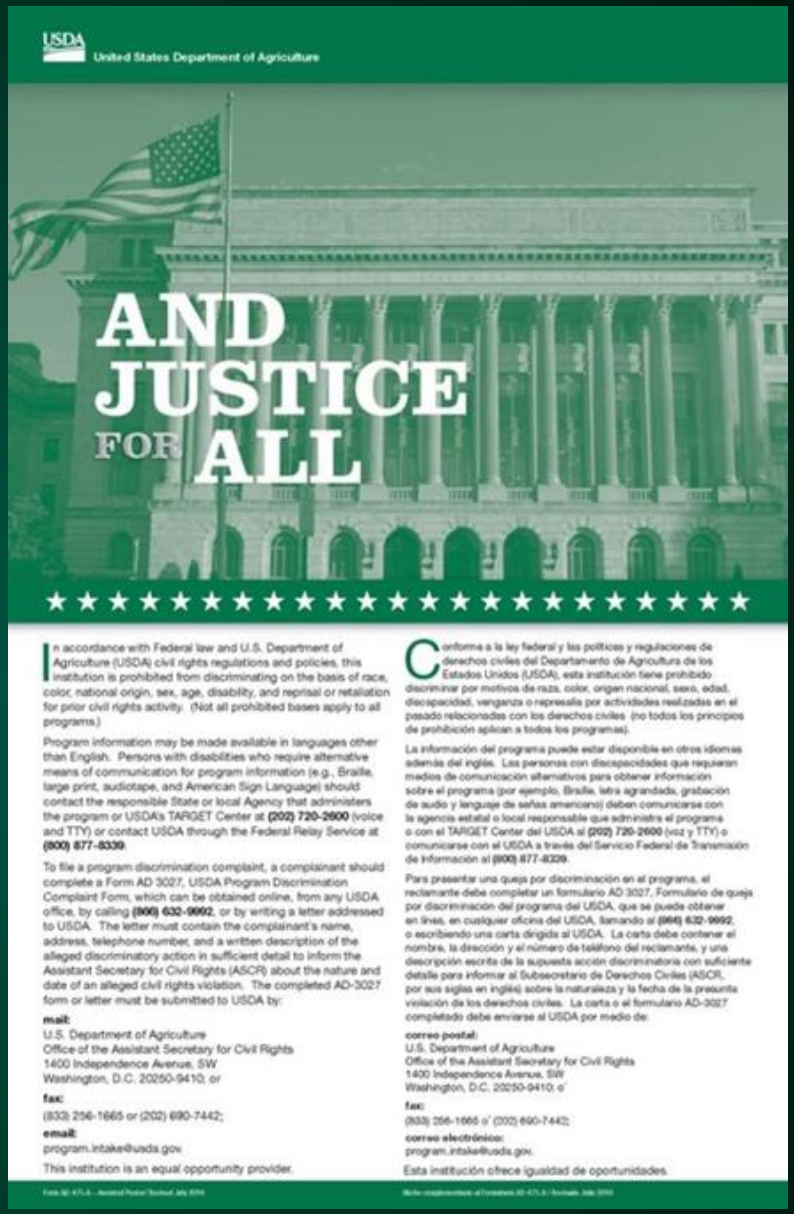

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Conditioning the Equine Athlete

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What is the horse's primary job in the U.S. today?

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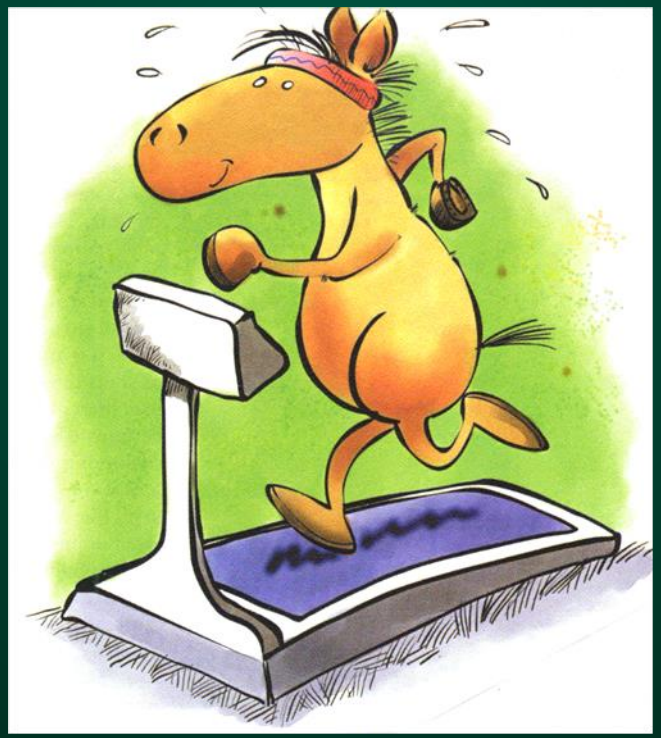
To be an athlete

Goal of Conditioning

- To improve psychological and physical responses to exercise



Basic Conditioning Considerations

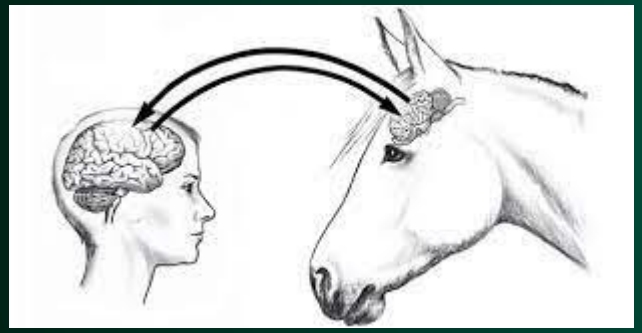
- Horse *and* human
  - Discipline or event
  - Level of competition
  - Current fitness level
  - Past injuries
  - Prior experience in discipline/event
  - Time
  - Age

Before you Begin

- Sound in wind and limb?
- Healthy overall?
- Shod/trimmed?
- Consult your veterinarian if unsure!

Conditioning Components

- Psychological adaptations
- Physiological adaptations



Psychological Adaptations

- Understand:
  - Training principles
    - International Society for Equitation Science https://equitationscience.com/
  - Horse behavior
  - Human impact on behavior

Psychological Adaptations

- Vary routine

Psychological Adaptations

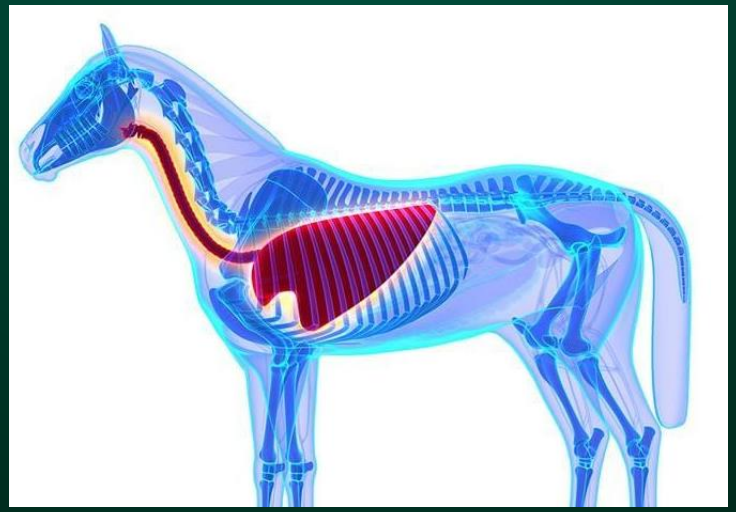
- Goal is for confident and willing partner

Physiological Adaptations

- Respiratory
- Cardiovascular
- Musculoskeletal
- Thermoregulation

Respiratory

- Oxygen uptake
- Resting
  - 1.25 gallons (5 L) per breath
  - Average 12 breaths per minute
  - 16 gallons (60 L) per minute



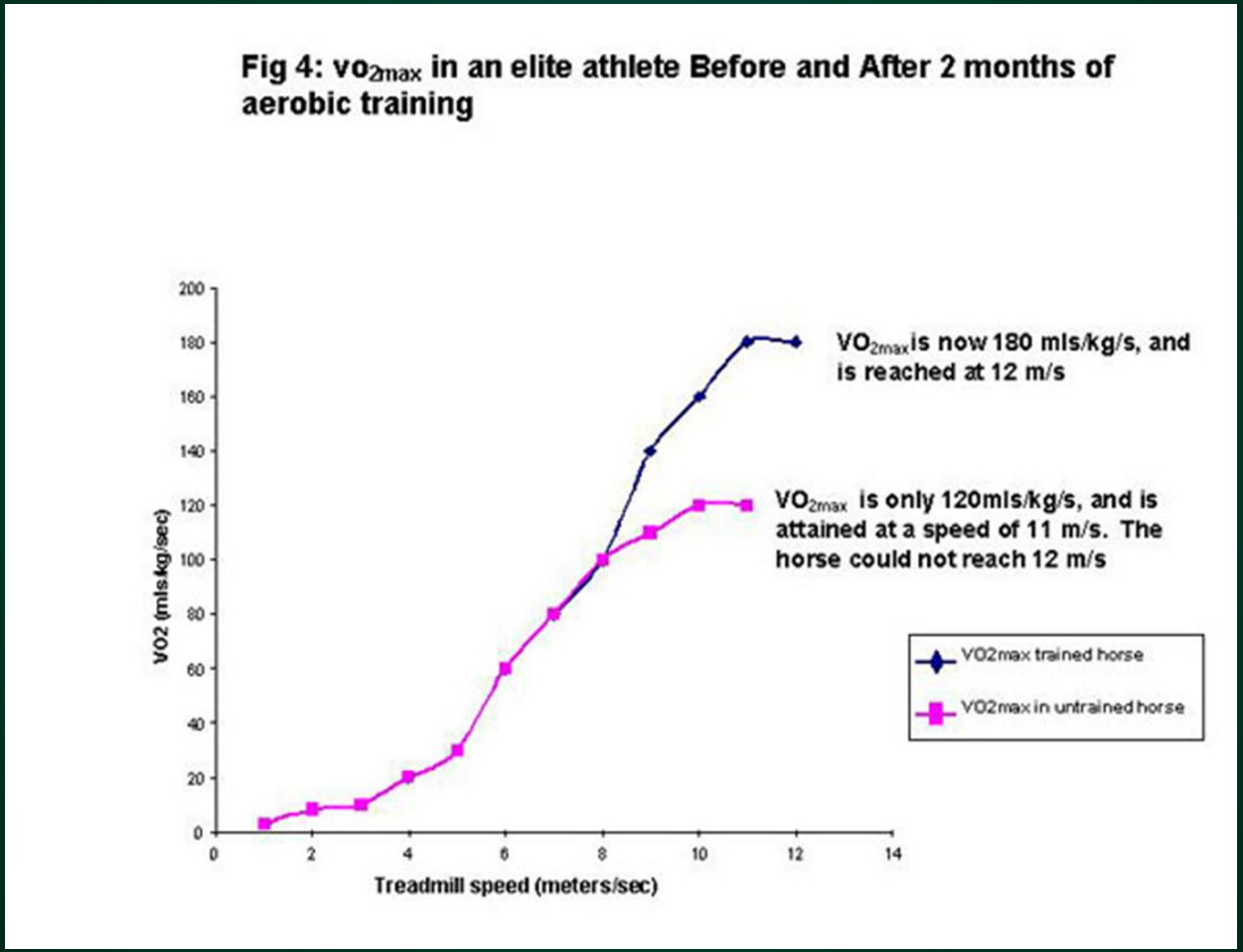
Respiratory

- Hard exercise
  - 3 to 4 gallons (12 to 15 L) per breath
  - Over 150 breaths per min
  - Over 595 gallons (2,250 L) per min

Respiratory Rate

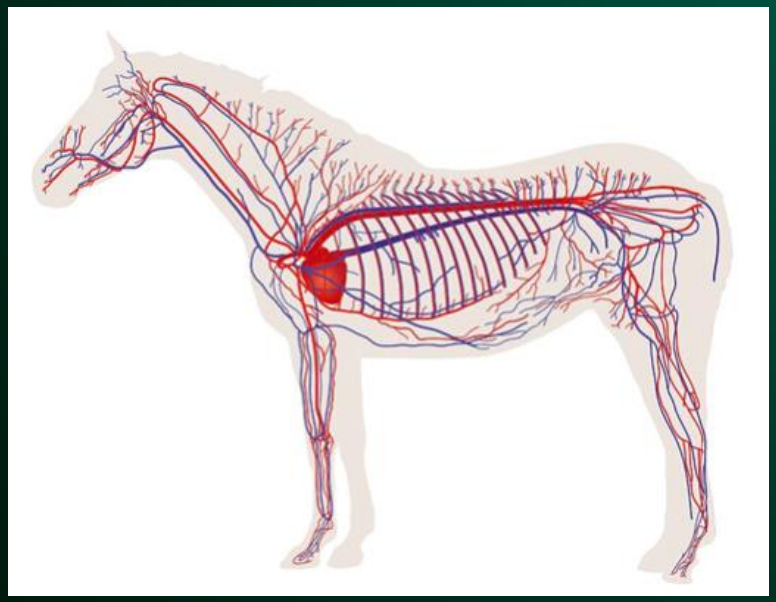
- Resting adult:
  - 8 to 20 breaths/min
- Max adult:
  - 180 breaths/min

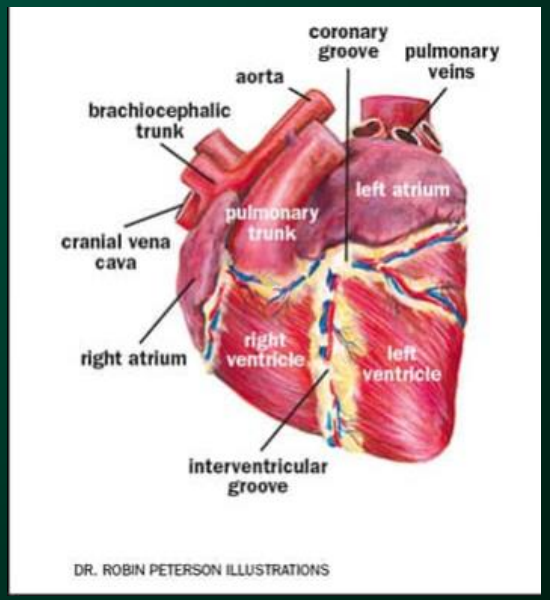
Respiratory Response to Conditioning



Cardiovascular

- Heart rate
- Heart size
- Vascularity
- Red blood cell volume





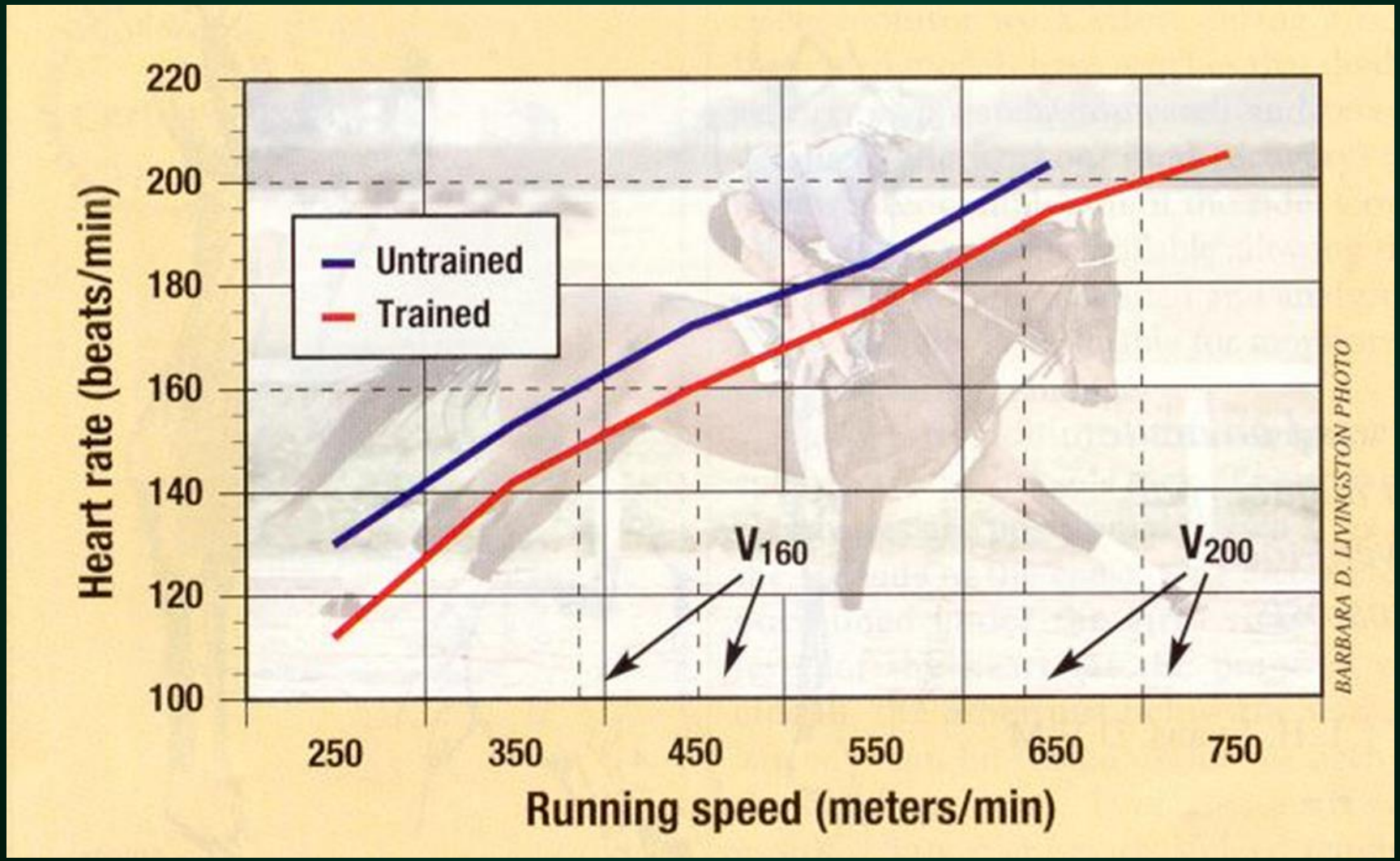
Heart Rate

- Resting adult:
  - 28 to 44 beats per min
- Max HR adult:
  - 220 to 260 beats per min

Cardiovascular Response to Conditioning

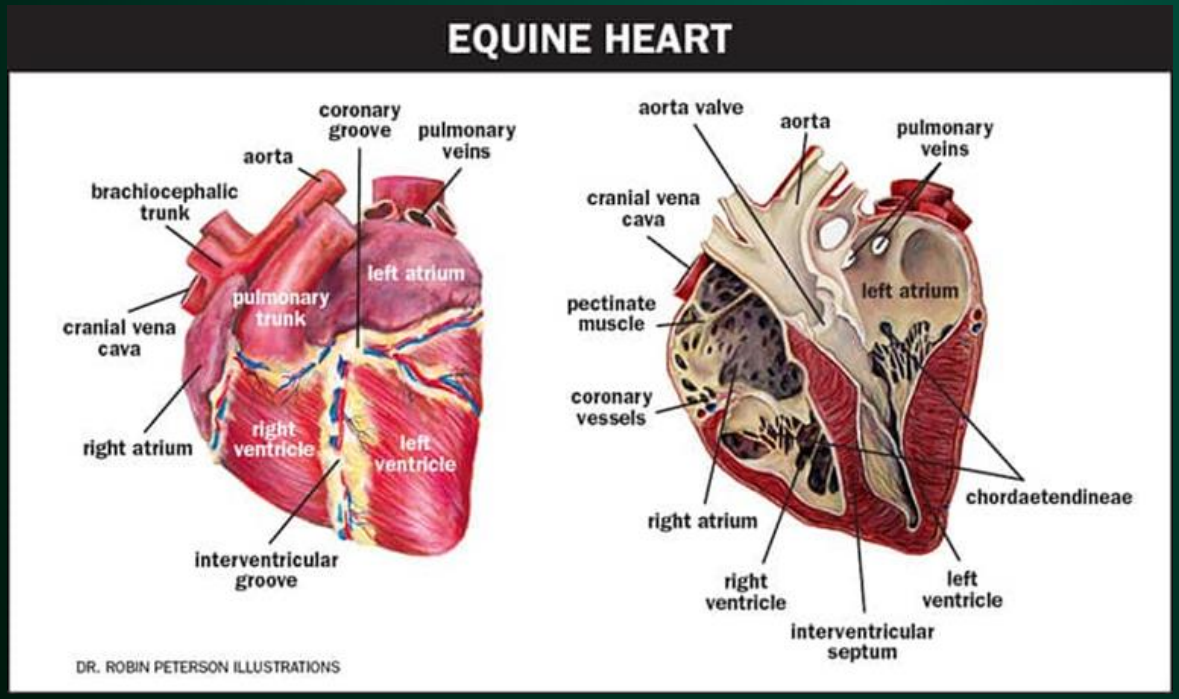
- Heart rate
  - Resting and max HR do not change in response to exercise
  - Recovery HR and HR during exercise *do* change in response to exercise
  - **Tracking HR is an excellent indicator of cardiovascular fitness**

Heartrate in Untrained vs Trained Horse



Cardiovascular Response to Conditioning

- Heart size
  - Average ~ 9 lbs (~ 4 kg)
  - Increase size and weight



Cardiovascular Response to Conditioning

- Vascularity
- 3 to 4 months

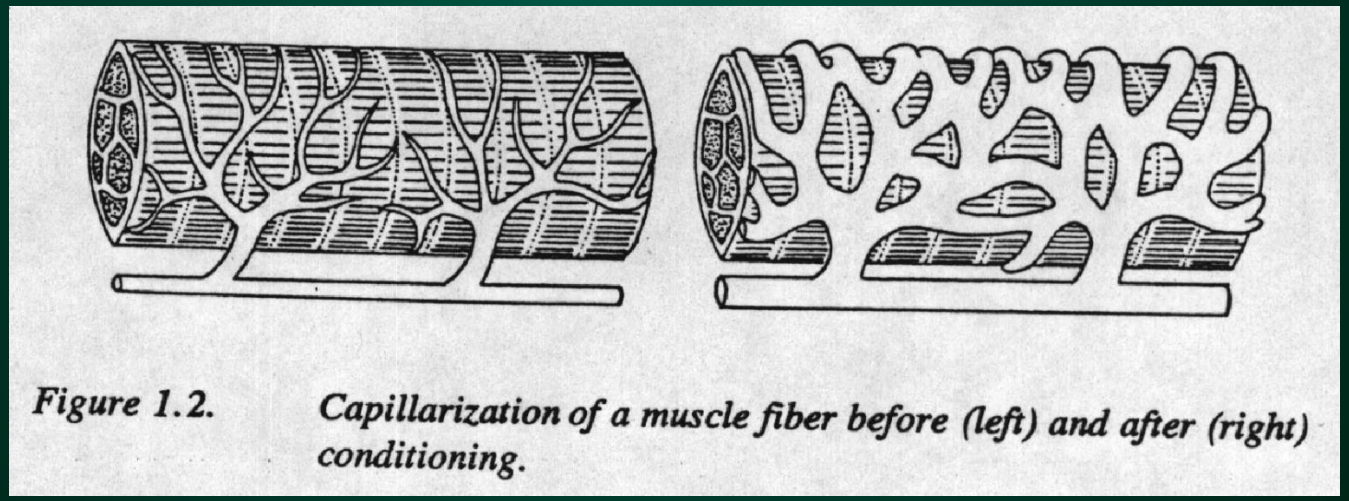
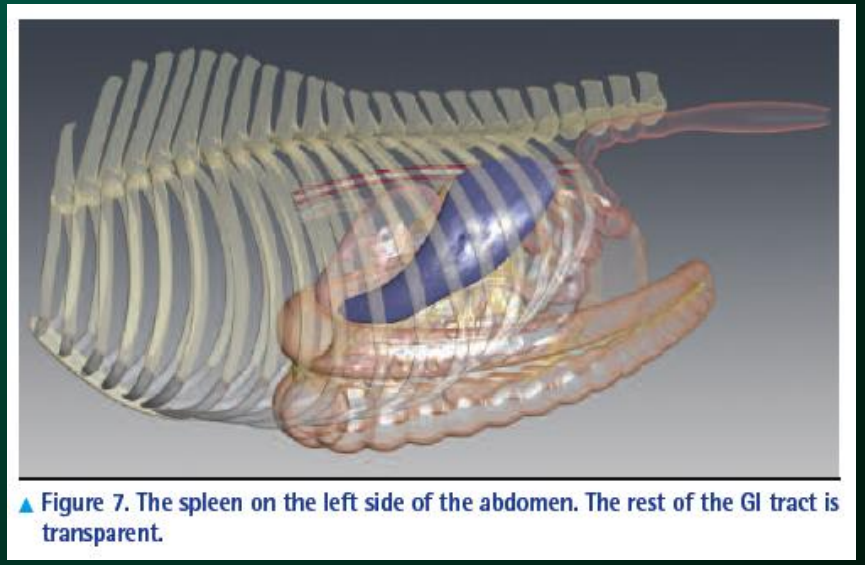


Figure 1.2. *Capillarization of a muscle fiber before (left) and after (right) conditioning.*

Cardiovascular Response to Conditioning

- Red blood cell (RBC) volume
  - RBC carry oxygen
- Spleen stores up to 1/3 of RBC



▲ Figure 7. The spleen on the left side of the abdomen. The rest of the GI tract is transparent.

Musculoskeletal

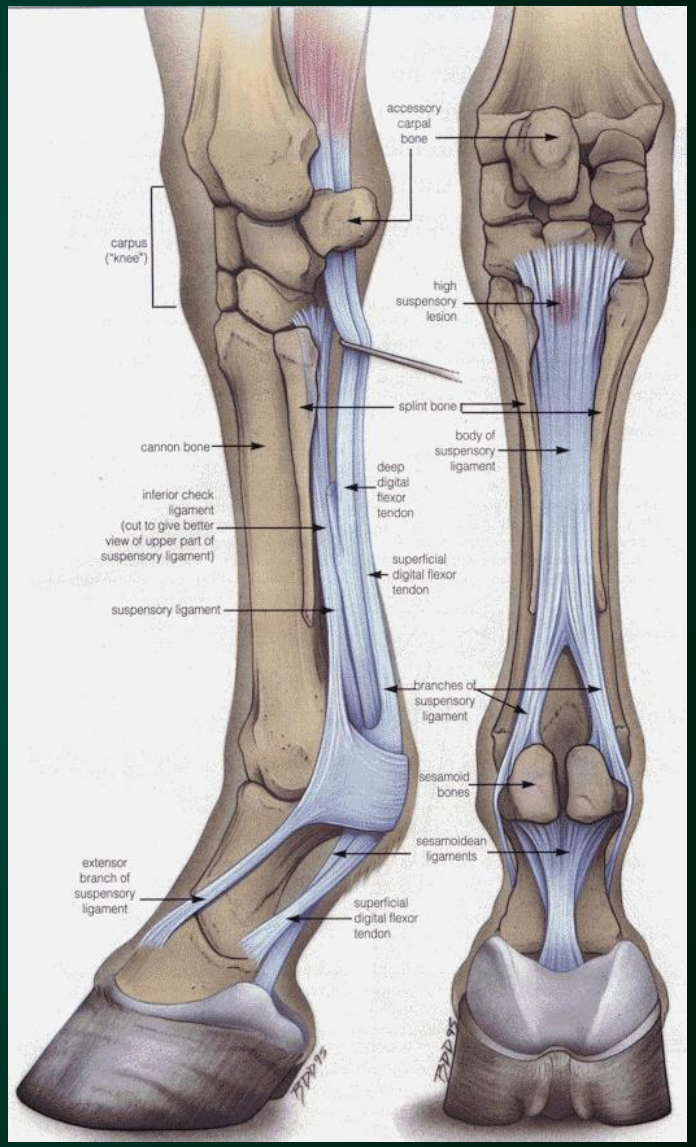
- Muscles
- Tendons and ligaments
- Bone

Musculoskeletal

- Muscles
  - Muscle size and strength
  - Muscle fiber type

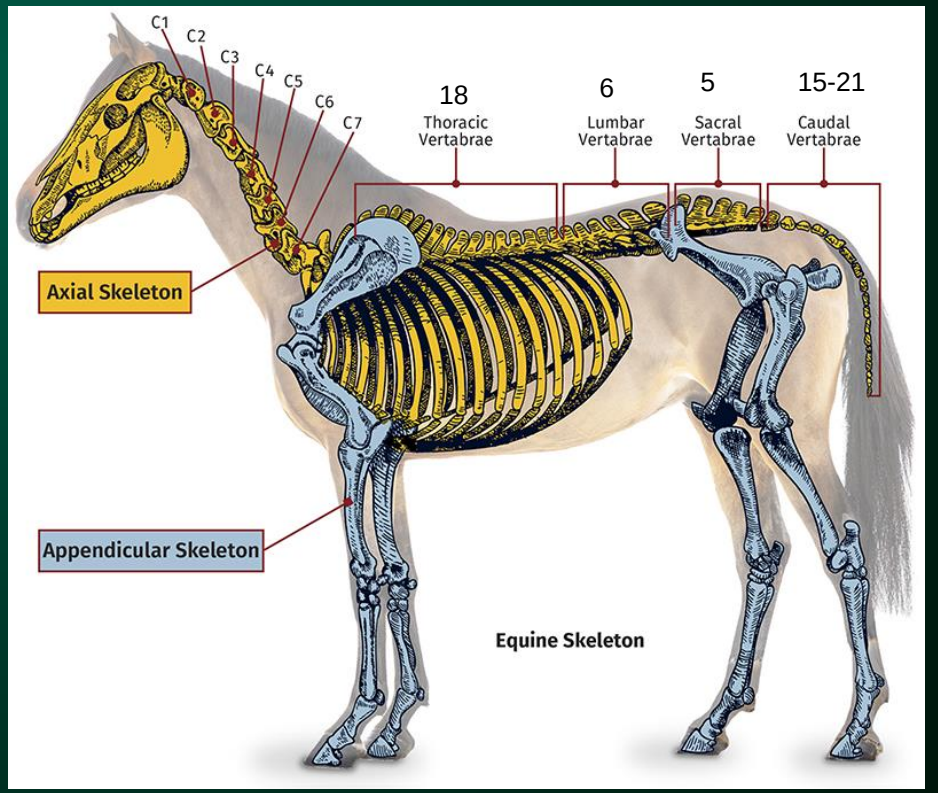
Musculoskeletal

- Tendons and ligaments
  - Tendons connect muscle to bone
  - Ligaments connect bone to bone



Musculoskeletal

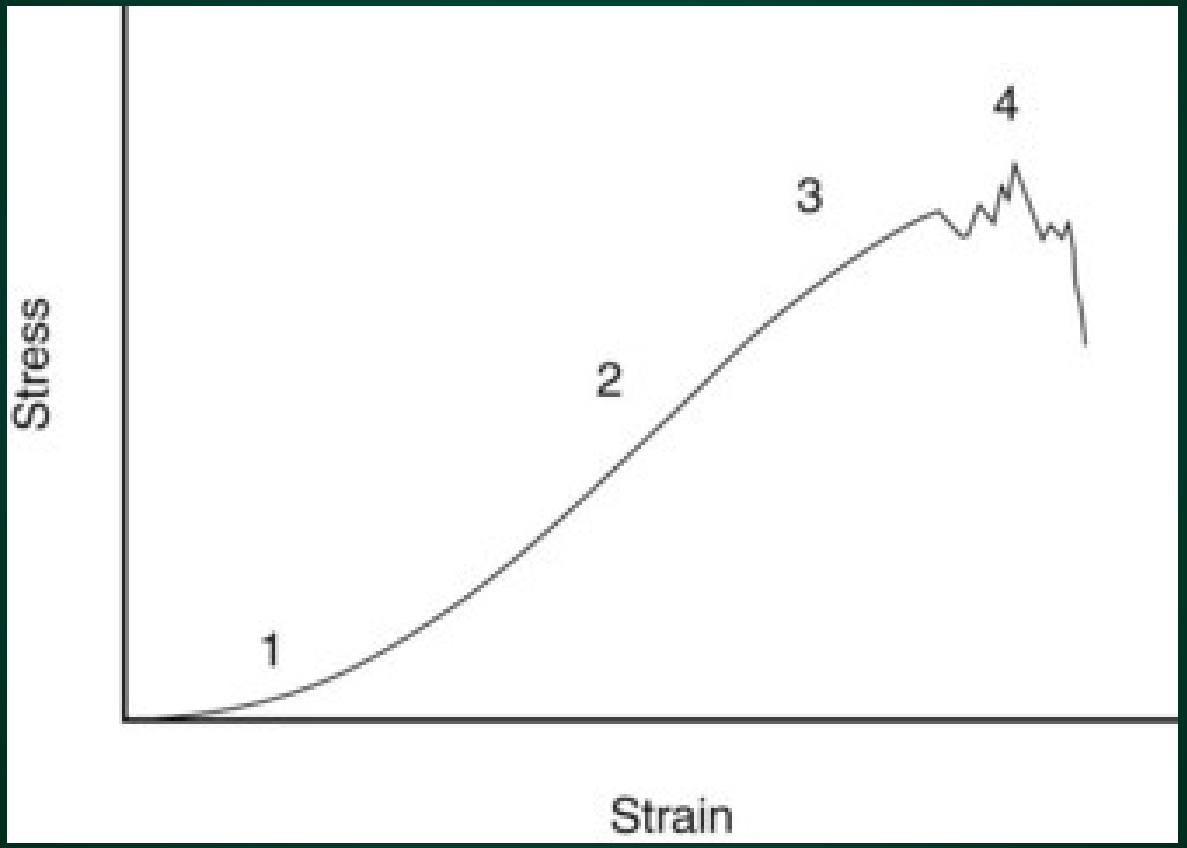
- Skeleton
  - Bone



Musculoskeletal Response to Conditioning

- Takes 4 to 6 months
- Muscles
  - Increased strength and suppleness*
- Tendons, ligaments and bone
  - Remodels in response to the forces placed upon it

Musculoskeletal Response to Conditioning



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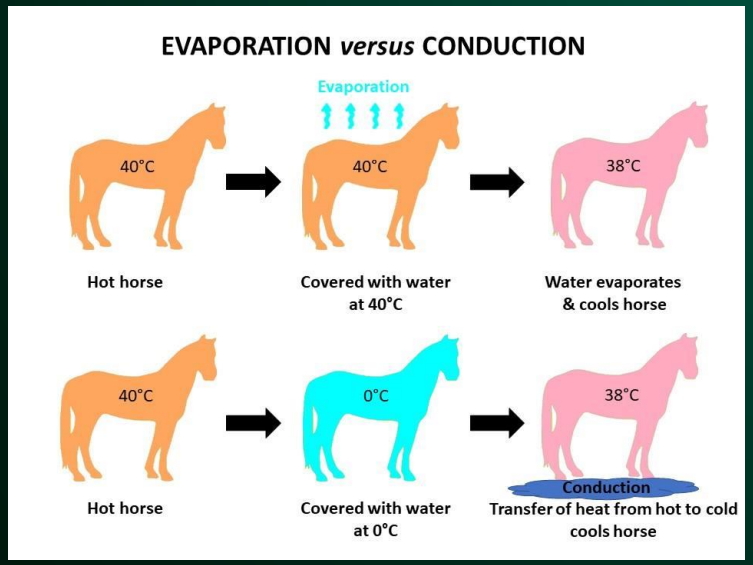
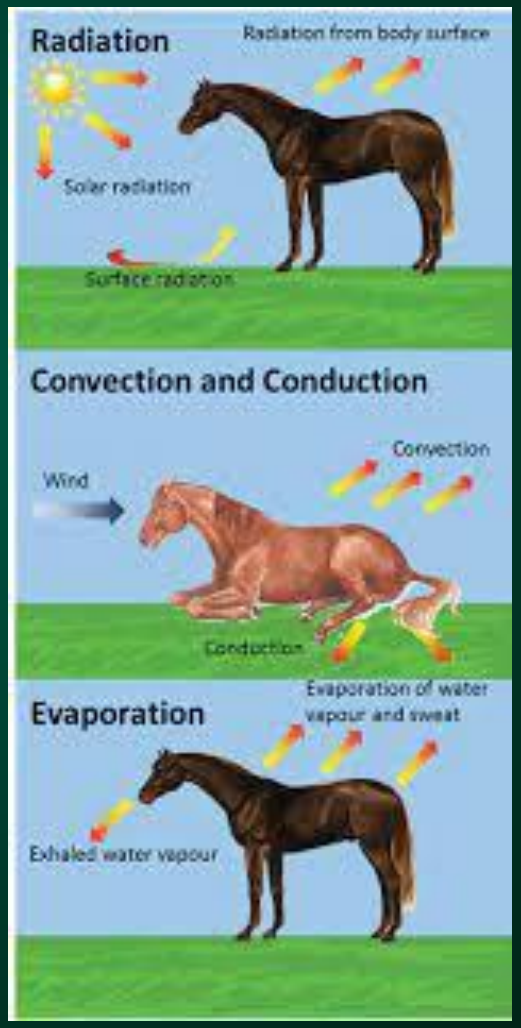
From Goodship AE, Birch HL, Wilson AM: The pathobiology and repair of tendon and ligament injury, Vet Clin North Am Equine Pract 10:323, 1994.)

Thermoregulation

- Radiation
- Convection
- Conduction
- Evaporation





Vital Signs for Exercise

- Heart rate (HR)
- Respiration rate (RR)
- Temperature

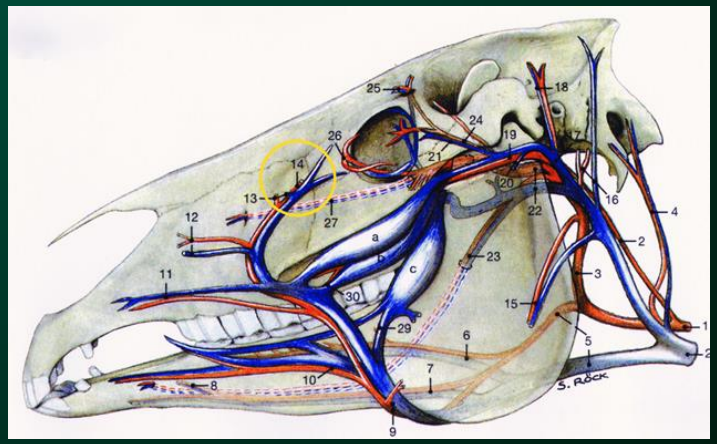
Measuring Heart Rate

- Count # beats (lub-dub = 1 beat) in 15 seconds, multiply by 4

Pulse Points

Facial artery

Transverse facial artery



Pulse Points

Heart beat

Radial and digital arteries

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https://badgervet.com/horses-vital-signs/

Heart Rate Monitor

Heart Rate Monitors

- Polar Heart Rate Monitor $200
  - https://shop.ker.com/products/hr-monitor?variant=1154717044
- V-MAX Equine HR Monitor $150
  - http://www.v-maxequineheartratemonitors.com/products.html

Respiration Rate

- Count # in 15 seconds, multiply by 4

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Temperature

- Adult horse at rest
  - 99 to 101 º F
  - 37.2 to 38.3º C

Energy for Equine Performance

- Energy = ATP
- Horses create ATP by metabolizing fuel stores:
  - Carbohydrates (CHO)
    - Muscle and liver as glycogen
  - Fats
    - Adipose as triglycerides
  - Proteins*
    - Muscles as amino acids

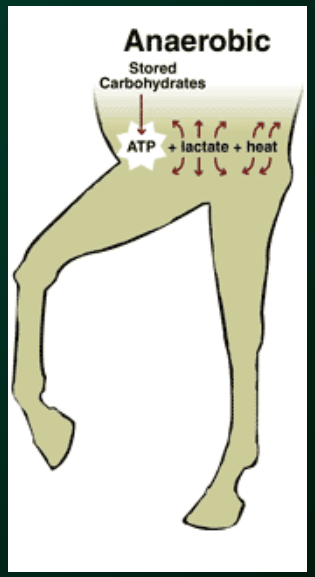
Aerobic vs. Anaerobic Exercise

Aerobic Exercise

- HR < 150 bpm
- Slow speed
- Oxygen required to breakdown fuel stores
- Uses CHO and fats

Anaerobic Exercise

- HR > 150 bpm
- High speed
- Oxygen <u>not</u> required to breakdown fuel stores
- Uses only CHO



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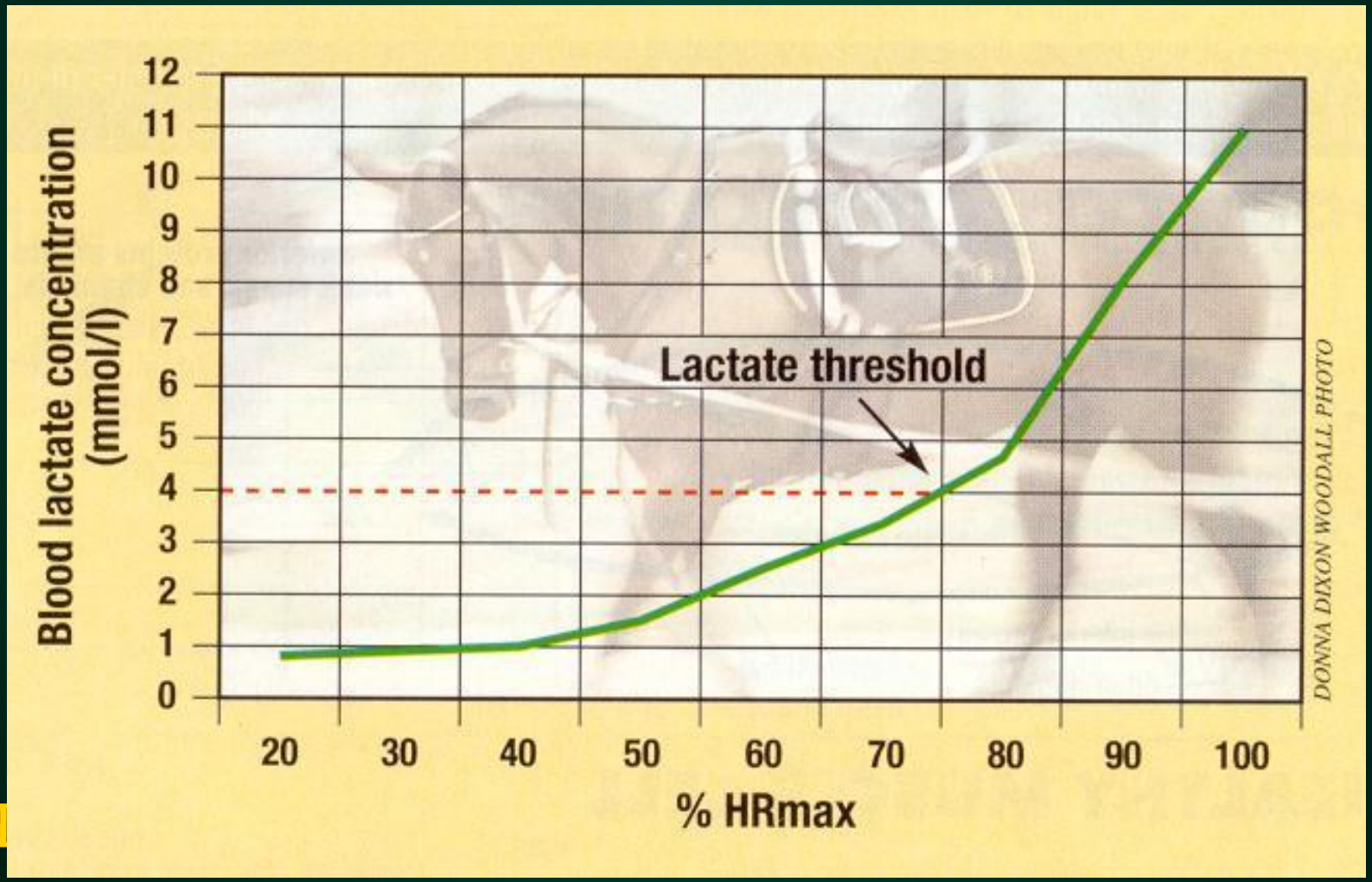
Aerobic vs. Anaerobic Metabolism

- Depends on exercise intensity
- Anaerobic threshold
  - Point when the horse can no longer function by aerobic metabolism alone
  - Heart rate ~ 150 bpm
  - Blood lactate ~ 4 mmol/L

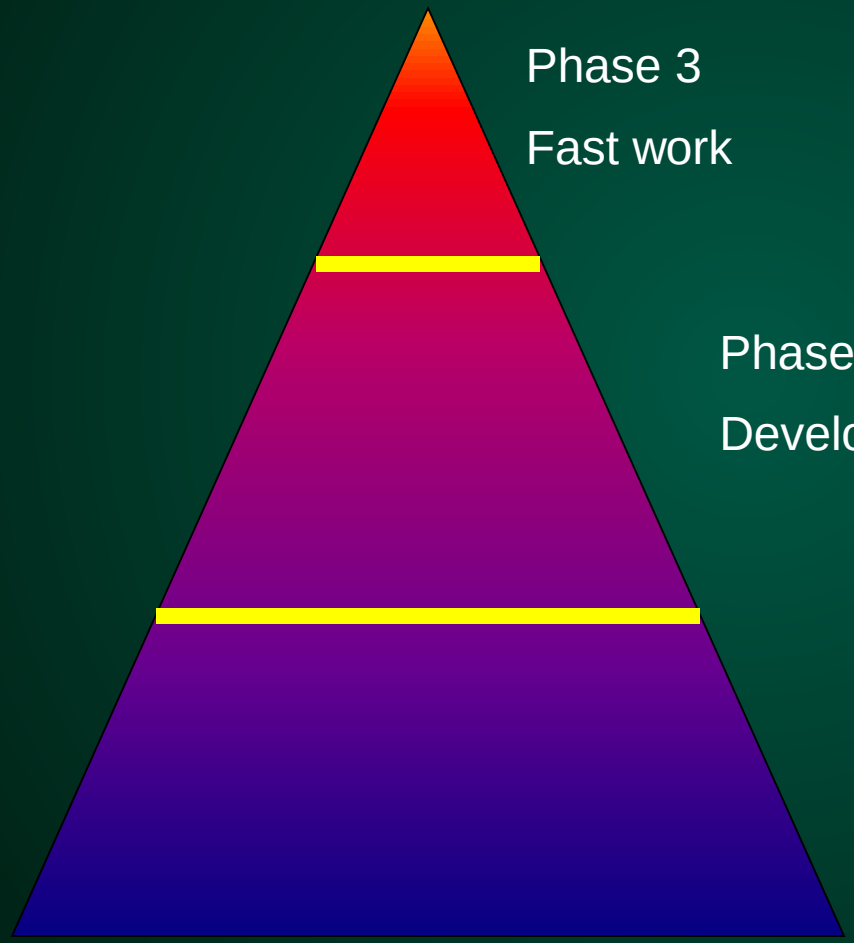
Anaerobic Threshold



Fitness Level

- Incorporating both aerobic and anaerobic exercise increases fitness level
- Higher fitness level burns more fat
- Glycogen-sparing effect
  - Can add fat to the diet
  - 10-12 %

Stages of Conditioning



Phase 3

Fast work

Phase 2

Development work

Phase 1

Preliminary work

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Phase 1: Preliminary Work

- Low intensity aerobic
  - Fairly constant exercise during workout
  - Walking and trotting
  - Ride, longe, long line, walker, treadmill
- Benefits
  - Improved cardiovascular and muscular fitness
  - Reduced risk of injury
    - Strengthen muscle, tendons, ligaments

Phase 1: Preliminary Work

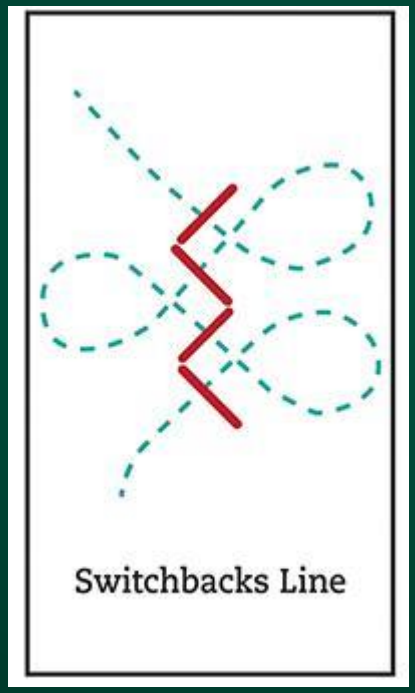
- Length
  - 3-12 months in immature horse
  - 1 month in mature horse
- Goal: 45-60 minutes of walk and trot

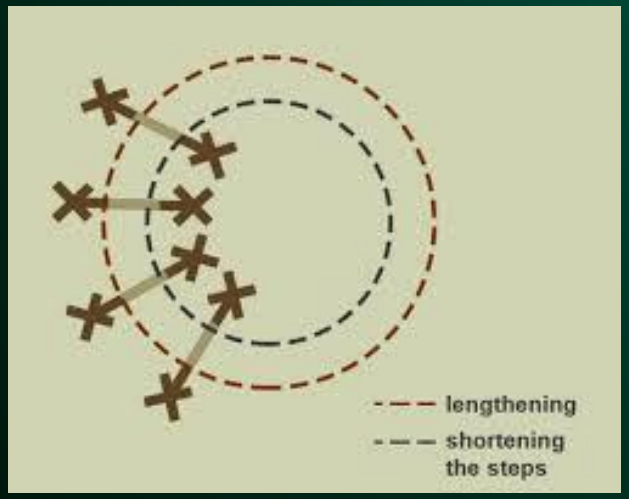
Phase 1: Preliminary Work

- Carrot stretches
  - Wall/panel
  - Watch fingers
  - 3 to 5 reps, 4 to 7 d/wk

Phase 1: Preliminary Work

- Gymnastic work



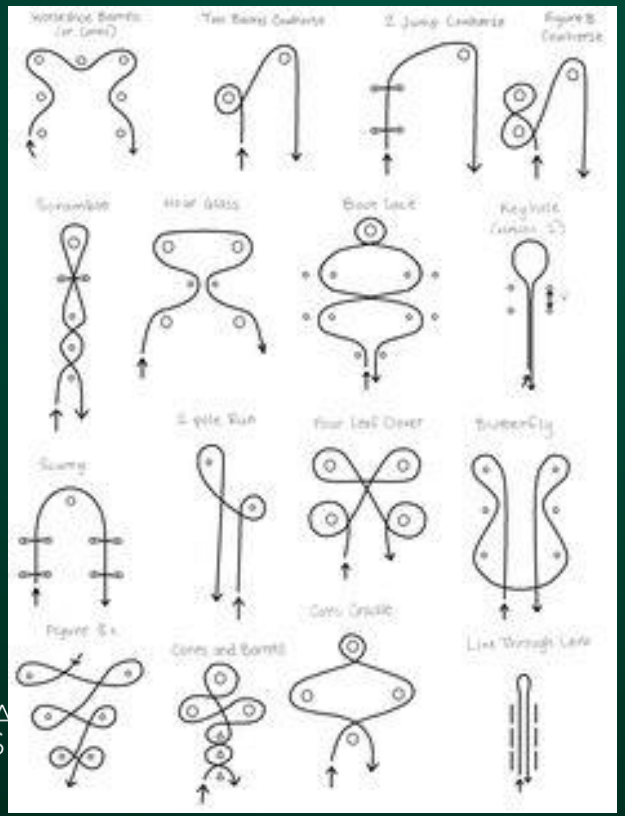


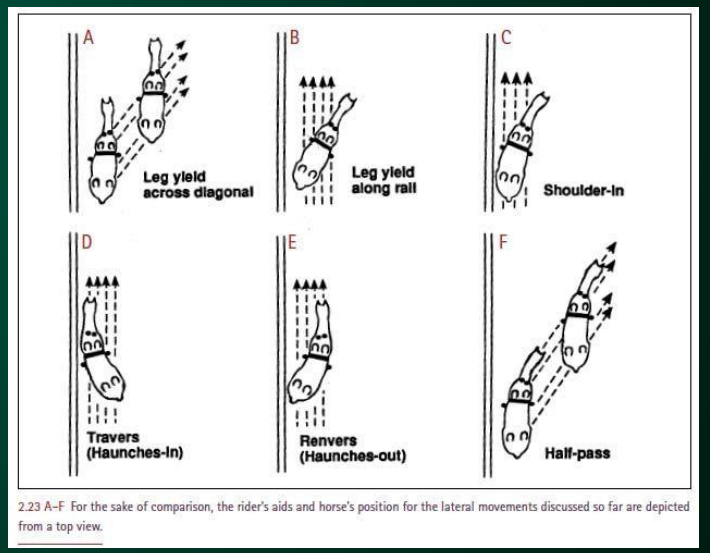
Phase 1: Preliminary Work

- Gymnastic work
  - Spacing is important and depends on horse stride and gait
    - Walk 2.5 ft
    - Trot/Jog 3.5 to 4 ft
    - Canter/lope 8 to 10 ft
  - Start with straight lines, over center
  - Increase # of poles
  - 8 to 10 times, reverse 8-10 more times

Phase 2: Developmental Work

- Addition of canter and suppling exercises
  - Varies according to discipline



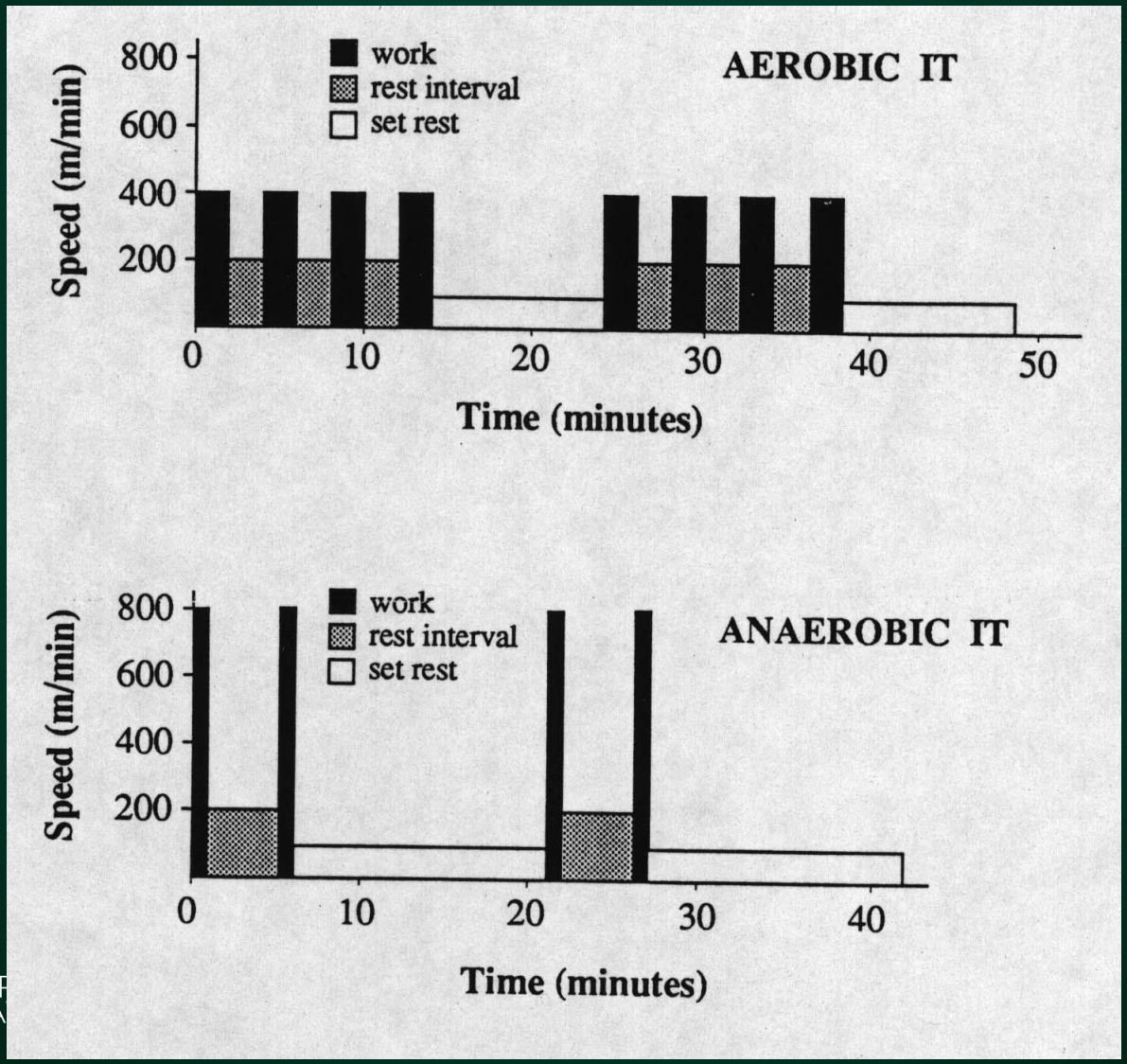


2.23 A–F For the sake of comparison, the rider's aids and horse's position for the lateral movements discussed so far are depicted from a top view.

Phase 2: Developmental Work

- Interval training
  - Bouts of intense exercise with partial recovery rest periods
  - Goal is to enhance O2 utilization and aerobic performance (delay anaerobic)

Examples of Interval Training



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Phase 3: Fast Work

- Power and athleticism honed
- Speed work

Conditioning

- **Write it down!**
  - Workout routine journal
  - Horse's response to workout routine
- Start slowly
- Gradually increase distance, speed, incline

Monitoring Progress

- Only helpful if measured over time!

Equine Exercise Response to Workout

Date	
Name	
Horse	
Location	
Heartrate	
• Pre-exercise	
• During exercise	
• Post-exercise	
• 1 minute	
• 5 minutes	
• 10 minutes	
• 20 minutes	
Respiratory rate	
• Pre-exercise	
• Post-exercise	
• 1 minute	
• 10 minutes	
• 20 minutes	
Temperature	
• Pre-exercise	
• Post-exercise	
• 10 minutes	
• 20 minutes	
Environment	
Weather/temperature	
Terrain	
Subjective performance assessment	
Other notes	

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Recovery of Vital Signs

Time (min)	Heart Rate	Respiratory Rate	Temperature
0	high	high	high
1	markedly reduced	high-moderate	high
5-10	declining steadily	declining/panting	maximal
20-30	declining/normal	panting/normal	declining

**Ideally back to normal 20-30 min after workout

Sample Unfit Horse Program

- **Week 1:** 30 minutes per ride with 5 minutes trotting
- **Week 2:** 30 minutes per ride with 10 minutes trotting
- **Week 3:** 40 minutes per ride with 15 minutes trotting
- **Week 4:** 40 minutes per ride with 20 minutes trotting and 5 minutes cantering
- **Week 5:** 40 minutes per ride with 20 minutes trotting and 10 minutes cantering

https://equusmagazine.com/horse-care/an-easy-equine-fitness-plan-8488

Signs of Fatigue

- Elevated pulse or body temperature that does not decrease
- Inversion of heart and respiration rates
- Weakness
- Excessive sweating
- Muscle cramping
- Inability to perform

Summary

- Re-visit slides
  - Conditioning Considerations
  - Before You Begin
- Work gradually
- HR**, RR and temp
- **Monitor progress by writing it down!**

On-line Resources

- Kentucky Equine Research
  - www.ker.com
- My Horse University
  - www.myhorseuniversity.com
- The Horse
  - www.thehorse.com

On-line Resources

- Top 5 Stretches for Healthy Horses
  - https://s3.us-east-2.amazonaws.com/thehorse/files/Q/stretches-for-healthy-horses.pdf

- PBS Video: Inside Nature's Giants: Racehorse

Text Resources

- *Equine Fitness* by Jec Aristotle Ballou
- *101 Western Dressage Exercises for Horse and Rider* by Jec Aristotle Ballou
- *101 Ground Training Exercises for Every Horse and Handler* by Cherry Hill
- *Core Conditioning for Horses* by Simon Cocozza

Questions?

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