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fax

(833) 256-1665 or (202) 690-7442;

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Conditioning the Equine Athlete

Dr. Erika Berg
Department of Animal Sciences



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





To be an athlete









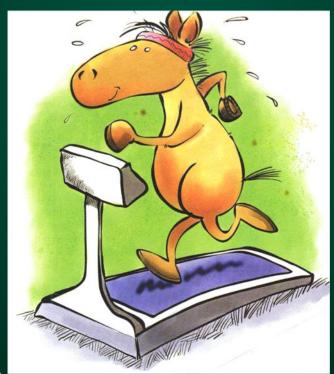






Goal of Conditioning

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



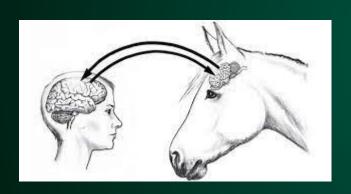
Before you Begin

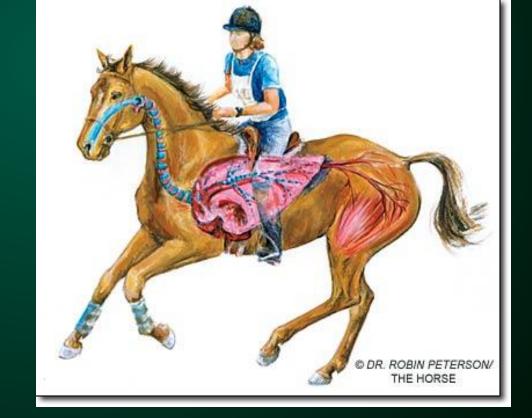
- Sound in wind and limb?
- Healthy overall?
- Shod/trimmed?
- Consult your veterinarian if unsure!



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



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Psychological Adaptations

Vary routine







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Psychological Adaptations

 Goal is for confident and willing partner







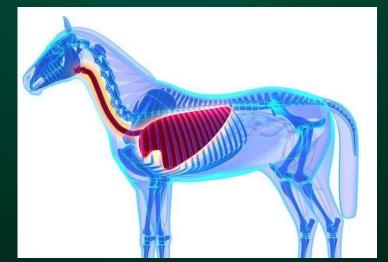
Physiological Adaptations

- 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



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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



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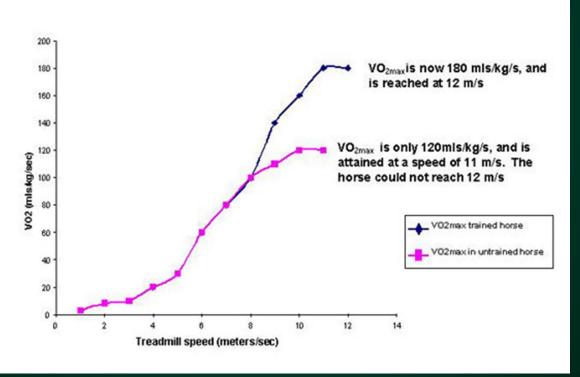
Respiratory Rate

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



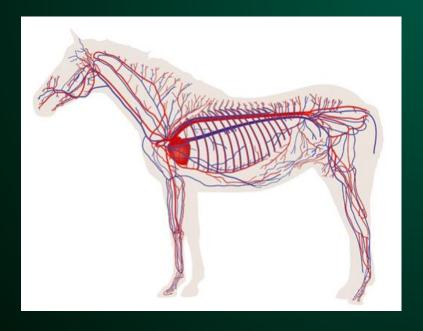
Respiratory Response to Conditioning

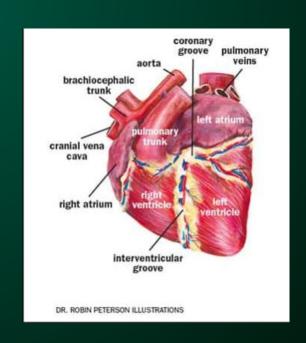
Fig 4: vo_{2max} in an elite athlete Before and After 2 months of aerobic training



Cardiovascular

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





Heart Rate

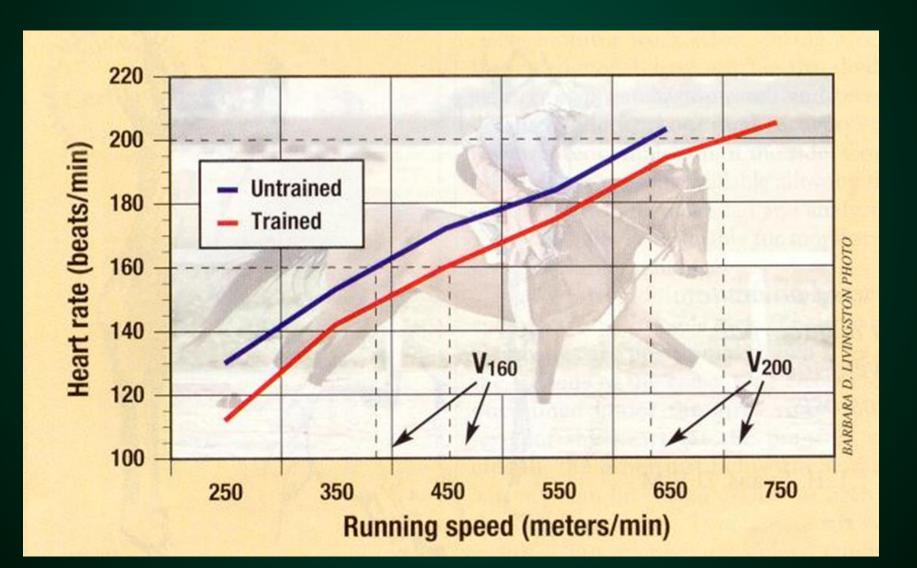
- Resting adult:
 - 28 to 44 beats per min
- Max HR adult:
 - 220 to 260 beats per min



- 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

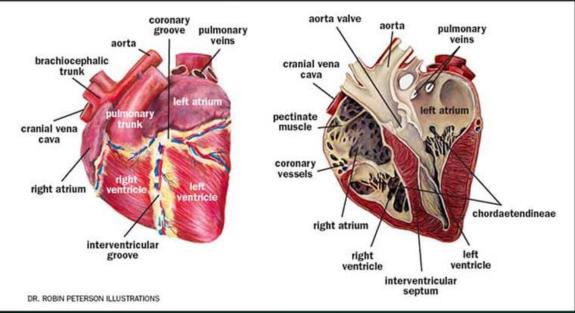


Heartrate in Untrained vs Trained Horse



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

EQUINE HEART



- Vascularity
- 3 to 4 months

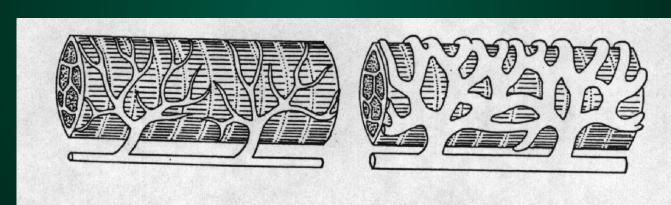


Figure 1.2. Capillarization of a muscle fiber before (left) and after (right) conditioning.

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



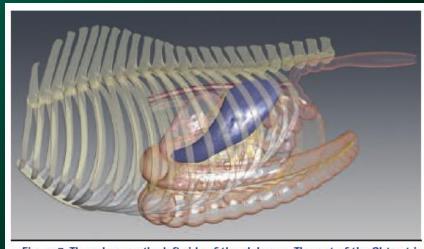


Figure 7. The spleen on the left side of the abdomen. The rest of the GI tract is transparent.



- Muscles
- Tendons and ligaments
- Bone

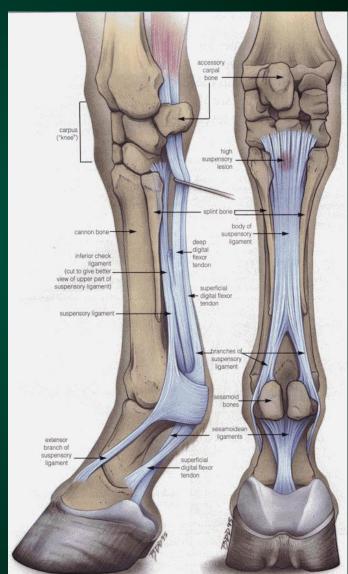


- Muscles
 - Muscle size and strength
 - Muscle fiber type





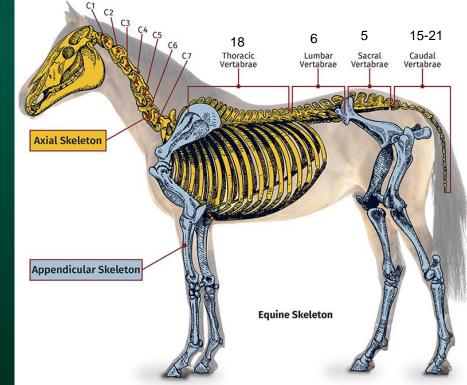
- Tendons and ligaments
 - Tendons connect muscle to bone
 - Ligaments connect bone to bone





- Skeleton
 - Bone





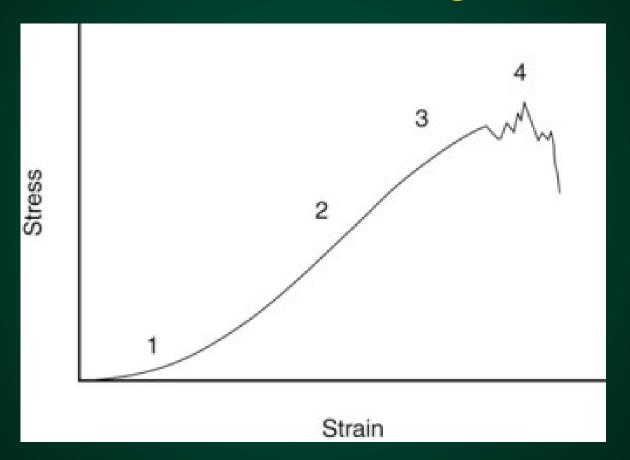


Musculoskeletal Response to Conditioning

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



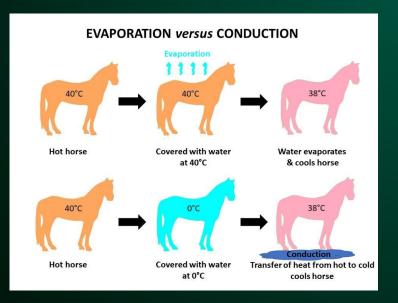
Musculoskeletal Response to Conditioning

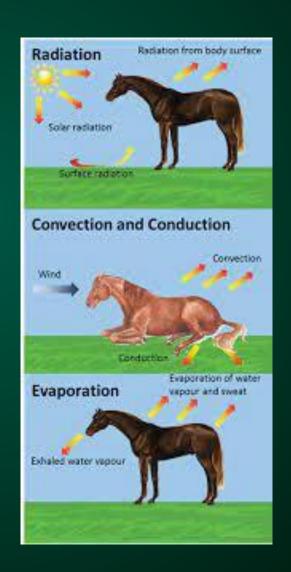




Thermoregulation

- 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

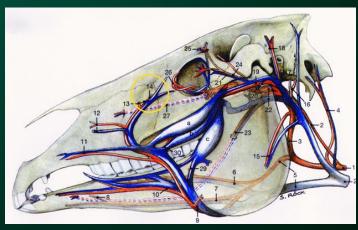
Facial artery





Transverse facial artery





Pulse Points

Heart beat



Radial and digital arteries





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.vmaxequineheartratemonitors.com/products.ht ml



Respiration Rate

 Count # in 15 seconds, multiply by 4







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Temperature

- Adult horse at rest
 - 99 to 101 ° F
 - 37.2 to 38.3° 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

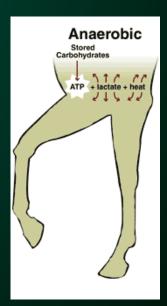
Aerobic Exercise

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

carbohydrates, fats + O₂ ATP, CO₂, H₂O, heat

Anaerobic Exercise

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



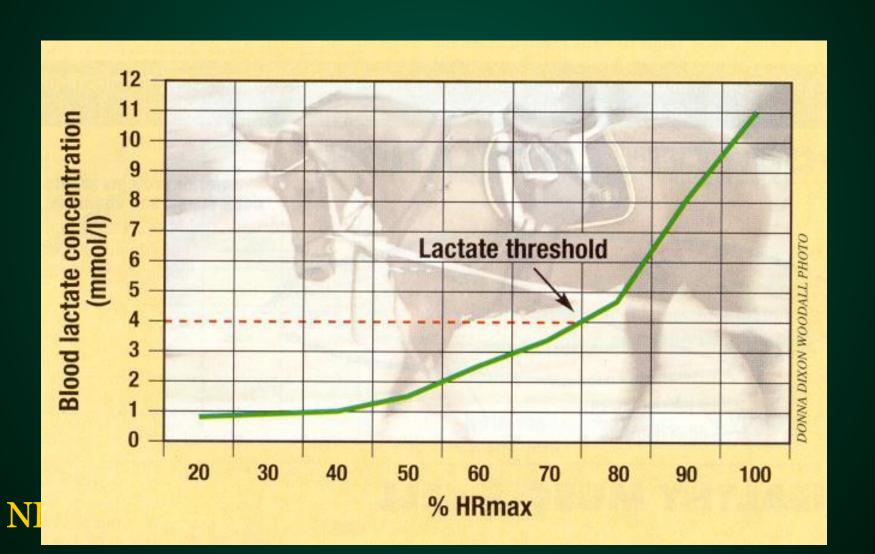


Aerobic vs. Anaerobic Metabolism

- 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

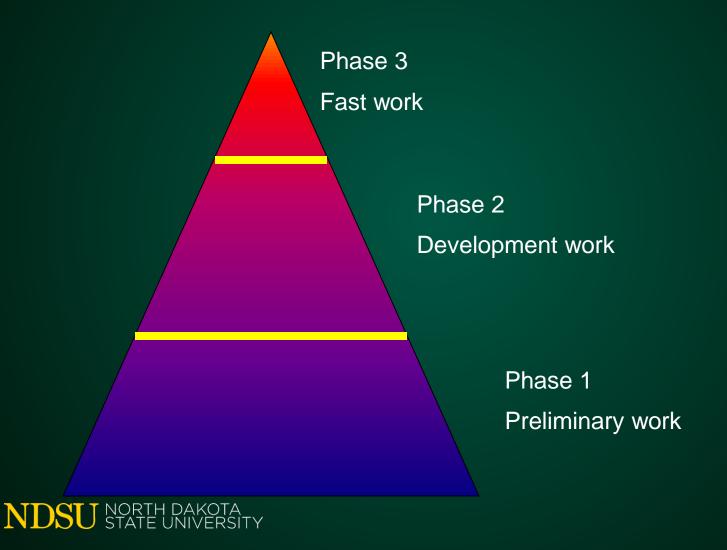


Fitness Level

- 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



- 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



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



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

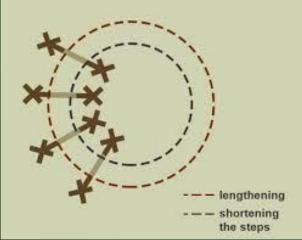


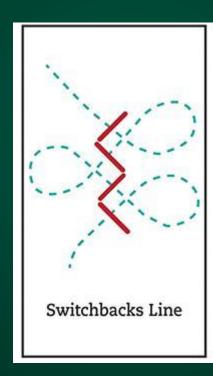




Gymnastic work











- 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

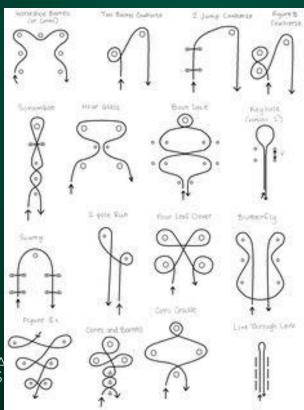


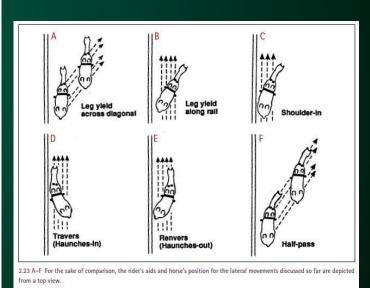
Phase 2: Developmental Work

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







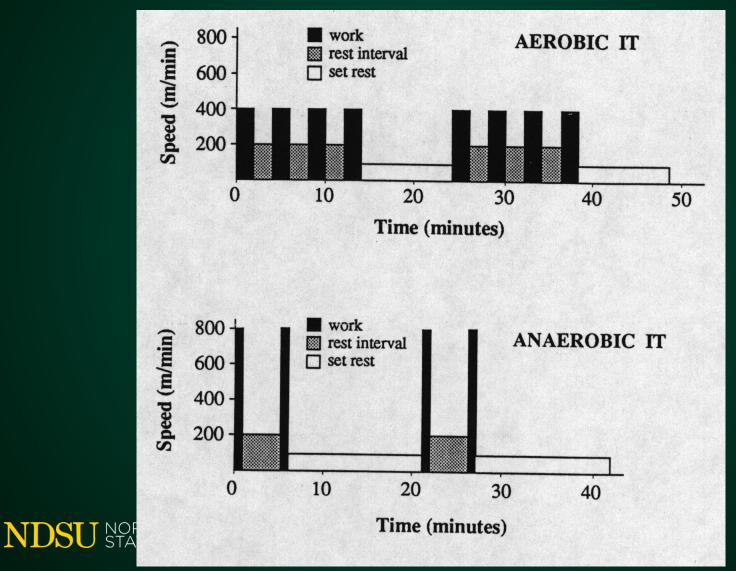


Phase 2: Developmental Work

- 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



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¶

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· II		
Date¤	и	Þ
Name¤	п	¤
Horse¤	и	¤
Location¤	и	Þ
Heartrate¤	и	þ
•→Pre-exercise¤	þ	¤
• → During-exercise¤	¤	¤
•→Post-exercise¤	и	þ
•→1·minute¤	и	¤
•→5·minutes¤	и	¤
•→10·minutes¤	и	þ
•→20·minutes¤	и	¤
Respiratory-rate¤	и	¤
•→Pre-exercise¤	¤	¤
•→Post-exercise¤	и	¤
•→1·minute¤	¤	¤
•→10·minutes¤	¤	¤
•→20·minutes¤	и	¤
Temperature¤	и	Þ
•→Pre-exercise¤	й	Þ
•→Post-exercise¤	й	Þ
•→10·minutes¤	¤	Þ
•→20·minutes¤	¤	¤
Environment¤	1	¤
	д	
Weather/temperature¤	¶	¤
	д	
Terrain¤	1	¤
	Д	-
Subjective-performance-	¤	ŭ
assessment¤		-
Other-notes¤	1	¤
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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

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?

