Primary Texts

- *Conditioning the Sport Horse* by Hilary Clayton

- *Equine Exercise Physiology* by Kenneth Hinchcliff, Raymond Gene & Andis Kaneps

- *Scientific Principles for Conditioning Race & Performances Horses* - Texas A&M University Department of Animal Science
Goal: Fit horse fully prepared for competition

Training

- Motor Control
- Mental Discipline
- Measure of Success is qualitative

Conditioning

- Maximize performance
- Maintain Soundness - Prevent Injury
- Measure of success is quantitative
Principle of Conditioning

Flexibility

Endurance

Strength
Principle of Conditioning

- Volume of Exercise
  - Intensity
    - Amount of Energy expended over time
  - Heart Rate is a good measure
  - Duration
    - Period of time which exercise is performed
    - Time is the unit of measure
  - Frequency
    - Building cardiovascular or strength is usually 3+ times/week
    - Maintenance is 1-2 times/week
Principle of Conditioning

- A process to strengthen the cardiovascular, respiratory, and muscular systems of the horse
- Combines Strength training, supplying exercises, and cardiovascular training
Systems of the Horse

- **Skeletal** - Support, protection, and movement
  - Muscles, Bones, Tendons, Ligaments, Cartilage
  - Joints - (immovable, slightly movable, & freely movable)

- **Circulatory** - transportation system
  - Heart, veins, arteries, blood

- **Respiratory** - exchange of O₂ and CO₂ from blood stream
  - Lungs, wind pipe (trachea)
Systems of the Horse

- **Digestive** - extract nutrients from foodstuff
  - Teeth, digestive tract, stomach, intestines

- **Central Nervous Systems** - manages reasoning and coordination of movement, instincts, and makes decisions
  - Brain, spinal cord, nerves

- **Reproductive** - ensures continuance of the species
Exercise Physiology

- **Cardiovascular System** - a combination of the skeletal and circulatory system
  - Blood is 10% horse weight
  - During exercise O2 consumption increases as much as 35 time in comparison to resting rate
  - Maximal heart rate 210-280 beats/minute
    - 7 fold increase from resting

- **Respiratory System**
  - Can rise as high as 180 beats/minute
  - It is desire for respiration rate to always be lower than pulse rate
  - Breathing is assisted by the locomotion of horses stride
Muscular System

- Slow Twitch (Type I) – uses Oxygen or aerobic energy conversion
- Fast Twitch (Type II a & b) – Version a uses both anaerobic and aerobic energy conversion equally, Type II-b only uses anaerobic.
- Ratio of fast twitch to slow twitch muscle is constant and not changed by fitness level
- Horses switch from aerobic to anaerobic energy conversion in a heart rate range of 140 - 170 beats/minute approximately 400m/minute
- Horse have a high level of fast twitch muscle ranging from 70-100% depending on breed
Exercise Physiology

■ Thermoregulation
  ■ Heat is a by product of work
  ■ Average temp is 100.5 but can rise as high as 105 after exercise. Can continue to rise after exercise for 5-10 minutes.
  ■ Affecting factors - surface area, hair coat, temperature, humidity, and wind speed

■ Fluid & Electrolyte Balance
  ■ Water is 60% of the horse’s body weight
  ■ Electrolytes are more concentrated in sweat than in blood.
Cardiovascular Conditioning

- Enhances horses ability to produce energy
  - Strengthens respiratory, cardiovascular, and muscles to produce energy
  - Should mimic intensity and duration of competition
  - Also strengthen the supporting limbs (Skeletal)
  - Aerobic conditioning – work up to 140-170 beats/minute approximately 400m/min for an average horse
  - Anaerobic conditioning – working above 140-170 beats/minute
- Cautions - High altitude, Overtraining can result in loss of fitness
Cardiovascular Conditioning

- Enhances horses ability to produce energy
  - Common training tools
    - Long slow distance (LSD)
      - aka legging up 2-12 months
      - Low intensity aerobic work of walk/trot/canter building to 45-60 minutes of work
    - Especially important for young horses
  - Continuous training – implies constant intensity of exercise during a workout
  - Interval training – intense work outs alternating with rest
  - Speedplay - high speed exercise alternating low intensity work
  - Acceleration sprints - maximum acceleration with gradual deceleration
  - Inertial drills - jumping
Strength Training

- Enhances strength, power, and/or endurance of the muscles
- Should be specific to sport
- Common Strength training methods
  - Gradients - improves balance, vary slope and direction
  - Gymnastics jumping - interval effect
  - Steps - uphill explosive, downhill muscle contraction
  - Different surfaces - sand, water, snow
  - Transitions within gaits and between gaits
Supplying Exercises

- Increase range of motion and reduces tension and resistance in muscles
- Improve Performance and reduces risk to injury
- Types of Supplying exercise
  - Passive supplying – slow long controlled movement
    - Carrot stretches, leg extension, belly lifts
  - Dynamic supplying – active rapid rotation of a joint through its range of motion
    - Turns, lateral movement, stretch circles, circles, voltes, cavelletti
**Heart Rate Ranges**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speed (M/Min)</th>
<th>Average Heart Rate</th>
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<tbody>
<tr>
<td>0</td>
<td>150-200</td>
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<tr>
<td>Galloping</td>
<td>800-1000</td>
<td>200-250</td>
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</table>

*These are approximate Heart Rate ranges. Numbers will vary based on fitness level, breed, age, and environmental factors.*
# Respiratory Rate Ranges

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speed (M/Min)</th>
<th>Average Respiratory Rate</th>
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<tbody>
<tr>
<td>Galloping</td>
<td>0</td>
<td>125</td>
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<tr>
<td></td>
<td>800-1000</td>
<td>150-180</td>
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</tbody>
</table>

*These are approximate Heart Rate ranges. Numbers will vary based on fitness level, breed, age, and environmental factors.*
Fun with Math

How many breaths per minute is a horse taking at 400 m/minute if he has a 12’ stride?

• 400 m/min = 1312 ft/min
• With a 12’ stride that’s 109 strides/min
• With 1 breath per stride that’s 109 breath/min
Designing a Conditioning Program

- **Horse** - Breed/type, Age, Conditioning history, Present level of fitness, Previous injuries
- **Sport** - Type of sport, Level of competition, Timing of competitions during the season
- **Rider** - Time schedule, Competitive objectives
- **Environment** - Weather, Terrain, Facilities
- **Means** of monitoring progress/Record Keeping
Pre-Conditioning Assessment

<table>
<thead>
<tr>
<th>Assessment Date:</th>
<th>Horse</th>
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<tbody>
<tr>
<td>Age &amp; Gender</td>
<td>Current Soundness</td>
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<tr>
<td>Breed</td>
<td>Current Weight/Muscle Description</td>
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<tr>
<td>Height</td>
<td>Body Type</td>
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<tr>
<td>Resting TPR's</td>
<td>Current Weight</td>
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<td>Location</td>
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Projected Health Services:

**Brief Conditioning History**
Pre-Conditioning Assessment

<table>
<thead>
<tr>
<th>Medical concerns</th>
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<tr>
<th>Condition Goal &amp; Metrics</th>
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Conditioning Goals & Metrics

Quantify your goals

What is a Beginner Novice Horse Trials:
- Dressage: Approximately a 30-45 Min Dressage warm up & a 5 Min Dressage test
- XC: Approximately 2000 Meter Canter @ 350m/min & 25 Jump efforts (Course 18 & warm up 7)
- SJ: Approximately 250 meter Canter & 20 Jump efforts (Course 14 efforts & warm-up 7 efforts)
- Hauling an hour each way
- Stabling over night
Conditioning Plan for a Dressage Horse
# Pre-Conditioning Assessment

<table>
<thead>
<tr>
<th>Assessment Date: 03-01-20##</th>
<th>Re-assessment Date: 04-26-20##</th>
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</thead>
<tbody>
<tr>
<td>Horse: Chrystopher Radetzky</td>
<td>Age &amp; Gender: 12 yr. old Gelding</td>
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<tr>
<td>Current Soundness: Sound Excellent</td>
<td>Current Weight/Muscling Des.: Body Type: Baroque Style</td>
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<td>Breeding: Oldenburg¥Thoroughbred</td>
<td>Weight: approx. 1800</td>
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<td>Height: 17H3”</td>
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<tr>
<td>Resting TPR’ s: 100.5° F, 36 beats/min., and 12 breaths/min.</td>
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<td>Location: Kansas City, MO</td>
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<td>Projected weather conditions: Spring weather: 40° - 70° F, low humidity, with frequent rain</td>
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<tr>
<td>Rider’s Ride Schedule: M-F between 5-9 PM, weekends between 7-11 AM</td>
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<td>Projected Ration Changes: No planned grain or hay modifications, but an increase of calories as a result of new grass on turnout will be monitored to determine if feed changes need to be made.</td>
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<tr>
<td>Projected Health services: De-Worming, Annual Vaccinations, Teeth Floating, Chiropractor</td>
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</table>
Pre-Conditioning Assessment

Brief Conditioning History

- Current conditioning score would be an 8.5-9 out of 10.
- Last three month: Winter maintenance routine of 3-5 approximately hour-long indoor rides/week, including bi-weekly lessons, cavaletti work, and groundwork. Horse on regular turn-out on dry lots (10-16 hours/day)
- Previous competition year: Horse successfully competed at 1st and 2nd level dressage.
- Long term historical conditioning: Has been in steady work of 3-6 rides/week for last 2.5 years. The 1st 18-months of this history, horse was improved from a conditioning score of a 5 to a 9.

Medical Concerns

- Bone Spur in right stifle, permanent scaring on left hip as a result of inability to sleep on right side before treatment of stifle.
- Wind puffs on all pasterns due to body type and age
- Previous history of colic & colic surgery (occurrence more than three years)
- Glycogen storage deficiency
Conditioning Goals & Metrics

- Primary goal is to return horse to the level of fitness required for competition at 2nd level, with an emphasis to increase the horse’s overall strength through his back and hind end in preparation for the requirements of 3rd level.

- Date of next competition: May 12, 20##

- Recovery Time of cooling out phase of each day of exercise will be the primary metric tracked to monitor status of conditioning program toward goals. Recovery time baseline is an average ## minutes.

- Maintain current weight, and endurance. Increase horses strength, and flexibility as required to meet the needs of 3rd level exercises.
Schedule

Plan – Bi-weekly exercise rotation (repeat schedule 4 times)

Day 01  Ride Outside on terrain (Pasture)  Day 08  Flat Lesson
Day 02  Flat School w/cavaletti  Day 09  Rest
Day 03  Lunge/Long line w/cavaletti  Day 10  Flat School
Day 04  Grid Work  Day 11  Grid Work
Day 05  Rest  Day 12  Ride
Day 06  Flat School  Day 13  Flat School
Day 07  Ride Outside on terrain (Park)  Day 14  Rest
Schedule

- **Riding in the Open (≈ duration 45 - 90 Min) – Cardiovascular Emphasis**
  - Trailer ride 2x15 min. to State Park
  - Ride length of .75-1 hrs
  - 5:4:1 ratio of walk: trot: canter (1:1 work to rest ratio)
  - Target heart rate 130 beats/min
  - Average speed 110 meters/minute & Target Distance: 3500 – 6000 meters

- **Flat School & lessons (≈ duration 40 - 60 Min) – Flexibility Emphasis**
  - Warm-up
    - 10-15 min. ≈ 3:1 walk: trot ratio
  - Workout
    - 20-30 min. ≈ 3:3:1 trot: canter: walk ratio
    - Inc. ≈ 2x2 min. walk break
    - Target heart rate (120-150/beats min)
  - Warm Down
    - 5 min long rein trot
  - Cool Out
    - 5-10 Min long rein walk
    - Recovery rate monitored
Schedule

- **Grid Work (≈ duration 35 - 45 Min) – Strength Emphasis**
  1. Warm-up
     1. 5-10 min. ≈ 1:2 walk: trot ratio
     2. Includes cavaletti
  2. Workout
     1. 20 min in duration
     2. Grid w/reps
     3. Target heart rate (120-200/beats min)
  3. Warm Down
     1. 5 min long rein trot
  4. Cool Out
     1. 5-10 min long rein walk
     2. Recovery rate monitored
Schedule

- **Lunge/Long Line (≈ duration 15 - 25 Min)** – Flexibility
  - 1:1:1 walk: trot: canter ratio
  - Target heart rate 120 beats/min

- **Rest (Minimum 24 hours)** – Recovery
  - Rest days can float a day early or late to accommodate Health service needs

- **Turnout** - Recovery
  - Daily 16 – 20 hours outside time split between dry lot and pasture pending weather and 4-8 hours in stall allowing time for his naps
### More traditional Stamina schedule

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 7</th>
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<tbody>
<tr>
<td>1. 10 Min walk</td>
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<td>2. 6-10 Min trot</td>
<td>2. 12-20 Min trot</td>
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<td>3. 2 Min walk</td>
<td>3. 2 Min walk</td>
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<td>4. 6-10 min trot</td>
<td>4. 4-5 min Canter at 300-350 M/min</td>
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<td>5. 2 Min walk</td>
<td>5. 2-3 Min Walk</td>
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<tr>
<td>6. 1-2 min Canter at 300-350 M/min</td>
<td>6. 4-5 min Canter at 300-350 M/min</td>
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<tr>
<td>7. 2 Min Walk</td>
<td>7. 5-10 min walk</td>
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<tr>
<td>8. 1-2 min Canter at 300-350 M/min</td>
<td>8. 10 Min trot</td>
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<tr>
<td>9. 2 min walk</td>
<td>9. 10 minute walk</td>
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<tr>
<td>10. 1-2 Min Canter at 300-350 M/min</td>
<td>Total time 45 Min – 75 Min</td>
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<td>11. 5 min walk</td>
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<tr>
<td>12. 6-10 Min trot</td>
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<td>13. 10 minute walk</td>
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**Total time 45 Min – 60 Min**
# Record Keeping

## Temperature and Humidity Log

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<th>Horse:</th>
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# Record Keeping

## Conditioning Schedule & Workout Log

<table>
<thead>
<tr>
<th>Rider:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Horse:</td>
<td>Week:</td>
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<table>
<thead>
<tr>
<th>Plan</th>
<th>Turn Out/Diet Changes</th>
<th>Actual</th>
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<td>Monday</td>
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</table>
Equipment Consideration

- Meter Wheel
- Basic Watch
- Garmin Forerunner
Trends of a mount gaining fitness
**Trends of Building Fitness – Turn Back**

![Graph showing the relationship between turnback measured in time (minutes) and volume of exercise. The graph includes three trends labeled as Turn Back 1, Turn Back 2, and Turn Back 3. Each trend line shows a different pattern of change in turnback over the volume of exercise.](image-url)
Trends of Building Fitness – Turn Back

Heart rate (PULSE) vs Volume of Exercise

- Heart Rate 1
- Heart Rate 2
- Heart Rate 3
Cautions

• Need to react/re-evaluate if horse is not responding to the designed program or desired result is not being achieved
• It is common to need to adjust feed schedule as a result of increased work particularly if horse is loosing weight, or sluggish
Basic Conditioning Vocabulary
Basic Conditioning Vocabulary

- **Types of Conditioning:** Cardiovascular, Strength, Supplying/Flexibility
- **Volume of Exercise:** Intensity, Duration, Frequency
- **Daily Workout:** warm up, workout, warm down, cool out
- Strength, power, endurance as it relates to muscles
- Dehydration, electrolytes, sweating, evaporation, heat index
- Continuous Training verse Interval Training
- Overloading, Overtraining, injury, fatigue, rest
- Fitness level, Heart rate
- Oxygen debt, panting
Basic Conditioning Vocabulary

- Annual Periodicity
- Record Keeping
- Ration formulation
- Lactic acid
- Long slow distance
- Temperature, Pulse, Respiration rates at rest, values during work for various sports, and a range of maximum values
- Recovery time
- Work: rest ratio, walk: trot: canter workout ratio
- Tapering, peaking
- Conditioning verse Training (qualitative verse quantitative)
Questions?
Presenter Information

Scot has earned his Level II - Provisional ICP status through USEA, and is also a National Examiner, Chief Horse Management Judge with United States Pony Club (USPC). Scot graduated from USPC as an HA from Cazenovia Pony Club in the Western NY Region, but currently lives near Kansas City, MO. He is the owner of Appleshed Equestrian which is private training facility for Pony Clubbers and Eventing enthusiasts. As a rider Scot has had many influences, but most recently his primary instructors have been Heidi Williams (Stonewall Farms, MO) and Moray Nicholson (Yorkshire Equestrian Center, UK). Outside of the horses, Scot has achieved several advanced degrees in Imaging and Color Science, and works for Hallmark Cards, Inc. as an Engineering Manager in the Creative Technologies Department. His current horse related goals include completing his USDF Bronze Medal, and continuing to develop his eventing training facility and team.