2009 USDA Tennessee Walking Horse Trainer's Seminar

UTILIZING THERMOGRAPHY to ASSESS COMPLIANCE with THE HORSE PROTECTION ACT

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- 1978 Graduate Colorado State University
- M.S. degree Purdue University, thesis: “Thermographic Evaluation of the Equine Lower Limb” 1979-1981
- Spoke nationally and internationally on lameness topics
- Written over 100 scientific publications and book chapters
- Board certified in Surgery (ACVS) 1986
- Board certified in Thermology (ABT) 2002
- Inducted into Equine Veterinary Hall Fame in 2004 for my work on the horse’s foot
- Member of ad hoc committee on the AAEP Tennessee Walking Horse white paper
- Vice President of Minnesota Horse Council, chair of the MHC Legislative Committee
- Served 2 terms on Central States Dressage and Eventing BOD
- President of Minnesota Association of Equine Practitioners
- Member of Minnesota Unwanted Horse Coalition

THE PROBLEM

- Soring is the practice of inflicting pain to create an extravagant and exaggerated show gait for both padded and flat-shod horses and includes but is not limited to the use of irritants; the treatment of the pastern region to remove the visible effects of irritants or scar/callus remnants resulting from previous irritants and/or action devices; pressure shoeing and excessive paring of the sole and/or frog; and any method utilized to induce pain or laminitis.

39 YEARS: A Culture of Abuse

- Its continued practice is documented by the USDA's citation of 127 violations of HPA regulations during the 2007 TWH Celebration, the industry's championship event.
- 2008: almost 50% of the horses tested for foreign (forbidden) substances on the pastern were positive

Aromatic hydrocarbons consistent with the composition of a fuel oil
Benzocaine
Elemental Sulfur
Octyl Methoxycinnamate
Isopropyl Palmitate
o-Aminoazotoluene
Camphor
Oxybenzone
Methyl Salicylate
Isopropyl Myristate
Lidocaine
Dimethly Sulfoxide (DMSO)
Menthol

WHY DOES IT CONTINUE

- The failure of the HPA to eliminate the practice of soring can be traced to the woefully inadequate annual budget of $500,000 allocated to the USDA to enforce these rules and regulations.
- In the absence of adequate governmental funding, it is incumbent upon industry participants themselves – owners, trainers, and all support personnel – to take full responsibility for developing a program which succeeds in eliminating the recognized abuses that are at the core of the problem.
- Continued reliance on the use of traditional techniques dependant upon the subjective response of the horse would appear a wasted effort and funding for the development of objective methodology for use by qualified veterinary inspectors must be provided.

Improved Methods of Evaluation

- Because the HPA has been in effect since 1970, no scarring, calluses or other skin conditions indicative of treatments directed at increasing sensitivity should be present in horses currently in competition and none should be tolerated.
- no efforts to mask such treatments should be tolerated

To Ensure the Health and Welfare of Horses

- Immediate institution of drug testing (plasma, serum and cutaneous swabs) based on the methodology and regulations established by the United States Equestrian Federation (USEF).
- Prohibition of any medical treatments or syringes, therapeutic or otherwise, by any personnel in the make-up ring prior to each class, an area which should be supervised by trained stewards known to be otherwise uninvolved in the Walking Horse industry.
  - ✓ Limitations on the number of individuals and equipment which may accompany the horse into the make-up ring.
    - Forbid the use of any devices utilized to tighten the bands which secure the ‘packages’

To Ensure the Health and Welfare of Horses

- In recognition of the fact that many acts associated with soring occur in the stabling areas of the show grounds, it is recommended that security personnel and supervising inspectors be present in these areas 24 hours each day of the competition to ensure that no violations of the HPA occur.
- Physical inspection of the horses prior to entering the ring to include:
  - ✓ Visual inspection of the limbs and shoes
  - ✓ Removal of saddles/girths to check for pain-inducing objects
  - ✓ Thermographic screening of the limbs to assist in defining specific anatomical areas requiring additional clinical examination and/or surface swabbing to detect forbidden substances.
  - ✓ Palpation of the limbs including:
    - Routine evaluation of the limbs
    - Assessment of digital pulses
    - Critical assessment of specific areas suggested to be abnormal on thermographic examination
  - ✓ Swabbing of the limbs for foreign substance testing
    - Areas determined to exhibit an abnormal thermographic pattern should be included in the testing.
  - ✓ Examination of the horses in a standard pattern at a walk and extended walk, on a loose rein, in hand and under tack.

To Ensure the Health and Welfare of Horses

- Observation by qualified veterinarians of the horses during competition for lameness while at work.
- Re-examination of selected horses as they exit the ring (with horses held in the make-up ring while examinations are completed) to include:
  - ✓ Thermographic re-examination.
  - ✓ Removal of both front shoes of randomly selected horses or horses with abnormal thermographic patterns:
    - Visual and hoof tester examination of unshod feet for evidence of methods directed at inducing pain, such as pressure devices and excessive paring of the sole and frog.
    - Weighing of shoes (flat-shod horses) or shoes and package (padded horses).
  - ✓ Digital radiographs of the feet, in randomly selected horses or horses found to have any physical or thermographic abnormalities, to detect:
    - Laminitis, acute or chronic, as manifested by either rotation of the third phalanx or sinking of the bony column within the hoof capsule.
    - Sole thickness.
  - ✓ Drug testing including <u>both</u> plasma and urine for the presence of prohibited substances.
  - ✓ Swabbing of the limbs for foreign substance testing utilizing current standard methodology.
    - Areas determined to exhibit an abnormal thermographic pattern should be included in the testing.

Implementation

- Drug testing can be implemented in similar fashion to that utilized by the USEF, with contract veterinarians responsible for collecting and submitting samples to the testing laboratory.
  - ✓ The enforcement of the screening methods outlined above will necessitate the training of a corps of veterinarians, known to be independent of the TWH industry and certified by an organization created solely for the enforcement of regulations governing competitions
- The Task Force suggests that the staff of Veterinary Medical Officers (VMOs) be utilized to supervise the inspection of the horses by this corps of trained veterinarians and to impose sanctions for violations.
- Training of both the VMOs and this additional corps of veterinarians must include more objective measures of detection such as thermography and digital radiography.
- Every event should be required to have veterinarians on duty during the hours of competition who, in addition to providing emergency medical treatment, could assist in these evaluations.

Implementation

- The Designated Qualified Persons (DQP) Program should be abolished since the acknowledged conflicts of interest which involve many of them cannot be reasonably resolved, and these individuals should be excluded from the regulatory process. The current duties of the program should be assumed by qualified veterinarians.
- Many of the above recommendations will require significant financial resources to implement; however, if the industry is serious in its intention to end this cruel and inhumane practice and restore the reputation of its breed and the integrity of its leadership, funding must be provided. The expense of these measures must be borne by the TWH industry.

The Importance of Additional Research

- Establishment of objective methods to detect soring in order to eliminate the current practice of conditioning horses to tolerate pressure applied to the distal limb.
  - ✓ Thermography
    - Confirm the consistent thermographic patterns of normal TWHs with double blind, placebo-controlled studies.
    - Confirm, with double blind, placebo-controlled studies, the consistent thermographic patterns associated with soring reported by Nelson and Osheim, 1975; Purohit, 1978-1983; and Turner, 1981 and 1986.
      - Areas of increased temperature (circulation).
      - Areas of decreased temperature associated with topical applications.
    - Determine if thermographic patterns consistent with pressure shoeing are demonstrable.

The Importance of Additional Research

- ✓ Digital Radiographic Assessment of TWHs to determine:
  - The normal configuration of the TWH digit including thickness and radiopacity of sole.
  - Hoof capsule distortions.
  - Presence of laminitis – either rotation or sinking.
  - Identify which foreign materials may be visualized between the shoe and sole, resulting in inappropriate sole pressure, and within the package, resulting in excess weight.
- ✓ Determine the effect of shoeing alone and shoeing plus chains of variable weights in the development of pastern irritation and scarring on both young and mature TWHs.
  - Evaluate the necessity of the use of lubricants with chains.

Putting the Horse First

1. Establishment of a single organization that has governance responsibilities for the industry is critical for the effective resolution of conflict and the establishment and enforcement of uniform standards and regulations. The current arrangement of multiple Horse Industry Organizations (HIOs) fails to accomplish this vital need and has resulted in competing interests.

Putting the Horse First

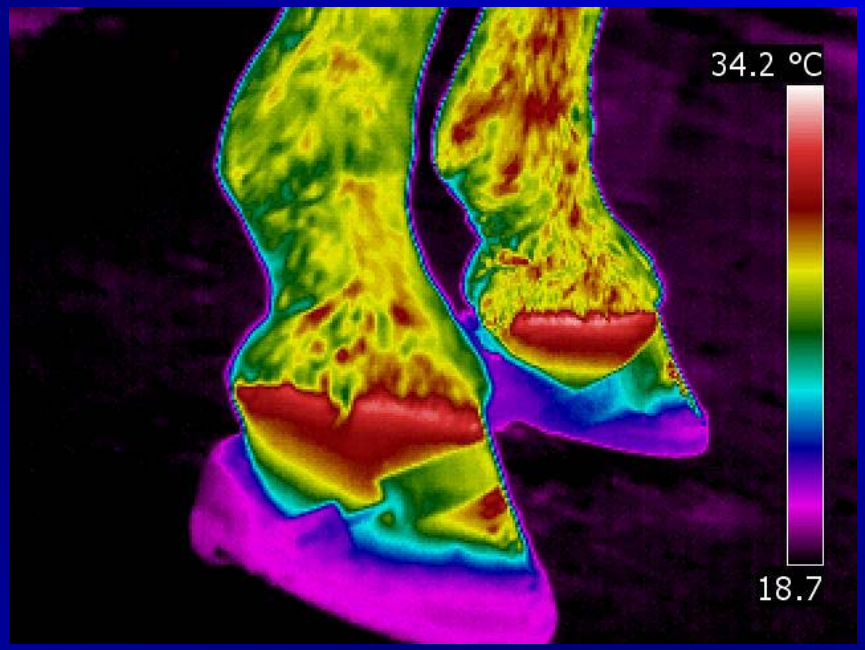
2. The adoption and strict enforcement of meaningful uniform standards and regulations, combined with more stringent penalties, are the cornerstones of establishing fair and humane competitions. Penalties should be much more severe and consequential to owners, trainers and other support personnel than in the past. Lifetime disqualification of horses found not to be in compliance would penalize trainers and owners to a degree likely to mitigate against a second infraction. We believe that owners are the only individuals who can bring adequate pressure to bear on each other and their trainers to eliminate these intolerable abuses.

Putting the Horse First

3. Establishing standards of judging which value the innate grace and beauty of this breed instead of rewarding the currently manufactured extravagant and exaggerated gaits will facilitate a rapid return to horsemanship and training devoid of the intolerable abuses of soring in all its manifestations.

THERMOGRAPHY and THE HORSE PROTECTION ACT

- 1975 NELSON, detection of SORING in Tenn Walking Horses
- 1978 report in JAVMA: THERMOGRAPHIC ENFORCEMENT of the HORSE PROTECTION ACT
- 1978-1982 PUROHIT, AUBURN UNIV: THERMOGRAPHY IN DIAGNOSIS OF INFLAMMATORY PROCESSES IN HORSES IN RESPONSE TO VARIOUS CHEMICAL AND PHYSICAL FACTORS



WHAT IS THERMOGRAPHY??

ANATOMIC IMAGING

- RADIOLOGY
- ULTRASONOGRAPHY
- COMPUTED TOMOGRAPHY
- MAGNETIC RESONANCE IMAGING

PHYSIOLOGIC IMAGING

- SCINTIGRAPHY
- THERMOGRAPHY

THERMOGRAPHY THEORY

HEAT IS EMITTED IN THE FORM OF INFRARED RADIATION

THERMOGRAPHY THEORY

WHAT PHYSIOLOGY DOES THERMOGRAPHY MEASURE?

- **LOCAL CIRCULATION**
- **BLOOD FLOW**
- **LOCAL METABOLISM**

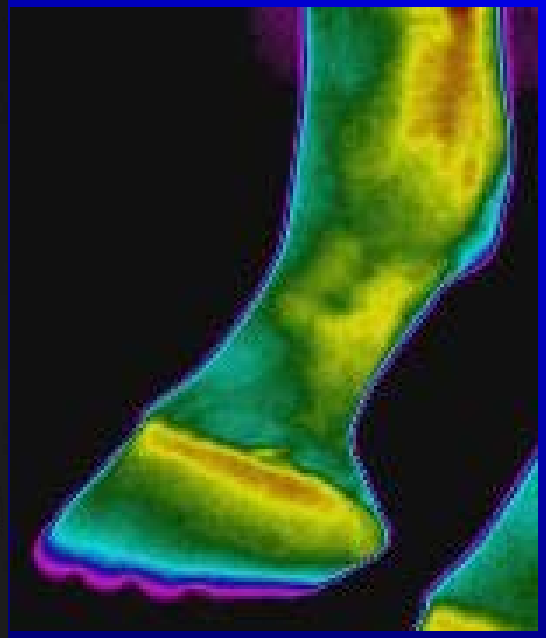
THERMOGRAPHY

ABILITY TO NON-IVASIVELY ASSESS INFLAMMATION

- MAKES THERMOGRAPHY AN IDEAL TOOL TO AID IN THE DIAGNOSIS OF LAMENESS
- MAKES THERMOGRAPHY AN IDEAL SCREENING TOOL FOR INFLAMMATION

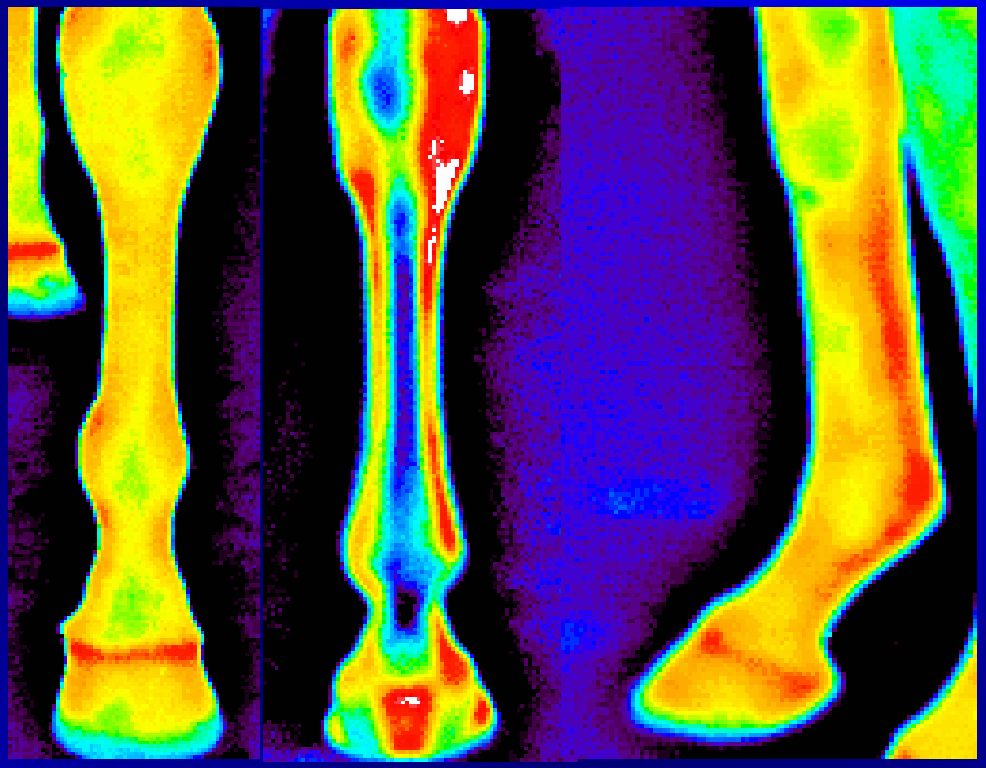
THERMAL PATTERN

- DICTATED BY
  - ✓ CIRCULATORY PATTERN
  - ✓ LOCAL VASCULARITY
  - ✓ SURFACE CONTOUR



THERMAL PATTERN

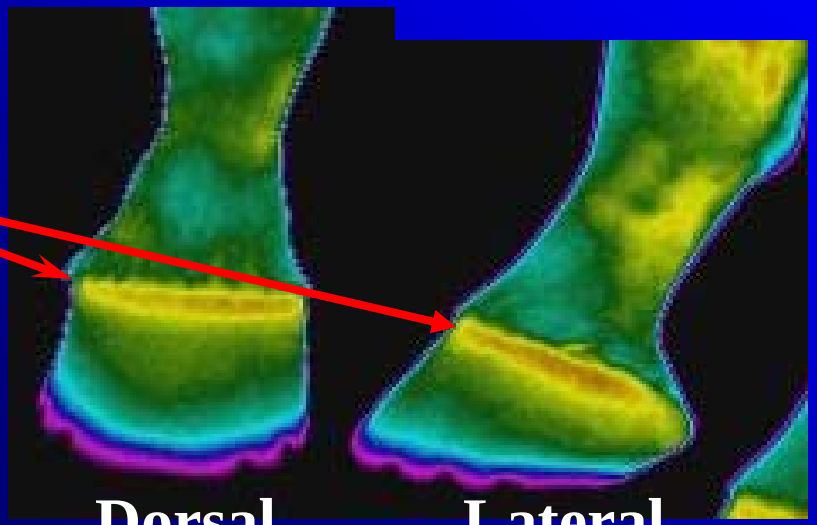
- DORSAL VIEW = relatively cool
  - TENDONS = relatively cool
  - HEAT between MC/MTIII and FLEXOR TENDONS



Dorsal Palmar Medial

THERMAL PATTERN

- CORONARY BAND and LAMINAR CORIUM are WARMER
- BETWEEN BULBS of the HEEL is WARMEST



Dorsal Lateral

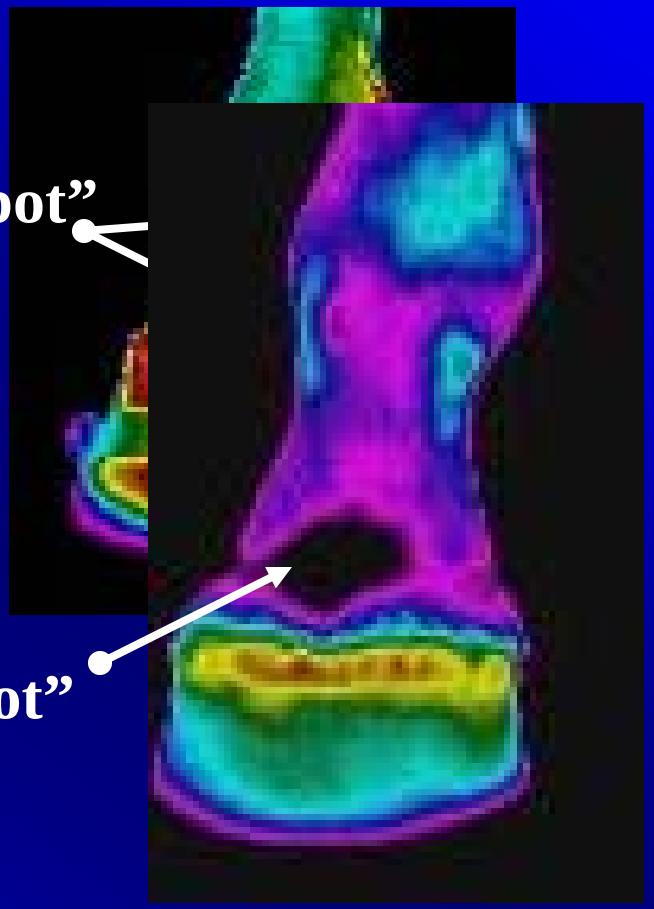
Palmar

THERMOGRAPHY as a DIAGNOSTIC TOOL

INFLAMMATION MAY BE DETECTED THERMOGRAPHICALLY AS EITHER:

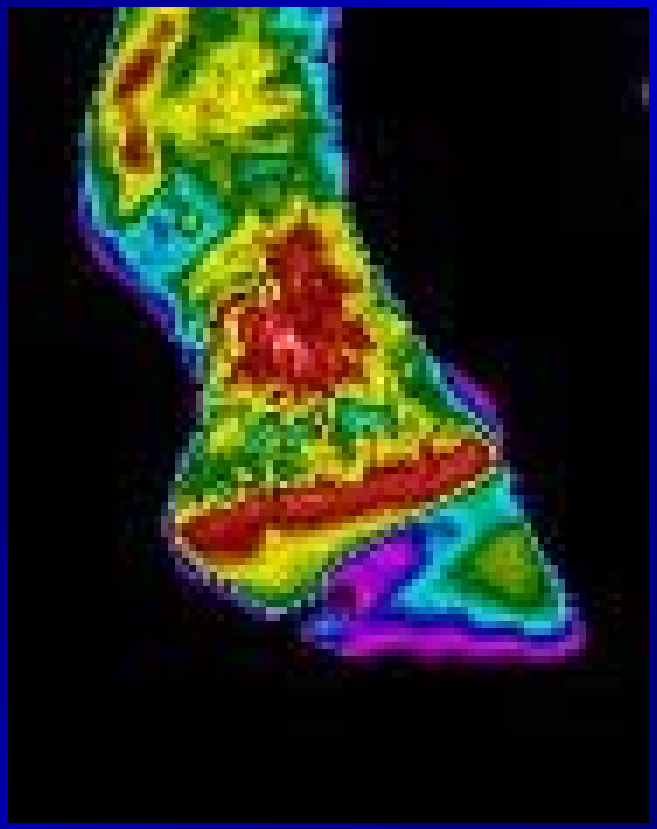
- **“HOT SPOT”**
- **“COLD SPOT”**

1°C difference over 25% of a bilaterally symmetrical area is evidence for further investigation



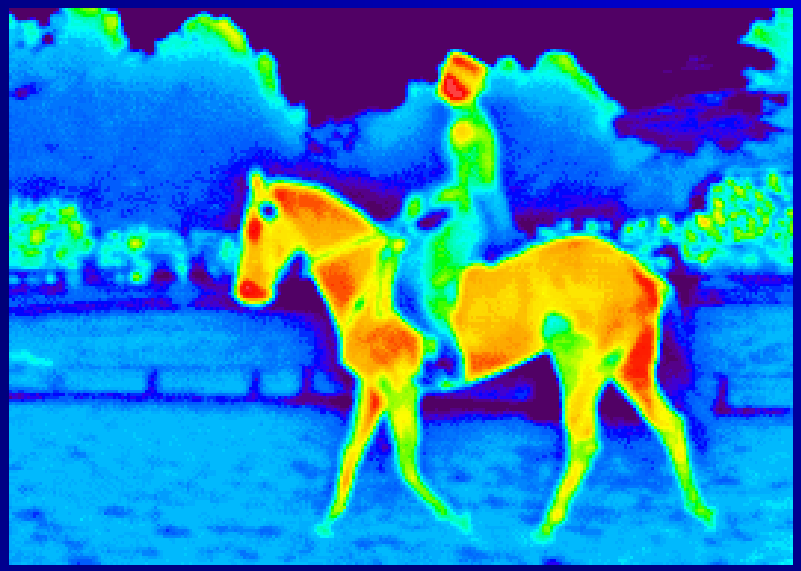
THERMOGRAPHY can ENHANCE CLINICAL EXAMINATION

- QUALITATIVE ASSESSMENT OF THE VASCULATURE AND BLOOD FLOW TO TISSUES
- TELLS THE EXAMINER WHAT THEY DID NOT KNOW
- DETECTING HEAT WHERE IT WAS NOT PALPABLE
- DETECTS NOT NORMAL



THERMOGRAPHY RESEARCH

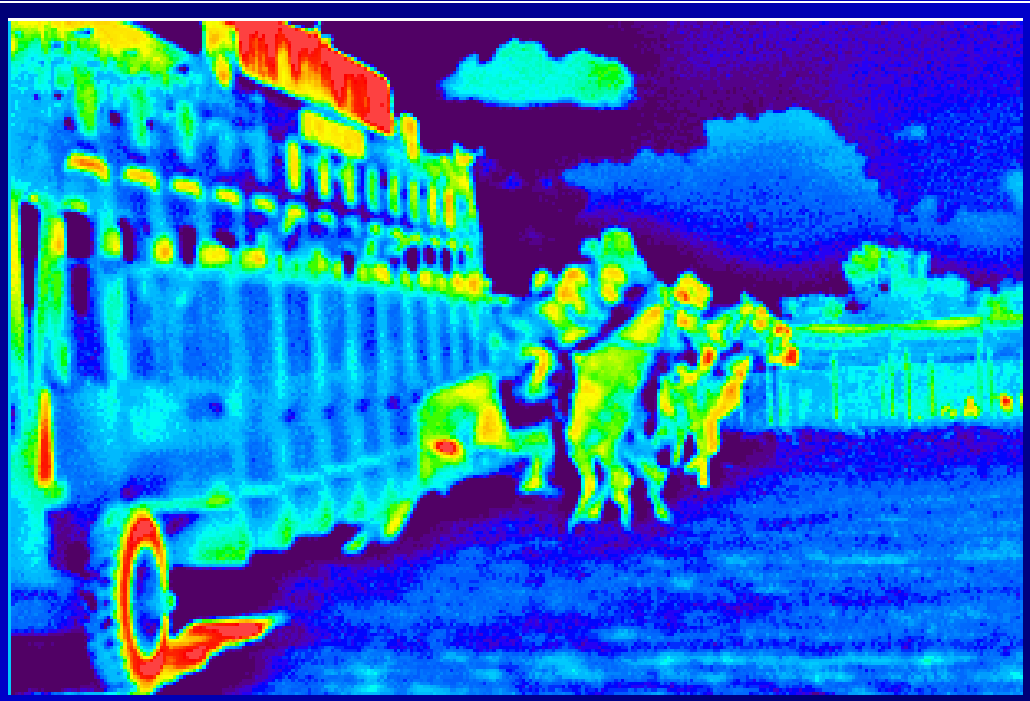
- FACTORS THAT MUST BE CONTROLLED:
  - MOTION
  - EXTRANEOUS RADIANT ENERGY
  - AMBIENT TEMPERATURE
  - QUANTIFICATION OF TEMPERATURE



THERMOGRAPHY FIELD CONDITIONS

Turner TA, Pansch J, Wilson JH: Thermographic assessment of racing Thoroughbreds. Proceedings Am Assoc Eq Practnr, 47, 2001: 344-346.

- **EXAMINED 50 HORSES OVER 2 RACING SEASONS**
- **686 THERMOGRAPHIC EXAMINATIONS**



RESULTS

CAN THERMOGRAPHY PREDICT INJURIES BEFORE THEY ARE CLINICALLY APPARENT?

- **YES: PROBLEMS WERE IDENTIFIED *2.3 WEEKS* PRIOR TO TRAINER CONCERN**

HOW WELL DOES THERMOGRAPHY CORRELATE WITH EXAMINING VETERINARIAN'S FINDINGS?

- **95% AGREEMENT**

RESULTS

- THERMOGRAPHY CAN BE READILY USED UNDER FIELD CONDITIONS WITH ACCURATE RESULTS
- ENVIRONMENTAL ARTIFACTS CAN BE ACCOUNTED FOR AND ACCURATE ASSESSMENTS MADE
- WHEN INFLAMMATION IS PROPERLY TREATED, THERMAL IMAGES RETURN TO NORMAL

THERMOGRAPHY and THE HORSE PROTECTION ACT

A STUDY

- To develop an efficient protocol using thermal imaging and known standards of normality to identify horse's with abnormalities with the potential to either effect performance or be in violation of the standards of the Horse Protection Act.
- To develop an objective process to assign a index of suspicion to abnormalities identified.
- To provide materials to be used for education of Veterinarians, the general public, and members of the TWH community concerning proper preparation of horses for athletic competition.

STUDY DESIGN

Research Activities

1) Pre-exercise Thermographic exam

2) Clinical exam using the currently established protocol which includes a 3 part evaluation of General Attitude (GA), Locomotion/Lameness (L), and Physical Exam / Palpation (PE). Each segment is scored 1 - 3 in terms of normal =1 and severe = 3.

3) Horse to enter the ring and compete vigorously in its normal occupation at winning level of intensity. Horse to stay in motion for 10 minutes.

4) Post Exercise Physical exam

5) Post Exercise Thermal Exam
Horses allowed to cool out and rest.

6) Horses all received DP and Lateral Digital Radiographs of all four feet.

7) 2 hour post exercise Physical Exam.

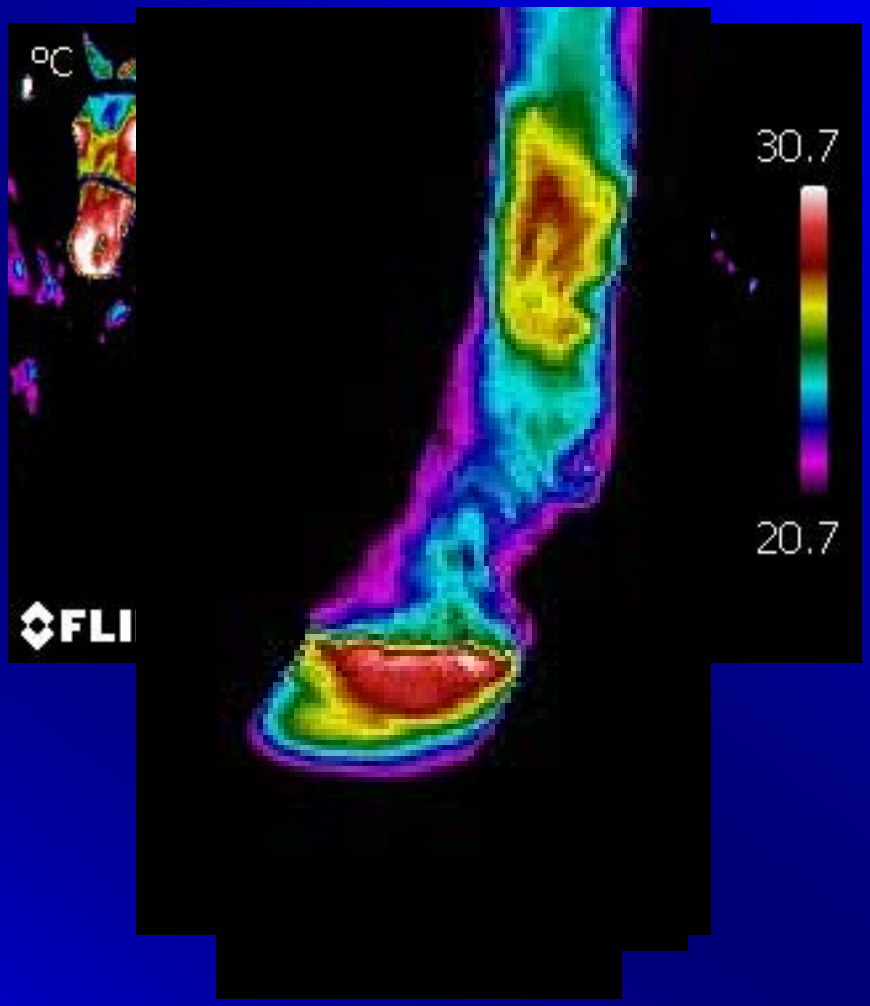
8) 2 hour post exercise Thermal Exam.

Horse 1 excused from evaluation

- **Study Event took place in December 2007**
- **15 TWHs of various disciplines participated**
- **All horses were teamed by Persons Responsible to be fit to compete, and were currently being actively shown.**
- **Researchers were blinded as to the individual horse's identity or competition records.**

RESULTS

- 15 HORSES EXAMINED, 1 WAS NORMAL
- 5 HORSES HAD AN ABNORMAL PASTERN
- 3 HORSES HAD ABNORMAL HOOVES
- 5 HORSES HAD ABNORMAL PASTERNS AND HOOVES
- 1 HORSE HAD ABNORMAL CANNON



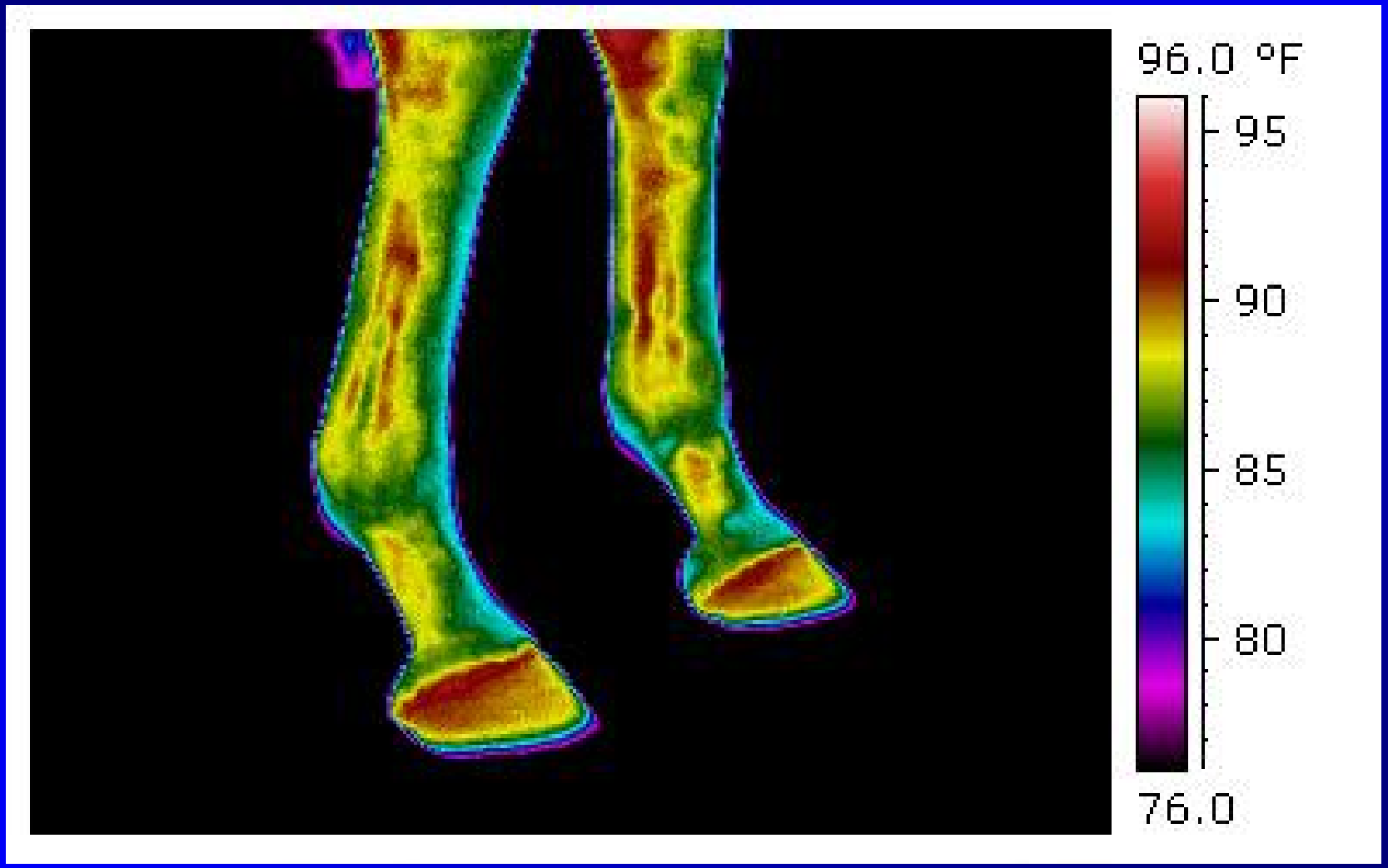
RESULTS

- 14 HORSES WERE THERMOGRAPHICALLY NOT NORMAL
- 11 CONFIRMED ABNORMAL BY FURTHER EXAMINATION:
  - ✓ 10, ABNORMAL PALPATION and/or HOOF TESTER EXAMINATION
  - ✓ 8, ABNORMAL DIGITAL RADIOGRAPHY

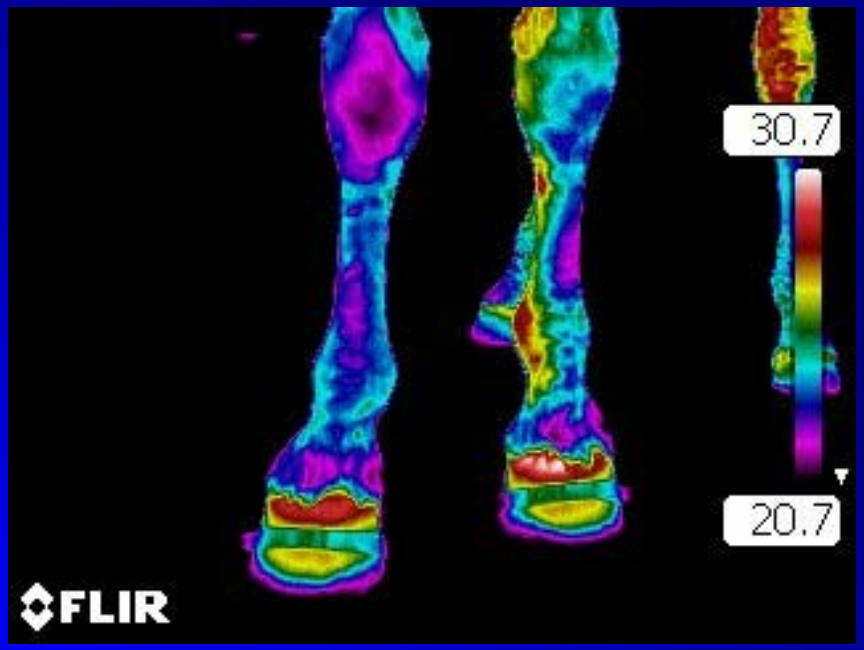
PROTOCOL

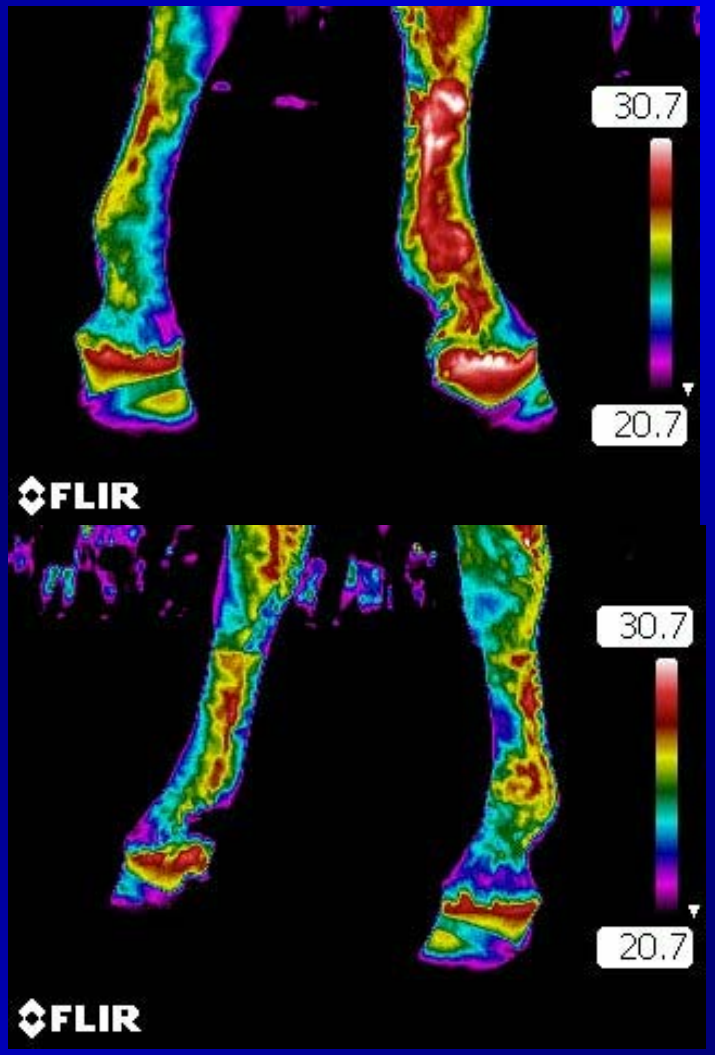
- PRESENT THE HORSE TO VMO THERMOGRAPHER, HORSE FACING TOWARD EXAMINER
- TURN RIGHT, LEG NEAREST THE CAMERA FORWARD
- TURN RIGHT, WITH REAR LEGS SPREAD SLIGHTLY APART
- TURN RIGHT, LEG NEAREST THE CAMERA FORWARD

NORMAL



NOT NORMAL





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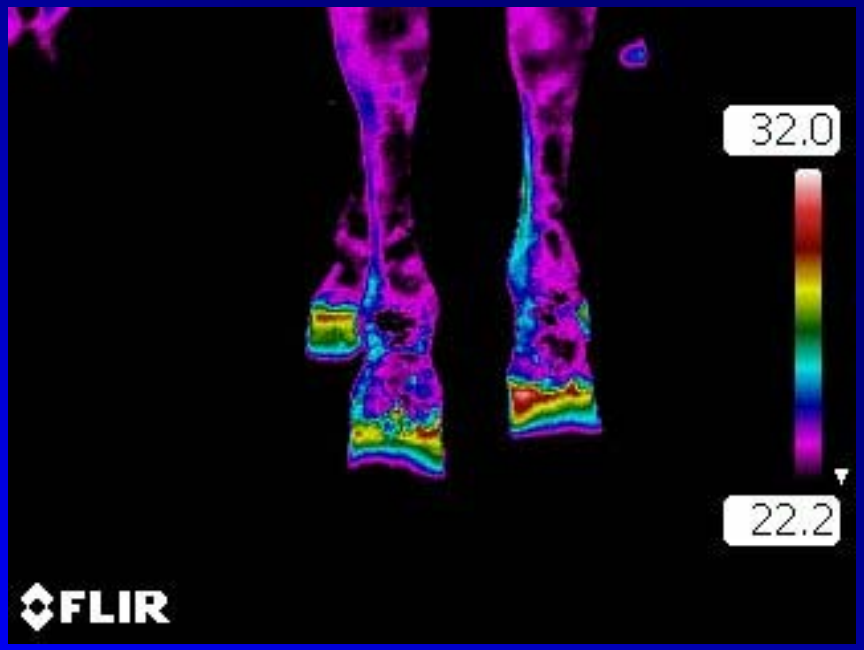
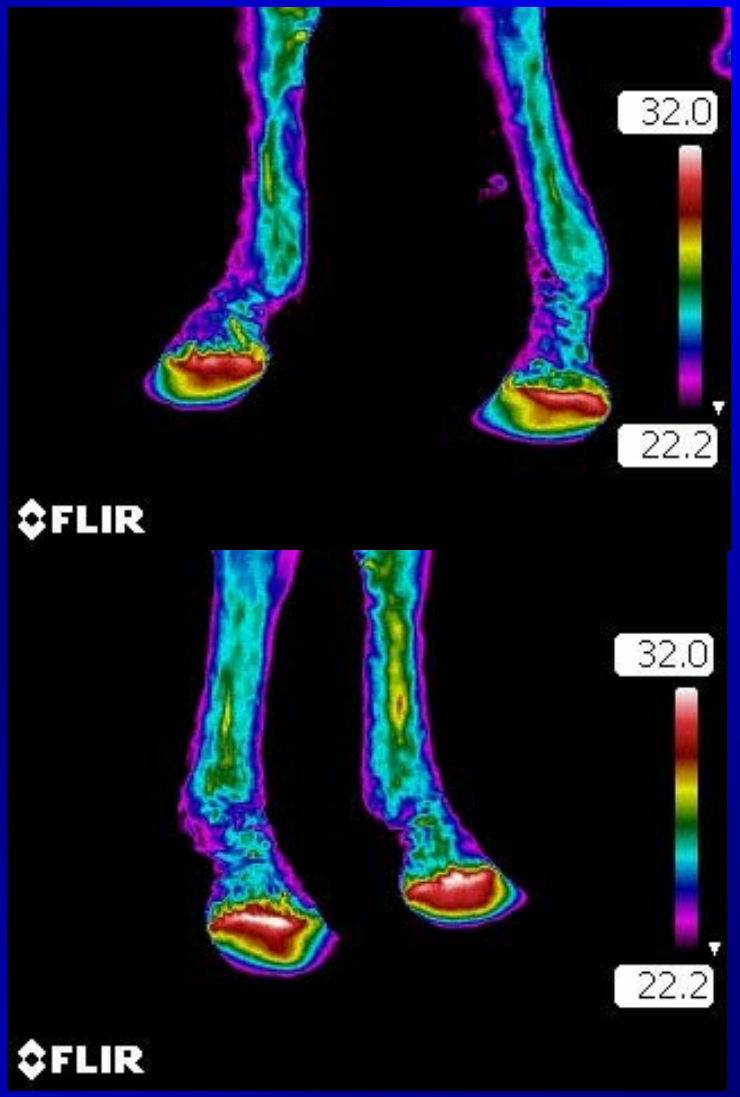
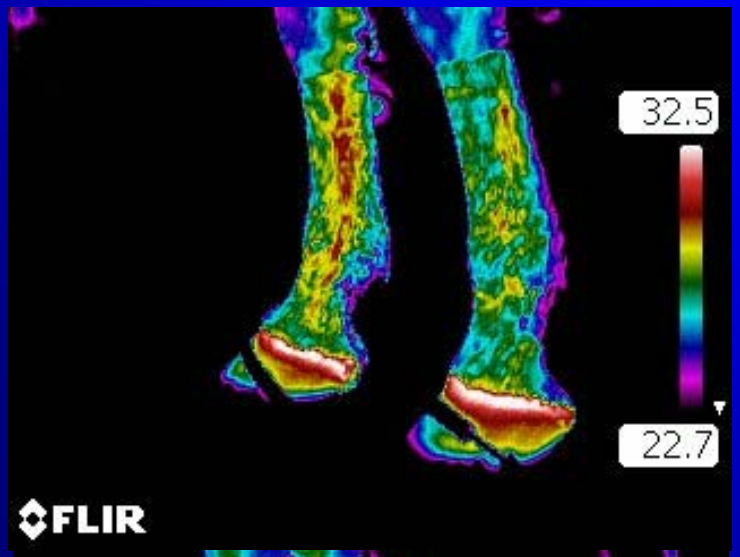




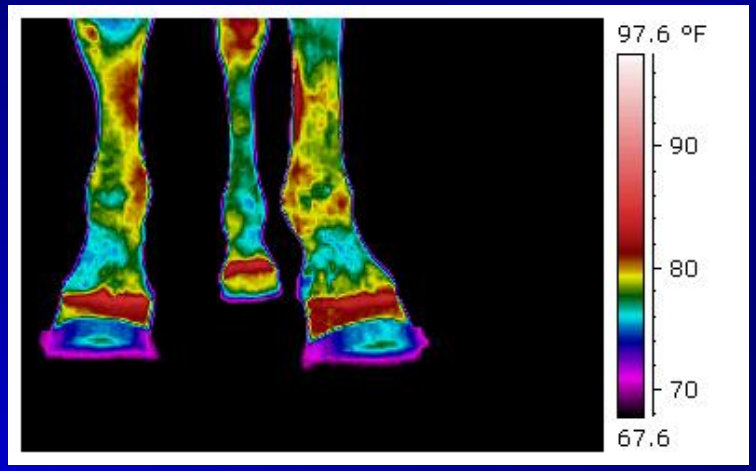
DIGITAL RADIOGRAPHY

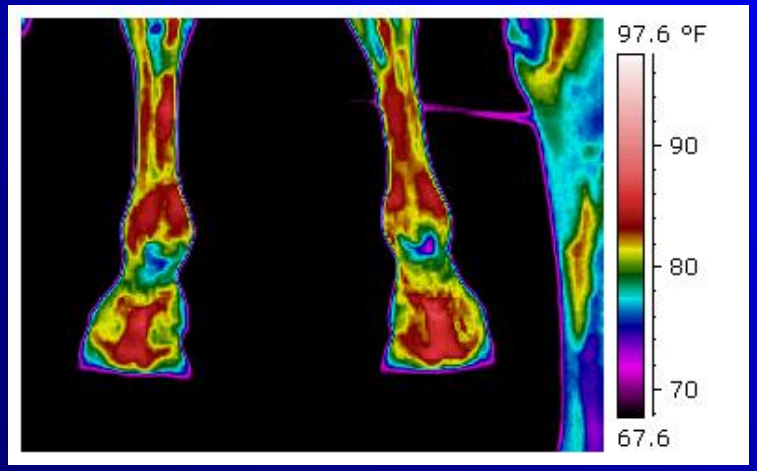
NOT NORMAL

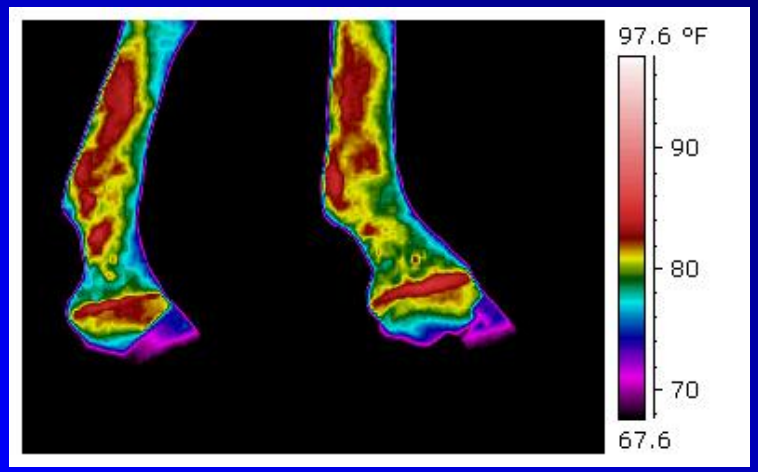


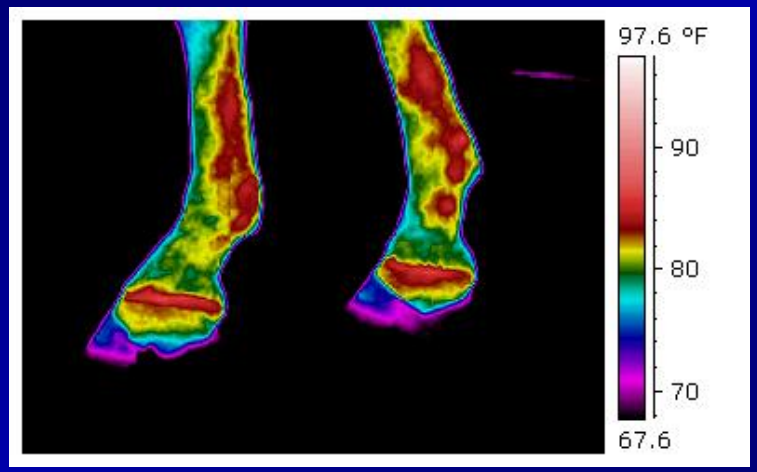
DIGITAL RADIOGRAPHY

HORSE 1 bay mare



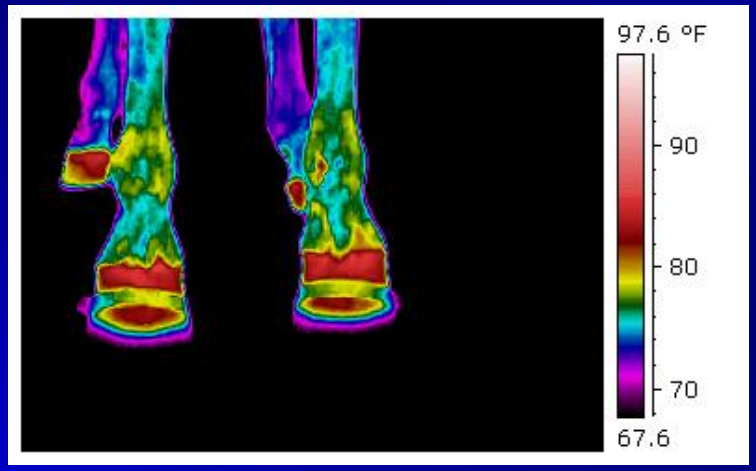


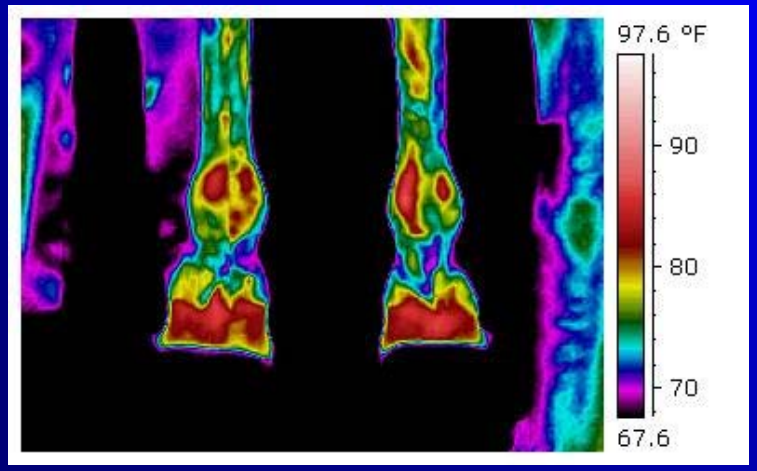


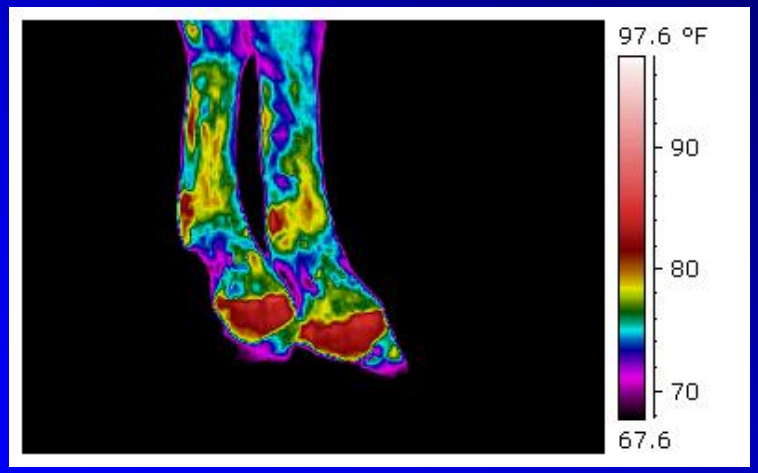


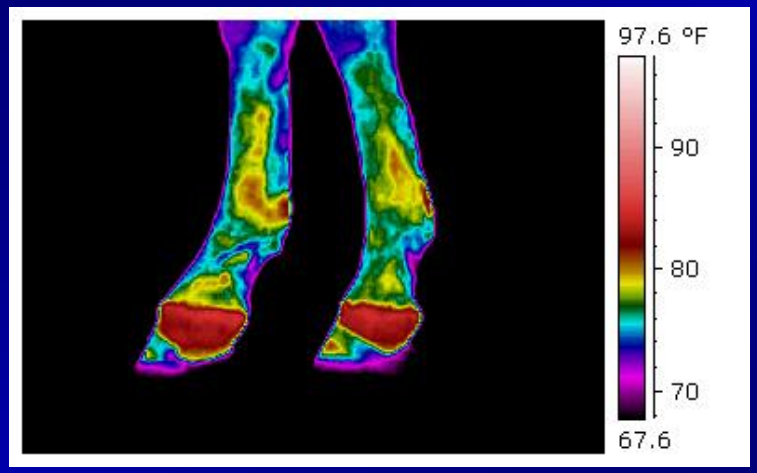
Palmolive on dorsal coronary bands

HORSE 2, chestnut stallion



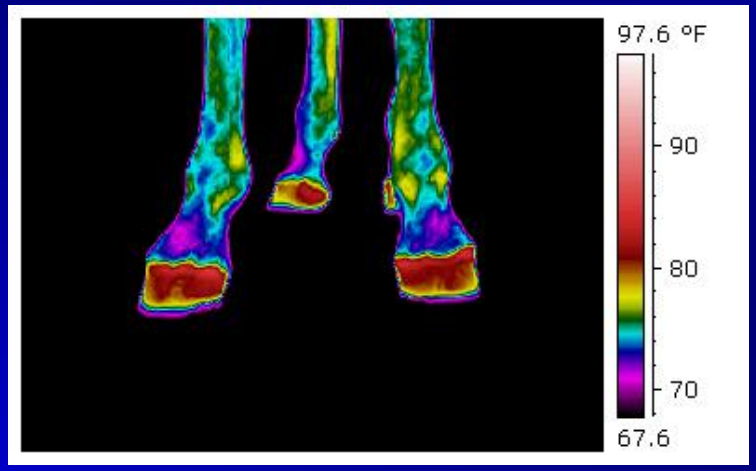


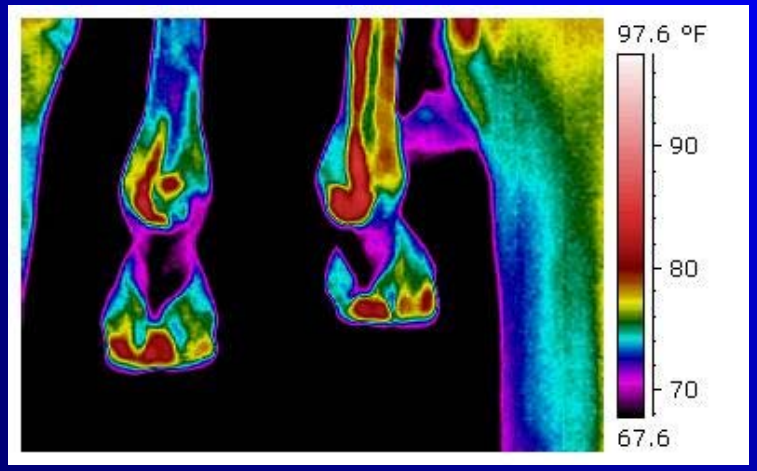


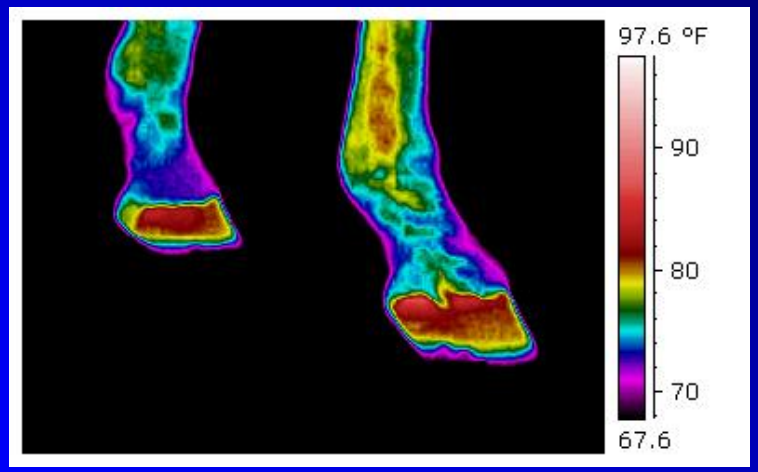


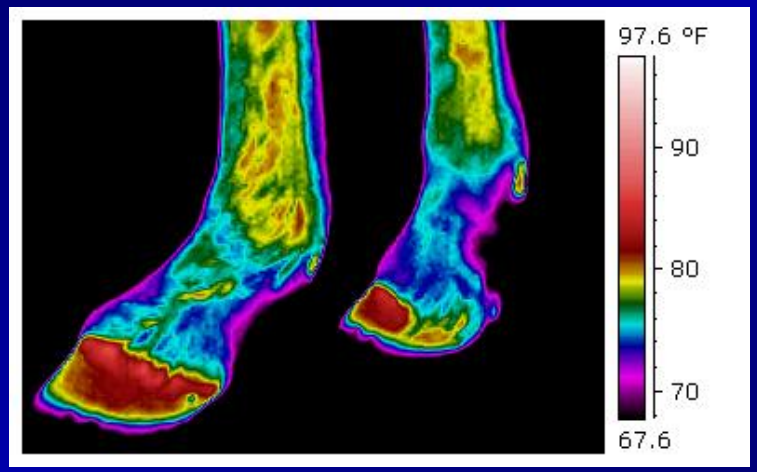
LF kerosene pastern, RF kerosene palmar pastern only

HORSE 3, chestnut flat shod





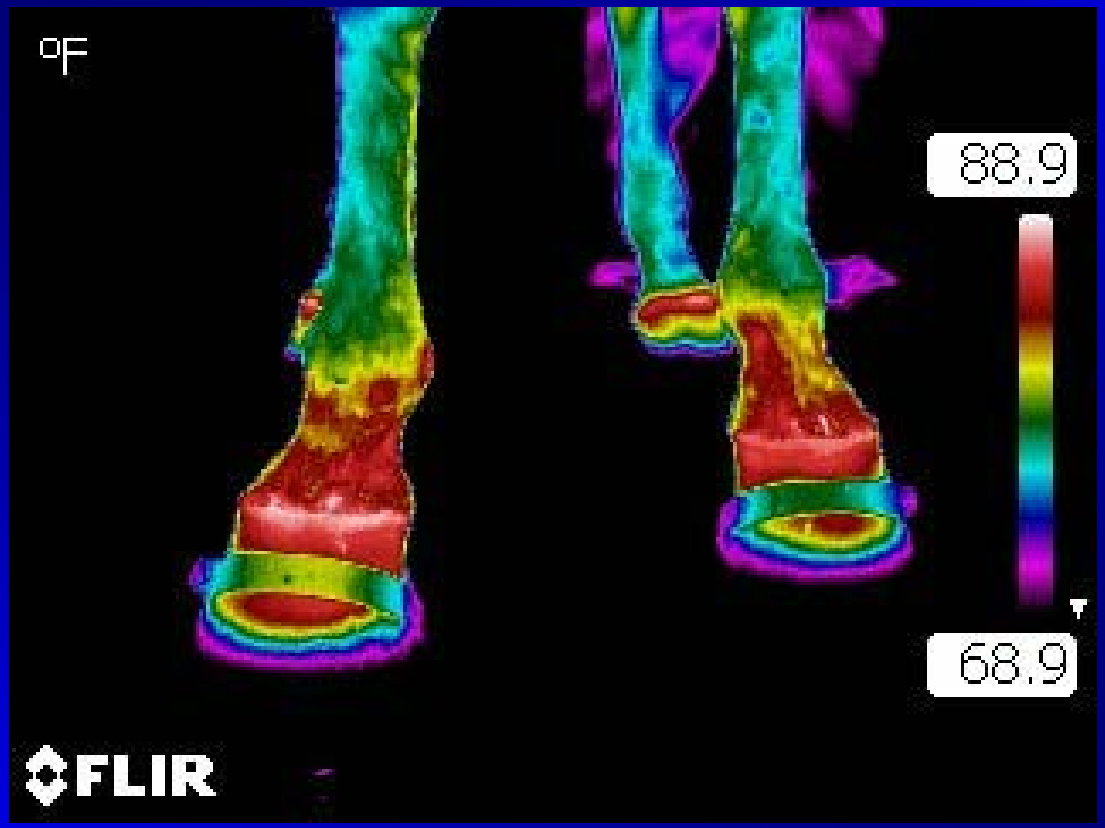




Kerosene palmar heels only

OTHER RESULTS

- **“TREATED PASTERN”**



3 MONTHS POST TREATMENT

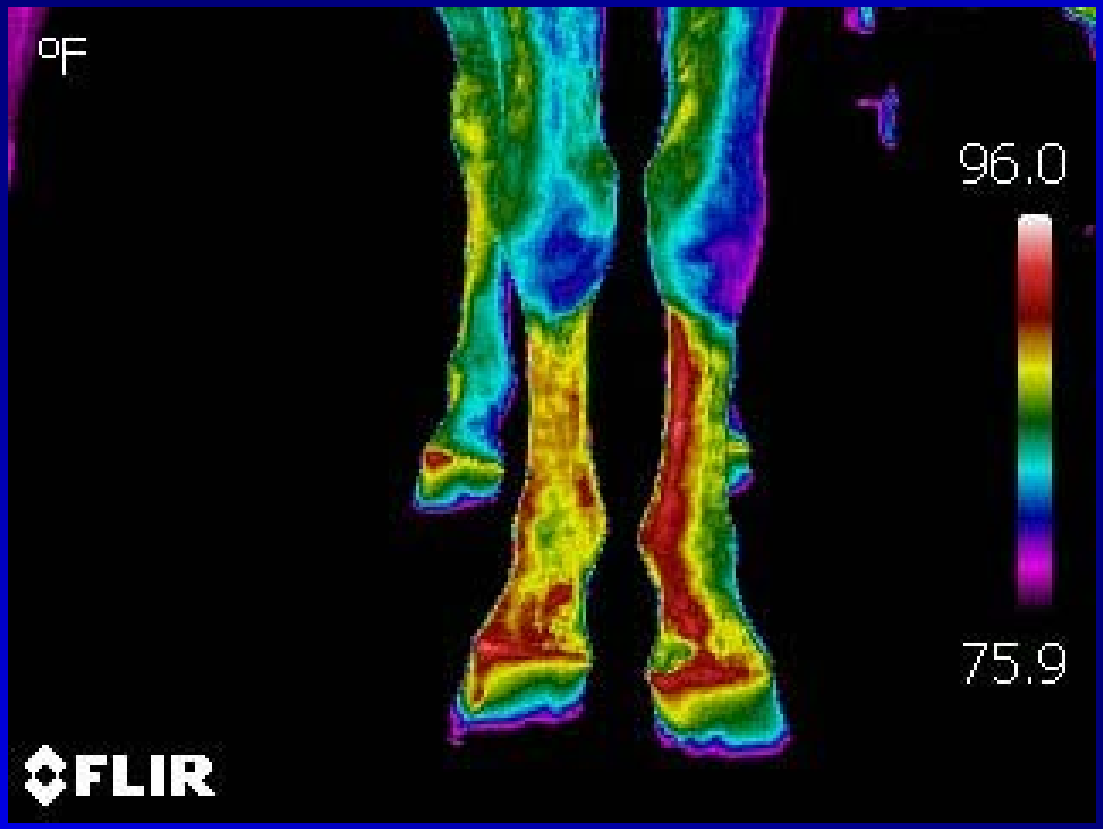
OTHER RESULTS

- **“GO-JO TREATED”**

TECHNOLOGY SHOWS EXACTLY WHERE

OTHER RESULTS

- “EXCESSIVE WORK 3 HOURS EARLIER”



CONSIDERATIONS

- OVER THE PAST 30 YEARS THE PACKAGE HAS CHANGED
  - 1978: 4.5lbs
  - Mid 90s: 8lbs

CONSIDERATIONS

- OVER THE PAST 30 YEARS THE PACKAGE HAS CHANGED
- 1978: EXTERNAL WEIGHT ONLY
- TODAY: INTERNAL WEIGHT

CONSIDERATIONS
TOO MUCH ANGLE

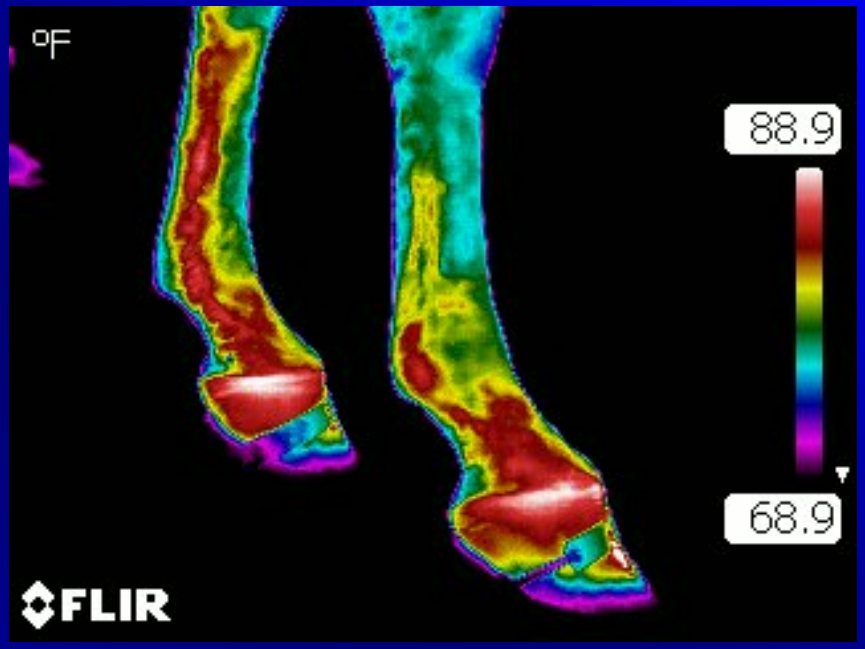
CONSIDERATIONS
HOOF IMBALANCE

CONSIDERATIONS

CONSIDERATIONS

CONCLUSION

- THERMOGRAPHY CAN BE USED TO DETERMINE IF A HORSE IS IN COMPLIANCE WITH THE HORSE PROTECTION ACT



THE PLAN

- THERMOGRAPHIC NORMAL>>>>SHOW
- THERMOGRAPHIC NOT NORMAL
- SWAB SPECIFIC AREAS
- CHECK DQP PROFICIENCY
- INTENSIFIED VMO EXAMINATION

QUESTIONS?