

Mule Behavior: Differences with horses and donkeys

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Introduction

- Increased number of long eared equids owned for recreational purposes, increased demand for information from owners and veterinarians
- Increased number of research articles and information for donkeys but not mules and even less for hinnies
- A new mule owner's first question "which parent should the animal be compared to, the horse or the donkey?"
- The objective of this work is to attempt to compare and contrast both behavior and physical parameters of mules and hinnies to those of their parents, the horse and donkey, to help provide a better understanding of the similarities and differences.

Introduction cont.

- Many fallacies and opinions related to working with and owning mules, hinnies, and donkeys when comparing them to horses
- Some experts will agree that mules are not for everyone
- Muleskinner has been applied to people who can understand the ways of a mule and can work around the mule's peculiarities without injury (*Burnham, 2000*)
- Often time's routine procedures with mules require more patience and work than when working with a horse (*Burnham, 2000; Taylor and Mathews, 2000*)
- The issue of mules and trust
- Mule behavior has often been critiqued by many and incorrectly perceived
- This presentation will try to focus on research and interviews with those who work with mules on a regular basis to provide a better understanding of this hybrid's behavior



Attitudes and Perceptions towards Mules and Hinnies

- Why some owners choose mules vs. hinnies or donkeys or horses
 - Availability of mares
 - Fallacies associated with hinnies
 - Smaller than mules
 - Conformation & internal concerns
 - Behavior and trainability (many fallacies)
 - Mules are aggressive
 - Hinnies are harder to train
 - Cultural differences associated with mules and hinnies
 - Advantages/Disadvantages of mules and hinnies
 - The need for patience
 - The understanding of working with the animal

(Corazon Vaquero, DVD, 2008, www.corazonvaquero.com)

Perceptions: True or False...

- **Social:** Mules will tend to bond with horses, hinnies with donkeys
- **Feeding:** Mules will not over eat
- **Health:** Mules don't colic
- **Physiological:** Behavior maybe related to condition of the mule
- **Temperament:** All mules are naturally aggressive
- **Temperament:** Mules reflect the behavior of their parents flight/fight
- **Body Language:** You can tell a lot about a mule based on his ear and tail movement and placement?
- **Training:** Fight or Flight instinct, which makes them more trainable?
- **Training:** Mules are smarter than horses and donkeys
- **Handling:** You must work smart around a mule
- **Handling:** All mules must be restrained
- **Equid Human Relationship:** Mules develop trust in their owners

Social: Mule and Hinny Behavior

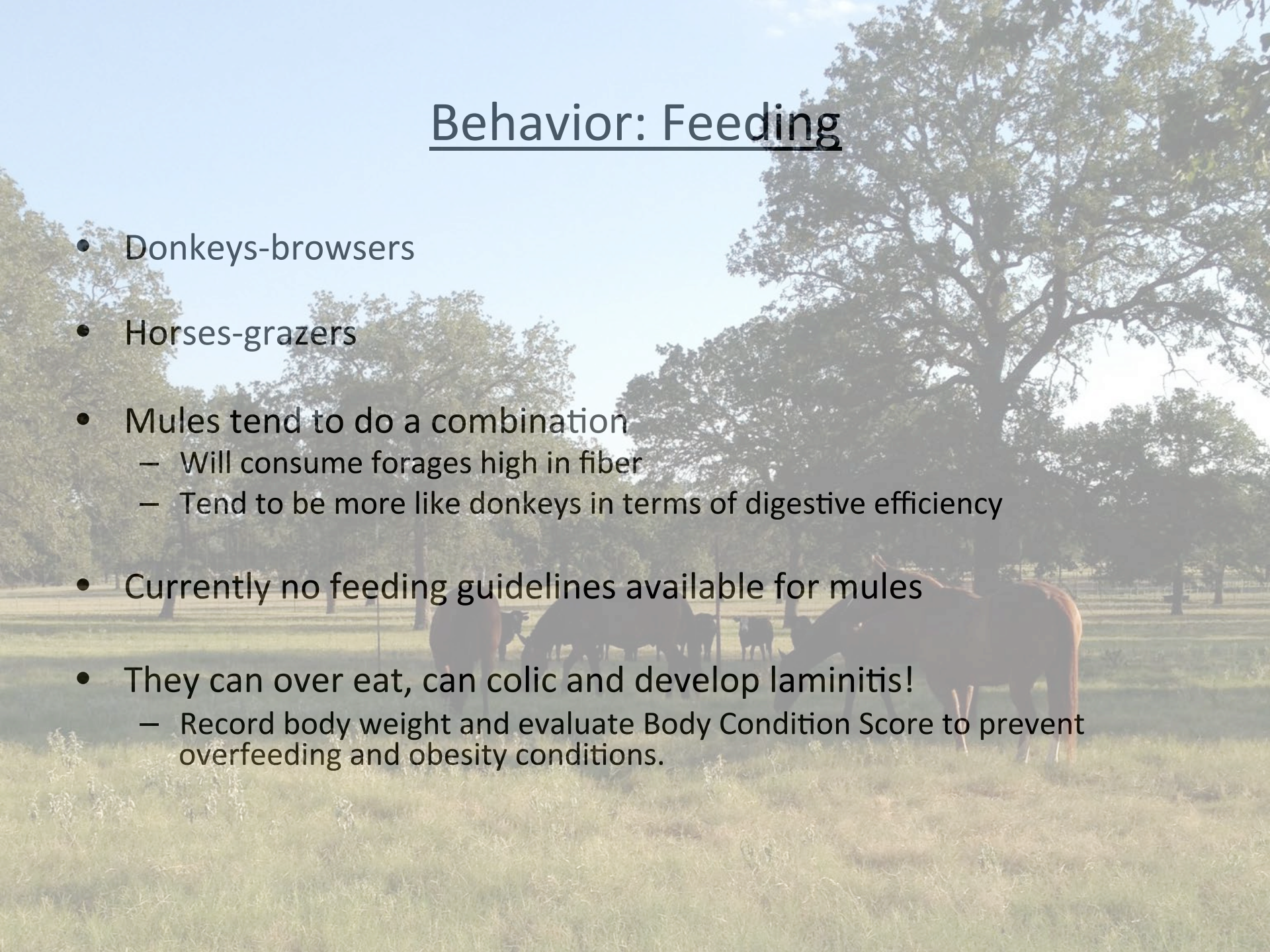
- When comparing dominance hierarchy among ponies, mules and donkeys
 - Ponies were most dominant, then mules, then donkeys
 - **Ponies, Mules, Donkeys**
 - Rank was not correlated with age or height but equid type
 - Pair bonding did not remain the same for donkeys and mules
 - Unilateral inherited trait:
 - Mules preferred to stay with their own or ponies as
 - Hinnies prefer to stay with hinnies and then donkeys
- (Proops et al., 2012, Travis, 1990)*

Social: Mule and Hinny Behavior

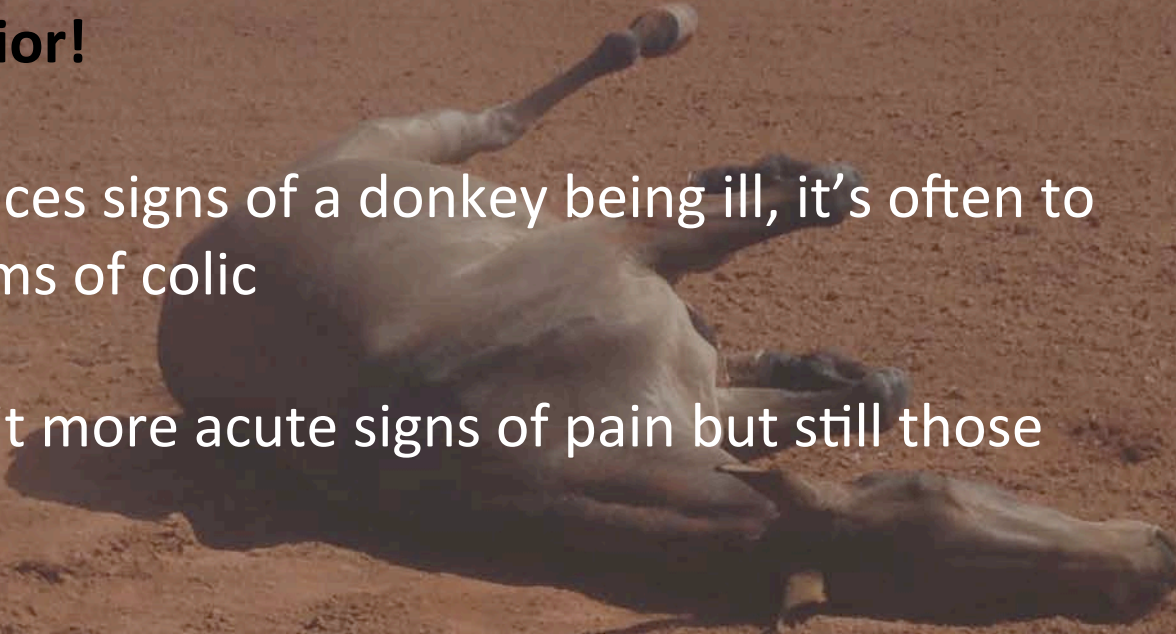


Behavior: Feeding

- Donkeys-browsers
- Horses-grazers
- Mules tend to do a combination
 - Will consume forages high in fiber
 - Tend to be more like donkeys in terms of digestive efficiency
- Currently no feeding guidelines available for mules
- They can over eat, can colic and develop laminitis!
 - Record body weight and evaluate Body Condition Score to prevent overfeeding and obesity conditions.



Behavior: Health Care

- **The key to preventative health care of mules and donkeys is knowing their behavior!**
 - When an owner notices signs of a donkey being ill, it's often too late, especially in terms of colic
 - Mules tend to exhibit more acute signs of pain but still those signs may be subtle
 - Mules and donkeys are very stoic animals, an intuitive owner will be able to pick up on any behavioral changes
 - Some research has suggested higher levels of pain tolerance
- 
- A mule is lying on its side in a dirt paddock, appearing to be in pain or distress. The mule is light-colored with a dark face and is lying on its side with its head down. The background shows a fence and trees.

Behavior: Physiological

Physiological: Behavior maybe related to condition of the mule

- **Body Condition Score** (Thin vs. Obese)
- **Age** (young vs. old)
- **Welfare status** (dehydration, amount of work)
- **Genetics** (Thoroughbred vs. draft and breed of donkey
Catalonian vs. Poitou)

Behavior: Equine Mentality

- Horses have excellent memories but may not be able to reason
 - But can donkeys and mules reason?
 - Cognitive test: Mule, Donkey and Pony Cognition Test (*Proops et al., 2009*)
 - Improved spatial learning test (*Osthaus et al., 2013*)
 - Fight vs. Flight?
- Might not be able to reason based on their diet: grazing animals versus an animal that has to catch its food (example a cat hunting down a mouse)
 - What about a grazing animal that browses?
 - Could previous sources of nutrition and availability improve reasoning?
- Brain tissue that requires reasoning is more expensive to fuel
- Horse's brains allow for repetitive behavior patterns
 - Creatures of habit

(McGreevy et al., 2004)

Behavior: Temperament

- The behavior of a mule mimics both parents
 - the donkey and the horse
- They have both flight and fight mechanism= issue of Hybrid vigor, both instincts are strong (Proops et al., 2009)
 - So, one must really understand both equine species in order to get the most or the best out of a mule
 - Some may prefer female or male mules, DIFFERENCES found in their temperaments
- A study looking at mules and donkeys in brick kilns in Egypt found mules to be more aggressive than donkeys
 - “Firm belief that mules are more aggressive than donkeys but maybe caused by harsh, violent handling and restraint procedures” (Ali et al., in prep)
 - OR is it freight (and a combination of both fight and flight instincts?)
 - Or is it a sex linked, hormone driven response
 - Human-Animal Relationship (repeated abusive methods)

(photograph by Dr. Ahmed Ali)

Behavior: Temperament

Table 5: Significant prevalence and standard errors of behavior observations donkeys (n=114 groups, representing 1140 total) and mules (n=25 groups, representing 250 total).

Group	Depression	No response	Avoidance	Aggressive response	Avoid chin contact
Donkeys	44.01 ± 0.49	49.96 ± 0.53	16.37±0.12	3.01±0.02	46.5 ±0.59
Mules	27.67 ± 0.66	27.34 ± 0.23	39.5 ± 0.27	19.16± 0.17	55.84± 0.40
F _{1,137} , P value	24.31, <0.0001	25.22, <0.0001	69.52, <0.0001	504.65, <0.0001	11.65, 0.001

All parameters are presented as mean percentage of animals ± standard error.

(Ali et al. in preparation)

Behavior: Body Language

A light-colored horse, possibly a foal or yearling, stands in a field of tall grass and wildflowers. The horse is facing left, looking towards the camera. The background consists of a line of trees under a clear sky. The overall scene is bright and natural.

- **Eyes:**
 - Vision and head placement
- **Head and Neck:**
 - Head and neck placement
- **Ears:**
 - Movement and position of the ears
- **Tail:**
 - Movement and position of the tail
- **Body:**
 - Overall posture
- **Limbs:**
 - Movement and position of the limbs

A case with an intact male mule biting its handler in Egyptian Brick kiln
Photos/Case study by Ahmed Badr Ali, 2014



Body Language: Yearling Hinny



Body Language: 4 yo Hinny



Body Language: Mule



Body Language: Donkey

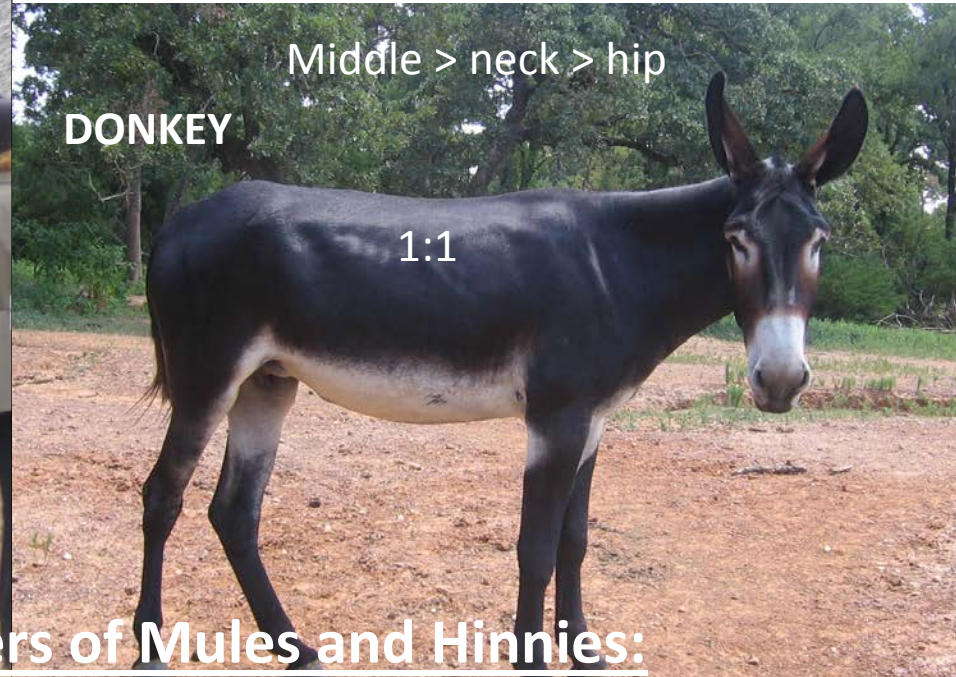
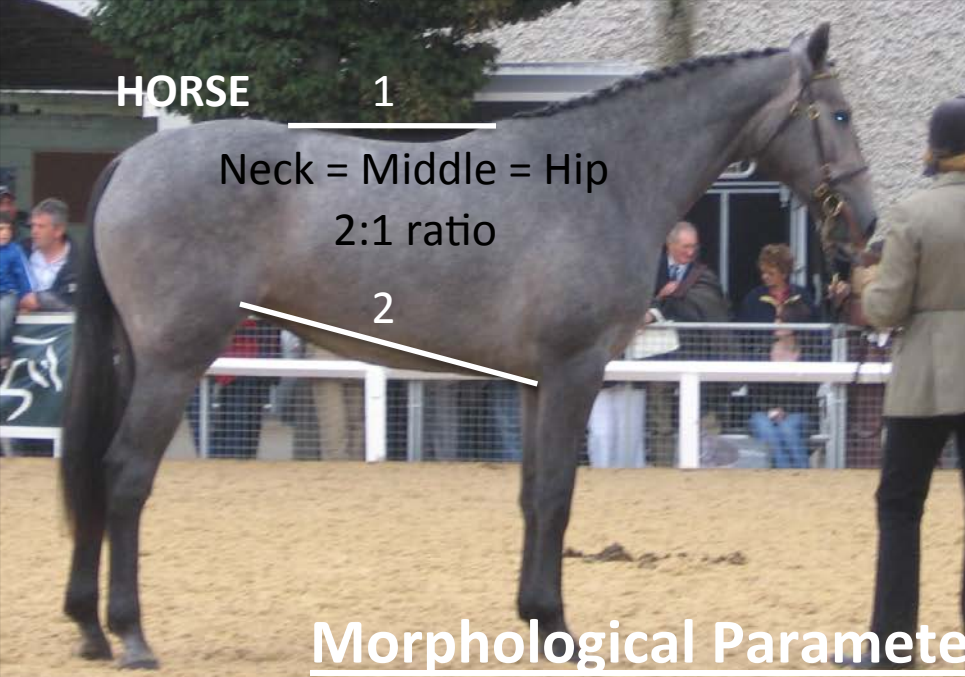


Body Language: Horse

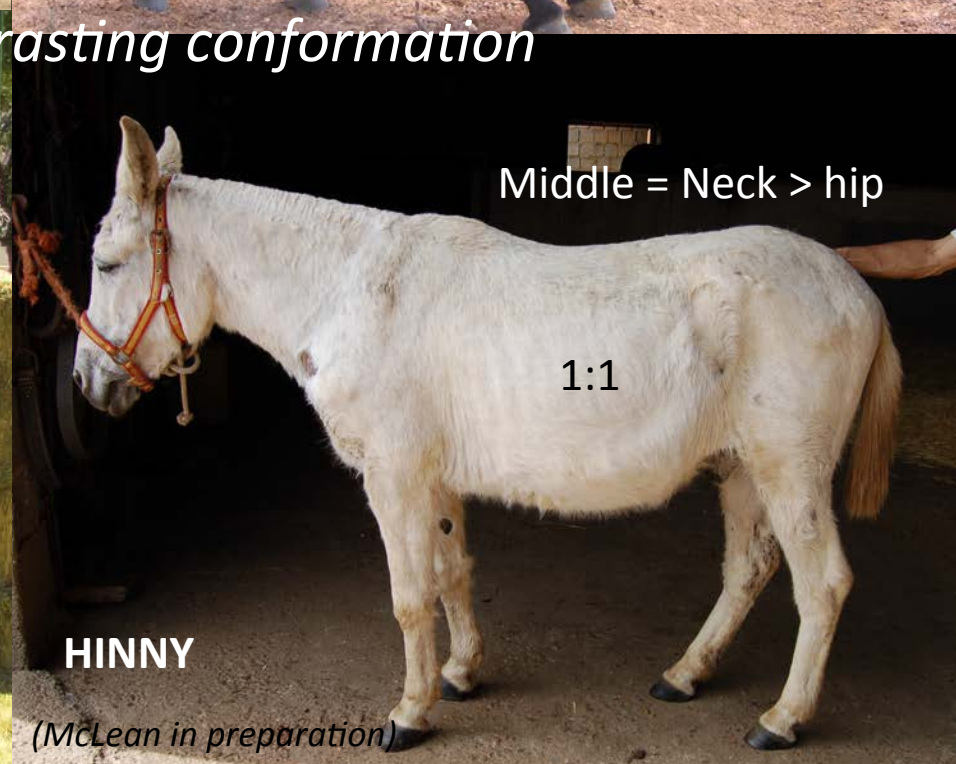


Physiological: Form to Function

- *The value of equine is often related to its level of training or ability to be trained*
- *However, Conformation may limit the quality of the training or level that can be obtained*
 - Example: Limited performance in jumpers and dressage horses include the wither: croup ratio , if wither is lower than croup, the animal has a hard time collecting himself and carrying weight on his hindquarters
- Horses that are croup high are more often found in race horses: Arabians, Thoroughbreds, plains zebra
- How are donkeys and mules made?
 - Generally the neck and back are equal in length but not the hip
 - Enhanced vision?
 - Mules demonstrated enhanced visual discrimination capabilities compared to horses and donkeys



Morphological Parameters of Mules and Hinnies:
Comparing and contrasting conformation



Physiological Parameters of Mules and Hinnies: Temperature, pulse, respiration

Table I. Comparing significant differences of the hinny, mule, donkey and horse using the Kruskal-Wallis test ($P < 0.05$)

<u>Parameter</u>	<u>Hinny</u>	<u>Mule</u>	<u>Donkey</u>	<u>Horse</u>	<u>P-value</u>
Temperature °C	37.0	37.2	36.7	37.5	0.05
Heart Rate bpm	42.6	43.3	50.5	42.5	0.01
Respiration br/min	29.5	34.5	21	34.2	0.44

(McLean et al., 2013, McLean et al., 2014)

Physiological Parameters of Mules and Hinnies: **Biochemical Parameters**

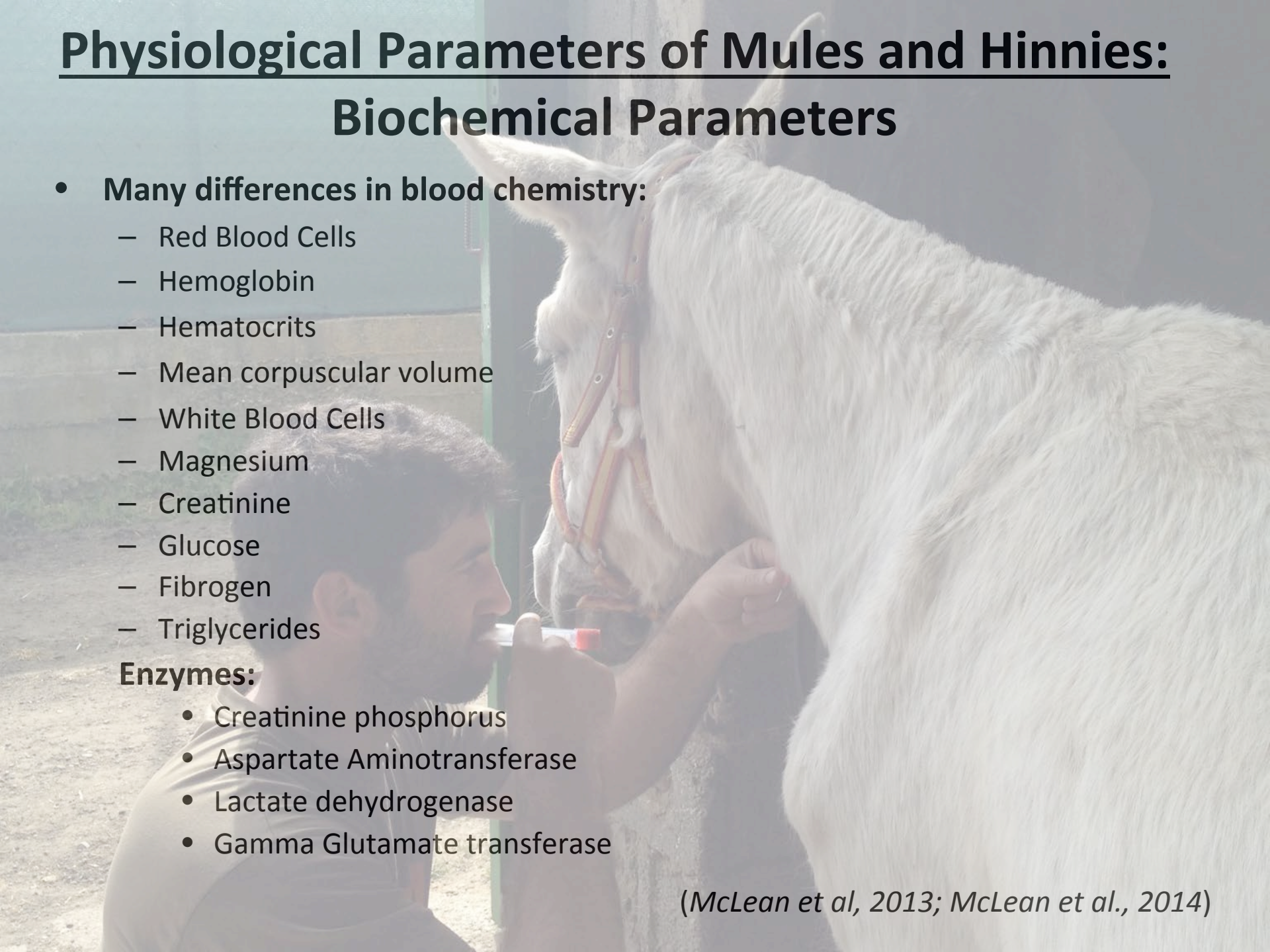
- **Many differences in blood chemistry:**

- Red Blood Cells
- Hemoglobin
- Hematocrits
- Mean corpuscular volume
- White Blood Cells
- Magnesium
- Creatinine
- Glucose
- Fibrogen
- Triglycerides

Enzymes:

- Creatinine phosphorus
- Aspartate Aminotransferase
- Lactate dehydrogenase
- Gamma Glutamate transferase

(McLean et al, 2013; McLean et al., 2014)





Training and Handling

- Superior learning capability?
 - Hybrid lines of mice have shown superior learning capability
 - Flynn effect on mules ?
- *Proops et al. (2009)* tested the cognitive ability of mules compared to donkeys and ponies by testing how many stimulus pairs could be learnt in 25 sessions
 - Visual discrimination task
- Mules were the most accurate in this study (71.6%) when compared to ponies (66.9) and donkeys (66.5)
 - Maybe related to life experiences, more motivational to find food, more likely to ignore environmental constraints
- Mules learned the most pairs of black and white objects (16) compared to ponies (11) and donkeys (6)
- Mules may have improved spatial cognition and achieved detours faster when compared to horses and donkeys may indicate increased flexibility (*Osthaus et al., 2013*)

Mule Cognition Study- Proops et al., 2009
Photos by L. Proops



Mule

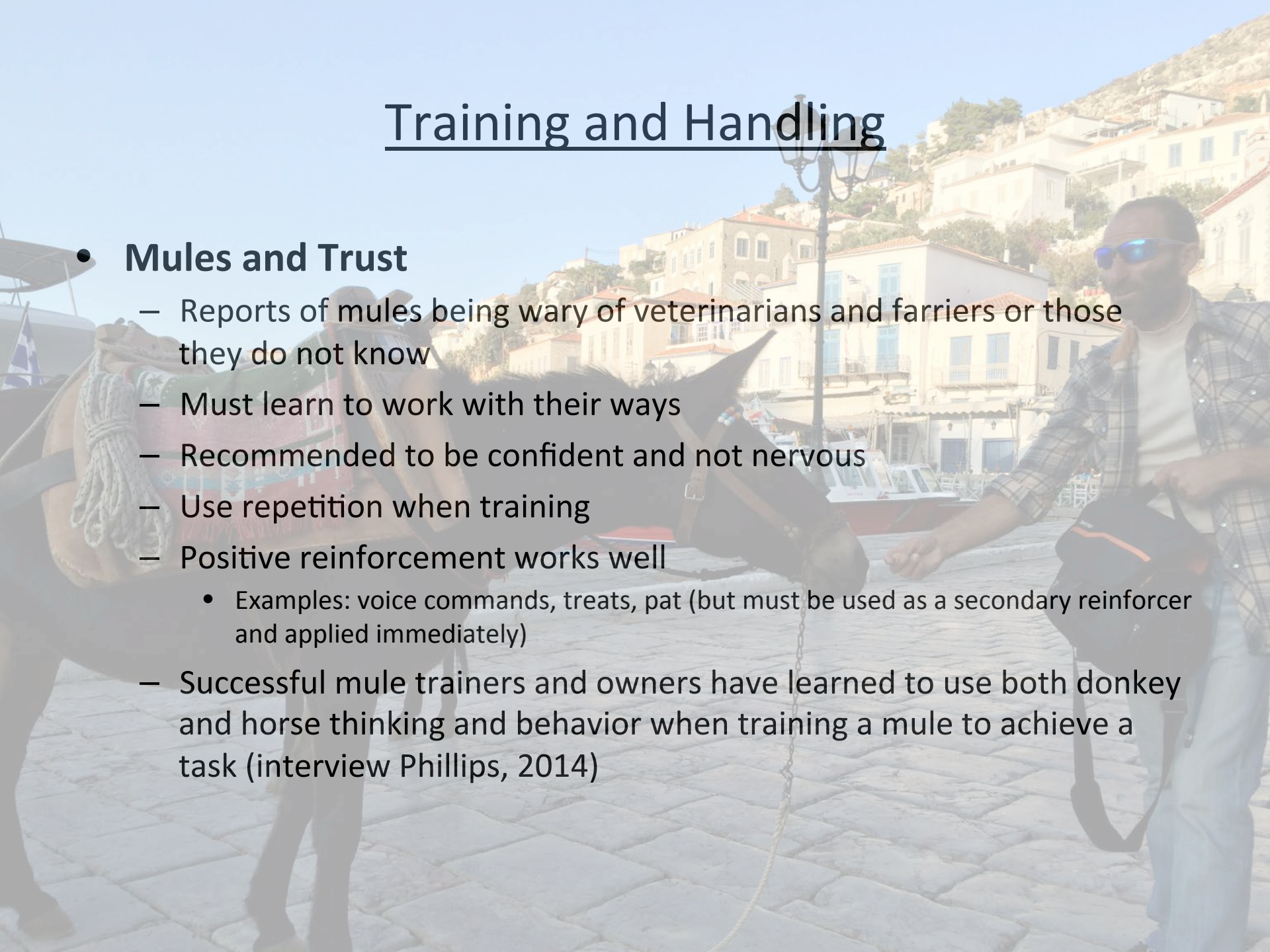


Horse

Training and Handling

- **Mules and Trust**

- Reports of mules being wary of veterinarians and farriers or those they do not know
- Must learn to work with their ways
- Recommended to be confident and not nervous
- Use repetition when training
- Positive reinforcement works well
 - Examples: voice commands, treats, pat (but must be used as a secondary reinforcer and applied immediately)
- Successful mule trainers and owners have learned to use both donkey and horse thinking and behavior when training a mule to achieve a task (interview Phillips, 2014)



Training and Handling

- **Mules and Trust**

- If a mule is used to being fed at a certain time of the day a change in schedule can upset the animal and create abnormal behavior (Burnham, 2000)
- A strange person may prevent a very gentle and friendly mule from being caught until the stranger leaves
- Observations from professionals suggest mules may bond with an owner or person
- Trust maybe gained by positive reinforcers (*Burnham, 2000, McLean et al., 2008, and observations*)

- **Familiar vs. Unfamiliar people**

- Behavioral approach tests showed that:
 - Donkeys were most tolerant
 - Mules were least when approached by an unfamiliar person at the neck, face or ears
- However, mules were tolerant when approached by familiar person (*Bott et al., 2014*)

Training and Handling: Restraint

- Such techniques as twitching or using a rope to tie up a leg are methods commonly used
 - Some studies have suggested that horses become quieter when the twitch is applied but donkeys respond differently (*Lagerweij et al 1984 and Vreeman et al. 2009*)
 - It has yet to be determined how a mule may respond to a twitch or rope other than anecdotal reports
 - Over use or improper use of restraints may create fear (*Ali, in preparations*)
 - Can try procedures without restraint
 - Then quickly and efficiently apply restraint and remove once procedure is finished

Restraints Commonly Used: Ear twitch



Improper use of Restraints: Nose Twitch



After Restraint

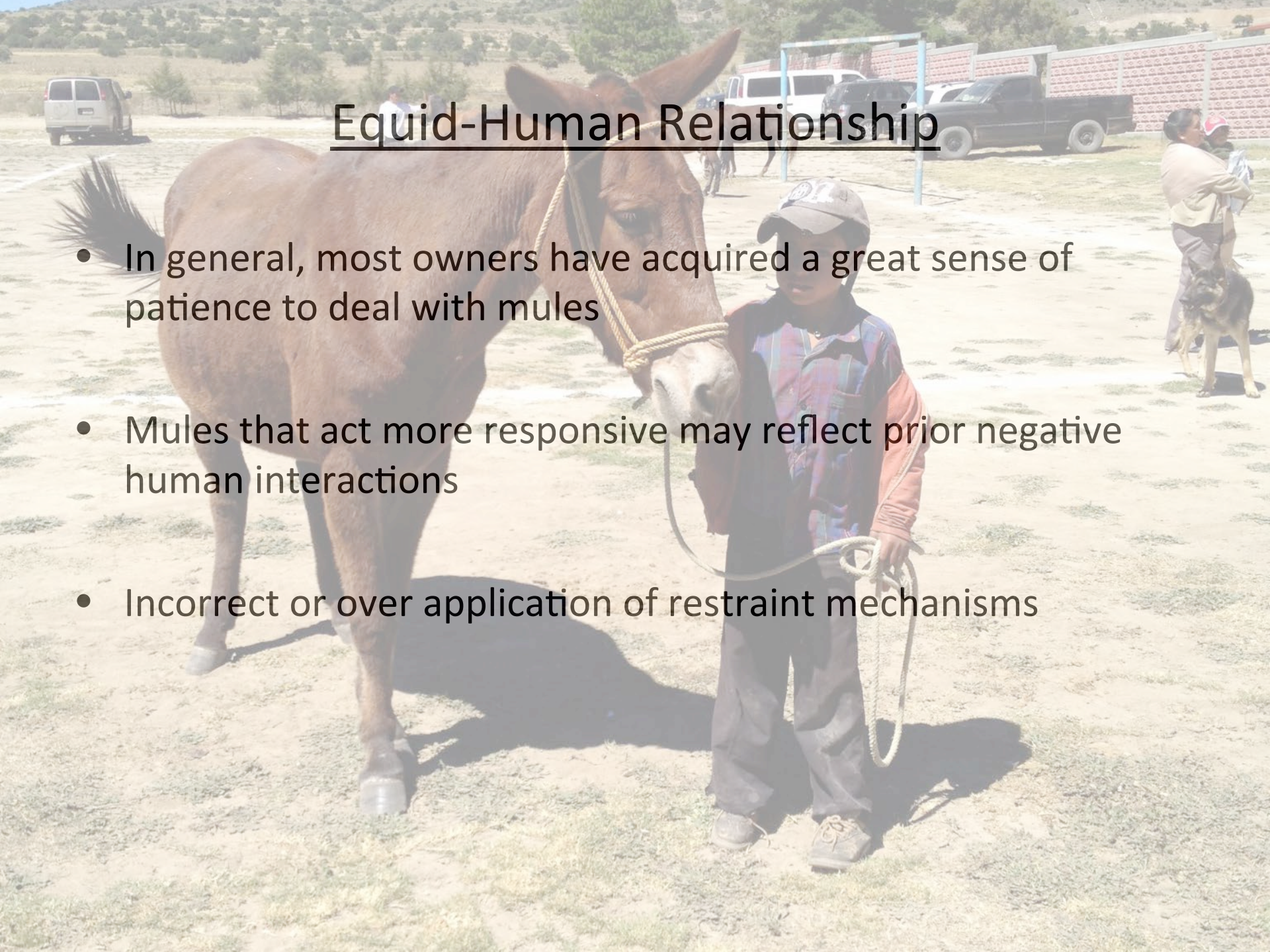


Proper use of Restraints: Nose Twitch



Equid-Human Relationship

- In general, most owners have acquired a great sense of patience to deal with mules
- Mules that act more responsive may reflect prior negative human interactions
- Incorrect or over application of restraint mechanisms



Conclusion

- When working with both mules and donkeys remember to be patient possibly more so than with a horse!
- Consider herd dynamics in pasture settings and feeding protocols
- Monitor behavior closely to prevent health conditions like colic
- Be smarter than your mule, so think your plan through before attempting to execute it
- Mules hardly ever forget so once they've had a bad reaction or got away with something they will not forget
- Get your hands on your mule foal! Don't wait until it's a yearling to touch it
- Make your mule your friend!

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