

Cause & Effect

Necessary

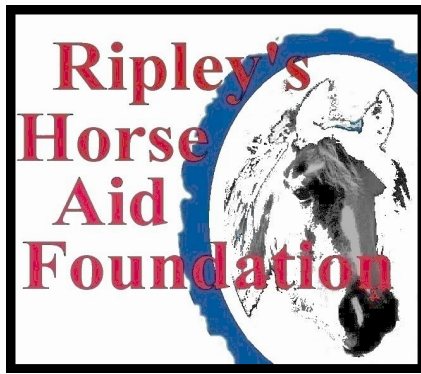
“Care 4 Equines”



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Ripley's Horse Aid Foundation TM
Program Director CEO
Wilma A. Tronstad



As an equine owner, it is up to you to educate yourself on the basic needs of your animals.

Credits

Introduction

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www.aaep.org



Purina Mills
www.purinamills.com



Bayer Animal Health
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Redwings Horse Sanctuary - Hapton, Norwich, UK

Equine Information www.equine-information.com

Stablemade.com www.stablemade.com

Bright Futures Farm - Spartansburg, PA

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Not everyone working within the equine community understands the basic needs of these animals. Whether they are horses (as large as a draft or as small as a mini), mules, donkeys, or burros the owner has control over most of the safety and health issues that can affect the animal. Injuries and health issues outside of the owner's control, ultimately, become the owner's responsibility to take action upon also.

The information compiled within this publication was chosen from the most qualified and respected resources available. The topics were selected to cover only the basic care needed. If a proper management program is not supplied by the owner it can cause unnecessary harm and affect an equine's quality of life.

A vast amount of additional information is available on the care and training of equines. Free information might be found at your local library. Libraries often have computers available for the public and there is valuable Internet information available by the American Association of Equine Practitioners (AAEP). Their website is www.aaep.org.

Books are often available at your local feed supply store. If they do not carry them, bookstores will be able to order the books you are looking for. Also, pet supply stores, especially the larger chain stores, will have an equine magazine and book section.

Understanding what an equine needs is up to you. If you are in doubt always check with your veterinarian. For the love of a horse,
Ripley's HAF

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Be Prepared Check List

Making Repairs:

- ✓ Hammer
- ✓ Nails
- ✓ Nail puller
- ✓ Wire cutter
- ✓ Extra Fencing Materials
- ✓ Leather gloves

Sanitation:

- ✓ Shovel
- ✓ Wheelbarrow
- ✓ Bedding material
- ✓ Pitchfork
- ✓ Broom

Tack:

- ✓ Halters
- ✓ Lead ropes with heavy -duty fastener
- ✓ Fly masks

Hoof Care:

- ✓ Bucket for soaking
- ✓ Rasp
- ✓ Hoof Pick
- ✓ Hoof Conditioner
- ✓ Iodine or thrush treatment product
- ✓ Epsom salts

Health Care:

- ✓ Equine First Aid Kit
- ✓ Weight tape
- ✓ Fly wipe and spray
- ✓ Grooming stone (bot removal)
- ✓ Grooming brush
- ✓ Curry
- ✓ Face curry
- ✓ Dry clean rags
- ✓ Sheath Cleaner for Geldings

Safe and Healthy Environment

All domesticated animals (family pets, livestock and exotics with the exception of those that have gone feral) are restricted and confined in an environment chosen by their owners. The property on which an equine is confined, regardless of size, must accommodate their unique requirements as an animal or they will suffer unnecessary painful injuries, diseases and illness.

Perimeter Fencing

The perimeter of the equine world is the boundary between a safe haven and a dangerous outside world. The fencing is the owner's safeguard against an animal-at-large; which can result in serious injury to itself, to other animals or people, to property and possibly ending with financial repercussion for the owner.

Fencing materials that are considered safe and suitable for equines can vary, based on the size of their living space.

Barbed wire fencing is not considered safe for equines as it results in many crippling injuries. However, there are some areas within the US where the fenced area is so vast that the equine rarely makes contact with these boundaries. With regular maintenance the fencing causes no problems.

Size of the property and the size of the herd is a significant condition for fence crowding. As pastures dry up the equines will spend more time at the perimeters of the property making an effort to reach grasses outside of their boundary. Old, poorly maintained fencing that was suitable for previous livestock such as sheep and cattle can end up being a hazard for your equines.

Sheep wire that has openings large enough for an equine's foot to slip through can cause serious injury to the animal, especially if there is no one around to untangle the animal, as it will struggle to get free inflicting more damage to itself.

All fencing can cause injury to an equine if not maintained. Board fencing loses nails which can be stepped on. Hot wire brakes and unused wire left on the ground can tangle around legs and feet.

The key to safe boundary fencing is to choose fencing that is safe for your equine, effective for size of your property and maintained regularly.

Hazards

Your property may have hidden hazards from how it was used by previous owners. The most common that may create a risk to your equine is old private dump sites. With the constant movement of the earth not only will rocks work their way to the surface, so will other buried materials such as glass, nails and metal. Walking your property periodically is recommended to find and remove these hazards before they can do foot damage.

Your equine will go where the grass is greener and this includes into and around potential hazards that have grass growing around them. Machinery, old cars, lumber piles, etcetera should be removed from their living space or securely fenced off.

Any tack such as halters, blankets or any item placed on the equine should not be left on for extended periods of time. When forgotten they become a hazard for the animal.



Photo: Pacific Equestrian Center - Kent, WA
Blanket Imbedded to the bone



Photo: Pacific Equestrian Center - Kent, WA
Auction collar not removed



Even with the poor quality of this photo, you can clearly see on this mule's face and head where the halter had been. It was imbedded and had to be cut apart to be removed.

Shelter

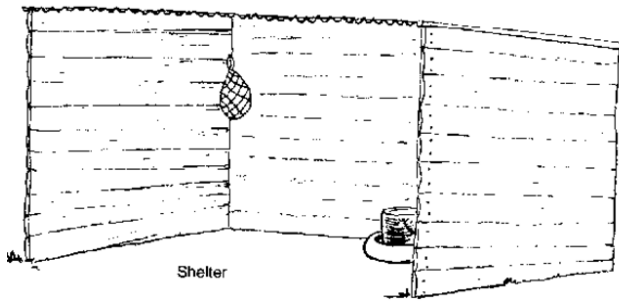
Unlike most livestock, equines must have shelter. In a natural habitat they will seek and find sheltered locations that are suitable to their well-being. There are geographic locations that have hostile weather patterns and create health issues for many equines. Suitable shelter must be provided for them under such conditions.

Suitable Shelter:

The survival instinct is very strong in horses and they will not seek shelter under or in something that they perceive as a threat to themselves.

- Keeping that in mind, suitable shelter is one that they will use. Anything that flaps in the wind will be perceived as a danger such as a suspended tarp or a building in poor repair.
- A shelter is a structure that the equine has access to when needed. A 3-sided shelter with a roof slanting away from the opening and facing away from the prevailing wind works well.
- Shelter provides some relief from insects. In shade there are fewer flies which feed off body moisture and blood. If the animal has an open wound flies will lay eggs close to it and the maggots which hatch will feed on the blood and meat.
- The shade of the shelter also provides relief from the direct heat of the sun. Extreme heat can cause colic. One important reason is that it may be very difficult for horses to drink enough to compensate for the heat. Lack of water

can lead to dehydration and impaction. Additionally, some horses are more prone to "tie up", i.e. develop rhabdomyolysis. In addition to the stiffness and pain associated with this condition, horses may show signs of colic. Finally, the onset of heat stroke itself can be deadly.



Shelter can be provided by a three-sided shelter made of wood or exterior wood sheeting. The structure needs to be sturdy and not effected by wind. Animals can be fed hay or concentrates in the shelter when necessary. (Shelter example and information AFO)

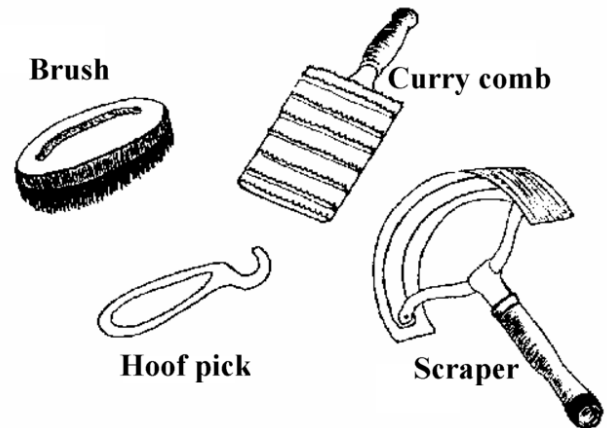
- More than one shelter may be required. This would be determined by herd size in order for all to take shelter when needed.
- Shelter is a protection in cold weather when the wind-chill factor can rob the animal of body heat.
- Suitable shelter is on high ground giving relief from mud and standing water; both of these wet conditions increase the likelihood of developing hoof thrush. (Mud with high amounts of ammonia content from urine also causes abscesses)
- Relief from prolonged rain to minimize the conditions that cause rain rot.
- Shelters need to be kept clean and bedding material might be needed and must be removed when wet.
- The shelter needs to be large enough for the equines to lie down and get up without injury.
- Blanketing is not a replacement for shelter. When used incorrectly, blankets can cause health issues. Wearing a blanket flattens the coat, making it easier for water to soak thru to the skin. If you feel that your horse needs a blanket, it would be best to invest in two lightweight, waterproof blankets; one to wear and one to let dry when it gets wet. Even the best waterproof blankets can soak thru.

A horse's coat has natural insulating and water resistant qualities. Left in a natural state, a healthy winter coat traps a layer of warm air between the surface and the horse's skin, keeping them warm and dry. If it is very windy, or if the horse's coat gets matted and wet, this layer of air disappears and the horse gets wet and cold (poor nutrition may hamper the growth of a good winter coat).

Caring for the wet animal:

When an animal returns to the stable soaked with sweat, rain or snow it must be dried immediately or it may become

sick. The water must be removed from the coat using a metal scraper with a handle which is drawn down over the coat. You can also remove water by twisting a handful of straw or hay into a curved shape and using this in downward strokes over the body. More straw, cloths or an old blanket should then be used to dry the animal by rubbing the body.



Rain Rot and Thrush

In geographic areas that have long periods of rain or high temperature along with high humidity, equines will be at greater risk to develop painful foot conditions and frequent cases of rain rot. A shelter that provides a place to stand free of moisture as well as sheltering them from wind and rain is absolutely necessary.

Rain Rot:

The *Dermatophilus congolensis* bacterium cannot survive when exposed to air, so the horse's coat needs to remain wet for a long period of time for it to develop.

This usually happens when moisture is captured under a thick coat of winter hair.

There must be a way for the bacteria to get under the horse's skin, such as an abrasion or a bug bite. If the bacteria cannot reach the epidermis your horse is safe.

Given the way this infection works, the most obvious form of prevention is keeping your horse dry during periods of intense rainfall. In addition groom your horse often, particularly during the early spring months. Not only will removing the winter coat make your partner more elegant, it will make it far more difficult for rain rot to take root.

Rain rot, also referred to as *rain scald* or *streptothricosis*, is one of the most common skin infections seen in horses. It usually appears on the horse's back and rump and sometimes on the horse's ears and around the eyes and muzzle. When rain rot appears on the front of the cannon bone and behind the fetlock, it is most commonly referred to as *dew poisoning*.

When removed, the base of the hairs can be seen sticking through the bottom of the scab. In early or less severe cases of this disease, simply removing the scabs with shampoos

and currying will take care of the problem. More severe cases in which the infection has affected deeper layers of the skin might require antibiotics.

Rain rot can appear as large crust-like scabs, or small 1/4 inch matted tufts of hair. There is usually dozens of tiny scabs that have embedded hair and can be easily scraped off. Underneath the scabs, the skin is usually (but not always) pink with puss when the scabs are first removed, then it becomes gray and dry as it heals. It is usually hard to differentiate rain rot from other similar skin conditions, so if you are unsure, call your veterinarian.

In the early stages, you will be able to feel small lumps on the horses' skin or hair by running your hand over your horse's coat. Although this condition is not life-threatening, if rain rot is evident it is not advisable to let the condition persist. It is very important to treat rain rot immediately before it gets any worse.

Since the organism needs a warm, moist environment, it is possible that a secondary bacterial infection may become present. The most common secondary bacterial infections known are staphylococcus (staph), and streptococcus (strep) and may be even more resistant and difficult to treat.

Staph and strep are infections that can result in death.

1. The organism does not like oxygen so if your horse's haircoat is long, use clippers to eliminate the heavy hair around the infected area to allow air to get to the skin.
2. Use an antimicrobial shampoo that lathers well. Vigorously lather the horse, let it sit for 10 minutes, then rinse. Be sure to follow with a conditioner that works well. Continue this daily for 1 week. Do not use ointments on rain rot, since they hold moisture to the skin and moisture needs to be removed for the condition to cease.
3. Remove all scabs that are present. This is usually painful for the horse and many will resist, be gentle and patient. The best way is to temporarily moisten scabs with warm water so they become soft and easier to remove. Be sure to dry the horse immediately after scab removal.
4. Keep the horse in a dry, clean area that is very well ventilated. Give the horse protection against biting insects. Separate the horse from any others that also have rain rot.
5. When treating this condition, you must keep all *equipment* used disinfected, to keep the organism from coming back and spreading to other equines. A good solution is 2 tablespoons of bleach to 1 gallon of water. **Do not use this solution on your horse, only on the equipment.**

The organism, *dermatophilus congolensis*, can be spread through sharing of equipment between horses. This includes saddle pads, blankets, leg wraps, brushes, halters, etc. It is extremely difficult to prevent the spread of rain rot, since a horse can pass it to another horse by simply rubbing its skin on any object that the other horse may touch. The best prevention for rain rot is to use a disinfectant on any equipment shared between horses after each use.

If the condition does not improve antibiotics may be needed. Contact your veterinarian.



Photo: Equine-Information Rain Rot - Rain Scald

Thrush:

Horse thrush (also known as equine thrush) is a well known disease of the hoof demonstrating itself in the decay of the frog. This bacterial disease is anaerobic and it survives without the presence of oxygen. The frog is a soft elastic section shaped like a triangle with its base at the heel and its apex pointing forward and has two distinct layers. The external skin is called horn tissue and the corresponding vascular layer of tissue is called the sensitive corium. Beneath the inner sensitive layer lies a pad-like shock absorber that reduces concussion for the horse's hoof and his entire limb, called the deep digital cushion.

This bacteria causes the horn to rot producing a black residue which produced a strong unpleasant smell. The bacteria lives in the soil, liking conditions where there is not much oxygen as in muddy pastures and un-cleaned stables. A horse who is exposed to "clean" mud that is more or less free of manure and urine is less likely to develop thrush, verses a horse that must stand all the time in such conditions.

Thrush rarely causes lameness and poses no major health hazard, provided that appropriate measures are taken. In serious cases, the thrush bacteria invades the sensitive layers of the frog which causes pain and can cause lameness. In severe cases where bleeding from the frog is evident, contact your veterinarian for treatment and a tetanus shot will probably be required.

Prevention is the best cure:

When dirt collects under the foot over a long time without being removed, oxygen levels drop creating conditions for the bacteria to multiply.

1. Thrush is normally controlled with good foot care and dry clean living conditions.
2. If you smell a foul odor while picking your horse's feet, chances are he has contracted thrush.
3. In many minor cases, hoof picking every day will be enough to stop thrush as the exposure to oxygen may actually kill it.

Treatment:

There are several commercial products that successfully combat the frog-eating disease and are most effective when administered directly after a thorough hoof cleaning.

The following are common treatment products:

- Iodine solution (**not if the affected foot is sensitive**)
- Formalin (**not if the affected foot is sensitive**)
- Copper sulphate
- Antibiotics in the form of sprays
- Other materials that kill off the bacteria

If there are flaps or shelves of compromised frog, have your farrier pare them away so the fungus is easier to reach.

1. Make your own cotton swab by wrapping a wisp of loose cotton tightly around the end of a hoof pick.
2. Soak the cotton in treatment solution using a commercial preparation or bleach also works.
3. Swab down the sides of the frog as if you were picking out the hoof. The goal is to get into all the cracks, so don't be afraid to apply a bit of pressure.
4. Swab the cleft of the frog and any other crevices in its surface. The swab will become darker as you work, a sign it is picking up exudates and dead tissue. Repeat the process, using fresh cotton, until the swab comes out of the hoof nearly clean.



Photo: Stablemade Equine Services Thrush

Some horses are prone to thrush and have recurrent episodes no matter how clean their environment is kept. For these horses, a daily preventive swabbing can control the

problem. However, using straight bleach or a commercial thrush product every day can dry out the frog. Instead, make a gentler preparation of half bleach and half glycerin or glycerin-based hand lotion. Apply this solution to the hoof a few times a week using the hoof-pick swab technique.

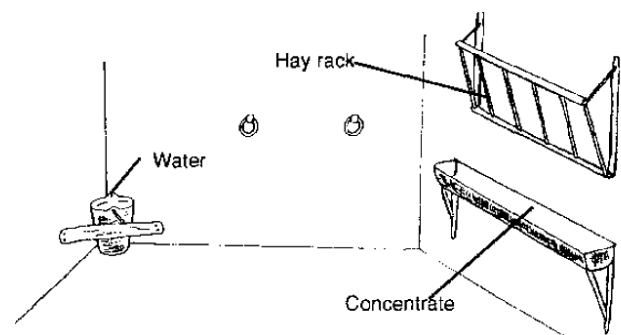
Summary:

Not picking out the feet often enough and a dirty environment are the two most common causes of the problem. If these two are not an issue and cases of equine thrush persists, it may be caused by a weak immune system and/or poor horn growth because of a dietary imbalance. Contact your veterinarian.

Stables

Stables and barn stalls have historically been used as a responsible and effective management program for healthy horses/equines. Along with this type of environment comes more work. Stalls need to be cleaned every day. Turnout time should be allowed each day for their needed exercise, along with adequate water supply, ventilation, a consistent feeding program and grooming.

A box stall should be large enough to allow the horse to turn around, lie down, and get up without interference. Minimum size requirements vary; one source recommends at least 9 square feet per 100 pounds body weight, which is 10.4' by 10.4' for a 1200-pound horse. Other experts recommend that a box stall be no smaller in area than twice the height of the horse squared, with no side shorter than one and a half times the height. Horses in smaller stalls (roughly 10' x 10') injured themselves during attempts to rise. Many authorities recommend nothing smaller than 12 feet by 12 feet. Straight stalls should be a minimum of 4 square feet per 100 pounds body weight (48 square feet for a 1200 pound horse), or at least 5' by 9', which is 45 square feet.



Concentrate feeds for the stabled horse are placed in a manger (a feeding trough) which is fixed to a wall at least 60 cm above the ground. Hay is fed from a hay rack of wooden or metal bars attached to the wall at least 1 meter from the ground. Hay can also be fed from a rope net hung from a hook or ring in the wall. A metal ring should be attached to a wall to allow the animal to be tied up when it is groomed or examined. Water can be provided in a strong bucket placed in a corner of the stable with a bar of wood to hold it in place. (Stall example and information AFO)

Problems for Unattended Confined Equines

- Horses need regular exercise to prevent stocking up (swelling of the lower legs) from poor circulation and to aid digestion of their food.
- Horses confined with their heads elevated have decreased clearance of infectious material simply due to gravity. Other factors that contribute to the development of respiratory disease in horses are ammonia, particulate matter from bedding and feed, temperature extremes, poor ventilation, and overcrowding in a confined location for extended periods of time. All of these play a role in damaging airways and decreasing resistance to disease.
- Dehydration can impair pulmonary defense mechanisms that normally clear infectious material.
- Lack of access to their minimum water requirements and not having a set feeding program put them at risk to develop gastric ulcer disease and a decrease in its body condition. Horses' stomachs secrete acid constantly, but only chewing stimulates production of saliva to neutralize the acid. Given the choice, "horses drink in association with feeding. Since they eat frequently, they also drink frequently" (Houpt & Ogilvie-Graham).



Photo: Second Chance Ranch - Elma, WA

3 y/o spent his entire life in a small, windowless building, back hooves indicate that he probably spent a good deal of time standing in a hole -- the hoof wall actually curls underneath the foot on the inside and flares out to the outside.

- Throwing dry bedding over the top of wet will **not** protect the animal. As the animal stands and lies on the new bedding it draws the moisture from underneath into the new bedding.

This unsanitary condition has a high content of ammonia, high content of bacteria and is a breeding ground for insects. Constant contact with such an environment will result in thrush (many times very serious), abscesses, infections in wounded areas received while confined, and bed sores.

Continuous, indoor confinement without exercise, is only done to recover from a medical situation on the advice of a veterinarian.



Photo: Stablemade Equine Services Thrush



Photo: Stablemade Equine Services

Abscesses from ammonia in urine are very painful

Hazards of Ammonia From Unclean Housing

Unclean housing creates several health issues. When the stall or other place of confinement is not kept free of manure and urine, it becomes an area of a toxic ammonia hazard for animals and humans.

According to The Agency for Toxic Substances and Disease Registry (ATSDR), a federal public health agency of the U.S. Department of Health and Human Services, ammonia exists naturally in the air at levels between 1 and 5 parts in a billion parts of air (ppb). It is commonly found in rainwater. The ammonia levels in rivers and bays are usually less than 6 parts per million (ppm; 6 ppm=6,000 ppb). Soil typically contains about 1-5 ppm of ammonia.

When it is in the air at a level higher than 50 ppm, it has a very strong odor that is irritating and that you can smell. You will probably smell ammonia before you are exposed to a concentration that may harm you. Levels of ammonia in air that cause serious effects in people are much higher than levels you would normally be exposed to at home or

work. However, low levels of ammonia may harm some people with asthma and other sensitive individuals. Farmers can be exposed to ammonia when they work with or apply fertilizers containing ammonia to fields. Farmers, cattle ranchers, and people who raise other types of livestock and/or poultry can be exposed to ammonia from decaying manure.

Ammonia is a toxic, reactive and highly hazardous chemical. The U.S. Department of Labor's Occupational Safety and Health Administration warn that concentrations of greater than 50 ppm can cause serious harm to human beings. OSHA has set an 8-hour exposure limit with readings of 25 ppm and a short-term of 15-minutes exposure limit with readings of 35 ppm for ammonia in the workplace. NIOSH recommends that the level in workroom air be limited to 5 minutes of exposure with readings of 50 ppm.

Ammonia is a corrosive substance and the main toxic effects are restricted to the sites of direct contact with ammonia; skin, eyes, respiratory tract, mouth, and digestive tract (for the confined equine this also includes their feet). For example, if you spilled a bottle of concentrated ammonia on the floor, you would smell a strong ammonia odor; you might cough, and your eyes might water because of irritation. If you were exposed to very high levels of ammonia, you would experience more harmful effects. For example, if you walked into a dense cloud of ammonia or if your skin comes in contact with concentrated ammonia, your skin, eyes, throat, or lungs may be severely burned. These burns might be serious enough to cause permanent blindness, lung disease, or death.

Confined Equine

Horses expel excess dietary protein (what is not metabolized during digestion) through their urine in the form of urea, which enters the soil to be absorbed by plants. When an equine is outdoors, it will roam away from urine-soaked areas which eliminates any harm. In the cleanest barns, ammonia levels in equine stalls exist well above the 50 ppm concentration. When urine floods the stall, it can seep into cracked stall mats, drains or deep bedding where the anaerobic bacteria feed on the nutrients in urea and produce ammonia, which rises to be inhaled by you and your horse.

Although acute toxicity for horses is unlikely, problems crop up from long-term, low-level exposure, according to the International Veterinary Information Service. Researchers M.S. Davis and W.M. Foster released a paper indicating that as little as 10 ppm for 5 to 7 weeks can cause dysfunction of the horse's mucus membranes, which decreases immune response and makes the horse susceptible to other pathogens.

Ammonia gas is heavier than air and the level of harmful exposure will be greater at floor level. Foals and miniature equines are at higher risk for ammonia exposure because they spend so much time on or near the stall floor. Accord-

ing to Frederick Harper, PhD and extension horse specialist for the University of Tennessee, approximately 15 percent of all confined foals suffer a severe respiratory disease before they are one year old, although most occur between 2 to 6 months. Since foals spend a great deal of time on or near the stall floor, ammonia exposure is heightened. In addition, young foals have immature respiratory systems, so they are increasingly susceptible to disease, according to Harper.

Susan J. Holcombe, PhD, at the Equine Pulmonary Laboratory, released a paper on the causes of airway inflammation in horses, noting that ammonia is linked to mucus accumulation in the equine airway.

Ammonia Management:

Ammonia is caustic (capable of destroying or eating away by chemical action) and is a by-product of manure decomposition and is in urine. As each day goes by that the area in which the equine is confined is not cleaned out, the build up of the manure and urine intensifies the harmful effects of the ammonia in both liquid and gas form.

While ammonia's effects are clearly harmful, its presence is not a necessary part of your barn's environment. There are several steps you can take to reduce ammonia exposure for your horse even if it cannot be completely eradicated from your barn.

1. Clean stalls regularly.

Clean stalls daily which includes removing urine and wet bedding and strip the stall about once a week. If possible, remove your horse from the stall while you clean because ammonia will be stirred up by the cleaning process. Not removing wet bedding forces the equine to stand and lay in the liquid ammonia.

2. Ventilate.

For many horse owners, total pasture time is not an option, but when you must stall your horse, provide adequate ventilation. This dilutes the ammonia concentration by increasing its removal from the facility. Increased ventilation also increases the drying rate of litter or bedding on which animals excrete; thus, further decreasing indoor ammonia levels.

Proper air flow through your barn will provide your horse with fresh air, distribute air evenly, regulate temperature and moisture levels and help to remove odors and gases.

3. Limit stall time.

Not only will fresh air eliminate ammonia exposure, free movement will enhance your horse's quality of life.

4. Absorbent bedding and ammonia neutralizing agent.

Manufacturers are now producing improved ammonia-absorbing products made up of all natural ingredients, because of the potentially hazardous effects of hydrated lime. Research has shown these products to be highly effective in ammonia and moisture absorption, and their all-natural content makes them an excellent alternative to hydrated

lime. Such products as Sweet PDZ, Stable Boy, and Stall Dry, are composed of diatomaceous earth, clay, and natural minerals, such as zeolites, that are non-toxic and won't irritate your horse's mucous membranes or respiratory system. These products, especially diatomaceous earth and clay, are considered highly moisture-absorbent, and the minerals trap ammonia within tiny channels in their structure, eliminating odors and noxious chemicals from the stall and the air.

These products, especially those that are zeolite-based, make excellent composting materials and fertilizer components. Ammonium molecules replace part of the mineral structure, allowing the ammonia to retain its nutrient value and become a slow-release fertilizer, which will prevent crop burn caused by excess nitrogen.

Never allow bleach to come in contact with urine!

The liquid ammonia within the urine and the bleach will produce a highly toxic gas. You will find references for the use of bleach within this publication; however, never use bleach as a cleaning or disinfectant agent where the two can mix.

* * * * *

mins and minerals in correct amounts and relationships needed for growth, maintenance, reproduction or physical activity.



Photo: Ripley's HAF "Hay 4 Horses" Animal Control Voucher Program

The "hay belly" and poor body condition of this mule as well as the horse in the background, is due to the poor nutritional value in this hay. Even with free choice, they were receiving bulk of no real energy value.

Feed and Water

Whether your horse or other type of equine serves as your energetic leisure companion, skillful competitor in the show ring, dependable work partner, or has been retired to the status of pasture pal and/or pet, he needs and deserves the care and attention comparable to the performance he gives. There are few animals whose needs are as determined by human beings as are the horse's. The horse's lifestyle, be it pleasure, show, breeding, work, or retirement, is largely determined by the owner . . . You.

Therefore, the relationship between the role a horse plays for its owner and the nutrition he needs to perform that role places a special responsibility on you to provide a feeding program that meets the horse's needs.

Nutritional Needs of Horses:

Like people, each horse needs certain kinds and amounts of nutrients to thrive. Their requirements are largely determined by their lifestyle and age. Feed each horse according to his weight and the demands placed on the horse. Re-evaluate these demands as required by changes in age, weight and lifestyle.

Good nutrition means more than supplying a quantity of feed. A well-balanced diet contains energy, protein, vita-

Water,

The Most Important Nutrient

Although many of us may not think of water as being a nutrient, it is vitally important. The lack of this important nutrient will create life threatening health conditions more quickly than any other component of the horse's diet.

Water is essential for almost all bodily functions, so any alteration in the normal water balance of the animal has an immediate and profound effect. Within 24 hours of restricting water intake, the horse will go off feed. By 72 hours without water, the horse can be in a very serious or even life-threatening situation.

The body of the adult horse is composed of about 70% water. For a 1,100-pound animal that equals 770 pounds of water or about 96 gallons. The body of a foal has even higher water content, which approaches 80% of its body weight.

In the healthy horse, water intake is influenced by four major factors: body weight, level of activity or work, ambient or environmental temperatures and diet. On a weight-to-weight basis, smaller horses consume more water than large horses. As you would expect, with increased levels of activity horses also require more water. And as environmental temperatures increase, so does water intake. The type and amount of diet consumed by the horse can also greatly impact the amount of water consumed by the horse.

For example, horses on high grain diets will consume 30 to 40% less water than horses on a long hay diet such as brome or timothy. It is also important to understand that horses on good quality spring and summer pasture will consume less drinking water (compared to horses on hay and concentrates) because the moisture in the forages they consume meets a large percentage of their water needs. Good quality pasture forage can be 65 to 80% moisture while hay may only contain 8 – 10% moisture. This is why horses may actually consume less drinking water in the summer than in the winter—they may be getting most of their water needs met by lush, green forages as compared to the dry pasture or hay diets in the winter. Their total water intake may be similar—it is just coming from different sources.

The normal water intake for a healthy, non-pregnant horse is about 25 milliliters per pound of body weight. This equates to about 8 to 10 gallons for an adult horse each day. But this requirement can vary widely due to factors mentioned above. A horse under a heavy workload in a warm to hot environment could easily need triple this amount.

As a horse owner, the thing to remember is that your horse needs clean, good quality water available at all times (free choice). Large, outdoor water troughs should be cleaned regularly; during the summer, this means every 1 to 2 weeks. If the horse is stalled, the water buckets should be emptied and rinsed daily of feed and other materials. In very hot weather, it may be necessary to clean water troughs more often especially if algae begin to grow in the tanks. When possible, on hot days run some fresh, cool water into the tank; horses drink better if the water is cool (45 to 65 degrees) as compared to very warm water. If you have an automatic water system, check these also; they need regular cleaning and a quick once-over to be sure they are operating normally. If you notice your horse(s) spending a lot of time around the water tank, appear to be fighting over water, or have dry feces, check it out, there could be a problem.

Watering Guidelines:

1. Each horse requires 8 to 10 gallons of water every day. Some studies show that an idle horse requires a minimum of 10 to 12 gallons of water a day. But each horse is an individual--some horses might need more; others, less.
2. It is important that owners watch their horses, no matter how young or old the animals are, to make sure all are drinking enough.
3. Pinch the skin on the shoulder into a little tent between your fingers. The tent should bounce back immediately. A tent that lasts a couple of seconds lasts too long, indicating dehydration. People should do this with their horses during normal times so they have a baseline to know that horse's normal reaction.
4. Watch for signs of dehydration by checking the manure for a covering of mucus; this covering indicates an inadequate water intake.

5. The container which your equine drinks from must be large enough to accommodate the size of its head. If the container is too small there will be water left that it cannot reach. This could be misleading. If horses do not drink enough, they can be subject to a really bad colic or intestinal impaction.

6. Water troughs and containers should be regularly cleaned to prevent algae buildup.

7. Water troughs and containers should be located where they are protected from electrical problems, fouling and freezing.

8. Automatic watering systems should be checked daily to ensure they are dispensing water properly.

When to use caution in watering:

- When the horse is excessively hot, it should be given small sips of lukewarm water until it has recovered.
- After a strenuous workout, cool down the horse before allowing it to drink.
- *If the horse has been denied water for an extended length of time (24 hours or more) do not let it drink its fill as there is a strong risk of colic, leading to the death of the animal. Introduce the water slowly, a little at a time.*

Watering in the Winter Months

In the winter, when the water can be very cold, some horses drink less. This is a problem because water is one of the most important items a horse needs to be healthy. Young horses, before they have their full set of teeth, are very tender in the mouth. So are many older horses and horses with any kind of dental problem, such as a sore tooth. A horse with sensitive teeth, mouth, or gums might refuse to drink cold water because it's painful. But for many normal, adult horses, cold water tends to be less of a problem. While some older horses are very reluctant to drink cold water at the beginning of every winter, as they get a little farther along into the winter, they adjust to colder water. What is important is that an owner watch their horses, no matter how young or old the animals are, to make sure all are drinking enough, check for dehydration and watch the manure for indications of inadequate water intake. It is always good to at least take the chill off the water you offer. How warm the water needs to be depends on the individual. Some horses will drink water that is 32.5* Fahrenheit! Horses are very suspicious about any change, so if they are used to the water getting cool as the temperature drops and you warm the water up, it's going to be different. This could make them suspicious. So do not warm it up too much.

Any livestock supply house has a variety of devices you can put in the water trough or in individual drinking buckets to warm the water or take the chill off. These devices can include an electric bucket or tank heaters and so on.

For pastured horses, or for troughs where there is no electrical service, the most important thing in keeping water from freezing is to insulate your water tank. You can get a lot of heat from the ground if the ground is not completely frozen. If the tank is suspended in the air, it will freeze quicker, just like a highway freezes faster on a bridge than on the roadway. Even in snow-pack country, at the interface of the snowdrift with the ground, the temperature is right at 32° F. Above the snow, temperatures are going to be equal to the ambient air temperature. So, to help keep water warmer and prevent freezing, set the trough or tank low into the ground.

In situations where you have no means mechanically to take the chill off the water or keep it from freezing, you might only be able to offer warm water during certain times of the day. This probably means carrying a bucket of warm water out to your horse. How often you make the trip depends on how many horses you have, how much water each horse will take in before the water chills or freezes and that each has taken in enough to meet its health needs. You should offer your horses water at least twice a day, but if a horse doesn't drink enough before the water freezes, then twice a day will not be enough. Still, horses seem to figure it all out pretty quickly. They are creatures of habit and will get into the routine of twice daily watering. If you give them a little bit of grain with salt on it before watering, then they are more likely to take on water right after that.

One thing that you need to keep in mind is that horses are very suspicious of change. If you use the same bucket, sometimes the water could take on a taste or taint. If they are used to it, they will do fine. But if you switch buckets and the water tastes strange or different, they might not want to drink as much. Keep your buckets and watering equipment familiar to your horses, especially as you head into and through the winter months.

Diet,

The Role it Plays in Your Horse's Health

Good management of a feeding program involves two basic steps:

1. Understand and recognize your horse's physical and nutritional needs based on age, weight and lifestyle (activity level of the equine)
2. Provide a diet that fills those needs efficiently.

Your horse requires a daily diet that includes water, fiber and nutrients. Water and fiber help transport feed through the horse's digestive tract, while other nutrients work to maintain life-sustaining processes. Horses obtain dietary fiber by eating roughage. Pasture is a typical roughage source, as is hay, which usually contains about 30% fiber. The combination of fiber and water in the horse's digestive tract creates "bulk", which keeps the intestinal tract healthy

and operative.

Normal contractions in the horse's intestinal tract stimulate passage of feedstuffs through the body. Fiber and water must be present in sufficient amounts for the digestive tract to function properly. If dietary fiber is provided through hay or pasture, the horse should be fed about one pound of loose hay or an equal amount of pasture each day for every one hundred pounds of body weight.

Signs of Starvation:



Photo: Ripley's HAF emergency euthanasia program

This emaciated mare (healthy weight pasture mate) is not a feeding issue; it is a health issue (Aggressive metastasizing cancer) and was humanely euthanized at the owner's request as no recovery was possible

A rapid drop in weight and body condition may be a sign of a terminal medical condition such as cancer or other diseases affecting the equine's internal organs. However, the most frequent cause of a slower loss of body conditioning is the lack of a proper diet, starving the body of life-sustaining nutrition. When this occurs the animal's body will initially use stored fat and carbohydrates. Once these are gone, energy is derived from the breakdown of protein.

Even though protein is a component of every tissue it is not stored in the body as fat and carbohydrates are stored. Therefore, the starved body uses protein not only from muscles, but also from vital tissues such as the heart and even gastrointestinal tissues. In other words, tissues that are necessary for life. The starved body cannot select which tissue protein that will be metabolized for energy. When an equine loses more than 50% of its body weight, the prognosis for survival is extremely poor.

Important Considerations When Feeding:

1. Do not feed moldy or insect-infested hay or grains as it may cause illness or death.
2. Do not feed on the ground in sandy soils to minimize the

risk of sand colic.

3. Do not feed on the ground where there is manure present to minimize parasite infestation.
4. Do not feed hay that contains sand and/or dirt as this is a cause of sand colic.
5. Let equines feed in natural position from large feed containers.
6. Avoid feeding excessive grain and energy-dense supplements. (At least half the horse's energy should be supplied through hay or forage. A better guide is that twice as much energy should be supplied from a roughage source than from concentrates.)
7. Make sure each animal is receiving its rations (In the pecking order of the herd, there might be some that eat more than what is good for them, leaving others not receiving a healthy amount of needed feed).
8. Reduce and/or delay feeding a horse which is hot, excited or showing pain, has fever or diarrhea. Consult your veterinarian if any problems arise. Prevent rapid eating.
9. Divide daily concentrate rations into two or more smaller feedings rather than one large one to avoid overloading the horse's digestive tract.
10. Any feed changes should be made gradually over a period of 7 to 10 days. Changes in the rate of feeding should not exceed 1 pound per day for each horse.
11. All feeds and supplements should be properly labeled to avoid misuse. Feeds designed for other species, particularly medicated feeds and those containing urea, are *not* to be used for horses.
12. Feed troughs and buckets should be cleaned regularly.



The body condition of this horse is due to the owner. It has been denied the food (nutrition) it needed to maintain its life. It is very close to being starved to death. If it is not already too late, the recovery process will end up taking a tremendous amount of time and money to bring the animal back to full health. In some cases full recovery might not be achieved as there may be long-term health issues due to the severity of its depleted condition.

Photo: Equine-information

Basic Feeding Instructions

Start at The Right Rates:

- Start with the horse's lifestyle and use either a scale or weight tape to determine the health needs of each horse and other equines that you own.
- A typical horse eats between 2 and 2.5% of its body weight in feed each day.

Weigh Your Feed:

- Feed and hay vary significantly in weight compared to volume. Start by weighing your hay. For the best accuracy, use a scale to weigh "flakes" of hay and "cans or scoops" of feed so you know exactly what the feed intake is; this will prevent underfeeding or overfeeding and founder.
- Commercial feed supplements should be fed at recommended levels with good quality pasture, grass hay or legume/grass hay; no additional minerals or vitamins are required. It is important to match your feed supplement with the age and life style of your equine such as a senior feed for your older horse and a foal supplement for the youngster.

Switching feeds and changes in diet:

- A drastic change in diet can result in health difficulties such as colic.
- During the first week, plan to blend the new feed in with your old feed, decreasing the old feed and increasing the new each day for seven to ten days. Then feed a full ration of the new feed.

Observe the Condition of your Horse

Each individual horse is different. Use the Body Scoring Guide, page 58, to gauge your horse's overall body condition. As you note changes in the condition, make adjustments in your feeding program. Do not make drastic changes - increase or decrease the rate by no more than 10%.

Overweight:

Feeding is one of the most rewarding chores of horse ownership. But many horses, given the opportunity, will eat far more than they need, tipping the scale into an unhealthy balance. No matter how much your horse enjoys eating, you do it a disservice by overfeeding. Excess pounds put a strain on virtually every body system. A far kinder strategy is to supply food and exercise in proper amounts to keep your horse fit and healthy.

Maintaining the ideal weight is not always easy, however. Some horses are what we call "easy keepers." They require minimal calories to maintain optimal body condition. Po-

nies, in particular, seem to store excess energy as fat. Many adult horses too - especially those in their middle years - begin to retain unneeded weight due to reduced activity and a slow-down in metabolism. When weight gain becomes extreme, we classify the horse as obese.

Hazards of Obesity

Excess weight and over-nutrition have a number of potentially negative effects, including:

- Increased stress on the heart and lungs
- Greater risk of laminitis or founder
- Increased risk of developmental orthopedic (bone and joint) problems in young, growing horses
- More strain on feet, joints and limbs
- Worsened symptoms of arthritis
- Less efficient cooling of body temperatures
- Fat build-up around key organs, which interferes with normal function
- Reduced reproductive efficiency
- Greater lethargy and more easily fatigued

Weight Reduction

You hold the keys to controlling your horse's weight. You'll need to enforce sound nutrition management, become dedicated to a regular exercise program, and use restraint when measuring the ration.

When implementing a weight loss program, it's important to do it in a way that will not stress the horse. Changes in both exercise and nutrition should be gradual.

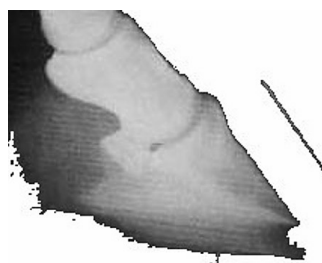
By increasing the amount of exercise, you can rev up the horse's metabolic engine and burn more calories. By shifting to a lower-calorie diet, you can create an "energy deficit" so that the horse begins to utilize its fat reserves as fuel. However, even though the ration provides fewer calories, it should be balanced so that it continues to provide all the essential nutrients. Develop a program that will allow your horse to reduce its weight without any negative side effects.

Here are some guidelines

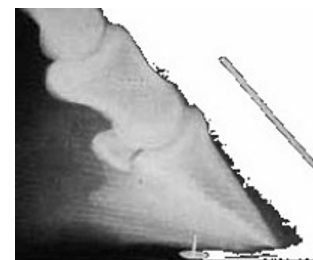
- Be patient. Weight reduction should be a slow, steady process that does not stress the horse or create metabolic upsets.
- Make changes in both the type and amount of feed gradually. Reduce rations by no more than 10% over a 7 to 10 day period. Losing weight too quickly can develop a serious disease called hyperlipidemia.
- Track your horse's progress using a weight tape. When the horse's weight plateaus, gradually cut back its ration again.
- Gradually step up the horse's exercise regimen avoiding

exhaustion and overheating. The out of shape, overweight equine in hot weather would be at risk of going into a shock-like condition which can be fatal; build time and intensity as the horse's fitness improves. Some horses are natural pasture potatoes. Ride, longe, drive or work the horse on a treadmill rather than rely on free-choice exercise.

- Provide plenty of clean, fresh water so the horse's digestive and other systems function as efficiently as possible and rid the body of metabolic and other wastes.
- Select feeds that provide plenty of high quality fiber but are low in total energy. Measure feeds by weight rather than volume to determine appropriate rations.
- Select feeds that are lower in fat, since fat is an energy-dense nutrient source.
- Switch or reduce the amount of alfalfa hay fed. Replace with a mature grass or oat hay to reduce caloric intake. This will also satisfy the horse's need to chew, reduce boredom and provide fill for its stomach.
- Feed separate from other horses so the overweight horse doesn't have a chance to eat his portion and his neighbor's too. In extreme cases of obesity, caloric intake may also need to be controlled by limiting pasture intake.
- Balance the horse's diet based on age and activity level. Make sure the horse's vitamin, mineral and protein requirements are met. A supplement may be added to the ration to compensate for lower quality, less nutrient dense feeds.



Healthy



Sinker

Overfeeding that becomes excessive stored fat puts the animal at risk to develop laminitis, the most crippling disease a horse can have (also referred to as founder).

Because obesity can affect a horse's health, keep a good line of communication with your veterinarian. Schedule regular check-ups, especially during the weight reduction process.

Basic Feedstuffs

• Roughage

Roughage is high-fiber feed tuffs such as hay, pasture, oat hulls and cottonseed hulls. Roughage satisfies the need for bulk and adds energy, protein and minerals to the horse's diet. However, feedstuffs that are good sources of fiber tend to be relatively low in energy and protein and these alone might not meet your horse's nutritional needs.

Evaluating Hay

Most people buy hay based on how it looks, smells, and feels. These are “qualitative” factors, and they are important. When appraising hay, what is inside is what counts. Ask that one or several bales be opened so you can evaluate the hay inside the bales. (Do not worry about slight discoloration on the outside, especially in stacked hay.) Keep in mind the following points:

1. Choose hay that is as fine-stemmed, green and leafy as possible. It should be soft to the touch.
2. Avoid hay that is over-cured; excessively sun bleached; or smells moldy, musty, dusty or fermented.
3. Examine the leaves, stems, and flowers or seed pods to determine its level of maturity.
4. Select hay that has been harvested when the plants are in early blooms for legumes, or before seed heads have formed in grasses.
5. Avoid hay that contains a significant amount of weeds, dirt, trash or debris.
6. Examine hay for signs of insect infestation or disease. Be especially careful to check for blister beetles in alfalfa. Ask the grower about any potential problems in the region.
7. Reject bales that seem excessively heavy for their size or feel wet to the touch. (They may contain excess moisture that could cause mold or worse, spontaneous combustion.)
8. When possible, purchase and feed hay within a year of harvest to preserve its nutritional value. Store hay in a dry, sheltered area out of the rain, snow, and sun; or cover it to protect it from the elements.
9. When buying in quantity, have the hay analyzed by a certified forage laboratory to determine its actual nutrient content.

• Grains:

Grains such as oats, corn, milo (sorghum grain), and barley have a high carbohydrate content. Grains also supply some protein. Generally, grains are deficient in minerals and, except for corn, have almost no vitamin A - the one vitamin horses cannot synthesize and is most often missing from a horse's diet.

Oats tend to be safer to feed due to high fiber content. Crimping is considered by many to aid digestion, but the storage of crimped oats reduces their nutritional value and should be avoided.

Corn and barley have a higher energy value than oats. Because of their high-energy content, *they can cause laminitis and/or colic if introduced to the diet too quickly.*

Barley's energy value lies between that of corn and oats. Its hard husk needs to be crushed or cracked to aid digestion.

Soybean meals are often included in conditioning rations for young and growing horses and increase the protein content of the ration. *They should be fed in small amounts*

and introduced gradually.

Linseed meal is not an appropriate protein supplement for growing horses because it is low in the amino acid lysine that is essential for normal development.

• Supplements:

For the individual owner, a commercial feed is the best answer in supplementing your equine's diet to meet its nutritional needs. Commercial feeds were developed to provide all the essential nutrients in their proper balance. *Resist the temptation to dilute or “cut” a feed with straight grains.* Usually this does not pay off and *can change the calcium/phosphorus ratio leading to serious skeletal and bone development problems in growing horses.*

Nutrition/Energy

Energy:

Energy in the horse's diet comes primarily from carbohydrates and fats. Most dietary energy a horse consumes is “digestible” - meaning it is readily absorbed into the bloodstream as it passes through the digestive tract and is distributed throughout the body.

As the horse's body metabolizes or breaks down carbohydrates and fats, the energy released becomes fuel for body functions. *A portion of the energy taken into the body will first be used to maintain body life processes: breathing, digesting food, and pumping blood.* Strenuous activities, such as running, jumping, working and growing, require energy above and beyond that needed for maintenance. Feeding programs for active, growing horses should reflect these increased nutritional needs.

Excesses or insufficiencies of energy in a diet affect a horse's condition and subsequent performance. *If a horse takes in less energy (in the form of carbohydrates and fats) in the diet than is needed to meet body requirements, it will use body protein reserves to supply the needed energy. Body protein is normally used to build and repair body tissues.* When the horse uses protein reserves to meet energy needs, body condition deteriorates.

There are also risks associated with feeding energy beyond what is demanded by lifestyle. If a horse takes in more energy than needed, the excess will be stored as body fat. *Body fat, beyond that needed for insulation and cushioning, is unhealthy because it places an added burden on the functions of vital organs.*

Protein:

Protein is made up of chemical units called amino acids. Different groupings of amino acids create different proteins which are used by the horse to build muscle, cartilage, hooves and haircoat. The horse is able to synthesize, or manufacture, some of the amino acids used in proteins from other substances in his body. Those that the horse needs but

cannot synthesize are called “essential” amino acids. These must be obtained through protein sources in its feed. Each protein source in feed contains different types and amounts of amino acids, and not all of these are necessarily needed or utilized by the horse. Indeed, a horse may consume what appears to be an adequate quantity of protein and still not get the amino acids needed for normal growth and development.

Minerals:

Minerals play an integral role in bone and skeletal development, maintaining the integrity of skin and tissue and facilitating body reactions that drive life processes such as breathing, digestion, reproduction, and tissue repair. Minerals play an essential role in bone development - which is essential to the beauty and performance of your horse.

Calcium and phosphorus are the two minerals needed in the largest amounts by the horse for bone growth and maintenance. Young horses especially require calcium and phosphorus, because their bodies are still actively experiencing skeletal growth and development.

The calcium/phosphorus ratio in a horse’s diet should not be less than 1:1 or more than 3:1. Ideal ratios fall between 1.5:1 and 2:1.

Iron, zinc, manganese, sodium, potassium, magnesium, copper, iodine and cobalt are types of trace minerals (needed in small amounts by the horse) which facilitate the chemical reactions that drive life processes within the body. Deficiencies and imbalances of trace minerals may cause reduced growth rate, lack of stamina, less resistance to disease, and lower reproductive rate.

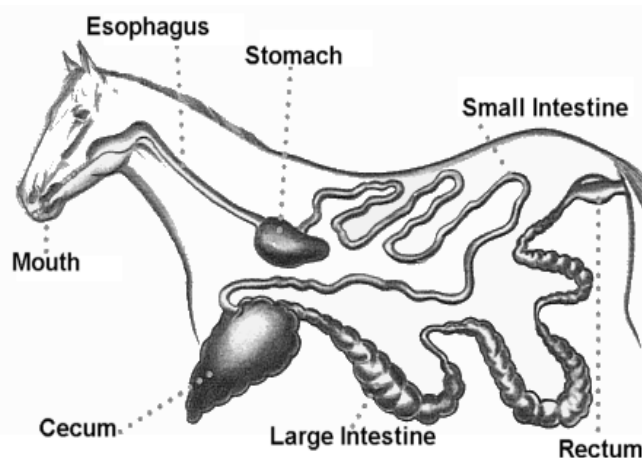
Vitamins:

Vitamins are chemicals needed in small amounts to help horses utilize nutrients for growth, maintenance and reproduction. Your horse is unique from many animals in that he is able to synthesize many of the vitamins it needs (Vitamin K, and the B-complex vitamins) from bacteria living in his intestine and Vitamin C comes from the liver. *Excess vitamins can be harmful to your horse. Feed do not need to contain vitamins he is already synthesizing or obtaining from hay or pasture.*

The Equine Digestive System

The horse is a non-ruminant herbivore, an animal that eats fibrous feedstuffs (such as grasses or hay) but does not have a rumen to help utilize the fiber. (In ruminants, such as cattle and sheep, bacteria in the rumen produce enzymes that digest fiber.) The horse is able to utilize fiber because its digestive system includes the cecum, an organ which contains the bacteria necessary for fiber digestion. The horse’s digestive system consists of a muscular tube approximately 100 feet long that extends from the mouth to the rectum. This tube, which is lined with a mucous mem-

brane, is used to take in, grind and mix feedstuffs, break down and absorb nutrients and eliminate waste material. Feedstuffs pass through the horse’s digestive system in about two days. Major organs of the digestive system include the mouth, esophagus, stomach, small intestine, cecum, and large intestine.



The Mouth and Esophagus:

The horse’s lips, teeth and salivary glands work in conjunction to take feed stuffs into the mouth, chew them up, and wet them with saliva. *A horse produces about 10 gallons of saliva each day.* The horse then swallows, and the feed passes through the esophagus into the stomach.

The Stomach:

As it is chewed, moistened feedstuffs enter the stomach and the stomach produces acids (primarily Hydrochloric Acid). These acids begin breaking down the feed into digestible components, but little nutrient absorption takes place in the stomach.

The horse evolved as a grazing animal, and horses naturally eat almost continuously. When management practices provide for feed only once or twice a day, the relatively small stomach capacity of the horse make it difficult for the horse to meet its energy needs, especially for performance or working horses. To meet higher energy demands, trainers traditionally decrease forage and increase the grain ration. However, the horse can handle only so much grain. Too much grain can result in digestive disorders, such as founder or colic. Often a performance horse cannot or will not eat enough to meet its daily caloric requirements. The horse is also unable to regurgitate, and if overfed, colic can occur.

The Small Intestine:

The small intestine, which takes up about one-third of the digestive tract’s capacity, secretes enzymes that digest the majority of the feedstuffs’ nutrients (protein, carbohydrates, fats, minerals, and vitamins).

The horse does not have a gallbladder to store bile. Instead, bile salts are constantly secreted into the small intestine to help the digestive process.

The Cecum:

The cecum is a large, pear-shaped, pouch-like organ which connects the small and large intestines. It contains a bacterial population similar to that found in the rumen of the ruminant animal. Indeed, the cecum performs the same basic function as that of the rumen: the digestion of fiber. As feedstuffs pass through the cecum, bacteria in the organ break down fiber and produce volatile fatty acids (VFA's), which are absorbed by the horse as an energy source. VFA's are absorbed primarily in the cecum.

The Large Intestine:

The large intestine (or colon) is about 20 feet long and takes up approximately 50% of the total capacity of the digestive system. Fibrous feedstuffs which were not digested in the cecum are passed into the large intestine, where bacteria continue producing and absorbing VFA's. In addition, any other nutrients which can be utilized by the horse, but have not yet been absorbed, are digested in the large intestine. Finally, waste material is eliminated through the rectum.

* * * * *

Effective Parasite Control

In terms of management priorities, establishing an effective parasite control program is probably second only to supplying the horse with clean, plentiful water and high-quality feed. It is that important!

Internal parasites, or worms, are silent thieves and killers. They can cause extensive internal damage without you even realizing your horses are heavily infected. **The effects of internal parasites range from a dull haircoat, not thriving well to colic and death.** Internal parasites lower the horse's resistance to infection, rob the horse of valuable nutrients and in some cases, cause permanent damage to the internal organs.

A Complete Management Program

Chemical control using dewormers is just one part of a complete parasite control plan. As parasites are primarily transferred via manure, good management is essential.

- Keep the number of horses per acre to a minimum to prevent overgrazing and reduce pasture contamination with parasite eggs and larvae.
- Pick up and dispose of manure regularly (at least twice a

week, even in dirt or sand yards).

- Do not spread manure on fields to be grazed by horses; instead, compost it in a pile away from the pasture.
- Mow and harrow pastures periodically to break up manure piles and expose parasite larvae to the elements. Larvae can survive freezing, but they cannot tolerate extreme heat and drying for very long.
- Keep foals and weanlings separate from yearlings and older horses to minimize the foals' exposure to ascarids and other parasites.
- Use a feeder for hay and grain rather than feeding on the ground.
- Remove bot eggs regularly from the horses' hair-coat.
- Consult your veterinarian to set up an effective deworming program for your horse (s) and monitor its effectiveness.

Types of Internal Parasites

There are more than 150 species of internal parasites that can infect horses. The most common and troublesome are the following:

- Large strongyles (bloodworms or redworms)
- Small strongyles
- Ascarids (roundworms)
- Tapeworms
- Pinworms
- Bots
- Threadworms

Probably the most important, in terms of health risk, are the first four: large and small strongyles, ascarids and tapeworms.

The life cycle of most internal parasites involves eggs, larvae (immature worms), and adults (mature worms). Eggs or larvae are deposited onto the ground in the manure of an infected horse. They develop in the environment and eventually are swallowed while the horse is grazing, and the larvae mature into adults within the horse's digestive tract (stomach or intestines). With some species of parasite, the larvae migrate out of the intestine into other tissues or organs before returning to the intestine and maturing into egg-laying adults.

Large Strongyles:

Large strongyles, as larvae, penetrate the lining of the bowel and migrate along the blood vessels that supply the intestines. Even small numbers of these larvae can cause extensive damage and possibly death. Infection with large strongyles can cause unthriftiness, weight loss, poor growth in young horses, anemia (low numbers of red blood cells) and colic. In most cases, colic caused by these parasites is mild, but severe infections can result in loss of blood supply to a portion of the intestine, leading to severe and potentially fatal colic. Fortunately, large strongyles can be effectively controlled by most available dewormers for horses.

Small Strongyles:

Small strongyles have become a group of major importance. Unlike the large strongyles, small strongyle larvae do not migrate through the tissues. In some instances, instead of completing a normal life cycle, they burrow into the lining of the intestine and remain dormant, or “encysted” (enclosed in a cyst-like structure), for several months before completing their life cycle. During this time the larvae are not affected by most dewormers.

Small strongyle larvae can cause severe damage to the lining of the intestine, especially when large numbers of larvae emerge from the encysted stage all at once. Colic and diarrhea are common in heavily infected horses. These parasites also cause weight loss, slowed growth in young horses, poor coat condition and lethargy or lack of energy. While lighter infections are not obvious, it is common for a horse’s general health and performance to improve after treatment for these parasites.

The early and late larval stages (before and after they burrow into the lining of the intestine) and the adult parasites are susceptible to several dewormers. But currently there are only a few dewormers that are effective against the encysted larval stage- the stage that causes the most damage. Strategic use of these products is called larvicidal therapy, as it is targeted at the encysted larvae.

Ascarids:

Ascarids, or roundworms, are most often a problem in young horses (especially foals, weanlings and yearlings). Adult ascarids are several inches long and almost the width of a pencil. In large numbers they can cause blockage (or impaction) of the intestine. In addition, ascarid larvae migrate through the lungs as part of a normal life cycle and can cause pneumonia. Ascarid infection in young horses can cause coughing, poor body condition and growth, rough coat, potbelly and colic. Colic is most often seen when deworming older foals (over 3 months of age) for the first time, which are heavily parasitized with ascarids.

Tapeworms:

Until recently, tapeworms weren’t considered to be a significant problem in horses. We now know that tapeworms can cause colic, ranging from mild cramping to severity requiring surgical treatment. The tapeworm life cycle involves a tiny mite as an intermediate host, and horses are at risk of developing tapeworm infection when they eat this mite in grass, hay or grain.

Treatment for tapeworms takes planning. Tapeworms are not susceptible to most dewormers, and there are certain times of the year (depending on geographic location) when treatment is likely to be most effective. Your veterinarian can advise you on an effective treatment plan if tapeworm infection is suspected.

Other Internal Parasites:

Lungworms cause chronic coughing in horses, ponies and mules. Donkeys are the natural host of this parasite, so typically they don’t show any obvious signs of infection.

Pinworms lay their eggs on the skin around the horse’s anus. The irritation they cause makes the horse repeatedly rub its tail.

Bots don’t usually cause major health problems, although they can damage the lining of the stomach where they attach. They may also cause small areas of ulceration in the mouth, where the larvae burrow into the tissues for a time after the eggs are taken into the mouth.

Threadworms are mostly a problem in young foals, in which they can cause diarrhea.

Signs of Parasitism:

Contrary to popular belief, horses can have potentially dangerous numbers of internal parasites while still appearing to be relatively healthy. But in some individuals, especially young horses, parasites can take a visible toll. Common signs of parasitism include the following:

- Dull, rough haircoat
- Decreased stamina
- Unthriftiness or loss of condition
- Slowed growth in young horses
- Pot belly (especially in young horses)
- Colic
- Diarrhea

Dewormers:

There are several different dewormers currently available. Most are broad-spectrum, meaning that they are effective against several different types of parasites. It is generally best to use a broad-spectrum as the basis of your deworming program. If a specific problem is identified, such as tapeworms or encysted small strongyles, a more specific dewormer can be used.

No deworming product is 100% effective in ridding every horse of all internal parasites. However, it is not necessary for a product to kill every worm in order to improve the horse’s health, minimize the risk of serious disease, improve feed efficiency and reduce pasture contamination with parasite eggs and larvae.

Daily dewormers can be worthwhile in grazing horses. With these products, a small quantity of dewormer is fed to the horse each day, usually in a small amount of feed. They effectively prevent new infections from larvae picked up during grazing. But they may not resolve existing infection and they do not kill bots. When using a daily dewormer, also include deworming with a paste twice a year.

Treatment interval: When paste or liquid dewormers are used, how often you should deworm your horse depends on the circumstances. With some products, or in some situa-

tions, it may be best to deworm your horse every month; in other circumstances, every 2 months may be adequate. With certain dewormers in good management systems, the deworming interval may be as long as 3-4 months.

It is a good idea to have your veterinarian help you determine the best deworming interval for your horse. Fecal egg counts can be very useful in this regard, as well as in evaluating the effectiveness of the product you're using.

Rotating products: Whether or not to rotate dewormers (switch to a chemically different product every few months or every year) is a controversial topic. When the same or a chemically similar dewormer is used repeatedly for years, a population of parasites may be selected that is not as susceptible to the dewormer. However, rotating products too often could create strains of parasites that are resistant to multiple products. Whether or how often to rotate classes of dewormer is something you should discuss with your veterinarian.



Photo: Ripley's HAF "Hay 4 Horse's" Animal Control voucher program

The parasite infestation of this extremely underweight 4 year old pregnant mare was robbing her of valuable nutrients. She was found to have tapeworms over a foot long and was severely infested with lice.

Methods of Administration

There are three main ways of administering dewormers.

1. Oral paste syringe
2. Feed additive (powder, liquid or pellets)
3. Nasogastric tube by a veterinarian

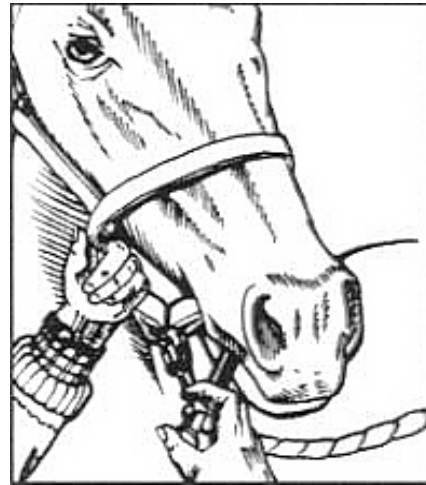
All three methods are effective, provided the proper dose is given at the right time, and the horse receives the full dose.

The dose must be calculated based on the horse's body weight. Weight tapes are accurate enough to estimating a horse's body weight for this purpose.

Deworming pastes and feed additives are convenient and easy to administer. However, some horses find them unpalatable and spit them out or refuse to eat them. So be sure that all of the dose you've given is actually consumed by the horse.

Tube deworming is a highly effective means of ensuring that the horse receives the proper dose because the de-

wormer is delivered directly into the horse's stomach. However, with the range of dewormers now available, it is seldom necessary for a veterinarian to deworm a horse by this method.



Do not waste your money on outdated products!

Designing a Deworming Program:

There are three basic types of programs:

1. **Continuous;** feeding a daily dewormer year-round or throughout the grazing season
2. **Interval;** deworming at regular intervals of 1, 2 or 3 months, depending on the product and the management system
3. **Strategic;** deworming only at certain times of the year or when fecal egg counts rise

Combination programs can also be used. For example, continuous deworming can be supplemented with strategic deworming for bots.

There is no single deworming program that suits all horses and all situations. The ideal program for your horse(s) depends on the type, number and ages of the horses on your farm, pasture management and your geographic location.

Monitoring

Whichever deworming product or program you use (e.g., daily vs. monthly, 2 or 3-month deworming; single product vs. rotation of product; etc.), have your veterinarian perform fecal egg counts occasionally to make sure your program is effective. The outlay of time and money will be well worth it.

Fecal Egg Counts

One of the most useful tool in a parasite control program is the fecal egg count- microscopic examination of **fresh** manure for parasite eggs. This simple test allows the veterinarian to determine which parasites are present and whether the infection is light, moderate or heavy. This information is important in developing a deworming program for your horse or farm, and in monitoring the

eggs present is not as important as determining presence or absence. It is important to note that a negative fecal examination does not mean the horse is free of internal parasites. Some types of parasites produce eggs only intermittently. Larvae do not produce eggs at all and may be present in large numbers in a horse with a fecal egg count of zero. Tapeworm eggs may be missed with routine fecal egg count techniques. The results are most useful when several horses of a farm are tested on the same day. This information gives the veterinarian and farm manager a good idea of the level of parasitism on the property.

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Skin Problems and Diseases

Just a glance now and then is not enough to catch problems early. Be an up-close, hands-on caregiver. This will save your equine from unnecessary discomfort and save you time and added expense.

Lice

Lice infestation causes irritation, a dull coat, hair loss, loss of body conditioning and anemia.



Photo: Equine-Information

Both sucking and biting lice can affect horses. The chewing louse feeds off tissue and cells sloughed from the surface of the skin. The sucking louse of horses feeds off blood. The species of lice is important since it is easier to kill sucking lice with a systemic insecticide than it is to kill biting lice. Lice are normally species-specific. However, the chewing lice of poultry can also affect horses when housed together. The horses should be removed from the building. If the poultry is removed, the lice will continue to harass the horses unless a good cleanup and premise insecticide treatment is used.

Lice transform from egg to nymph to adult with the entire cycle being completed on the host. The chewing louse is about 1/10 of an inch long, chestnut brown in color, with a yellow abdomen with dark cross bands. They are flat with a broad, rounded head and slender legs. The eggs are attached to the hair and hatch in 5 to 10 days. Nymphs immediately start feeding and mature in 3 to 4 weeks.

The sucking louse is about 1/8 of an inch long and a dirty gray color. They have a broad abdomen which contrasts with their long narrow head. Sucking lice are more common and more irritating than chewing lice. They have piercing mouth parts. When present in large numbers, they can cause anemia. The eggs are attached to the hair and hatch 11 to 20 days later. Nymphs begin sucking blood immediately. They complete their life cycle in 2 to 4 weeks.

Transmission:

1. Direct contact between horses
2. Contact with infected brushes, blankets and tack
3. Infected living quarters

Control:

1. Clean equipment thoroughly with the same insecticide as used on the horses.
2. Cleaning should be repeated in two weeks.
3. Sterilization of equipment by boiling will kill the lice, nymphs and eggs
4. Blankets and coolers in the dryer at the highest heat setting.



Photo: Ripley's HAF "Hay 4 Horses" Animal Control Voucher Program

Treatment:

Choice of treatment will vary depending on time of year, ambient temperature and the number of horses being treated. Your veterinarian can provide you with the best treatment option.

- Powders should be used by dusting the entire animal and ensuring that the dust reaches the skin. It is difficult to get the powder down to the skin when animals have a long

winter coat. Wettable powders are intended to be mixed with water and applied to improve contact with the skin. Powders may contain any of several chemicals including: rotenone, coumaphos, carbaryl, and fenthion.

Lice powder is inexpensive and comes with clear directions on how to use, including information on allergic reactions.

Ringworm

Although the lesions are probably caused by a local fungal infection, they might signify something more serious such as a body-wide infection requiring veterinary treatment. Call and provide updates throughout your home-treatment program to determine if veterinary treatment is called for. A diagnosis of ringworm can be confirmed by culturing hairs plucked from the edge of a lesion.

Treatment:

Fungal dermatitis should respond well to home treatment.

- Clip hair away from the affected area. Using electric clippers and a #40 (surgical) blade, clip any remaining hair from each bald spot. Extend the shaved area so there's a 1/2-inch margin of unaffected skin around each lesion.
- Wet the shaved area with a sponge, and apply antifungal antiseptic, such as Betadine scrub, available at pharmacies, or Novalsan scrub, available by prescription from your veterinarian. Lather up the scrub, and let it stand for 10 minutes to give it time to thoroughly kill the fungus.
- Rinse thoroughly with water. Follow with a final rinse, using 2 tablespoons white vinegar mixed in 1 quart of clean water. This solution helps cut any remaining soap and creates a slightly acidic environment unfriendly to fungi. Apply the vinegar solution to affected areas with a sponge or trigger-type spray bottle.
- Apply a thin layer of antifungal ointment or spray, such as Betadine ointment or an over-the-counter human product for athlete's foot. Repeat daily for 7 days, then reduce to twice a week until the lesions appear to be shrinking and new hair growth is visible in their centers (about 1 to 2 weeks).
- Keep lesions clean, dry, and exposed to air and sun.
- Fungus thrives in dark, damp conditions, such as the deep recesses of a wet, dirty winter coat. Dry conditions and ultraviolet light (sunlight) kill fungus.
- If the horse gets wet and/or dirty, use clean grooming tools to remedy the situation, and provide clean, dry living quarters. On clear, sunny days, turn it out.
- *Ringworm is contagious to horses and other livestock, house pets, and humans.* Clean up all clipped hair and grooming debris in the treatment area, and discard them in a knotted plastic garbage bag. Thoroughly clean grooming equipment in Lysol disinfectant concentrate, rinse, and allow to dry. Bathe and shampoo yourself and any house

pets that may have come into contact with these materials. Launder your clothes. Check yourself, family members, and other animals for lesions once weekly for the next 3 weeks

- Once a week, check for new lesions, and examine existing lesions to see whether they're shrinking and growing new hair in their centers. If there's evidence of spread, and/or if there's no improvement within 2 weeks, call your veterinarian for an evaluation.



Photo: Equine-Information.

Ringworm

Mange

Several different mites (very small insects) can infect equines and cause mange. Various parts of the body can be affected and the conditions are known as:

- Body mange (starts on head and neck and spreads over entire body and causes loss of condition resulting in death)
- Foot mange or itchy leg
- Ear mange

Mange causes severe irritation, scabs and lesions on the skin, and loss of weight. The mite causing the problem can only be identified by your veterinarian examining skin scrapings under a microscope. Some mange mites can infect humans so wash thoroughly after handling infected animals. The stable, harness and grooming equipment should be thoroughly cleaned and if possible disinfected.

Pyoderma

Pyoderma is a bacterial skin infection that drains pus. Many

cases are the result of self-mutilation. When a horse rubs or bites at a persistent irritant to its skin, the skin becomes infected. Always look for another skin disease before concluding that pyoderma is the only problem the horse has.

Cellulitis

Cellulitis is an infection of the deep layer of the skin. Most cases are caused by puncture wounds, scratches, and cuts. Horses are particularly prone to such injuries. Many wound infections can be prevented by proper early treatment of wounds.

Signs of cellulitis are swelling, pain (tenderness to pressure), warmth (the skin feels hotter than normal), firmness (not as soft as normal), and change in color (it appears redder than normal). As infection spreads out from the wound, you may feel tender cords which are swollen lymphatic channels. Regional lymph nodes may enlarge. This is a stage beyond cellulitis and is characterized by two diseases (ulcerative lymphangitis and malignant edema).

Abscess

A skin abscess is a localized pocket of bacterial infection. Pimples, furuncles, and boils are examples of small skin abscesses. An abscess is fluctuant and feels like fluid under pressure.

Summer Rash

Folliculitis is a hair-pore infection nearly always caused by a *Staphylococcus* bacteria. It tends to occur in hot weather as a consequence of excessive sweating and friction to the skin from ill-fitting tack. Small pimples appear, usually at points of contact in the saddle or harness areas. These pimples enlarge and form pustules. The pustules rupture and exude pus. Crusts form and the hair becomes matted.

Folliculitis can be prevented by good hygiene, such as brushing and cleaning the skin and coat after workouts, and using clean dry blankets beneath saddles.

Furunculosis

This is a deep-seated hair-pore infection with draining tracts and patchy hair loss. It is a progressive form of folliculitis and more difficult to treat.

Tail Pyoderma

This condition begins as an itchy skin disorder caused by mange mite or pinworms. As the horse scratches, rubs, and abrades the skin of its tail, secondary staph infection occurs and pustules develop. The ailment is complicated by furunculosis, and by abscesses that rupture and drain in an unending cycle. Hair is lost on the top of the tail. Treatment is most difficult.

Hives

Recurrent urticaria can be recognized by the sudden appear-

ance of wheals in the skin, some of which might coalesce, or grow together. The skin lesions are a response to allergens that could be inhaled, ingested, or contacted in the environment. The wheals might disappear quickly only to recur, or they might remain over several days.

Ventral Midline Dermatitis

Ventral Midline dermatitis is a skin disease caused by a hair-like worm called *Onchocerca cervicalis*. The majority of horses in the United States are infected, but a few develop a dermatitis with the use of dewormers.

Onchocerciasis is hypersensitivity to the larval stage of a parasite that can live in the horse's skin and the skin response is due to an allergic reaction to the dying microfilaria (pre larvae stage of worms released by female worm into the bloodstream)

The adult worm lives in connective tissue of the horse's neck. The filaria migrate under the skin and settle primarily on the midline of the abdomen from the chest to the groin, especially around the umbilicus. Other sites are the withers, face, eyelids, and legs. At these sites the parasites produce

an itchy skin disorder with redness, moist shallow sores, crusting and scaling, and patchy hair loss. Spots up to 10 inches in diameter can develop. Scarring and loss of skin pigmentation may also develop.

These open sores attract *Culicoides* gnats and other flying insects. Gnats feeding on the open sores pick up filaria and introduce them to a new host. Biting flies and other insects aggravate the skin disorder and create pyoderma.

Treatment:

- Transmitted to the horse by *Culicoides*, these parasites are effectively controlled by the dewormers ivermectin and moxidectin.
- Adult worms are not affected by deworming agents and therefore serve as a reservoir for recurring infection. To keep the skin free of disease, ivermectin must be repeated at 4-month intervals. A deworming program incorporating ivermectin will effectively control the onchocerciasis.
- Ivermectin paste is completely effective in ridding the horse of filaria within 2 to 3 weeks. Minor reactions can

NOTE: The filaria are capable of penetrating the eye and producing uveitis (moon blindness), a leading cause of blindness in horses.

Summer Skin Problems

With the arrival of summer, skin problems in many horses appear and become progressively worse each year. Often horses with this history are allergic to insect bites. Any biting insect can be involved in insect hypersensitivity and many affected horses are allergic to the bites of more than one kind of insect.

The first signs of a problem can include redness and large, flat, circular swellings (wheals) or raised nodules with or without crusting. Intense itching often leads to skin damage, hair loss, secondary infections that can cause unsoundness, and thickened and wrinkled skin that can disfigure a horse. The best therapy is to prevent insects from biting your horse, or at least reduce the number of bites.

Your veterinarian should be an active partner in diagnosing and treating skin disease, particularly one that does not resolve itself in one to two weeks.

Effective strategies include:

- Using long-acting insect repellents, either on the horse or in mesh blankets or other equipment
- Stabling during times of high insect activity
- Directing fans to the surface of the horse when stalled
- Skin testing (IDST) can help detect the insect or group of insects to which the horse is most allergic and a desensitizing vaccine can be custom-made for that horse. Approximately 50%-70% of horses respond favorably to desensitization. However, it will take six to 12 months before the horse receives the full benefit of this therapy.
- Another strategy to control insect hypersensitivity is decreasing the horse's immune reaction through corticosteroids. These compounds can be applied directly to the affected areas or given systemically. (Check with your veterinarian)

Many horses with allergic skin disease can develop contact hypersensitivity to medications or insect repellents used to treat the disease, making the original lesions worse. By carefully examining your horse and following the progression of the skin lesions, you can help your veterinarian choose a place to perform a skin biopsy--the best diagnostic procedure for troublesome or persistent skin disease. Your veterinarian might request that you stop treatment with all topical compounds and shampoos while preliminary diagnostic work is performed. Once a diagnosis is made, specific therapy can be recommended to resolve the condition.

* * * * *

Colic

Colic is the number one Killer of Horses. The good news is that most cases of colic are mild and are resolved with simple medical treatment, and sometimes with no specific

treatment at all. Less than 10% of all colic cases are severe enough to require surgery or cause the death of the horse. Nevertheless, **every case of colic should be taken seriously**, because it can be difficult to tell the mild ones from the potentially serious ones in the early stages.

Colic is not a disease; it is a symptom of disease. Specifically, colic indicates a painful problem in the horse's abdomen (belly). There are dozens of different conditions that can cause a horse to show signs of abdominal pain. Most (but not all) involve the digestive system, most often the stomach or intestines.

Recognizing Colic

Horses show signs of abdominal pain in a wide variety of ways. Some signs, such as curling the upper lip are subtle and easily overlooked, whereas other signs, such as repeated rolling or violent thrashing, are hard to mistake. Among the more common signs of colic are these:

- Turning the head toward the flank
- Pawing
- Kicking or biting at the belly
- Stretching out as if to urinate, without doing so
- Repeatedly lying down and getting up, or attempting to do so
- Repeated rolling, often with grunting sounds
- Sitting in a dog-like position, or lying on the back
- Holding the head in an unusual position (with the neck stretched out and the head rotated to one side)
- Leaving food or being completely disinterested in food
- Putting the head down to water without drinking
- Lack of bowel movements or fewer bowel movements than normal
 - Reduced or absent digestive sounds
- Inappropriate sweating (unrelated to hot weather or exercise)
- Rapid breathing and/or flared nostrils
- Elevated pulse rate (greater than 50 beats per minute)
- Depression
- Lip curling unrelated to sexual interest

Usually, a horse shows only a few of these signs during an episode of colic. Seeing any of these signs should prompt you to take a closer look and keep a watchful eye on the horse.

In general, the more obvious the signs of pain, the more serious the problem. Also, in horses with serious conditions, the signs of pain usually persist and may even worsen with time, whereas in horses with mild colic, the signs of pain may be intermittent or may disappear after a short time.

Take Immediate Action

While some cases of colic resolve without medical care, a significant percentage of horses with colic require medical treatment. Time is perhaps the most critical factor if colic is to be successfully treated, particularly if the horse has a condition that requires emergency surgery.

If you suspect your horse is suffering from colic, the following action plan is suggested:

1. Call your veterinarian immediately!

2. Remove all food from the horse's surroundings, but leave the horse some water.

3. If necessary, move the horse to a small enclosure (e.g., a stall or yard) so you can watch it more closely.

4. If it is already dark or approaching nightfall, arrange for some lighting so that you (and, if necessary, your veterinarian) can examine the horse properly. Allow the horse to rest if it simply wants to stand or lie quietly; walk the horse around if it is continually rolling or in danger of hurting itself - but do **not** tire the horse with relentless walking.

5. Keep the horse under close observation until the signs of colic resolve or the veterinarian arrives.

Alert your veterinarian from the outset that your horse is suffering from colic. The veterinarian may not need to examine the horse immediately if the colic signs are mild, but leave that decision to the veterinarian. When you call, be prepared to provide as much of the following information as possible.

- Specific signs of colic and their severity

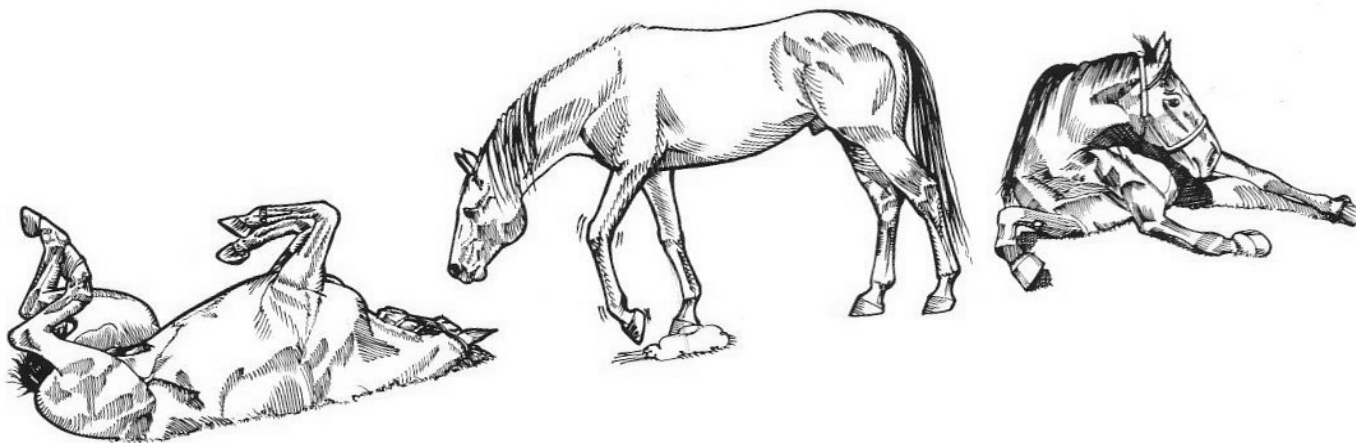
- Moistness of the gums (moist, tacky or dry)
- Refill time for gum color (the time it takes for the color to return to the horse's gum after you briefly press on the gum with your thumb; normal is 1-2 seconds)
- Digestive sounds (if any)
- Bowel movements, including color, consistency and frequency
- Any recent changes in management, feeding or exercise.
- Medical history, including deworming, and any past episodes of colic
- Breeding history and pregnancy status if the patient is a mare, and recent breeding history if the patient is a stallion. Insurance status of the horse.

After evaluating the information, your veterinarian will advise you on the appropriate course of action. Follow your veterinarian's advice **exactly**. Do **not** administer any drugs to the horse unless specifically directed to do so by your veterinarian. Sedative or pain-relieving drugs can camouflage serious problems and interfere with accurate diagnoses.

Do Not Attempt to do Any of the Following:

Unless you have the necessary training, equipment and experience; you may cause irreversible harm, additional pain and/or the unnecessary death of your equine.

- 1. Do not pass any kind of tube into the horse's stomach.**



- Pulse or heart rate (beats per minute), measured over the heart (just behind or above the left elbow) or over an artery (at the sides of the fetlock or on the underside of the lower jaw)

- Respiratory rate (breaths per minute), measured by watching the rise and fall of the flank with each breath

- Rectal temperature

- Color of the gums (white, pale pink, dark pink, red, or bluish-purple)

It is very easy to damage the horse's nasal passages, throat or esophagus with improper equipment or technique. Also, the tube passes more readily into the trachea (windpipe) than into the esophagus, potentially damaging the trachea. Any liquid poured down the tube will be delivered directly into the horse's lungs.

- 2. Do not give the horse any substance by mouth, particularly liquids.** Most horses resist swallowing liquids given by mouth, and some of the liquid may be inhaled into the

horse's lungs. Mineral oil is particularly harmful when inhaled.

3. Do not insert anything (your hand, a hose or any other kind of tube or device) into the horse's rectum. The only exception is a thermometer to take the horse's temperature. The rectum is easily damaged, and rectal tears can be fatal.

4. Do not give any intravenous infections. Even with practice, every intravenous injection carries some risk.

Note: *Home remedies such as castor oil, kerosene and turpentine are useless for colic and are dangerous; they should never be given orally to horses.* *Over-the-counter* remedies that contain bella donna extract (e.g., Dr. Bells) should also be avoided. *They may relieve mild, spasmodic (crampy) colic, but* over-use or use in horses with more serious types of colic can be disastrous.

Preventing Colic

Colic is a problem with many potential causes and contributing factors, some of which are beyond our control. The key to minimizing the incidence of colic is good management (to understand the health requirements for your animal and to follow through with those needs). Treat every incident as potentially serious and call your veterinarian immediately; try never to jeopardize your horse's health for the sake of a few dollars.

Some of the types of colic:

Pelvic flexure impaction:

This is caused by an impaction of food material at a part of the large bowel known as the pelvic flexure of the left colon where the intestine takes a 180 degree turn and narrows. Impaction generally responds well to medical treatment, but more severe cases may not recover without surgery. If left untreated, severe impaction colic can be fatal. The most common cause is when the horse is on box rest and/or consumes large volumes of straw, or the horse has dental disease and is unable to masticate properly. This condition could be diagnosed on rectal examination by a veterinarian.

Spasmodic colic:

Spasmodic colic is the result of increased peristaltic contractions in the horse's gastrointestinal tract. It can be the result of a mild gas buildup within the horse's digestive tract. The signs of colic are generally mild and respond well to spasmolytic and analgesic medication.

Ileal Impaction:

The ileum is the last part of the small intestine that ends in the cecum. Ileal impaction can be caused by obstruction of ingesta. Other causes can be obstruction by ascarids or tapeworm.

Sand impaction:

This is most likely to occur in horses that graze sandy or

heavily grazed pastures leaving only dirt to ingest. The term sand also encompasses dirt. The ingested sand or dirt accumulates in the pelvic flexure and right dorsal colon of the large intestines. As the sand or dirt irritates the lining of the bowel it can cause diarrhea. The weight and abrasion of the sand or dirt causes the bowel wall to become inflamed and can cause peritonitis. Medical treatment of the problem is with laxatives such as liquid paraffin and psyllium husk. Some cases may need surgery. Horses with sand or dirt impaction are predisposed to Salmonella infection. Horses should not be fed from the ground in areas where sand colic is common, although small amounts of sand or dirt will still be ingested by grazing.

Enterolith:

Enteroliths are mineral deposits around a piece of ingested foreign material. When they move from their original site they can obstruct the intestine. Enteroliths are not a common cause of colic in the northwest but are very common in the southwest and usually requires surgery.

Colic caused by parasites

Large Roundworms:

Occasionally there can be an obstruction by large numbers of roundworms. This is most commonly seen in young horses as a result of a very heavy infestation of *Parascaris equorum* that can subsequently cause a blockage and rupture of the small intestine. Deworming heavily infected horses may cause dead worms to puncture the intestinal wall and cause a fatal peritonitis. A blockage of the small intestines by worms may well require colic surgery. A more conservative approach can be to give a horse a laxative (eg liquid paraffin) prior to deworming if a heavy worm infestation is suspected. It is often the result of a poor deworming program. Horses develop immunity to *parascaris* between 6 months of age and one year and so this condition is rare in adult horses.

Tapeworms:

Tapeworms at the junction of the cecum have been implicated in causing colic.

Cyathostomes:

Acute diarrhea can be caused by cyathostomes or "small Strongylus type" worms that are encysted as larvae in the bowel wall, particularly if large numbers emerge simultaneously. The disease most frequently occurs in winter time. Pathological changes of the bowel reveal a typical "pepper and salt" color of the large intestines. Animals suffering from cyathostominosis usually have a poor deworming history.

Left dorsal displacement:

Left dorsal displacement is a form of colic where the left dorsal colon becomes trapped on the outside of the spleen and against the nephrosplenic ligament. It may necessitate surgery although often it can be treated with exercise and/or

epinephrine. This condition can be diagnosed on rectal examination by a veterinarian.

Right dorsal displacement:

Right dorsal displacement is another displacement of part of the large bowel. Although signs of colic may not be very severe, surgery is usually the only available treatment.

Torsion:

Various parts of the horse's gastrointestinal tract may twist upon themselves. It is most likely to be either small intestine or part of the colon. Occlusion of the blood supply means that it is a painful condition causing rapid deterioration and requiring emergency surgery.

Intussusception:

Intussusception is a form of colic in which a piece of intestine "telescopes" within a portion of itself. It most commonly happens in the small intestine of young horses and requires urgent surgery.

Epiploic foramen entrapment:

On rare occasions, a piece of small intestine can become trapped through the epiploic foramen. The blood supply to this piece of intestine is immediately occluded. The intestine becomes trapped and surgery is the only available treatment.

Other causes that may show clinical symptoms of colic:

Strictly spoken colic refers only to signs originating from the gastrointestinal tract of the horse. Signs of colic may be caused by problems other than the GI-tract (e.g. problems in the kidneys, ovaries, spleen, testicular torsion, pleuritis, pleuropneumonia etc).

* * * * *

Dental Care

Routine dental care is *essential* to your horse's health. Your horse will be more comfortable, will utilize feed more efficiently, may perform better and live longer.

Periodic examination, corrections and regular maintenance are especially necessary for a number of reasons:

- We have modified the horse's diet and eating patterns through domestication and confinement.
- We demand more from our performance horses, beginning at a younger age, than ever before.
- We often select breeding animals without regard to dental considerations.

The Horse's Mouth:

Horses are grazing animals, and their teeth are perfectly

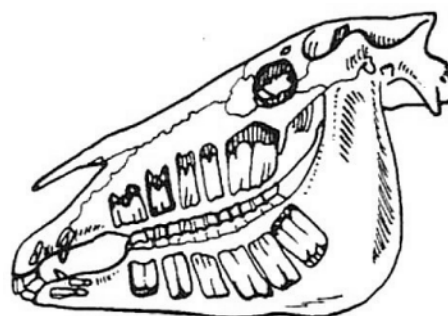
adapted for that purpose. The forward teeth, known as incisors, function to shear off forage. The cheek teeth, including the molars and premolars with their wide, flat, grveled surfaces, easily grind the feed to a mash before it is swallowed.

Like humans, horses get two sets of teeth in their lifetime. The baby teeth, called deciduous teeth, are temporary. The first deciduous incisors may erupt before the foal is born. The last deciduous teeth come in when the horse is about 8 months of age. Only the incisors and the first three cheek teeth have deciduous precursors to the permanent ones. These teeth begin to be replaced by adult teeth around 2 ½ years of age. By age 5, most horses have their full complement of permanent teeth. An adult male horse has 40 permanent teeth. A mare may have between 36-40, because mares are less likely to have canine (bridle) teeth.

The following chart shows the approximate ages at which different teeth are first visible (erupt) in the mouth. By referring to it, you may detect potential abnormalities of your own horses associated with teething. For more information, refer to the "Official Guide for Determining the Age of the Horse", published by the American Association of Equine Practitioners. It should be noted that the eruption teeth can vary significantly among individual horses and breeds.

Deciduous (Baby Teeth)

1 st incisors (centrals)	Birth or 1 st week
2 nd incisors (intermediated)	4-6 weeks
3 rd incisors (corners)	6-9 months
1 st , 2 nd & 3 rd premolars (cheek teeth)	Birth or first 2 weeks for all Premolars



Permanent (Adult Teeth)

1 st incisors (centers)	2 ½ years
2 nd incisors (intermediates)	3 ½ years
3 rd incisors (corners)	4 ½ years
Canines (bridle)	4-5 years
Wolf teeth (1 st premolars)	5-6 months
2 nd premolars (1 st cheek teeth)	2 ½ years
3 rd premolars (2 nd cheek teeth)	3 years

4 th premolars (3 rd cheek teeth)	4 years
1 st molars (4 th cheek teeth)	9-12 months
2 nd molars (5 th cheek teeth)	2 years
3 rd molars (6 th cheek teeth)	3 ½ -4 years

Common Dental Problems

Horses suffer from many dental problems. The most common include:

- Sharp enamel points forming on cheek teeth, causing lacerations of cheeks and tongue
- Retained caps (deciduous teeth that are not shed)
- Discomfort caused by bit contact with the wolf teeth
- Hooks forming on the upper and lower cheek teeth
- Long and/or sharp canine (bridle) teeth interfering with the insertion or removal of the bit
- Lost and/or broken teeth
- Abnormal or uneven bite planes
- Excessively worn teeth
- Abnormally long teeth
- Infected teeth and/or gums
- Misalignment/poor apposition (can be due to congenital defects or injury)
- Periodontal (gum) disease

Recognizing Dental Problems:

Horses with dental problems may show obvious signs, such as pain or irritation, or they may show no noticeable signs at all. This is due to the fact that some horses simply adapt to their discomfort. For this reason, periodic dental problems include:

- Loss of feed from mouth while eating, difficulty with chewing or excessive salivation 'Quidding'.
- Loss of body condition, common for older equines.
- Large or undigested feed particles (long stems or whole grain) in manure
- Head tilting or tossing, bit chewing, tongue lolling, fighting the bit or resisting bridling
- Poor performance, such as lugging on the bridle, failing to turn or stop, even bucking
- Foul odor from mouth or nostrils, or traces of blood from the mouth
- Nasal discharge or swelling of the face, jaw or mouth tissues

Oral exams should be an essential part of an annual physical examination by a veterinarian. Every dental exam provides the opportunity to perform routine preventative dental maintenance. The end result is a healthier, more comfortable horse.

Preventative Maintenance:

Routine maintenance of a horse's teeth has been historically referred to as "floating." Floating removes the sharp enamel points and can help create a more even bite plane. Routine examination and maintenance by a veterinarian or licensed Equine Dentist, should also include identification and correction of any abnormalities such as those listed previously under "Common Dental Problems."

When turned out on pasture, horses browse almost continuously, picking up dirt and grit in the process. This, plus the silicate in grass, wears down the teeth. Stabled horses, however, may not give their teeth the same workout. Feedings are more apt to be scheduled, not continuous, and to include processed grains and hays. Softer feeds require less chewing. This may allow the horse's teeth to become excessively long or to wear unevenly. Adult horse's teeth erupt throughout their life and are worn off by chewing.

Unfortunately, cheek teeth tend to develop sharp enamel points even under normal grazing condition. Because the horse's lower jaw is narrower than its upper jaw and the horse grinds its feed with sideways motion, sharp points tend to form along the edges. Points form on the cheek side of the upper teeth. These points should be rasped to prevent them from cutting the cheeks and tongue.

Routine maintenance is especially important in horses who have lost a tooth, or whose teeth are in poor apposition and do not fit together well. Normally, contact with the opposing tooth keeps biting surfaces equal. When cheek teeth are out of alignment, hooks can form.

If left unchecked, these hooks can become long enough to penetrate the hard or soft palate. Small hooks can be removed with rasps. Longer hooks are usually removed with molar cutters or a dental chisel.

Wolf Teeth:

Wolf teeth are very small teeth located in front of the second premolar and do not have long roots that set them firmly in the jaw bone. They rarely appear in the lower jaw. A horse may have one to four wolf teeth, or none at all. While not all wolf teeth are troublesome, veterinarians routinely remove them to prevent pain or interference from a bit.

The Age Factor:

The age of a horse affects the degree of attention and frequency of dental care required. Consider these points:

- Horses going into training for the first time, especially 2 and 3-year-olds, need a comprehensive dental checkup. Teeth should be floated to remove any sharp points and checked for retained caps. Caps should be removed if they have not been shed. This should be done before training begins, to prevent training problems related to sharp teeth.
- Even yearlings have been found to have enamel points sharp enough to damage cheek and tongue tissue. Floating may improve feed efficiency and make the horse more

comfortable.

- Horses 2-5 years old may require more frequent dental exams than older horses. Deciduous teeth tend to be softer than permanent teeth and may develop sharp enamel points more quickly. Also, there is an extraordinary amount of dental maturation during this period. Twenty-four teeth will be shed and replaced during this time, with the potential for 12-16 teeth erupting simultaneously. Horses in this age group should be examined twice yearly, and any necessary procedures should be performed.

- Even the best dental program may not be able to solve or alleviate all of a young horse's teething discomfort.

- Mature horses should get a thorough dental examination at least once a year, whether or not there are signs of tooth problems.

- It is important to maintain an even bite plane during a horse's middle teens in order to ensure a level grinding surface into its 20s. If you wait until the horse is in its 20s, the surfaces may be worn excessively and/or unevenly, and since the teeth are no longer erupting at this age, alignment may be impossible.

Developing Greater Awareness:

- If a horse starts behaving abnormally, dental problems should be considered as a potential cause.

- Abnormalities should be corrected and teeth should be floated and maintained as indicated.

- Wolf teeth are routinely extracted from performance horses to prevent interference with the bit and its associated pain.

- Sedatives, local anesthetics and analgesics relax the horse and keep it more comfortable during floating and other dental procedures. Such drugs should be administered only by a veterinarian.

- If your equine practitioner finds a loose tooth, he or she may choose to extract it. This may reduce the chance of infection or other problems.

- Canine teeth, generally present in mature geldings and stallions and sometimes mares, are usually clipped and filed smooth to prevent interference with the bit. This also reduces the possibility of injury to both horse and human.

- Depending on the condition of your horse's teeth, more than one visit from your equine practitioner may be required to get the mouth in prime working order.

- It is important to catch dental problems early. Waiting too long may increase the difficulty of remedying certain conditions or may even make remedy impossible.

- Older horses should have their teeth examined at least once yearly or as recommended by your equine veterinarian.

More Serious Dental Ailments:

Serious dental conditions can develop, such as infections of

lost or fractured teeth, and others. These conditions may require surgical treatment and/or extraction by a qualified veterinarian.

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Immunizations

Few things will help protect your horse from the ravages of some infectious diseases as easily and effectively as immunizations. The vaccines administered by your veterinarian to your horse place a protective barrier between the horse and several diseases: tetanus, encephalomyelitis (sleeping sickness), equine influenza, rhinopneumonitis, rabies, strangles and Potomac Horse Fever, to name the most common.

Vaccinations are a vital part of proper equine management. If incorporated into a program that includes regular deworming, an ample supply of clean water, good nutrition and a safe environment, you and your horse will be all set to enjoy many happy, healthy, productive years together.

What to Expect:

Each geographic area is different on what vaccination program is needed, consult with your Veterinarian.

A good immunization program is essential to responsible horse ownership, but just as in people, vaccination does not guarantee 100% protection. Please keep the following information in mind as you plan your vaccination program with your veterinarian:

1. Vaccination serves to minimize the risk of infection, but does not prevent disease in all circumstances.

2. Primary series of vaccines and booster doses should be administered before likely exposure.

3. Each horse in a population is not protected to an equal degree nor for an equal duration following vaccination.

4. All horses in a herd should be appropriately vaccinated; and, whenever possible, the same schedule should be followed.

Vaccination involves the administration (usually by injection or intranasal) of *the causative organisms or important components of these organisms* that are inactivated or modified to avoid causing actual disease in the horse. Two or more doses are usually needed to initiate an adequate immune response.

After the immunization procedure is completed, the protective antibodies in the blood and other specialized immune system components stand guard against the invasion of specific diseases. Over time, however, those antibodies gradually decline. Therefore, a booster is needed at regular

intervals *to maintain adequate protection*. Protection against some diseases, such as tetanus and rabies can be accomplished by boosters once a year. Others, require more frequent intervals to provide adequate protection.

Vaccinations Needed

The specific immunizations needed by a particular horse (horses) depend upon several factors: environment, age, breed, sex, use, exposure risk, geographic location, and general management. Your local equine veterinary practitioner can help you determine the vaccination program best suited to your horse's individual needs.

The following diseases are those most often vaccinated against. Again, your local practitioner will know what is best for your horse.

Tetanus:

Sometimes called "lockjaw," tetanus is caused by toxin-producing bacteria that *can be found* in the intestinal tract of many animals and found in abundance in the soil where horses live. Its spores can exist for years. The spores enter the body through wounds, lacerations, or the umbilicus of newborn foals. Although not contagious from horse to horse, tetanus poses a constant threat to horses.

Clinical signs include muscle stiffness and rigidity, flared nostrils, hypersensitivity and legs stiffly held in a sawhorse stance. As the disease progresses, muscles in the jaw and face stiffen, preventing the animal from eating or drinking. More than 80% of affected horses die.

All horses should be immunized annually against tetanus. Additional boosters for mares and foals may be recommended by your veterinarian. Available vaccines are inexpensive, safe and provide good protection.

Encephalomyelitis:

More commonly known as "sleeping sickness," *vaccines are available against* Western Equine Encephalomyelitis (WEE), Eastern Equine Encephalomyelitis (EEE), Venezuelan Equine Encephalomyelitis (VEE) and West Nile Virus (WNV). Throughout North America, WEE has been noted, while EEE appears only in the east and southeast. Venezuelan Equine Encephalomyelitis (VEE) has not been seen in the United States for many years. Sleeping sickness is most often transmitted by mosquitoes, after the insects have acquired the virus from birds and rodents. People also are susceptible when bitten by an infected mosquito, but direct horse-to-horse or horse-to-person transmission is very rare.

Signs vary widely, but result from *infection of the brain and/or spinal cord*. Early signs include fever, depression and appetite loss. Later, a horse might stagger when it walks, and paralysis develops in later stages. About 50% of horses infected with WEE die, and the death rate is 70% to 90% of animals infected with EEE or VEE. The mortality rate for West Nile Virus is 25-35%.

Most horses need an EEE and WEE vaccine at least annually.

West Nile Virus (WNV) has infected horses in every state. The vaccine is relatively low risk and very effective. Unless discouraged by your veterinarian all horses should be vaccinated. Pregnant mares and foals may require additional vaccinations. The best time to vaccinate is spring, before the mosquitoes become active. In the south and west some veterinarians choose to add a booster shot in the fall to ensure extra protection year-round.

Influenza:

This is one of the most common respiratory diseases in the horse. Highly contagious, the virus can be transmitted by aerosol (when snorting or coughing) from horse to horse over distances as far as 30 yards.

Signs to watch for include cough, nasal discharge, fever, depression and loss of appetite. With proper care, most horses recover in about 10 days. Some, however, may show signs for weeks, especially if put back to work too soon. *Influenza has no specific treatment and can* result in a lot of "down time" with indirect financial loss, not to mention discomfort for your horse.

Unfortunately, influenza viruses are constantly changing or "mutating" and can bypass the horse's immune defense. Therefore, duration of protection is short-lived and revaccination may be recommended as frequently as every two to four months.

Not all horses need vaccination against influenza. However, horses that travel or are exposed to other horses should be regularly immunized against influenza. Follow your veterinarian's advice as to whether your horse needs influenza vaccine.

Rhinopneumonitis:

Two distinct viruses, equine herpesvirus type 1 (EHV-1) and equine herpesvirus type 4 (EHV-4), cause two different diseases. Both cause respiratory tract problems and EHV-1 may also cause abortion, foal death and paralysis. Infected horses may be feverish and lethargic, and may lose appetite and experience nasal discharge and a cough. Young horses suffer most from respiratory tract infections by these viruses.

Rhinopneumonitis is spread by aerosol and by direct contact with secretions, utensils or drinking water. Virus may be present but not apparent in carrier animals.

Pregnant mares, foals, weanlings, yearlings and young horses under stress *are candidates* to be vaccinated. Immune protection is short. Therefore, pregnant mares are vaccinated at least during the fifth, seventh and ninth months of gestation and youngsters at high risk need a booster at least every three months. Many veterinarians recommend vaccination at two-month intervals year-round for high-risk animals.

Other Disease Threats

Several other diseases are common, although the need for vaccination against them is dependent on individual risk. Rely on your veterinarian to guide you.

Strangles: A highly contagious and dangerous *bacterial* disease, caused by the *Streptococcus equi* organism. There may be some side effects associated with vaccination; therefore, it is important to discuss the risks versus benefits of vaccination with your veterinarian.

Rabies: A frightening disease which more commonly occurs in some areas than in others. Horses are infected infrequently, but death always occurs. Rabies can be rarely transmitted from horses to humans.

Botulism: Known as “shaker foal syndrome” in young horses, this disease can be serious. Botulism in adult horses, “forage poisoning,” also can be fatal. Vaccines are not available against all types of botulism. Pregnant mares can be vaccinated against one form, clostridium botulism type B for the shaker foal syndrome. Foals can be protected by vaccinating the pregnant mare late in her pregnancy and then ensuring adequate colostrum intake by the newborn foal. The colostrums contains the specific antibodies necessary to provide protection in the foal.

Equine viral arthritis (EVA): A complicated disease which can result in abortion and/or export. Follow your veterinarian’s recommendations.

Potomac Horse Fever: A seasonal problem with geographic factors. One third of affected horses die. Follow your veterinarian’s recommendations.

Summary and Reference

The following is a handy reference guide for scheduling your horse’s immunizations. Appropriate vaccinations are the best and cost-effective weapon you have against common infectious diseases of the horse. A program designed with the help and advice of you local veterinarian will help keep your horses healthy, and you happy for many years to come.

For primary immunization, an initial series of vaccination is required, followed by appropriately spaced boosters. The following is a handy reference guide for scheduling your horse’s immunizations:

Tetanus

- Foals from non-vaccinated mares: 3 doses at monthly intervals, beginning at 3 to 4 months of age.
- Foals from vaccinated mares: 3 doses at monthly intervals, beginning at 6 months of age.
- Yearlings and adult horses require annual boosters.
- Booster at time of penetrating injury or surgery if last dose not administered within 6 months.
- Broodmares; booster annually, 4 to 6 weeks before foaling.

Encephalomyelitis

- Foals from non-vaccinated mares of from vaccinated mares in high-risk, endemic areas: 3 doses at monthly intervals, beginning at 3 to 4 months of age.
- Foals from vaccinated mares: 3 doses at monthly intervals, beginning at 6 months of age.
- Yearlings and adult horses in low-risk areas require annual boosters in spring.
- Yearlings and adult horses in high-risk, endemic areas require boosters every 6 months.
- Broodmares: booster annually, 4 to 6 weeks before foaling.

Influenza: Inactivated injectable vaccines:

- Foals from non-vaccinated mares: 3 doses at monthly intervals, beginning at 4-6 months of age. Then follow with boosters at 3-month intervals as prescribed by veterinarian.
- Foals from vaccinated mares: 3 doses at monthly intervals, beginning at 9 months of age. Then follow with boosters at 3-month intervals as prescribed by veterinarian.
- Yearlings and adult horses: booster every 3 to 4 months up to annually depending on recommendations of veterinarian.
- Broodmares: booster semiannually, with 1 booster 4 to 6 weeks before foaling.

Rhinopneumonitis (EHV-1 and EHV-4)

- **Foals:** 3 doses at monthly intervals beginning at 4 to 6 months of age. Then follow with boosters at 3-month intervals as prescribed by veterinarian.
- **Yearlings and adult horses:** booster every 3 to 4 months up to annually as prescribed by veterinarian.
- **Broodmares:** vaccinate at 5, 7 and 9 months of pregnancy with optional dose at 3 months. Suggested that mares be vaccinated before breeding and 4 to 6 weeks before foaling.

Many combination vaccines are available. Please check with your local equine practitioner.

* * * * *

Expectant Mare

As a conscientious owner, you probably have many questions about caring for your expectant mare. In truth, you may be a little worried. Relax. With a little TLC, your mare should progress through her pregnancy without mishap. Proper nutrition, deworming, exercise and vaccinations will help ensure a healthy pregnancy and you can look forward to the birth of your foal with greater confidence.

Nutrition: Rations should be composed primarily of high-quality forage in approximately the same as pre-pregnancy amounts. Extremes in weather can alter her nutritional requirements and should be taken into account when formulating the ration. She should always have plenty of clean, fresh water. The mare will also benefit from routine hoof and dental care, standard vaccinations and regular deworming.

Exercise: Unless there are special circumstances, during the first 7 months of pregnancy treat your mare as you would a non-pregnant one. She will benefit from moderate riding or exercise.

Vaccinations: should be current since infectious diseases can trigger aborting. A four-way inoculation for Eastern and Western encephalomyelitis, influenza and tetanus is recommended at the beginning of pregnancy. A booster should be given 1 month prior to foaling to increase the antibody level in the mare's colostrums (first milk) and help protect the newborn foal from diseases. Also, the mare should be vaccinated for equine rhinopneumonitis (commonly called virus abortion or rhino) at 5, 7 and 9 months gestation. Consult with your equine veterinarian regarding other vaccines that may be advisable in your area, such as rabies, rotavirus and botulism.

Deworming: Most deworming agents available today are relatively safe for pregnant mares. Consult your veterinarian to establish an effective and safe deworming schedule for your mare.

It is especially important to deworm the mare within several weeks of foaling, because the mare will be the primary source for infecting her foal with parasites. Of course, manure should always be disposed of properly.

Changing Needs:

During the last four months of pregnancy, the foal will grow rapidly. To accommodate this growth, the mare's energy needs will increase. Even so, special nutritional supplements are probably unnecessary. Good-quality hay and forage should remain the bulk of the expectant mare's diet. Concentrated feeds such as grains may be added to the ration to bolster energy intake without adding excess bulk.

Use the mare's body condition as your guide to how she's faring. Adjust the rations accordingly. The mare should not become obese.

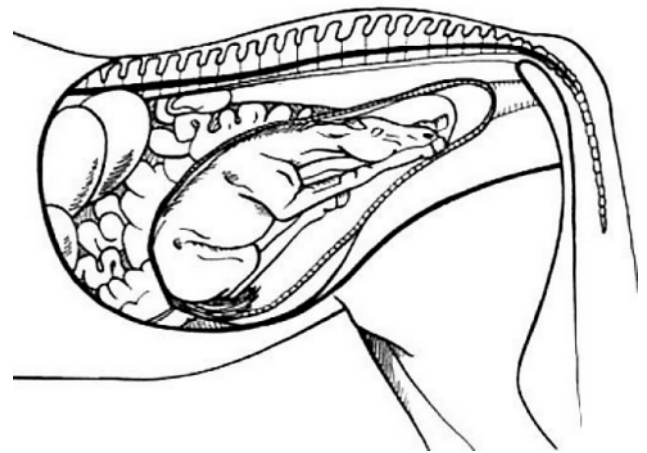
Exercise during the last four months of the mare's pregnancy should be light to moderate. In fact, a pastured mare will get as much exercise as she needs just grazing. Vigorous exercise is not recommended.

Home Stretch

The average length of pregnancy in the mare is 338-343 days. However, normal gestation can range from 320-380

days. You needn't become overly concerned if your mare is past due. Prolonged gestation is not generally associated with problems or extra large foals unless the mare is grazing **endophyte-infected fescue grass**. If your mare's pregnancy extends much past 340 days or you're concerned, ask your veterinarian to examine her to determine if the mare is still pregnant and confirm that all is well.

Suspected Abortion: Mares do occasionally abort. If you notice a vaginal discharge or dripping milk during pregnancy, contact your veterinarian to examine her. It may be possible to ascertain the cause of abortion and treat the mare accordingly. Mares can and do abort without ill effects. However, it's always a good idea to have her checked by your veterinarian, because some complications of abortion, such as a retained placenta, can be life-threatening to your horse.



Impending Birth:

There are obvious as well as subtle signs of impending birth. The time frame during which they occur varies from mare to mare. The most obvious and reliable are:

- Filling of the udder (two to four weeks pre-foaling)
- Distension of the teats (four to six days pre-foaling)
- Waxing of the teats (one to four days pre-foaling)
- Obvious dripping of milk
- An increase in milk calcium 1-3 days pre-foaling (detected by using a stall-side test kit)

More subtle signs include:

- Softening and flattening of the muscles in the croup
- Relaxation of the vulva
- Visible changes in the position of the foal

Preparing for Birth:

Your eleven-month waiting game will be over before you know it. To prepare, brush up on your foaling knowledge with the companion AAEP educational brochure, *Foaling Mare and Newborn*. Your equine veterinarian will be happy

to supply it and will also be able to answer any further questions you may have about caring for your expectant mare.

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Foal Growth

A healthy foal will grow rapidly, gaining in height, weight and strength almost before your very eyes. From birth to age two, a young horse can achieve 90 % or more of its full adult size, sometimes putting on as many as 3 pounds per day.

Genetics and environment play significant roles in determining individual growth patterns. Through research, we also know we can influence a foal's growth and development, *for better or worse*, by the nutrition we supply.

Strive for Balance:

Feeding young horses is a careful balancing act. The interplay between genetics, management and nutrition is complex. While the genetics of each individual horse are out of our control, through proper management, we can affect its ultimate outcome.

The nutritional start a foal gets can have a profound affect on its health and soundness for the rest of its life. We can accelerate growth if we choose. However, research suggests that a balanced dietary approach, which supports no more than a moderate growth rate, is less likely to cause developmental problems.

Some conditions, which have been associated with rapid growth rates include:

- Contracted tendons
- Epiphysitis
- Angular limb deformities
- Osteochondrosis

The Nursing Foal

One of the foal's first missions in life is to stand and nurse. In doing so, it receives the antibody-rich colostrum which helps protect it from disease. During the first weeks of life, the mare's milk provides everything a rapidly growing foal needs for sustenance. The burden then gradually shifts to other sources.

A simple blood draw will show if your foal has obtained enough immunity from the mares colostrum (first milk). Foals that have failure of passive transfer often do not gain weight and are more susceptible to illness. It is important to have a veterinary examination at approximately 24 hours of age.

Observe the foal's nursing habits. If it suckles for more than

30 minutes at a time, it may not be receiving enough milk. Supplemental feed or milk replacer may be required.

During lactation, a mare will produce an average of 2-3% of her body weight in milk a day. But in order to do so she must receive ample feed and water.

Peak lactation generally occurs during the second and third month of a foal's life. At this time *a mare will need almost double the amount of feed she required during her early pregnancy*. In addition to extra energy, her diet must include adequate protein, vitamins and minerals to keep from depleting her own body reserves. Increases or decreases of feed should be made gradually over a 7-10 day period.



This 6-month-old filly is so thin and *stunted* that she is comparable in size to a healthy 1-month-old foal. One contributing factor to her poor condition is that she was taken off her mother way too early and not fed any kind of necessary milk supplements.

The Foal's Changing Diet:

As early as 10-14 days of age, a foal may begin to show an interest in feed. By nibbling and sampling, the youngster learns to eat solid food. Its digestive system quickly adapts to the dietary changes. At 8-10 weeks of age, mare's milk alone may not adequately meet the foal's nutritional needs, depending on the desired growth rate an owner wants for a foal. In order to achieve a more rapid rate of gain, high-quality grains and forage should be added to the foal's diet.

It is essential the ration be properly balanced for vitamins and minerals. Deficits, exceeded or imbalances of calcium, phosphorous, copper, zinc, selenium and vitamin E are of particular concern for the growing foal. Improper amounts or ratios can lead to skeletal problems.

Foal Feeding Guidelines

As the foal's dietary requirements shift from milk to feed and forage, your role in providing the proper nutrition gains in importance. Here are some guidelines to help you meet the young horse's needs:

1. Provide high quality roughage (hay and pasture) free

choice.

2. Supplement with a high-quality, properly balanced grain concentrate at weaning, or earlier if a more rapid rate of gain is desired.
3. Start by feeding 1% of a foal's body weight per day, (i.e. 1 pound of feed for each 100 pounds of body weight)
4. Weigh and adjust the feed ration based on growth and fitness. A weight tape can help you approximate a foal's size.
5. Foals have small stomachs so divide the daily ration into 2-3 feedings.
6. Make sure feeds contain the proper balance of vitamins, minerals, energy and protein.
7. Use a creep feeder or feed the foal separate from the mare so it can eat its own ration. Try to avoid group creep feeding situations.
8. Remove uneaten portions between feedings.
9. Do not overfeed. Overweight foals are more prone to developmental orthopedic disease (DOD).
10. Provide unlimited fresh, clean water.
11. Provide opportunity for abundant exercise.

Weaning:

Foals are commonly weaned at 4 to 6 months of age. Beginning about the third month, the mare's milk supply gradually declines and a natural weaning process begins.

The mare's grain should be reduced and/or gradually eliminated to further limit milk production. Once the foal is no longer nursing, a 500-600 pound weanling should be eating between 2 and 3 percent of its body weight in feed and forage a day.

Total Care And Management Sustaining Growth:

Weanlings and yearlings continue to build bone and muscle mass at a remarkable rate. From weaning to two years of age, the horse may nearly double its weight again.

Weanlings and yearlings benefit from a diet containing 14-16 percent protein. They also require readily available sources of energy to meet the demands of growth and activity. The percent of concentrates or roughage a diet may contain depends on the desired growth rate. However, the diet should never contain less than 30% as roughage, measured by weight.

A good rule of thumb is to provide 60-70% of the ration as concentrates and 30-40% of the ration as roughage, measured by weight. On good quality pasture 50% rations of concentrates is suitable. The diet must also provide ample fiber to keep the digestive tract functioning properly. Some of the "complete feeds" have the ration already balanced.

Weight-gain and development taper off as the horse matures. As growth slows, you will need to adjust the ration to

approximately 1.5-2% of the yearling's body weight. The grain-to-roughage ratio should also be adjusted so by the time the horse is 2 years old, half of its daily diet (by weight) is coming from grain sources and the other half from hay and pasture. Breed type, maturity, desired growth rate and condition and level of activity will affect the horse's exact nutritional requirement.

Work with your equine practitioner to develop a total health care plan for your foals, weanlings and yearlings. A regular deworming, vaccination and examination schedule is essential to ensure your foal is getting the care it needs.

Remember, vaccinations and deworming regimens may vary depending on regional factors and disease risks. Consult your equine practitioner for exact recommendations.



Photo: Ripley's HAF "Hay 4 Horses" Animal Control Voucher Program

This 2-year-old colt is the size of a yearling. Underweight and lacking in needed nutrition, his body is reserving its energy and even though it is well into summer he has retained his winter coat.



Photo: Ripley's HAF "Hay 4 Horses" Animal Control Voucher Program

After only 2 weeks on an improved nutrition program, the 2-year-old has begun to slough-off his winter hair.

Here are some other management tips:

- Unless there is a medical concern, provide youngsters free-choice exercise daily. The less time foals are confined to stalls, the better.
- Use longeing, round-pen or tread mill work judiciously. Excessive forced exercise can strain joints and limbs.
- Never exercise a foal to the point of fatigue.
- Keep your youngster's feet properly trimmed to foster proper bone development.
- Provide a clean, safe environment with adequate shelter from the elements.
- Check the horse's surroundings and eliminate any potential hazards such as loose boards, nails, wire fencing or equipment.

The reward of providing excellent nutrition, conscientious care, and a safe environment will be a healthy foal that grows into a sound and useful horse.

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Stallions

No one should have a stallion without having the knowledge and facilities to do so. Stallion behaviors such as herding, mounting and biting associated with play-fighting, the potential for displays of aggression, and their intolerance for other male horses are dangerous aspects of stallion behavior which frequently result in injuries to the herd.

Stallions are evolutionarily programmed to ignore daughters as a protection against inbreeding. However, his natural instinct is to increase the herd size for the group's survival and he will mate with his own daughter/s when there are no other choices. The result of such inbreeding is birth defects and other health issues.

Should resources such as food, water, space or shelter fall below that which the stallion senses is adequate, he may try to eject members of the harem group by force. This attempt to retain a smaller group may result in serious injuries to post pubertal colts, daughters and lower status mares.

Stallions are often kept by themselves because they tend to be dominant over mares and geldings, and fights often occur unless they are separated. This necessary separation is the most difficult thing for animals to endure that normally live in herds.

Kept in confined and unnatural conditions of isolation tends to produce psychological aberrations in the stallion. Horses, animals or people may be wrongly perceived as a threat and might be driven forcibly from the area through or over gates and fences.

Think seriously and extensively about letting a male horse remain entire (a stallion). Most veterinarians and breed associations advise that only the best animals should be kept for breeding purposes. Adequate facilities and training are usual prerequisites to correctly handling a stud as most exhibit more aggressive behavior and can be unpredictable.

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Geldings

Geldings can be housed in lower cost buildings, and smaller grazing areas. They are far less likely to exhibit the extreme and potentially dangerous aggression. They are also far simpler to manage, being free from reproductive urges and associated behaviors.

Castration:

Castration is one of the most common surgical procedures performed in equine medicine. Proper planning and care can increase the chances of a successful procedure.

- Castrating at an early age when young colts are easy to handle, the testicles are smaller and the incision can be sutured closed. This means less swelling, resulting in a good cosmetic appearance.

- Horses castrated in their weanling year do not develop some of the musculature and neck and facial features associated with stallions. These early geldings keep finer features, thinner necks and lighter muscle mass, though they can grow taller than they might if left entire.

- Many castrations are performed on colts between one and two years old, and due to the larger size of the testicles, the incisions must remain open. Since open incisions are more susceptible to fly irritation, spring and fall are the preferred times of the year, before or after fly season. (In general, avoid extremes in weather because they slow healing and can add to post-surgical complications.)

- Veterinarians use two castration techniques. "Up" castrations are done with the tranquilized horse standing. Additional anesthetic is injected into the nerves of the testicular cords. The surgeon stands near the horse, leans over and removes the testicle using a special piece of equipment that cuts the cord, crimps and seals the blood vessel and removes the testicle.

- Horses are given a short-acting general anesthetic for "down" castrations. The veterinarian usually ties up one of the horse's hind legs and performs the surgery while kneeling over the prone animal.

- Each approach has its advantages and disadvantages and owners should discuss the choices with their veterinarian. Neither technique is universally better than the other.

- Horses are generally born with their testicles in the scrotal sac or they descend through a small hole or "ring" in the belly and are in the sac shortly after birth. Occasionally, one or both testicles will remain in the abdomen or only partially emerge through the ring. These testicles may drop down at a later date; some never descend.

- A horse with undescended testicles is called a cryptorchid, and general anesthesia and surgical exploration of the abdomen is necessary to castrate successfully.

New laproscopic techniques utilize a long, thin camera and long, thin instruments inserted into small incisions in the belly wall to perform the removal of these retained testicles. This saves the horse from the stress of opening the abdomen - and the resultant longer recovery.

There are many different terms for horses that have testicles in other locations. Colts with testicles through the ring but not in the sac are called ridgelings or rigs. A horse with a testicle through the ring and under the skin of the upper thigh or groin is called a high-flanker.

If the testicle is not completely removed, the horse will look like a gelding but may still behave like a stallion. Small remnants of certain testicular tissue can still produce the male hormone testosterone and, while the resulting "gelding" cannot reproduce, it may exhibit many typical stallion-like behaviors. Such an improperly castrated horse is often called proud-cut.

Improper removal of all the testicles is not the only possible complication of equine castration. In fact, there are many potential problems related to this simple procedure. Occasionally, the ring that the testicle drops through to get into the scrotum is abnormally large. Once the testicle is removed there is nothing blocking this hole and pieces of intestines can drop into the hole and out the newly made castration incision.

There are large blood vessels associated with the testicles and bleeding can be a serious complication. Because the castration incision must be left open to drain serum, except in very young colts, infection is another common complication.

Thousands of castrations are done each year, and most are uneventful. In fact, a routine castration can seem so simple and uncomplicated that it is sometimes easy to forget that problems can occur. Proper planning, care and attention to surgical technique can increase the chances that the procedure will be successful.

Horses are usually turned out in a small paddock following castration and allowed to walk slowly as their anesthetic wears off. Incisions should be monitored and kept clean and free of flies. Cold water hosing may be recommended to help keep the wounds open and draining.

A stallion recently gelded can still impregnate a mare for 2-4 weeks after surgery; keep them separated for that length of time. It takes time for the levels of testosterone

one in the system to drop. Some geldings may take a month or more before showing a decrease in stallion-like behavior.

Sheath Cleaning

"Sheath cleaning" is an entirely necessary project to ensure your gelding's health. Most geldings only need their sheaths cleaned about once a year, although it varies from horse to horse. The skin within the sheath has sebaceous glands, which secrete a fatty, foul-smelling material that combines with dirt and cellular debris, and is called smegma. In geldings, smegma can often build up and cause irritation, especially when it accumulates within a sac of skin at the tip of the penis, surrounding the urethra. Excessive accumulation of smegma can cause sheath swelling.

Surrounding the urethra is a pouch in which smegma can accumulate and harden into what is referred to as a "bean". This hard little nugget can put pressure on the urethra, making it uncomfortable for a horse to drop, and urination becomes difficult. Every gelding should be checked for a bean; doing this periodically will prevent a bean from ever becoming big enough to cause discomfort to the horse. This is probably the portion of cleaning that causes the most discomfort for the horse.

Having your veterinarian clean the gelding once before you take on the job yourself, will give you an opportunity to ask questions and determine if it is a job you wish to do in future years or leave it up to a veterinarian. A healthy sheath has a population of inhabitant bacteria and other microscopic organisms; over-cleaning and inappropriate cleaning methods could cause problems for your gelding.

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The Older Horse

Special Care & Nutrition

Due to improvements in nutrition, management, and health care, horses are living longer, more useful lives. It's not uncommon to find horses and ponies living well into their 20's & 30's. While genetics play a determining role in longevity, you can help make your horse's golden years happier and more productive by providing *proper care and nutrition*.

Owner Awareness - Needs of the Aging Process

Time does take its toll on many body systems. The horse's digestive tract is not as efficient as it once was. Bones and joints are less resilient. Elderly horses may feel the aches and pains of arthritis. The immune system is less reliable, making older horses more susceptible to illness, and slower

to recover from both disease and injury. Parasite infestations also take a heavy toll. Aged horses are more prone to respiratory, eye and dental problems. Elderly animals are also less able to cope with environmental stresses, such as wind, wet and cold. Additionally, hormonal changes may affect overall body condition, hair growth, appetite and energy levels. While some signs of decline may be directly related to the aging process, others may have an underlying medical problem, so be sure to consult with your veterinarian.



Homer at 23 and his owner and friend still enjoying light workouts

Special Nutritional Needs

While every facet of horse health care is important, proper nutrition is vital. As horses age, their digestive systems become less efficient. Hormonal and metabolic changes affect or interfere with their ability to digest, absorb and utilize essential nutrients in their feed, especially protein, phosphorus and fiber. For these reasons, many older horses benefit from complete rations with built-in roughage that are specially formulated to compensate for changes in their digestive physiology.

When selecting feeds, evaluate your choices by the following criteria. The senior diet should be:

- Highly palatable
- Easy to chew and swallow
- Clean and dust-free to prevent or lessen the impact of allergies or lung disease.
- Provide 12-14% protein
- Contain enough high-quality fiber to aid digestion
- Provide essential minerals, including calcium and phosphorus in the proper ratio
- Include all essential vitamins, especially vitamin C and B-complex vitamins
- Provide enough readily available energy (feed and/or

forage) to maintain proper body condition

- Include adequate, palatable fat from a vegetable source to promote healthy skin and hair, aid digestion and boost energy intake



Nikki at 43 years old



Dancer looking good at 30 years old., as a result of dental care and diet

Dental Care

A horse that can chew its feed properly will waste less of it, get more nutrient value from it and be less likely to choke or colic. Have your veterinarian examine and float (file) your horse's teeth at least once a year, twice annually if the horse is over 20. This will keep his nipping and grinding surfaces in good working order. It also gives the veterinarian a chance to troubleshoot for broken or lost teeth and check for tongue, gum or other problems.

Monitoring the proper weight condition of your Senior is as important as in younger animals. If your aging equine is losing weight or remains too thin, it may be a sign of a serious medical condition or the need to reevaluate its diet. Consult your veterinarian.



Photo: Ripley's HAF "Hay 4 Horses" Animal Control Voucher Program

This 28 year old mare lost body conditioning because of a chewing difficulty. Improvising with what was on hand, until a larger feeding container could be purchased, the white bucket was used to mix a mash from alfalfa pellets and then poured into the dogfood bowl. The owner set up an appointment for a dental exam and an extended teeth float.

* * * * *

Donkeys

Donkeys have the greatest longevity of all the equines and can sometimes live for over 50 years. Although donkeys and horses belong to the same family, they actually differ significantly and a donkey should not be treated as a small horse. Despite their small stature, they are extremely strong, can be willful and have the potential to cause injury by kicking and biting. Donkeys are highly intelligent creatures that need plenty of care and attention and can become grumpy, and even ill, if left unattended and lonely. Basic equine requirements apply along with additional needs.

Living Environment:

Perimeter:

Donkeys are excellent escape artists and can squeeze through the smallest of gaps. Post and rail fencing is always recommended and gates should always be fastened securely. Donkeys are naturally inquisitive and will wander off at the slightest opportunity.

Shelter:

Donkeys must have shelter in geographical locations that produce rain and snow. Donkeys originated from a warm, dry climate. Their thick coats give protection on dry-cold nights only. The haircoat is not waterproof because it does not contain the same oils as horses and ponies. This means they cannot cope with driving rain or snow, as moisture is able to penetrate the coat and reach the skin where it will quickly drain body heat.

Feeding

Never allow a donkey to become fat:

Donkeys are at high risk to founder. It is far better to

monitor and control a donkey's weight so that dieting does not become necessary.

Sudden dieting is potentially fatal in donkeys as it can lead to a condition called hyperlipaemia. This mobilizes fatty deposits around the body and overloads the liver and kidneys, causing organ failure. Should a donkey need to lose weight, it must be done very gradually, preferably under the guidance of a veterinarian.

Medical

Donkeys have a higher tolerance for pain than do most horses. This can make it more difficult to see signs of problems. The same vaccinations are required as for horses.

- Colic symptoms in a donkey will often display only as a loss of appetite. Colic in donkeys frequently is brought on by extreme stress.
- Laminitis in donkeys often occurs in all four feet or in rear feet only. Laminitis of rear feet will more likely lead to euthanasia than if in front feet.
- In the past there was a risk that donkeys could pass lungworm (which they can carry without ill-effect) on to horses. However, by sticking to a proper worming routine that includes Ivermectin products being given at the appropriate time to both donkey and horse, the risks are negligible.
- Severe respiratory distress in donkeys is a cause for immediate and aggressive diagnostics and treatment, especially if in a herd. Donkeys often have severe secondary bacterial infections after or along with equine influenza virus.
- Stringhalt (involuntary flexion of the hock, the leg springs upward in a reflex-like manner) and upward fixation of the patella (patella becomes fixed and the horse is unable to flex the leg) is more common in donkeys than in horses.
- Any donkey off feed for three to four days or more should be checked for hyperlipemia or hyperlipidemia, also known as Fatty Liver. Treatment consists of specific treatment of the primary disease, nutritional support, fluid therapy, and drug therapy.
- Chronic non-healing coronary band lesions in donkeys look like a gravel eruption. This is a syndrome of donkeys that may persist for years and may become frequent. Keep the toes trimmed short.
- Donkeys are very susceptible to both physical and psychological stress, but symptoms can easily go overlooked until a problem has overwhelmed them.

Donkeys are herd animals and need constant companionship. If possible they should always be kept in pairs as donkeys bond very strongly with their friends.

Stress can be caused by separation from or loss of a companion, change of home or routine and long journeys. Anything with the potential to cause stress should be carefully thought through and changes introduced as gradually as

possible with the donkey being closely monitored. If a donkey's companion dies, the body should be left with the surviving donkey for at least an hour. Not all equines will approach a body, but many do and to have the opportunity is important.

Hoof Care

- Your farrier should visit every 12- 14 weeks to check all donkeys and trim or file as needed.
- Pick out your donkey's feet on a regular basis, especially when the ground is wet and muddy.
- Take the time to inspect the hoof wall for cracks or chips and inspect the foot for thrush.
- The best defense for thrush is to keep your donkeys feet clean and dry.
- White Line Disease is also common in donkeys.

Summary:

A good management program is necessary. It is not easier to care for a donkey then it is for a horse; it is just different. Most of the basic care needed for horses applies to donkeys.

1. A balanced diet based on grazing, with supplementary forage in the winter
2. ½ acre of space per donkey
3. A constant supply of fresh water
4. A regular program of deworming to control internal parasites
5. Routine visits from a farrier to trim the hooves and fit shoes if necessary
6. Vaccinations to protect the donkey against equine influenza and tetanus
7. Veterinary care whenever needed
8. Plenty of attention, including grooming, health checks and mental stimulation.

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Mules

Genetically all mules are *not* created equal. Mules are now the offspring of a much more varied combination of parent-age.

In the past, mules were working animals from draft-type mares and sired by draft-type jacks. They performed, generally, in a reasonably straight line or loose turn and at a walk and trot. Rarely were they required to work at greater

speeds. The modern mule is produced from saddle-type performance mares and sired by smaller, more refined jacks.

Most of today's mules are often duplicating the maneuvers of racehorses, roping horses, reining horses, driving horses, cutting horses, etcetera; and along with the training programs to accomplish such roles, the same lameness problems seen in horses are now developing in these mule types. However, with their higher pain tolerance than most horses, it is not as easy to detect problems quickly.

Basic Care

All the care that is required for horses will apply also to mules. However, their individual requirements should be carefully assessed to make sure all their needs are met.

- Before the mule demonstrates sufficient lameness to be presented for examination and treatment, many will be much more advanced than in a horse.
- Laminitis in any type of equine is a very serious condition, but it is compounded in the draft-mule due to its size.
- Stringhalt (involuntary flexion of the hock, the leg springs upward in a reflex-like manner) and upward fixation of the patella (patella becomes fixed and the animal is unable to flex the leg) is more common in mules than in horses.
- Mules are more susceptible to equine sarcoids than are horses.

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Miniatures

Miniature horses grow to approximately 90 % of their adult height by the time that they are a year old. Foals are normally weaned from nursing at 4 to 5 months of age. A single miniature horse consumes the same types of feed as full sized horses. These are primarily pasture grass, hay, and grain; and depending on their age, size and whether they are also on pasture, will consume in the range of 2 to 5 pounds of good quality hay per day.

Each can be reasonably maintained on as little as 1/2 acre of land provided that its feed is supplemented with hay on a daily basis and is also provided with a structure to get out of the sun, rain or inclement weather conditions.

Healthy Conditions:

Due to the small size of the miniatures it takes less feed to impact their healthy weight. Because of this, an onset of laminitis can happen quickly especially in spring and early summer when pastures are lush.

In the winter the miniature horse gets a very long coat and it can be very deceiving about how their weight is holding. It is important to check the horse's condition by rubbing the fingers across the ribs of the horse just below the backbone. If a "washboard" feel is evident, the horse is probably underweight and the feed ration should be increased.

- Horses are usually wormed on a two month routine with one of the modern wormers or fed the daily supplement that has a wormer included.
- Veterinarians should be consulted for advice on annual vaccination programs for horses to prevent common diseases.
- Generally hooves of miniatures are trimmed at two month intervals. This may be necessary more often with younger horses (yearlings and younger) while they are growing to assure proper bone development, leg conformation and gait.

Medical

The conditions that can affect a standard size horse also applies to the miniature. The following are problems that mini owners also need to be aware of.

Ulcers:

Ulcers can be a real source of problems for miniature horses in general and foals in particular. Horses are prone to stress whether from travel, illness, medication, show and training environment, moving to new surroundings, changes in feed, etcetera.

Hyperlipemia:

The most common clinical signs are anorexia and lethargy and are most often associated with reduced food intake. Hyperlipemia can occur in miniature horses, miniature donkeys and ponies. This condition may result from any systemic disease that produces a negative energy balance, such as enterocolitis, parasitism, gastric impaction, or colic.

Hyperlipemia in ponies is most frequently a primary disease associated with obesity, pregnancy, lactation, stress, and transportation.

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No Foot- No Horse!

The foot of the horse is a very unique structure that undergoes a tremendous amount of strain and stress. The foot is the foundation and is the most common area of forelimb

lameness because of the amount of stress to which the equine foot is exposed.

Foot conformation is extremely important in maintaining the health of the foot and the soundness of the horse. Ideally, the horse will have a large round front foot and a similar-sized more elongated hind foot. The sole needs to be concave, which allows for foot expansion and absorption of concussion each time the foot hits the ground. Normally the horse's foot should land heel first and the heels of the foot subsequently expand.

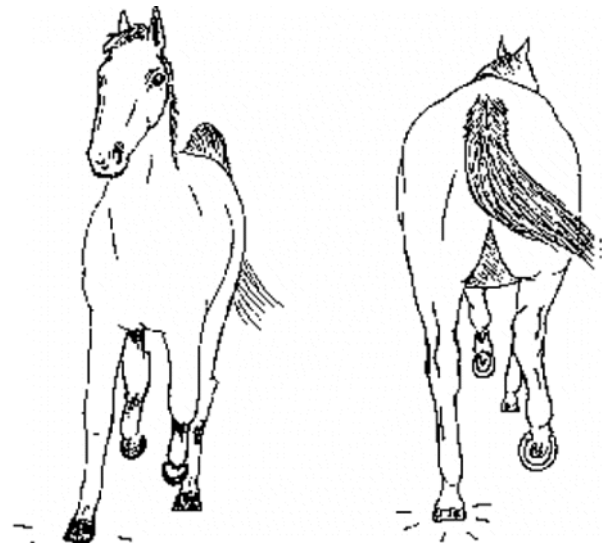
Thereafter, the pressure is moved from the walls of the foot to the frog, which further absorbs concussion as well as helps move blood through the foot and back up the leg.

Lameness

Lameness is caused by injury or disease. There is a greater chance for a successful outcome if the lameness is addressed at its onset and a complete examination and work-up performed.

To identify the lame leg:

- Halter the animal and ask someone to lead the animal



- To check the front legs ask your helper to trot (faster than walk) the animal towards you. A lame animal will be seen to nod the head as it trots. The head is raised as the lame leg touches the ground.

- To check the back leg have the animal trotted away from you. Watch the back of the animal and you will see it rise as the lame leg hits the ground.

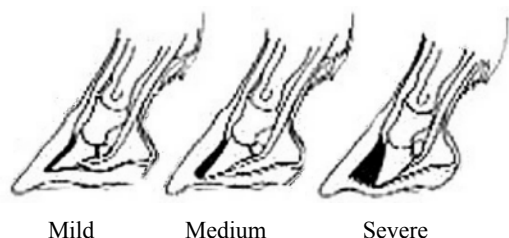
- Examine the lame leg for any heat, swelling or pain.
- Lameness is usually caused by a problem with the foot.

Founder

Founder is the term used to describe the partial detachment of the coffin bone from the hoof wall. The word founder is actually a maritime term meaning “to sink,” which is appropriate, since the final stage of detachment results in the coffin bone actually sinking through the bottom of the hoof.

The coffin bone is the “hoof-shaped” wedge that normally follows the angle of the outside hoof wall. When laminitis occurs, the coffin bone begins to pull away from the laminae and slowly sinks downward. The breakdown happens quickly – full rotation to the bottom of the hoof can happen in as little as 60 hours. It is extremely painful.

Two-thirds of a horse’s weight is carried on his front feet. On a thousand-pound horse, each hoof – a structure barely the size of the palm of your hand – carries about 350 pounds of weight.



Laminitis

Every day veterinarians across the country see hundreds of cases of laminitis, a painful disease, which affects the feet of horses. What is especially alarming is that some cases are preventable. In fact, it may be that we are killing our horses with kindness. **Consider that a common cause of laminitis is overfeeding - a management factor that is normally within our control.**

The terms “**laminitis**” and “**founder**” are used interchangeably. However, founder usually refers to a chronic (long-term) condition associated with rotation of the coffin bone. Acute laminitis refers to symptoms associated with a sudden initial attack, including pain and inflammation of the laminae.

Laminitis results from the disruption (constant, intermittent or short-term) of blood flow to the sensitive and insensitive laminae. These laminae structures within the foot secure the coffin bone (the wedge-shaped bone within the foot) to the hoof wall. Inflammation often permanently weakens the laminae and interferes with the wall/bone bond. In severe cases, the bone and the hoof wall can separate. In these situations, the coffin bone may rotate within the foot, be displaced downward, “sink” (founder) and eventually penetrate the sole. Laminitis can affect one or all feet, but is most often seen in the front feet concurrently.

Causes:

Although laminitis occurs in the feet, the underlying cause

is often a disturbance elsewhere in the horse’s body. While the exact mechanisms by which the feet are damaged remain a mystery, certain precipitating events can produce laminitis. The causes vary and may include the following:

- Digestive upsets due to grain overload (such as excess grain, fruit, or snacks) or abrupt changes in diet.
- Sudden access to excessive amounts of lush forage before the horse’s system has had time to adapt; this type of laminitis is known as “grass founder”
- Toxins released within the horse’s system
- High fever or illness; any illness that causes high fever or serious metabolic disturbances has the potential to cause laminitis, (e.g., Potomac Horse Fever)
- Severe colic
- Retained placenta in the mare after foaling
- Consumption of cold water by an overheated horse
- Excessive concussion to the feet, often referred to as “road founder”
- Excessive weight-bearing on one leg, due to injury of another leg, or any other alteration of the normal gait
- Various primary foot diseases
- **Bedding that contains black walnut shavings**
- Prolonged use or high doses of corticosteroids

Risk Factors:

Factors that seem to increase a horse’s susceptibility to laminitis or increase the severity of the condition when it does occur include the following:

- Heavy breed, such as draft horses
- Overweight body, cresty necks
- High nutritional plane (feeding large amounts of carbohydrate-rich meals)
- Ponies, Morgans and donkeys
- Unrestricted grain binges, such as when a horse breaks into the feed room. If this happens, **do not wait** until symptoms develop to call your veterinarian. **Call immediately so corrective action can be taken before tissue damage progresses.**
- Horses who have had previous episodes of laminitis
- Older horses with Cushing’s disease

Signs:

Signs of **acute laminitis** include the following:

- Lameness, especially when a horse is turning in circles: shifting lameness when standing
- Heat in the feet
- Increased digital pulse in the feet
- Pain in the toe region when pressure is applied with hoof

testers

- Reluctant or hesitant gait, “walking on eggshells”
- A “sawhorse stance,” with the front feet stretched out in front to alleviate pressure on the toes and the hind feet “camped out” or positioned farther back than normal to bear more weight

Signs of chronic laminitis may include the following:

- Rings in hoof wall that become wider as they are followed from toe to heel



Photo: Stablemade Equine Services

- Bruised soles or “stone bruises”



Photo: Stablemade Equine Services

- Widened white line, commonly called “seedy toe,” with occurrence of seromas (blood pockets) and/or abscesses

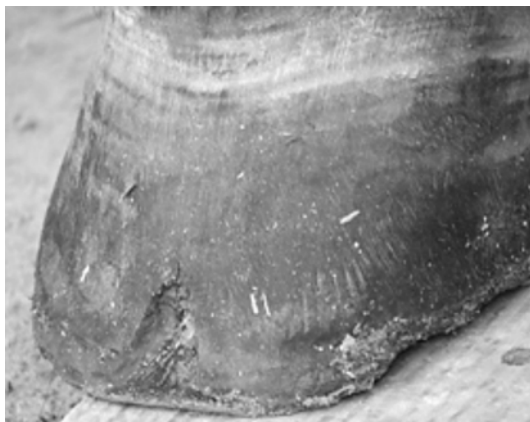


Photo: Stablemade Equine Services

- Dropped soles or flat feet



Photo: Stablemade Equine Services

- Thick, “cresty” neck



Photo: Habitat For Horses

- Dished hooves, which are the result of unequal rates of hoof growth (The heels grow at a faster rate than the rest of the hoof, resulting in an “Aladdin-slipper” appearance)



Photo: Ripley's HAF Animal Control “Hay 4 Horses” Voucher Program.

Treatment:

Caution! Do not try and treat your animal yourself - the information below is to help you better understand what is needed for this condition and should be the decision of your veterinarian as to the appropriate action to be taken.

The sooner treatment begins, the better the chance for *recovery*. Treatment will depend on specific circumstances, but may include the following:

- Diagnosing and treating the primary problem (*Laminitis is often due to a systemic or general problem elsewhere in the horse's body.*)
- Dietary restrictions; stop feeding all grain-based feeds and pasture; feed only grass hay until advised otherwise by your veterinarian. Administering fluids, by your veterinarian, if the horse is ill or dehydrated
- Administering other drugs, by your veterinarian, such as antibiotics to fight infection; antitoxins to reduce bacterial toxicity; anticoagulants and vasodilators to reduce blood pressure while improving blood flow to the feet. (Corticosteroids can actually cause laminitis or exacerbate existing cases.)
- Stabling the horse on soft ground, such as in sand or shavings (not black walnut), and encouraging the horse to lie down to reduce pressure on the weakened laminae
- Opening and draining any abscesses which may develop
- Cooperation between your veterinarian and the farrier (Techniques that may be helpful include corrective trimming, frog supports, and therapeutic shoes or pads.)

Long-term Outlook

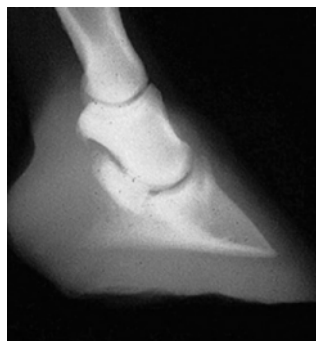
Many horses that develop laminitis make uneventful recoveries and go on to lead long, useful lives. Unfortunately, others suffer such severe, irreparable damage that they are, for humane reasons, euthanized

Importantly, once a horse has had laminitis, it may be likely to recur. In fact, a number of cases become chronic because the coffin bone has rotated within the foot and because the laminae never regain their original strength. There may also be interference with normal blood flow to the feet, as well as metabolic changes within the horse. Extra care is recommended for any horse that has had laminitis, including:

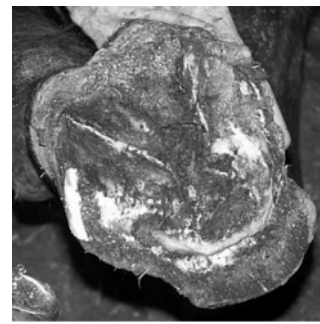
- A modified diet that provides adequate nutrition based on high-quality forage, digestible fiber (beet pulp), and oil; avoiding excess energy, especially from grain.
- Routine hoof care, including regular trimming and in some cases therapeutic shoeing (Additional radiographs may be necessary to monitor progress.)
- A good-health maintenance schedule, including parasite

control and vaccinations to reduce the horse's susceptibility to illness or disease.

- Possibly a nutritional supplement formulated to promote hoof health
- Avoid grazing lush pastures, especially between late morning and late afternoon hours, since plant sugars are the highest during these times; restrict pasture intake during spring or anytime the pasture suddenly greens up



The left x-ray is a healthy foot. Right shows the condition of the horse's founder.



The coffin bone has penetrated the sole of this horse's foot. There was no hope of recovery and euthanasia was the only humane form of treatment available for the animal.

Keep in Mind

The best way to deal with laminitis is **preventing the causes under your control**. Keep all grain stored securely out of the reach of equines. Introduce your equine to lush pasture gradually. Be aware that when an equine is ill, under stress or overweight it is especially at risk. Provide good, routine health and hoof care. **If you suspect laminitis, consider it a medical emergency.** Notify your veterinarian immediately.

Navicular disease/syndrome

Until recently, a diagnosis of navicular disease meant chronic lameness, loss of usefulness, and expensive, special shoeing that might help for a while or not at all. Ultimately, a horse with navicular disease could be expected to deteriorate to a point where euthanasia would be the only option.

Recent advances in the understanding and application of correct hoof biomechanics are raising the possibility that many previously doomed horses may be rehabilitated to a comfortable and useful life.

Navicular disease has traditionally referred to degenerative changes in the navicular bone that have been confirmed by X-rays. Magnetic resonance imaging (MR) has now provided veterinarians with a technique to diagnose navicular disease more precisely and the ability to see into the horse's foot, viewing ligaments and tendons, that could not previously be seen with other imaging techniques, as well as giving much more detailed images of bones. The ability to more precisely diagnose is leading to changes in the treatment of horses with navicular disease, as well as those horses that were previously incorrectly diagnosed with the condition.

Symptoms include:

- chronic, progressive lameness in one or both forelimbs (front legs)
- short or shuffling gaits, often with a toe-first landing
- sensitivity to hoof testers on the central third of the frog
- relief from pain when a nerve block is applied to the palmar digital nerve
- frequent shifting of body weight when resting
- resting the affected foot on the toe ("pointing")

Cause:

One theory suggests that the unnatural toe-first landing seen in many domestic horses, and the unnatural forced rocking and vibration that result, is the primary cause of navicular disease.

During normal, heel first movement, the deep flexor tendon is quickly tightened by the descending fetlock joint. At the same time, the coffin joint is rotating forward toward break-over, and is loosening the deep flexor. In a toe-first landing, the descending fetlock is still tightening the tendon just after impact, but after impact, the heel rocks down, tightening the tendon simultaneously.

In a heel-first landing, one pulley is tightening as the other is releasing tension, but with a toe-first landing, both pulleys are tightening at the same time. Far greater force is directed to the navicular pulley than was ever intended by nature adding greatly to the force applied to the tendon and navicular bone. Greater force means greater friction, and the continued repeat of this insult causes damage to the region.

Prevention:

The lateral cartilages and the digital cushion are soft, thin and incomplete in the newborn foal, but become key to the support, protection and overall function of the foot as they become thicker and stronger from birth through the first few

years of the horse's life.

Shoeing interferes with the horse's nature as well as with the natural response of the hoof to the environment. Current practices often prevent the development of these structures, leaving full grown horses with "baby" feet that are extremely vulnerable to pain and lameness, particularly in the back part of the foot. It is this unnatural and unnecessary sensitivity that leads to toe-first landing and often to navicular disease.

The back of the foot is supposed to be a solid, but flexible landing zone that can slam into any terrain like the hooves of a wild horse. Shoeing the young horse lifts the frog off the ground and raises the heels; lifting the sensitive structures off the ground and makes the horse feel better that may have a sensitive frog, but ensures the hoof will never develop into something the horse can use to dissipate impact energy like it was supposed to. The horse will always be forced to absorb energy impact with the rigid front of the foot.

Treatment

It is absolutely necessary to get the foot back to the form and function that nature intended by proper trimming.

- Keep the toe short between the frog apex and the hoof wall
- Keep the frog and bars on the ground
- Leave clean-dirt [no rocks or gravel] in the foot which provides natural support; [manure should be removed]
- Get the horses out and moving
- The sole should not be trimmed except to sometimes exfoliate shedding or false sole. There should be enough sole depth to lift the collateral grooves (beside the frog) about an inch off the ground.
- The walls should be kept 1/16th inch longer than the sole and finished with a large bevel or 'mustang roll.'
- Routine frog trimming should be avoided. It should be left to callus, like the sole.
- If there is wall flare, breakover should be set exactly where it would be if there were well connected walls.

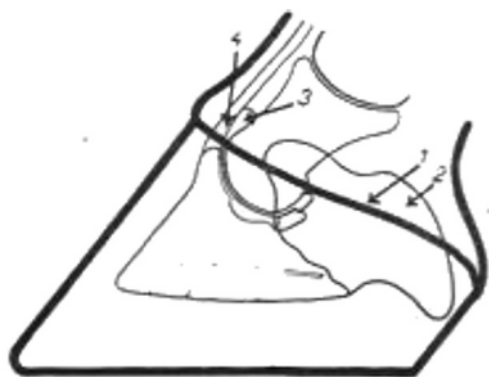
It is important to achieve heel-first landing and the frog pressure to finish developing the inner structures. If the inner structures are weak and undeveloped on a standing navicular horse, the frog may be so sensitive on the ground that the horse 'tiptoes' in motion. By leaving the heels a little longer for a few months, they sink into footing and reduce the pressure to the frog; often to a level the horse can and will bear. This reduced pressure allows progress with digital cushion development; boots with foam insoles dramatically speeds up this process.

The Foot

The relationship of how the foot is related to the limbs and how the limbs are related to the body determines the confor-

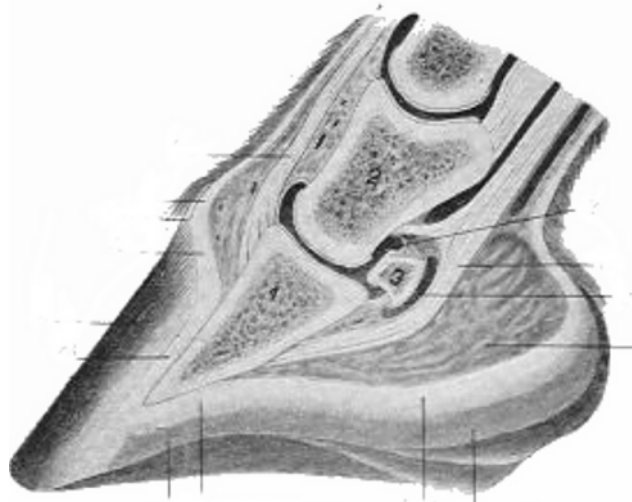
mation of the horse. Genetics and growth will determine the limb conformation. However, the foot can be influenced throughout the horse's life by trimming and shoeing. Horses will often toe-in and toe-out which will affect whether the horse travels straight or paddles out or wings in. Only when the horse is very young should attempts be made to correct these types of defects. Generally, the mature horse limb conformation should not be altered, as this is the angle with which the bones, tendons and ligaments have developed.

There is no one ideal foot angle for the horse. The angle of the front hoof wall should parallel the pastern angle of the horse. Thus, if a horse has an upright shoulder and pastern angle then the hoof conformation needs to be upright. If the horse has a long sloping pastern, then the foot will also have a longer sloping angle. When there is an abrupt angle change in the pastern/foot angle, there will be abnormal forces exerted through the foot.



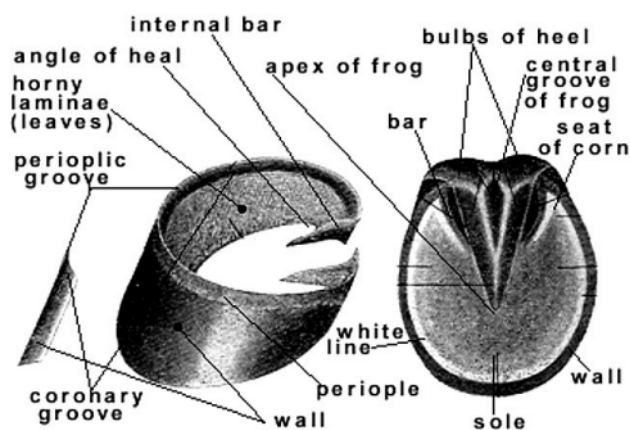
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A horse's foot is really a single toe, and the hoof is a thick "toenail". The tip of the toe bone fits within the hoof (# 1 & # 2)), and the heel angles upward. The bone is so porous that it looks somewhat like pumice stone. The toe bone and two other bones make up the horse's foot. All fit within and are protected by the hoof capsule (# 3).



Stablemade Equine Services

2



Stablemade Equine Services #3

4

The part of the hoof that we see (# 3) when the horse's feet are on the ground is the wall. The wall protects the front and sides of the foot. It is longest in the front and decreases toward the back of the foot. Horseshoes are putting a shoe on the under-part of the wall to help protect it from extensive wear or injuries when the horse is working. The shoes must be changed and the hoofs trimmed approximately every sixth week. A hoof grows about one-third inch in six weeks in the average healthy horse.

The sole (# 4) covers most of the undersurface of the foot and is arched to protect the bones and soft parts of the foot above it (# 2). The frog (# 4) is a soft elastic section shaped like a triangle with its base at the heel and its apex pointing forward. It helps in shock (concussion) absorption, cushioning the jarring impact that occurs every time the animal's foot comes in contact with the ground.

Hoof Care

To know and understand the nature of horse's hoof is of great importance for every horseman. It will help to understand and implement not only the proper care for the hoof but the proper shoeing as well.

Just like the nature of the horse adjusts to the environment and the living condition, so do the feet adjust and very much keep themselves in balance. The key elements to which the hoof responds are: moisture, surface and the horse's movement on it, as well as the various stresses on the hoof itself. The latter is very important when it comes to shoeing.

When the weather is dry, the ground gets hard and so does the hoof. This is a natural reaction to protect the hoof from premature wearing off. When the weather is wet the foot softens preventing the hoof's overgrowth and enables easier wearing/breaking off.

The surface plays also a great role in the condition of the hoof. Horses living on softer ground will have a slower growing and weaker hoof (horses standing on rubber

mats/pads will tend to react as living on soft ground). This will often create problems in shoeing as there is very little foot to work with, since the growth slows down, as well as the walls gets thinner making it hard for the shoes to stay on and complicating the entire shoeing process. Living on the grass will have similar effects, which can be seen on the English Thoroughbreds that were primarily raised on grass and in time the weaker, slower growing foot became their inbred nature. The Arabian horse, who was raised in the rocky desert, contrasts this by his inbred nature that presents a horse with a strong hoof.



Photo: Stabledmade Equine Services

A virgin hoof of a wild Chincoteague pony, that was never trimmed. Hoof is fairly well balanced and worn off. Note, the toe is neither squared or rolled.

The smaller the area and the more hostile the geographic location is to the breed of equine, the more frequent the care will be needed for maintaining a healthy foot.

Farrier

In days gone by, the most vital person to have in the smallest of communities was the blacksmith. In today's world they are more commonly referred to as

farriers. Proper foot care is as important as proper diet and adequate exercise, and choosing the right farrier that has the experience to care for your particular equine is the first step to having a healthy foot.

The care of the equine hoof can be divided into two categories: unshod and shod. The care significantly differs in each of them. Understanding the nature of the hoof, as well as the nature of particular horse (breed) is essential in making decisions in hoof care and the shoeing process. You set the stage of the healthy foot by having your young ones get accustomed to having their feet picked up and practicing good foot care in between farrier visits.

If you do not already have a farrier, equine veterinarians in your area should be able to make recommendations for one or more, that has the knowledge to provide proper care for the breed-types of your equines.

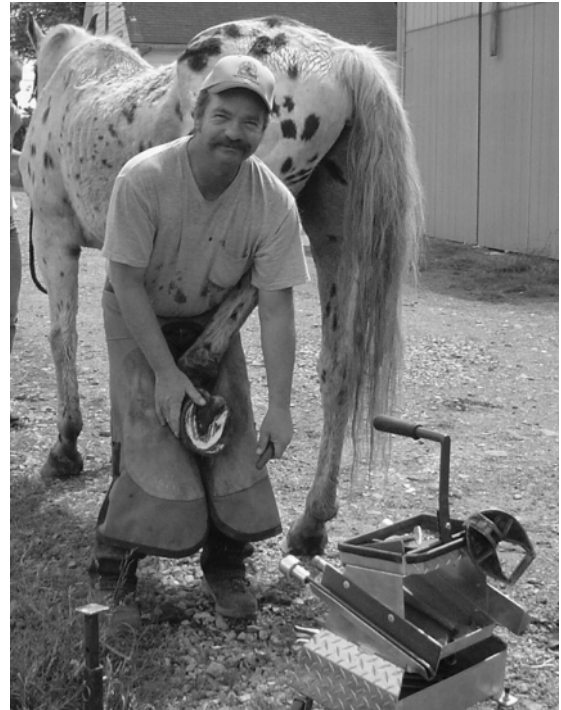


Photo: Ripley's HAF Animal Control "Hay 4 Horses" Voucher Program.

Unshod Hoof

Taking care of the bare foot is much different than a hoof that is shod. Geographical location with weather patterns and terrain that is compatible with your breed of animal will play a major role in the type of hoof care required. Hooves, like human fingernails, grow constantly throughout the horse's life. Some grow faster than others, some are more brittle than others, and some will need more attention than others.

- Horses living outside all the time on large pastures and ranches might not need any care at all, if the wearing off equals the growth. **Very few areas of this type exist.**

It is not recommended to use various hoof ointments and conditioners, since the horse needs to respond to the environmental conditions to keep his hoof in good health. The hoof dressing will interfere with the softening and the hardening of the hoof in response to the ground. This is very much relevant to the particular breed of horse, his nature versus the living conditions, and mainly the ground.

- This will work only if there is regularity of movement in open areas and relevant to the ground versus the nature of a particular breed of horse. When irregularities in movement occur, the hoof growth becomes irregular and care by the farrier is essential.

- In cases where the horse is living on gravel-type ground it

will require some hoof care, mainly in cleaning of the imbedded small rocks in the white line, since they could damage the foot or cause an abscess.

- No part of the hoof, especially at the toe, should have a ski-slope look. Long toes can put stress on tendons and ankle joints and contribute to under-run heels. Many times a toe is too long to set back properly with just one trim. If a toe is excessively long, trimming it back every few weeks helps the white line migrate back to its proper position. Keeping the toe short helps build a strong heel and, in turn, gives much better tendon support.
- Regular trims are particularly important for young and hard working horses. Improper angles cause stress on growing joints and affect a working joint's ability to remove toxins and lubricate itself. These situations often set the stage for the early onset of ringbone (when bone is not strong enough it responds to pressure by laying down excess deposits of calcium at the site of the pressure) and other arthritic conditions in pre-teen horses.



Photo: Ripley's HAF Animal Control "Hay 4 Horses" Voucher Program.

- Your farrier will be able to explain the ideal schedule for your particular situation; however, every six to eight weeks is average.
- Donkeys' feet are noticeably different in shape from those of horses and ponies. They will need regular trimming from an experienced farrier.
- If your equine requires regular trims that are hard for your farrier's schedule to accommodate, learn to rasp off the edges. Rasping takes a bit of strength and finesse, but many owners can learn to do it.
- If chipping and cracking are an issue, the hoof-wall may be too dry and a hoof moisturizer may be needed.
- At any time you are unsure of what action you need to take, ask your veterinarian and/or farrier about the hoof's health. A simple change in diet or other environmental factor may help the condition.



Photo: Ripley's HAF Animal Control "Hay 4 Horses" Voucher Program.

Summary

The rate at which a hoof grows and wears depends on several things, including climate, terrain, genetics, nutrition, and daily use, to name a few. A healthy hoof has a characteristic odor. Once you learn that smell you know immediately if an unhealthy hoof is being trimmed.

- The angle of the hoof depends on, and should match, the angle of the horse's shoulder and pastern.
- Toes should be kept as short as possible.
- The toe or quarters should have no flares.
- The frog should always touch the ground.
- The toe and edges may be rolled if necessary to prevent chipping.

Hoof Care in Young Foals

A young foal should, in his early age, be educated for shoeing/trimming by cleaning the hoofs at least a couple of times during the week and lightly tapping on them. **Avoid reprimand as young foals lack the comprehension and this will create behavior problems.**

In the first months of the young foal's life, the shape of his feet is somewhat different than an adult horse. The coronet band is larger than the circumference of the bottom walls/sole of the hoof, hence the feet/hoofs are narrowing downwards. In about six months the shape of the foot will be getting more like in an adult horse.

It is very important to pay great attention to the newborn foals and to their feet as well. The insufficient care for youngster's feet can demonstrate itself in various ways. It all depends in what terrain the foal is moving and on his living environment.

If the foal is moving on too soft ground, or if he is stall raised, the hoof will not wear off sufficiently and it will grow long. Due to the fact that most foals have irregular conformation only a certain part of the hoof is stressed. In these areas the soft youngster's foot will wear off quicker than in the areas with lesser stress/pressure, which will give the beginning to an irregular foot, and in time it can become asymmetrical.

In the soft bones and pliable tendons of the foal it can lead to serious deformities. Photo # 1 shows a young foal that was stressed with extreme pain in his left front leg, thus overweighing the opposite leg, which then lead to extreme hyperextension of the pastern and the "hoof" joint. This example shows the extent of abnormalities that can come to young foals as a result of moving malfunction and irregular strain on their legs. Similar changes can come due to uneven strain/pressure on the hoofs, even though often not quite apparent in the early stages. The photo # 2 shows a defective front stand of a young foal caused by overgrown hoofs. The x-ray photos # 3-A show the abnormal angling of the joints by the same horse. Photo # 3-B depicts the adjustment of the corrected angling in the joints after proper trimming.

1



Photo: Stablemade Equine Services

2



3-A



Photo: Stablemade Equine Services

3-B



It is very important to pay great attention to the horse's feet in his early age (about in his fourth week). The trimming of young foals requires certain expertise and it should be entrusted only to an experienced farrier.

The overgrown hoof is trimmed and the foot is given an approximate shape. With proper but not sudden changes in trimming, there can often be corrections made to some of the irregularities in the conformation/stand during the early stages of the foal development. However, it is of great importance in such cases that the trimming/correcting is done more frequently (about every three to four weeks). The intervals in trimming are of course influenced by the quality of the youngster's hoof as well as the terrain on which he is moving and the living environment. On dryer, harder pastures the trimming of the feet is less frequent than on softer and grassy pastures or where there is a lack of turn out.

If the foal is moving on a harder ground, the hoof could wear off faster than the new growth. When the sole gets too thin it could become bruised and the foal will go lame. In such cases there may be a need for special shoes, photo # 4 called "partial shoes/plates".

- Such shoes should be thin, light, and about 1 cm wide. The ends are thinned and rounded. The plate covers only the part of the hoof that has been worn off. It is not recommended to shoe the foals on the hind legs if they are turned out with other youngsters to prevent injuries when kicking.

4



Photo: Stablemade Equine Services

- This type of shoe should not be on the foot longer than three weeks. After this time the plate should be removed, foot trimmed and the shoe placed back if there is still further need for shoeing.

- If the foal wears off the sole completely to the point that he uncovers and damages the laminae, the need for a specialist/farrier will be required. With today's technology there are ways to fill in and form artificial material and create a partial artificial hoof.

Care of the Shod Hoof

Because the shoe becomes a barrier between the nature and the horse, the hoof care differs greatly from the unshod hoof. The object of shoeing is not only to make the horse perform better and longer at work, but also to minimize the

negative effect that the shoeing has on the foot and the animal in general.

What the horse does not need, he will more than likely not grow. If the stress is more one-sided, the horse will grow the stressed part more than the less stressed part of the hoof. This will create various problems in maintaining a balanced hoof when shoeing.

In his free life the horse would not only grow the stressed part more, but would also wear it off more, keeping the feet in balance and good health. Keep in mind, that it is very important to all horses with irregular hooves to be shod more often than horses with normal hooves. This is very often ignored and causes hoof deformities, offsetting hoof capsules and further threatens the soundness of the horse as well as his longevity. The hoof capsule is not attached to the horse's leg by bones and tendons and it can be easily offset from the original position by improper, irregular, and/or infrequent farrier care.

General Care

As an owner the responsibility becomes yours to provide a well-cared-for hoof for your farrier to work with. It is important to remember that when using the metal hoof pick do not dig so aggressively as to causes damage to the sole. A valuable and most often forgotten part in hoof care is the washing of the hoof, which is important to the hygiene and the general health of the shod hoof. The washing of the hoof two or three times per week is of great importance, especially when it comes to white line decay and abscesses caused by imbedded bacteria. The foot should be scrubbed not only on the bottom but the entire walls all the way to the coronet, as well as the heels. How to treat the hoof after the wash depends just how much moisture is in the hoof and the environment in which the horse is living.

Many of the working horses that are shod are living outside, which makes hoof care more complicated not only by the changes in the environment but also by the irregularities in their movement. On the other hand horses that train (move) regularly (evenly) while living in the stalls (like race horses) have less complications in hoof care.

Moisture

One of the most important factors is the moisture in the hoof (pertinent to blood circulation), especially when it comes directly to the shoe itself, since the shoe cannot expand or contract as the hoof does in reference to the moisture. It is therefore a primary concern to keep steady and even moisture in the hoof, preventing the changes in sizes of the hoof in relevance to the shoe. Even after stabilizing the moisture in the hoof, it does not mean that the moisture problems have been solved.

Too much or too little moisture in the shod hoof will have negative effects depending on the structure of the hoof. Such as, a too moist wide-hoof will spread more. A too dry

contracted hoof will contract more, not to mention that both of these factors will greatly influence the quality of the farrier's work as well as the general health of the hoof.

Horses living outside on dry and hard surfaces need special care for their feet, since the bottom of the hoof does not come in contact with the ground most of the time. The side effects vary, the most common is thrush and in wide footed horses sole protrusion.



Photo: Stablemade Equine Services **Contracted Heel**



Photo: Stablemade Equine Services **Thrush**



Photo: Stablemade Equine Services

If the hoof is shod while too moist, the size of the perimeter of the shoe is bigger since the hoof expanded on account of the water within. As the horse's hoof dries out, the horn will contract as well as the size of the hoof, but the shoe of course will not. This usually results in cracked walls or clinches that are sticking out within a few days after shoeing.

Nailing into the hard foot often causes cracking of the walls, or in the too wet environment the white line (which is covered by the shoe) will tend to rot. Many other problems will occur especially in the case of irregular hoofs, causing tilting to one side, injuries like splints, etcetera. If shod when too dry, the hoof will expand with moisture later, spreading over the shoe. This can place inward stress of the nails against the white line, often resulting in white line decay and possibly abscesses.

Snow and Mud

Keeping the ground muddy near the water source will cause the horses to pack their feet with mud in dry conditions. This will help to keep relatively even moisture in the hoof and will promote the health of the entire hoof. There can be some negative effects, if left uncared for. If there is balling-up with the mud, this puts too much pressure on the horses sole. The sole can then concave and will get too thin, causing the horse to be very sensitive when stepping on rocks.

It is important that the mud is not too deep and only a little of it stays packed in the hoofs. The balling up of the hoofs must be prevented in all cases for horses living outside, whether it is the snow or mud. The concaved sole can often be seen in the spring in these horses, which were not shod properly for the snowy conditions or on account of too much mud in the season. Once the mud stops balling up, the concaved sole will try to repair itself and this will often lead to indentation in the sole (soft spots), which can cause some lameness in horses, especially when the sole comes in contact with the ground.

Removing the Shoe

To be able to nail on a lost or removed shoe is very practical for any horseman, however one's ability to remove a horse-shoe is essential in the care of shod horses. There are many situations that require the removal of the shoe as soon as possible. The farrier cannot always come the same day. In instances where the shoe is bent or twisted it must be removed immediately; if left in such condition, it could cause serious injuries to the horse (e.g. fracture of the coffin bone etcetera). Other reasons that may require the removal of the shoe are hoof abscess, hot nail and similar problems.

Pulling off the shoe is fairly easy, depending on how the shoe is fastened and how long the shoe has been on.

- First you will need to remove the clinches by either cutting them off or by rasping them off. In cases where the shoe has

side clips, or when the shoe has been recently nailed on, it is recommended that you remove each individual nail one by one and not use the pull-offs; this could break up the hoof.

- Do not use the pull-offs where there is some inflammation in the sole of the hoof, usually caused by abscess, hot nail or foreign object penetrations. Remove one nail at a time, using the nail pullers. In such cases the pull-offs will press against the sore sole and horses will tend to react strongly, usually by quickly pulling the leg from you or in case of hind legs possibly kicking.

- Using the nail pullers when removing a shoe in case of a hot nail, will also help identify the nail that caused the injury, since the horse will more likely react strongly at the slightest pull on the nail in question.

- There are some instances when the nail pullers will not work, depending on the condition or type of the nail head or the groove in the shoe. In such cases try to pry off the shoe just a little, then tap the shoe back down and pull the nail that is partially raised above the shoe with the pull-offs. Then simply repeat this process, prying and tapping down the shoe little by little from the heel part toward the toe removing one nail at a time. If the horse's sole is sore, start first on the side that is not sensitive or hurts less.



Photo: Stablemade Equine Services

It is extremely important to not leave the shoes on the equine for longer than the appropriate length of time that the shoe fits properly.



Photo: Stablemade Equine Services

Hoof Abscess

This is a very common illness/injury of the hoof. In principle the sensitive part of the hoof (laminae) is inflamed and infected due to various injuries.

Most common causes.:

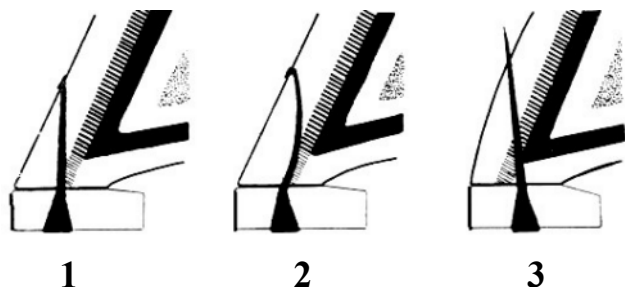
1. Picking the horse's foot too aggressively
2. Various bruises due to an impact that can get infected in a latter stage. Often seen in the winter months on bare footed horses.
3. Excessive pressure to the laminae (usually under the bars) that will die off and in time cause an abscess.
4. Foreign object (stones, dirt, bacteria) working its way through the horny part of the sole or along side, beneath the wall to the sensitive part of the hoof (laminae)
5. Foreign objects penetration such as nails.
6. In some cases, thrush can cause an abscess of the laminae above the frog.
7. Founder
8. Ammonia build up in unclean housing

Treatment:

Treatments will vary based on whether injury location is the laminae or the coronet, the wall, the sole or the frog; also, whether there was a deep penetration to the foot by a foreign object or damage while picking the horse's hoof.

In cases where the abscess is trying to break at the top of the coronet, some authorities do not recommend Butazolidin in the treatment. They believe Bute will reduce the ability of the horse to fight the infection, slowing down the process, and the horse may be lame for several weeks.

Check with your veterinarian or farrier to evaluate the problem and find the best treatment.



In figure 1 you can see proper penetration of a shoe nail through the wall of the hoof. In principle there is a thin layer of the hoof wall between the nail and the sensitive part of the hoof (laminae).

Figure 2 shows an indirect hot nail, where the layer of the wall between the nail and the sensitive part of the hoof is too thin, the nail is pressing against the sensitive part of the foot.

Often in this case horses do not go lame immediately. In some cases they do not go lame at all. Sometimes however, horses can go lame as late as two weeks after shoeing. In this case the sensitive part of the foot gets inflamed and very seldom infected/abscessed.

Figure 3 shows genuine/direct hot nail. In this case the sensitive part of the foot gets directly damaged which can sometimes lead to very serious complications, especially if the treatment is delayed. In most cases this kind of injury causes infection/abscess and must be treated immediately to prevent these complications.

Most common causes:

- Improper placement of the channel or a groove in the shoe. This was most common in the old days, when farriers made their own shoes. However, there are on the market these days shoes with the same faults, mainly the "wide web" shoes, where the groove is too far inward from the outer edge of the shoe.
- Incorrectly made nail holes in the shoe. Most common when farriers make their own shoes.
- Improper trimming of the foot, especially by removing large amounts of the hoof wall, as you can see in figure 3, where the shoe is set too far back and the foot then filed even with the shoe.
- Bad condition of the foot like: too thin walls, crumbling walls or too hard hoof for the farrier to work on.
- Lack of experience and expertise of the farrier.
- Badly behaving horse when being shod.

Hoof Testers

The hoof tester is a very practical gadget that allows examination of the hoof for sensitivity and pain. Because it can help to diagnose various forms of lameness associated with the hoof, it will help to make proper decisions in what to do for the horse or whether or not to call the veterinarian. In the latter case the hoof testers can save you a lot of money, usually paying for themselves in the first use.

The hoof testers can help diagnose bruised sole, sore heels, evaluate foundered hoof, locate hoof abscess (not always conclusive) and identify hot nail

In the case of navicular, the hoof testers are not conclusive but can be helpful in the diagnosis. For deep abscess, the horse may not respond to the hoof testers.

Use the hoof testers on the healthy hoof first. Some horses will respond as if in pain just to the unfamiliar feeling of the hoof testers' pressure. Once the horse gets familiar with what is being done, test the foot in question (sore leg). This will give a better idea about the horse's response to the hoof testers and you will be less likely to misdiagnose the lameness.

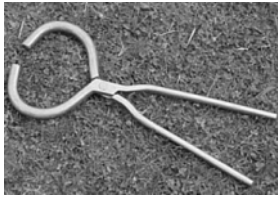


Photo: Stablemade Equine Services

If you are not familiar with how to use the hoof testers or how to hold the leg properly, it is best to have someone else hold the leg for you. Please, exercise caution as in some cases of severe pain, like for example in case of hot nail, the horse can respond by kicking or in the case of front legs by striking. When testing the front leg, especially on a young colt (yearling or two-year old male horse), the person holding the horse should stand well to the side, as these young boys have a greater tendency to strike.

* * * * *

Restraining Equines

Equines can kick and bite and there are several different ways to control these animals to examine, treat or shoe them.

The most effective form of control over equines is to start working with them at a very young age, having them halter broke and leading easily. Grooming and picking up their feet on a regular basis will get them comfortable with being handled. Unsuccessful attempts are positive rewards for bad behavior that rapidly become a learned skill. Training young animals is much easier because of their smaller size and what you start you can finish, making it easier to do the next time.

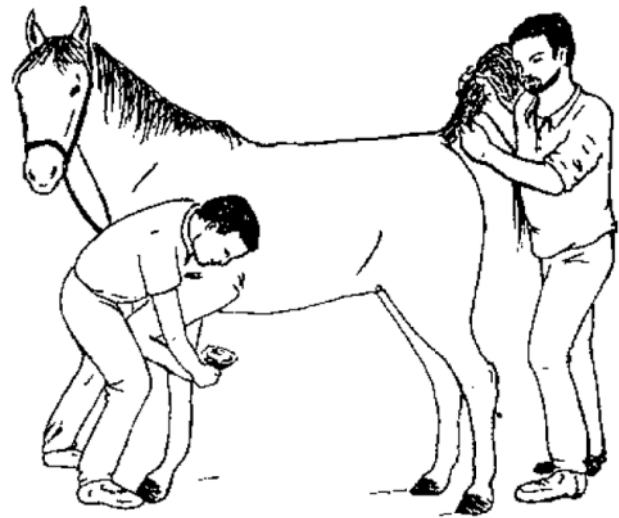
When this has not been done and your equine now needs health care and farrier attention it most likely will be necessary to use more aggressive forms of restraint for the safety of the animal and the caregiver.

Do Not:

Never twist an equine's ears! Twisting of the ear is very painful and can cause damage. It will make the animal head-shy and difficult to work with in the future.

Holding up a front leg is a passive form of restraint. It can be effective for some equines to stop them from moving or kicking. It will be necessary to restrain the animal's head. However, if the horse frees its front leg it can then easily kick.

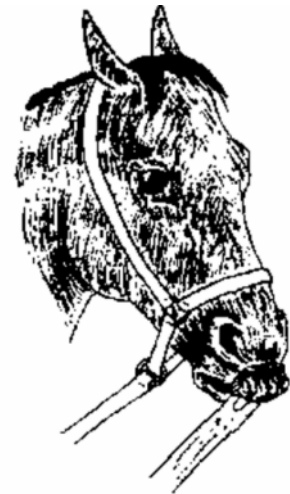
This is not a safe form of restraint for a mule. They can kick standing on two legs and have been known to be able to kick the person holding the front leg while doing so. Mules can also kick sideways.



The twitch is a simple tool used to control an equine. Twitching can sometimes be accomplished by pinching and the twisting of fingers if the hands are strong enough.



Twitch



Hobbling

A set of hobbles consists of four straps each of which has a metal ring attached to it. A rope is passed through the rings. Pulling the rope will make the animal fall and when it is down the head should be held down to keep it down. An animal is hobbled in order for it to be examined or castrated.

Hobbling the back legs only is done to the mare when she is mated to a valuable stallion.

Covering the animal's head (blindfolding)

Putting a blanket, coat or sack over both the eyes will calm an animal and make it easier to restrain.

Summary

When treatment is required the safety of the professional care giver comes first. They will take whatever methods necessary to protect the animal and themselves from injury.

* * * * *

Exhaustion and Overheating

Being able to identify and assist an exhausted horse or other types of equines--as well as knowing how to prevent the condition--might save your horse or the horse of a friend or competitor.

A horse asked to perform strenuous exercise often is pushed to the limits of his body's mechanisms to recover. In most cases, these mechanisms allow the horse to finish the exercise with no problem. Sometimes, however, the horse's ability to recover is inadequate, putting the horse into a shock-like state. This means that more than one organ--such as the muscles, kidneys, central nervous system, or clotting system--might stop functioning properly. Without prompt veterinary care, the horse might die.

Examples of exercise that can lead to exhaustion include endurance and competitive trail rides, three-day events, and foxhunting. The chances of overworking a horse increase when any of the following conditions exist:

- * heat and humidity
- * poor fitness
- * high altitude
- * rough or steep terrain
- * rider inexperience
- * the horse has the inability to sweat
- * presence of another disease or lameness

An exhausted horse typically is distressed and anxious. He might have a high heart and respiratory rate that does not decrease with rest, and his skin might feel hot and dry. Signs of shock include pale, dry mucous membranes; increased capillary refill time; increased jugular vein fill time; a weak, irregular pulse; and no gut sounds. Some horses become stiff and experience pain due to muscle cell damage, which can be detected by observing red urine or by running specific blood tests. Horses affected this badly might go down or develop other, often life-threatening conditions such as laminitis, kidney failure, or diarrhea. A badly affected horse also might appear wobbly or demented.

Horses with any of these signs must be treated right away. While waiting for the veterinarian to arrive, the horse should be moved slowly to a cool, shady area, if possible. Strong efforts should be made to lower the rectal temperature below 100.5 degrees Fahrenheit. The best remedy is whole-body ice water rinses in front of fans, or simply repeated rinsing/scraping cycles. In the past, riders were cautioned against applying cold water to the muscles of overheated horses because it could make the condition worse. However, research has shown that this method

quickly and safely reduces the horse's core temperature, protecting him from serious illness.

Once the veterinarian arrives, he or she will decide the right type, amount, and method of fluids to be given based on the horse's condition, the type of exercise, and the response to treatment. Medications might be given to relieve pain and improve proper metabolism. Ideally, the horse should not be transported for 48 hours.

Prevention:

Based on the conditions listed above, there are a number of ways to help prevent exhaustion in the horse. For example, horses should be thoroughly prepared on the same type of terrain over which the event will be held. If the event involves transporting them to a hot, humid climate (the 1996 Atlanta Olympics is a good example), they should be given at least three weeks to get used to the conditions in the new location.

The commonly used method of "salt-loading" a horse for several days before a competition probably offers no advantages. However, your veterinarian might recommend a specific electrolyte paste, top-dress, or mixture be added to a second bucket of water just before and during exercise to protect against electrolyte losses. Horses should have free-choice access to water (and roughage) during training, before the event, and at each rest stop, if this applies to your sport. It generally is accepted that horses (and humans) do not voluntarily drink enough water or take in enough electrolytes to completely prevent dehydration. Therefore, every effort should be made to replace fluid and electrolyte losses during the overnight portion of events.

Also, it probably is wise to avoid feeding a large concentrate meal before a competition. Instead, small amounts (one to two pounds) of concentrate can be fed one to two hours before the event, and at each rest stop (if this applies to your sport). In events that span more than one day, these small amounts of concentrate should be fed every few hours until competition begins again.

Consult your veterinarian for other ways to bring your horse home from your particular competition in the best physical condition.

* * * * *

Body Condition Evaluation

When it comes to a horse's ideal body condition, beauty is often in the eye of the beholder. For example, a competitive endurance horse is usually leaner than a show-fit horse.

Because “fitness” is subjective, equine health care professionals utilize a “Body Condition Scoring” system to talk in relative terms. The horse’s physical condition is rated on visual appraisal and palpation (feel) of six key conformation points.

Healthy Weight

The weight of your equine is an excellent indicator for evaluating your management program and making the necessary changes for its good health. *Regardless of age, thin and/or fat are unhealthy conditions.* By using the combination of a weighttape and the body scoring system you will be able to monitor the health of your equine.

For most horses, body condition scores in the “Moderate” to Moderately Fleishy” range, (scores of 5 or 6) are ideal. However, keep in mind that the job of your particular athlete also has a bearing on what weight is appropriate for maximum performance. Polo, race and endurance horses might be perfectly fit with body condition scores of 4 (moderately thin), while a body condition score of 7 (fleshy) may be required for success in the show ring. However, by feeding a horse to a level of 8, you are starting to push the limits of good health. Horses with scores of 8 or 9 are definite candidates for a weight reduction plan.

How to use the scoring system:

1. Six parts of a horse are checked in this system—the neck, withers (where the neck ends and the back begins), shoulder, ribs, loin, and tailhead. When using the Henneke system, you should always make physical contact with these parts. It is possible to be firm and gentle at the same time, and both traits are necessary to properly score a horse and the kind of touch you use is important.

The pressure you apply should be much like that of a massage. When you press a horse's side with your hand you will be able to feel the fat covering his ribs and get an idea of how much fat is present. When checking the withers, feel all around the area, as if you were squeezing firm clay.

2. After pressing each part of the horse with your hands to feel for body fat, you then assign each area of the body the numerical score of 1 through 9 from the scoring chart that corresponds with the horse's condition.

When a horse has a long haircoat it is imperative that you use your hands to feel the horse. The horse's long haircoat will hide the protrusion of bones, all except in the most extreme cases.

3. Conformation changes in pregnant mares as they approach parturition (birth). Since the weight of the conceptus tends to pull the skin and musculature tighter over the back and ribs, emphasis is placed upon fat deposition behind the shoulder, around the tailhead and along the neck and withers in these cases.

Conformational differences between horses may make cer-

tain criteria within each score difficult to apply to every animal. In these instances, those areas influenced by conformation should be discounted, but not ignored when determining the condition score.

5. The scores from each area are then totaled and divided by 6 thus giving the final body condition score (BCS).

Condition Scores

Equine veterinarians consider a body score of between 4 and 7 as acceptable; 5 is considered ideal.

Score of 1-Poor: The horse is emaciated. The spinous processes (backbone), ribs, and hooks and pins, all project prominently. The bone structures of the withers, shoulders and neck are easily noticeable and no fat can be felt anywhere.



Photo: Bright Futures Farm - Spartansburg, PA

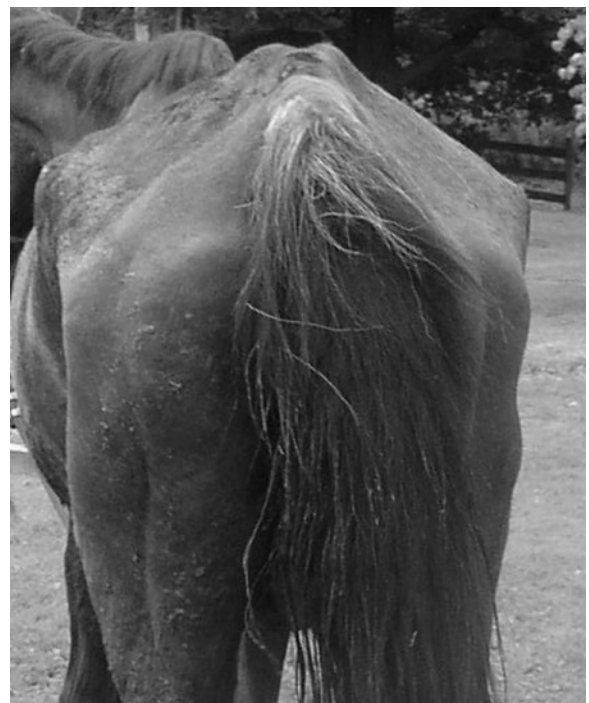


Photo: Bright Futures Farm - Spartansburg, PA



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA

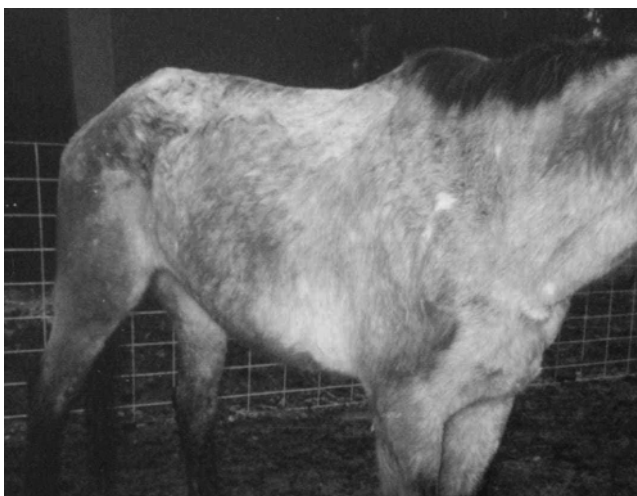


Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA

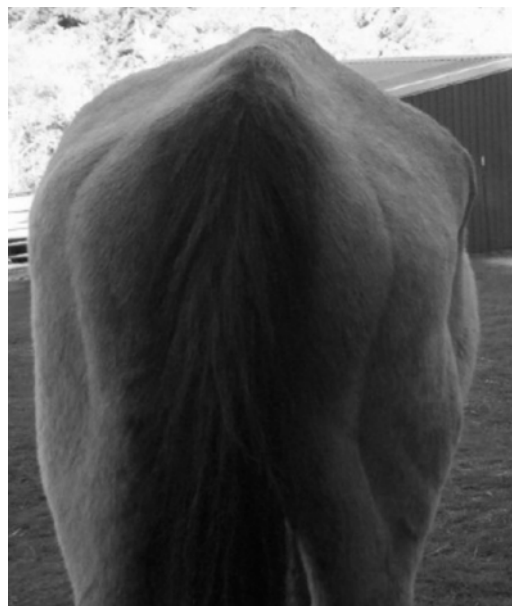
Score of 2-Very Thin: The spinous processes are prominent. The ribs, tailhead and pelvic bones stand out: bone structures of the withers, neck and shoulders are faintly discernable.



Photo: Bright Futures Farm - Spartansburg, PA



Spirit on 10--06



Spirit on 10--06



Spirit on 10-28-06



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Photo: Bright Futures Farm - Spartansburg, PA

Score of 3-Thin: The spinous processes stand out, but fat covers them to midpoint. Very slight fat cover can be felt over the ribs, but the spinous processes and ribs are easily discernible. The tailhead is prominent, but individual vertebrae cannot be seen. Hook bones are visible, but appear rounded. Pin bones cannot be seen. The withers, shoulders and neck are accentuated.



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Spirit 11-14-07



Spirit 11-14-07



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA

Score of 4-Moderately Thin: The horse has a negative crease along its back, and the outline of the ribs can just be seen. Fat can be felt around the tailhead. The hook bones cannot be seen; and the withers, neck and shoulders do not look obviously thin.



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Spirit 2-10



Spirit 2-10



Score of 5-Moderate: The back is level. Ribs cannot be seen, but can be easily felt. Fat around the tailhead feels spongy. The withers look rounded, and the shoulder and neck blend smoothly into the body.



Spitit 2-10-07



Spirit

Score of 6-Moderately Fleshy: There may be a slight crease down the back. Fat around the tailhead feels soft, and fat over the ribs feels spongy. There are small deposits along the sides of the withers, behind the shoulders, and along the sides of the neck..

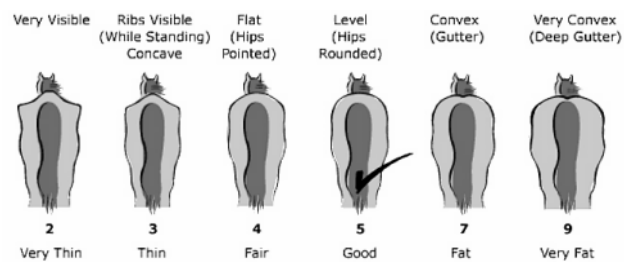


Spitit 2-10-07





Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Score of 7-Fleshy: There may be a crease down the back. Individual ribs can be felt, but there is noticeable fat between the ribs. Fat around the tailhead is soft. Fat is noticeable in the withers, the neck and behind the shoulders.



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA

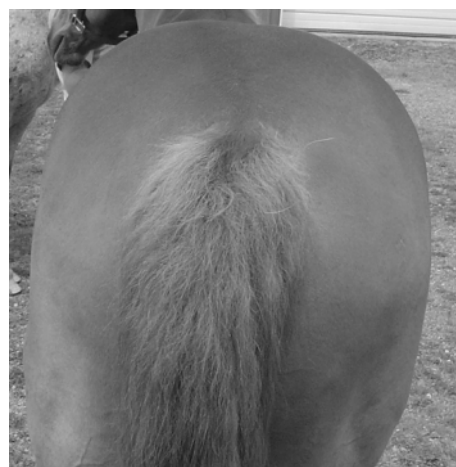
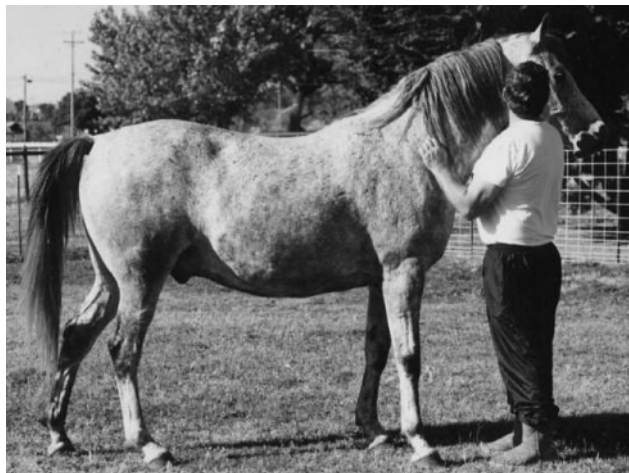


Photo: New Beginnings Horse Rescue and Rehabilitation - Camano Island, WA



Score of 8-Fat: The horse has a crease down the back. Spaces between ribs are so filled with fat that the ribs are difficult to feel. The area along the withers is filled with fat, and fat around the tailhead feels very soft. The space behind the shoulders is filled in flush, and some fat is deposited along the inner buttocks.



Score of 9-Extremely Fat: The crease down the back is very obvious. Fat appears in patches over the ribs; and there is bulging fat around the tailhead, withers, shoulders and neck. Fat along the inner buttocks may cause buttocks to rub together, and the flank is filled in flush.



Photo: New Beginnings Horse Rescue & Rehabilitation - Camano Island, WA



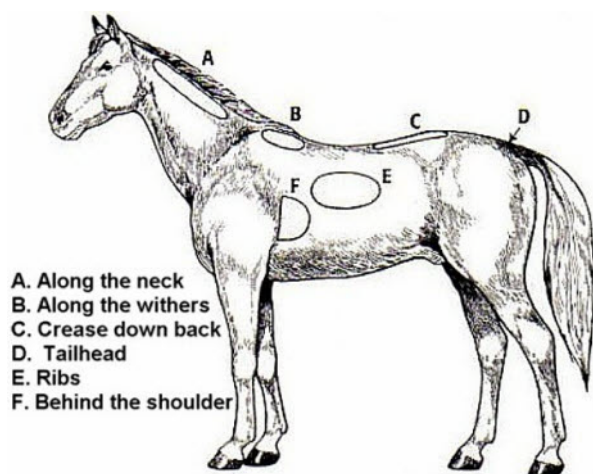
Photo: New Beginnings Horse Rescue & Rehabilitation - Camano Island, WA



Photo: AAEP

Condition	A-Neck	B-Withers	C-Back/Loin	D-Tailhead	E-Ribs	F-Shoulder
1 Poor	No fat tissue, bony Extremely emaciated	No fat tissue, bony, sharp	Sharp, bony over spinous processes	Projects prominently	Project prominently	Skeletal structure is prominent
2 Very Thin	Faintly Discernible Emaciated Animal	Faintly discernible	Transverse Processes are rounded, Spinous processes prominent	Projects prominently	Ribs are prominent	Faintly discernible
3 Thin	Neck is accentuated	Accentuated	Processes are prominent with slight covering	Prominent, hip rounded, but dis- cernible	Easily seen & felt, ribs have slight cover	Easily seen & felt, ribs have slight cover
4 Mod. Thin	Neck is thin, but not obviously so	Not obviously thin	Not obviously thin	Some fat may be felt	Faint outline dis- cernible	Not obviously thin
5 Moderate	Neck blends smoothly into body	Rounded, not sharp	Level, no + or- crease	Fat starting to feel spongy	Cannot be seen, but are easily felt	Blends smoothly into body
6 Mod. Fleishy	Neck blends into body, has mini- mal thickening	Rounded with some thickening	Level to slight crease	Fat covers area, fat starting to feel soft	Spongy fat, ribs can be felt	Fat starting to fill area behind shoulder
7 Fleishy	Slight thickening	Noticeable thickening	Positive crease likely	Well-covered & soft	Noticeable fill between ribs, smooth feel	Definite fullness behind shoulder
8 Fat	Crest present	Thick cover, well rounded	Positive crease	Fat very soft	Thick cover, difficult to feel	Thick cover, difficult to feel
9 Ext. Fat	Bulging fat, crest present	Thick cover, well rounded	Obvious positive crease along top	Well-covered rounded	Patchy fat, thick cover	Well-rounded, thick cover

* * * * *



Emergency Care Guidelines

See illustration) **A** -the amount of flesh or fat covering along the neck, **B** -the withers, **C** -down the creases in the back, **D** -at the tailhead, **E** -ribs, **F** -and behind the shoulder at the girth. Scores range from 1-9, from “poor” to “extremely fat.”

How to use chart:

Each area A - F is given a 1 to 9 score then is divided by 6 to find body score

If you own horses long enough, sooner or later you are likely to confront a medical emergency. There are several behavioral traits that make horses especially accident-prone: one is their instinctive flight-or-fight response; another is their dominance hierarchy - the need to establish the pecking order within a herd; and a third is their natural curiosity. Such behaviors account for many of the cuts, bruises, and abrasions, that horses suffer. In fact, lacerations are probably the most common emergency with which horse owners must contend. There are other types of emergencies as well, such as colic, foaling difficulties, acute lameness, seizures and illness. As a horse owner, you must know how to recognize serious problems, respond promptly and take appropriate action while awaiting the arrival of

your veterinarian.

Proud Flesh

Treating minor wounds will avoid more serious issues developing later.

When granulation tissue grows out and protrudes from the wound, then the granulation tissue is known as proud flesh. Granulation tissue is the pebbly or granular appearing tissue which develops in healing wounds anywhere on an equine's body and is a very important and necessary part of wound healing. Prevention of proud flesh involves good wound management. Any significant wound should be evaluated and treated by a veterinarian as soon as possible.

Proud flesh can take over with the granulation tissue becoming so large it appears to be a tumor, usually obliterating the original wound. Granulation tissue in this form can be very difficult to manage. The treatment of wounds that have developed exuberant granulation tissue usually depends on the extent of the overgrowth. Mild overgrowth of tissue--just protruding above the surface of the wound--might require only steroid ointment applied directly to the granulation tissue to inhibit the growth, then bandaging of the wound to prevent further growth. Moderate to severe overgrowth of granulation tissue requires surgery to remove the excessive tissue.



Photo: Second Chance Ranch, Elma, WA

This wound area of proud flesh had also been invaded by maggots

Proper and timely management is crucial especially for wounds on the lower limbs. Wounds on the lower legs are contaminated easily with bacteria since the wounds are closer to the ground, bedding, and manure. Also, the constant movement of the horse's legs as he walks, turns, and bears weight can greatly impair healing, especially if the wound occurs over a joint. Therefore, when wounds occur in these areas, steps need to be taken immediately to prevent proud flesh.

Bandaging is very important in the prevention of proud flesh (exuberant granulation tissue) and helps prevent bacteria from contaminating the wound. It also helps maintain a healthy environment and helps reduce motion of the tissue, optimizing wound healing. The wound is covered

with a non-stick pad and some type of conforming gauze bandage and depending on the wound location, it is followed by a thick cotton bandage and an elastic bandage to prevent contamination of the wound from bedding and dirt. The pressure from the bandage helps prevent the granulation tissue from becoming exuberant.

Recognizing signs of Distress:

When a horse is cut or bleeding, it is obvious there is a problem. But in cases of colic, illness or a more subtle injury, it may not be as apparent. That is why it is important to know your horse's normal vital signs, including temperature, pulse and respiration (TPR), as well as its normal behavior patterns. You must be a good observer so that you readily recognize signs of ill health.

What is Normal?

There will be individual variations in temperature, pulse and respiration values. Take several baseline measurements when the horse is healthy, rested, and relaxed. Write them down and keep them within easy reach, perhaps with your first aid kit, so you can compare to them in case of an emergency. Normal ranges for adult horses are:

- Pulse rate: 30-42 beats per minute.
- Respiratory rate: 12-20 breaths per minute.
- Rectal temperature: 99.5° to 101.5° F. If the horse's temperature exceeds 102.5° F, contact your veterinarian immediately. Temperatures of over 103° F indicate a serious disorder.
- Capillary refill time (time it takes for color to return to gum tissue adjacent to teeth after pressing and releasing with your thumb): 2 seconds or less.

Other observations you should note:

- Skin pliability is tested by pinching or folding a flap of neck skin and releasing. It should immediately snap back into place. Failure to do so is evidence of dehydration.
- Color of the mucous membranes of gums, nostrils, conjunctiva (inner eye tissue), and inner lips of vulva should be pink. Bright red, pale pink to white, or bluish-purple coloring may indicate problems.
- Color, consistency, and volume of feces and urine should be typical of that individual's usual excretions. Straining or failure to excrete should be noted.
- Signs of distress, anxiety or discomfort.
- Lethargy, depression or a horse that's "off-feed"
- Presence or absence of gut sounds.
- Evidence of lameness, such as head-bobbing. Reluctance to move, odd stance, pain, unwillingness to rise.
- Bleeding, swelling, evidence of pain.
- Seizures, paralysis or "tying up" (form of muscle cramps that ranges in severity from mild stiffness to life-threatening illness).

Action Plan:

No matter what emergency you may face in the future, mentally rehearse the steps you will take to avoid letting panic take control. Here are some guidelines to help you prepare:

1. Keep your veterinarian's number by each phone, including how the practitioner can be reached after-hours. If you have a speed-dial system, key it in, but also keep the number posted.
2. Consult with your regular veterinarian regarding back-up or referring veterinarian's number in case you cannot reach your regular veterinarian quickly enough.
3. Know in advance the most direct route to an equine surgery center in case you need to transport the horse.
4. Post the names and phone numbers of nearby friends and neighbors who can assist you in an emergency while you wait for the veterinarian.
5. Prepare a first aid kit and store it in a clean, dry, readily accessible place. Make sure that family members and other barn users know where the kit is kept.
6. Also keep a first aid kit in your horse trailer or towing vehicle, and a pared-down version to carry on the trail.

First Aid Kits:

First aid kits can be simple or elaborate, but there are some essential items. Here is a short list to get yours started. (*materials that should be sterile.)

- *Cotton roll
- *Contact bandage
- *Cling wrap
- *Gauze pads, assorted sizes
- *Gauze wraps
- Antibiotic ointment
- Adhesive wrap and adhesive tape
- Leg wraps
- Sharp scissors
- Hemostats (A clamp-like instrument used to compress a blood vessel in order to reduce or arrest the flow of blood)
- Steel cup or container
- Rectal thermometer with string and clip attached
- Stethoscope (an instrument used to convey sounds in the chest or other parts of the body to the ear)
- Surgical scrub and antiseptic solution
- Latex gloves
- Flashlight and spare batteries
- Permanent marker pen
- Pliers (to pull nails)

Emergency Wound Care:

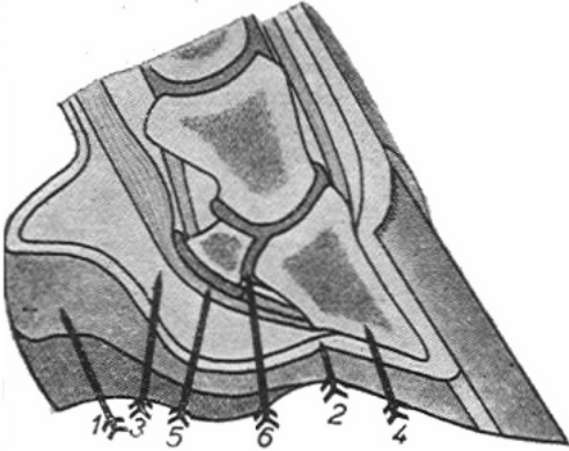
The sight of blood may unnerve you, but maintaining your presence of mind can save your horse's life. The initial steps you take to treat a wound can prevent further damage and speed healing. How you proceed will depend on your individual circumstances, and you must exercise good judgment. The following should be viewed as guidelines:

1. Catch and calm the horse to prevent further injury. Move the horse to a stall or other familiar surroundings, if this is possible without causing distress or further injury to the horse. Providing hay or grain can also be a good distraction.
2. Get help before attempting to treat or evaluate a wound. It can be difficult and very dangerous to try to inspect or clean the wound without someone to hold the horse. You cannot help your horse if you are seriously injured yourself.
3. Evaluate the location, depth and severity of the wound. Call your veterinarian for a recommendation anytime you feel your horse is in need of emergency care. Here are some examples of situations where your veterinarian should be called:
 - A. There appears to be excessive bleeding.
 - B. The entire skin thickness has been penetrated.
 - C. The wound occurs near or over a joint.
 - D. Any structures underlying the skin are visible.
 - E. A puncture has occurred.
 - F. A severe wound has occurred in the lower leg at or below knee or hock level.
 - G. The wound is severely contaminated.
4. Consult your veterinarian for a recommendation before you attempt to clean the wound or remove debris or penetrating objects, as you may precipitate uncontrollable bleeding or do further damage to the wound. Large, penetrating, foreign objects should be stabilized to avoid damaging movement, if possible. Don't put anything on the wound except a compress or cold water.
5. Stop the bleeding by covering the wound with a sterile, absorbent pad (not cotton), applying firm, steady, even pressure to the wound.
6. Do not medicate or tranquilize the horse unless specifically directed by your veterinarian. If the horse has suffered severe blood loss or shock, the administration of certain drugs can be life-threatening.
7. If the eye is injured, do not attempt to treat. Await your veterinarian.
8. If a horse steps on a nail or other sharp object and it remains embedded in the hoof, first clean the hoof. Consult your veterinarian for a recommendation before you remove the nail. If your veterinarian advises, carefully remove the nail to prevent the horse from stepping on it and driving it deeper into the hoof cavity. As you remove it, be sure to mark the exact point and depth of entry with tape and/or a marker so the veterinarian can assess the extent of damage.

Apply antiseptic to the wound, and wrap to prevent additional contamination.

9. All horses being treated for lacerations or puncture wounds will require a tetanus booster if they have not been vaccinated within 6 months.

In case of deep penetration of a nail or similar object, it may be necessary to have the foot x-rayed by a veterinarian prior to removing the object (if circumstances allow). Some of the penetration (mainly 6, 5 & 4) will require special antibiotic treatment. These injuries should not be taken lightly and a veterinarian's presence and assistance is a definite must in all these cases.



This picture shows various possibilities of penetration of nails or other sharp object. It also helps to evaluate the seriousness of these injuries.

Summary

Many accidents can be prevented by taking the time to evaluate your horse's environment and removing potential hazards. Also, assess your management routines to make them safer. Mentally rehearse your emergency action plan. Preparation will help you stay calm in the event of a real emergency. Keep your veterinarian's phone number and your first aid kit handy. In an emergency, time is critical. Don't be concerned with overreacting or annoying your veterinarian. By acting quickly and promptly, you can minimize the consequences of an injury or illness. Your horse's health and well-being depend on it.



Photo: Second Chance Ranch, Elma, WA
Untreated abscesses, most likely from an injury, resulted in an ulcerated fetlock and a bone infection.



Photo: Second Chance Ranch, Elma, WA
A broken knee that was not set or treated and developed crippling arthritis

* * * * *

Euthanasia

Guidance for a Difficult Decision:

Difficult though it may be to contemplate, there may come a time when, for humane or other reasons, you need to consider euthanasia for your equine. Choosing whether, or when, to end a beloved animal's life may be the hardest decision you ever have to make regarding your equine's welfare. However, it may be one of the most responsible and compassionate things you can do for your friend.

The decision to euthanize, or induce a painless death, should never be made without careful consideration. The right choice is clearly the one that is in the best interest of the equine.

Consider the Situation:

There is a wide range of circumstances under which euthanasia is a reasonable and responsible choice. Among the most common are these:

- Incurable, progressive disease
- Incurable, transmittible disease
- Chronic, severe lameness
- Inoperable colic
- Foals born with serious defects
- Debilitation in old age
- Severe traumatic injury
- Dangerous behavioral traits
- Undue financial burden of caring for a sick or incapacitated horse (equine)

- Undue suffering for any reason

Every case is unique. Even in similar situations, the decision to euthanize is highly individual. For example, in the case of a severe traumatic injury, such as a broken leg, the animal's psychological makeup can influence the outcome. Some horses may respond better to treatment than others; some are more co-operative than others; and some have higher pain tolerance than others.

- Euthanasia is often a highly emotional issue. Yet it is important to address the situation from a practical standpoint as well. Whether you are dealing with an emergency or a long-term illness, discuss the following questions with your veterinarian to help you decide what is right for your horse: What is the likelihood of recovery or at least a return to pasture soundness or some level of usefulness?

- Is the horse suffering?
- Does the horse continue to show an interest and desire to live, or has it become depressed or despondent?
- What kind of special care will the horse require, and can you meet its needs?
- Can you continue to provide for the horse financially?
- What are your alternatives?

AAEP Guidelines:

The American Association of Equine Practitioners (AAEP) has developed euthanasia guidelines to help your veterinarian assist you during this very difficult time. The AAEP's standards apply to all horses, regardless of their monetary value, and are designed to avoid or terminate incurable and excessive suffering. Included in the guidelines are the following test statements:

- Is the condition chronic or incurable?
- Does the immediate condition suggest a hopeless prognosis for life?
- Is the horse a hazard to himself or his handlers?
- Will the horse require continuous medication for the relief of pain for the remainder of its life?

The Veterinarian's Role:

As the horse's owner, you ultimately have the responsibility for determining your horse's fate. Your veterinarian can provide you with medical information and help you fully understand the implications for the horse's future. Your veterinarian can also explain the options, and offer comfort and support. But your veterinarian **cannot** make the decision for you. If you are in doubt about the prognosis or your options, get a second opinion. It is important for your peace of mind that you feel sure you are making the right decision.

In extreme emergencies a veterinarian may assume the responsibility for this decision, acting on an animal's behalf without its owner's consent. An example of such a situation is a horse that gets loose on a roadway and is struck by a car

and severely injured. In this situation, the attending veterinarian may decide to euthanize the horse immediately to end its suffering. But such cases are rare.

Equine practitioners are frequently asked, "What would **you** do in this situation?" This question puts the veterinarian in a difficult position. No matter how compassionate and caring, your veterinarian is not as attached to the horse as you are, nor will he/she have to assume the emotional or financial responsibility of caring for the horse. Some veterinarians will feel comfortable answering such a question; others will not.

Remember, too, that a veterinarian must follow his or her conscience. A veterinarian may refuse to euthanize an animal if euthanasia seems unnecessary or unjustified. Or the veterinarian may choose to discontinue treatment if an owner is inhumanely allowing an animal to suffer or is unduly prolonging its death.



Planning & Preparation:

If you and your veterinarian agree that euthanasia is the best choice, it is important to prepare as best you can. If you are able to make the decision in advance rather than in an emergency situation, making prior arrangements will ease the process. These guidelines might help:

- Decide when and where the procedure will be best carried out, bearing in mind that arrangements must be made for the removal of the body. Choose what is most comfortable and practical for you, your veterinarian and your horse.
- If you board your horse, inform the stable manager of the situation.
- Decide whether you wish to be present during the procedure. If you cannot or do not wish to be present, you may want to ask a friend to stand in for you. (If you are unfam-

miliar with the procedure and are unsure what to expect, discuss it with your veterinarian.)

- Be aware that for safety reasons your veterinarian may not allow you to be touching or holding the horse during the procedure. You will, however, be able to touch and be with your horse afterward.
- Make arrangements *in advance* for prompt removal and disposal of the body. Check with your veterinarian and/or the city or county health department. Many municipalities have ordinances prohibiting or restricting burial. Removal to a rendering facility or pet crematory may be required.
- Explain to members of your family, especially children, in sensitive but honest terms, why the decision was made to euthanize the horse.
- Allow yourself to grieve. Finding a support person to talk with can help you work through this difficult period. Pet Loss Support Hotline 530-752-4200
- If the horse is insured, notify the insurance company in advance so that there are no problems with claims. While the veterinarian will provide you with any required documentation, the rest (notification, filing, follow-up, etc.) is your responsibility.

One note about terminology: “Put down” and “put to sleep” are terms for euthanasia commonly used by horse owners, and even by veterinarians when talking with horse owners. However, it is important to realize that these terms can mean different things to different people. For example, “put to sleep” may also mean to induce general anesthesia (render the horse unconscious for a surgical procedure from which the horse will recover, or wake up). Be sure your meaning is clear whenever you use these terms.

A Peaceful End:

As a caring owner, you want your horse to have a peaceful, painless end. Most commonly, euthanasia is achieved by injecting a barbiturate anesthetic in a dose sufficient to shut down the horse’s central nervous system. The drug renders the horse unconscious, the horse’s heart stops and the horse quits breathing. These drugs act quickly and effectively.

If you plan to be present when the lethal injection is given, keep in mind that not all horses respond in exactly the same way. Most horses simply drop and lay still, maybe taking one or two deep breaths before expiring. Some horses continue to take occasional breaths for a minute or so, and there may also be some movement of the limbs, even though the horse is deeply unconscious and may no longer have a heart beat. Seeing these apparent signs of life can be upsetting for some owners. But remember that they do not indicate that the horse is conscious or has any sense of feeling; they are simply involuntary reflexes by the body in its final moments.

Some veterinarians prefer to use a gun or captive-bolt pistol to perform euthanasia. Many owners recoil at the idea of

this method of euthanasia because of the perception of violence often associated with the use of guns. However, when properly carried out, this method of euthanasia is instantaneous and is as humane as lethal injection.

Coping with Emotions:

Given the affection we have for our horses, dealing with their deaths can be extremely difficult. But dealing with your emotions honestly and going through the grieving process is important for your emotional well-being.

To help you deal with your grief, there are local and national counseling organizations, such as the University of California, Davis, School of Veterinary Medicine’s Pet Loss Support Hotline, 530-752-4200. Your veterinarian may also know of resources in your area that can help you, so don’t be afraid to ask.

Insurance Considerations:

If your horse is insured, become familiar with the regulations concerning your policy - including the fine print - before you act. Most insurance carriers require that they be kept fully informed from the beginning about a horse’s medical condition, especially if death or euthanasia is a potential outcome. Even in an emergency, a reasonable attempt should be made to notify the insurance company. This notification is the owner’s responsibility. If the animal can be stabilized, many policies require a second opinion before a horse is euthanized. However, under extreme circumstances, it is always up to the discretion of the owner and the veterinarian to act in the best interest of the horse. Being aware of your policy’s guidelines can minimize any unpleasant surprises relating to your claim.

Thinking Ahead

Death is an inevitable part of life. Your horse, like all living creatures, will not live forever. Ideally, your horse will remain healthy and happy into old age and will die a peaceful, natural death. However, it is wise to give some thought to other possibilities.

By thinking about what you would do in an emergency, or how you would act if your horse were to develop a painful or debilitating condition from which recovery is unlikely, you can be prepared for whatever happens. Be sure to share your thoughts and wishes on this issue with others, especially those who may be caring for your horse in your absence, such as your barn manager or neighbor, and your veterinarian. Doing so may spare your horse needless suffering if a severe illness or injury were to occur when you could not be contacted.

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Summary

Bringing an equine into one's life is an exciting time and, for many, a long-time dream come true. Regardless of whether it is a donkey, burro, mule or horse they are compelling creatures; stimulating the imagination and representing personal achievement. The reasons for owning horses/equines are as varied as the breeds themselves. The one constant in today's society is no one needs a horse as was the case in our historical past. By making the choice to have these marvelous creatures in your life, you are also making the commitment to give them the care they need for a healthy and safe life.

As soon as you become an owner, the responsibility is yours to provide a management program where they will thrive. Along with this is the daily care and the need to understand the importance of health care maintenance. A good management schedule not only removes some of the unnecessary problems that will occur but will save the owner money. Health situations beyond your control, will also become your financial responsibility.

Being prepared to address whatever comes your way is the key. Having one or two qualified farriers you can contact as needed and being familiar with veterinarians in your area that you can work with is essential. Be ready to make decisions regarding the future of your animals if there is a sudden change in your circumstances such as a loss of a job, medical problems or other situations that make it no longer feasible for you to care for them properly.

They have no choice. They have no voice. You are their future.



A photograph of a horse and foal in a field. The horse is a reddish-brown color and is lying down on the grass. The foal is a lighter color and is also lying down. They are in a green field with trees in the background. In the foreground, there are pink flowers on the left and a tree branch on the right.

It is a privilege to have a horse in your life.

It is in your hands,

for each to have a long and healthy life.