Preventative Health Care for the Horse

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Disease control strategies

Control of disease in your horse requires a combination of good management, proper vaccination schemes and a good working relationship with your veterinarian. There are three factors that impact the development of a preventive health care program: horse factors, location factors and owner factors.

1. ***Horse factors***: number/population density, age, type and use of horses, and value of horses.
2. ***Location factors***: facilities, climate, endemic disease, and population fluxes.
3. ***Owner factors***: cost of prevention vs. cost of disease, likelihood of disease, potential zoonoses (spread of disease from animals to humans), and management style.

Management factors that may influence disease on your farm include:
nutrition, isolation of new arrivals (very important), stable and pasture design, stable and pasture hygiene, pasture management, routine screening tests for some diseases.

The ***vaccination schedule*** you choose for your horses will depend on:
age of horse(s), efficacy of available vaccines, likelihood of disease exposure and cost of vaccine vs. cost of disease.

Timely vaccination of your horse is important for proper health and performance. In North Carolina horses should be vaccinated for the following:

Vaccination strategies

Tetanus: This is caused by a bacteria that lives in the soil. Horses should be vaccinated every year with tetanus toxoid vaccine. Do not administer tetanus ***antitoxin*** to your horse without first consulting your veterinarian. This vaccine may cause an allergic reaction of the horse's liver which can be fatal. Consult your veterinarian before administering this injection.

Influenza (Flu): This is a virus that can cause fever, cough and nasal discharge. It is easily transmitted to other horses. Horses at risk (especially young horses) should be vaccinated twice a year.

Encephalomyelitis (EEE/WEE): This is a neurological disease (sleeping sickness) that can cause death and is transmitted by mosquitoes. The warm moist climate of North Carolina makes an ideal breeding ground for mosquitoes. I recommend vaccination at least twice a year.

West Nile:

A killed virus vaccine is available for vaccination against West Nile virus. Initially, horses need to receive the primary vaccine and a booster vaccine 3-6 weeks later. I have been recommending twice yearly vaccination.

Rhinopneumonitis (Rhino): This is caused by a herpes virus that can cause fever, cough, and nasal discharge. This virus may also cause abortion in pregnant mares, or may cause neurological disease. Rhinopneumonitis is a contagious organism that can spread through barns via nose-to-nose contact between horses, or on the hands of

people handling the horses. Vaccination of performance horses should be at least twice a year.

Equine Viral Abortion (Rhino): This is also caused by herpes virus and infection may result in abortion. Pregnant mares should be vaccinated at the beginning of the 5th, 7th, and 9th month of pregnancy. This is a killed virus vaccine.

Rabies: This is a virus that can affect humans, horses, dogs and cats. With the increasing number of rabies cases in North Carolina I recommend vaccination annually to protect your horse from this fatal disease. This vaccine must be administered by a veterinarian or state-approved veterinary technician.

Potomac Horse Fever (PHF): This viral disease can cause colic, diarrhea, fever and other non-specific signs of illness. PHF has not been reported in this area, but if your horse travels in endemic areas vaccination is warranted. The horse should receive its first shot and a booster 30 days later. Annual revaccination is recommended.

Strangles: The strangles organism, Streptococcus equi, can cause swollen lymph nodes that may abscess. Rarely, the guttural pouches of the horse may become infected, or the organism may cause abscesses in the thoracic or abdominal cavity. Some stables may require strangles vaccination for horses coming onto the property. The intramuscular vaccine may cause abscesses and soreness at the injection site. The absolute efficacy of the vaccine is unclear. An intranasal vaccine is available, but the efficacy (usefulness) of this vaccine is unproven. Additionally, vaccination of some horses may result in swollen lymph nodes, and possible lymph node abscessation.

EQUINE VACCINATION

	SPRING	**SUMMER**	**FALL**	**WINTER**

Tetanus/EEE/WEE	EEE/WEE
West Nile	West Nile
Rhino/Flu/Rabies	Rhino/Flu

I suggest that the “spring” vaccinations be performed between February and April, and the “fall” vaccinations be performed between August and October.

Broodmares: regular vaccination program, but be sure to always use only killed vaccine products. Add Pneumabort K or other killed herpes product that is approved for use in pregnant mares at 5th, 7th, and 9th month of gestation. Administer tetanus, sleeping sickness, West Nile, intramuscular influenza vaccines 30 days prior to foaling. Administer botulism, strangles, rotavirus, Potomac horse fever vaccinations based on the recommendations of your veterinarian.

Early Disease Recognition: very important!

Owners and trainers should observe all horses daily for changes in attitude, appetite, or behavior. Monitor feed and water intake, and fecal production at least twice a day. You should try to maintain regular communication with a veterinarian familiar with your horses. If you think a horse may be sick, isolate it immediately if you think it may have an infectious problem. A major flaw in most horse operations is failure to isolate or quarantine horses prior to exposure to other horses or integration into the herd. Newcomers to your property should be isolated for at least 2 weeks, and monitored for signs of disease, especially cough, nasal discharge and swollen lymph nodes.

Deworming Strategies

Horses are constantly exposed to parasite eggs that can infect the gastrointestinal tract. Parasite larva in the intestine of the horse may cause colic, weight loss, diarrhea, and unthriftiness. The main parasites targeted in a deworming program include the blood worms (Strongyles), small strongyles, round worms (Ascarids, very important in foals and weanlings), tapeworms, bots and pin worms.

Control of parasites in your horse involves:

1. A regular deworming program that includes deworming of **ALL** horses at the same time.
2. Minimize stocking rates on the pasture - high horse density equals high parasite exposure.
3. Monitor parasite burdens by performing fecal egg counts on randomly selected horses in the herd. This is very important. A small number of horses in your herd may harbor a large number of parasites, especially those resistant to dewormers.

Performing fecal egg counts on all herd members can identify parasite carriers if you suspect a problem. Fecal egg counts can also be performed 10-14 days after deworming to verify the efficacy of (and detect resistance to) the dewormer. The goal of a successful deworming program is NOT to make the horses worm free. In the case of strongyles (large and small) a fecal egg count of less than 100 epg (eggs per gram) is acceptable.

Some tips: The commercial paste wormers are very effective in a parasite control program IF you get all of the product into the horse's mouth and administer the appropriate dose for the weight of the horse. I do not think there is an advantage to tube worming. A deworming program that uses products such as of Zimectrin (ivermectin), Quest (moxidectin), Strongid (pyrantal), Panacur (fenbendazole), Anthelcide (oxibendazole) is usually effective. Horses should be dewormed every 1-2 months. Once or twice a year, administer a double dose of Strongid (paste or liquid) or an ivermectin/praziquantal dewormer to help control tapeworms. Avoid

organophosphate dewormers in pregnant mares - may cause abortion.

Equine Infectious Anemia

Equine infectious anemia (EIA) is caused by a retrovirus and once infected, the horse remains infected for life. The clinical signs are fever, weight loss, ventral edema, moderate anemia, depression, and thrombocytopenia (low platelet count). Or there can be ***no*** clinical signs of the disease. Horses with no clinical signs can serve as a source of infection for other horses near them. **There is no vaccine or treatment for this disease.** The virus is spread from horse to horse by biting horseflies and deerflies, not mosquitoes. Using the same needle on multiple horse could also spread the virus.

Coggins Testing

Each horse should be tested annually for EIA. The test for this extremely contagious disease is called the "Coggins" test. In NC, positive horses must be quarantined, euthanized, or moved to a recognized research facility. If a horse tests positive, the laboratory immediately notifies the state veterinarian. The state veterinarians will repeat the Coggins test to verify the results. Horses that test positive for EIA must be permanently identified by a brand on the left side of the neck. Positive horses must be quarantined (no horses within 880 yards), euthanized, or transported to a recognized research laboratory (but cannot cross state lines without special paperwork and permission). A negative test is required for any horse to cross state lines. **THERE IS NO VACCINE AVAILABLE TO PROTECT HORSES AGAINST EIA virus!** All horse owners should be educated about EIA and its control.

New regulations adopted by the State of North Carolina, effective October 1, 1999, required a negative Coggins test within the past 12 mo on all equines over 6 mo of age for horses being sold or ownership transferred. A negative Coggins test (within the past 6 mo) is also required for all equines brought or kept at any public stable or other public place for exhibition, recreation or assembly. All horse owners should be aware of this regulation and be prepared to show their Coggins test when asked.

Prevention of EIA

-Require a negative EIA test as part of every prepurchase exam.

-Require all new horses on a farm to have recent negative EIA test.

-Test all horses on the farm at least yearly.

-Encourage rigorous fly control, do not pile manure near areas where horses gather.

-Thoroughly disinfect any items contacting equine blood prior to use on another horse.

-Never use the same needle for multiple injections on different horses.

Equine Dentistry

Horses of all ages are subject to teeth abnormalities that can adversely affect their ability to chew and maintain body weight. In addition, tooth problems may lead to infections or may cause soreness resulting in performance problems. In contrast to humans, the teeth of horses grow continuously during their lives. The horse chews its food by grinding from side to side. Excessive tooth growth is thus limited by slow, continuous grinding away by the opposing tooth. Many horse owners think that a horse does not need dental care or dental examinations until it is old or having problems. Not true! Annual examinations during routine vaccination visits by your veterinarian allow for early detection of dental problems. Older horses may benefit from twice-a-year examinations. These regular examinations allow for correction of tooth problems before the horse experiences pain or has trouble maintaining its weight.

Problems to watch out for in the horse include:

Sharp edges on the outside edge of the upper molars and premolars and the inside edge of the lower molars and premolars. These sharp edges are caused by the side to side grinding of feed during chewing. Over time, these sharp edges may cut into the cheek or tongue making it painful for the horse to chew. In less severe cases, the horse may experience discomfort when ridden resulting in head shaking or problems with the bit.

Hooks on the premolars and molars as a result of overbite or underbite. As a result of the teeth not meeting properly (malocclusion), the teeth are not worn down uniformly by an opposing tooth. This results in a hook, most commonly in the first upper cheek tooth (premolar 2). A hook on this tooth may cause problems with the bit. More importantly, the presence of a hook on the first upper cheek tooth signals a potential problem of the last lower check tooth. A hook on this last tooth may cause the horse considerable pain leading to serious weight problems and even colic.

Wave mouth, an abnormality where the teeth have an undulating pattern from front to back. In this condition, some teeth may be too long relative to the adjacent teeth, and other teeth may be worn down to the gum line. **Step mouth**, where the front cheek teeth are longer than the back cheek teeth. Both of these problems may interfere with chewing.

- ***Problems with individual teeth include***:

  Broken or split teeth. If broken off below the gum line, broken or split teeth generally do not cause a problem. If the tooth is broken off, care must be taken that the opposing tooth does not become overgrown.

  Infected tooth roots may cause the horse pain and may result in extension of infection into the maxillary sinus. The signs of an infected tooth root and maxillary sinusitis include fetid smelling nasal discharge and foul breath, and possible swelling over the side of the face. This problem can be diagnosed by radiography and can be treated by removal of the tooth.

Probably the most serious problem associated with tooth problems in horses is inability to maintain body weight. As the horse ages, its digestive efficiency diminishes. This problem is compounded if the horse is not able to chew the feed effectively. A sign that your horse is having problems with its teeth is excessive dropping of hay and grain when eating, a problem known as ***quidding***. Horse owners often spend large amounts of money on feed and supplements for horses that have undiagnosed tooth problems. With advances in veterinary care, especially in parasite control, horses are living longer. In extreme cases, old horses may actually grind their teeth down to the gum line. Horses with severe teeth problems may require special diets to maintain their body weight. This may include feeding all-in-one pelleted feed that can be softened, if necessary, by soaking.

Routine dental care is essential to the health of the horses. Regular teeth filing, known as ***floating***, is tolerated will by most horses and can be done with minimal restraint. In some cases, it may be necessary to sedate the horse to facilitate floating. More severe cases, especially those involving hooks on the back teeth, may require the horse to be deeply sedated or possibly anesthetized.

Summary:

Horses with problems gaining weight and horses with performance problems such as head shaking or discomfort with the bit, benefit from dental examination by your veterinarian. It is much easier on the horse to have dental problems corrected before they become severe. All horses should have their teeth examined annually by a veterinarian, and older horses will benefit

from twice-a-year examinations. And remember, **do** look that gift horse in the mouth. A horse with severe dental problems may require extensive work by your veterinarian or costly feed supplementation to maintain body weight.

Weight loss in horses

There are **3 main differentials** for chronic weight loss in the horse:

1. **Malnutrition**
2. **Parasitism**
3. **Dental problems**

The list for **other causes of weight loss** can be very long and may include:
chronic liver disease, chronic renal disease, peritonitis, pleuritis or other chronic infection, malabsorption, endocrinopathy (eg. pituitary adenoma), chronic respiratory disease (COPD), sinusitis, guttural pouch empyema, heart disease, chronic colic (sand, fecaliths, enteroliths, abscesses, adhesions, foreign bodies, lameness, neurological disease, pregnancy, lactation, neoplasia (lymphosarcoma).

The workup of chronic weight loss includes a **detailed history**. This will include:

- Diet: quality, quantity, availability, changes
- Number of horses affected (a common environmental factor may indicate an infectious agent
- Age of horse, time period affected, season (may indicate parasite problem)
- Nature of appetite, water intake, fecal consistency
- Previous health, vaccination and deworming status
- Most recent Coggins test and results
- Previous drug therapy
- Management system - parasite control, space available
- Caregivers - knowledge, responsibility

The workup also includes a **complete physical examination**. This will include:

- Temperature, heart rate, heart rhythm, presence of arrhythmias, respiratory rate and character
- Auscultation of the abdomen for gut sounds and evidence of sand
- Auscultation of the thorax for evidence of abnormal breath sounds or areas of dullness (must use a rebreathing bag or something to induce the horse to take deep breaths)

- Palpate external lymph nodes
- Examine facial symmetry, examine sinuses
- Examine for evidence of edema
- Examine fecal consistency
- Observe horse at rest, during and after exercise
- Examination per rectum, if indicated

When working with clients on horses with weight loss, I usually recommend that if physical examination findings are fairly unremarkable, and one of the "Big 3" has been identified as a potential cause of the weight loss, a two-tiered approach to the problem can be taken.

1. Most often I address a problem that has been identified, eg. nutritional guidelines, float teeth, outline a deworming program and schedule a recheck appointment or phone call to the client in 1 month to see if the horse has gained weight.
2. At the first appointment, discuss the value (and cost) of laboratory work with the veterinarian. This may include a CBC (with fibrinogen), chemistry panel, urinalysis and fecal egg count. If a Coggins test has not been performed during the past year, this should be done.
3. Weigh the horse, either with a scale or weight tape, so you can follow the weight gain. Record the body condition score.
4. Follow up with your vet, by scheduling an appointment or by phone to report how the horse is doing.
5. If the horse has not gained an adequate amount of weight appropriate for its level of nutrition and exercise, repeat the physical examination and perform additional test based on additional causes of weight loss outside of the "Big 3".

Methods of feeding and management to increase weight of horses:

1. Increase feed -
   increase grain portion of diet, but not more than 50% of total ration
   increase pasture turn out (if forage is adequate)
   increase amount of good quality hay fed
   feed additional meals (lunch, bedtime snack)
2. Increase caloric content of feed -

add fat to diet (corn oil, rice bran, commercial diets [Purina Athlete])

feed beet pulp

3. Feed thin horse separately

Decrease exercise

Colic

In a study at Texas A&M University, the following factors were found to be risk factors for causing colic in horses:

Feed changes (especially hay)

Change in Stabling

Irregular deworming program

Weather changes

History of previous colic

Arabian horses

Signs of Colic

Off feed

Pawing

Kicking at belly

Looking at side

Laying down

Bloating

Constipation

Physical examination findings:

Temperature (normal 99-101F)

Pulse rate (normal 36-48)

Mucous membrane color, moistness, capillary refill time

Digital pulse intensity

Gut sounds

Question: Where do you listen for gut sounds in the horse? Where can you hear sand in the intestine with the stethoscope.

What can you do if you think your horse has colic?

1. Monitor attitude and appetite
2. If signs of colic are seen, perform a basic physical examination?

    Assignment: list 4 procedures that would be included in a physical exam for a horse with colic.

Call your veterinarian if you think your horse has colic to discuss your exam findings and formulate a plan. Do not administer medications without consulting your vet first. Medications may alter the vet's physical exam findings, may mask a severe colic, and the meds you choose may not be appropriate.

Hoof Care

Horses that are housed in stalls or small pens should have their feet picked out daily. This will aid in examination for rocks, sticks or other foreign objects. The removal of mud and organic matter will also reduce the risk for infection or "thrush". ***Thrush*** is a foul smelling bacterial infection that may soften the foot, and in severe cases, invade deeper tissues.

Your horse should be trained to readily pick up its foot when asked. Using a hoof pick, clean the foot from toe to heel, being sure to clean the commisures or sulci on each side of the frog, and sulcus of the frog itself. It is a good idea to clean out the feet after you ride. Carry a hoof pick with you on trail rides, so that you can readily remove rocks or sticks from your horse's hoof.

Extremely dry or brittle feet may cause excessive chipping of the hoof wall. There are several commercial hoof dressings on the market that may be useful. Oral hoof supplements, usually containing biotin and methionine, may aid in hoof growth. Very soft soles may be tender and cause the horse to be lame when walked over gravel. Topical dressings, such as Keratex, iodine or Venice Turpentine, may be useful in toughening the sole. Talk to your veterinarian or farrier for product recommendations.

Trimming and Shoeing

Generally, horses are trimmed and/or shod on a 6-week cycle. This guideline may vary due to individual hoof growth differences. It is important to train your horse to stand obediently for the farrier. It is not the farrier's job to train your horse, and unruly horses can cause injury to the farrier. Training to accept the feet being picked up, and handling by the farrier should begin at birth (imprinting).

The goal of foot trimming is to maintain proper shape and length of the foot. The farrier will usually trim the hoof wall with nippers to remove excess length. The foot is then made level with a rasp. The rasp is then used to shape the foot, and smooth rough edges on the wall.

Horses are often shod, but many do not need to wear shoes, and can benefit from

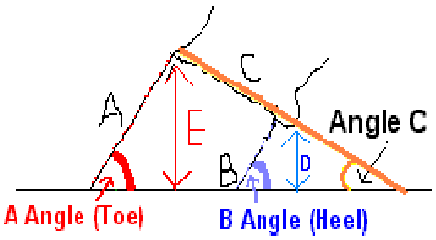
routine trimming only. The reasons to shoe a horse include a need for:

1. Traction
2. Protection
3. Correction

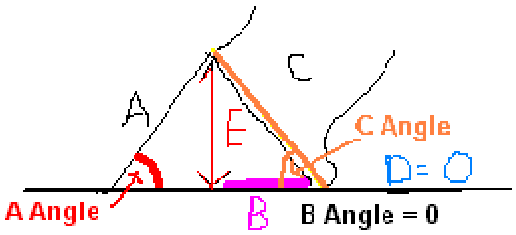
Horses not needing these features may do very well barefoot. The angle of the horse's hoof (when viewed from the side) should be approximately equal to the angle of the pastern. This angle is often very similar to the angle of the shoulder. Horses may have subtle or major differences between left and right feet. In general, it is desirable to have the feet as equal as possible in shape and angle.

The "ideal" angle for your horse's foot will depend on their conformation. In general, the angle should be between 48◦ and 55◦. The hindfeet are typically a little steeper than the forefeet. When the horse is shod, the shoe should be of adequate size that the entire wall is covered and the foot can expand a little onto the shoe. The heels of the shoe should be wide enough to promote spreading of the heels. If the heels are "pinched" they can become contracted, which can lead to lameness.

In general, the angle of the dorsal hoof wall should match the angle at the heels.



Back of Hoof



Back of Heel

It is sometimes a dilemma as to how much heel support to give with the shoe. In some areas, farriers are concerned that if the heels of the shoe are too long, the horse may pull the front shoe off with the hind foot. The hazards of providing inadequate heel support are magnified if the toes are left too long. In these situations, the absence of

adequate heel support may promote tenderness in the heels (lameness), and may cause undue strain on the tendons and ligaments along the back of the leg, and may even promote navicular disease (lameness).

In the shod horse, the toe region may grow more hoof than the heel region. For this reason, it is often inappropriate to assess quality of a farrier's work late in the shoeing cycle.

A good web site for care of the feet:
http://muextension.missouri.edu/explore/agguides/ansci/g02839.htm

A good website for pictures of the foot and lower limb:
http://members.aol.com/_ht_a/arfryn1/HorseTalk/horsehoof

Bad things we do to horse's feet:

1. Neglect: With the domestication of horses, the distances they travel in search of feed and water are reduced. With this comes reduces natural wear of the hoof. If you choose to have a horse, you need to budget between $50 to $120 for farrier work every 6 weeks.
2. Poor husbandry: Maintaining horses in a muddy, filthy environment promotes poor hoof health. Ensure that your horse can stand in a dry area for a few hours per day. There is NO excuse for housing a horse in a stall that is not cleaned daily and bedded with clean straw or shavings.
3. Soring: Certain gaited horses, especially Tennessee Walking Horses, are sometimes abused. In an effort to accentuate the gait, the feet and legs of these horses are sometimes treated with chemicals or subjected to mechanical trauma (chains, nails, pressure shoeing) that cause pain when the foot hits the ground. In response to this pain, the horse yanks its foot up in an exaggerated gait. Soreing of horses is ILLEGAL under the Horse Protection Act. Inspectors are present at many horseshows. If you sore your horse, or allow this to be done by a third party – shame on you.

A good website to read about soring:
http://www.horsequest.com/journal/health/soring.html

Selected problems of the hoof:

Bruises: Horses may step on a rock or piece of wood, and this may lead to a sole bruise. The ensuing lameness may be mild or severe. If your horse becomes lame, examine the sole for a foreign body. Use your judgment about calling for veterinary attention. The veterinarian will usually watch the horse walk and trot. Then hoof testers will be used to localize the area of pain. The digital pulses will be palpated to detect inflammation in the foot. If the veterinarian determines that a bruise is the most likely cause of lameness, a bandage may be applied. This may be either a diaper or sheet/roll cotton. Your horse may be administered phenylbutazone (aka Bute, acts like horse aspirin). Be careful about using Bute without the direction of your veterinarian – this medication may cause gastric and intestinal ulceration and kidney damage.

Abscesses: An abscess may form in the hoof, usually between the sensitive and insensitive sole. Horses suffering from a foot abscess may be VERY lame (a fracture may be suspected). The lower limb may be coincidentally swollen. If your horse is extremely lame, your veterinarian should be called. As with the bruise, the area of tenderness will be identified with hoof testers. The abscess may be opened with a hoof knife – prior to this it may be necessary to sedate the horse or perform a regional nerve block with a local anesthetic. After the abscess is opened, your veterinarian may advise you to soak the foot, often in warm water with Epsom salts. The foot may then be bandaged, and the horse administered phenylbutazone. Rarely, the abscess will not drain out the bottom of the foot, but rather will migrate up the hoof wall and drain out at the coronary band. These abscesses may take a few weeks to resolve and can be very frustrating for the horse owner, farrier and veterinarian.

Thrush: As mentioned earlier, thrush is an infection of the frog and sulci, usually

secondary to the horse standing in mud or organic matter. Every time you clean out your horse's feet, you should look and smell for the presence of thrush. If you suspect it, you can apply topical medicine such as Koppertox or Thrush-Buster. If your horse develops thrush in the central sulcus of the frog, this area can be gently packed with soft cotton which is then moistened with the thrush medicine.

Navicular Syndrome: Navicular syndrome is a very broad term that describes degeneration of the navicular bone and/or disease of the surrounding support structures. There is no single cause of this syndrome that most likely results from compression of the navicular bone and tension on the supporting ligaments. Horses with navicular syndrome may have mild to severe lameness. They may avoid landing the hoof in the heel region, and may have a short, choppy, stilted stride (often confused with a shoulder-based lameness).

The diagnosis of navicular syndrome can be very complicated. In general, a methodical lameness examination is indicated. This will include evaluation of the hoof structure and balance, observation at the walk and trot, and response to hoof testers. The response to regional infiltration of a local anesthetic is usually then evaluated. It is most common for the heel region of the horse to be "blocked out" first with a posterior digital (PD) nerve block. In most cases the PD block will alleviate the lameness. Some horses will then show a lameness on the *opposite* limb, suggesting that the problem is bilateral. The next step in the diagnosis of the horse's lameness is to take radiographs. This is most often (and most completely) done with the shoe removed. The standard radiographic series includes 5 views, but may include more. Radiographic signs of navicular syndrome may cysts, channels or lollipops in the navicular bone. It is important to note that there is not a close correlation between severity of lameness and severity of radiographic lesions in navicular syndrome. It is important to remember that there are MANY other causes of heel-based lameness in the horse. A list of other causes of heel pain can be found on a web site written by John Crowley BVSc (Hons.) MRCVS http://www.equineoz.com.au/art17.htm

The veterinarian, possibly in consultation with the farrier, will develop a therapeutic plan for management. This usually involves:

1. Shoeing recommendations: balanced hoof, reduction of toe length, PLENTY of heel support, +/- change in breakover with a rolled toe, +/- wedge pads to elevate the heels.
2. Exercise: light work is usually encouraged, strenuous exercise during the initial management phase is discouraged.
3. Medications: phenylbutazone is often prescribed. Vasodilators, such as isoxsuprine may be useful.
4. Nutriceuticals: oral or intramuscular joint supplements may be useful.

In some cases, the signs of navicular syndrome may recur, and your veterinarian may recommend surgical transection of the posterior digital nerve ("nerving"). This procedure is a little controversial, and therefore a discussion with your veterinarian to discuss the pros and cons is required.

Laminitis: Laminitis literally means "inflammation of the laminae". In certain pathological situations, the laminae may loose their attachment to the hoof wall, allowing the coffin bone to rotate within the hoof capsule, or sink towards the ground ("sinkers"). In general, I like to reserve the term "founder" for horses with severe consequences of laminitis.

Laminitis may occur secondary to a decrease in blood flow to the laminae, perhaps secondary to shunting of the blood between the arterioles and venules (AVA). In severe cases, the laminae between the coffin bone and hoof detach. In most cases, the laminae on the front of the hoof are more severely affected, allowing for tipping of the coffin bone (rotation). In severe cases, the tip of the coffin bone rotates through the bottom of the sole. In other cases, the laminae detach circumferentially, and the coffin bone "sinks" through the bottom of the sole. Diagram from: www.silverhippy.com/laminitis/laminitis.htm.

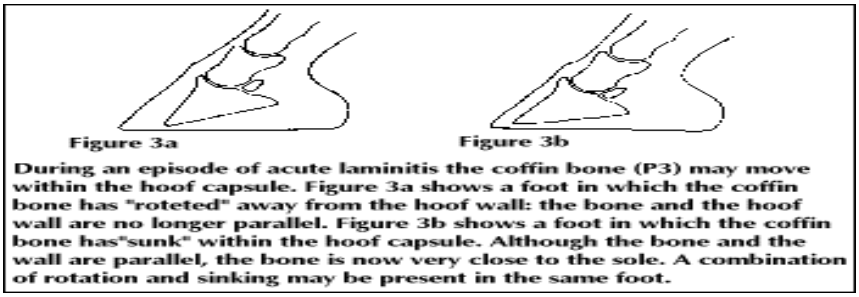


Figure 3a Figure 3b

During an episode of acute laminitis the coffin bone (P3) may move within the hoof capsule. Figure 3a shows a foot in which the coffin bone has "roteted" away from the hoof wall: the bone and the hoof wall are no longer parallel. Figure 3b shows a foot in which the coffin bone has"sunk" within the hoof capsule. Although the bone and the wall are parallel, the bone is now very close to the sole. A combination of rotation and sinking may be present in the same foot.

Causes of laminitis: Grain overload, excess exposure to lush pasture (especially when your horse is not used to it), high fever, toxemia (as from severe colic, retained placenta), consumption of cold water in an overheated horse (???), excessive concussion (road founder). Laminitis is most common in obese horses. Older horses with hyperplasia of the intermediate lobe of the pituitary gland (Cushing's disease) may be at increased risk for laminitis compared to other horses.

Signs of laminitis: Mild to severe lameness, reluctance to circle, heat in the foot, increased digital pulses, walking on the heels/avoiding concussion on the toes, "sawhorse" stance".

Diagnosis of laminitis: history, physical examination, response to hoof testers, radiographs.

Therapy for laminitis: Therapy usually includes administration of drugs to minimize pain. Often, phenylbutazone is used, however, other medications such as Banamine and Ketofen may be used. DMSO may be administered intravenously or orally, and acts as an anti-inflammatory agent. An opioid drug, such as butorphanol, may be administered to provide further pain relief. Acepromazine may be administered to increase blood flow to the hoof. Pentoxyphylline may be administered to improve red blood flow through the small blood vessels of the foot.

The foot may be supported to limit coffin bone rotation. Frog support, for example by using Lily pads, or sole support with Styrofoam or cast padding, may be used. In some cases, wedge pads may reduce the pull of the deep digital flexor tendon on the coffin bone. The farrier may be instructed to apply a horseshoe "backwards",

thereby providing heel support and relieving weight-bearing from the toe. Alternately, an egg bar or heart bar shoe may be used.

In general, exercise should be strictly restricted. The stall should be bedded deeply to encourage the horse to lay down.

Prognosis: the prognosis for horses with laminitis is variable. In general, the clinical signs of the horse can be used to guide you as to decisions for continuation of therapy. A horse that cannot or will not rise, is losing weight, developing bed sores, grinding its teeth is a possible candidate for euthanasia. Rotation of the coffin bone through the sole is another indication for euthanasia. In most cases, horses that are "sinkers" are usually euthanized.

References:

Equine Lameness by Christine King and Richard Mansmann. Published by Equine Research, Inc. Grand Prairie, Tx.

 Also, the information in this presentation represents, in part, the opinions of Dr. Vivrette. Please consult your own veterinarian for "fine tuning" of this information for your particular situation.