

The Miniature Horse: More Than Just a Smaller Horse!

What comes in a small package, has all the characteristics people love about horses, is easy to manage and a delight to have around? A miniature horse!

Miniature Horses are no taller than 38 inches and come in a rainbow of coat colors and patterns. They are easily trained, have a gentle nature, and can pull four times their own weight. These horses are descended from Shetland ponies and were selectively inbred for their size. In earlier times, small horse breeds were likely the products of surviving harsh natural climates and limited feed sources. As human knowledge of genetics grew, it became possible to breed specifically for size.

Miniature Horses have been bred for superb conformation and outstanding dispositions. The result is a beautifully proportionate little horse that is suitable to a variety of uses: as pets, show animals, and a form of therapy for



disabled people and guides for the blind. In the show ring, “Minis” compete in halter/conformation and in performance events such as obstacle driving.

An organization devoted to small equines—the American Shetland Pony Club (ASPC)—includes the American Miniature Horse Registry (AMHR) among other registries. Founded in 1888, the ASPC began registering Miniature Horses in 1971. The AMHR includes an A division, which registers horses standing 34 inches or under at the last hair of the mane, and a B division for horses standing up to 38 inches. Regular Shetlands stand up to 46 inches.

Minis require similar care to their full-sized counterparts but, based on their size, they require much less space, making them accessible to more people, including those who have had no experience with horses. It is important that owners of Miniature Horses educate themselves thoroughly in good basic horse care as well as in the unique needs of Minis. While many Miniature Horses are kept primarily as pets, they still need to be treated like horses, with appropriate nutrition, housing, room to run, regular hoof care, dental care,

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DIRECTOR'S MESSAGE



Dr. Claudia Sonder
CEH Assistant Director

It's the rare Miniature Horse that doesn't bring a smile to my face. I have known many in private practice and they are loaded with personality. They tend to be cute and inquisitive, which is fortunate as they generally dislike veterinary work and often give me a run for my money. Food is always my friend and I can get a Mini to comply with annual vaccinations or procedures if there is a constant source of treats at the ready.

Over the years, I have experienced several Mini cases that did not go as planned. I learned that Minis require different medical management than their larger cousins. They tend to be hardy and thrifty and stay sound for the most part. The trouble comes when they are confined to small spaces, treated like dogs, and allowed to become obese. Their small size and propensity for obesity predisposes them to medical crisis that most people aren't aware of. In many ways, they need to be managed like large-breed horses for optimal health, wellness and behavior.

Miniature Horses have endured selective inbreeding over the past 350 years to possess a certain size and look. It is estimated that there are 100,000 Miniature Horses in the United States. The size of the Mini is a mixed blessing. On the one hand, their small stature

allows them to withstand orthopedic and medical crisis that larger horses cannot. They are less expensive to keep than large horses and they have gained popularity as pets and even guide animals. Most of them are not expected to be athletic, although some are used as working cart horses. This altered job description makes them less likely to receive the routine veterinary care of their larger counterparts and also less likely to suffer from the work-related musculoskeletal degeneration of larger horses.

On the other hand, the genetic alterations that have created their diminutive size have predisposed them to a subset of medical afflictions that are not as common in their larger counterparts. We humans have selected traits that we admire in our animal companions and we have bred similar individuals to produce more of the same. This is true in horses, both full size and miniature, and many of the diseases discovered over the past 10 years have been associated with inappropriate mating selections, or the overuse of a particular sire line.

The propensity for dwarfism in the breed was a significant problem 25 years ago, but with genetic outcrossing the incidence of this problem has declined. Responsible breeders have learned to avoid line breeding, which, over time, has contributed to the overall health of the Mini. As a rule, genetic diversity is good for a species. Mutations and genetic combinations that adversely affect health are less likely to occur when the parents do not share DNA.

The weight and the size of the Miniature Horse alter their susceptibility to certain types of medical conditions. Hyperlipemia and eclampsia are examples of problems that are not regularly identified in larger breeds. Both of these disorders are potentially life-threatening and difficult to treat in advanced stages. Consequently, diagnostic and therapeutic modalities practiced by veterinarians need to be adjusted for the breed's size and propensity for disease. Miniature Horse owners and veterinarians should be

familiar with the afflictions common to Minis. This *Horse Report* will highlight these in an effort to enhance the recognition of problems that can advance quickly in these small, popular equine companions.

Veterinarians from the UC Davis William R. Pritchard Veterinary Medical Teaching Hospital work with referring veterinarians to manage difficult cases involving Miniature Horses. Many of these patients require nutritional support while they recover from colics or other medical conditions affecting appetite. Diagnostic ultrasound and x-ray are particularly useful in Minis for identifying the underlying causes of colic. Our reproductive unit and surgical team work quickly and efficiently to resolve foaling difficulties, common in Miniature Horses, and to care for premature and dysmature foals with advanced medical or musculoskeletal impairments.

We hope the information in this *Horse Report* will be useful to owners of Miniature Horses as well as to veterinarians new to the world of Minis, to better understand this breed and avoid some of the health problems that can be prevented. With good, consistent care, Minis can provide constant entertainment for 30 years or more. *



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grooming, vaccinations and parasite control.

As has frequently arisen with breeding a species for specific characteristics, desired traits can be accompanied by undesirable ones. In Miniature Horses, dwarfism is an unfortunate complication of breeding, even when both of the parents appear to be normal. In Minis, a dwarf is not only smaller than normal, it also has varying degrees and combinations of undesirable conformational faults. These can include limb, spine and jaw deformities. A dwarf Mini may have one or a combination of such traits. Mildly affected horses can lead normal lives, while the most severely affected ones may suffer from chronic pain or the inability to stand or move. In some instances, the deformities are not noticeable at birth but become obvious as the horse ages.

Although the care of Miniature Horses is nearly the same as that of larger breeds (but on a much smaller scale with regard to feed, deworming doses, medication, etc.), Minis are more susceptible to certain health problems, as discussed below. And, there are times when it can be dangerous to treat Miniature Horses the same as you would treat a full-sized horse. Many potential problems can be avoided altogether by providing the proper care and feeding these animals require.

Unique Health Issues of Miniature Horses

Obesity

Miniature Horses are prone to obesity. They love to eat! Most owners of large-breed horses tend to overfeed

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the Minis, but one flake of hay would be equivalent to about six feedings for a Mini. In addition, pasture restriction and daily exercise are less likely to occur. Many of the medical challenges Miniature Horses face can be avoided by maintaining an ideal body condition (Henneke Body Condition Score of 5).

Ideally, Minis should consume approximately 1.5% of their body weight in hay daily. The average Mini weighs 250 lbs, and this translates to 3.5 lbs/day of hay. The backyard Mini in the U.S. does not expend a large amount of calories in exercise. Those used as cart animals, show horses and lactating mares will have higher nutritional demands and can require up to 3% of their body weight in forage. Small amounts

of concentrates or alfalfa should be given only during the breeding season or for exercising and showing horses. Vitamin and mineral supplements may be required for Mini horses or foals, depending on the diet fed.

Vitamin and mineral requirements are similar to large-breed horses on a per-weight basis. Protein requirements mimic those of large-breed horses (per-weight basis) and lower nonstructural carbohydrate content (NSC) hays, such as certain grass hays, are recommended for Miniature Horses given their propensity for obesity.

Most owners and veterinarians underestimate the weight of a Mini by 20%, which equates to 50 lbs. Weight tapes tend to be inaccurate and scales are not a common resource. However, dewormers and other medications should be administered with caution

and there are formulas to calculate body weight based on body length and girth width, as follows:

$$\text{Estimated Body Weight (lbs)} = (9.36 \times \text{girth inches}) + (5 \times \text{body length in inches}) - 348.5$$

Dental Issues

Healthy teeth are important to the general health of all horses. The most common cause of death in aged wild horses is the inability to chew food; these horses either die of intestinal obstruction or weakness or are taken down by predators. In addition to the ability of the horse to process its feed, the health of the teeth also affects the health of the sinuses and the condition of the nasal passageway (Frankeny, 2003).

Miniature Horses have more problems with their teeth than do larger breeds of horses. This is likely due to the



small size of their heads combined with the same number and size of teeth as found in a full-size horse, leading to overcrowding of the teeth. Overbites (brachygnathism) and underbites (prognathism) are common and can set the Mini up for years of abnormal dental wear if left untreated.

We recommend that newborn foals have their first oral exam shortly after birth to identify any bite abnormalities. For foals with abnormalities, periodic reduction of dental overgrowths should be done from several months of age on to improve the range of motion of the jaw. Otherwise, annual dental exams, starting at one to two years of age, should be performed.

The young Mini is prone to sinus infections because of overcrowding of the dental roots in the smaller sinus space. This affects normal sinus drainage, and these horses will often display tearing of the eye on the affected side, swelling of the facial area below the eye, and a unilateral nasal discharge.

Minis tend to retain their deciduous teeth (baby teeth), which are also called caps. They will drool and display difficulty chewing. Specialized equipment is usually required to examine and correct these abnormalities in their much smaller oral space.

Many owners of Miniature Horses do not invest in regular dentistry, perhaps because their horse does not wear a bit and has a voluptuous body condition. However, years of abnormal alignment and wear can lead to severe dental malocclusions that will predispose the horse to colic and choke and possibly shorten its lifespan.



Yearly dental examinations are highly recommended. In addition to routine dental care, teeth should be evaluated any time a horse shows signs of possible dental disease (difficulty chewing, dropping partially chewed food also known as “quidding”, excessive salivation, swelling of the face, nasal discharge, or a foul odor from the mouth or nose). Many problems can be successfully treated if addressed immediately.

Colic

Minis have robust appetites, but their predisposition for dental problems can impair their chewing capacity. All too often they are overfed, and it is rare to find a Mini that is underweight. The reduced ability to grind feed combined with the robust food-seeking nature of the Mini creates a unique subset of common colic.

Minis are prone to three distinct types of colic: fecaliths, enteroliths and sand colic. The root “lith” means “stone”. Fecaliths are accumulations of long-stem feed, twine or hair and manure that create a hard, rock-like obstruction in the small colon. These obstructions cause gas to build up and cause moderate pain. Similarly, trichophytobezoars, which is an accumulation of feed and hair, are sometimes seen in Minis that spend a lot of time standing around and grooming each other. It is much less commonly seen in horses that are pastured.

Enteroliths are mineral stones that form in the colon of horses fed a diet involving alfalfa hay. Alfalfa hay is rich in magnesium, protein and phosphorus, and these components combine as magnesium, ammonium

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and phosphate around a central nidus such as a piece of wire or foreign material to form a stone. Arabian horses are the most common enterolith formers, and Minis are also at increased risk.

Although horses can pass small enteroliths, surgery is often required to remove larger stones that cause obstruction. Abdominal radiographs have a 90% detection rate for enteroliths in a fasted horse. The small abdominal diameter of the Mini makes radiographic diagnosis a valuable tool and radiographs are recommended for any Mini experiencing multiple colic episodes or unrelenting abdominal pain.

Sand colic is also common in Minis because they tend to be scavengers and vacuum their surroundings. Sand settles in the colon, weighs the colon down and abrades the lining of the colon to produce inflammation and diarrhea. Sand is readily visible on x-ray and a fecal float for sand should be a regular part of the colic exam for a Miniature Horse. A fecal float

consists of placing a large handful of feces into a plastic bag filled with water. The bag is hung, and the bottom is inspected for sand that will have settled after a few minutes.

Sand can be treated with oral laxatives and psyllium, but occasionally it will cause the colon to displace or function poorly. Sand colics can require surgery when medical treatment does not resolve the problem. Feeding Minis on rubber mats, adding psyllium to the monthly routine, and avoiding sandy environments can help prevent this problem.

Hyperlipemia

The most significant metabolic difference between large-breed horses and Minis that puts them at risk is their propensity for hyperlipemia. Miniature Horses, donkeys and small ponies have a tendency to mobilize fat when their body senses an energy crisis and they are not able to meet their metabolic demands. Late-term pregnancy, lactation, stress, illness or any factor that impairs appetite for more than 24 hours can initiate a crisis.

This disorder of lipid metabolism causes fat to be released from lipid stores and transported to the liver where it is converted to glucose. Obesity increases the risk of hyperlipemia. When the horses are off feed or stressed, then the lack of insulin stimulates a cascade of events, which triggers fat breakdown. This breakdown of fat leads to fatty acids that are taken up by the liver. These are reformulated into triglycerides that are released into the bloodstream, and the horses develop “fatty” blood. The fat influx often overwhelms the liver and causes hepatic lipidosis, which is an excessive amount of fat inside the liver cells as well as infiltrating organs. The fat infiltration interferes with normal liver function, leading to failure or rupture of the liver. Rapid intervention with intravenous glucose and nutritional support, coupled with insulin therapy, is necessary to prevent this.

Affected Minis will often show a decline in appetite, lethargy and weakness and will progress to incoordination, abdominal pain, tremors, diarrhea, jaundiced coloration, seizure, head pressing and, if left untreated, death. Even aggressive treatment can be ineffective once the liver is overwhelmed; there is a 70% mortality rate associated with delayed treatment, whereas early medical treatment can be associated with a good outcome.

Hyperlipemia should be suspected in any Miniature Horse that has been off feed for more than 24 hours. Prompt veterinary attention is the key to successful reversal of this condition. The physical appearance of fat or alterations in markers of fat and liver metabolism in a blood sample will confirm the suspicion of hyperlipemia.

Prevention of hyperlipemia is very important because this condition is





difficult to treat. Miniature Horses should be on a diet that provides adequate nutrition but does not induce obesity. Extreme stress should be avoided as much as possible, and horses that are in a stressful situation should be closely monitored for loss of appetite. Any sickness or loss of appetite should be addressed immediately to determine whether supportive therapy should be initiated.

Reproduction

The incidence of dystocia, or difficult births, in Miniature Horses is much

higher than in full-sized breeds. This is probably due to the fetopelvic disparity (small size of the mare's pelvis relative to the large fetus) and to fetal malpresentations (abnormal presentation, posture or position of the fetus) in the Mini. In addition, the umbilical cord can become twisted and entangled around the foal.

Regardless of the cause of the dystocia, once a foaling problem arises, it is more difficult to correct because manual manipulation of the fetus is more complicated in the smaller uterus. Therefore, we highly recommend that owners of Miniature

Horses seek the attendance of a veterinarian for any foaling mares so that if complications arise, immediate assistance can be given.

The increased rate of congenital abnormalities also makes loss of pregnancy more likely in this breed. The abortion rate in Minis can approach 30%.

It is very important to monitor Minis used for breeding in their last trimester. Gestational length has been observed to be shorter in the Mini,

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with an average of 320 days and wide individual variation. The impending signs of parturition are similar to those in large breeds, with vulvar relaxation, softening of the tail head, mammary development and lactation occurring within the last six weeks of gestation.

Eclampsia

Clinical eclampsia is not commonly seen in large breed horses but can be a life-threatening complication associated with pregnancy and lactation in Miniature Horses. Eclampsia is a dramatic drop in systemic calcium concentrations that can occur in late gestation or early lactation. The body requires calcium for normal muscular and electrical activity, and signs of low calcium include muscle tremors, sweating, anxiety, bloat, colic and pupil dilation. Left untreated, it will progress to recumbency, seizures and death. To the uninformed eye, this set of symptoms mimics a severe colic.

Foals

The average weight of a miniature horse foal is approximately 20 pounds. These small patients require extra attention to drug dosages and equipment size. They are prone to angular and flexural limb deformities and careful assessment of their conformation is necessary at birth. Common abnormalities include valgus (toed out) or varus (toed in) conformations. Tendon contracture, and the opposite called tendon laxity, are both problems that can occur in Mini foals.

Other congenital defects include heart defects (e.g., ventricular septal defect), brachy- or prognathia, patellar abnormalities and dwarfism (discussed earlier). Patellar

abnormalities include lateral deviation or luxation of the patella. When trying to stand, the affected foal fails to extend its stifles and adopts a crouching position or does “the splits”.

Summary

There are aspects of Miniature Horse care that are very similar to the large-breed horse. Obesity is one of the largest obstacles in this breed, and regular exercise and feed restriction that is relative to size are necessary to sustain health. Routine maintenance of their teeth, their feet and their vaccination and deworming schedules should be similar to those of their larger counterparts. Their size can work for them and against them, and a knowledge of their unique health considerations is valuable to anyone considering adding one to their herd. *

Acknowledgments

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Reference cited: Rebecca L. Frankeny, VMD, *Miniature Horses: A Veterinary Guide for Owners and Breeders*, Trafalgar Square Publishing, 2003.





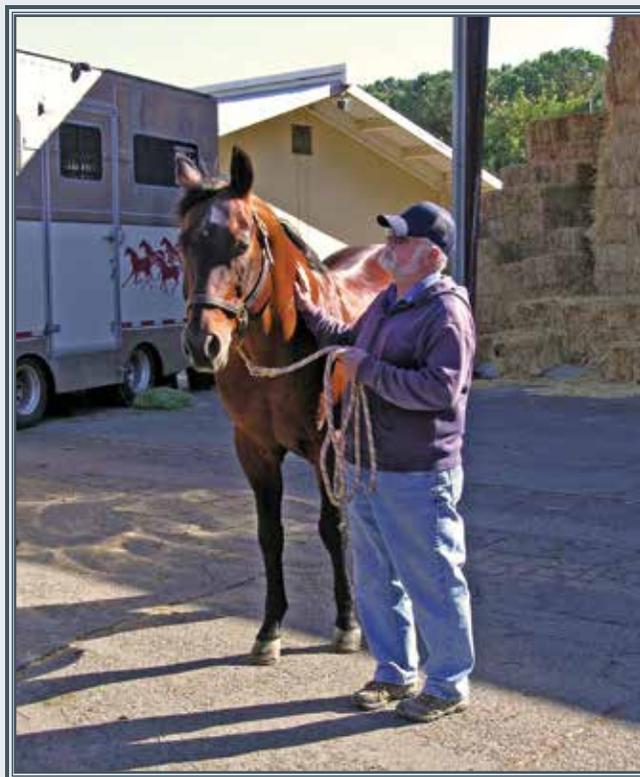
Best Wishes to Zippin Bonanza Flash

by Paul Mickel

Zippin Bonanza Flash, aka Bo, came to the Center for Equine Health around the same time as I did (2003). He was the nicest stud I had ever worked with, quiet and well behaved without all the stud mannerisms many stallions have. His only fault was that he didn't have much of a sense of humor, as he never seemed to get any of my jokes. I forgave him for that.

In or out of the breeding shed, Bo was easy to handle. And when people came to see him, they were always impressed with how quiet and well behaved he was. His babies were easy to spot because they showed a lot of his characteristics. They had good dispositions and looked a lot like him.

Now Bo has come full circle. He's gone back to his original home where he started 24 years ago. I like to think that he will have his own barn there, because he deserves nothing but the best. He will be sorely missed here at the CEH. So long Bo!



Miniature Horses as Guides for the Blind or Disabled

Miniature Horses have shown great promise in serving as guide animals to the blind or disabled. People who have experimented with guide horses report that they perform exceptionally well at keeping their person safe. The horses demonstrate excellent judgment and are not easily distracted by crowds and people. There is a strong demand for guide horses among blind horse lovers, those who are allergic to dogs, and those who want a guide animal with a long lifespan.

There are many compelling reasons to use horses as guide animals. Horses are natural guide animals and in fact have been guiding humans for centuries. They have been shown to possess a natural guide instinct. When another horse in a herd goes blind, a sighted horse accepts responsibility for the welfare of the blind horse and guides it with the herd. Through history, Cavalry horses have been known to guide their injured rider to safety. Several characteristics of horses that make them suitable as guide animals include their calm nature, great memory, excellent vision, focus, safety orientation (looking out for danger), stamina and good manners.

To read more about guide horses:

Her Assistant, Her Guide, Her Horse, by Tim O'Brien, timesunion.com, Albany, NY

<http://www.timesunion.com/local/article/Her-assistant-her-guide-her-horse-3665174.php#ixzz2GUSXbjTZ>

Decoding Your Horse's DNA

Do you want to verify your mare's parentage for a breed registry? Or need to know if your stallion carries a recessive gene for a fatal disease that could be passed along to offspring? These questions and more can be answered by supplying hair samples for DNA testing to the Veterinary Genetics Laboratory (VGL) at the UC Davis School of Veterinary Medicine.

Hair strands with intact roots provide DNA that can reveal parentage, the presence of inherited diseases and desired genetic traits. For breeders, the VGL offers valuable tools to avoid passing along inherited diseases that can either prove fatal or negatively affect the health of the animal. Some of the tests offered include:

- DNA typing to verify parentage (this test will not determine breed).
- Cerebellar abiotrophy (CA) is a genetic, neurological condition found almost exclusively in Arabian horses, but has also been found in low frequency in other breeds that have used Arabian horses as foundation stock. Identification of carriers is critical to avoid production of affected foals.
- Lavender foal syndrome (LFS) is a fatal autosomal recessive condition of Arabian horses, primarily with Egyptian bloodlines, that causes neurological dysfunction in newborns.
- Coat color: Most color assignments can be made correctly based on physical appearance or phenotype alone. However, genetic testing may be necessary to define phenotypes that are visually ambiguous or the color possibilities for offspring.
- Glycogen branching enzyme deficiency (GBED) is a fatal disease that occurs in foals of American Quarter Horses and related breeds. The newborns lack the enzyme necessary to store glycogen in its branched form and therefore cannot store sugar molecules, leaving the heart, brain and skeletal muscles unable to function.
- Hereditary equine regional dermal asthenia (HERDA) is a genetic skin disease found mostly in the American Quarter Horse. The condition typically manifests by the age of two and the majority of diagnosed horses are euthanized because they are unable to be ridden and are inappropriate for breeding.

- Hyperkalemic periodic paralysis (HYPP) is an inherited disease of the muscle that results in excessive potassium in the blood, making the horse susceptible to sporadic episodes of muscle tremors or paralysis. This genetic defect has been identified in descendants of the American Quarter Horse sire, Impressive.

- Horse embryo pre-implantation genetic diagnosis (PGD) is a procedure used to screen embryos to determine genetic traits prior to implantation in a surrogate mare. The test allows selection of those embryos that are free of known genetic diseases, thus maximizing the outcome of the embryo transfer process.

For more information, please call the Veterinary Genetics Laboratory at (530) 752-2211 or visit their website at www.vgl.ucdavis.edu.



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School of Veterinary Medicine
University of California
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Center for Equine Health
(530) 752-6433
www.vetmed.ucdavis.edu/ceh
www.facebook.com/ucdavis.ceh

Director: Dr. Gregory L. Ferraro
glferraro@ucdavis.edu

Assistant Director: Dr. Claudia Sonder
eqdvm@yahoo.com

Senior Editor: Barbara Meierhenry
cehwriter@ucdavis.edu

Management Services Officer: Katie Glide
kaglide@ucdavis.edu

Dean, School of Veterinary Medicine:
Dr. Michael D. Lairmore

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