



EQUINE HEALTH UPDATE

For Horse Owners and Veterinarians
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Equine Odontoclastic Tooth Resorption and Hypercementosis: A Dental Disease That’s Quite a Mouthful

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Within the last decade, an underdiagnosed dental disease has emerged in the area of equine dental health. The disease is Equine Odontoclastic Tooth Resorption and Hypercementosis, or EOTRH. This is a slowly progressive and painful disease, affecting predominantly the incisor (front) and canine teeth of aged horses and less commonly affecting the cheek teeth. It is most often seen in Thoroughbreds and Warmbloods over 15 years of age, although any breed is susceptible. It affects all of the structures that make up the tooth, including the cementum, dentin, enamel, pulp, and bone. The disease is characterized by internal and external tooth resorption/destruction in addition to deposition of irregular cementum. There are three types of EOTRH, which are classified based on the main pathologic process involved. The **resorptive** type is characterized by significant dental resorption. The **hypercementotic** type is characterized by unregulated deposition of irregular cementum, or a bone- or cement-like material. Lastly, the **mixed** type is characterized by dental resorption and cementum deposition. In general, EOTRH typically progresses from the third (or outside) to first incisors. Some common questions related to EOTRH are answered below.



What causes EOTRH?

The cause of EOTRH is unknown; however, the disease is believed to be multifactorial. The disease process is related to a physiologic inflammatory reaction in response to increased occlusal forces in aging teeth. Occlusal forces are those forces that result from the surface of one tooth contacting the opposing surface of another tooth in the opposing jaw. Excessive mechanical stress on the periodontal ligament (the tissue that attaches the tooth to the bone within which it sits) causes death of periodontal cells and release of inflammatory mediators that

recruit cells to the area causing tooth resorption, and compromised tooth integrity. This process begins the cascade of events leading to the unregulated deposition of irregular cementum (hypercementosis). In addition, age-related stress may also create suitable decaying regions in the gums that allow bacterial organisms to thrive and promote the development of EOTRH.

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EOTRH *(continued from cover)*

What signs will I see if my horse has EOTRH?

Clinical signs of EOTRH are variable depending on the progression and severity of the disease. The most common clinical signs include pain and inflammation in and around the front teeth and gums. Visually, the gums surrounding affected teeth may be reddened. Pain associated with this disease may lead to weight loss, as horses may become reluctant to eat. Signs of more severe or advanced cases of EOTRH may include: ulceration of the gums, draining tracts around affected teeth, development of a bulbous, roughened appearance of the affected teeth, and fractured, missing, or loose teeth (Figure 1). Behavioral changes associated with cases of EOTRH include: head shaking, reluctance to pick up or chew hard foods such as apples or carrots, head shyness, increased drooling, and reluctance to take the bit.

How is EOTRH diagnosed?

EOTRH is diagnosed from external observation of tooth appearance and by taking x-rays in the mouth of the canine and incisor teeth. The two radiographic findings consistent with EOTRH are dental resorption and bulbous enlargement at the base of affected teeth.

What is the treatment for EOTRH?

For mild cases, a combination of home care including removal of food accumulation between teeth, tooth brushing, and topical administration of a chlorhexidine antiseptic solution can be performed. Other therapies include pain management, antibiotic therapy, and dietary modification to softer, more easily chewable foods. Moderate to severe cases of EOTRH are treated with surgical extraction of affected teeth. Depending on the amount and extent of teeth affected, one to all of the affected teeth may need to be removed (Figure 2). Horses without any incisors may take some time adjusting to learning how to graze; however, with time they learn to grasp grass with their lips. Cosmetically, removal of the incisors does not affect the outward appearance of the horse with the exception of some cases in which the tip of the horse's tongue may protrude from the mouth.

Take Home Messages

Equine Odontoclastic Tooth Resorption and Hypercementosis is an underdiagnosed, painful dental disease affecting older equines. Diligent and careful observation of any behavioral changes and performance of routine oral examinations in your horses can facilitate early diagnosis of this slowly progressive disease.

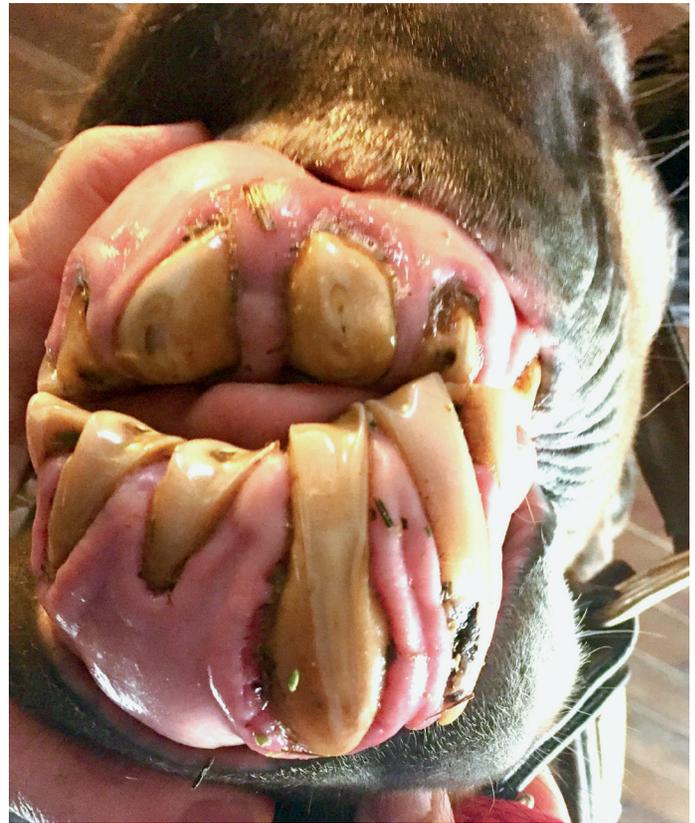


Figure 1: Bulbous, resorbed teeth and gingivitis in a horse affected by EOTRH.



Figure 2: Thickened and inflamed incisor teeth extracted from a horse with EOTRH.

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Reproductive System Examination in Mares

By Brian Cerrito, DVM Student (Class of 2017) – Edited by Dr. Jennifer Koziol, DVM, MS, Dipl. ACT

Examination of the mare's reproductive system is important not only for breeding, but also for assessing the overall health of the mare. If your goal is to breed your mare(s) next year, contact your veterinarian and get organized before the breeding season.

Why should my mare have a reproductive exam?

Determining a mare's fertility and ability to produce a foal are not the only reasons to examine a mare's reproductive system, though it is the most common reason. Reproductive exams can also be conducted during pre-purchase exams, in the event of major trauma or severe abdominal pain, for insurance purposes, and when the mare is behaving or cycling abnormally. For reproduction purposes, mares should be examined prior to the breeding season to assess the overall health of the mare along with the health of her reproductive tract.

Components of a full reproductive exam

As with any exam, a reproductive exam should always begin with a general history and physical exam. A mare's ability to carry a foal depends on her reproductive system as well as her overall health. Discussing the mare's reproductive history with your veterinarian is also important. Questions about when and how the mare was previously bred, how the mare was previously bred (live cover or artificial insemination), and whether or not a veterinarian conducted the breeding, are all important pieces of information to share with your veterinarian.

The reproductive examination begins with the examination of the perineal area (vulva, anus), followed by trans-rectal palpation and ultrasound of the uterus and ovaries. A speculum exam of the vagina and cervix with digital palpation combined with a uterine culture, cytology, and biopsy should be performed as well.

The perineal region of the mare should be examined for poor conformation. If this is noted, a Caslick's procedure to partially close the vulva can be performed to act as a barrier to keep outside contamination from entering the reproductive tract and making its way to the uterus. Transrectal palpation and ultrasound of the mare's entire reproductive tract including the uterus and ovaries should be performed and can give vital information to the veterinarian. Ultrasound may reveal problems within the uterus or ovaries that could be undetectable by palpation even for the well-trained veterinarian. Speculum exam of the vagina and cervix along with digital examination are necessary to ensure that there are no adhesions or tears subsequent to the previous foaling that are preventing the cervix from functioning properly. Urine pooling can be detected during this part of the examination as well.



Assessment of the health of the uterus can be performed by utilizing uterine cytology, culture and biopsy. Cytology and culture can be used to detect inflammation or infection of the uterine lining (endometritis) caused by bacteria, yeast or fungi. A uterine biopsy can give more in-depth look at the uterus with evaluation of all layers that line the uterus. The biopsy should be graded and will give you a prognosis for the mare's ability to carry a foal to term under proper management conditions.

Additional testing

Additional testing may be warranted in some cases to allow the practitioner to increase their understanding of the findings of the reproductive examination. Commonly performed tests include hysteroscopy, hormone testing, and karyotyping (chromosome testing). Hysteroscopy involves using an endoscope to visually examine the uterus. Hormone testing and karyotyping require blood collection and results usually take several days.

Common fertility problems in mares

While some mares are normally able to carry and give birth to healthy foals without any problems, there are several common diseases and conditions that are seen in mares. Endometritis, or inflammation of the endometrial lining of the uterus, is the most common reproductive problem in mares and may cause the mare to not conceive following breeding. Ovarian enlargement is another problem that can be due to a number of physiologic abnormalities. The most important of these abnormalities is a granulosa-theca cell tumor (GTCT) that can cause notable behavioral abnormalities. Uterine or endometrial cysts, hemorrhagic anovulatory follicles/ovarian hematomas, and pyometra are also findings that may cause infertility or decreased fertility in mares and require medical attention by your veterinarian.

There is a vast expanse of research that has been performed on the mare's reproductive system, but there is still more to learn. In the end, a healthy mare producing a healthy foal is the best possible outcome after performing a reproductive exam for breeding purposes.

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White Line Disease

By Clayton Carr, DVM Student (Class of 2017) – Edited by Dr. Tim Lescun, BVSc, MS, PhD, Dipl. ACVS, Purdue Large Animal Surgery

A year with exorbitant rainfall can cause bigger problems than muddy horses. Damp, wet conditions can spell disaster for horse feet. There are multiple hoof conditions that are exacerbated by extremely wet conditions including White Line Disease. White Line Disease (WLD) is the common name for a progressive hoof wall separation that occurs at the junction between the stratum medium and lamellar horns (hoof wall and sole) of the hoof. This condition goes by several other names such as dew poisoning, yeast infection, *Candida*, hoof rot, and onychomycosis.

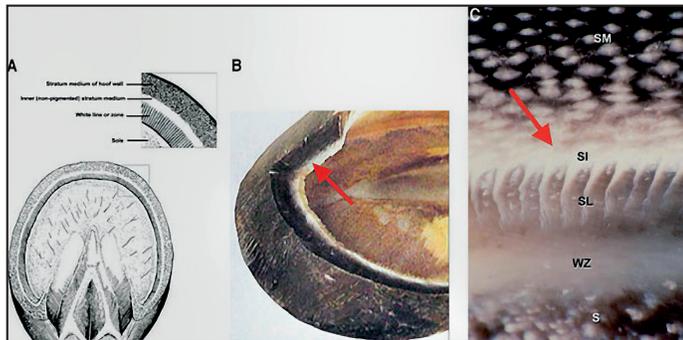


Figure 1. Anatomy of the Equine Hoof. Stratum Medium (SM), Stratum Intermedium (SI) and Stratum Laminar (SL). http://www.equipodiatry.com/article_white_line.htm

There are almost as many names for this condition as there are suggested causes. There is no one proven cause of WLD, but there are many factors that contribute to its onset and progression. The most agreed upon contributor is the environment. Extremes in moisture such as very wet swampy pastures or very dry moisture absorbing conditions can predispose a horse to this hoof condition. Therefore, the highest prevalence of WLD occurs in the southeastern United States, and it is most common during the rainy part of the year. Other contributing factors include nutrition, mechanical forces, and infectious organisms.

Hoof quality, strength and growth rate depend on the body's ability to consume and process adequate amounts of protein, vitamins, and minerals. It is essential to provide a good quality diet for one's horse that contains vitamins, such as biotin, and minerals, like selenium and zinc, to encourage proper hoof growth. Therefore, feeding a good quality diet can help decrease the occurrence and recovery time of WLD.

Mechanical factors that cause damage or stress to the stratum medium and lamellar horn junction can be both the inciting cause and the reason for progression of WLD. For example, when a horse's hoof is too long, it puts stress on the toe and outer portion of the hoof causing it to pull away from the inner structures, weakening the stratum medium and lamellar bond. A long toe also results in additional pull on the coffin bone by the deep digital flexor, causing rotation and the inner structures of the foot to pull away from the outer hoof wall.

Once an inciting cause results in separation of the white line, it is possible for secondary bacterial and fungal infections to invade and cause further damage. It is unlikely bacterial and fungal infections are a primary cause of white line disease,



Figure 2. Crumbling of the Hoof Wall. <http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3292.1998.tb01785.x/full>

because the condition can be cured with debridement alone. Whether infectious organisms are primary or secondary invaders of the hoof, their presence results in increased separation up the white line and slowed healing and repair of the hoof.

It is crucial to recognize the clinical presentation and to make an early diagnosis of WLD. It can be present in one or more feet per horse, and one or more horses per farm can be affected at a time. Most of the time WLD is an unexpected finding on a routine hoof trimming and appears as grey to black, dry, crumbly horn material. Other common presentations include black serous drainage, crumbling of the hoof wall at the ground, hollow sounding hoof walls on percussion, and even lameness. The lameness is usually mild, but it can be severe if the WLD is secondary to laminitis and rotation of the coffin bone.

The **definitive** diagnosis is made by clinical presentation. Findings such as grey crumbly horn material at the area of the white line, **dark material being present deep in the white line**, and a hollow sound on percussion of the hoof wall all help confirm the diagnosis. Lateral and dorso-palmar (front to back) radiographs of the foot are recommended to determine the extent of the disease and to differentiate WLD from laminitis. Separation of the wall can be seen on radiographs as air between the hoof wall and the deeper structures of the foot. The separation begins at or near the ground surface in WLD, while the separation begins higher up in laminitis cases. Once the severity and extent of the hoof wall separation has been determined, a treatment plan can be developed.

Treatment of WLD consists primarily of resecting the affected hoof wall. It is important to debride all tracts to ensure proper healing and to decrease the chances of recurrence. Next, the remaining hoof wall needs to be stabilized. The degree of stabilization is dependent on the extent of hoof wall debridement.



Figure 3. White Line Disease. Separation of hoof wall starts at the ground. http://www.equipodiatry.com/article_white_line_fresh_look.htm



Figure 4. Laminitis. Separation starts higher up the hoof at the level of the coffin bone. http://www.equipodiatry.com/article_white_line_fresh_look.htm

Meet our Staff...



Angie Hilbun

Hi! I'm Angie Hilbun. I started working at the Purdue Veterinary Teaching Hospital 19 years ago, 8 years in the Small Animal Hospital and the last 11 years in the Large Animal Hospital. I like the variety and challenges of the day to day contact with clients and clinicians. In my free time I enjoy being outdoors, road trips, shopping and spending time with my family.



Katy Lewis

Hi! I'm Katy Lewis. I started working at the Purdue Veterinary Teaching hospital three years ago. I started off as a part time Small Animal receptionist. I have been cross trained to work in the Large Animal hospital for the past 2 years. I really enjoy my time working with clients on both ends of the hospital. I personally own 15 horses, 2 dogs and 6 chickens. I have always used the Purdue Equine Community Practice for my horses so I am proud to also work with those same doctors on a day to day basis. In my free time I enjoy working on our ranch and riding horses with my husband. We will be welcoming our first child at the end of July!

News & Notes



Stephanie Stillwell

Hi! My name is Stephanie Stillwell. I have worked at the Purdue Veterinary Teaching Hospital for 20 years, 5 years in Small Animal and 15 years in Large Animal. I enjoy working with the public. I have 2 rescue dogs, Daisy and Dixie, both of which are quite spoiled. In my free time I love to cook and spend time at Lake Shafer. Boiler UP!!!

Stabilization can range from a simple shoe, to a shoe with clips, to a medicated acrylic placed over the debrided portion of the hoof. The shoe should also be placed so that the hoof's breakover point is moved backwards. This change will help to decrease the mechanical force on the dorsal hoof wall and the toe. Acrylics such as polymethylmethacrylate have also been used to repair the hoof wall in cases where cosmetics are a necessity. This method is not recommended because it can trap bacteria under the acrylic and weaken the surrounding hoof wall.

Topical antibiotics and antibiotic infused acrylics have been used but in most cases are not necessary. The most important step in stopping the disease process and preventing reoccurrence is to adequately resect the affected hoof wall and all of its tracts **and provide ongoing stabilization.**

Once the initial resection has been performed it is important to maintain a regular shoeing schedule every four weeks. This will allow for proper maintenance of the hoof support and observation of the healing process. Along with regular hoof maintenance, it is necessary to make environmental changes. The feet should be kept as dry as possible by providing clean, dry shavings in the horse's stall, and turnout should be restricted during wet conditions such as rain and heavy dew.

WLD prevention is difficult due to the lack of a single definitive cause, but there are steps one can take to decrease the likelihood of occurrence. First, keep horses out of extremely wet environments. Second, provide a good quality diet for the horse, that contains adequate levels of vitamins and minerals to promote healthy hoof growth. Lastly, keep horses' hoofs properly trimmed and look for signs of WLD on routine trimmings. ↻



Figure 5. Equine foot post hoof wall resection. <http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3292.1998.tb01785.x/full>



Figure 6. Hoof wall resection and horse shoe with clips to provide stabilization. <http://www.thebarefootfarrier.com/Slide-Show.html>

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Donkeys in Danger!

By Stacy H. Tinkler, DVM, MPH, Dipl. ACVIM
Purdue Large Animal Internal Medicine

Did you know that...

- 🔗 There are 44 million donkeys estimated world-wide, and the vast majority are in developing nations and are used as working animals?
- 🔗 Donkeys are used for packing, riding, plowing and pulling carts as well as entertainment and food production?
- 🔗 Donkeys are consumed for milk, meat and even their skins?



Thousands of donkeys in the developing world that people depend on for their survival are being killed for their hides. Donkey hides are boiled to produce a medicinal gelatin, which is the main ingredient in a traditional Chinese medicine called *ejiao*, sold in gelatinous bar, pill or tonic forms. *Ejiao* is considered to be a “blood tonic” and is reportedly used to treat “blood deficiency” in traditional Chinese medicine cases—more specifically such conditions as anemia,

heavy menstrual cycles, and to improve circulation for reproductive issues. *Ejiao* was used in royal courts for thousands of years and was deemed “a product worthy of emperors” used to promote good health, long life and fertility until the early 20th century. It has recently seen an online and television marketing push where it is now being promoted as a skin-care product that preserves youth and beauty, which has resulted in exposure and appeal of the medicine to a younger, consumer-driven Chinese populace. *Ejiao* is big business, with 2 lbs selling for about \$388 and with China as the main importer of donkey hides world-wide.

The demand for donkey hides, anywhere from 4-10 million skins, has surpassed the donkey supply over the past 2 years. This means that 4-10 million donkeys will have to die every year to in order to meet the demand for *ejiao* production in China due to the skin trade. This demand is unsustainable, and has major animal welfare implications as well as risks to the livelihood of millions of people in the developing world who depend on donkeys. China’s donkey population has declined from 11 million to 6 million over the past 20 years due to the *ejiao* trade, thereby fueling the demand for hides. This demand has increased the value of donkeys in some countries, making them unaffordable to those who depend on them for their day-to-day survival for taking goods to market, farming and transportation. Many countries with large donkey populations report an increase in legal donkey slaughter, as well as illegal “bush” slaughter (poaching) where animals are being stolen, slaughtered and skinned in rural African communities. Additionally, this demand for donkey hides has increased the cost of donkeys in certain countries 10-fold (from ~\$20 to ~\$200), making purchase of replacement donkeys almost impossible for

poor families who have had their only donkey stolen and who only earn several dollars a day. In 2016, Sub-Saharan Africa provided 25% of this trade to China, up from 2.3% in 1985. The response to this threat has been sparse. A number of countries have taken steps to ban donkey hide export but there are still many countries that are supplying the Chinese market.

Attempts have been made to farm donkeys to meet the demand for *ejiao* but due to low fertility rates among donkeys, this has not been successful.

What are the animal and human welfare issues at hand?

- 🔗 Donkeys are stolen from their families where they are often well-cared for and have lived and worked for many years and then put into the hands of strangers who transport them long distances with little to no opportunity for food, water and rest
- 🔗 Many donkeys are slaughtered for their skins only, with no value placed on their meat. In these cases, sick or weak donkeys can be used for profit and subjected to significant stress and mistreatment
- 🔗 There are no legal, humane-slaughter guidelines in place when animals are being poached or slaughtered illegally
- 🔗 For every working donkey sold into the meat and skin trade, there is an impact on their owners and the remaining donkeys—sick or weak/older donkeys will be relied upon when there are no resources to buy a healthy replacement donkey or the women and children in the communities will fulfill the role of the donkey and be used as transportation
- 🔗 Donkeys play key roles in their communities—empowering women, and providing freedom for children to study instead of working

So what is the way forward?

The Donkey Sanctuary, a UK-based non-profit in support of donkeys world-wide who has investigated the skin trade thoroughly, recommends the following actions be taken:

- 🔗 Halt the donkey skin trade and *ejiao* production until the impact of the trade can be assessed and shown to be humane for donkeys and for the communities that depend on them
- 🔗 Urge other countries affected by this trade to ban the slaughter and export of donkeys for their skins
- 🔗 Raise public awareness about the impact of this trade so that *ejiao* consumers can make an informed choice
- 🔗 Governments and local authorities need to join forces and support affected communities, protecting them from the illegal trade and preventing the decimation of donkeys through legal trade

WHAT YOU CAN DO:

Do not buy products containing *ejiao*

Read the full report by the Donkey Sanctuary about this issue at the Donkey Sanctuary. Click on the link below:

<https://www.thedonkeysanctuary.org.uk/under-the-skin>

Share this link with friends and family to raise awareness of this important issue

Strangles: How to Manage Disease in Your Barn

By Megan Brunn, DVM Student (Class of 2017)

Edited by Stacy H. Tinkler, DVM, MPH, Dipl. ACVIM, Purdue Large Animal Internal Medicine

“**Strangles**” is a contagious disease caused by *Streptococcus equi subspecies equi* bacteria. The disease typically presents with a fever and decreased appetite followed by mucopurulent (white/yellow/green) nasal discharge and swollen (abscessed) lymph nodes. Sometimes these lymph nodes rupture and form draining tracts around or under the jaw. The disease gets its name because in severe cases the lymph nodes will get big enough to block the airways hence leading to asphyxiation or “strangling” of the horse. “Strangles” doesn’t typically result in death; however, it can be a very expensive disease to treat and manage. Quarantine and good biosecurity are important to prevent disease transmission.

“Strangles” is transmitted by direct contact with nasal discharge containing *Streptococcus equi equi* bacteria. This includes

nose to nose contact and/or contact with any object that may be contaminated with bacteria such as hoses, buckets, your clothes, and tack or grooming equipment. Once a horse is diagnosed with “Strangles”, the horse should be isolated as far away as possible from other horses and should have its own food and water supply. Direct contact should be reduced to as few people as possible and the infected horse and stall should always be handled after all the healthy horses. Signs should be placed to inform others to not enter the stall and an area around the stall should be designated

and cordoned off from the barn. This area will be a contaminated area to store items such as pitch forks, grooming supplies, buckets and other items needed to care for the horse while in isolation. It is important to not share these items with other horses during quarantine and that the items are thoroughly disinfected at the end of quarantine with a 10:1 solution water to bleach in order to reduce transmission risk. Coveralls or biosecurity suits, gloves, and boots should always be worn inside the contaminated areas to prevent contamination of clothing and oneself and removed and left in the contaminated area before you move onto another healthy horse or uncontaminated area. High risk horses (horses that were in contact with an infected horse) that are not showing signs of disease should have their temperatures taken twice daily and managed in the same way as the sick horse showing signs: cease direct contact with other horses, disinfect objects before touching another horse, wash hands and wear gloves between horses, and no sharing of water sources. Talk to your veterinarian for more detailed and customized biosecurity protocols for your barn should you have a case of “Strangles.”

Quarantine is voluntary and not enforced by the state in Indiana; however, it is the prudent action during an outbreak. Infected horses and all at-risk horses on the property ideally should be included in a no-travel quarantine until the disease is under control on the farm, so as not to put other horses at risk of infection. This means no horses enter or leave the property until testing

confirms the absence of bacterial shedding from the infected horse or horses. Testing should be performed at minimum 3 weeks after the complete resolution of clinical signs (nasal discharge, fever, swollen lymph nodes) but horses recovering from disease may shed bacteria (and therefore still be contagious to other horses) for up to 6 weeks. Ideal testing to release animals from quarantine includes a guttural pouch endoscopy, wash and PCR of the fluid. Biosecurity procedures described previously need to be followed until the testing confirms clearance of the organism. Some horses can become chronic shedders and if a one is suspected or identified on your farm, quarantine, testing and further treatments to eliminate the bacteria are needed. If any clinical signs return in any horse on the farm at any time, the quarantine clock is reset.

There are a few methods to reduce the presence of “Strangles” in your barn. The most common method is vaccination. Modified live intra-nasal vaccine or killed intra-muscular vaccine are available to prepare the immune system for exposure in high risk horses. Although the vaccines are effective they do not guarantee 100% protection, and some horses are not good candidates for vaccination. The killed vaccine does not generate as strong of an immune response as the intra-nasal vaccine, and both vaccines have associated reactions but they are generally rare. You can discuss

with your veterinarian which vaccine, if any, is right for your horse. Any new horses should be quarantined for two weeks after arrival to a new barn in order to prevent disease transmission in the case they are shedding the bacteria or other respiratory pathogens. If they don’t show clinical signs within this time frame they are unlikely to be infected with “Strangles” and can be introduced to the herd.

“Strangles” is a highly infectious disease that can be both costly and difficult to treat and manage. To reduce spread, quarantine new horses or horses returning from shows for two weeks to watch for signs of illness before introducing back to the herd. If a horse contracts “Strangles” a veterinarian should be involved to help treat symptoms, manage the barn quarantine, and perform diagnostic tests to release the barn from quarantine. Although “Strangles” is highly infectious and difficult to manage, appropriate vaccination, quarantine and management can help protect your barn from the disease. ↻

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