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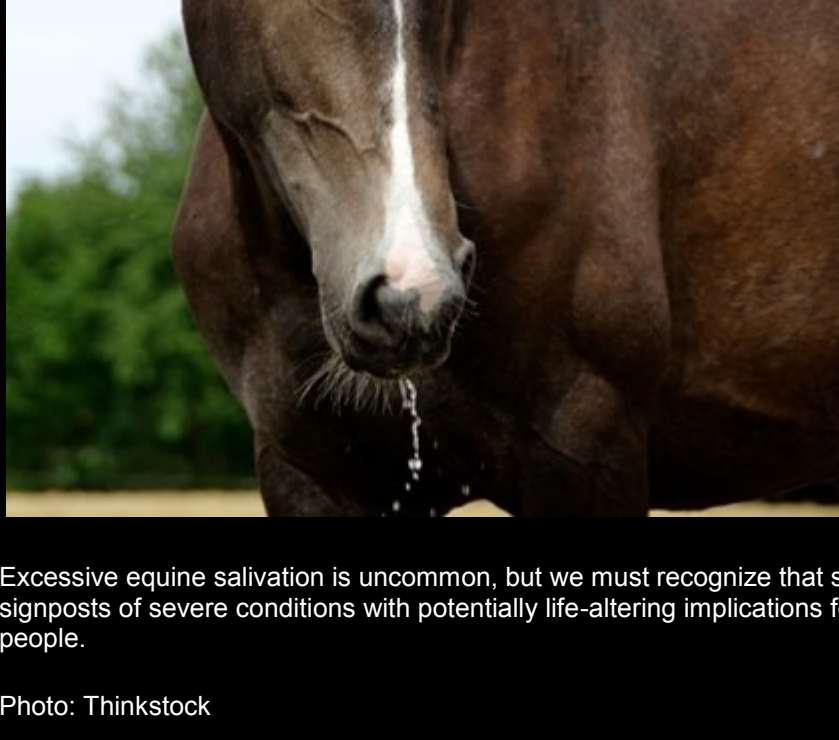
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## Hypersalivation in Horses



Excessive equine salivation is uncommon, but we must recognize that streams of slobber can be signposts of severe conditions with potentially life-altering implications for both horses and their people.

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### Does your horse drool like a dog? Here are some reasons why, from the benign to the life threatening

Serous, slightly slimy, and warm, slobber is pretty gross no matter the source. But while a dog's drivel might simply send you to the sink to wash your hands, a horse's should cause more concern.

Excessive equine salivation is uncommon, but we must recognize that streams of slobber can be signposts of severe conditions with potentially life-altering implications for both horses and their people.

To understand the abnormal, it is important to start with normal—recognizing how horses produce saliva, how much they generate, and why. Horses have three pairs of salivary glands: the parotid, sublingual, and mandibular. Those glands are busy little beavers, producing almost 40 liters (about 10 gallons) of saliva each day. That saliva moistens and lubricates food to facilitate its transfer from the mouth, down the esophagus, to the stomach. Saliva is primarily comprised of water, but it also contains sodium, chloride, sodium bicarbonate, and the enzyme amylase.

While equestrians might drool over a pair of designer boots or the barn of their dreams, there are only a limited number of reasons that horses drool excessively, says Inge Wijnberg, DVM, PhD, Specialist Equine Internal Medicine, KNMVD, Dipl. ECEIM, from the Department of Equine Sciences at Utrecht University, in The Netherlands.

"There are really only two main causes for excessive salivation in horses: increased production of saliva or decreased swallowing of normal amounts of saliva," she says.

In this article we will describe several reasons for hypersalivation. In all cases, owners should work with their veterinarians to identify and rectify the primary problem as soon as possible because, as we will discuss, a number of life-threatening conditions could be at play.

#### Infectious Causes

**Rabies** We might as well start with the scariest one and get that out of the way. Rabies can occur in any animal and is most commonly transmitted to horses when infected animals bite them. Terrestrial carnivores (i.e., skunks, raccoons, foxes) and bats are the virus' natural reservoirs.

When an infected animal bites another, the virus multiplies at the bite site and then invades sensory neurons—the nerve cells that conduct information to the central nervous system. Once inside the neurons, the virus can travel through the long arms of the nerve cells, called axons, undetected by and shielded from the immune system. The rabies virus prefers to migrate down specific peripheral nerves to the salivary glands, which explains why infected horses frequently produce large volumes of saliva.

"Rabies is one of the few 100% fatal diseases in the horse that is completely preventable with appropriate vaccination," says Angela Pelzel-McCluskey, DVM, equine epidemiologist with USDA-APHIS Veterinary Services, in Fort Collins, Colorado. "Despite a commercially available rabies vaccine licensed for use in horses since at least 1983, one recent study reported a total of 6,154 rabies cases in 2010, including 37 horses and donkeys," she adds.

Horse owners in rabies-endemic areas should work with their veterinarians to ensure their horses are vaccinated. And owners suspecting their horses could have rabies should avoid any contact with the potentially virus-laden slobber because it can be just as deadly in humans.

**Equine viral arteritis** Reports of equine viral arteritis (EVA) outbreaks are relatively infrequent in the United States, but the virus that causes it—equine arteritis virus (EAV)—remains present in domestic equine populations worldwide.

Some of the most common signs of EVA in horses include:

- Fever;
- Depression;
- Edema (swelling) of the ventrum (below the abdomen) and limbs;
- Inflammation, erosions, and vesicles (fluid-filled sacs) in the mouth; and
- Hypersalivation.

"Over the past 20 to 30 years, there has been a modest increase in the frequency of EVA disease events that has been associated with the greater volume in international movement of horses and trade in equine germplasm, such as semen and embryos," says Peter Timoney, MVB, MS, PhD, FRCVS, of the Gluck Equine Research Center at the University of Kentucky, in Lexington. "Currently, the disease is notifiable (to animal health officials) in only a limited number of states in the U.S." There is no specific treatment for EVA, and outbreaks result in significant economic losses to the industry due to high rates of abortion, death in young foals, and establishment of the carrier state in stallions.

**Borna disease virus** Similar to rabies in some ways, the potentially fatal Borna disease virus affects the horse's nervous system, causing incoordination, behavior changes (sommolence, or drowsiness), and paralysis of the pharynx, or the area extending from the rear of the mouth and nasal passages to the larynx and esophagus, which can cause drooling.

#### Other Hypersalivation Causes

##### CAUSE

Heavy metal toxicity  
Musculoskeletal disorders  
  
Pharynx infections or inflammation  
  
Oral cavity conditions  
Primary salivary gland diseases  
  
Dysphagia (difficulty swallowing)  
  
Tongue abnormality

##### SPECIFICALLY

Grazing on lead-contaminated pastures  
Fractured bones of the mouth or hyoid apparatus (voice box); temporohyoid osteopathy (fusion of these bones, etc.)  
Strangles, *Streptococcus equi*, retropharyngeal lymphadenopathy (pimples), swelling of the pharynx, guttural pouch disease  
Foreign pain, tongue injuries, inflammation, cellulitis, trauma  
Inflammation, salivary stone or mucocele (small, fluid-filled sac) formation, trauma, neoplasia of the salivary gland or duct (adenocarcinoma, melanoma)  
Facial nerve trauma, pharyngeal paralysis, megaesophagus (esophageal motility disorder),  
*Actinobacillus lignieresii* infection (wooden tongue)

##### Toxic Causes

**Clover** The Rhizoctonia leguminicola fungus growing on clover, especially red clover, can cause hypersalivation in horses. This is because the fungus produces two compounds, slaframine and swainsonine, the former of which has the ability to stimulate the parasympathetic nervous system, causing excessive saliva production.

"Hypersalivation is a hallmark feature of slaframine toxicity, which is why this condition is also referred to as 'slobbers.'" says Wijnberg. "Horses with slobbers have been reported in various geographic areas, including the central, southeastern, and southwestern U.S."

Ruminants such as cows can also suffer from slaframine toxicity, with additional signs including anorexia, bloat, diarrhea, frequent urination, and excessive eye tearing; however, excessive salivation is the most consistent indication that horses have ingested the fungus, and in some cases it is the only sign of toxicity. After elimination of the source, horses quickly return to normal without specific therapy. The clover typically does not cause damage, but in severe cases can lead to photosensitization (increased susceptibility of skin to UV light) and liver disease.

**Organophosphate toxicity** Certain types of phosphorus-containing insecticides designed to protect animals and plants can be toxic to horses. Organophosphates, which historically have been used for parasitic infections, such as bots and pinworms, in horses, can be a major cause of poisoning in all animals if toxin levels reach beyond what the body can handle. Accidental agricultural poisonings can occur when farmers use organophosphates to prevent crop destruction.

Signs of initial toxicity are fairly consistent among affected horses and include:

- Excessive drooling;
- Small pupils;
- Frequent urination;
- Diarrhea;
- Colic; and
- Difficulty breathing.

If the horse is left untreated, muscle spasms, weakness, nervousness, lack of coordination, and seizures can follow.

**Ulceration** A variety of ulcer types can form on the horse's body, both externally and internally, including his tongue, lips, stomach, and right dorsal colon. Hypersalivation is fairly common in horses with mouth, esophagus, and/or stomach ulcers. Owners might also notice affected horses showing signs of difficulty eating, pain when swallowing, colic, and anorexia.

Owners can help prevent and treat equine ulcers by:

- Giving non-steroidal anti-inflammatory drugs judiciously, as some can cause ulcers and kidney damage;
- Administering veterinarian-prescribed ranitidine or omeprazole to decrease acid production in the stomach; and
- Using the protectant sucralfate to coat the ulcer and allow it to heal.

**Equine grass sickness** This enigma continues to plague horses in Europe, especially in Scotland, but veterinarians also diagnose it in other parts of the world, including the United States. Veterinarians don't know exactly what causes this autonomic nervous system dysfunction, but one hypothesis is that a toxin produced by the Clostridium bacterium in pastured horses is to blame. Researchers believe the toxin spreads throughout the body, causing classic signs of colic, loss of appetite, excessive salivation, and in many cases, death.

#### Gastrointestinal Causes

**Dental or oral disease** During the 2013 American Association of Equine Practitioners' (AAEP) Focus on Dentistry Abnormalities, Jon Gieche, DVM, FAVD EQ, of Kettle Moraine Equine Hospital and Regional Equine Dental Center, in Whitewater, Wisconsin, highlighted the importance of performing oral examinations every six to 12 months beginning at a foal's newborn exam. Veterinarians can easily identify hypersalivation-inducing oral cavity abnormalities during a properly conducted oral examination, including:

- Plaque;
  - Calculus (tartar);
  - Sulcular (between the gum and the tooth) bleeding;
  - Gingivitis (gum inflammation);
  - Tooth mobility;
  - Oral masses;
  - Periodontal pockets and widened spaces between the teeth that can result in food getting stuck; and
  - Malocclusion (a misaligned bite).
- "The more common abnormalities of the oral cavity capable of causing hypersalivation include malocclusions; periodontal disease; trauma to oral soft tissues, dental hard tissue, or supporting bone; foreign bodies; and oral masses/tumors," says Gieche. "Essentially, anything that can irritate the oral mucosa or cause oral pain has the potential to cause hypersalivation."

**Choke** Horses that choke have material in the esophagus that cannot pass to the stomach as it would normally (hence, it's also known as esophageal obstruction). Signs of choke include anxious behavior and standing with the neck extended. Gagging or retching can occur, particularly if the obstruction is located in the proximal (upper) esophagus close to the throat. You might note a frothy nasal discharge containing saliva and food material, in addition to dysphagia (inability to swallow) and ptyalism (excessive drooling). The extent of hypersalivation and other clinical signs depends on the severity of the choke and the foreign material's location in the esophagus.

**Gastric neoplasia (tumors)** Although relatively rare, in one study of equine gastric cancer published in a 2009 edition of the Journal of Veterinary Internal Medicine, researchers reported that the most common form by far was squamous cell carcinoma. In the 24 affected horses included in the study, the researchers most commonly noted inappetence, weight loss, lethargy, colic, and fever. In addition, they observed hypersalivation in seven of 24 horses with gastric cancer (29%).

**Hepatic causes** Liver diseases, while typically uncommon in horses, can be caused by various triggers ingested in the pasture. For example, some plants contain compounds such as pyrrolizidine alkaloid (PA), which is a common cause of liver disease in horses. Plants that produce PAs are typically unpalatable to horses, but in times of drought horses might consume such plants when grazing or they might eat PA-containing plants inadvertently baled into hay.

"The liver regulates energy metabolism and biotransforms and eliminates foreign substances," said Johanna R. Elfenbein, DVM, Dipl. ACVIM, during her presentation at the 2011 AAEP Annual Convention. "Clinical signs of liver dysfunction are often nonspecific and result from abnormalities of metabolism and excretion."

Affected horses show icterus (jaundice), poor body condition, anorexia, lethargy, mild colic, hepatic encephalopathy resulting in cerebral dysfunction (e.g., behavior changes, stupor, coma), diarrhea, edema, pruritus (itchiness), polydipsia (excessive drinking), and hypersalivation.

#### Take-Home Message

Despite the wide array of potential causes, sources in this field agree that, overall, increased saliva production in horses is rare, and most causes of hypersalivation are easily resolved. But all horse owners are strongly encouraged to approach every slobbery steed with some trepidation, particularly because of the potential zoonotic spread of rabies—a 100% fatal disease. As always, when in doubt, call your veterinarian and ask about your horse's clinical signs.