

# Consequences of Stall Confinement

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Confined horses tend to display undesirable behaviors and are more at risk of developing intestinal or musculoskeletal problems.

When we think of a contented horse, in our mind's eye we see him grazing in an expansive pasture, surrounded by fields of green and other equine companions. But for some horse owners, this vision might also appear as an eager equine head popping over a stall door, attentive to its human entering the barn.

What inspires the practice of housing a horse in a stall? It might have begun as an attempt to provide shelter from adverse weather or to protect the hair coat from sun and dust. Such seclusion also allows a horse to eat without other horses interfering. Stall rest prescribed for an injured horse might persist despite full recovery. And confinement conveniently keeps a horse contained and ready to ride, rather than requiring a hike across the field to catch him.

Whatever the reason, modern horses spend more time confined to stalls or small paddocks, with results that aren't necessarily in the best interests of health or mind.

## The Stall Environment

Without inhabiting a stall, it is easy for us to ignore some microclimate effects of an enclosed space. Frederik Derksen, DVM, PhD, Dip. ACVIM, of Michigan State University's Pulmonary Laboratory in the Department of Large Animal Clinical Sciences, has investigated the effects of such an environment on equine airways.

While viruses and bacteria pose risks to airway health, environmental exposure to particulates dispersed from feed, bedding, footing materials, and other sources (i.e., gas or diesel exhaust) can lead to inflammatory airway disease (IAD). Horses living in a dusty environment have increased mucus in the airways; even a moderate amount of mucus impairs performance, so Derksen stresses, "Mucus matters!"

A critical player in generating respiratory inflammation is endotoxin, a component of the bacterial cell walls of Gram-negative bacteria that is liberated as these bacteria die. Endotoxin is found in large quantities in fecal matter, hay, and straw.

Soaking hay can minimize dust and respiratory irritants, and Derksen suggests feeding wet hay immediately. Bacteria multiply quickly in moist materials, making wet hay a rich source of endotoxin.

He explains, "Endotoxin tends to adhere to airborne particles, which are then inhaled. This is potent stuff and not good for animals or people to breathe. The body thinks it's getting infected, although these are dead bacterial cell walls. This foreign protein (antigen) elicits an aggressive inflammatory response."

Derksen says British studies have shown exposing horses prone to respiratory disease to dust creates lots of inflammation and breathing difficulty. "However," he says, "If endotoxin is removed from dust particles, the reaction is much less severe, indicating that endotoxin is an important stimulus of equine respiratory problems."

He said individual horse behavior affects degree of exposure, too. For example, a horse that defecates in a corner (not walking all over his stall) lessens his exposure.

Ensuring a barn has good ventilation with ample air changes per minute is important to airway health. He notes, "A fan may not carry air flow out of the stall, instead generating a whirlpool effect that whips up dust and endotoxin."

Dust particle concentrations are increased in stalls in proximity to manure handling, air-moving fans, or foot traffic. Derksen recommends consulting with barn designers, engineers, or extension agents to develop effective barn and stall ventilation.

Turnout isn't always a cure. "If horses congregate in one corner of a paddock or pasture (or in a run-in), wind and stamping feet stir up manure and dust to develop a stall-like environment, with increased exposure to endotoxin. And, in overgrazed or overstocked pastures, manure contamination limits clean grazing areas, exposing a horse to more endotoxin."

Other strategies to minimize dust:

- Use high-quality, low-dust hay/bedding;
- Clean stalls of manure and urine-soaked bedding regularly--twice daily is best;
- Minimize activities that kick up dust when horses are inside (i.e., raking, sweeping, leaf blower use); and
- Place fans so they don't whip up dust.

## **Confinement and Intestinal Health**

Recently imposed stall confinement is associated with 54% of impaction colic cases; researchers on another study found 62% of colon impactions occurred within two weeks of significant management changes, such as stall confinement or transport. Earl Gaughan, DVM, Dipl. ACVS, a surgeon at Littleton Equine Medical Center, in Colorado, notes, "The word 'change' is the most important factor--changes in feed and housing, especially if concurrent, pose a bad formula for intestinal health."

For a horse accustomed to stall confinement and consistent feeding, additional stall time is not as big a worry. However, Gaughan remarks, "Intensive housing and feeding

programs enhance the potential for colic problems as compared to horses living at pasture with the opportunity to regulate their own feeding patterns."

He says to use common sense when stabling: "Minimize changes in feed type, volume, frequency, and water availability."

Reduce feed quantity, especially of concentrates. Vets have acknowledged that free-choice forage intake reduces the incidence of developing gastric ulcers, and Gaughan recommends feeding less calorie-rich hay and supplements. Minimizing a horse's overall stress can also deter ulcers.

Exercise increases metabolism, and there's evidence that light physical activity (walking) stimulates gastrointestinal motility. Fiber digestibility increases by up to 20% in exercised horses, promoting greater retention of the fluid part of the diet and shortened retention of the more formed, particulate part, deterring impaction colic.

Just as dietary changes challenge equine digestion, horses with sudden decreases in activity should be monitored closely for digestive problems that can lead to colic. Gaughan says, "As much turnout time as possible is best for overall equine health."

### **Performance Effects**

Patty Graham-Thiers, PhD, of Virginia Intermont College, evaluated confinement's effects on fitness of middle-aged (14-year-old) horses separated into three groups. She and colleagues found that pastured horses and stall-kept horses with nighttime turnout in a small paddock that were in an exercise program demonstrated improved fitness. (More details on the study can be found at [www.TheHorse.com/15901](http://www.TheHorse.com/15901).)

Over 24 hours, pastured horses traveled twice the distance (detected on GPS) of those with only nighttime paddock turnout, averaging 6.7 miles; those in stalls, with or without exercise, went 2.8-3.2 miles. Also, pastured horses had a larger increase in bone density, significantly different from exercised/nonexercised stalled horses.

### **Effects on Growth and Development**

Many studies have focused on confinement of youngsters and musculoskeletal development, particularly joints. One overriding conclusion is that restricting exercise in a growing foal retards cartilage development, but this is reversible once he gets pasture exercise. The objective: Allow pasture playtime to achieve submaximal joint loading. Stall confinement of a young horse can lead to potential cartilage injury, especially if short bouts of heavy exercise are superimposed on unconditioned joints. A newborn's joint cartilage is a blank slate, ready for adaptive change. Particularly before five months of age, juvenile articular cartilage is a dynamic, continuously remodeling tissue, gradually assuming characteristics important to future joint strength and resistance to injury. "Impressionable" cartilage functionally adapts via weight bearing to a "mature" state by 18 months. "Flexural deformities (contracted tendons) can result from

imbalances between growth and exercise," he notes. "If physes (growth plates) or angular limb deformities (crooked legs) generate pain, then exercise restriction is essential. (But) normal weight-bearing exercise is necessary for normal equine limb development."

### **Confinement for an Injury**

Stall rest does not always have negative consequences, according to Gaughan. He observes, "Short-term confinement likely has little influence on joint and musculoskeletal tissue health and maintenance. Horses are obligate weight bearers and as such will engage these tissues even at rest. Some horses may incidentally 'exercise' more when stall confined than with paddock confinement--that is why 'rest' needs careful defining to be effective."

Gaughan says, "Certain injuries (e.g. bowed tendon, post-arthroscopic surgery) are amenable to turnout exercise in final stages of rehabilitation prior to return to controlled exercise or conditioning." This should be supervised and graduated in steps.

Every horse tolerates stall rest differently. Gaughan says, "Give horses as much outside time (with other horses visible) as reasonable for mental and physical health."

### **Behavioral Effects of Confinement**

Raf Freire, PhD (animal behavior and welfare), of Charles Sturt University, in Australia, says, "In common with other social animals, (horses) experience behavioral problems when isolated and confined. Our recent study showed that stabling does not meet horses' needs for exercise, resulting in expression of high levels of activity when given the opportunity to exercise. This 'rebound effect' indicates that stabled horses are frustrated by the inability to exercise." One hour of exercise per day was sufficient to relieve frustration in Freire's study horses, but he stresses that the absolute time out of the stall is not the critical factor; what a horse is able to *do* while outside appears equally, if not more, important.

He emphasizes, "Horses confined for prolonged periods may become increasingly frustrated by lack of exercise--there are likely to be other adverse effects on their social behavior. With time, the prevention of movement, social interaction, and grazing becomes channeled into problem behaviors, such as weaving and crib biting."

Freire added, "A critical finding in our study is that continuously stabled horses were more likely to misbehave during handling and trailer loading, for example. This has important implications for horse and rider safety since the majority of riding accidents are due to horse misbehavior."

### **Take-Home Message**

Confined horses tend to display undesirable behaviors and are more at risk of developing intestinal or musculoskeletal problems. When stalling your horse, consider effects this

might have on general health and emotional state, particularly over the long term. Explore alternatives to balance confinement time with turnout and exercise to optimize your horse's health and performance.