

# Breaking Horses not Bones:

## Properly Raising Young Horses to Avoid Costly Injuries

Determining the best age to begin training young horses is a heated debate within the equine industry. While many believe that horses should be skeletally mature when training begins, others believe it is unnecessary to wait 6 years until skeletal maturity. An online poll by an equine feed company indicated that 79 percent of their followers felt horses should begin training around the age of skeletal maturity (>4 years old) and 21 percent felt that horses should begin training before 2 years of age.

The common opinion that horses need to be fully mature to begin training is based on equine welfare concerns and a fear that early training is to blame for high rates of lameness and breakdown in performance horses. Lameness not only presents welfare concerns within the industry, but it is also very costly. A 1998 estimate found that equine lameness costs the US equine industry \$678,000 to \$1 million per year.

**When adjusted for inflation, the estimated cost of lameness to the 2022 U.S. equine industry is \$1.2 to \$1.8 million each year.**

While advances have been made in veterinary medicine to improve lameness recovery, these solutions are costly. An economical solution to this problem is to prevent lameness before it happens through improved training and maintenance practices. Practicing a proactive approach to lameness prevention, rather than a reactive approach, can improve horse welfare as well as prevent a costly recovery.

Contrary to popular opinion, research has shown exercising young horses in mindful moderation decreases the probability of lameness and improves the musculoskeletal development of bone, cartilage, tendons, and ligaments. In fact, horses exercised before 2 years of age have lower lameness instance rates than horses started at 3 or 4 years of age. Additionally, easily changed management practices, such as providing pasture access, have been shown to decrease instances of lameness and facilitate musculoskeletal development.

Allowing pasture access and incorporating moderate amounts of high-impact exercise can minimize the risk of lameness and

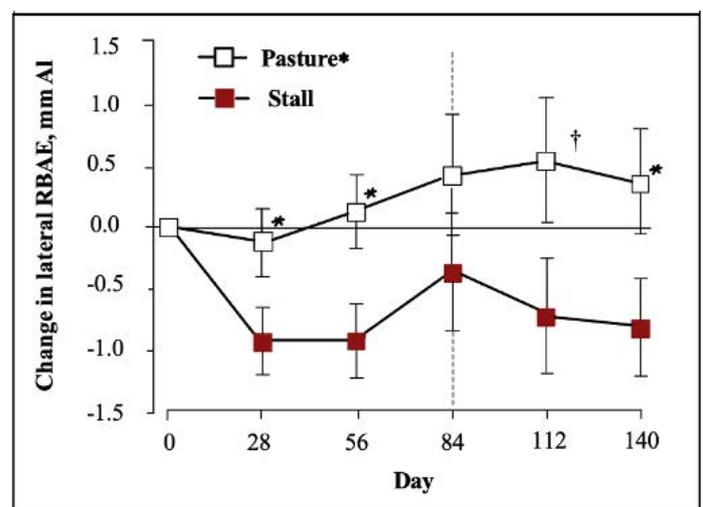
promote proper musculoskeletal development of horses.

Despite the benefits exercise provides in the development of young horses, there are several mistakes owners and trainers should avoid when starting horses. This article presents several missteps that can result in lameness during training.

### Mistake 1: Stalling Young Horses in Training

#### *Stalling Decreases Bone Density*

Horses that are stalled for long periods of time experience weakened, less dense bones that leave them susceptible to catastrophic injury. Horses in these studies were stalled 24/7 except during training, so it is clear some amount of turnout is required to avoid negative implications. This is because when young horses are allotted pasture access, they are likely to run. High-velocity strides cause the bone to become stronger, and when horses are kept in stalls and undergo training that does not include amounts of high-impact exercise, bones lose strength very quickly. The impact of stalling on bone density can be seen in Figure 1, where bone density of stalled horses is significantly and consistently lower than that of horses kept in pastures.



Adapted from Hoekstra et al., 2010

\* In legend indicated pasture different than stalled ( $P < 0.05$ )

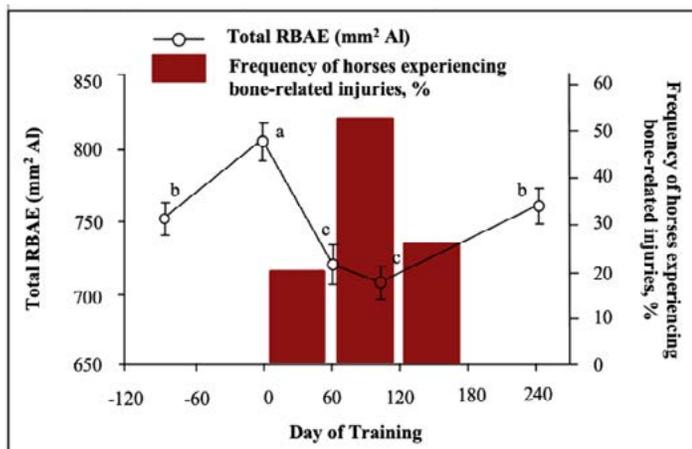
\* In graph indicates pasture different than stalled at given day ( $P < 0.05$ )

† In graph indicates pasture different than stalled at given day ( $P < 0.1$ )

Figure 1. Changes in bone density as measured by lateral radiographic bone aluminum equivalence (RBAE, mm Al) versus day of project.

The decreased bone density caused by keeping horses in stalls has been seen in association with high rates of injury in training, as seen in Figure 2.

**When young horses in training are confined to stalls, their bones lose density and make them more susceptible to injury.**



Adapted from Nielsen et al., 1997

RBAE = radiographic bone aluminum equivalence to measure bone density  
 abc Days lacking a common subscript differ (P<0.05)

Figure 2. Bone density as measured by radiographic aluminum equivalence (RBAE) and periods during which bone-related injuries occurred.

### Stalling Degrades Cartilage

Stalling horses introduces a level of inactivity that negatively impacts cartilage maintenance. The deterioration of cartilage impacts joints, which causes pain during exercise and leads to high instances of costly treatments such as hock injections. It has been found that horses kept in pastures have thicker cartilage than horses who were stalled. Thicker cartilage provides horses more comfort in movement—a positive outcome. It is especially important to preserve cartilage health, as cartilage has limited healing capacities and deterioration is difficult to combat. Allowing horses to have pasture access is a small price to pay for cartilage preservation.

### Stalling Increases Susceptibility to Tendon and Ligament Injuries

Tendon and ligament injuries are two of the most common types of equine injuries. Recovery times range from 6 months to a year, with some horses taking even longer to return to their full potential. Lack of exercise and mobility, such as in stalls, can impair tendon structure and function, leaving horses susceptible to injury.

## Mistake 2: Starting Horses Too Late

Although horse skeletons don't fully mature until age 6, suggesting they shouldn't undergo any training until this point is akin to suggesting children should not exercise until they are adults. In fact, exercise at a young age actually strengthens horses' musculoskeletal structures to prepare them for future strains.

**Exercising horses in moderation during growth strengthens bones, joints, tendons, and ligaments in a way that is not possible after maturity.**

If not developed while the horse is growing, these potential gains are lost and cannot be recovered.

The time of bone formation is an important period in which minerals are either added or removed from bone. This happens in the early years of the horse's life. After it ends, the bone cannot change the net amount of minerals within it. These minerals determine bone strength. Exercising horses early encourages mineralization of the bone, predisposing it for increased strength at maturity.

Moderate levels of work at while young also promotes cartilage and tendon health and maintenance. Exercising horses at a young age improves tendon quality, the adaptation of which is lost after 19 months of age. While the common digital extensor tendon and deep digital flexor tendons fully mature later in life, horses must be exercised during the growth of these tendons at 2 to 3 years of age for optimal strength in maturity.

**Horses that are not exercised before 3 years of age risk cartilage deterioration, diminished bone strength, and weak tendons.**

## Mistake 3: Overexercising Young Horses

While there are clear benefits to starting horses at a young age to optimize musculoskeletal development, there must be an understanding of how to exercise horses to promote development without overtraining.

Overtraining horses has the potential to cause as much damage as underworking them. Overtraining occurs when horses are worked without the opportunity for their body to recover.

Overtraining symptoms include:

- ▶ Fatigue and depression
- ▶ Diminished performance
- ▶ Sickness

- ▶ Mineral deficiencies
- ▶ Decreased healing rate

Overtraining can also cause horses to experience serious injuries due to missteps, and improper pressure loading as a result of intense fatigue.

Young horses are especially susceptible to overtraining syndrome. Many symptoms of overtraining are attributed to heightened cortisol levels, and young horses naturally have higher baseline levels of this steroid hormone compared to mature horses. In chronically high levels, this “stress hormone” is responsible for immune system suppression, which contributes to increased susceptibility to illness.

**Overtraining syndrome can be prevented by allowing horses proper time to recover from exercise. Recovery can take up to 48 hours, even after short spurts of activity.**

Longer training sessions or strenuous competitions can increase necessary recovery times.

While many trainers are hesitant to compromise their training timeline by offering horses time to recover, allowing horses rest after training ultimately saves time, money, and preserves equine welfare in the prevention of overtraining.

## Mistake 4: Training at Low Speeds and Long Distances

Because of the musculoskeletal benefits outlined above, it is important that young horses are trained in a way that optimizes their structural development. Short sessions of high-impact work, such as sprinting, causes bones and tendons to adapt and strengthen in response to the exercise. This work is very important before the age of 3— the age at which bones and tendons begin to lose developmental potential.

After the bones and tendons are strengthened through this work, horses are better prepared for muscle and cardiovascular development with proper rest periods.

Without first preparing bones and tendons, muscular and cardiovascular training through low-speed work over long distances will diminish bone and tendon strength, leaving horses susceptible to costly injury.

## Summary

Research has found that training horses before their musculoskeletal structure is fully mature actually strengthens their bones and ligaments to prevent injuries late in life. Horses that are not trained before maturity cannot benefit from this crucial development and are more likely to become injured in exercise.

**Horses that are trained at moderate levels in short bouts of high-impact exercises are better prepared for the future strain of performance exercise, and therefore have lower lameness rates and higher earnings.**

However, musculoskeletal improvements seen with exercise are negated if horses are placed in stalls during this period. Stalling young horses in training results in weak bones and diminished joint, cartilage, and tendon development. These factors predispose horses to serious injuries and early breakdown.

While exercise that strengthens the musculoskeletal system is important, owners and trainers must be mindful of permitting recovery time to prevent detrimental effects of overtraining.

**Young horses can be started safely before maturity, granting they are not stalled for long periods of time, trained in moderate, short bouts of high-impact exercise, and allowed time to recover from exercise.**

Owners and trainers should talk with their veterinarian about developing a training regimen that takes advantage of the developmental potential of young horses while preventing overtraining.

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