

# Soundness and Health in Performance Horses

The performance horse industry has a large economic impact in the United States, with up to \$122 billion generated in 2017. Equine producers are always looking for ways to keep their animals in optimal physical condition.

## Soundness

Soundness and lameness are common terms in the equine industry. **Soundness** is a reference to a horse's overall health. **Lameness** is a term referencing changes and abnormalities in a horse's gait or movement. Lameness can arise from several factors, including hoof issues, muscular-tendon injuries, laminitis, and others. Roughly \$1 billion is spent on lameness annually. Understanding ways to improve and treat these issues will result in healthier, more sound horses.

## Nutrition

Overfeeding animal athletes is a common problem in the performance horse industry. Owners often feed their horses "from concentrate" diets that have an overabundance of starchy grains. Overconsumption of these high-starch diets can lead to insulin dysregulation and weight gain, which can then lead to equine metabolic syndrome and laminitis. Laminitis can be very painful and debilitating.

Owners must take measures to keep their horse at an acceptable body condition score. How can you provide your horse with the carbohydrates it needs to perform without making it gain excessive amounts of weight? One solution may be to add dietary fat to equine forage. A 2018 study using five ponies showed that adding caloric fat in the form of vegetable oil to alfalfa pellets gave equids the caloric fat they needed without being detrimental to their health. Adding vegetable oil with fat concentrations of 5, 10, and 15 percent over a 10-week period increased plasma fatty acid concentrations without causing dramatic changes in plasma glucose or insulin concentration over a 9-hour sampling period after feeding (Table 1).

**Table 1. Adding caloric dietary fat caused insignificant changes in glucose and insulin in horses (Williams et al., 2018).**

Time (hours post-feeding)	Glucose concentration (mg/dl)	Insulin concentration (mU/ml)
0	71.87	0.08
1	71.10	0.14
2	73.07	0.20
3	75.50	0.19
4	84.61	0.23
5	81.94	0.17
6	75.12	0.12
7	71.10	0.16
8	77.48	0.10
9	68.01	0.13
10	82.49	0.09
SEM	8.194	0.042

These results show dietary fats in moderation give horses the fats needed to perform high-intensity work, while reducing the chances of unsoundness caused by poorly regulated metabolic processes.

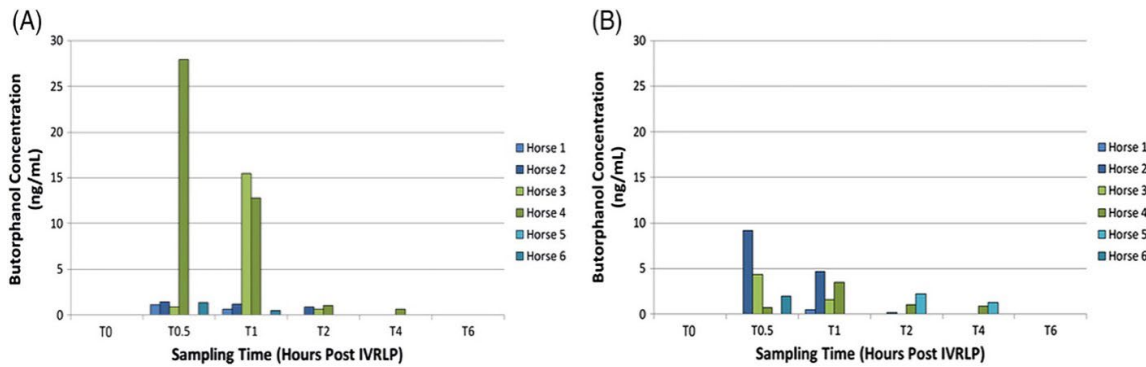
## Lameness Treatment

Often, lameness is inevitable in performance horses. Whether the lameness is something mild like saddle soreness or a crippling tendon tear, performance horse owners must often manage lameness in their horses. Some methods include stall rest, joint flexions, and shoeing changes. Another commonly used method to manage equine lameness is joint injections with steroidal medications to treat inflammation and pain. However, these steroids are often damaging to the integrity of the joint itself.

One method of quick pain management is butorphanol injected into the equine joint via intravenous regional limb perfusion (IVRLP). IVRLPs are most commonly used to inject antibiotics into joints or other regions more directly. A study on six sedated horses with sound forelimbs tested synovial butorphanol concentrations in their joints after IVRLP treatment. One forelimb was injected, and the other forelimb

acted as a control group. After the IVRLPs were administered, blood and synovial fluid samples were collected and tested. In five of the six horses, the IVRLP was successful, with obvious butorphanol levels present in synovial joint fluid. Figure 1 shows the butorphanol levels in the synovial fluid of the treated (A) forelimbs compared to the control (B) forelimbs over 6 hours.

The IVRLP did not present any major health complications or concerns and was deemed successful. One major drawback to this method is the time the butorphanol remains in the synovial fluid—after 6 hours, none was present in the synovial fluid. So, while IVRLP injected butorphanol can indeed be used as a less strenuous method of equine joint pain management, more research is needed to determine if the pain itself is managed for extended periods of time.



**Figure 1. Horses showed greatest butorphanol concentration in the fluid for the first few hours after IVRLP (Crabtree et al., 2019).**

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