



Using Force Measurements to Help Shoe Laminitic Horses

by: Tracy Gantz

December 15 2010 Article # 17394

Corrective shoeing for laminitis doesn't always work, despite veterinarians' and farriers' best efforts, and it's not always clear why a particular shoeing job isn't successful. In-shoe force measurements, however, can show the effects of shoeing on the foot, allowing for timely adjustments and improved treatments. During the Sept. 17-18 Laminitis West Conference in Monterey, Calif., Patrick T. Reilly, chief of farrier services at the University of Pennsylvania's New Bolton Center, explained the advantages of taking these measurements in laminitic horses.

There are a variety of opinions on how best to treat each individual laminitic horse, but, Reilly said, "There are two things that we seem to agree on universally in our mechanical goals (for laminitis). One goal is that we want to take some strain off of that lamellar interface--we want to try to protect that interface. Secondly, we want to protect the dorsal sole on the surface of the foot (the sole nearest the toe area, which is an area frequently traumatized as a result of laminitis)."

Reilly demonstrated how he was able to document the mechanical effects of a particular corrective shoeing treatment on the hoof using force measurements. At New Bolton, he and his colleagues have treated many horses at risk for laminitis (such as those with a serious injury in one limb, potentially overloading its opposite) with convex (arched) solar support. The idea is that putty on the bottom of the foot can help reduce weight bearing by the hoof wall, potentially relieving strain on the compromised lamellar interface. Subsequent force measurements showed that such treatment achieved this goal.

When one of New Bolton's research horses, a 34-year-old Morgan mare, developed laminitis, Reilly used force measurements to investigate three ways to manage the dorsal hoof wall: Leaving the distorted wall extending over the front of the shoe, squaring off the dorsal hoof that extended over the shoe at a 45-degree angle, and blending the hoof wall from the shoe up to the coronary band. While one might not think that it would matter what you do with wall that's not touching the shoe or the ground, Reilly explained that removing this wall seems to affect the structural integrity of the hoof capsule, which can affect other parts of the hoof as well.

First Reilly measured the force on the dorsal solar surface when leaving the wall in place. After he squared off the toe, the force on the dorsal solar surface rose, and it rose again after Reilly removed most of the distorted hoof wall. This would suggest that there is a possible benefit to leaving this wall, albeit potentially detached and distorted, to keep the hoof capsule strong and able to withstand the weight bearing and mechanical forces associated with even limited movement.

In a similar yet opposite case, Reilly reinforced the outside of a weakened hoof with a hoof repair fabric, and force measurements showed that this reinforcement reduced dorsal solar force.

Reilly noted that another hot topic in shoeing laminitic horses is where to place breakover (the forwardmost point of ground contact when the hoof is on the ground). Breakover is often manipulated to adjust the speed the foot "breaks over" during movement, and the forces required to do so, potentially affecting tendon tension and stress on various areas of the hoof. Reilly conducted a study on six sound horses to see the effect of changing breakover location on dorsal solar forces at the walk and trot. Although the statistical analysis is incomplete, he found that while there might be beneficial aspects to moving the breakover point back, there can also be consequences (increased dorsal solar force with certain breakover locations).

"I continue to move the breakover point back aggressively (in laminitic horses to reduce stress on the weakened laminae at the toe)," said Reilly. "What I'm cautious of is to try to find ways to protect that sole when I do."

While Reilly continues to use force measurements to study the effects of shoeing on laminitic cases, he gave conference attendees two take-home messages:

1) Keep the weight off the dorsal sole as much as possible, and 2) Externally reinforcing the hoof wall can often help achieve this goal.



Readers are cautioned to seek the advice of a qualified veterinarian before proceeding with any diagnosis, treatment, or therapy.

Copyright © 2011 BLOOD-HORSE PUBLICATIONS. All rights reserved. Reproduction in whole or in part in any form or medium without written permission of BLOOD-HORSE PUBLICATIONS is prohibited. THE HORSE, THE HORSE logo, THEHORSE.COM and THEHORSE.COM logo are trademarks of BLOOD-HORSE PUBLICATIONS.