



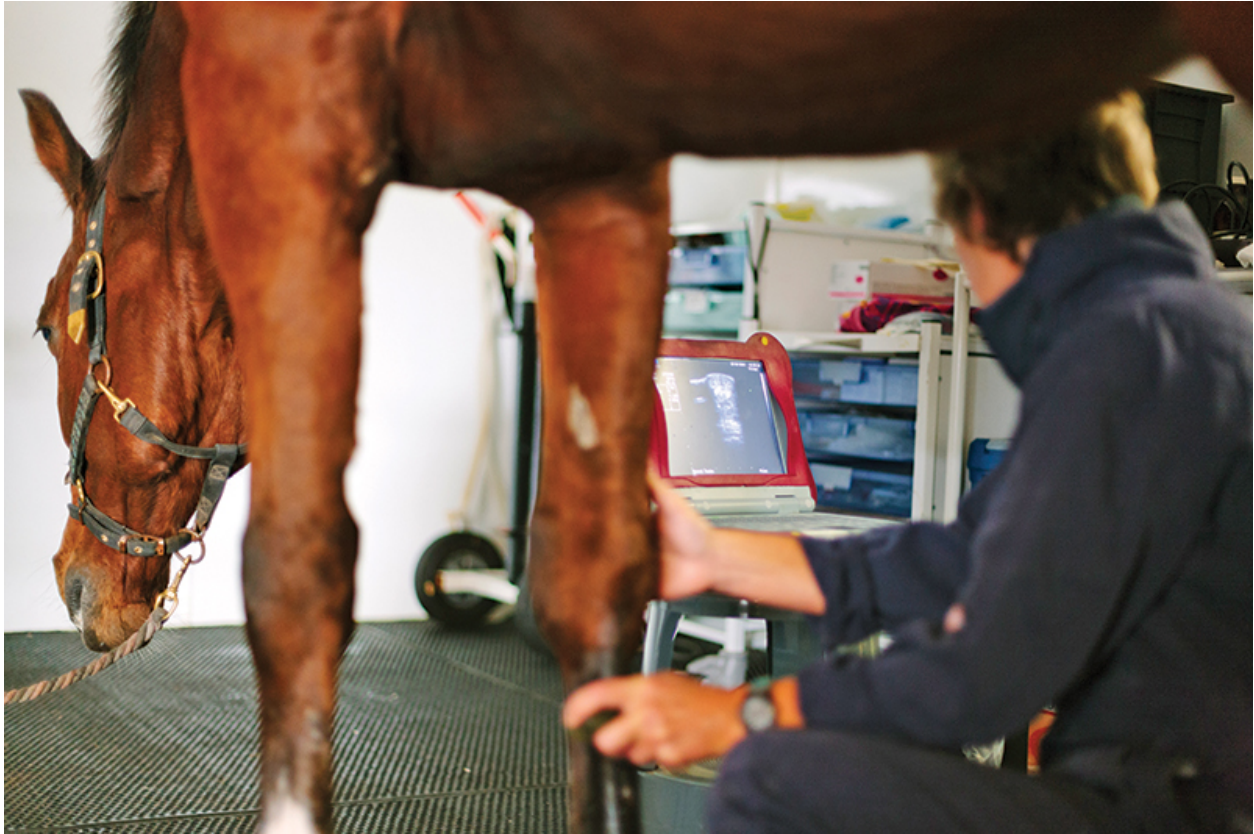
**Updated:**  
November 29, 2018

## Therapeutic Horseshoeing

*Farriery options provide important benefits to horses with soundness issues.*

By Steve Chiasson, DVM, CVMA

If you're lucky, you and your horse see your farrier once every six weeks or so, and these visits involve a simple trim or standard shoeing. If your horse has always been sound and performed well, it is likely that regular, routine care by a qualified farrier is more than sufficient to keep his feet in tip-top shape. However, when lameness issues or poor performance are hindering your horse in his ability to remain comfortable and efficient in his work, more advanced farriery may be indicated to help get him back on track.



*Prior to any therapeutic shoeing program, your veterinarian should perform a full lameness examination to determine the exact cause of lameness. Photo: iStock/UrbanCow*

Modern farriery is a fascinating blend of science, craftsmanship, and tradition. As a trade, it has evolved from a necessary service to working animals, to a highly technical craft and instrumental part of equine sports medicine. When treating a lameness case, a team of professionals including the farrier, veterinarian, and trainer, must collaborate and then work together with the owner to design and execute the best treatment plan for the horse. The treatment modalities available for lameness are numerous, but at the foundation of any rehabilitation plan should be proper foot balance and maintenance. In most cases, this can be achieved with a well-balanced trim and standard shoeing, but certain lameness conditions can benefit greatly from therapeutic shoeing. These specialized shoes are used to minimize forces on injured areas, thereby decreasing pain and, in some cases, allow for healing to occur.

Prior to any therapeutic shoeing program, it is essential to achieve an accurate diagnosis of the problem. This is where your veterinarian should get involved. In order to determine the cause of lameness, veterinarians perform a full lameness examination, which often includes diagnostic anesthesia (nerve blocking) and medical imaging. Radiography and ultrasonography are imaging modalities that can be performed right on farm, and are sufficient for diagnosing most sports medicine injuries involving bone or soft tissues. More

complicated cases may require advanced imaging at a referral facility in order to get a complete picture of the problem at hand.

Once the cause of the horse's lameness has been diagnosed, a treatment plan can be established. This can be as minimal as rest and slow rehabilitation, as extensive as surgery, or a wide spectrum of non-surgical therapies in between. But when it comes to addressing the horse's feet, a discussion between the veterinarian and the farrier is invaluable. Together, the horse's healthcare team can develop a trimming and shoeing plan to give the horse the best possible chance to return to soundness.

## **PRINCIPLES OF THERAPEUTIC SHOEING**

Historically, horses were shod to reduce the surface wear on their hooves and to protect the feet from contact with hard ground when being used for pulling or riding. The shoeing of horses allowed them to be used for longer periods of time and over more varied footing than would otherwise be possible. Today, the need to shoe a horse will depend on his natural foot quality, the climate and footing to which he is exposed, and his workload. When selecting a type of shoe, the horse's discipline must be taken into account. For instance, racing Thoroughbreds require racing plates, reiners are often shod in sliders for the show season, and show jumpers competing on grass may benefit from studs for improved grip. With all of this in mind, your farrier will select the best type of shoe for your horse's situation.

Should a horse require more a more specialized shoeing program in order to address a specific lameness or conformational fault, the above factors may be considered in addition to the problem at hand. When it comes to designing therapeutic shoes, the sky is the limit! There are endless ways to modify horse shoes to achieve the goal of balancing the foot and protecting an injury. All one needs is a skilled farrier and a forge. Before proceeding, however, it is important that a specific goal be set, so that the reason for therapeutic shoeing is understood. For instance, the goal may be to protect an acutely injured area, provide support for a chronic lameness issue, or correct an imbalance that has developed as a result of faulty conformation or previously incorrect hoof care.

Therapeutic shoes work by placing more stress on certain areas of the foot and limb, thereby relieving stress on areas requiring more protection. In general, wider areas of the shoe are subject to higher ground force, and therefore the areas of the horse's foot that are covered by these parts of the shoe will bear more of the load.

Here is a brief overview of two common types of therapeutic shoes. There are many, many other types of modifications and shoe styles that may be suitable for your horse. These two styles have great benefits when used for treating specific conditions. As discussed, speak with your veterinarian and farrier about the needs your horse may have.

## **ROLLER MOTION SHOE**

## What It Does

Horses that have a properly balanced, well-trimmed foot and are free from other conformational or lameness related problems will have a natural, smooth stride with a properly timed “breakover” at the toe of each foot. You will see this term used a lot when discussing trimming and shoeing. Understanding exactly what this means is important to grasping how this type of shoe may help your horse.

Breakover is simply defined as the time between a horse’s heels leaving the ground and when the toe leaves the ground. During this period the foot rotates around the tip of the toe (or shoe) that is still in contact with the ground. Several crucial factors affect this phase of the stride.



*Ground view of a roller motion shoe. The outside perimeter is continuously beveled from heel to heel. Photo: Taylor Moore, Farrier*

Firstly, the deep digital flexor (DDF) tendon is under maximal tension immediately before breakover. This is one of the tendons running down the back of the leg, and it attaches within the foot to the coffin bone. Imagine this structure as an extremely strong elastic band that is stretched over the back of the cannon bone, the fetlock, the pastern, and the heel. As the horse strides forwards this DDF will stretch under tension until the point when the heels elevate off the ground. The longer this takes results in more tension on the DDF and also more compression of structures in the heel, including the navicular bone.

Heel height factors into how much force is placed on structures within the foot prior to breakover starting. Horses with very low, shallow heels will have a situation where the DDF is trying to “bend around a 90-degree corner.” Proper conformation, good foot care, and correct trimming will maintain adequate heel height, giving the foot a head start on beginning the breakover process.



Toe length is the most important factor affecting breakover. Excessively long toes create a longer lever arm for the foot to rotate around. It is also thought that longer toes result in more stress on the lamina in the foot as the DDF “pulls back” on the coffin bone. An easy way to visualize how toe length affects breakover is the analogy of ski boots. Regardless of your foot size, imagine yourself walking across concrete in size three kids’ boots, then in size nine boots, then in size 22! The longer your toe gets, the more difficult it becomes to initiate breakover. The same holds true for horses.

## Description

There are several different types of roller motion (or omni-directional) shoes available, varying from pre-manufactured off- the-shelf steel and aluminum, to padded glue-on styles with a fibreglass cuff attached around the perimeter of the shoe. Most commonly, roller motion shoes will be custom-made by your farrier at the time of the visit.

Depending on which direction, or directions, require improved easier breakover, your farrier will bevel the outside perimeter of the shoe. This procedure is commonly done anyway for normal shoes on the leading toe edge of the shoe. With a roller motion shoe, the bevel is often continued around the lateral (outside) and medial (inside) quarters, and extends back towards the heels. A full roller shoe will have breakover in all directions including the heels.

## Use Cases

As mentioned, facilitating ease of breakover is the main goal of these shoes. There are many scenarios where this might be required including:

**1. Toe-In (or Toe-Out) conformation:** With the more common toe-in conformation in a front foot, the most forward point of breakover will be located towards the lateral (outside) portion of the toe. Think of the 11:00 o’clock position on the left front foot and the 1:00 o’clock position on the right front foot. Having the ground surface edge of the shoe beveled at this area will enable the shoe to rotate over more easily than a squared off edge. This highlights the fact that the entire perimeter does NOT have to be rolled over. Leaving the

inside front edge of these shoes square will help prevent breakover towards the toe-in direction.

**2. Heel Pain:** Many structures in the heel can be cause for pain in one or both limbs. Deep flexor tendon damage, navicular disease, and coffin joint arthritis can all manifest as caudal heel pain. Remember that the DDF is under maximal tension just prior to breakover. Compression of the heel anatomy is greatest until the heel lifts and breakover starts. The sooner we can get this to happen, the less chance there is for pain to occur.

**3. Ring Bone:** While not the most common cause of lameness, this simple process can have devastating consequences for affected horses. Larger breed horses are more commonly affected. Instability or stress on the pastern joints and soft tissues will sometimes result in excessive bone formation around the bones and joints. This is not caused by trauma, but is more of a slow attempt by the body to stabilize the forces it is experiencing. The excess bone enlarges the pastern bones, makes movement of the pastern joints painful in any direction, and causes painful compression on soft tissue within the pastern. An aggressive roller bevel around the entire perimeter from heel to heel will help breakover movement in all directions and reduce stress on pastern joints. In my experience, this shoe has helped many horses continue their athletic careers despite the severity of the ringbone.

## **SUSPENSORY SHOE**

### **What It Does**

This type of shoe falls under the broad category of a ground support shoe. The goal of these shoes is to provide extra support to a specific area of the foot depending on the particular condition being treated. Because of the importance of placing the extra support in a certain region, it is critical to have an exact diagnosis of what the problem is and what type of corrective measures need to be taken. Incorrectly altering the forces on an already compromised leg can have serious consequences.



*The main body of the suspensory ligament is outlined in blue. The extensor branch of the ligament is indicated in green. Excessive toe sinking will stretch the extensor branch and result in increased tension on the suspensory ligament body. Photo: Agwest Veterinary Group Ltd. "Lily"*

With suspensory ligament injuries the main concern is the risk of over-stretching damaged or healing tissue. To lessen this risk, extra support is provided at the front of the shoe to reduce the amount of toe sinking into penetrable ground. This might sound counter intuitive. When looking at the leg from the side it is tempting to think: *If we keep the heel elevated, then the back of the leg and the suspensory ligament are less stretched* – but that is exactly the opposite of what we need.

The key is in the anatomy of the suspensory ligament itself. The lower extensor branches of the SL connect the sesamoid bones at the back of the fetlock to the extensor tendon on the FRONT of the leg. The more the toe sinks into the ground, the more the extensor branches stretch, and the more stress is placed on the main portion of the SL behind the cannon bone. Keeping the toe elevated reduces this stretching.

## **Description**

The biomechanics described above are generally achieved by increasing the surface area of the shoe in a specific area. This is done using a variety of methods including widening the steel or aluminum, placing pads between the foot and shoe, or attaching additional material onto the ground surface of the shoe.

Again, the most common application is a custom-fit shoe forged during your farrier visit. This allows widening of the toe portion such that the forward part of the sole is somewhat covered by the shoe. Think "snowshoes."

The extra width required will vary case by case. Pre-manufactured shoes are also becoming more common as these shoes move into mainstream use. Alternative methods to increase surface area can include a plastic pad across the toe area of the sole, or metal plates attached to the ground surface at the toe. Your farrier and veterinarian should work together on making the best shoeing plan for these types of cases.





*This suspensory shoe has excellent widening of the toe to reduce sinking in soft ground and prevent stretching of the suspensory extensor branch. Photo: Agwest Veterinary Group Ltd. "Whiskey"*

One additional modification of the suspensory shoe is the continuation of the widened portion down one side of the shoe towards the heel. This is done when there is a localized injury to one of the branches of the SL above the fetlock. As with the wide toe, the wider branch prevents sinking of the foot on the injured side of the ligament and reduces stress on the healing tissue.

## **Use Cases**

Obviously, this shoe gets its name from the structure it is trying to protect. Suspensory ligament injuries bring up some of the most worrying thoughts for horse owners, and while the degree of injury varies greatly, the same principles apply for most cases. Adding in proper therapeutic shoeing to the routine treatment approaches will always benefit the horse. After diagnosis of a suspensory ligament injury, your veterinarian and farrier will discuss the exact area of the SL that needs additional support in case there are specific requirements to be addressed. Each case is different, but in general your horse will have a SL support shoe on for the entire rehabilitation period, and potentially for several shoeing cycles afterwards if there is risk of re-injury.

## **SUMMARY**

While many lameness cases have treatments and therapies involving veterinary medications and procedures, every horse can benefit from the amazing skills of your farrier. Working together with information from you and your veterinarian, it is incredible to see the immediate improvements therapeutic farriery can provide for your horse. With so many options for diagnosis and treatment of soundness issues, it only makes sense to start with a good base from the ground up.

And honestly... who doesn't like a new pair of shoes?

*Main article photo: Shutterstock/Mariait*

*This article was originally published in the Summer 2018 issue of Canadian Horse Journal.*



**Dr. Steve Chiasson** is originally from Sydney, a small town in Cape Breton, Nova Scotia. After completing pre-vet studies at the Nova Scotia Agricultural College in Truro, he attended the Atlantic Veterinary College in Charlottetown, graduating with Honours in 1995. Steve has been living and working in veterinary practice in Abbotsford, BC since 1995, and together with Dr. Fawcett co-founded Agwest Veterinary Group Ltd. in 2004. Particular areas of interest include sports medicine, teaching acupuncture, and technology implementation into veterinary medicine.

**For more information, please visit [www.AgWestVet.com](http://www.AgWestVet.com).**