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Researching Horse Boots

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Equine legs are at the mercy of a lot of potential blows--the strike of an opposite leg's powerful overreaching stride, the impact of contacting a solid fence, the unexpected encounter with a sharp object in the field. If you're like many conscientious owners, you'll do just about anything to protect those precious lower legs from injury, and you've recruited everything from traditional polo wraps to fancy "support boots" to help. But according to equine researchers, many boots and bandages provide inadequate protection at best, or increased damage at worst.

"Some materials offer protection against concussion, but are ineffective against penetration, and other materials have the opposite problem in that they protect against penetration, but do not reduce concussion damage," says David Marlin, PhD, associate dean for research at Hartpury College, in the U.K., who focuses his research on equine exercise physiology and biochemistry and is the author of more than 200 research papers and book chapters. "It's almost impossible to predict which boots will do what until you either test them and/or take a knife and open them up."

Currently the International Chairman of the International Conference on Equine Exercise Physiology (ICEEP), Marlin's high-profile research projects have included the studies of heat and humidity's effects on horses in advance of the 1996 Olympic Games in Atlanta. Among his concerns about boots: the effects of their weight on gait biomechanics, and their ability to trap potentially harmful heat against the animal's leg. But first, there's the issue of support, which he discussed along with Rachel Murray, MA, VetMB, MS, PhD, MRCVS, Dipl. ACVS, ECVS, head of the Centre for Equine Studies at the Animal Health Trust, last year at a seminar organized by Equilibrium Products Ltd., a British maker of leg boots and other equine accoutrements. Equilibrium, in its own research-and-development practice, noted the variability in protective abilities among a variety of boots was extreme, so it organized the conference as a call-to-arms for the industry on the need for minimum protection standards and an industry-wide testing methodology. About 50 veterinarians, riders, industry officials, and media representatives attended the invitation-only event, according to Marlin.

Heat and Weight Factors

High price, sturdy-looking construction, space-age materials--no external factor has emerged as a reliable predictor of good protection, Marlin says. "We have taken boots that look good, and then been surprised at how poorly they have performed in tests."

Although many equestrians purchase so-called support boots in the hopes of guarding against pulled suspensory ligaments and other common soft tissue injuries, little evidence exists that a leg boot can offer sufficient support to be called effective, notes Murray, whose specialties include lameness, sport horse performance issues, and the use of magnetic resonance imaging (MRI) in the diagnosis of bone and soft-tissue injuries. She is also an FEI-level dressage rider and competitor, lending to her insight on the consumer side of these various types of boots.

More weight=more stress A boot or wrap adds weight to the lower leg, thereby requiring the horse to expend more energy to move and stop that leg, Marlin says. Add enough weight and you can alter the horse's stride, increase the required athletic output, or both. A very stiff boot can also cause the horse's way of going to change, restrict the lower leg's range of motion, compromise tendon function, or even lead to soft tissue injury.

What's more, some boots and bandages can absorb up to their own weight in sweat and water, making the weight issue serious, indeed, when the horse is traversing water, exercising in high-heat conditions, or other situations.

Too hot to handle Scariest of all, "Some materials and designs retain heat inside the boot, making the legs underneath and the tendons very warm," Marlin says.

The lower-leg tendons of a bare-legged, galloping horse reach about 45°C (113°F), according to Marlin. At that threshold, tendon inflammation and even tendon-cell death occur--and the tendons of boot-wearing horses frequently reach much higher temperatures. During the Equilibrium symposium, Marlin presented thermographic images showing various boots' insulating properties. Some boots are highly insulating, meaning they cause heat buildup and do not allow heat to escape, increasing heat in the tendons they cover (see images on page 66).

Choose the Right Protection

Marlin and Murray's objective is a standardized testing and rating system for equine leg protection. They'd like to see boots identified as offering "light," "medium," or "heavy" protection against concussion and penetration, using a standardized system similar to those used in testing equestrian headgear and body protectors. They believe manufacturers should also have to provide boot weights and heat-insulation ratings so consumers can make educated decisions about their purchases.

Until such time that the horse industry adopts the standards, here's a rundown of the types of equine leg protection available, with pointers on choosing the ones that fit your needs, according to Marlin.

For the purposes of this article, we're focusing on the major types of leg boots and bandages used for exercise and turnout (not those used for shipping, while stabled, or for treating injuries).

Polo or Track Bandages

Pros: These bandages are inexpensive. Most can be machine-washed and dried. Correct wrapping produces a custom fit. They're made of breathable, washable materials, and most have easy-to-use hook-and-loop closures. They are available in a rainbow of colors and patterns; white, the traditional dressage color, creates an even focal point on each leg, making visual assessment of a horse's movement easier.

Cons: Polo or track bandages can be wrapped either too tightly (damaging soft tissues) or loosely (leading to dangerous slippage). Fleece material traps burrs and other debris, making polos unsuitable for riding outside the arena. Single closure is not sufficiently secure for high-intensity workouts, such as eventing cross-country, and these are not suitable for turnout because bandages can unroll, frightening the horse, catching on objects, or both. The wrap material is highly absorbent, making polos a poor choice when water (or, simply, moisture on grass) is involved. Applying and removing bandages requires squatting next to horse's legs for a prolonged period of time, which can be dicey around a kicker, a horse that is prone to spooking, or in busy and crowded environments, such as a horse show warm-up ring.

Splint/Brushing/Galloping Boots

Pros: These are usually inexpensive to moderate in price (although some high-tech models are pricey). Most are machine-washable, but they might require line drying. A wide selection of colors is available, and multiple hook-and-loop closures help keep boots in place on legs. These are probably the most popular type of leg boot and are used widely for everything from general riding and turnout to jumping. Usually, a sturdy piece of material lines the medial side of the boot (against the inner part of the leg), and this is designed to protect the inner cannon bone area from blows. Some boots of this type feature such options as elasticized straps and fleece (or sheepskin) linings for horse comfort and a little extra padding. Most boots today are constructed of synthetic materials; some high-end models are still made of the traditional leather and fasten with leather straps and buckles.

Cons: Quality and durability of these boots can vary widely. The user generally doesn't know how much heat is retained and protection afforded, and the boot design might not protect the fetlock area. Selection of correct size is essential in ensuring a good, no-slip fit. Elasticized straps might be overtightened by inexperienced users. Boots with fleece or sheepskin lining require more care than unlined models. Leather models must be cleaned and conditioned like leather tack.

Fetlock/Ankle Boots

Pros: These short boots cover only the indicated area, thereby minimizing heat buildup on horse's legs, and they are a good choice when the user doesn't want to cover the leg all the way up to the top of the cannon. Materials and care are similar to those listed for splint boots.

Cons: These are less widely used than leg boots, so color choices and other options might be limited.

Open-Front Boots

Pros: This specialized design protects a jumper's legs from interference, while providing for "sensory feedback" on the fronts of the forelegs if he hits a rail. Materials and care are similar to those listed for splint boots above.

Cons: The lack of 360-degree leg protection makes this design unsuitable for most other disciplines or for turnout.

Support Boots

Pros: These boots offer protection from the top of the cannon to below the fetlock, which makes them popular for use in high-intensity activities (jumping, reining, barrel racing, etc.), as well as for turnout. The fetlock-sling straps found on many boots of this design can offer some support to this joint. Support boots tend to be sturdily constructed of rugged synthetic materials. Most are machine washable, but must be line dried. These boots are generally available in a wide range of colors, and most do not have elasticized straps, making overtightening much less likely. Copying among manufacturers and the development of other leg-boot technologies have made these boots' prices more reasonable.

Cons: According to researchers, there is insufficient data on heat retention and protection. Application is somewhat more exacting than regular leg boots, due to the sling strap, and an inexperienced user might need to practice applying the boots under the supervision of someone more experienced. Some designs tend to trap grit and sand between the boot and the leg, especially if they are not applied properly. Many of these boots' designs are such that the exterior surface is the "loop" type of material for securing the hook-and-loop straps, meaning that it catches and holds burrs, seeds, and other debris, making cleaning after a hack through a field a potentially tedious chore.

Wrapping it Up

Of course, Marlin and Murray would also like to see the equine industry develop better boots. The ideal, according to Marlin, is a lightweight, flexible boot that offers adequate protection for the situation and that allows heat to escape.

Some manufacturers now tout the use of breathable, non-heat-retaining materials in their leg-protection products, but at press time, no industry standards had been enacted. According to Marlin, the British Equestrian Trade Association last year set up a working group to explore how the U.K. could implement leg boot testing.

Until such a standardized testing or rating system comes to pass, a horse owner's best bet is to choose a boot whose manufacturer has conducted its own protection tests, Marlin says. Other good practices include using boots only when needed and removing them as soon as the workout or turnout session is finished. Cooling the legs, such as by hosing with cold water, is wise, especially if the horse has undergone a strenuous workout.

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



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