

# The Science of Saddle Pads

*We help sort through the options*

By Hilary Clayton, BVMS, PhD, Diplomate ACVSMR, MRCVS

According to an online survey, more than 98 percent of riders use a layer of padding between the saddle and the horse's back. Common reasons cited by respondents for using a saddle pad are compensating for saddle-fit problems, increasing the horse's comfort, improving saddle balance for the rider's benefit, absorbing sweat, and protecting the saddle.

prominent withers. If the contouring is excessive, take care that the pad is not so bunched-up in the gullet that it puts pressure on the withers.

It's also useful to have an upward contour at the back of the pad to avoid having an area of pressure behind the back of the saddle, as shown in Figure 1. This tends to occur when the front of the pad is pulled up too much into

lar saddle pads is that they contribute to heat accumulation during exercise. Areas of the horse's body that are covered by the tack or the saddle pad cannot lose heat by conduction, convection, or radiation; horses sweat heavily underneath but the sweat is unable to evaporate, so they lose fluids and electrolytes without losing heat. This is not a problem for most horses; but for those affected by anhidrosis (inability to sweat), it is important to do everything possible to minimize heat accumulation. For these horses, a saddle pad that matches the shape of the saddle is preferable.

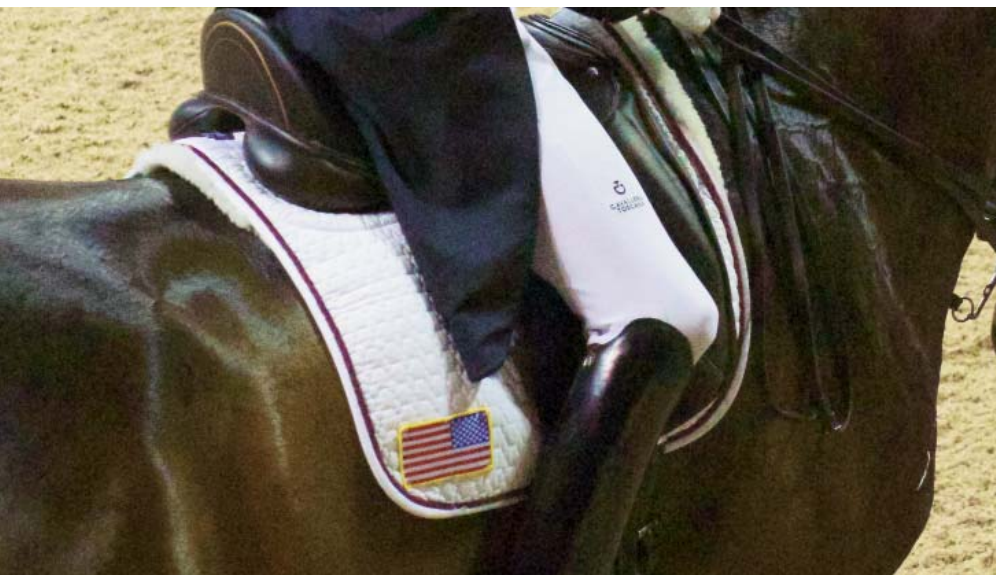
One of the most frequent complaints with saddle pads is that they slip during use. Even though most riders pull the front of the pad up into the gullet of the saddle, it is common for the pad to slide down onto the horse's withers. To prevent this from happening, take care in adjusting the pad before you mount. If your pad has a choice of slots for the girth billet straps as shown in Figure 1, use the ones that will hold the pad forward when the girth is correctly placed. Also make sure that the pad is not being pulled down at the back.

## Materials: Pros and Cons

**Synthetic fibers**, such as polyester and nylon, are made from oil-based products. In addition to being less comfortable than natural fibers, synthetics are based on plastic, which is much less biodegradable than natural fibers. On the positive side, saddle pads made from synthetic fibers are inexpensive and easy to launder.

**Natural fibers**, such as cotton and wool, are commonly used in saddle pads. Cotton is soft, absorbent, and breathable, although the presence of the saddle affects its ability to disperse heat and moisture. Saddle pads can be made of pure cotton or a cotton/polyester blend.

Wool pads for dressage are usually in the form of sheepskin, with the wool remaining attached to its leather (skin) backing. Wool fibers are strong, with a natural crimp and resiliency. The crimp makes wool feel



*MORE THAN LOOKS: Saddle pads are attractive, and they can also help—or hinder—your horse's performance. The layer of wool beneath this pad helps to reduce pressure, to keep the horse's back cooler, and to wick away sweat.*

Just as there are many reasons for using a saddle pad, there are also a huge number of pads to choose from. In this article, I'll explore some of the factors you should consider in making a purchasing decision.

## Pad Shape

The majority of dressage riders use a rectangular pad that is contoured to accommodate the elevation of the horse's withers (Figure 1). High withers require more contouring than less-

the gullet, or if the trim around the pad has shrunk more than the pad itself. If you notice ruffled or broken hairs in the area behind the saddle, take a look at how your saddle pad fits in this area at the end of your ride.

Another thing to check is that any partial pads, shims, or risers have a smooth contour against the weight-bearing area of the horse's back, without any potentially painful ridges and wrinkles.

One of the drawbacks to rectangu-



FIGURE 1. Dressage-type saddle pad that is contoured both at the front (right side of photo) and at the rear (left side). This amount of wither contouring is appropriate for a horse with normal withers; more contouring would be required for a horse with very prominent withers. This pad has three slots for secure placement of the girth billet straps.

soft and springy to the touch. It also adds bulk and traps a large volume of air between the fibers, which allows a sheepskin pad to dissipate pressure and reduce pressure points. Maximum pressure reduction has been found when the pile is clipped to a uniform length of about an inch and a quarter. Testing in hospitals has confirmed the value of sheepskin in preventing and treating pressure ulcers in human patients. In the equestrian industry, wool's ability to reduce and dissipate pressure has found many applications, including saddle pads, numnahs, saddle seat covers, sheepskin horse boots, tack linings, and girth tubes.

Sheepskin can be dry-vacuumed or washed. The interior of the wool fiber is susceptible to chemical attack, such as by strong alkaline detergents, so washing in cold water with a pH-neutral detergent is recommended. Tack shops carry products that are specially formulated for washing wool or sheepskin. After washing, air-dry sheepskin out of direct heat or sunlight, as the wool is susceptible to UV damage. Stretch sheepskin as necessary as it dries to retain the shape and prevent excessive shrinkage. Do not

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tumble dry, iron, or bleach sheepskin. Brushing with a wire wool comb will help restore the fluffy appearance and natural “loft” of the fibers between washings.

Sheepskin products with cotton or other backing material are generally not suitable for machine or hand washing, so dry cleaning is usually recommended.

Wool has a unique property called felting. When wool is agitated in the presence of heat and moisture, as in a washing machine, the scaly coating on the fibers makes them interlock to form felt and prevents the fibers from returning to their original position. Shrinkage resulting from felting is irreversible. Some saddle pads, such as the thick pads used with Western saddles, are made of this felt.

Gel pads are filled with a gelatin-like substance that is a solid but with some characteristics of a liquid. The gel’s resiliency allows it to disperse on impact and then rebound to its original shape. The many types of gel



FIGURE 2. Images from a saddle pressure mat showing pressure scans of the same horse, saddle, and rider at the time of maximal force in the trot stride. The pommel is toward the top of the images, and the cantle is toward the bottom. The color bars on the right side of each scan show the colors used to represent increasing levels of pressure, from black (lowest) to pink (highest). The scan on the left shows the saddle without a pad; the scan on the right shows the effect of a sheepskin pad. Note that the sheepskin pad produces a more even pressure distribution, an overall reduction in peak pressures, and no pressures in the red or pink zones.

vary both in impact absorption and rebound characteristics. Similarly,

there are many types of **foam**, which differ in their ability to absorb impact

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and to return to their original shape sufficiently rapidly to provide effective cushioning beneath a saddle.

### Why Use a Saddle Pad?

Saddle pads fulfill a range of functions, and your reason for using a pad determines the type of pad you should choose. The main reasons for using a saddle pad are to protect the underside of the saddle, to pull heat and moisture away from the horse's back, to improve saddle fit, and to distribute the forces on the horse's back more consistently as he moves. Let's look at the properties of the saddle pad required for each of these functions.

If your saddle fits well and your goal is simply to keep it clean and dry, then use a thin pad because a thicker one may interfere with saddle fit. To dissipate heat from your horse's back and wick moisture, then the requirements are fairly simple. Natural fibers are generally better than synthetics for wicking away moisture and absorbing heat. Wool acts as a natural insulator by trapping air between its fibers, so sheepskin pads keep the horse's back warm in cold weather and near body temperature when the weather is hot. Sheepskin also draws sweat away from the horse's skin and into its fibers, where it can trap over 30 percent of its own weight in moisture.

Your horse's back will get hot and sweaty under any pad because the pad is trapped between his skin and the saddle. The best way to cool this area is to use liberal applications of cold water, either by sponging or cold-hosing, after you remove the saddle.

In an ideal world, every horse would be ridden in a saddle that fits perfectly, but this is not always the reality. Horses change shape, flocking moves within the panels, or a saddle may be used by more than one horse. If the saddle is basically the correct size and shape, then a remedial pad may improve the fit and make it more comfortable for the horse—but pads have their limitations, and it is not possible to correct a saddle that is the incorrect size for the horse.

If the saddle tree is too narrow and is exerting pressure on the sides of the withers, then adding padding material will make matters worse. If the saddle is too wide, extra padding may help to stabilize it, but check carefully that the saddle and padding material are clear of the withers because a wide saddle tends to sit lower in the pommel.

Saddles may have localized areas of high pressure, such as from lumpy flocking or tight stirrup bars. In these cases, natural sheepskin is a good

material for relieving localized high pressure. Compared to wool and sheepskin, synthetics perform poorly. Wool's natural crimp and resiliency traps a large volume of air between the fibers, which allows a sheepskin pad to compress in areas of high pressure and reduce pressure points. The photos in Figure 2 show the effect of a sheepskin pad in changing the pressure patterns beneath a saddle that fits reasonably well. The areas showing the highest pressure without a pad have

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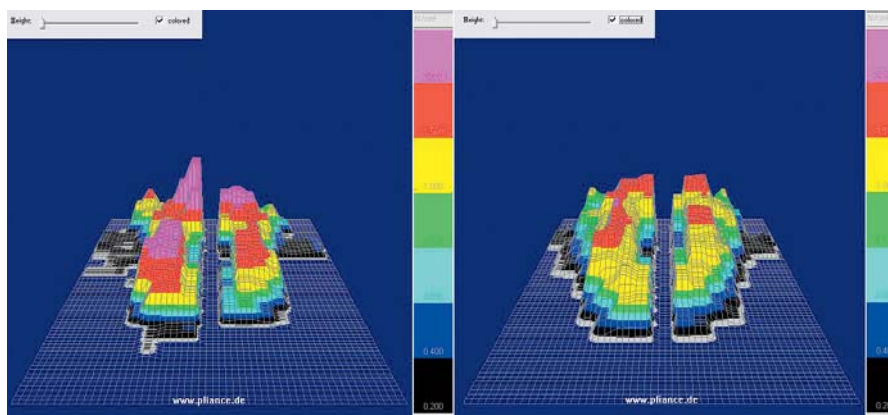


FIGURE 3. Images from a saddle pressure mat showing pressure scans of the same horse, saddle, and rider at the time of maximal force in the trot stride. The pommel is toward the top of the images, and the cantle is toward the bottom. The color bars on the right side of each scan show the colors used to represent increasing levels of pressure, from black (lowest) to pink (highest). This saddle shows “bridging”: high pressure areas at the front and back of the panels, with an area in the middle that is relatively unloaded. Bridging is a common saddle-fit problem, most often resulting from a tree that is too narrow.

The image on the left shows the saddle with a foam pad, and the image on the right shows the saddle with a sheepskin pad. The loading patterns are similar, but the pressure magnitudes are lower with the sheepskin pad. However, neither pad corrects the bridging.

lower pressure with a sheepskin pad. The pressure is redistributed to other areas, so the pressure profile becomes more uniform. The sheepskin has the

same beneficial effects in evening out the pressure when it is placed directly on the horse’s back or on top of a thin pad. By using a thin pad underneath,

the sheepskin stays cleaner but is less effective in wicking sweat.

Another reason for using a saddle pad is to cushion the forces on the horse’s back: to reduce the maximal force during each stride by spreading it more evenly over time. In the walk, the total force on the horse’s back is fairly consistent throughout the stride and is approximately equal to the combined weight of the rider and the saddle. But in the suspension phases of the trot and the canter, the force of the horse’s back pushing upward against the saddle and the rider’s seat projects the rider upward. As this happens, the horse’s back experiences higher forces—approximately twice the rider’s weight. A cushioning pad aims to reduce the peak forces and redistribute them more evenly throughout the stride.

Natural fibers have good cushioning properties. One European study showed that reindeer fur was particularly effective for this purpose—but before you search the Internet for a reindeer-fur pad, my own research

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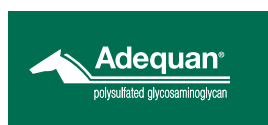
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indicates that sheepskin is equally effective. The key is the natural loft of wool or fur. Gel or foam pads deform when loaded, which absorbs energy, but then they rebound later to their original shape. The changes in shape help to disperse the impact energy, while the rebound characteristics determine how the energy is recycled. The material properties of each type of foam or gel determine how much the pad deforms and how rapidly it rebounds, so there can be considerable variation between pads. Unfortunately, there is insufficient research to make recommendations about which pads are more (or less) suitable for use with dressage saddles.

## Fit the Pad to the Purpose

The first question to ask yourself is why are you using a saddle pad. If your saddle fits well and you simply want to keep it clean, then a thin pad is all you need. To wick moisture and heat away from your horse's back, choose natural rather than artificial fibers. If

## Meet the Expert


**H**ilary Clayton, BVMS, PhD, Diplomate ACVSMR, MRCVS, is the professor and Mary Anne McPhail Dressage Chair emerita. She was the first-ever Mary Anne McPhail Dressage Chair in Equine Sports Medicine at Michigan State University's College of Veterinary Medicine, East Lansing, from 1997 to 2014. At the same time, she was also a professor in MSU's Department of Large Animal Clinical Sciences.

A world-renowned expert on equine biomechanics and conditioning, Dr. Clayton is president of Sport Horse Science, LC, which is dedicated to translating research data into practical advice for riders, trainers, and veterinarians through lectures, articles, and private consultations. A USDF gold, silver, and bronze medalist, she is a member of the US Equestrian Federation Dressage Committee and a *USDF Connection* contributing editor.



you are trying to improve the fit of a saddle that is basically the correct size but not a perfect fit, sheepskin is a good choice, and it is equally effective used against the horse's skin or on top of a thin pad that will help to keep it clean. Do not use incompressible materials under saddles that have pressure points. Sheepskin is also a

good choice for attenuating forces on the horse's back, so long as the wool retains its loft. Foam or gel pads may also be effective, but little information is available regarding the benefits of specific types of foam or gel for this use. Finally, be aware that some types of pads—notably gel—tend to make the horse's back hotter. ▲




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