

# The Kinder, Gentler Saddle

*Are treeless saddles better for equine backs? We put them to the test.*

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

It can be quite a challenge to find a saddle that is a good fit for both horse and rider. Ideally, the saddle conforms to the shape of the horse's withers and back on its underside and to the shape of the rider's pelvis and thighs on its upper side. Add to the equation the rounding and bending movements of the horse's spine as he performs the different dressage figures and movements, together with the movements and weight shifts of the rider, and the complexity of the problem becomes apparent.

Traditionally, saddle fit was assessed manually with the horse at a standstill. Today, we can also use an electronic pressure mat to measure



Figure 1. Horse wearing the saddle pressure mat with the conventional saddle. The rider has the power supply and Bluetooth transmitter for the pressure mat in a pack on her back.

the dynamic forces of the saddle on the horse's back during ridden exercise, when the shape of his back and the forces exerted by the rider are continually changing. Data collected using a pressure mat have indicated the amount of pressure that may lead to the development of clinical signs of back pain.

## Study: Treed vs. Treeless

Many people have become frustrated after failing to find a saddle that provides an adequate fit for both horse and rider. Consequently, some riders have turned to alternative solutions, such as treeless saddles, which lack a rigid tree or frame and therefore conform more easily to a variety of equine back shapes. Theoretically, treeless saddles fit any type of conformation and distribute the rider's weight over the horse's back by making use of an adaptable interface between horse and rider.

Researchers at the McPhail Center wondered whether treeless saddles are indeed more comfortable for the horse. To find out, we performed a study to compare the force and pressure-distribution patterns on the horse's back with both a conventional saddle and a treeless saddle. We used eight school horses ridden by the same 125-pound woman, who rode each horse in both saddles without stirrups at the sitting trot. In accordance with our usual experimental protocol, the order in which the saddles were tested was randomized between horses; and we were careful to make sure that each horse trotted at the same speed with both saddles, as faster trotting speeds cause larger forces.

The total force on the horses' backs (calculated by adding together the forces on all the sensors) was the

same for the conventional and treeless saddles, which was to be expected given that the rider's weight and riding style were the same for both saddles. However, the way in which the pressure was distributed beneath the two saddles was very different.

In the conventional treed saddle, the tree performed as intended, spreading the rider's weight fairly evenly over a large area of the horse's back that corresponded with the shape of the long, broad saddle panels. There was a large area of contact: on average 1,340 cm<sup>2</sup>, compared with an average contact area of 1,153 cm<sup>2</sup> for the treeless saddle.

As a consequence of having a smaller weight-bearing area, the treeless saddle showed higher average pressure over all the weighted sensors. In addition, the treeless saddle produced higher maximal pressure readings in any individual sensor, with a larger number of sensors showing an average pressure greater than 11 kPa, which is equivalent to approximately 230 lb/ft<sup>2</sup>. This amount of pressure is recognized as a threshold level above which saddle sores may be induced.

The high-pressure areas for the treeless saddle were located under the middle of the seat, immediately beneath the rider's seat bones. The pressure maps shown in Figure 2 are from the same horse with the two saddles and are representative of the patterns seen in all eight horses. These high-pressure areas overlie the horses' long back muscles, and it is known that muscle tissue is particularly vulnerable to pressure-induced damage.

With regard to interpretation of these results, keep in mind that the study looked at only one brand and model of treeless saddle, which is not necessarily representative of all treeless saddles. Other treeless saddles may perform differently and may have a different pattern of force distribution. However, a European study that evaluated differences among racing saddles with and without trees yielded very similar results. The treeless racing saddle concentrated pressure in

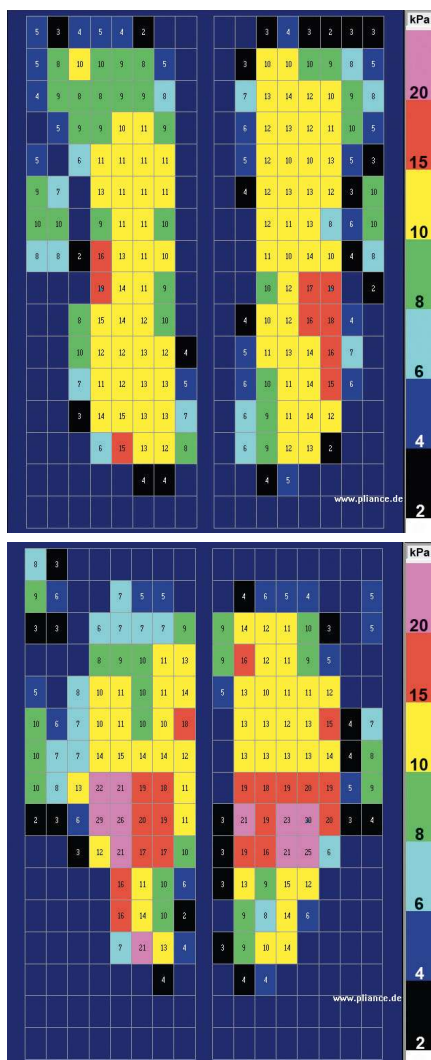


Figure 2. Pressure scans at the moment of maximal total force for the conventional saddle (top) and the treeless saddle (above) in the same horse. Both images are recorded at the same pressure scale shown on the right of the image. The front of the saddle is at the top of the image.

the area beneath the rider's center of gravity; in posting trot, pressure was concentrated under the rear of the seat, whereas in the racing seat the areas of high pressure moved to the front of the saddle.

It should also be noted that the saddles in our research study were used without pads, which is a necessary first step in understanding how the rider's weight is transmitted through the saddle. Because treeless saddles would normally be used with a pad to assist in force dissipation, a logical next step would be to evaluate

# OBSOLETE:

ob•so•lete (*adjective*):

1. no longer in general use; fallen into disuse
2. of a discarded or outmoded type; out of date:



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the performance of different types of pads used in combination with a treeless saddle.

## Study Shows: Properly Fitted Treed Saddle Best for Most Horses

Saddle fit is a complex issue that requires consideration of the multi-dimensional shape of the horse's back, changes in back shape during loco-

tion, rider size and shape, and the mechanics of different gaits. Electronic analysis of saddle forces and pressures is useful for quantifying saddle fit dynamically; it provides information that is not available by observing and palpating saddle fit in the standing horse.

As a result of our findings, we concluded that a saddle tree is beneficial in distributing the rider's weight over a larger area and in distributing the pressure more evenly over the

horse's back, as compared with a treeless saddle. The treeless saddle used in this study was an inferior fit on every horse as shown by the smaller weight-bearing area, focal concentration of pressure beneath the rider's seat bones, and higher maximal pressures compared with those of the conventional saddle.

This does not mean that treeless saddles should not be used, although our findings do indicate that treeless saddles pose some potential problems of which riders should be aware. The rider in our study weighed only 125 pounds; heavier riders transmit proportionally higher forces to the horse's back. It would be useful to identify saddle pads that distribute the force more evenly beneath a treeless saddle. Finally, it would be interesting to compare the pressure profiles of a treeless saddle with those of a poorly fitted conventional saddle in horses that are difficult to fit. ▲

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## Meet the Expert

**H**ilary Clayton, BVMS, PhD, Diplomate ACVSMR, MRCVS, is a world-renowned



expert on equine biomechanics and conditioning. Since 1997, she has held the Mary Anne McPhail Dressage Chair in Equine Sports Medicine at Michigan State University's College of Veterinary Medicine, East Lansing. The position focuses on dressage- and sport-horse-focused research. Dr. Clayton is a USDF gold, silver, and bronze medalist and a member of the US Equestrian Federation Dressage Committee.