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# SADDLE SCIENCE

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FIND OUT WHAT'S NEW IN THE SCIENCE BEHIND PERFORMANCE SADDLES AND THE LATEST ON THE INNOVATIVE RESEARCH ON HOW THE SADDLE CONNECTS WITH THE EQUINE BACK IN MOTION FROM THE TEAM AT FAIRFAX SADDLES.

**W**hile a well fitted saddle can help influence your horse's performance, as well as your own balance and effectiveness as a rider, finding the perfect design to encourage harmony and enhance communication with your horse is the key to you both enjoying training and competing.


The past decade has seen an explosion in saddlery research and development and Fairfax Saddles has been at the forefront of producing successive innovative designs using the latest technologies for their ongoing scientific testing and studies.

A ground-breaking seven-year research and development

project by the team at Fairfax, which includes Rachel Murray, Russell Guire, Mark Fisher, and Vanessa Fairfax, has been looking at how reducing peak pressures under the saddle panel, between the 10th and 13th thoracic vertebrae, is associated with improved movement and gait, even when saddles are fitted to published guidelines.

Having already established that girth and bridle pressure is associated with gait and posture, this latest scientific research has shown that saddle pressure has a similar impact.

This has led to a new saddle design that is scientifically proven\* to relieve a key pressure zone on the horse's back and significantly improve performance. ►



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- SPENCER WILTON

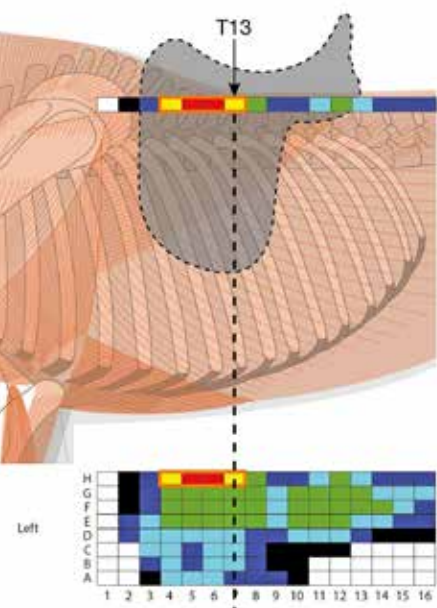
All horses and riders in the study were elite athletes on the British Equestrian Federation Dressage World Class Programme.

When determining initial pressure zones, the horses were ridden in their usual saddles by their usual riders and these saddles had been regularly maintained and fitted by an SMS qualified saddle-fitter.

Research studies conducted by the team included simultaneously using Pliance pressure mapping and gait analysis, allowing researchers to analyse the pressure patterns under well-fitting saddles and their effect on the locomotion of elite competition horses.

“Working with elite riders and their horses allows us to control variables often associated with less experienced horses and riders, such as maintaining a consistent speed,”

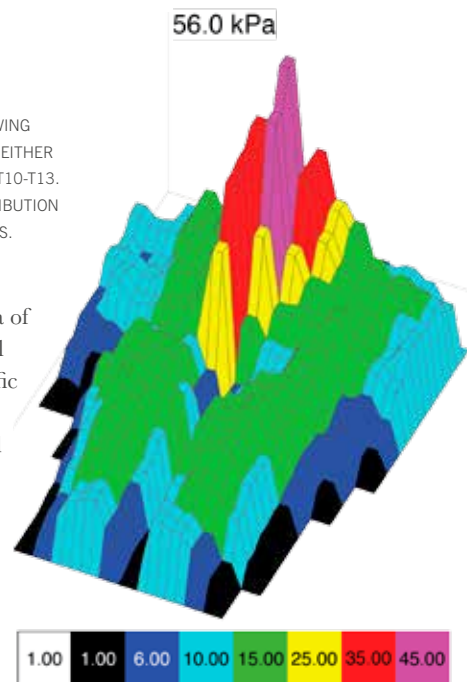
says designer Vanessa Fairfax, “Although our findings are beneficial to horse and rider combinations of all levels.”



### PRESSURE ZONES

Pliance is recognised modern dynamic testing equipment which uses two specifically designed pressure mats to measure exactly what pressures the horse in motion is experiencing under the saddle.

**LEFT:** THE POSITION OF THE SADDLE OVER THE SPINE IN RELATION TO T13. THE DATA UNDERNEATH SHOWS THE PRESSURE DISTRIBUTION DETECTED BY THE PRESSURE MAT, WITH HIGH PEAK PRESSURE (RED AND YELLOW) AT THE AREA OF T10-T13.



**RIGHT:** PRESSURE DISTRIBUTION SHOWING HIGH PEAK PRESSURE (RED AND PINK) EITHER SIDE OF THE SPINE IN THE REGION OF T10-T13. THIS IS REPRESENTATIVE OF THE DISTRIBUTION UNDER ALL THE HORSES' OWN SADDLES.

In this study, the pressure mapping identified a key area of peak pressures common to all 13 saddles used in the scientific test – around the base of the wither (between the 10th and 13th thoracic vertebrae – see image right).

The research also showed that high pressures were consistently recorded in this area when the horses were working in their usual saddles.

High-speed cameras and state-of-the-art software were used to objectively evaluate the locomotion of the horse and identify the specific moment during the trot stride when the pressure repeatedly peaks.

Templates of back shape taken at the standard template locations before and after exercise, revealed how the changes in the shape of the horse's back during activity are linked to this key pressure zone.

### POSTURE AND MOVEMENT

Studies have found that the area around the base of the wither is the location of a high concentration of muscle activity related to posture and the control of movement.

In trot, horses extend and then flex their backs, as well as rotating their spine and ribcage in the T13 region during the motion of each stride. ▶

**BELOW:** THIS SCREENSHOT FROM HIGH-SPEED CAMERA FOOTAGE CAPTURES THE TIMING OF PEAK PRESSURE UNDER THE SADDLE IN RELATION TO THE STRIDE PATTERN IN TROT.



### SPENCER WILTON AND SUPER NOVA II

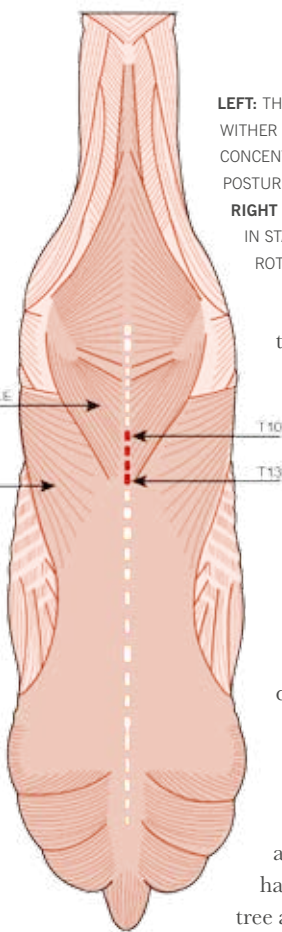
One of the first elite riders to benefit from the differences in Fairfax's new design is Olympic team silver medallist Spencer Wilton.

He won a saddle in the Fairfax Saddles sponsored Prix St Georges Championships in 2013 and was so impressed by the change in his horse, Super Nova II (Neville), that he has been working with Fairfax ever since.

“I noticed the change in Neville's way of going immediately. He felt so much freer, and I could really feel him moving through his back,” says Spencer after riding in the saddle the first time.

“I enjoy working with Fairfax Saddles because the company is constantly looking at the products we currently use and then finding ways to improve them for the comfort and therefore performance of the horse.”





**LEFT:** THE AREA AROUND THE BASE OF THE WITHER (T10-T13) IS THE LOCATION OF A HIGH CONCENTRATION OF MUSCLE ACTIVITY RELATED TO POSTURE AND THE CONTROL OF MOVEMENT.

**RIGHT MIDDLE:** WHEN THE LEFT FRONT LEG IS IN STANCE (ON THE GROUND) THE RIBCAGE ROTATES UPWARDS ON THE RIGHT SIDE.

This research shows that when the front left leg is in stance, the ribcage rotates upwards on the opposite side, the right, causing pressure under the saddle on the right side of the spine (See image below right).

### PERFORMANCE DRESSAGE PANEL

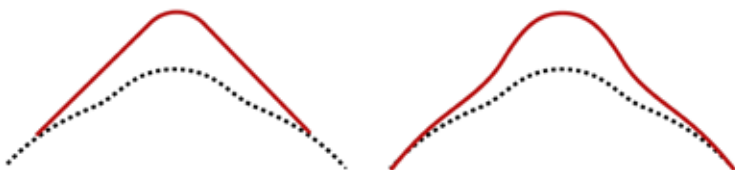
Previous studies have shown that the horse's back profile changes during exercise and Vanessa Fairfax's templates of back shape show similar results.

Using the templates as an indication, she has designed a new tree and a patented Performance Dressage Panel (Patent GB2515079B) to accommodate the musculature of the sport horse in motion.

The panels are shaped to interface with the contours of the horse's back as it moves and are lined with pressure-absorbing Prolite.

This design's most obvious visible difference is a significantly shortened solid arm that runs down the front of the saddle, separating the weight-bearing part under the rider's seat from the section under

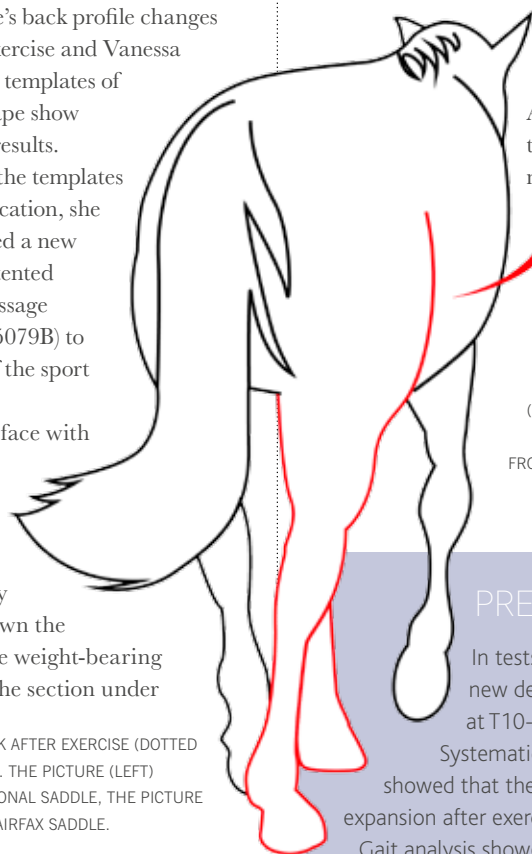
**BELOW:** CROSS SECTION OF A HORSE'S BACK AFTER EXERCISE (DOTTED LINE) AND TREE SHAPE (CONTINUOUS LINE). THE PICTURE (LEFT) REPRESENTS THE TREE SHAPE IN A TRADITIONAL SADDLE, THE PICTURE (RIGHT) REPRESENTS TREE SHAPE IN THE FAIRFAX SADDLE.



the rider's knee which lies over the horse's shoulder (see image right). This allows a greater range of motion of the shoulder.

### LONG-TERM GAIN

The final phase of the research highlights the long-term benefits of pressure relief on performance. Back templates taken after three months of using the new saddle reveal that improvements in exercise-related back expansion are long-term. The pre-exercise measurements taken after three months were considerably bigger than the pre-exercise measurements taken three



months previously. The same applies for the templates taken after exercise. Another interesting point is that the ratio between the two measurements taken before and after exercise also increases after three months in the new saddle, showing that the benefit has a cumulative effect. ■

**TOP RIGHT:** IN THE PERFORMANCE PANEL (PATENT GB2515079B) THE WEIGHT-BEARING PART UNDER THE RIDER'S SEAT IS SEPARATE FROM THE PART WHICH LIES OVER THE HORSE'S SHOULDER AND UNDER THE RIDER'S KNEE, ALLOWING A GREATER RANGE OF MOTION.

### PRESSURE RESULTS

In tests against the horses' usual saddles, Fairfax's new design was shown to reduce the peak pressure at T10-T13 in all cases by between 55% and 68%.

Systematic measurement of the horses' back shape showed that the new Fairfax saddle allows greater back expansion after exercise than the horse's usual saddle.

Gait analysis showed that reducing saddle pressure in the area of T10-T13 was associated with:

- improved gait symmetry
- improved knee and hock flexion
- increased front and hind leg extension

Fairfax saddles with the patented Dressage Performance Panel are the Gareth Monoflap, the Rebecca Monoflap and the Original Dressage Monoflap. For more information visit [www.fairfaxesaddles.com](http://www.fairfaxesaddles.com)



\*Read the Fairfax Saddles study in full visit [http://www.j-evs.com/article/S0737-0806\(16\)30642-6/abstract](http://www.j-evs.com/article/S0737-0806(16)30642-6/abstract)