Saddle Fit Study in the Western Saddle Market

By

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Introduction

Does your saddle fit? If not you are among the majority of western saddle riders according to a recent study by New Mexico State University's National Agri-Marketing Club.

Bad saddle fit is an age old problem that can cause serious damage to a horse and reduce their desire to perform. There are several studies which have evaluated the influence of the width of the saddle tree, thickness of saddle pads, and different brands on saddle fit (Harman 1994, Meschan et al. 2007, Clayton et al. 2009). Although these studies addressed some of the problems of saddle fit, they were not specifically targeted toward the barrel racing and roping segments. This study evaluated the effect of rider's weight, type and brand of saddle, and thickness of pad in three areas of saddle fit; 1) spinal process pressure, 2) pressure under the load bearing bars, and 3) bridging.

Procedures

We collected data from a convenience sample of 200 roping and barrel racing saddle-horse combinations in New Mexico. Only 153 of the observations were included in the analysis due to incomplete data and sureness of accurate readings. A Force Sensory Array (FSA™)[3] mat was used to measure the pounds per square inch (psi) exerted at 304 points along the horse's back from the weight of a saddle and rider (figure 1). The procedure was as follows: 1) the pressure mat was placed on the horse's back under the rider's typical saddle pad and saddle, 2) the rider rode around a few circles to allow the saddle to settle into place, and 3) the pressure mat was then connected to a computer to record the pressure data, resulting in a pressure scan for each saddle-horse combination. Each scan consisted of a three-dimensional image of the saddle fit, color-coded scale from light blue to red depending on the exerted pressure (figure 2).

Figure 1

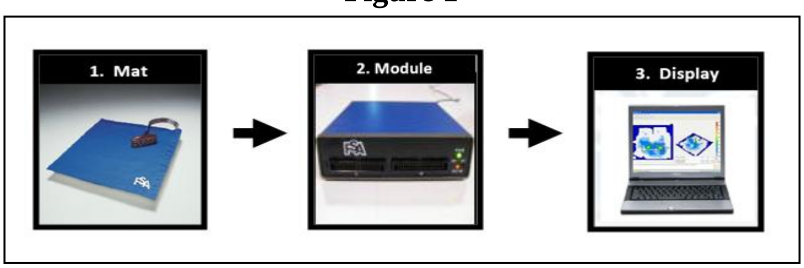


Figure 2

No Pressure	Acceptable Pressure		Potentially Damaging Pressure		Rating
0.0	0.6-2.3	2.4-3.5	3.6-4.7	4.8-6.0	Pounds per square inch

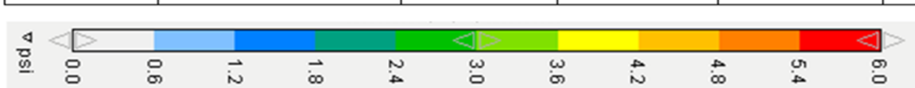
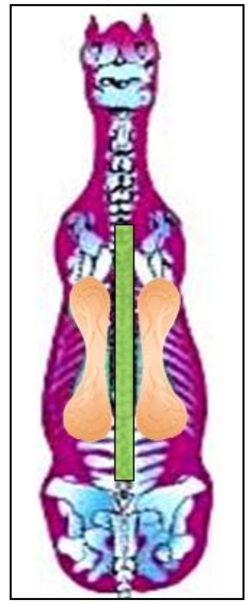


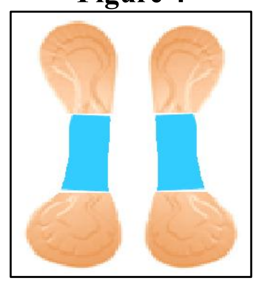
Figure 3



This study analyzed saddle fit in the following three areas:

- *Saddle Bar Pressure:* Contact pressure between the saddle and the horse's back directly under the load bearing bars as shown in orange in Figure 3. We specified areas with pressures of 3.6 psi or higher as poor fit.
- *Spinal Process Pressure:* Pressure at the contact area of the saddle, generally the pommel, along any of the spinal processes of the horse's back including the withers and spine as shown in the green strip along the back in Figure 3. Again we specified areas with pressures of 3.6 psi or higher as poor fit.
- *Bridging:* This characterizes the lack of contact between saddle and the horse's back, presenting a contact gap between the front and back of the horse as shown in blue in Figure 4. We qualitatively classify saddles as having bridging or not based on little or no contact shown on the scans.

Figure 4



Studies in the literature reported varying pressures that could potentially compromise blood flow (Clayton, 2009; Harman 1994). We specified pressures less than 3.6 psi were not likely to cause serious damage during short exposures, while pressures above 3.6 psi could compromise blood flow and potentially lead to tissue damage. Figure 5 shows a scan classified as a bad saddle fit, where excessive pressure as indicated by the red and yellow colors is exerted at several concentrated areas along the horse's back, with little contact down the rest of the back. A saddle with a good fit should make contact along the back of the horse from end to end with no excessive pressure points and no bridging. This distributes the weight of the rider and saddle over a larger area and should help to alleviate pressure focused on specific areas. Figure 6 shows an example of a scan showing good saddle fit exhibiting no yellow, orange, or red pressure points and adequate contact throughout the horses back.

Figure 5
Bad Scan

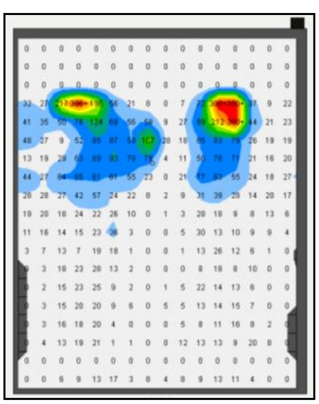
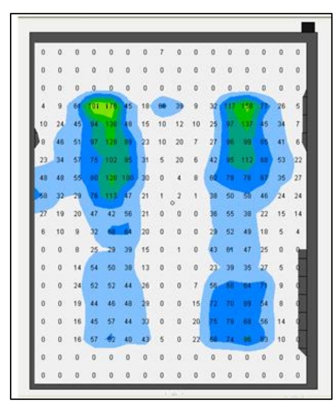


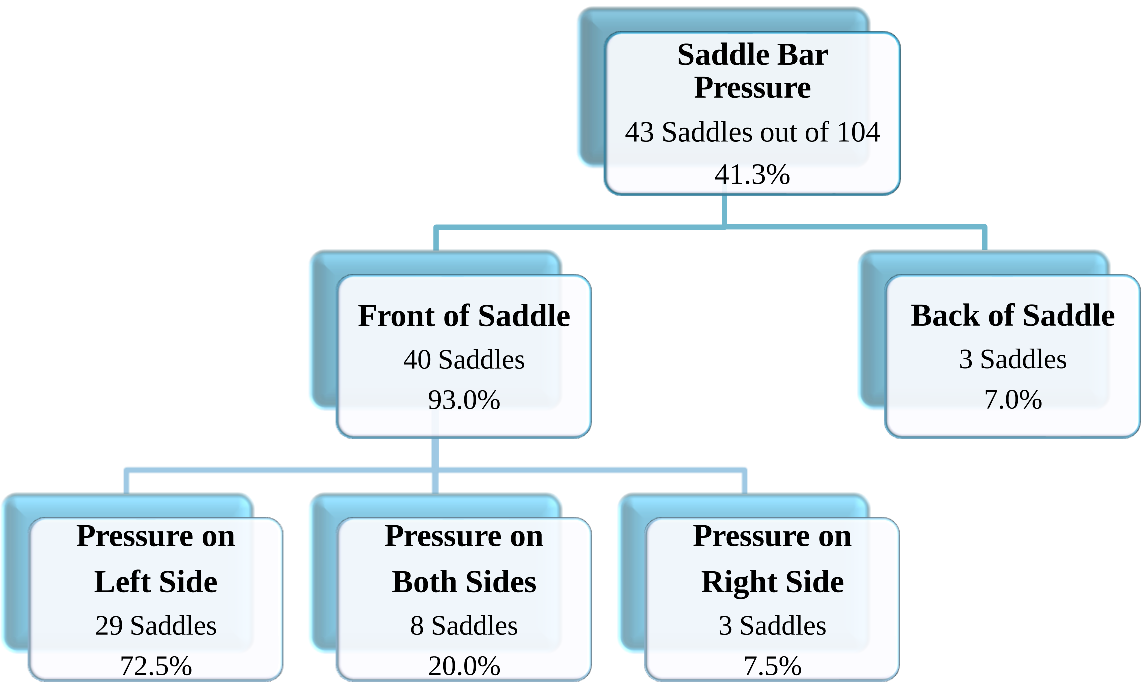
Figure 6
Desirable (Good) Scan



Results
The results of this study are presented separately for roping and barrel racing saddles because of the differences in saddle designs and intended uses.

Roping Saddles
Our sample includes 104 roping saddle-horse combinations.   The average rider's weight was 170.8 pounds ranging from a minimum of 125 pounds to a maximum of 250 pounds. These riders equipped their saddles with pads with widths averaging 1.2 inches, ranging from .374 inches to 2.088 inches.

Roping Saddles Found to Have Saddle Bar Pressure Above 3.6 psi



Forty-three roping saddles out of 104 observations (41.3%) exhibited pressures exceeding 3.6 psi with 93 percent of these having fitting problems at the front of the saddle. Of saddles with fitting problems at the front, 72.5 percent exhibited pressures greater than 3.6 psi on the left side possibly occurring because of uneven exercise to both sides of the horse's body. It is common for riders to exercise their horses in a counter clockwise motion causing the horse to build his left side larger than the right. One out of 5 saddles showed excessive pressure on both sides and 7.5 percent showed excessive pressure on the right side.

Roping Saddles Exhibiting Spinal Process Pressure Above 3.6 psi
Our research showed that there were 28 roping saddles that showed spinal process pressure above 3.6 psi or 26.9 percent of 104 total saddles.

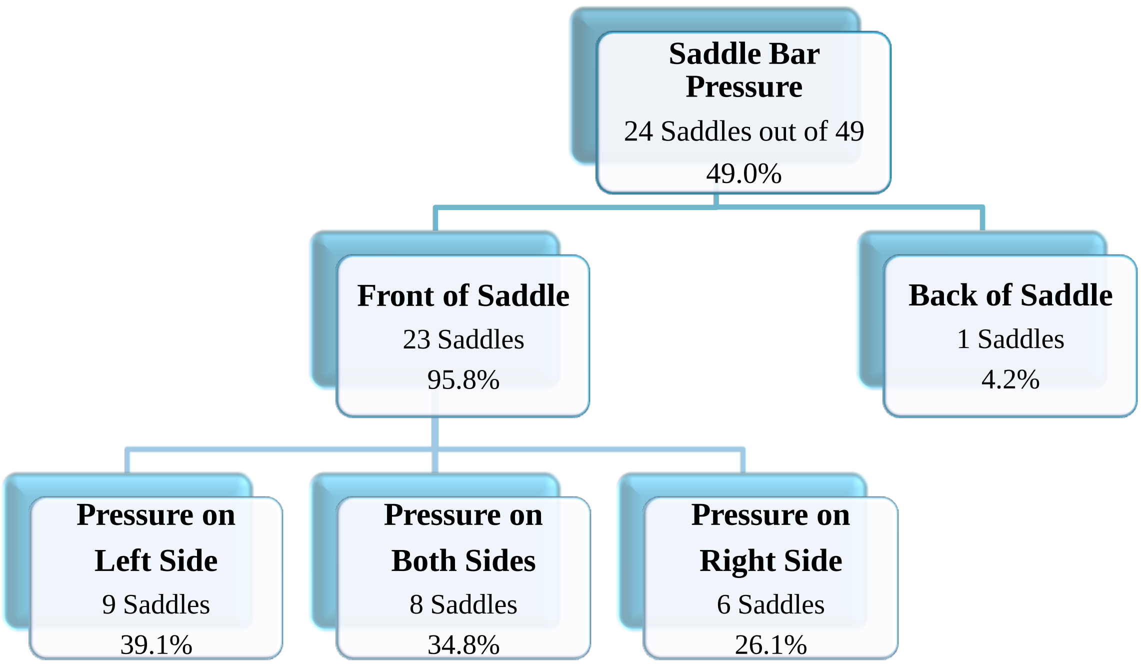
Roping Saddles Exhibiting Bridging

There were 88 roping saddles that showed signs of bridging or 84.6 percent of the 104 total saddles. Theoretically, saddles with little or no bridging should not have areas of high pressure. This was obviously not the case in our study.

Barrel Racing Saddles

Our sample included 49 barrel racing saddle-horse combinations. The average rider's weight was 143.1 pounds but ranged from 105 pounds to 250 pounds. These riders equipped their saddles with pads which measured on average 1.1 inches, ranging from .398 inches to 3.0 inches.

Barrel Racing Saddles Found to Have Saddle Bar Pressure Above 3.6 psi



Twenty-four out of 49 barrel racing saddle observations (49%) showed pressure points greater than 3.6 psi under the load bearing bars. The excess pressure occurred at the front of the bar on all but one of the observations. Whereas there was a strong left side bias for roping saddles, this was not found with the barrel saddles. Excess pressures points were more evenly distributed between the left, right, and both sides.

Barrel Racing Saddles with Spinal Process Pressure above 3.6 psi

Our research showed that there was 8 barrel racing saddles that showed spinal process pressure above 3.6 psi or 16.3 percent of 49 total saddles.

Barrel Racing Saddles Exhibiting Bridging

There was 46 barrel racing saddles that showed signs of bridging or 93.9 percent of the 49 total saddles.

Effect of Pad Thickness on the Probability of Saddle Fit Problems

We found that thicker pads increased the probability of bad fit along the spinal processes for roping saddles but not for barrel racing saddles. The lack of significance for barrel racing saddles could be due to a smaller sample size and only a few observations over 150 pounds.

Each additional inch of pad thickness increased the probability of bad fit by 23.3 percent. This finding is consistent with information in the literature called the Pad Paradox (Kaden, n.d.) where riders often incorrectly think that increasing pad thickness will provide greater comfort to the horse. In his article Pad Paradox, Kaden explains the effects and influence of padding on saddle fit and how the front and rear of the saddle tree (which have different bar angles) are lifted different amounts by saddle padding, contributing to the bridging seen in many western saddles (Kaden, n.d.).

Thickness of the saddle pad was found to have no impact on saddle fit along the back of the horse under the load bearing bars for either roping saddles or barrel racing saddles.

Effect of Riders Weight on the Probability of Saddle Fit Problems

Rider's weight increased the probability of bad fit along the back of the horse under the load bearing bars with roping saddles, but not for barrel racing saddles. Each additional pound of rider's weight increased the probability of bad saddle fit by 0.5 percent. This means that for a rider weighing 221 pounds, i.e. 50 pounds over the mean of 171 pounds, his extra weight would increase the probability of bad saddle fit by 25 percent. This estimated impact is based on the survey data which showed that more than 80 percent of roping saddles evaluated had significant bridging. If the bridging problem can be alleviated, one would expect that rider's weight would not result in excess pressure points except in extreme weight situations.

The weight of the rider did not have a significant effect on saddle fit along the spinal processes for either roping or barrel saddles.

Impact of Saddle Brand on Probability of Saddle Fit Problems

Several different brands of saddles were included in the 153 saddles tested. We found no significant relationship between the saddle brand and the probability of saddle fit problems for either roping or barrel racing saddles. We did not test any treeless or flexible tree saddles.

Comments

This research attempted to quantify the problem of poor saddle fit for ropers and barrel racers but did not provide any specific suggestions on solving the problem. However, during one session of testing we were able to retest seven saddle-horse combinations which had saddle fit problems by substituting the owner's saddle with an adjustable saddle made by Specialized Saddles, a company located in Canutillo, Texas (www.specializedsaddles.com). This company advertises that their saddles can be adjusted to fit all horses. This company has been selling saddles for use in endurance racing for several years and has recently introduced a line of western saddles. None of the 153 western saddle observations used in the above study were Specialized Saddles because they are new in the market and none of the study participants owned one.

The Specialized Saddle has adjustable fitting pads. After prescribed fitting adjustments, we were able to quickly correct the poor saddle fit problem in six of the seven situations. These findings are impressive but the numbers tested were few.

Research focusing on measuring the ability of adjustable type saddles to either eliminate or reduce the possibility of poor saddle fit appears promising.

Acknowledgements

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3. VistaMed Inc. and A.J. Frank are acknowledged for the pressure mapping equipment and technical support.

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Student Researchers Collecting Data