# A pilot study into the effects of various mounting techniques on the pressure of the horse's back

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## Introduction

The horse is used for human benefit first for agriculture, war and transport and lately for competition. In order for this to be effectively achieved, the saddle was developed for human stability and comfort and to distribute their weight further and more evenly. This was with little consideration for the horse whose welfare is changed by our ownership of them (National Equine Welfare Compendium, 2009).

The horses back is not intended to carry weight, however the design makes it possible. The bow and string theory proposed by Barthez (1978) cited in Henson (2009) explains how the spine and surrounding musculature is effected by limb movement and head and neck position and therefore its ability to effectively support the saddle and rider weight. A small amount of natural movement is likely to be seen depending on the gait, with flexion of the back seen when the limbs are under the trunk or when the neck position is low (Henson, 2009). This is the most ideal position for weight carrying and is the basis for traditional training techniques (Heuschmann, 2009)

The saddle has to be designed to fit the horses conformation and musculature on one side paired with that of the rider on the other (Belock *et al*, 2011). It is an important requirement for the comfort of both athletes for them to perform at their best, and this has led to the development of many different types and styles of saddle (Bellock et al, 2011).

Geutjens *et al* (2008) found that rider weight was the most important factor when investigating the effects of mounting on pressure on the horse's back. They found that pressure was asymmetrical, localised to the right side of the withers and that the horse stabilizes itself to avoid loss of balance by contracting it's shoulder muscles.

The aim of this study is to investigate the pressure caused by a range of mounting techniques, from the ground and from two different mounting block heights.

## Materials and Method

A competent rider was asked to mount a cob type horse with a well fitting saddle three times for each technique. The Pliance-x pressure measuring system was arranged under the saddle, one pad either side of the spine. The following mounting techniques were employed, while data was recorded until the rider had been seated for three seconds. At this point recording stopped and the rider dismounted according to usual practice.

1. Ground unsupported: Traditional method adapted from the mounting section of the BHS stage one exam (Reed, 2008)
2. Ground Self supported: With the same method as 1, but the riders right hand extended over the saddle and holding the offside stirrup.
3. Ground Counter balanced: Mounting from the ground but with someone asserting equal force as the rider on the offside stirrup.
4. Leg up: Traditional method adapted from Belknap (2004)
5. Lower Block Unsupported: Use of mounting platform at 28cm using the traditional mounting method.
6. Lower block self supported: Hand position adjusted to hold the offside stirrup mounting from the platform at 28cm.
7. Lower block counter balanced: Rider weight counter balanced by helper mounting from the 28cm platform.
8. Lower block no stirrups: Mounting from the 28cm platform with out placing the foot in the left stirrup
9. Higher block unsupported: Mounting platform raised to 58cm using the traditional mounting method.
10. Higher block self supported: Mounting platform raised to 58cm with right hand holding off side stirrup.
11. Higher block counter balanced: Platform at 58cm with helper counter balancing the riders weight
12. Higher block no stirrups: Platform at 58cm mounting without the left foot placed in the stirrup.

The mean distribution of pressure under the saddle was calculated as; number of sensors activated x length of time activated (0.02s intervals)

The data was analysed using a one way ANOVA for: maximum peak pressures, mean peak pressures and mean distribution of pressure under the saddle.

## Results

No significant difference between methods was observed in overall mean pressure supporting previous studies on saddle fit and rider influence. However, both maximum and mean peak pressures varied significantly between the techniques ($P<0.05$). The mean pressure under saddle varied greatly between the mounting methods with mounting from the ground in an unsupported fashion having the highest (4.43KPa) and the lower block self-supported method having the least (1.97KPa).

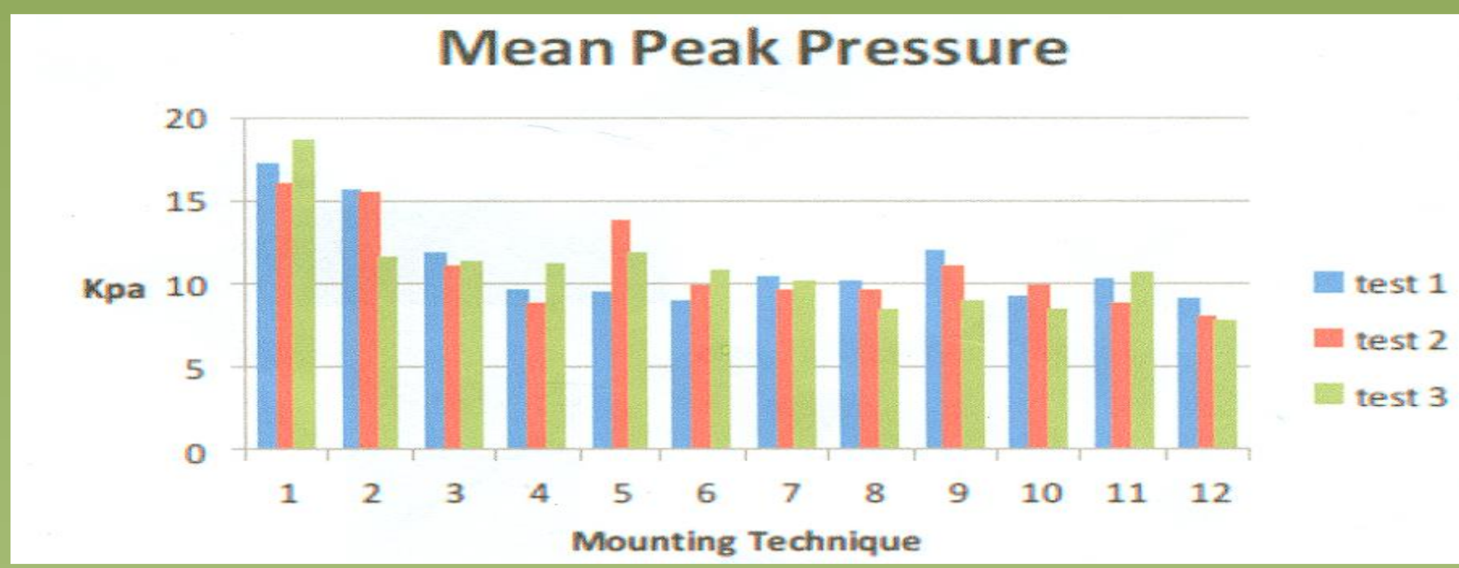
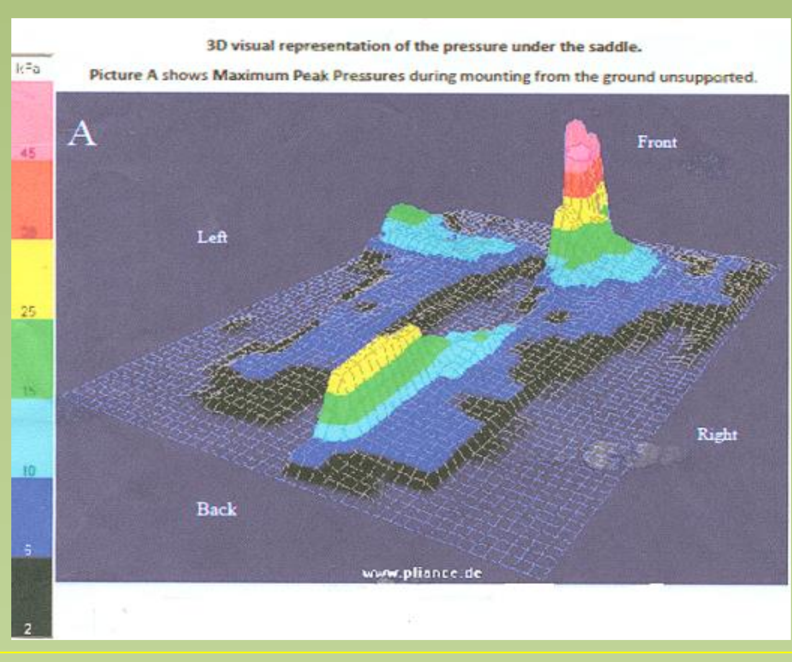
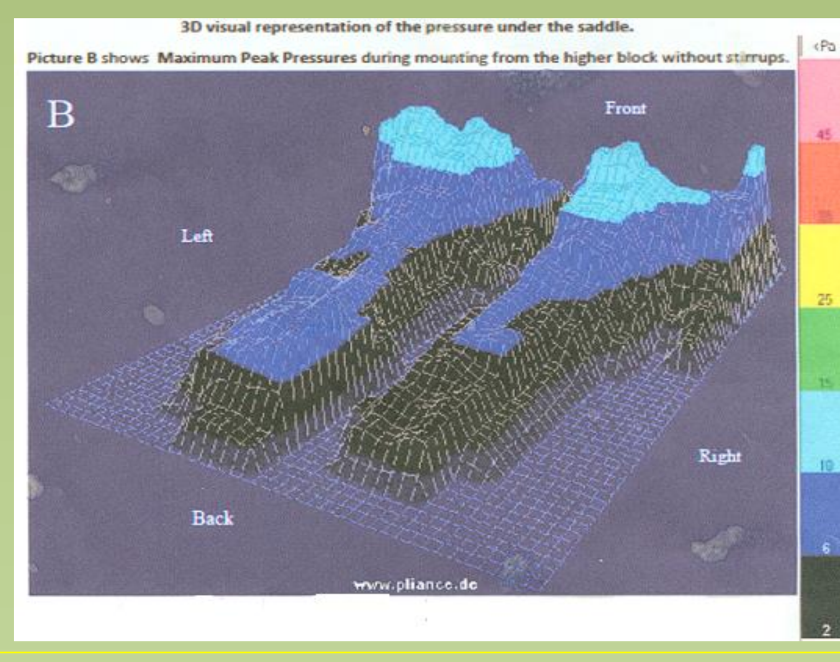



Figure 1. There was a great variation in mean peak pressure under the saddle pad between mounting methods (see Materials and Methods section for annotation).

In terms of peak pressure, the ground unsupported method was again the highest (18.61KPa) with mounting from the higher block self-supporting having the least (8.35KPa). These results suggested that mounting from the ground unsupported and self-supporting or counter balancing from the ground is also not ideal (see Fig.1).




## Discussion

The study found that pressure distribution means were not statistically significant ($P>0.05$) implying that mounting techniques does not have an effect on the saddles ability to distribute the riders weight across the back which supports previous studies.

Geutejens *et al* (2008) found that when the riders leg swings upwards, the highest pressure was seen which correlated to the riders weight. They also found that the highest pressure was seen when mounting from the ground, this contradicts this studies findings. This could be due to the control of variables such as rider weight (Pullin *et al,* 1996; De Cocq, 2004; Geutjens *et al*, 2008) rider ability (Peham & Schobeserger, 2004; Peham *et al*, 2004; Latif *et al*, 2010) and rider experience (Peham *et al*, 2004) by using only one rider.

The saddle used could also explain why distribution was insignificant. The use of a well fitting treed saddle helps to distribute the riders weight over a larger area compared to a treeless saddle (Belock, *et al*, 2011) and a well fitting saddle distributes weight more evenly (Meschan *et al*, 2007).

The study found that the two methods of mounting that created the lowest peak pressures on the horses back were the two methods completed without stirrups. Both of these methods would not have caused any pressure on the horses back during the swing of the riders right leg, which was shown by Geutjens *et al* (2008) to be the point of highest pressure. During the no stirrup techniques the left foot weight remains on the platform explaining why this method can be best recommended for the horses welfare.

All of the mounting techniques exceeded the 11Kpa tolerance limit established by Von Peinen *et al* (2010) although the pressure will only be at this height for a short period of time whilst mounting. High pressure for a short amount of time are less damaging than the repeated pressures seen when riding. However if they persist some underlying damage can occur.

## Conclusion

The aim of the study was to investigate mounting from three heights using various methods to establish an ideal method for the welfare of the horse by comparing the pressures seen under the saddle using an electronic pressure mat. A limit for the horse's tolerance to pressure before sores and injury occur has previously been identified, and although this is higher than that of human tolerance, attempts should be made to avoid causing pressure above this limit in any aspect of human horse association.

The most preferential method of mounting in this study which caused least pressure on the horse's back was mounting without the foot in the stirrups but simply swinging the right leg across the horse to find the opposite stirrup or by a self-supporting method where the rider holds the opposite stirrup leather as he/she mounts from a height of some 28 or 58 cm.

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