Tight nosebands: can they cause harm?

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Discusses the welfare implications associated with overly tightened nosebands in competition horses

Introduction

Nosebands are widely used in equestrian sports to increase control of the horse and to reduce unwanted oral behaviours (FEI 2017). However, there is increasing concern that noseband pressures have a negative impact on horse welfare (Doherty *et al*. 2017a). Emerging evidence suggests that tight nosebands may potentially cause physiological stress and physical damage to the underlying tissue (Doherty *et al*. 2017b; Fenner *et al*. 2016). This makes the over-tightening of nosebands a considerable animal health and welfare concern.

Discussion

The Fédération Equestre Internationale (FEI) Dressage Rules state that nosebands cannot be tightened to the extent that they harm the horse (FEI 2017). However, they do not include a guideline as to how tight a noseband can be fastened before it causes harm, nor a recommendation for an acceptable tightness. Traditionally it is recommended that two fingers should fit easily underneath the fastened noseband. Doherty *et al*. (2017a) investigated current noseband usage in equestrian competition. Data were collected from 750 competition horses. Noseband type was recorded, an International Society for Equestrian Science (ISES) taper gauge was used to judge noseband tightness, and skin calipers were used to measure noseband width and position relative to bony landmarks. This study found that 7% of nosebands were set at two fingers, with the remainder being tighter. Forty-four per cent of nosebands had zero finger margin. Eventers had significantly tighter nosebands than dressage or performance hunters ($p<0.001$). Flash nosebands were significantly tighter than cavesson ($p<0.001$), drop ($p<0.001$) and Micklem ($p<0.005$) nosebands, but not significantly tighter than grackle nosebands. These findings indicate that over-tightening of nosebands is a widespread practice.

While many horses wear tight nosebands, the physiological effects of this are not fully understood. Evidence that tight nosebands stimulate a physiological stress response was demonstrated by Fenner *et al*. (2016), who investigated the stress response resulting from different levels of tightness. Twelve horses received each treatment in a randomised order: unfastened, 2 fingers, 1 finger and 0 fingers. Each horse was subjected to each treatment once over four consecutive days. Heart rate, heart rate variation and eye temperature were measured. Oral behaviours including licking, chewing and swallowing were observed and recorded during a baseline, treatment and recovery period of 10 minutes each. At 0 fingers horse heart rate ($p=0.003$) and heart rate variability ($p<0.001$) significantly increased, and eye temperature increased ($p=0.011$) during the treatment period, indicating a physiological stress response. Chewing, swallowing and licking significantly decreased during the 0 finger treatment compared to baseline. Behavioural responses increased in the recovery period for all treatments, indicating a post-inhibitory rebound response. This could be associated with the double bridle and crank noseband rather than the noseband itself, as all horses were naïve to double bridles and crank noseband prior to the study. The physiological stress response may be due to pain or discomfort caused by the tight noseband, or it may be associated with the inhibition of normal oral behaviours.

One predictor of potential for pain and tissue damage is to measure the force exerted by nosebands on the underlying tissue. Doherty *et al*. (2017b) developed a digital tightness gauge (DTG) to estimate the normal force exerted by a noseband. Two field trials were performed, using versions 3 ($n=15$) and 4 ($n=12$) of the DTG respectively. Noseband normal force was measured by placing the DTG probe underneath the noseband at three tightness settings: 2 fingers, 1 finger and 0.5 fingers, set using an ISES taper gauge. The force was measured at the frontal nasal plane for both trials, with a lateral site in the second trial. Mean normal force (N) at the frontal site was 52.4, 35.8 and 19.8 (range 8-83N) in trial 1 and 65.1, 39.0 and 14.2 in trial 2 at tightness 0.5, 1 and 2 fingers respectively. Lateral site mean normal force (N) in trial 2 was 18.6, 8.8 and 3.3 at tightness 0.5, 1 and 2 fingers respectively. This study gives an estimate of the forces exerted by the noseband; however, the force is uneven due to the contour of the horse's head around the circumference of the nose, with greater forces at contour areas such as either side of the nasal plane, and lower forces in concave areas (Murray et al. 2015). Furthermore, riders applying tension to the reins increases the force of the noseband on the underlying tissue in the ridden horse, and the force will increase as rein tension is increased (Doherty *et al*., 2017b). Nosebands are commonly tightened to 0 fingers in equestrian competition (Doherty *et al*. 2017a), but the force applied at this tightness was not measured in this study, as the DTG probe could not be inserted beneath the noseband at this tightness. It is likely that the forces applied at 0 fingers exceed those measured in this study.

The force required to cause nociception and tissue damage in horses is not well studied. However, one study found that 6.82 N of mechanical force stimulates nociceptors in the hindlimb of cattle (Ley, Waterman & Livingston 1996). The authors of the cattle study set the cut-off at 20 N to prevent tissue damage. While the threshold for pain and tissue damage in the horse is likely different to that in cattle, it is clear that the force exerted by the noseband on the horse can far exceed that required to cause pain in other animal species, and likely exceeds that required to stimulate nociception in horses.

Conclusion

Overly tightened nosebands cause physiological stress and may cause pain, hence have the potential to negatively impact horse welfare. Further studies are required to accurately map the forces applied by nosebands along the contour of the horse's head, and to determine the threshold forces for pain and tissue damage in horses, in order to better assess the potential for nosebands in causing pain and tissue damage. From this research, specific guidelines regarding the tightness of nosebands can be made to minimise the welfare impacts of nosebands, while still enabling riders to maintain appropriate control of their horses.

References

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