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## **Two methods of measuring in-vivo pressures applied by a cavesson noseband**

**Could noseband pressure be causing tissue and nerve damage in the horse?**

Researchers from Ireland and Australia have just completed the preliminary development of two methods of measuring *in vivo* noseband pressure, which could impact on the welfare of the ridden horse.

Some riders believe that a tight noseband enhances bit pressure, allowing rein aids to be more effective. This goes against the standard recommendation for adjustment of the noseband, where the space between the noseband and the nasal midline should easily allow the insertion of two fingers; such an adjustment allowing the horse normal jaw movement. Orla Doherty of the University of Limerick, Ireland and her research team investigated the level of noseband tightness being used at equestrian competitions.

The research team studied 850 show jumpers, and found only 20% were fitted with a simple cavesson noseband; the majority used flash or grackle nosebands. “We are also interested in how tight these nosebands are being fastened” said Doherty. Of 201 young event and hunter horses studied, only 12% had nosebands loose enough

to enable two fingers to fit underneath, and 47% had nosebands too tight to fit any fingers underneath.

In addition to possible physical damage, excessively tight nosebands may impact negatively on horse and rider safety. “A horse experiencing pain while being ridden is more likely to display flight and fear responses i.e. head tossing, bolting etc.” says Doherty.

The research team developed two approaches to estimate *in vivo* noseband applied pressures; one measuring dynamic tension in the noseband and inferring pressures based on the anatomical curvature of the horse’s nose; the other using pressure sensors deployed at specific noseband-tissue interfaces. In the first of two studies, an Irish Cob was fitted with the bridle and noseband, where a ‘two-finger’ tightness was established using the ISES Noseband Taper Gauge <http://www.equidaewelfare.com> . Data were collected while the horse wore the noseband, and was fed both hay and hard feed. Results showed rhythmic peaking of pressures while the horse chewed, and when it was cued to back up. The system is wireless, allowing data logging under normal exercise conditions.

In the second study, the same horse was ridden under saddle at walk, trot and canter through changes of rein. Inter-gait transitions were assessed; and the horse was also ridden over a small jump. Large pressure pulses were observed when the horse was ridden, which correlated to transitions, turns, during jumping, and when the horse stumbled. The physiological impact of high pressures (either sustained or pulsed) on animal tissue is as yet unknown; however, in humans, high pressures are known to cause tissue and nerve damage.

Doherty states that more data need to be collected to validate the measurement technique and demonstrate correlation between anomalously high pressures and animal behaviour and welfare outcomes. Researchers would like to establish objective metrics that could guide best practice. For instance “We really don’t know what happens to soft tissues when we tighten the noseband. If the horse physically can’t open its mouth, then are the fluctuations in pressure or force going to be greater or less or displaced to the bit-oral cavity interface? Much remains to be done to answer these questions”.

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The International Society for Equitation Science (ISES) is a not-for-profit organisation that aims to facilitate research into the training of horses to enhance horse welfare and improve the horse-rider relationship. [www.equitationsscience.com](http://www.equitationsscience.com)

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