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www.ufaw.org.uk

Animal Welfare 2022, 31: 231-241
ISSN 0962-7286
doi: 10.7120/09627286.31.2.007

Evaluation of the effect of tongue ties on stress parameters, behaviour and heart-rate variability in racehorses

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Abstract

Fixation of the tongue to the mandible using so-called tongue ties (TTs) is common practice in Standardbred (SB) and Thoroughbred (TB) racing, but little is known about their impact on animal welfare. In this study, the influence of TTs on heart-rate variability (HRV), stress parameters in plasma (cortisol, glucose, lactate) and behaviour was evaluated in 30 SBs and 29 TBs (n = 59) presenting with exercise insufficiency. Overall, 36/59 horses (24 SBs, 12 TBs) were familiar with TTs. Blood was taken at rest, after TT application and after racing in all horses, additionally samples were taken without TT in SBs another day. HRV was calculated over 3 min before, during and after racing. Additionally, SBs' behaviour during TT application and racing was documented in real time. TT application did not increase cortisol levels significantly, while highly significant increases in cortisol levels were found after racing. Lactate levels were not influenced by TT application, but also significantly increased after racing. No significant differences were found for glucose. Seventeen out of 30 SBs showed mild (n = 8), moderate (n = 8) and severe (n = 1) reactions during TT application, none during or after race training. At rest, 23/30 SBs had a low/high frequency (LF/HF) ratio < 1.5 (1.05 [± 0.61], n = 30, dominating parasympathetic activity). After TT application, the LF/HF ratio increased to 1.4 (± 0.45) (increased sympathetic activity). In TBs, sympathetic activity dominated at rest. No differences in LF, HF and LF/HF were found after TT application or comparing HRV after racing with/without TT. The stress response (blood parameters and HRV) was not influenced by horses' naivety to TTs, however an increased stress response was observed in SB mares. Overall, obvious adverse behaviour, but only slight evidence of an increased systemic stress response, was found in this study. These results might provide objective evidence for future decisions from equine sports organisations concerning further regulations on TTs.

Keywords: *animal welfare, cortisol, heart-rate variability, racing, stress, tongue tie*