Effect of head and neck position on upper airway function in standardbred racehorses.

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Introduction
Poll flexion is suggested to play an important role in the development of dynamic upper respiratory tract (URT) collapse. However, limited investigations have been performed in Standardbred racehorses despite the fact that poll flexion may be induced when they resist the bit.

Methods and materials
Eight Standardbreds were examined during training, once flexed and once in extension, using a randomised crossover design. Head position was maintained using modified check-reins and head-neck angle was recorded. On each occasion horses performed 2 rounds of exercise of 2400m at ≈35km/h. Speed and heart rate (HR) were measured during exercise and blood samples taken before and after exercise. URT endoscopy was performed during the second round. Videos were blinded and URT function assessed. HR, plasma lactate (Lac) and speed were compared for different head positions using paired T-tests. Cortisol was analysed using repeated-measures ANOVA and URT function using Fisher’s exact tests and paired T-tests (P<0.05).

Results
Data were excluded for 1 horse where head-neck angle could not be measured. Flexed and extended head-neck angles differed significantly (mean: 85.0° vs 97.8°; P=0.001). All horses showed some form of URT collapse during exercise, although this was only deemed clinically significant in 4 horses with a history of abnormal noise. These horses showed additional abnormalities during flexion. However, mean severity scores did not reach statistical significance (P=0.08). No significant difference was found for speed, HR or Lac. A significant increase in cortisol was found with exercise (P<0.001). The interaction between time and head position was P=0.09, with higher concentrations of cortisol generally occurring in extension rather than flexion.

Relevance to clinical equine practice
URT abnormalities may be exacerbated with poll flexion. The use of equipment to modify head position may induce a stress response.

Declarations
This study was approved by the University of Adelaide Animal Ethics Committee. Sources of funding: internal (University of Adelaide honours projects). This data is being presented at the International Conference on Equine Exercise Physiology in Chester UK, June 2014.