**Increased Soft Palate Angle and Basihyoid Depth is Related to Increased Body Condition Score and Increased Tongue Size in the Horse.**

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**Background**: Increased body weight has been associated with human obstructive sleep apnoea and canine brachycephalic obstructive airway syndrome. To the authors’ knowledge the effect of body condition score (BCS) on the structures of the upper airway and oropharynx of the horse has not been investigated.

**Objectives**: To investigate the effect of BCS on tongue area and height, soft palate angle and basihyoid depth in the horse.

**Study Design**: Single centre, retrospective, analytical, cross-sectional

Methods: Computed tomographic (CT) images of the head of 58 horses were evaluated using DICOM viewing software to measure head length, basihyoid-skin depth, soft palate angle (SPA), midline tongue area and dorsoventral height (DVH) of the tongue in two locations. Body condition scoring was performed at the time of the CT examinations and horses were positioned with a fully extended head for image acquisition.

**Results**: Increased BCS led to an increased SPA (mean difference=2.56$˚$; P=0.019) and increased basihyoid depth (mean difference=0.246cm; P=0.006). Following adjustments made for the effect of head length on tongue measures a significant correlation was identified between SPA and tongue area (Spearman’s r=0.544; P=0.007), SPA and DVH of the tongue at the level of the hard palate (Spearman’s r=0.562; P=0.004) and SPA and DVH at the lingual process of the basihyoid bone (Spearman’s r=0.690; P<0.001). No significant correlation was identified between any measured variables with sex or age of horses.

**Main Limitations**: All measurements were made from one image in a sagittal midline plane. The investigator collecting CT measurements was not blinded to BCS.

**Conclusions:** Increased BCS results in an increase in size measurements of the tongue, SPA and depth of the basihyoid bone. Results from this study warrant further investigation into the clinical significance of the effects of BCS on the upper airways of the horse.

**Ethical Animal Research:** University of Liverpool Ethics Review Committee, approval number VREC1226.

**Informed Consent:** Owners give informed consent for generic retrospective analysis of clinical data for research purposes on consent forms on admission.

**Antimicrobial stewardship**: - N/A

**Competing Interests**: None declared.

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