NOSEBAND TIGHTNESS AFFECTS EQUINE BIOMECHANICS

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Introduction

Noseband tightness and the consequent pressure applied to the nasal bone and surrounding soft tissues were studied (Doherty et al., 2017), showing pressures high enough to emulate the effects of a tourniquet. However, there is no research into its effect on performance. The objectives of this study were to 1) determine the peak pressure values under a cavesson noseband at 3 different settings; 2) correlate peak pressures with changes in back and hindlimb kinematics.

Methods

-Noseband tightness was ascertained using an International Society for Equine Science (ISES) taper gauge with the 3 settings being: 1) control at the recommended '2 finger' setting, 2) 1 finger space (setting 1) and 3) 0 fingers space (setting 2).

-Peak pressure was determined using calibrated pressure mats (F-Scan, Tekscan) under the noseband during in-hand trot (n = 8 horses).

-High speed motion capture at 240fps and posterior video analysis (Quintic Biomechanics) were used to detect changes in stride length, hip, stifle, hock and fetlock range of motion (ROM) and maximum flexion and extension angles and changes in four spinal angles at maximum protraction and retraction of the forelimb.

-Statistical analysis (repeated measures ANOVA and Friedmn's test) was carried out with SPSS.

ISES taper gauge

Set up of pressure sensor (F-Scan)

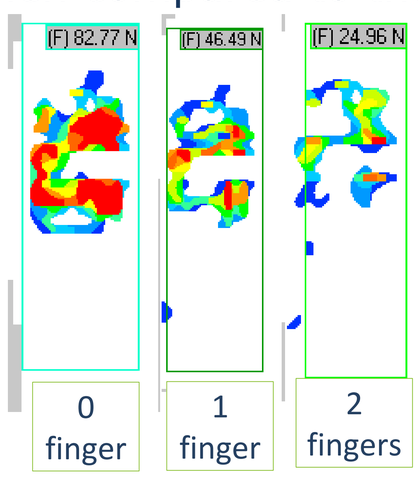
Positioning of markers for back kinematics

Take Home Message: Results suggest an association between increasing peak pressures and a decrease in multiple gait parameters pivotal to performance quality.

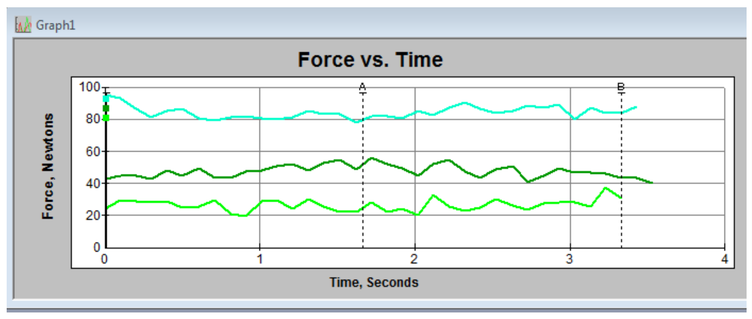
Reference: Doherty O et al. (2017) PLoS ONE 12(1): e0168996

Results

Mean peak pressures detected at noseband setting 1 and 2 when compared to the control value (26.44kPa) were 14.41kPa (154.53%) and 89.35kPa (437.98%) higher respectively. Stride length decreased, showing a statistically significant moderate, negative correlation between this and the pressure detected under the noseband at each setting. Setting 1 showed a 6.18% decrease in stride length when compared to the control setting and setting 2, an 11.14% decrease. On further gait evaluation, although not statistically significant, full ROM of the hip, stifle and overall hind limb at setting 2 decreased by 4.97%, 2.16% and 1.49% respectively when compared to the control noseband setting.



0 finger | 1 finger | 2 fingers



Graph depicting Force vs. Time. Top ,line= 0 finger; middle line= 1 finger; bottom line= 2 fingers