

**Title:** An investigation into the effect of the relationship between spinal vertebrae alignment and the performance of FEI international 1\* event horses at a British Eventing competition.

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**Introduction:** Chiropractic techniques focus on correction of joint dysfunction of the spine and pelvis to restore optimal nerve and muscle function and the symmetry of the musculoskeletal system. Previous research has mainly focused on the effect of the treatment on muscle tone (Wakeling et al, 2006, Langstone et al, 2015) and horse kinematics (Guest et al, 2014). No published research could be found on what effect vertebral joint dysfunction, measured by chiropractic alignment palpation, may have on the horses' competitive performance. The aim of this study is to investigate whether there is a relationship between number of vertebral misalignments (MA's), pelvic asymmetry and the overall placings of FEI 1\* competition horses at a British Eventing (BE) event.

**Material & methods:** This study was a cross section observational study which used 19 randomly selected sound horses competing at a BE FEI 1\* competition. The day before the competition, horses were stood square on a level surface and the numbers of cervical, thoracic and lumbar MA's were collected by palpation and pelvic asymmetry measured using a plumb line technique. History of horse and rider (previous injuries or illnesses, level competed at, any manipulative therapy) were noted. Spearman's Rank correlation test was used to test the association between the mean number of spinal misalignments and pelvic symmetry indices (SI) with the overall placings and after each phase of the competition (dressage, cross country, show jumping). Statistical level of significance was  $P < 0.05$ .

**Results:** There was a significant positive association between the total number of misalignments and the overall placings ( $R=0.636$ ,  $p=0.002$ ,  $n=19$ ). There was a significant positive association between the placings after the cross country phase and the total misalignments ( $R=0.715$ ,  $p=0.0005$ ,  $n=19$ ). There was a significant positive association between number of cervical misalignments and the cross country phase placings ( $R=0.580$ ,  $p=0.009$ ,  $n=19$ ) and overall placings ( $R=0.482$ ,  $p=0.03$ ,  $n=19$ ). There was a significant positive association between number of thoracic misalignments and the cross country placings ( $R=0.760$ ,  $p=0.0001$ ,  $n=19$ ) and the overall results ( $R=0.667$ ,  $p=0.001$ ,  $n=19$ ). There was a significant positive association between the number of lumbar misalignments and the cross country placings ( $R=0.465$ ,  $p=0.04$ ,  $n=19$ ). There was a significant negative association between pelvic rotation asymmetry and placings after the dressage ( $R=-0.539$ ,  $p=0.01$ ,  $n=19$ ) and overall placings ( $R=-0.477$ ,  $p=0.038$ ,  $n=19$ ).

**Discussion & conclusions:** Event horses that had a lower total number of misalignments were more likely to be placed higher in a FEI 1\* eventing competition. Therefore by reducing the number of misalignments, potentially by manipulative therapy, there could be an increase in success at eventing competitions.

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