

# An investigation into relationships of horse & rider pelvic asymmetry

L.Browne MSc; S. Hedderly MSc; S. Charlton MSc; C. Cunliffe DC PhD

McTimoney College of Chiropractic, Kimber Road, Abingdon, Oxon, OX14 1BZ, UK

## Summary:

**Implications** This study provides positive evidence of a relationship between horse and rider pelvis asymmetry. This has implications in awareness of related asymmetries and in chiropractic treatment of horse and rider.

**Introduction** Asymmetry of the horse and rider partnership is a challenging and complex area. Previous research has investigated effects such as axial rotation of the pelvis in horses with clinically diagnosed back problems. Asymmetry of the human pelvis is also thought to contribute to back pain. There is limited scientific research on the occurrence of misalignments in the horse and rider, and whether there is any relationship between the two, thus making asymmetry of the horse and rider a challenging but potentially insightful topic of investigation. The aim of this study was to investigate asymmetry of single horse and rider combinations focusing on pelvis asymmetry.

**Material and methods** 14 single horse and rider combination subjects (together for at least 6 months), kept on the same daily routine, at the same yard were used. Horse and rider combinations were assessed for misalignments of the pelvis, spine, and neck on the same day by a fully qualified human and animal (McTimoney) practitioner. A pilot study confirmed reliability of method and equipment for rider and horse measures. Triplicate measurements were recorded of rider pelvis asymmetry (mean values for distance (nearest 0.2cm) between iliac crests and degrees of tilt), sitting and standing, using a PALM palpation meter. Triplicate tuber coxae height (left, right) of the horse's pelvis was measured using a plumb line. The difference between the two means gave a measurement for rotation of the pelvis. A value < 0 indicated rotation to the left, a value > 0 indicated rotation to the right, and a height difference of zero indicates equal height of the tuber coxae and thus no asymmetry of the pelvis. The coefficient of Kurtosis was used to test data for normality, >0.05 assumed data was not significantly different from that of a normal distribution. Pearson's correlation analysis and regression examined relationships between horse and rider pelvis asymmetry. A paired T-test was used to compare measures of rider iliac crest height in the standing versus sitting positions. Chi-square was used to assess pelvis misalignment to other misalignments in horse and rider.

**Results** Degree of asymmetry of the horse pelvis with tuber coxae height discrepancy ranged from 0.2cm to 6.6cm. The mean height difference between left and right tuber coxae was  $1.3 \pm 1.6$ cm (1.d.p). 64% of horses showed asymmetry of the pelvis to the left and 36% to the right.

The mean height discrepancy of the rider iliac crests in a standing position was  $0.89 \pm 0.64$ cm (2.d.p) and  $1.00 \pm 0.66$ cm (2.d.p) in the sitting position. Of those with a tilt present in the sitting position (93%), 46% had a tilt left and 54% a tilt right. The mean iliac crest height discrepancy for riders with a left tilt in the sitting position was  $0.64 \pm 0.77$ cm (2.d.p). Those with a right tilt had a mean iliac crest height discrepancy of  $1.36 \pm 0.26$ cm (2.d.p).

Asymmetry of the pelvis was a feature of 93% of horse/rider combinations. Of those combinations where both had asymmetry of the pelvis, 85% occurred in the same direction, 15% in opposite direction. There was a significant positive correlation between horse tuber coxae and rider iliac crest height discrepancies ( $r=0.64$ ,  $n=14$ ,  $p<0.05$ ). Horse and rider pelvis asymmetry relationship suggested that 40% of the variance in rider iliac crest height discrepancy is due to changes in horse tuber coxae height discrepancy ( $R^2 = 0.4$ ,  $F = 8.24$ ,  $P < 0.05$ ). There were no significant trends between misalignments of the spine and neck of the horse or rider when compared to pelvis asymmetry.

**Conclusion** This study provides positive evidence of a relationship between horse and rider pelvis asymmetry. The hypothesis was accepted that if the horse had a left ventral rotation of the pelvis the rider had a left tilt of the pelvis; if the horse had a right ventral rotation the rider had a right tilt of the pelvis. The causal effect relationship between the two variables is indeterminate but the knowledge that a significant relationship is present could have fundamental implications for physical therapy treatment of horse and rider and awareness of asymmetry.

**Acknowledgements** There was no external funding for this project

**References:**