A software measurement tool for analysis of asymmetry in the interaction between horse, rider and saddle

Gandy, E.; Bondi, A.; Hogg, R.; Cornell, A., University of Sunderland

Introduction:

Limited research has been done on interactions between horse, rider and saddle. Asymmetry occurs and warrants further investigation. The traditional approach is via video analysis using packages such as Dartfish[TM] but this involves complex and time-consuming processing of individual video frames. Our aim is to develop a customised software system, which will automate as much of the process as possible.

Method:

- Markers applied to horse, rider and saddle: rider lumbosacral joint, midline of caudal aspect of saddle cantle, horse caudal vertebrae, horse tubera coxae (to determine width).
- Trot down marked straight runway
- High-definition video captured

EMAS[TM] Software System

- Written in C#.NET with Microsoft XNA plug-in.
- Select video & frames
- Prompts to guide user
- Positional adjustment
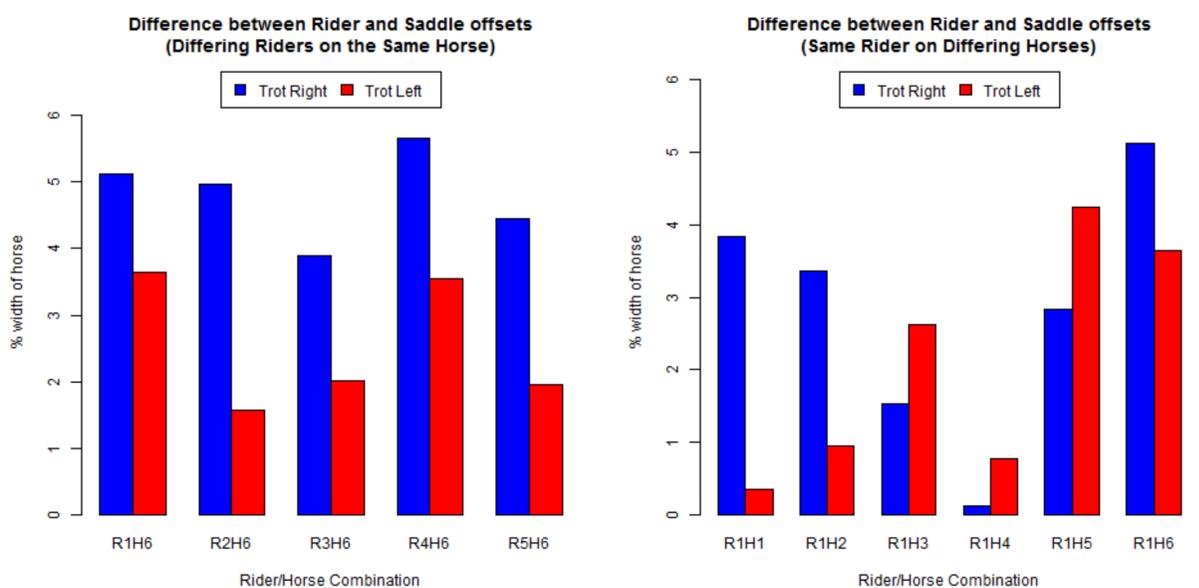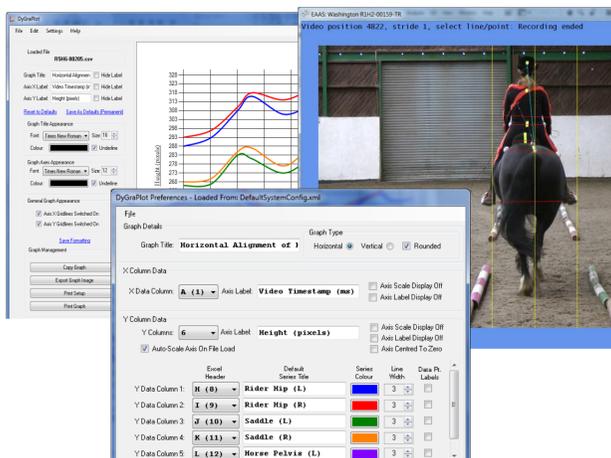- Data file export
- Image overlay

Figure 1. Average rider/saddle vertical offset comparisons (normalised to percentage of horse width)

Results:

Differing riders on the same horse (n=5) showed average rider/saddle vertical offset comparison between left/right reins[1] of 4.82 ± 0.67 (mean $\pm$ sd). When analysed with a single sample t-test this offset was found to be statistically significant at the 1% level ($p<0.01$, two-tailed test).

The same rider on differing horses (n=6) showed average offset of 2.8 ± 0.28 (mean $\pm$ sd) and the single sample t-test was found not to be statistically significant at the 5% level ($p>0.05$, two-tailed test)

From these small samples of observations we conclude that rider/saddle offset relates to horse asymmetry rather than rider.

Conclusion:

Understanding asymmetry in the interaction between horse/rider/saddle is important if equestrian performance and horse/rider health and welfare is to be improved.

The development of the EMAS[TM] software system provides a simple asymmetry measurement tool to assist riders, trainers and equine professionals in measuring and analysing these complex interactions.

Footnote 1. Normalised to percentage of horse pelvic width