

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

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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™ but this involves complex and time-consuming processing of individual video frames. Our aim was to develop a customised software system, which will automate as much of the process as possible.

Markers are applied to: rider lumbosacral joint, midline of caudal aspect of saddle cantle, horse caudal vertebrae, horse tubera coxae. A high-definition, fixed-zoom video camera records the horse/rider moving down a marked straight runway. The EMAS™ (Equine Motion Analysis System) is written in C#.NET, providing video and frame selection, prompts to guide user through marker selection, positional adjustment, image overlay and data file export.

The software prototype has been tested on 14 horse/rider combinations (skill levels novice to advanced). Differing riders on the same horse (n=5) showed average rider/saddle vertical offset comparison between left/right reins (normalised to percentage of horse pelvic width) 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.

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