

## **A pilot investigation into the limb phasing characteristics and stride length of fully shod, partially shod and barefoot horses**

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The hooves of feral horses, untouched by humans, adapt to the terrain and environment to offer the horse the most energy cost-effective way to travel in all gaits. Horses used by man however are often shod in order to better deal with modern surfaces and demands placed upon them but little research has been undertaken on how shoeing affects the stride mechanics of the horse. The aim of this study was to identify if there were any significant differences in the limb phasing characteristics and symmetry of stride in fully shod, partially shod and unshod horses. A convenience sample of twelve unshod horses, six shod and six partially shod horses were recruited for this study. The horses were walked and trotted in hand for a distance of ten meters to collect data of their stride characteristics. The ETB Pegasus limb phasing system was used to determine limb temporal characteristics (sagittal and coronal cannon range and time in stride for maximum protraction and retraction of the forelimb and hind limb). Analysis of the results was done through a one-way ANOVA test. The results suggested that there was no significant difference in the individual stride duration at walk ( $P=0.291$ ) or trot ( $P=0.430$ ) between horses that were shod (s, mean= $1.14\pm 0.29$  and  $0.67\pm 0.17$ , respectively), partially shod (s, mean= $1.17\pm 0.27$  and  $0.68\pm 0.16$ , respectively) and unshod (s, mean= $1.21\pm 0.05$  and  $0.71\pm 0.02$ , respectively). Equally, data collected on the limb phasing characteristics (sagittal and coronal cannon range and time in stride for maximum protraction and retraction of the forelimb and hind limb) showed no noticeable differences between the different shoeing regimes. However, forelimb and hind limb analysis for overall symmetry values in the sagittal and coronal ranges at walk and trot returned results of  $P=0.34$  (walk) and  $P=0.04$  (trot). This may support the theory that farriery used as a tool to correct unbalanced limb conformation may be effective and that weight added to the distal forelimb appears to increase its range of motion. However, generally, the data suggests horses appear to adapt their stride pattern to accommodate a shod or unshod condition. Further study needs to be conducted to evaluate how a horse adapts to the removal and addition of shoes in order to test this further.

**LP:** The shoeing decisions of a horse owner may have implications for the identification of early signs of lameness and training effectiveness. This study did not show statistically significant differences between shoeing regimes, however, advice should be sought from a qualified applied equine podiatrist or farrier with an understanding of the movement idiosyncrasies surrounding each individual horse. Further research is needed.