

Pilot study for validation in-vivo of a supporting device limiting extension of the metacarpophalangeal joint in sound horses

Pagliara E.^a, DVM, Cert. AVP; Cantatore F.^b, DVM, Cert. AVP (ELDT), DACVSMR, MRCVS; Penazzi L.^a, DVM, MRCVS; Riccio B.^a, DVM, PhD, Iselp Cert, DACVSMR, DECVSMR; Bertuglia A., DVM, PhD, DACVSMR, DECVSMR

a - University of Turin, Department of Veterinary Science, Grugliasco, Italy

b - Pool House Equine Clinic, Crown Inn Farm, Fradley, UK

Background

During the rehabilitation, it is essential to reduce the load and strains on the metacarpophalangeal joint (MCPJ) and flexor tendons/ suspensory ligaments.

Objectives

To evaluate the efficacy of a carbon fiber composite support system (SS) in reducing the extension of the MCPJ in walk and trot in 5 sound horses.

Materials and methods

Sagittal plane MCPJ patterns of forelimbs were recorded using 2 inertial sensor measurement units (IMUs) *per* limb without the SS (S) and with 2 different grades of attenuation of MCPJ extension (1 'minimal' and 4 'maximal') with the SS on the right forelimb (R). The left forelimb (L) was used as control. A paired T-Test was used to compare L and R range of motion (ROM) and maximal extension (ME) of the MCPJ under the 3 conditions.

Results

No statistically difference between L and R ROM and ME at trot and walk without the SS was found. A significant difference was observed in walk for setting 1 for ROM (L $58.7^{\circ} \pm 8.8^{\circ}$ -R $35.5^{\circ} \pm 10.1^{\circ}$ $p < 0.001$) and ME reduction (L $-12.8^{\circ} \pm 4.5^{\circ}$; R $-5.3^{\circ} \pm 3.1^{\circ}$ $p < 0.05$) and setting 4 (L $62.3^{\circ} \pm 6.8^{\circ}$ R $30.7^{\circ} \pm 9.9^{\circ}$ $p < 0.001$; L $-13.7^{\circ} \pm 3.6^{\circ}$ R $-8.2^{\circ} \pm 4.5^{\circ}$ $p < 0.01$). Reduction was significant in trot for setting 1 (ROM mean L $78.9^{\circ} \pm 12.5^{\circ}$ R $51.3^{\circ} \pm 14.4^{\circ}$ $p < 0.05$; ME L $-28.9^{\circ} \pm 7.2^{\circ}$ R $-16.8^{\circ} \pm 7.3^{\circ}$ $p < 0.05$) and setting 4 (ROM L $80^{\circ} \pm 9.1^{\circ}$ R $40.2^{\circ} \pm 5.3^{\circ}$ $p < 0.001$; ME L $-26.2^{\circ} \pm 5.9^{\circ}$ R $-17^{\circ} \pm 4.4^{\circ}$ $p < 0.05$).

Conclusion

SS is effective in limiting MCPJ ROM and ME in sound horses.

Conflict of interest: The authors declare no conflict of interest.

Ethical committee: The study was approved by the Ethics Committee of Turin (protocol n. 0000285/2023; approval date 01 February 2023).

Sources of funding: This research received no external funding.