Walking and trotting through a water track affects limb sagittal angles and stride timing in horses

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Rehabilitation after musculoskeletal injury has become an essential part of veterinary care. Various forms of exercise in water have been described as an effective medium to improve function while preventing further injuries. This study evaluated kinematic changes of horses walking and trotting through a water track (WTr). Eleven Warmblood horses, equipped with IMU sensors (EquiMoves®; one on each leg) were measured overground (OG1), while going through a water track (85 m long; water height 33 cm), and once more overground (OG2). Linear mixed models were used to compare different conditions ($p < 0.05$). No differences between OG1 and OG2 were found. Estimated mean speed (±SE); measured with GNSS[5 Hz]) was lower in water (1.4±0.02 m/s) compared with OG1 at walk (1.6±0.03 m/s; P=0.002). At trot, speeds were similar (2.9±0.05 vs 3.0±0.09 m/s; P=0.18). In the Wtr stride duration increased significantly at walk (+14.9%) and trot (+15.6%). Front limb sagittal angles changed in water, only at walk (from 34.3 to 29.4° protraction and -35.6 to -41.3° retraction). Hind limb protraction increased at walk (28.8 to 42.7°) and trot (30.2 to 50.9°). Hindlimb retraction decreased at trot (-20.5 to -16.2°). There is a combined effect of gait and water on limb sagittal angles and stride timings, where hindlimb pro- and retraction yielded the most noticeable change. The speed reduction in water at walk was small but should be considered as a confounding factor. These results can help clinicians to meet individual rehabilitation requirements.

Effect of exercise on blood perfusion of healing superficial digital flexor tendons in horses

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In order to evaluate the evolution of tendon blood perfusion (BP) throughout healing after an injury, it is essential to determine which factors other than the healing process itself affect it. The purpose of this study was to assess changes in the BP of sound and healing superficial digital flexor tendons (SDFT) of horses before and after exercise. We hypothesised that exercise would increase the BP of those tendons. Seven horses included in a rehabilitation program for SDFT tendinopathies were scanned before and 30 to 45 minutes after their ridden activity (average 700 m trot, 2,800 m canter) on two different occasions. SDFT BP was imaged using eFlow Doppler. Video recordings of the examinations were blindly reviewed and tendon BP was scored using a 4-grade scale in four equal metacarpal areas; the addition of the grades giving the SDFT score. Out of the 14 scanned SDFT, 10 were injured. None of the 4 sound SDFT (control) presented significant intra-tendinous BP neither before or after work. Among the 20 recordings of the 10 injured SDFT, 13 (65%) presented higher BP score after work than before, mean score increasing by 0.5. Five (25%) of them presented higher BP score before work, mean score decreasing by 0.6 after, and the score of the remaining 2 recordings (10%) did not change. More horses showed an increase in SDFT BP after work. This change should be taken into account when using Doppler imaging for the follow-up of horses with SDFT injuries.