standard anatomical marker placement. Paired students’ t tests compared left/right sides, and between saddles for each side.

Results: Peak pressures were significantly less with Saddle F than S for each cell and pooled (jumping: 62–82%; dressage: 55–68% difference. P = 0.01–0.0001), and left/right differences in S were not seen in F. Saddle F was associated with greater forelimb (13%) and hindlimb (22.7%) protraction, and carpal (3.5°) and tarsal (4.3°) flexion (P = 0.02–0.0001) (dressage), and 3.7° more shoulder flexion at jump take-off (P = 0.004).

Conclusions: Saddles fitted to published guidelines may still have a nonideal interface with the horse. Reducing peak pressures at T13 was associated with improved limb kinematics in trot and jump take-off.

Ethical animal research: Approved by the Ethical Review Committee of the Animal Health Trust (project number: AHT 14-2016). All riders consented to their horse taking part in the study. Sources of funding: Fairfax Saddles Ltd. Competing interests: Vanessa Fairfax is employed by Fairfax Saddles Ltd.

DOES SURFACE TYPE AFFECT EQUINE FOOT PLACEMENT, MOVEMENT SYMMETRY OR HOOF 3D ACCELERATION EXPERIENCED DURING RIDDEN WALK EXERCISE?

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Reasons for performing study: In the UK, many horses are regularly exercised on different surfaces including roads, grass margins and off-road surfaces. Research has focused on horse-surface-interaction on performance surfaces.

Objectives: To quantify foot placement, movement symmetry and hoof accelerations on three different ‘hacking’ surfaces.

Study design: Quantitative gait study in a convenience sample.

Methods: Six horses (1.35–1.63 m; 6–16 years) were equipped with inertial sensors (head, sacrum, tubera coxae) and one 3D accelerometer (1000× gravity, 5000 samples/s) attached to the dorsal hoof wall of the left forelimb. Three cameras (2 lateral, 1 cranial/caudal view, 640 × 240/400 fps) filmed ridden straight-line walk on grass, gravel and tarmac. Head movement symmetry, predominant foot placement (>75% of 12 stances) and hoof accelerations at stance (signal power up to 1503 Hz from fast Fourier transformation and frequency of maximum signal power for 50 ms after impact) were calculated. Repeated measures ANOVA (movement symmetry), Bowker symmetry test (foot placement) and mixed linear models (hoof accelerations) tested for differences between surfaces (P<0.05).

Results: No significant differences between surfaces were found for latero-medial and toe–heel foot placement (P = 0.6) or head movement symmetry (P = 0.5). Total power of hoof acceleration was significantly different between surfaces in all three directions (all P<0.0001). Frequency of maximum signal power along the dorsal hoof wall increased from 48 Hz for grass, to 119 Hz for gravel and 304 Hz for tarmac (P<0.0001).

Conclusions: No significant differences in foot placement and movement symmetry were found between three common hacking surfaces. The increase in total power and frequency of hoof wall accelerations warrants further investigations into the role of walk exercise on tarmac in the context of musculoskeletal problems such as osteoarthritis [1].

Ethical animal research: The study was approved by the RVC Ethics and Welfare Committee. Informed client consent was obtained for all animals used in the study. Sources of funding: RVC, British Horse Society and HBLB. Competing interests: None declared.

Reference