**Supplementary information**

**Image Undistortion**

Standard videos introduce geometric distortion to the images due to lens misalignments (Dobbert 2005) and the fluoroscopes create nonlinear pincushion and spatial artifacts (Wang and Blackburn 2000), which degrade image quality. To remove this distortion, we imaged a standardized sheet of perforated metal grid (1.6mm thick with 3mm diameter holes, spaced 4mm apart in a 600 staggered pattern) (RS Components Ltd, UK) in front of the intensifiers and captured the grid images at 32 frames for 1 second. The exposure setting for the two intensifiers during the collection of the grid images were respectively set at 57kv, 38mA and 50kv, 19mA.

To correct the distorted video images and the calibration cube images, we created undistortion files from the standardised reference grid images using the XrayProject MatLab (Mathworks Inc. Natick, Massachusetts, USA) protocol ([www.xromm.org](http://www.xromm.org)). By using the reference grid images of each intensifier as templates, we created a uniform set of squares and applied it to all video images (Gatesy et al. 2010). The distortion correction algorithm compared the spacing between holes in the fluoroscope image with the idealized spacing and calculated a transformation matrix for correcting all video images. We used a local weighted mean (LWM) distortion correction algorithm, implemented in MatLab.

**Calibration**

To calibrate the video images and generate a DLT algorithm in order to create “virtual cameras” in the Maya virtual 3D space for rotoscopy of the horse’s foot, we placed a custom-designed calibration cube with 64 steel 3mm diameter spheres as calibration points within the field of view of the two intensifiers at known coordinates and recorded the calibration images at 32 Hz for 1 second (Supplementary Figure S1). The calibration cube consisted of acrylic sheets of uniform thickness (5.42mm), on which we drilled 16 holes of 3mm diameter in a square pattern of 65mm separation. Nylon pillars served as spacers between the tiers. The exposure settings for the two intensifiers during the collection of the calibration cube images were set at 46kv, 39mA and 71kv, 11mA.

The undistorted images of the calibration cubes for each camera were used as templates to calibrate all video images using protocols established by the XROMM Research Coordination Network (Brown University, Providence, Rhode Island, USA; [www.xromm.org](http://www.xromm.org)). The undistorted calibration cubes were digitised by manually selecting the centroid of a minimum of 12 calibration cube beads in MatLab for each camera. Digitizing was repeated till a calibration coefficient of low residuals (<0.3) was given in for each camera. The calibration residual for each camera coupled with the video images of the calibration cubes were imported to Maya software (Autodesk, San Rafael, California, USA) to recreate a virtual scene with similar coordinates to the experiment (Gatesy et al. 2010).