Computed tomographic measurements in 110 front hooves of non-lame Thoroughbred racehorses and Warmblood showjumpers

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Products
Computed Tomography (CT) for hoof wall and sole morphology in sound sport horses

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Clinical Background
Foot pain is a major cause of lameness in sport horses. While MRI and radiographs provide insight into hoof structure, CT uniquely captures hoof wall and sole morphology in 3D. Establishing reference values in healthy horses is essential for accurate CT interpretation in cases of suspected hoof pathology.

Aim of Study
To define reference ranges for hoof wall and sole thickness, and the dorsal hoof wall to palmar length of distal phalanx (DHWDP) ratio, using CT in non-lame Thoroughbred racehorses and Warmblood showjumpers. The study also assessed associations with breed, side, laterality, and body conformation.

Cohort Study
CT analysis was performed retrospectively on 110 front feet from 56 non-lame horses (30 Thoroughbred racehorses, 26 Warmblood showjumpers). Soft tissue reconstruction protocols were used for standardized measurement at key dorsal, medial, lateral, and solar hoof sites.

Link to paper

Results

- **Warmbloods** had **thicker hoof walls** than **Thoroughbreds**, averaging **15.79 mm** vs **14.03 mm**

- **DHWDP ratio** averaged **0.24** in both breeds, consistent with **radiographic values**

- **Lateral sole** was significantly **thicker** at the **palmar site**, with **subtle hoof wall asymmetries**

- **Bodyweight:height ratio** was the **strongest predictor** of thickness; **age** and **side** had minimal effect

- Measurements were **highly repeatable**, with better **accuracy** using the **soft tissue algorithm**

Summary

- **First CT-based norms** for **hoof wall** and **sole** in **sound sport horses**

- Confirms **body build (weight:height)** plays a key role in hoof structure

- **Mediolateral differences** exist and are **measurable**, but typically <1 mm — **interpret cautiously**

- **CT outperforms** other modalities by visualizing **hoof wall layers**, detecting **subtle asymmetries**, and **removing magnification bias**

- These reference values will aid in **diagnosing hoof pain**, **laminitis**, and **subclinical hoof pathology**

- Encourages further research into **weightbearing CT**, **more breeds**, and **hoof asymmetry biomechanics**