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Standing Equine Leg CT (slCT)

All horse ridden disciplines result in stresses to both bony and soft tissue structures, with many breeds, in particular Western performance horses, experiencing extreme forces on the structures of the lower limb whilst executing transitions such as a tight turn or rapid acceleration. Lameness subsequent to distal limb injury is common to both the performance and pleasure horse, resulting in time out of ridden work at best or career ending at worst.

In this context, Hallmarq Veterinary Imaging Ltd (a company dedicated to veterinary imaging) and the Institute of Instrumentation for Molecular Imaging (i3M) established a collaboration in order to develop a CT prototype device for the examination of horse limbs. The Standing Equine Leg CT (slCT) is an additional tool for equine veterinarians to fully evaluate and diagnose lameness, fracture and disease in the equine distal limb.

The system consists of a novel dual- concentric ring design which enables the detector plate to remain very close to the region of interest to maximize the field of view, while the X-ray source rotates simultaneously with the detector about a common axis. Each acquisition lasts 60 seconds with the horse remaining in a standing position. In order to avoid overprojection of the contralateral limb, the acquisition may be made covering an angle of 270 degrees rather than 360°. The limited angle reconstruction is performed with a filtered backprojection algorithm. The device incorporates a unique motion correction technique to compensate for possible patient movement during the study.

This work presents the evolution from prototype to product of the slCT system, its measurement protocols, and an image gallery of patients.

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