Equine Sports Medicine: What’s New

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With advancements in imaging technology, equine sports medicine practice is constantly evolving. Ultrasonography, digital radiography, magnetic resonance imaging (MRI), and nuclear scintigraphy are readily available and have greatly enhanced diagnostic capabilities. Knowledge gained from these imaging modalities enhanced our understanding of numerous conditions. For example, “navicular disease,” a term previously reserved for navicular bone degeneration based on radiographic findings, currently includes a variety of pathological bone and soft tissue conditions identified via MRI evaluation.

Until recently, the availability of computed tomography (CT) was limited and confined to the anesthetized horse and confined to small body parts. As such, CT imaging was primarily used to facilitate sinus surgery and distal limb fracture repair.¹ ² As with other imaging modalities, technological advancements have afforded the ability to perform CT imaging on larger body parts and in the standing horse. Currently, several Universities and private practices worldwide routinely perform cone beam CT imaging in the standing sedated horse. Because of its high resolution, very subtle bone lesions can be detected. Computed tomography has the ability to evaluate cross sectional anatomy without superimposition, a distinct advantage over radiography. Subchondral bone changes which are particularly challenging to identify with conventional radiography are easily characterized via CT. Preliminary data³ using a robotics-controlled cone beam CT system has validated its use for the diagnosis of subchondral bone pathology in the racing Thoroughbred fetlock joint.

Flexed DP, 3-year-old TB racehorse with fetlock lameness

CT imaging of the same fetlock joint. Note the subchondral lucency (arrow) in the distal lateral MCIII.
In this standing cone beam system, synced car-manufacturing robotic arms rotate around the region of interest. Without a fixed circular gantry, this system has great flexibility which affords the ability image large body parts such as entire neck, carpus, hock, radius, and tibia. Despite this advantage, image acquisition is still limited by the shape of the equine body and the robotic arms since a minimum of 190° rotation is required. As with conventional CT, this system is highly susceptible to motion artifact and scatter. The robotic-controlled CT system does require an elaborate motion correction system and a compliant patient. Common scatter artifacts are manifested as streak-like appearances oriented along projection lines. Despite these limitations, CT imaging can identify lesions that are not readily apparent on other imaging modalities. Imaging capabilities of large body parts in the standing horse is particularly appealing particularly in the performance horse. The development of this technology may provide opportunities for improved understanding and enhanced recognition of musculoskeletal diseases in the sport horse.

References