LOW-FIELD MAGNETIC RESONANCE IMAGING ASPECTS OF PALMAR/PLANTAR METACARPAL/METATARSAL PAIN SYNDROME
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- MRI of the metacarpal region
- Use of standing technique to assess the subcarpal region in clinical practice

High-field magnetic resonance imaging of the equine subcarpal and subtarsal regions has been with us for over a decade and several pioneering papers have resulted \(^{(1-3)}\). The subsequent introduction of a dedicated equine standing magnetic resonance imaging system, used without the need for general anaesthesia, has led to a vast increase in the number of cases of foot, fetlock, subcarpal and subtarsal pain investigated using this modality. With the increasing throughput of cases an increasing amount of light is gradually being shed on some long-standing conundrums in equine lameness. The foot was the first focus of attention and MRI has yielded secrets related to palmar foot syndrome over the last half of the last decade \(^{(4-8)}\) and will continue to do so. Perhaps inevitably, as the technology improved, our sights migrated proximally to the fetlock, subtarsal and subcarpal regions. Nagy & Dysons' \(^{(9)}\) 2009 paper was a much-needed comparison of the normal anatomy of the subcarpal region as it appears on high and low-field magnetic resonance images. This enabled clinicians involved in the interpretation of low-field images without experience of high-field comparisons to familiarise themselves with the detailed anatomy of the region and how it compares on high and low-field pulse sequences in normal cadaver specimens.

Of course, imaging the living, breathing animal under sedation may yield a different quality of images altogether and attempting to draw diagnostic conclusions from images beset by movement artefact is something we all strive to avoid. Published work has so far been thin on the ground using low-field MRI systems in clinical practice as we all concentrate on optimising our horse handling and sedation protocols to maximise the quality of the images, though this is surely set to change soon. Users are now largely happy with its use in the (more amenable) forelimb but movement remains a huge problem when imaging the hindlimb in all but the most compliant patients. I believe the holy grail of achieving a complete set of immaculate sequences in the majority of cases is a task for the technical wizards of the manufacturing companies (rather than the users of the system in its current form) to dedicate themselves to over the coming years. A quantum leap in the application of motion correction techniques is need here and I look forward to a second wave of potential when it is achieved.

In the meantime in our practice the subtarsal region undergoes standing magnetic resonance imaging only in relatively rare cases where the benefits of potentially solving a diagnostic riddle significantly outweighs the money and time spent carrying out a subtarsal region MRI scan. With a few notable and interesting exceptions, our competition horse caseload and clinicians dealing with these animals dictate that the majority of horses with pain abolished by a lateral plantar nerve block or subtarsal infiltration can be adequately imaged radiographically and ultrasonographically (with a proportion going by way of the scintigraphy suite) and successfully managed conservatively or (usually) surgically, depending on the final diagnosis and degree/duration of lameness; this isn’t to say that MRI...
is not necessary, just that in our hands the image quality in the proximal metatarsus is not of sufficient quality in the majority of cases for us to offer it routinely. In addition, the majority of Thoroughbred racehorses with pain related to the subtarsal region are rarely admitted to our clinic for further investigation – their attending yard clinicians finding extracorporeal shockwave therapy (ESWT) or regional infiltration of low-dose corticosteroids a successful therapy in the vast majority of cases with little need for further work-up – perhaps testament to a differing aetiology in older competition horses.

By contrast, MR imaging of the subcarpal region is currently far more rewarding in terms of image quality and diagnostic potential. Subcarpal MRI has come into its own in forming specific diagnoses of pain related to the subcarpal region in the Thoroughbred racehorse (10,11) where suspensory ligament pathology can be differentiated from middle carpal joint pain and stress injuries to the proximal third metacarpal bone, predominantly in cases where the blocking pattern is ambiguous.

References: