

# BEVA 2022 7 - 10 Sept ACC, Liverpool

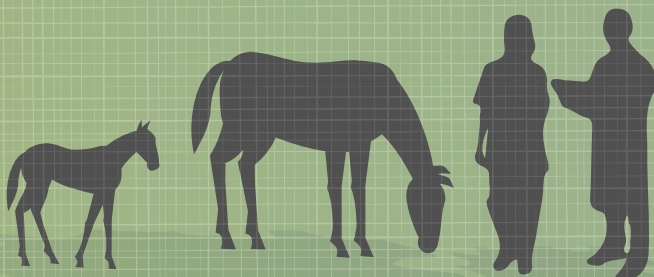
# CONGRESS

Championing the Equine Vet



# 60th

# Handbook of Presentations





## CLINICAL RESEARCH: IMAGING AND DENTISTRY

Chair: Alison Talbot

13.30

### MRI of the metacarpo/tarso-phalangeal region in 170 horses: a retrospective study

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**Background:** Findings of metacarpophalangeal/metatarsophalangeal joint (MCPj) MRI have been reported in racehorse and sport horse populations, but data are lacking from the general pleasure and performance horse populations. **Objectives:** To describe the MRI findings of general pleasure and performance horses undergoing low field MRI of the MCPj for investigation of lameness localised to the distal limb. **Study design:** Retrospective descriptive study. **Methods:** Medical and imaging records of horses undergoing standing low-field MRI between January 2014 and March 2021 were reviewed. Horses were included if they had undergone MRI of the MCPj following localisation of the lameness to the distal limb/fetlock region. Horses with traumatic wounds and racehorses were excluded from the study. **Results:** 170 horses were included; 33/170 (19%) underwent complete examination bilaterally; 81/170 (48%) underwent complete examination of the lamest limb and an abbreviated examination of the contralateral limb; 25/170 (15%) had complete examination in one (lame) limb only. Thirty-one horses (18%) underwent an abbreviated examination of the MCPj in one or both limbs following MRI examination of the foot/pastern where the initial findings did not account for the degree of lameness reported. In 20/170 horses (12%), no clinically significant abnormalities were identified. Trabecular bone damage (57/170; 34%) and osteoarthritis (57/170; 34%) were the commonest lesions, followed by subchondral bone damage (31/170; 18%). Collateral ligaments of the MCPj were the most frequently affected soft tissue structures (27/170; 16%) followed by the suspensory branches (22/170; 13%) and the deep digital flexor tendon (14/170; 8%). **Main limitations:** Lack of standardised orthopaedic evaluation and diagnostic analgesia pattern. Information obtained from MRI reports. **Conclusions:** Trabecular bone damage, subchondral bone damage, osteoarthritis and desmopathy of the collateral ligaments of the MCPj were the most frequently identified lesions. A significant proportion of horses (12%) had no clinically significant abnormalities identified on MRI examination. **Ethical animal research:** Approved by CVS Ethics Board. **Informed consent:** Not stated. **Competing interests:** None declared. **Sources of funding:** None.

13.45

### Magnetic resonance imaging of the proximal metacarpal region in endurance horses: investigation of the effect of training

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**Background:** Injury to the proximal palmar cortex of the third metacarpal bone (PcMcIII) and the suspensory ligament (SL) is common in endurance horses. Exercise-induced changes in the proximal metacarpal region have not been documented. **Objectives:** To describe magnetic resonance imaging (MRI) changes in the proximal PcMcIII and SL after 6 months of endurance training and competing in novice and experienced horses. **Study design:** Prospective descriptive study. **Methods:** Low-field MR images of both proximal metacarpal regions were acquired from six novice (never competed at >80km) and six experienced horses (completed  $\geq$ two 120 km rides), before

and after 6 months of training and competing. Measurements were acquired from T1-weighted transverse MR images at four levels, including thickness of the proximal PcMcIII (at 25%, 50% and 75% of its mediolateral width) and mediolateral width and dorsopalmar depth of the entire SL and its lobes. Measurements obtained at the two examinations and in novice and experienced horses were compared with independent or paired t-tests. **Results:** The medial aspect of PcMcIII was thicker in experienced than in novice horses at 2 ( $p = 0.002$ ; MD [mean difference] = 1.02 mm; 95% confidence interval [CI] 0.42-1.61) and 3 cm ( $p < 0.001$ ; MD = 1.92 mm; 95%CI 0.71-1.87) distal to the carpometacarpal joint. The PcMcIII was thicker medially than laterally ( $p = 0.006$ ; MD = 0.58 mm; 95%CI 0.17-0.99) and its thickness increased from proximal to distal ( $p < 0.001$ ; MD = 2.41 mm; 95%CI 1.89-2.92). No significant difference in the SL measurements was observed. **Main limitations:** Small sample size and short study duration. Low resolution of MR images may limit detection of subtle changes. **Conclusions:** The medial aspect of PcMcIII was thicker in experienced than in novice endurance horses, reflecting the cumulative effect of long-term exercise and possibly age. Six months of endurance training were insufficient to induce low-field MRI changes in the PcMcIII or SL. **Ethical animal research:** Approved by the Ethical and Animal Welfare Committee of the University of Veterinary Medicine Budapest. **Informed consent:** Informed owner consent was obtained. **Competing interests:** None. **Sources of funding:** This study was co-financed by the European Social Fund (grant agreement no. EFOP-3.6.3-VEKOP-16-2017-00005), and also supported by Hallmarq Veterinary Imaging. The National Research, Development and Innovation Office, Hungary, financed the equipment.

14.00

### Subchondral bone lesions of the metacarpophalangeal/metatarsophalangeal joint diagnosed by standing MRI in 23 horses

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**Background:** Subchondral bone damage is well described in race/sport horses. Data are lacking regarding subchondral bone damage of the metacarpo/tarsophalangeal joint (MCPj) in the general horse population. **Objectives:** To describe the clinical presentation, MRI findings and outcome of general pleasure/performance horses diagnosed with subchondral bone damage of the MCPj. **Study design:** Retrospective descriptive study. **Methods:** Medical and imaging records of horses undergoing standing low field MRI of the distal limb between January 2014 and March 2021 were reviewed. Horses (excluding racehorses) were included if subchondral bone damage of the MCPj was diagnosed. MRI sequences were reviewed, and the features of subchondral bone damage described. Follow-up information was obtained by telephone questionnaire and/or medical records. **Results:** Twenty-three horses were included. Median lameness grade was 3/10 (range 0/10-7/10). All horses had a high signal intensity lesion of the subchondral bone involving the condyle (10/23-43%) or sagittal ridge (3/23-13%) of the third metacarpal/metatarsal bone and the glenoid (7/23-30%) or sagittal groove (3/23-13%) of the proximal phalanx. Concurrent trabecular bone damage was identified in 20/23 (87%) and osteoarthritis in 18/23 (78%). Follow-up information was obtained in 23/23 horses (100%) after 10 months-8 years. One horse (1/23-5%) was sound at the previous level of exercise; 4/23 (17%) were sound at lower levels; 3/23 (13%) were intermittently lame in work; and 4/23 (17%) were retired. 8/23 horses (35%) had been euthanised due to persistent lameness/poor athletic prognosis,

and one (4%) for other reasons. Two horses (2/23-9%) remain in rehabilitation. **Main limitations:** Small numbers and follow-up by telephone questionnaire/medical records. **Conclusions:** Subchondral bone damage of the MCPj was identified by MRI in the general horse population, often with concurrent trabecular bone damage and osteoarthritis. With extensive periods of rest, a small proportion became sound enough to work at a lower level. A significant proportion were euthanised due to persistent lameness. **Ethical animal research:** Research ethics committee oversight not required by this congress: retrospective study **Informed consent:** Not stated. **Competing interests:** None declared. **Sources of funding:** None.

14.15

### Proton magnetic resonance spectroscopy of the distal metacarpus or metatarsus in Thoroughbred racehorses with and without catastrophic fractures

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**Background:** Fractures of the third metacarpal/metatarsal bone are common in racehorses. Previous human studies using magnetic resonance spectroscopy (MRS) have shown an inverse relationship between bone marrow adiposity and bone mineral density (BMD). **Objectives:** To quantify the IH spectra for the equine metacarpal/metatarsal bone and compare the fat content (FC) to BMD in racehorses with and without fractures. **Study design:** Cross-sectional. **Methods:** Cadaver limbs from Thoroughbred racehorses in training were recruited. Each limb underwent magnetic resonance imaging at 3T using a knee coil followed by single voxel MRS at three locations (lateral condyle, medial condyle, centre of the distal diaphysis of the third metacarpal/metatarsal bone). Percentage FC was calculated at each location. Each limb underwent computed tomography (CT) using a helical 64-slice CT scanner and mean BMD was calculated at the same three locations. All images were subjectively graded for sclerosis on MRI and CT. **Results:** A statistically significant negative correlation was identified for mean BMD and percentage FC for all condyles and in the proximal bone marrow (correlation coefficient = -0.36;  $p = 0.04$ ). The median (IQR) percentage FC in the distal diaphysis was lower in horses with fractures (88 (84-90)%) compared to controls (91 (90-92)%) ( $p = 0.02$ ). The median (IQR) BMD (mg CaHAP/ml) was significantly higher (grade 1: 751 (717-812), grade 2: 834 (793-909), grade 3: 971 (917-983) ( $p = 0.0009$ ) for MRI; grade 1: 756 (717-812), grade 2: 843 (815-937), grade 3: 971 (948-981) ( $p = 0.0018$ ) for CT) and percentage FC was significantly lower (grade 1: 82 (81-87), grade 2: 74 (71-79), grade 3: 58 (50-66) ( $p < 0.001$ ) for MRI and grade 1: 82 (80-84), grade 2: 74 (71-79), grade 3: 58 (50-66) ( $p = 0.001$ ) for CT) in condyles with a higher sclerosis grade on MRI and CT. **Main limitations:** Small sample size. **Conclusions:** Fat content decreases with an increase in BMD in trained racehorses. These findings suggest that fat and bone may be capable of mutual regulation in Thoroughbred racehorses. **Ethical animal research:** Approval by the University of Edinburgh Ethics Committee VERC 140.19. **Informed consent:** Owners gave consent for their animals' inclusion. **Competing interests:** None declared. **Sources of funding:** Horserace Betting Levy Board.

14.30

### Standing magnetic resonance imaging findings in the metacarpophalangeal region of 76 horses and metatarsophalangeal region of 24 horses

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**Background:** Standing magnetic resonance images (MRI) of metacarpophalangeal (MCP) and metatarsophalangeal (MTP) regions are increasingly acquired but imaging findings in large case series are lacking. **Objectives:** Describe abnormalities in horses undergoing standing MRI examination with lameness localised to, and compared between, MCP/MTP regions and sport disciplines. **Study design:** Retrospective descriptive. **Methods:** Signalment and findings from MCP/MTP MRI reports at RosSDales Ltd from December 2020-January 2022 were recorded, with queries verified by image review. Inclusion-criteria: lameness localised to fetlock region. **Results:** 76 MCP and 24 MTP from 100 horses (2-19 years; racing-39, sport-43, general-purpose-18). Dorsal and palmar/plantar third metacarpal/metatarsal (McIII/MtIII), proximal phalanx (PP), proximal sesamoid bone (PSB) injury, suspensory ligament branch (SLB) desmopathy and MCP/MTP joint abnormalities were most frequently reported. McIII abnormalities were more frequently dorsomedial (65.8%) including cortical (42.1%) and trabecular (46%) pathology, with fluid signal (26.3% cortical; 30.3% trabecular), frequent hypervascularity, cortical thickening, irregularity, and periosteal/endosteal abnormalities. Medial MCP articulation abnormalities were more frequently reported (85.5%) than lateral (55.3%), while lateral MTP pathology (66.7%) was more frequent. Dorsoproximal PP bone injury was more frequently reported in forelimbs (72.4%) than hindlimbs (54.2%). Joint pathologies included subchondral bone thickening/sclerosis (70.8% MTP; 71.1% MCP), fluid signal (58.3% MTP; 65.8% MCP), osteophytosis (41.7% MTP; 44.7% MCP), irregularity (62.5% MTP; 48.7% MCP), distension (66.6% MTP; 39.2% MCP), chronic synovitis (62.5% MTP; 51.4% MCP) and capsulitis (45.9% MTP; 33.8% MCP). Forelimb SLB (39.4%) and PSB (38.2%) pathology occurred together in 11.8% forelimbs. SLB desmopathy was more frequent in hindlimbs (58.3%), all with PSB pathology, as was digital flexor tendon sheath pathology (hindlimbs-29.1%; forelimbs-6.5%). Bone pathology was more likely in racing/showjumping than dressage/general-purpose horses. Ligament and chronic articular abnormality were more frequent in dressage/general-purpose horses. **Main limitations:** Retrospective review. **Conclusions:** Findings indicate pathology patterns vary between forelimbs/hindlimbs and disciplines which may be useful guidance for MRI interpretation. **Ethical animal research:** Research ethics committee oversight not required by this congress: retrospective data collection. **Informed consent:** Not stated. **Competing interests:** None declared. **Sources of funding:** None.

14.45

### Computed tomographic and radiographic findings in the metacarpophalangeal joint of Thoroughbred yearlings

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**Background:** Computed tomographic (CT) findings in the metacarpophalangeal (McP) joint of Thoroughbred yearlings have not been described. **Objectives:** To document CT abnormalities and radiographic findings in the MCP joints of untrained Thoroughbred yearlings. **Study design:** Prospective descriptive study. **Methods:** A convenience sample of 40 yearlings with no history or clinical signs of MCP joint associated lameness was included. Standing CT examination of both MCP joints was performed. Standard and additional (flexed

lateromedial, flexed dorsopalmar, dorsoproximolateral-palmarodistomedial, palmaroproximolateral-dorsodistomedial and flexed dorsoproximal-dorsodistal oblique) radiographs were obtained. Radiographs and CT images were analysed by different authors, blinded to the results of the other imaging modality. **Results:** Abnormalities in the sagittal ridge (SR) of the third metacarpal bone (McIII) were identified in CT images in 39 limbs of 23/40 (57.5%) horses and included proximodistally elongated lucent areas (in 7 limbs of 5/40 [12.5%] horses), lucent areas extending towards the trabecular bone (in 23 limbs of 15/40 [37.5%] horses) and abnormal mineralisation (in 19 limbs of 12/40 [30.0%] horses). Lucent areas in the McIII condyles were detected in the medial (n = 3), lateral (n = 2) or both (n = 3) condyles in 8 limbs of 6/40 (15.0%) horses. Abnormal mineralisation of the medial (n = 3), lateral (n = 2) or both (n = 5) condyles of McIII was detected in 10 limbs of 5/40 (12.5%) horses in CT images. Small indentation(s) or lucent areas in the sagittal groove of the proximal phalanx were present in CT images of 10 limbs of 10/40 (25%) horses. Only 22/85 (25.9%) of all abnormalities detected in CT images were identified radiographically. **Main limitations:** The clinical significance of the detected abnormalities is unknown. **Conclusions:** Computed tomographic abnormalities in the McP joint were commonly detected in yearling Thoroughbreds and only a small proportion were identified on radiographs. Follow-up assessments are required to establish the progression and clinical significance of these abnormalities. **Ethical animal research:** Approved by the Ethical and Animal Welfare Committee of the University of Veterinary Medicine Budapest and by the Government Office of Pest County (PE/EA/1051-7/2021). **Informed consent:** Informed owner consent was obtained. **Competing interests:** None declared. **Sources of funding:** Project no. FK 138825 was supported by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the FK\_21 „OTKA” Fialat kutatói kiválósági program funding scheme. Hallmarq Veterinary Imaging generously sponsored the MRI examinations.

15.00

### A cadaveric study using computerised tomography to assess the distribution of iodinated non-ionic radiocontrast agent after periodontal ligament injection in the horse

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**Background:** Local anaesthetic injections into the periodontal ligament are used to desensitise structures to facilitate exodontia in human and equine patients. This technique has received little attention in the literature and therefore distribution patterns of local anaesthetic agents post-injection in equine patients are currently unknown. **Objectives:** This study aimed to assess the distribution of iodinated non-ionic radiocontrast agent injected into the periodontal ligament in the horse using computerised tomography (CT). **Study design:** Descriptive cadaveric. **Methods:** Five heads from equine cadavers (aged 6-20+) were positioned to simulate that of a live horse standing in stocks for a dental procedure. 2.2 ml of iodinated non-ionic radiocontrast agent (Omnipaque 300 mg I/ml) was injected into the periodontal ligament of both maxillary 09 teeth using a 27-gauge, 35 mm dental needle at four different sites (mesiobuccal, mesiopalatal, distobuccal and distopalatal). Immediately post injection the heads were imaged using CT. Images in the horizontal and vertical transverse planes, as well as 3D volume rendering reconstructions, were examined to assess the distribution of the contrast agent. **Results:** Three of five heads were successfully injected (six teeth in total) however only one head (two teeth) could be injected at the buccal injection sites. Three out of the six injected teeth showed favourable diffusion of the contrast agent, two of these teeth having been injected at all four locations. **Main limitations:** Small sample size. **Conclusions:** This injection technique is indicated to facilitate exodontia in equine patients. The unreliable diffusion seen here, however, would suggest that a combination with other perineural anaesthesia is recommended. The distribution of contrast seen in these three heads is suggestive that increasing age and presence of pathology are factors which increase success rate. **Ethical animal research:** Approved by the ethics committee of the School of Veterinary Medicine and Science, University of Nottingham. **Informed consent:** Owners gave consent for their animals' inclusion in the study. **Competing interests:** None declared. **Sources of funding:** None.