

BEVA 2022 7 - 10 Sept
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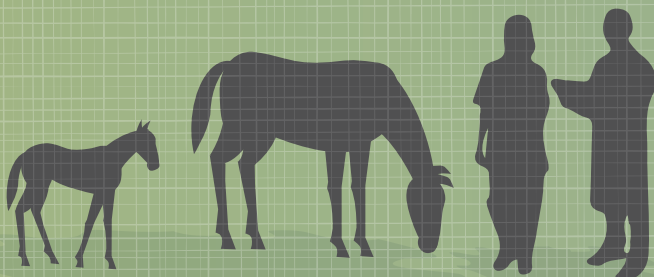
Championing the Equine Vet



60th



Handbook of Presentations





CLINICAL RESEARCH: LAMENESS

Chair: Bruce Bladon

8.30

The effect of successful hindlimb diagnostic anaesthesia on thoracolumbar displacement measured with kinematic analysis of horses trotting in hand

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Background: Hindlimb lameness is thought to impact thoracolumbar biomechanics in horses and cause secondary (or exacerbate primary) back pathology. Further investigation of the relationship is needed. **Objectives:** It was hypothesised that resolution of hindlimb lameness using diagnostic anaesthesia would lead to increased displacement of the thoracolumbar spine. **Study design:** Retrospective analysis of clinical data. **Methods:** Objective data collected using an eight-sensor inertial measurement system during clinical examinations of horses with lameness localised to the tarsal region were inspected. Dorso-ventral (DV) and latero-medial (LM) displacement of the sensors attached to the mid-thoracic and mid-lumbar spine were determined whilst the horses were trotted in hand in a straight line on a firm, flat surface. Data from before and after the resolution of hindlimb lameness using diagnostic anaesthesia were normally distributed and subsequently compared using a paired t-test. Results are presented as mean±SD. Significance was set as $p < 0.05$. **Results:** Seven horses met the inclusion criteria for this study. Prior to diagnostic anaesthesia the mean DV displacement of the lumbar spine was 76.1 ± 13.1 mm which significantly increased by 4.9 ± 2.3 mm following successful resolution of hindlimb lameness ($p = 0.001$). No significant differences were noted in LM displacement of the lumbar spine, or in DV or LM displacement of the thoracic spine. **Main limitations:** Small sample size, speed not a controlled variable, primary back pathology not investigated. **Conclusions:** These data support the assumption that hindlimb lameness has a direct effect on kinematics of the back. Further work is warranted to evaluate the long-term adaptations of thoracolumbar biomechanics following improvement in hindlimb lameness. **Ethical animal research:** Ethical approval granted by the ethics committee of the School of Veterinary Medicine and Science, University of Nottingham. **Informed consent:** Not stated. **Competing interests:** None declared. **Sources of funding:** None.

8.45

Donor and tissue source affect expression of secreted proteins in equine mesenchymal stem cells

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Background: Mesenchymal stem cells (MSCs) are widely used as regenerative therapy in horses. Currently, secreted factors are considered a primary mechanism of MSC action. We have identified proteins secreted by equine bone-marrow derived MSCs that are likely to be relevant to MSC action [1]. However, it is unclear how the MSC source affects synthesis of

secretory proteins, which may impact outcomes of cell therapy. **Objectives:** To test the effect of donor age, sex and tissue source on expression of secretory proteins in equine MSCs. **Study design:** Cross-sectional. **Methods:** MSCs were isolated from retroperitoneal fat ($n = 14$) from horses undergoing colic surgery, or bone marrow ($n = 13$) collected for autologous MSC therapy. MSCs were characterised through tri-lineage differentiation and expression of MSC markers. RNA was collected at passage 2 or 3 and used for cDNA synthesis. qRT-PCR was used to measure expression of clusterin (CLU), C-X-C motif chemokine ligand 6 (CXCL6), tissue inhibitor of metalloproteinase 1 (TIMP1) and insulin-like growth factor binding protein 6 (IGFBP6), relative to reference gene gluceraldehyde-3-phosphate dehydrogenase (GAPDH). The association of gene expression with donor age, sex and tissue source was assessed using generalised linear models with the Gamma distribution. **Results:** Donors included 15 females and 12 males, aged 1.5–24 years (mean 11.9, SD 6.6). CLU expression was higher ($p = 0.002$) in bone-marrow (median 2045.8, IQR 1627) than adipose-derived MSCs (median 731.8, IQR 431.8). Expression of TIMP1 was lower ($p = 0.01$) in males (median 1053.5, IQR 599.7) than females (median 1595, IQR 874.3) and increased with age ($p = 0.04$). **Main limitations:** Lack of protein abundance measurement. **Conclusions:** Donor age, sex and tissue source can affect expression of secreted proteins in MSCs and may impact their therapeutic action. **Ethical animal research:** Fat collection approved by the University of Liverpool Institute of Veterinary Sciences Research Ethics Committee under Colic Biobank project (generic approval number RETH000689). MSCs samples were surplus cell portions resulting from clinical procedures and were provided by Biobest Laboratories Ltd. **Informed consent:** Horse owners provided written consent for use of tissues and cells in research. **Competing interests:** Kieran McDonald is employed by Biobest Laboratories Ltd. **Sources of funding:** Supported by Horserace Betting Levy Board Equine Post Doctoral Fellowship - VET/2020 -2 EPDF 8.

Reference: [1] Turlo, A.J., Peffers, M.J., Clegg, P.D. and Hammond, D.E. (2022) Characterization of equine mesenchymal stem cell secretome with stable isotope dynamic labelling. *ORS 2022 Annual Meeting*. <https://www.ors.org/Transactions/68/1202.pdf>

9.00

CT findings in 21 foals with undiagnosed hindlimb lameness

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Background: Limited data is available on computed tomographic (CT) findings of the pelvis, lumbar spine and hindlimbs in lame foals. **Objectives:** To describe the range of pathologies and their location identified with helical CT in foals with hindlimb lameness and inconclusive clinical and/or radiographic examination. **Study design:** Retrospective descriptive. **Methods:** CT studies of foals (0–8 months old) acquired at RosSDales Ltd between July 2009 and March 2021 were reviewed. Inclusion criteria: Foals 0–8 months of age with hindlimb lameness where clinical and hindlimb survey radiographic examination (including stifle) had failed to definitively identify the lameness cause. Helical CT examination of the lumbar spine, pelvis and hindlimbs was performed under general anaesthesia/deep sedation in lateral/dorsal recumbency. **Results:** 21 foals met the inclusion criteria. Location of pathologies included: 12 affecting the pelvis, 7 affecting bones or soft tissues close to/associated with the stifle, 2 had spinal pathology and one remained undiagnosed. Of the 12 foals with pathology in the pelvic bones, 8 had imaging findings consistent with osteomyelitis or infectious phytitis,

3 had pelvic fracture related to primary trauma and one foal was diagnosed with a non-ossifying fibroma. Of the 7 with stifle-related pathology, 5 had imaging findings consistent with osteomyelitis and infectious physisitis. One of these had pelvic and distal femoral osteomyelitis. The non-ossifying fibroma affected the pelvis and proximal tibia. One foal presented with severe soft tissue swelling at the level of the stifle, no underlying bone injury was found; post mortem examination revealed necrotising fasciitis. Of two foals with pathology associated with the spine, one was diagnosed with infectious discospondylitis and one with a vertebral luxation. **Main limitations:** Small case numbers. **Conclusions:** Osteomyelitis and infectious physisitis associated with the pelvis were the most common findings in foals with hindlimb lameness and inconclusive clinical and radiographic examination, with traumatic fractures observed less frequently. **Ethical animal research:** Research ethics committee oversight not required by this congress: retrospective data collection. **Informed consent:** Explicit informed consent for this study was not obtained but horse owners were given the option to opt out of research. **Competing interests:** None declared. **Sources of funding:** None.

9.15

Validation of loss of skin sensation as an indicator of tibial nerve desensitisation following diagnostic perineural analgesia in lameness investigation

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Background: Loss of skin sensation (SSN) of the corresponding dermatome is typically used to assess efficacy of perineural analgesia. Use of loss of SSN as an indicator of tibial nerve desensitisation has not been validated and has been anecdotally reported as unreliable. **Objectives:** To validate loss of SSN for assessment of the efficacy of tibial perineural analgesia (TIB-PA). **Study design:** Prospective study. **Methods:** Inclusion criteria were horses presented for lameness investigation showing improvement in lameness following TIB-PA. TIB-PA was performed using mepivacaine hydrochloride 2% (w/v) with no other diagnostic analgesia in place. A hand-held digital algometer, with a 1 mm diameter pin, was used to test SSN at regular time points prior to and after TIB-PA in three locations (medial and lateral heel bulbs, and plantar-medial proximal metatarsus). A value of 25 Newtons would indicate complete loss of SSN. Gait assessment was performed at each time point prior to SSN measurements and lameness was graded subjectively and objectively with the aid of an inertial sensor-based system for lameness diagnosis. Timing and quantification of changes in SSN were analysed in relation to severity of lameness. Data analysis used General Linear Models implemented in R Statistical Computing Environment. **Results:** Seven horses were included in the study. There was significant positive correlation between time of loss of SSN and the time of lameness resolution for all skin locations: medial heel bulb ($n = 7$, $R_2 = 0.74$, $p = 0.008$), lateral heel bulb ($n = 7$, $R_2 = 0.74$, $p = 0.008$) and plantar-medial proximal metatarsus ($n = 6$, $R_2 = 0.83$, $p = 0.007$). One horse did not lose skin sensation at the plantar-medial proximal metatarsus. **Main limitations:** Limited number of cases. **Conclusions:** These results suggest that loss of SSN at the heel bulbs is a reliable indicator of efficacy of TIB-PA. **Ethical animal research:** Approved by the School of Veterinary Medicine Research Ethics Committee, University of Glasgow (Ref EA28/20). **Informed consent:** Owners gave consent for horses' inclusion in this study. **Competing interests:** None declared. **Sources of funding:** None.

9.30

Comparison of ultrasound guided versus 'blind' tibial perineural analgesia in lameness investigation of the horse

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Background: Tibial perineural analgesia (TIB-PA) has often been reported to fail to achieve nerve desensitisation. To overcome this difficulty ultrasound guided (USG) techniques for TIB-PA have recently been described. **Objectives:** To compare USG and 'blind' TIB-PA in lameness investigation. **Study design:** Prospective study. **Methods:** Horses presented for lameness investigation, which required TIB-PA, were randomly assigned to USG or 'blind' injection. TIB-PA was performed at the caudomedial distal crus, about 10 cm proximal to the tuber calcanei, with the limb weightbearing and using a caudal approach to the nerve (single skin penetration). 'Blind' injections were performed after nerve palpation with the limb flexed. USG injections were performed using an 8-13 MHz linear transducer in a transverse position. Efficacy of TIB-PA was assessed by testing loss of skin sensation (SSN) at medial and lateral heel bulbs and plantar-medial aspect of the proximal metatarsus. SSN was assessed, prior to TIB-PA and then at four intervals (10/15-minutes) post injection, using a hand-held algometer with a 1 mm diameter pin; A value of 25 Newtons would indicate loss of SSN. Data were analysed using General Linear Models implemented in R Statistical Computing Environment. **Results:** 13 USG and 11 'blind' injections were included in the study. All cases receiving USG TIB-PA had loss of SSN whereas this occurred in 1 case receiving the 'blind' TIB-PA. The probability of losing SSN was significantly correlated with the USG versus the 'blind' injections, and this was for all three skin locations tested: medial heel bulb ($n = 24$, $t = 4.20$, $p < 0.001$), lateral heel bulb ($n = 24$, $t = 4.20$, $p < 0.001$) and plantar medial proximal metatarsus ($n = 24$, $t = 4.68$, $p < 0.001$). **Main limitations:** Limited case number. **Conclusions:** These results suggest that USG TIB-PA should be preferred over the 'blind' technique. **Ethical animal research:** Approved by the School of Veterinary Medicine Research Ethics Committee, University of Glasgow (Ref EA28/20). **Informed consent:** Owners gave consent for horses' inclusion in this study. **Competing interests:** None declared. **Sources of funding:** None.

9.45

Injury distribution in British Eventing horses: a questionnaire-based investigation

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Background: There has been very little investigation into the health patterns of the Eventing horse population outside veterinary clinics. In order to target health problems in the Eventing horse population, it is important to determine the relative impact of different health problems. **Objectives:** To describe prevalence and patterns of lameness/illness in registered British Eventing horses. **Study design:** Prospective questionnaire-based. **Methods:** An online questionnaire was designed, piloted and released for all horses registered with British Eventing in the 2018 season, with a prize draw promotion. Data were collated and descriptive analyses undertaken. **Results:** For 1677 questionnaires completed, 49.4% reported a previous lameness/musculoskeletal problem; 26% with 1/more episodes in previous 6 months. The most frequently reported musculoskeletal problems were: foot (421), including 131 abscess, 131 sole bruising; joints (382), including 156 tarsus, 57 stifle, 50

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distal interphalangeal; wounds (340); back (333), including 112 sacroiliac, 76 muscle damage, 48 DSP; ligament (216) including 132 suspensory; tendon (213) including 88 superficial digital flexor (SDFT), 52 tendon sheath, 45 deep digital flexor tendon (DDFT); bones (140) including 77 forelimb splint bones, and muscles (135) including 73 strain/bruise and 45 tying up. 12% reported ill-health in previous 6 months. The most frequent non-musculoskeletal problems were skin (183), gastric ulceration (173), colic (145), and infection (88). Injuries to the sole/muscles/SDFT/DDFT were reportedly sustained more frequently in competition, suspensory ligament/splint bone/stifle/hock injuries were more frequently sustained during training and abscess/foot penetration at rest. It was reported that injuries to DDFT were most frequently out

of training for >12 months; SDFT, stifle and suspensory ligament for <12 months; tendon sheath and splint bone for <3 months; and hock, sole bruising/abscess for <2 weeks. **Main limitations:** Questionnaire based on rider/owner responses and recall bias. **Conclusions:** A greater understanding of injuries/illness frequently sustained could be useful for veterinarians working with Event horses. **Ethical animal research:** Approved by the Ethical Review Committee of the Animal Health Trust (project number: AHT 54-2017). **Informed consent:** Informed consent provided at time of questionnaire completion. **Competing interests:** None declared. **Sources of funding:** British Equestrian Federation World Class Programme, British Eventing Charitable Trust, World Horse Welfare, Animal Health Trust.