



spring/summer newsletter

Spring 2015

What's in this edition of the newsletter:

Computer assisted lameness evaluation now also available at the R(D)SVS!

Friesian horses; beware of challenging breed related disorders

Lesion oriented MRI scan protocol for foot penetrations



Trans-oesophageal echocardiogram demonstrating the communication between the aorta and the pulmonary artery.

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WELCOME TO OUR EQUINE HOSPITAL SPRING 2015 NEWSLETTER. We have had a busy winter and after a brief respite in March, the Hospital is starting to get much busier again. We are now right in the midst of a new final year vet curriculum so, since January, all the students we have in our Hospital have already completed core 4 week equine rotations, have passed their final year written examinations and are in their selective periods. Students can mix and match 3 weeks blocks of these selectives, to either cover lots of species or focus more on one group like horses or farm animals. This is a great opportunity for those students more interested in horses to get some extensive experience and we feel it should be a real benefit to those who intend to do horse work in the future.

The Equine Hospital, like the rest of the Vet School, is due several accreditation visits this year including from the American Veterinary Medical Association (AVMA) and the RCVS. These visitations are to ensure that we have the correct staff, facilities and curriculum in place to train suitable undergraduate veterinary students for the UK and beyond. It's a nerve-racking time for all staff, but a great chance to ensure everything

is up to standard. Hopefully we will pass with flying colours!

You may or may not be aware that all universities have to prove their worth in terms of research every five years and Edinburgh University did incredibly well, with us being ranked top Vet School in the UK in terms of research output. Equine contributed significantly to that result and we have ongoing significant basic research that underpins clinical practice in the areas of orthopaedics, respiratory disease and endocrinology as well as clinical research focus in areas such as grass sickness, cardiology and lameness evaluation. Your continued support in helping us progress equine science is genuinely much appreciated. For those of you that have an interest in getting involved with or contributing to research, then the Practice and Academia Linked Study (PALS) Network is specifically designed to try and answer some of the important questions in first opinion practice. For any more information, visit www.ed.ac.uk/schools-departments/vet/services/pals-network or contact Dr Scott Pirie.

We hope you enjoy the articles in this edition!

Computer assisted lameness evaluation now also available at the R(D)SVS!

What does it mean?

The Lameness Locator™ is the brainchild of Professor Keegan from the University of Missouri. Years of development have resulted in a system that allows objective evaluation of equine gait characteristics based on two accelerometers and one gyroscope: the accelerometers are attached to a horse's pelvis (in between the Tubera sacrales) and head (just in front of the ears); and the gyroscope attached to the right fore pastern. These devices feed live movement information to a laptop where it is graphically represented and compared to algorithms derived from normal horses (Figure 1).

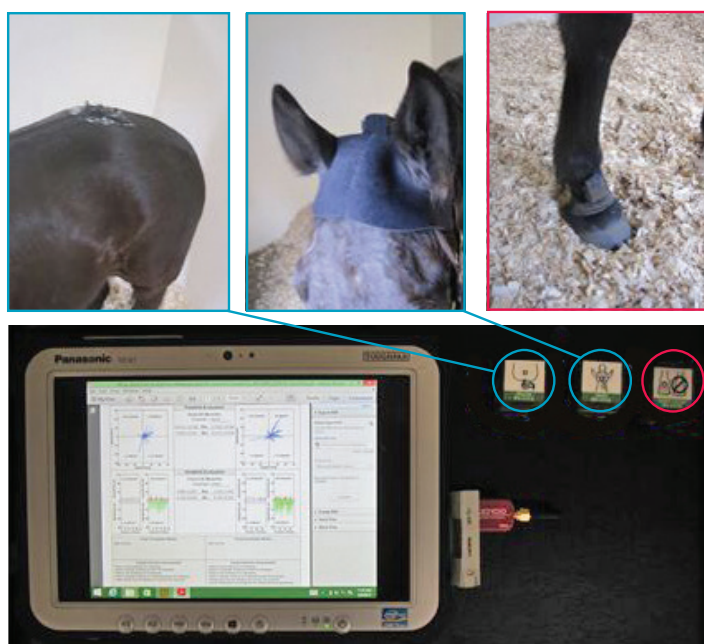


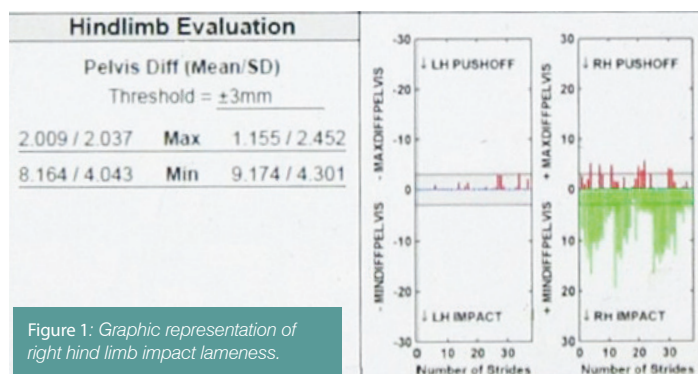
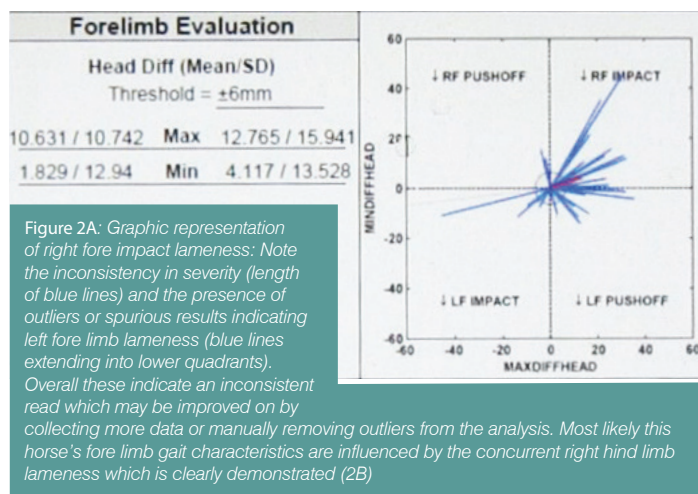
Figure 1: Accelerometers (blue circles) are attached to the horse's pelvis and head; and a gyroscope (red circle) is positioned in the right fore pastern. Data is transferred wirelessly to a tablet and automatically analysed.

The Lameness Locator™ can distinguish between “push-off” and “impact” lameness depending on how a horse moves when it feels pain in a stride (see Table).

	Impact Lameness	Push Off Lameness
Forelimbs	Horse reduces its downward head movement during early stance	Horse “throws” its head up higher to help push off the sore limb during late stance
Hindlimbs	Horse reduces downwards movement of the pelvis during early stance	Horse ‘hikes’ pelvis less, decreasing upward movement in late stance phase

For forelimb lameness the Lameness Locator™ displays results such that each stride is represented by a vector (summation of minimum and maximum head differences) indicative of lameness severity. The direction of the vector determines the type, side and severity of lameness (push-off vs impact; LF vs RF; long vs short rays) (Fig. 2A).

For hindlimb lameness, the Lameness Locator™ displays each stride on a bar chart according to the nature of the measurement (+ or – values indicating right or left, maxdiff or mindiff indicating push off or impact lameness) (Fig. 2B).



What does it do for us?

In our experience so far, the system can be extremely valuable for determining the role of compensatory and multi-limb lameness in horses. Responses to local anaesthetic can be easily compared retrospectively, which can be very helpful when multiple limbs are being blocked. Furthermore it allows us to optimize follow-up examinations at the hospital rendering them independent of the veterinarian who saw the horse last; i.e it adds objectivity. Additional advantages include teaching students lameness recognition and lameness related research: we have already initiated a new study on the immediate effects of shoeing on gait characteristics.

What can it not do?

This system is being used currently to support standard lameness examinations and does not replace specialist evaluations. Furthermore there is no validation yet of the technique for the evaluation of subtle obscure lameness or in poor performance; more work needs to be done before it can be recommended for those circumstances.

What to expect?

We aspire to make this system part of each of our lameness evaluations. However as it results in slightly longer examinations we would ask you to inform us when you would want us to provide this service such that we can plan ahead. Whenever the system is being used results will in future also be included in your report allowing you to follow gait chances as we experience them.

Friesian horses; beware of challenging breed related disorders

As an unfortunate consequence of the growing popularity of Friesian horses in the UK, vets are increasingly encountering several apparently breed-related medical disorders. These include conditions that may be related to connective tissue disorders (e.g. megaesophagus and oesophageal rupture, gastric impaction and rupture, aorto-pulmonary fistulation tendon/ligament laxity, along with verrucous pastern dermatopathy, and dwarfism (Boerma et al. 2012 EVE 24, 66; Komine et al. 2014 Vet Path 51, 979). It is unclear why Friesians are predisposed to these disorders, but a genetic basis, is currently under investigation. Several recent referrals to DVEH have highlighted the diagnostic challenges and the poor prognosis associated with some of these disorders.

Case 1; A 9 yo Friesian mare presenting for investigation of apparent colic had notable parietal pain, as evidenced by reluctance to move, hypometric gait, grunting, and pain elicited by thoracic palpation. Hyperaemic and injected mucous membranes, tachycardia (100-120 bpm), tachypnoea (36 brpm), pyrexia (39oC) and reduced gut sounds were also noted. Initial investigations focussed on ruling in or out common causes of parietal pain, including thoracic wall injury, pleuropneumonia and gastrointestinal rupture. Examination per rectum revealed gas distended large colon. Abdominal ultrasonography revealed multiple moderately distended loops of small intestine, but no gastric impaction/distension and no increased volume of peritoneal fluid. Abdominocentesis yielded a grossly normal sample making gastrointestinal rupture unlikely. Thoracic ultrasonography revealed no evidence of pleural effusion or pneumothorax. Radiography revealed a diffuse radiodensity throughout the ventral thorax (**Fig. 1**). Oesophagoscopy revealed a small volume of digesta adherent to the left wall of the distal oesophagus. With considerable difficulty this food was cleared, facilitating visualisation of a 5cm linear oesophageal rupture (**Fig. 2**). The mare was euthanased given the hopeless prognosis associated with oesophageal rupture and mediastinitis. Post mortem examination revealed that the full thickness tear was associated with a 20cm length of oesophageal muscle hypertrophy. Digesta was present within the mediastinum (**Fig. 3**). This case serves to highlight the higher prevalence of severe oesophageal disease, specifically megaesophagus, that is commonly associated with marked idiopathic caudal muscular hypertrophy in Friesian horses. Komine et al. (2014) speculate that this represents a hereditary condition in Friesian horses, with some similarities to human leiomyomatosis. Vets should consider this diagnosis in Friesian horses which present with unexplained parietal pain, salivation, dysphagia, nasal discharge, respiratory distress, aspiration pneumonia, pleural disease, anorexia and/or weight loss.

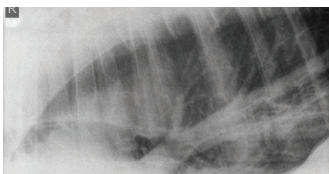


Figure 1: Lateral thoracic radiograph showing radiodensity throughout the ventral thorax; this was attributable to digesta, saliva and exudate within the mediastinum.



Figure 2: Lateral thoracic radiograph showing radiodensity throughout the ventral thorax; this was attributable to digesta, saliva and exudate within the mediastinum.

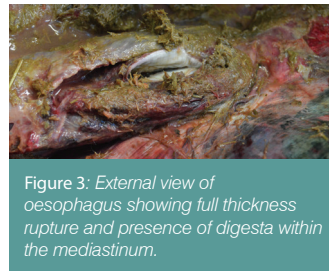


Figure 3: External view of oesophagus showing full thickness rupture and presence of digesta within the mediastinum.

Case 2; A 5 yo Friesian mare presented for evaluation of sustained tachycardia (~70 beats/minute) subsequent to an episode of acute lethargy whilst out at grass. Significant clinical findings included prominent facial and carotid pulse. When presented at the R(D)SVS,

she was mildly tachycardic (48 bpm) and cardiac auscultation revealed a loud 3rd heart sound with a soft grade 3/6 cardiac murmur with a point of maximum intensity over the tricuspid valve. Thoracic auscultation revealed increased lung sounds throughout with no adventitious sounds and a normal respiratory rate and effort. The mare coughed intermittently during the examination.

Two-dimensional and Doppler echocardiography revealed an enlarged left atrium and ventricle with a hyperdynamic left ventricular motion and dilated pulmonary vasculature; both consistent with left sided cardiac failure. Considering the breed, history and clinical signs, an aorto-pulmonary (AP) fistula was suspected and trans-oesophageal echocardiography confirmed this, revealing a clear communication between the aorta and pulmonary artery (**See front cover image**).

The consequence of the fistulation is overloading of the pulmonary circulation and subsequent left sided cardiac failure. Whilst the mare was compensating for this somewhat at the time of the examination, with the only overt clinical signs tachycardia, increased respiratory noise and occasional coughing, further decompensation would result in biventricular cardiac failure. Based on previous cases in the literature it was anticipated that she would deteriorate in a period of weeks to months. Unfortunately the mare was euthanased only 3 weeks later. Post mortem examination revealed an AP fistula at the level of the ligamentum arteriosum. An almost circumferential (except 2cm) defect was present in the aorta (**Fig. 4**). A routine cardiac post-mortem examination would miss these lesions and therefore an AP fistula needs to be suspected at the time of post mortem examination.

Accurate ante mortem diagnosis of this condition is very challenging and can only be definitively confirmed with trans-oesophageal echocardiogram; ours is the only custom made probe for horses in the world although clinicians in the Netherlands have used modified linear probes). History and clinical signs are indicative, and when presented with a Friesian with symptoms including recurrent colic, coughing, poor performance, anorexia, depression, peripheral oedema, epistaxis, pyrexia or sustained tachycardia at rest, an AP fistula should be considered. Aortic rupture has a prevalence of 2% in the Friesian breed (unpublished: Utrecht/Ghent/Wageningen University/Wolvega Equine Clinic). Whilst this was an example of chronic rupture; acute aortic rupture is always fatal and therefore a potential danger during ridden exercise.

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Acknowledgements: thanks to Hannah Duncan and Sam Galloway MsRCVS for sending these cases into us.

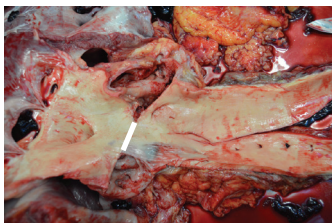


Figure 4: Aortic side of the AP fistula. The aortic defect (a pocket that surrounded the aorta) is nearly circumferential, leaving only 2cm fully intact (white line).

Lesion oriented MRI scan protocol for foot penetrations

Penetrating solar injuries are some of the most difficult injuries to deal with in equine practice. Commonly the horse is not seen by a veterinary surgeon until later in the course of the disease, the penetrating object has usually been removed from the foot and the exact location, direction and depth of penetration is often not obvious. These can be frustrating cases to deal with as it can be difficult to determine which structures are involved. Synovial sepsis secondary to foot penetration is not uncommon and is often life threatening, however assessment of these structures is technically challenging and not without risk to the patient.

MRI has been shown to be useful in solar penetrations and we are increasingly using it in our management of these cases. Research recently performed at the Dick Vet has shown that the penetrating tract is usually identifiable on MRI in animals scanned within a week of injury. The surrounding soft tissue and synovial structures can be assessed for involvement and an assessment can be made regarding the likelihood of synovial involvement. **We have recently introduced a reduced cost, lesion oriented scan protocol specifically for these cases.** Whilst this protocol does not allow us to assess the entire foot, it enables identification of the penetrating tract and any potentially infected synovial structures.

Case 1: 9 year old Warmblood mare, admitted with history of standing on a nail that afternoon. The nail had been removed from the palmar aspect of the frog. It had penetrated approximately 3cm in a dorsoproximal direction. The mare was mildly

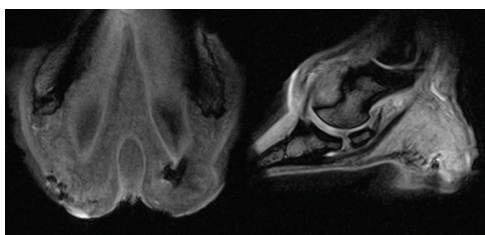


Figure 1: Transverse and sagittal images of the foot showing the penetrating tract within the palmar aspect of the digital cushion.

lame at presentation. MRI showed that the nail penetration was restricted to the palmar aspect of the frog and the digital cushion. No further investigation was required and the mare remained sound following discharge.

Case 2: A twenty year old thoroughbred mare presented with a history of standing on a nail 3 days previously and progressively increasing lameness over the intervening period. The mare was non-weightbearing at the time of presentation. The nail had penetrated the central third of the frog to a depth of approximately 4cm. MRI examination revealed a tract extending through the frog to the palmar aspect of the deep digital flexor tendon (DDFT) and traversing the tendon into the navicular bursa. The mare was taken to surgery and a large defect in the DDFT and the palmar fibrocartilage of the navicular bone were seen. Despite extensive surgical debridement and intensive post operative antimicrobial therapy the mare's lameness deteriorated and she was subjected to euthanasia 5 days post surgery.

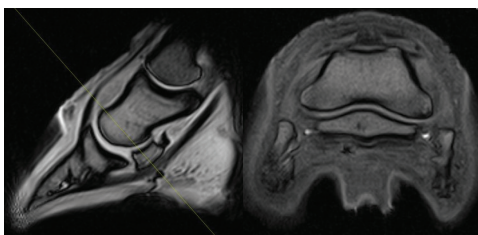


Figure 2: Sagittal and transverse images of the foot showing the discharging tract which traverses the DDFT and penetrates into the navicular bursa.

The use of MRI in the above cases allowed us to assess the location of the tract and tailor our treatment regime appropriately. The lesion oriented MRI protocol currently costs £400 + VAT, which is similar to the cost of initial radiographic examination and synoviocentesis. Synoviocentesis of the structures of the foot is technically demanding and not without risk to the horse, so it is our preference to perform MRI in the first instance. Should the results of MRI be equivocal, further investigation may be required, however in our experience this is rarely the case.

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