To be selected for the 2023 Worshipful Company of Farriers Equine Veterinary Studies Award was a massive honour and my weeks' placement with Robert Rush (Jr) AWCF in Suffolk has genuinely been a highlight of my veterinary career so far. I applied for the award after spending a lifetime around horses and wanting to understand how vets and farriers can best work together to better equine welfare and treat a wide variety of cases.

My placement in mid-July after a wet, warm start to southern summer meant the realisation of 3 things: 1. The grass is definitely greener down South, 2. With green grass comes an influx of laminitis cases and 3. We were going to get wet!

Figure 1 - Sole bruising seen at the toe in a laminitic pony mid-trim

Starting the week how we meant to continue, the first case I saw was a pony with sole bruising secondary to laminitic changes in the hoof (Figure 1). This pony had suffered badly from laminitis earlier in the season with radiographic imaging revealing slight rotation of the pedal bone, reduced solar depth and the formation of a laminal wedge due to unparallel dorsal wall – phalangeal alignment. Rob explained the solar depth gets dangerously thin or close when the bone loses the vascular structure which comes with laminae detachment leading to subsequent rotation and founders with a drop in the bone position. This predisposes them to secondary issues such as sole bruising and solar abscesses if dirt and bacteria tracks up through the separated white line and it is essential not to trim the sole at all if it can be helped with laminitics. We also discussed that you can see bruising some time after an episode of laminitis due to the growing out of the hoof wall revealing evidence of previous haemorrhage as laminal wedges cause mechanical damage on the surrounding soft tissue structures. The hoof was lightly pared to reduce weight-bearing pressure over the bruise without excessively thinning the already compromised sole and the pony was returned to its deep bedded stable.

Following on with the same theme, we later saw a Shetland pony who was struggling with an acute bout of laminitis coupled with severe radiographic foot issues due to years of inadequate farriery. This pony presented walking almost on its tip toes (Figure 2a) and radiographic views showed excessively long toes alongside laminar disturbance and a 'Turkish slipper' appearance starting on a rotated P3 (Figure 2b). Rob explained that this pony looked miles better then when it was originally rescued, and imprint shoes were fitted to provide pain relief whilst preventing P3 descent and bringing the centre of weight back over the heels using tailored moulded on extensions (Figure 2c). Treating these sorts of conditions take time and the imprint shoes are a great tool in our first aid kit, the removable rolled toe reduces pressure on the toe and the light mouldable glue on nature means support can be provided without having to try to hammer nails into painful feet.

Figure 2a - Laminitis case after removal of previous imprint

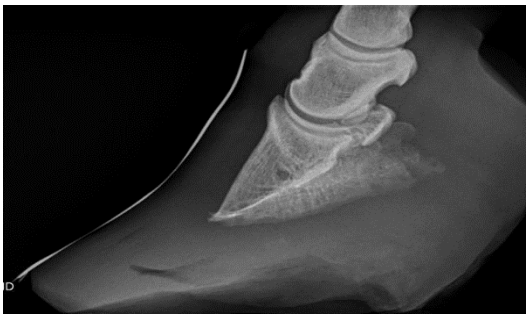

Figure 2b - Radiographic changes seen in acute laminitis case

Figure 2c - Laminitis case following application of imprint with heel extension

To finish our trio of laminitis, we also saw a number of chronic laminitis cases with treatment varying from heart bar shoes to the use of 3D pads and dental impression material to keep the weight breakover point back over the heels to shift weight from the hoof wall to the frog. I learnt about how versatile heart bar shoes are in treating a variety of hoof related diseases such as quarter cracks, corns and post keratoma surgery by transferring weight and enabling the damaged hoof to grow stronger and healthier (Butler, 2019). This week was great at showing me that laminitis comes in all shapes and sizes, and treatment needs to be tailored to the stage and severity of disease as well as what that individual animal is expected to do. Soft dental impression material, otherwise known as silicone packings, can be used alongside heart bars and 3D pads (Figure 4) to increase the contact between the shoe and the frog providing support and protection whilst still being flexible enough to allow natural movement of the foot (Easy Care, 2022).

Figure 3 - Heart bar shoes used in a retired chronic laminitis case

Figure 4 - Unclipped rolled toe shoes with a 3D pad and soft dental impression used on a school horse with chronic laminitis

It became apparent to me at this point that I needed to get a better grasp on a 'breakover point' is and how we can use trimming and shoeing to adapt this. Ramey (2005) states that the breakover point is the 'area at the toe that the horse pivots on and pushes from as the heel leaves the ground' with a correct breakover point allowing the foot to stay in contact with the ground for longer to produce a long, efficient arc like stride which allows the horse to load the heels at impact for optimum energy dissipation. In acute laminitis cases when the toe wall moves forward of its normal position surrounding P3 the horse must step earlier in the stride leading to a shorter, higher arching stride which lands toe first – starting a viscous cycle of toe flare and hood capsule rotation with lever pressures on the toes. The use of 'rolled toes' and positioning shoes with the dorsal edge on the palmar side of the white line can assist to shift the point of breakover in a palmar/plantar direction to reduce load on the toe as the horse moves (Hagen et al., 2021).

When visiting a college teaching facility, we met a heavy-set cob with outward rotation at the carpus (Figure 5) leading to it walking with a lateral toe first movement leading to concussive forces shooting up the lateral aspect. To correct this Rob parred the lateral aspect of the foot more than the medial and thinned the shoe on the lateral aspect to alter how he lands, making him bear weight more evenly as the medial aspect of the shoe now comes into contact with the ground at the same time (Figure 6). It was rewarding to see an immediate improvement in his gait when he was walked up afterwards. We discussed how steel bar shoes worked well for him due to his heavy set nature, but thinner graduated pads could be used in a smaller, lighter horse to the same effect.

Figure 5 - Outwards rotation at the carpus leading to a 'toe-out'

Figure 6 - Bar shoe thinned laterally to promote even landing

Talking in the van between yards was a great oppurtunity to broaden my understanding of farriery and shoeing, with Rob explaining the trimming protocol needed in foals to allow identification and correction of conformational issues as well as specific differences in donkeys and the importance of considering these when handling them. I now understand why you might see lightweight aluminium shoes on a Thoroughbred on race day yet a sturdy set of steels on hunters in the depth of the hunting season. Rob demonstrated how to properly map out a foot to highlight the location of internal anatomical structures to guide the way we trim a hoof so it can function properly.

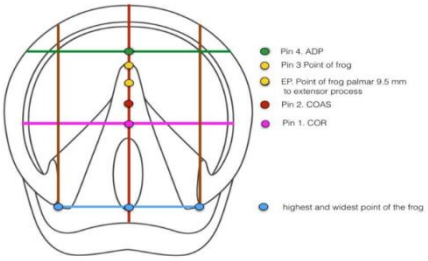

Figure 7- Diagram showing the solar surface of a front hoof illustrating external landmarks. ADP - Apex of the distal border of the distal phalanx, COAS - centre of the articular surface of the distal phalanx, CDR - centre of rotation of coffin joint (Moon, 2019)

Figure 8 - My very first horseshoe!

Finally it was time to test out my practical skills after a week of watching the pros doing what they do best. The experience was eye-opening and it was truly humbling to struggle so much at the tasks the farriers make look easy. Simply taking off a single shoe had me shaking at the knees and sweating from the brow but making my very own first horse shoe was a real proud moment, even if it did take me considerably longer then it took the rest of the team and leave me with blisters!

I really enjoyed my time with Rob and the team and cannot thank them enough for the effort they put into explaining what they were doing and answering my questions all week. Before the week commenced I knew there were many ways in which farriers and vets can work together to improve horse health but I was truly astonished by the understanding of biomechanics and how farriers can use these daily to prevent and treat injuries. I also want to say thanks to Dr Lydia Brown who coordinated the entire week and all of the staff at the RedWings facilities whose dedication to the horses under their care is unparalleled.

Citations

Butler, Pete. (2019) "*Heart Bar Shoes | Butler Professional Farrier Schools.*" Available at: butlerprofessionalfarrierschool.com/archives/1982. [Last accessed: 20 July 2023]

EasyCare. (2022) *"Using Dental Impression Material under an EasyShoe - EasyCare Hoof Boot News."* Available at: blog.easycareinc.com/using-dental-impression-material-under-an-easyshoe/#:~:text=Not%20all%20horses%20need%20it. [Last Accessed: 20 July 2023]

Hagen, Jenny, et al. (2021) *"Influence of Trimming, Hoof Angle and Shoeing on Breakover Duration in Sound Horses Examined with Hoof-Mounted Inertial Sensors.",* Veterinary Record, vol. 189, no. 4. Available at: https://doi.org/10.1002/vetr.450. [Last accessed: 20 July 2023]

Moon, Grant. (2019), *"Hoof Mapping -Guide or Rule? -the Accuracy of Using External Landmarks to Localise Internal Structures in the Equine Hoof*." Available at: https://www.wcf.org.uk/fwcf-

thesis?tid=7d601ec645dee7e4acf8e2f65bf6074ac4e442d3f619fc3d6b2137ca0989ad4d. [Last accessed: 20 July 2023]

Ramey, Pete. (2005) *“Breakover.”*. Available at: www.hoofrehab.com/Breakover.html. [Last accessed: 23 July 2023]