

Worshipful Company of Farriers Equine Studies Award 2024

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Many thanks to the Worshipful Company of Farriers for hosting the Equine Veterinary Studies Award 2024, which has provided me with the invaluable opportunity to spend a week with Stephen Hill FWCF and Sam Green AWCF. The experience has been incredibly eye-opening, and, as a final year vet student, has hopefully provided me with tools for the future to ensure collaborative communication between vet and farrier, so that we can work together for the welfare of our horses and the satisfaction of our clients.



Figure 1

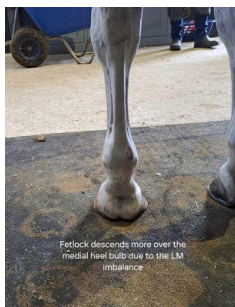


Figure 3



Figure 5



Figure 7

From the very first yard I visited with Stephen, we jumped straight in to discussing possibly the most important part of any equine assessment – conformation. We initially explored valgus and varus angular limb deformities (*Figure 1*), how they can originate from the carpus and the fetlock, and how this affects the loading of the leg and therefore the shape and weight bearing surfaces of the foot. We worked through 3 ways to evaluate hoof conformation, starting with how to assess the solar surface of the foot. I learnt that the heel contracts on the side with more load (which can be affected by angular limb deformities) (*Figure 2*), and how, when viewed from behind with the horse standing square, the fetlock descends over the contracted heel bulb (*Figure 3*). Stephen went on to explain to me how the solar surface of the foot is broken into the toe, toe quarters, heel quarters and heel, and that the toe quarter should match the contour of the heel quarter in the ideal hoof. The second axis we looked at was the medio-lateral balance of the foot, which can be viewed by facing caudally, raising the leg and holding it above the fetlock to allow the distal limb to hang, before using the T square, aligned with the tendons of the leg, to assess medio-lateral balance (*Figure 4*). I learnt that there were other clues to the medio-lateral balance of the foot, for example looking at the differences in heel height from behind, and the shape of the coronary band (*Figure 5*), the spacing between the hoof rings (*Figure 6*), and how a farrier can amend shoeing to work with this imbalance by thinning/grinding down the side of the shoe where the horse has the 'high' side (*Figure 7*). The third axis we evaluated was the hoof-pastern or hoof-phalangeal axis, which will be expanded on in the following paragraph. Finally, Stephen helped me to assess the conformation of the horse as a whole, looking at the tightness of the elbow to the body wall, a camped-



Figure 2



Figure 4



Figure 6



Figure 8

under stance, whether the horse is standing base-narrow or wide, and the musculature, specifically of the brachiocephalic muscles and the quarters, and how issues such as sacral/back pain can cause under-run heels and overdeveloped brachiocephalic musculature. Additionally, Stephen helped teach me to look and feel for lateral cartilage mineralisation, which may either be caused by direct trauma, or from repetitive concussion due to poor conformation (*Figure 8*). This ‘whole horse’ approach helped me to appreciate how conformational abnormalities can translate to hoof shape and alteration of weight bearing surfaces, and how, as conformation cannot be changed after the closure of growth plates, the farrier can amend the shoe to work with this conformation and support the horse to achieve level foot placement. Below I have included a short case progression of a horse with medio-lateral imbalance where the horse appeared to have a varus deformity (*Figure 11a*) due to the lateral side being high (*Figure 11b*), which was correctively shod with a medial heel lift and a ground down lateral side (*Figure 11c/d*). A pad and dental impression material was also used (*Figure 11e*) and the overall result was a horse with a more even landing surface (*Figure 11f*).



Figure 11a



Figure 11b



Figure 11c



Figure 11d



Figure 11e



Figure 11f

Another aspect of conformation that Stephen and I discussed in great detail was the hoof-pastern axis, which is so frequently taught in our veterinary curriculum in relation to ‘long toe, low heel’, or broken-back conformation, and the misleading terminology of the ‘long toe’ and how this can present challenges in vet-farrier communication. I learnt the main issue with the terminology ‘long toe’ is the fact it is incredibly subjective, and the appearance of a long toe is in fact largely

determined by the angle of the hoof wall, and measurements such as centre of rotation, centre of articulation and Duckett's dot can further help assess hoof dimensions. The terminology 'long toe' falsely suggests that the toe should be shortened, which may in fact be detrimental to the hoof as it weakens the hoof capsule. Instead, toe length should be assessed from the solar surface instead of from the hoof-pastern axis. The hoof is made up of many layers with different densities of horn tubules, the outermost layer being the strongest layer due to having the highest density of the horn tubules, which progressively become less dense moving to the innermost surface of the hoof wall. Due to the strength holding layer being the outermost layer of the hoof, overly shortening the toe, and rasping higher than the most distal 1/3 of the hoof drastically weakens the dorsal wall of the hoof. This weakening re-distributes the weight of the horse to other areas, causing flaring of the toe quarters and under-running of the heels as they suddenly have a greater load to contend with. Stephen likened this to having a table where you remove one of the legs, and the weight that was supported by that leg is redistributed to the 3 remaining legs, which made this concept easier to understand. As a consequence, shortening the toe to try and correct a broken back HPA, which we see as applying more strain the SDFT/DDFT, actually causes heels to under-run, worsening the strain on the tendons we are trying to protect. This concept took a while to sink in for me, as it has been so ingrained through our teaching that to correct a broken back HPA and protect the tendons, you need to bring back the balance of the foot by shortening the toe! It is this contrasting terminology and teaching that creates barriers between vet and farrier communication, and frustration for the owner when the two professions are at apposition. Stephen was incredibly helpful throughout the week in helping me get to grips with the correct terminology for describing hoof conformation, which I believe will massively benefit me in the future, by allowing me to communicate more accurately with farriers and furthering the understanding between the two professions. We also discussed the use of quarter clips on the forelegs, and how this can cause a narrowing of the foot and the appearance of a long toe, and how the most effective way to actually shorten the toe is not by drastic trimming, but through shortening of the shoeing cycle. Additionally, I learnt that excessive shortening of the toe can actually be detrimental to the hoof-phalangeal axis, where the dorsal hoof wall should be in alignment with the dorsal border of P3. I hope that in the future, instead of prescribing shoeing such as 'shorten the toe', I can speak more correctly with farriers and discuss how we can support the angle of the hoof to improve the hoof-pastern axis and preserve the correct hoof-phalangeal axis.

The following day, Stephen and I discussed proprioception and interference, and how they are mainly affected by riding quality, strength of the horse, conformation, and how farriery could be used as a tool to reduce the incidence of injury, but the other areas also need to be addressed. In the forelimbs interference consisted of buffing, brushing and speedy cutting, in the hindlimbs forging, over-reaching, scalping and cross-firing. I was introduced to 'Hunter shoeing', which aimed to reduce shoe loss by rolling the toes on the front limbs to reduce the duration of breakover, and rounding the heel of the shoe on the forelimb to encourage any over-reach to slide off instead of pulling the shoe, coupled with rolled toes on the hind shoes and making sure the hind foot was flush with this roll for the same effect. After this conversation we went more in depth discussing breakover, defined as the last phase of the stance phase. I learnt about early breakover, the point at which the heel comes off the floor, and the point at which structures such as the DDFT and navicular flexor surface are under the most tension, hence is often the point at which injuries in these structures occur. Late breakover is the point at which there is the most strain on the dorsal hoof wall and lamellar suspension of the pedal bone, important for conditions

such as laminitis where these structures are already inflamed. Easing breakover can help reduce these issues, through a variety of means such as modifying shoes to have rolled toes, setting back the shoe positioning, and angulating the foot by raising the heels. Foot analysis software can be utilised to assess where the point of breakover is for that individual horse, as well as the pressure going through the different areas of the foot at that time. This can also be seen from the position of wear on the shoe at the toe. However, easing breakover can be detrimental, as grip at breakover is needed for propulsion, therefore by easing breakover with the above methods, the decreased ground resistance may reduce grip and put more strain on the tendons, which can be helped in part by keeping the fulling at the toe. Furthermore, breakover is affected by many additional things, such as pain and the myofascial system, which also need addressing and further promote the whole horse approach.



Figure 9



Figure 10



Figure 15

I also had the opportunity during this week to see many shoeings where we were addressing a specific ailment or conformational issue. This led to discussion on how a farrier can change the shape of a shoe. Parts can be welded, such as the addition of frog support or extra clips, it can be shaped to create lateral extensions that support weaker areas of the foot, 'bumping up' refers to making areas of the shoe shorter and thicker, and 'drawing down', which makes the material longer and thinner. Specific examples of amending the shoe were heel extensions, heart bar shoes with positive frog pressure (Figure 9) and frog supports pads, which all contributed to preventing the foot sinking between the heel bulbs, pushed up on the digital cushion and P2 and therefore made the foot more upright and reduced the angle of the fetlock, therefore reducing strain on the tendons. Another horse had medial sidebone caused by increased weightbearing and concussion through that side due to medio-lateral imbalance with the lateral side being high (Figure 15), and the shoe was 'floated', meaning there was no connection between the shoe and that part of the hoof, to reduce the pressure in this area (Figure 10). I learnt this has to be done carefully though, as it redistributes the weight to another area of the foot. Again in a similar concept, a competition horse with an abscess had dental impression material under a pad, and the impression material was not placed directly over the site where the abscess had been to minimise pressure on this area. Shoeing for a purpose was also incredibly interesting to see – from adding fulling, tungsten road nails, and stud holes to shoes where the horses would need increased grip such as eventing and hunting, to shoeing show Suffolks where each shoe was meticulously handmade, and shod in the traditional way with 4 nails on the outside and 3 on the inside – Which I was to learn comes from the military where if one shoe was lost, there were enough nails in the other shoe to take and replace the lost shoe.

Another interesting area of Stephen's work was his work with foals and young horses. I quickly learnt that handling and early, regular trimming was paramount to both identifying and correcting flexural and angular limb deformities, and getting them to tolerate being handled - and having manners! I learn that foal feet are trimmed to the short axis of the limb, and the rapid growth period in a foal is the first 3 months of life, so any correctional work for angular or flexural limb deformities should be undertaken within this stage. Once growth plates have closed, there is no

ability to alter a horse's conformation, and therefore makes this stage of farriery so incredibly important to the horse's athletic career in the future. Growth plates close distal to proximal, so when correcting multiple angular limb deformities, the distal deformity needs correcting first



Figure 12a

before working the way up the leg. To help realign the leg, extensions can be used on the weaker side, as they affect the weight bearing through the limb, and alter pressure across the growth plates which in turn helps to straighten the limb. For flexural deformities, I had the opportunity to see a case of contracted DDFT (Figure 12a), which is a functional shortening of the DDFT caused by the growth of the bones and musculature exceeding the rate of lengthening of the tendon, resulting in a very upright foot, which is usually caused by an excessive plane of nutrition, in this example as the foal was in showing classes. For this case, Stephen



Figure 12b

used a quick setting moulding material to create a dorsal extension that improved the angle of the foot (Figure 12b). It was also advised that the foal was confined to box rest until the flexural deformity was resolved, as building the muscle would have caused more tension on the tendon, worsening the contraction. On the contrary, lax tendons are corrected by increasing exercise to strengthen the muscles.

Finally, I took a lot from seeing how Stephen interacts with his clients, and saw many parallels with what I have learnt already through my time on placement with vets. A huge part of keeping a horse running is management, as even with the best team of equine professionals, bad management can prove the biggest challenge to overcome. We discussed that therefore every meeting with a client is an opportunity for education not accusation - keeping feet dry, regularly picking them out, shortening the shoeing cycle when required and proper handling are all factors that play heavily into keeping horses' feet in the best condition they can be, and can help prevent conditions such as thrush (Figure 13). This cohesion between farrier, vet, and owner is paramount for keeping a horse running, and as vets and farriers we should be striving to use the right terminology, make time for each other and value each other's opinions with the respect that is deserved from both being equine professionals that want the best for the horses in our care.



Figure 13



Figure 14a

Thank you again to the Worshipful Company of Farriers for this opportunity, and Stephen Hill FWCF and Sam Green AWCF for taking the time to teach and going above and beyond to help me understand the complexities of their roles – and for making me a more proficient shoe puller! (*Figure 14a/b*)



Figure 14b