Maximizing Equine Performance:

Farriers, Vets and Therapists Address the Needs of the International Sport Horse at British Conference

By Fran Jurga, Hoofcare & Lameness Journal (USA)

SPORT SCIENCE IS A TERM BANDIED ABOUT LIKE A BADMINTON SHUTTLECOCK. It's not really veterinary medicine; veterinarians tend to see the horse when sport has tested a joint or a tendon or a bone. It's not really farriery, though the most successful farriers concoct creative combinations of art and science under the pressure of helping a horse meet the demands of sport. And is it really therapy, since the therapists are acting on clues to how a horse's musculature is handling the rigors of sport?

Sport science is like a cousin that the horse health family didn't know it had. He appears at a family reunion, and is simultaneously embraced—of course he belongs at this party—and yet eyed with suspicion. This party was doing just fine without the cousin; what effect will he have on the party and on family dynamics?

The farrier-vet-therapist trilogy of guardians for the horse's soundness holds frequent reunions around the world. Praises are sung to new diagnostic equipment, new support shoes, and new stimulating/shocking/massaging or soaking machines, as well as to the virtures of each other.

The trilogy is ready to receive the injured horse when he limps off the trailer after a show or event, and they will roll up their sleeves, do their best work, and drink a toast to each other for a job well done.

And, thanks to improved family relations in the past 20 years, they have done it together, and no blood, at least of the professionals, was shed.

But here comes sport science, galloping in from the human athletics field, where exercise physiology, biomechanics, and ergonomic equipment and clothing design have revolutionized the way that athletes train and perform.

While the equine side has nodded appreciatively and respectfully to the efforts of Hilary Clayton, Doug Leach, Willem Back, and Jean-Marie Denoix over the years, it is a hollow applause: Only about 150 professional and academic delegates attended the International Conference on Equine Locomotion when it was held at Michigan State University in 2004—hardly an enthusiastic turnout for the latest findings on how horses move, perform, and metabolize energy.

In preparation for the 2004 Olympic Games in Athens, the British Olympic Committee offered grants to fund sport science research in each of the disciplines. Swimming, track and field, sailing, and gymnastics had no problem organizing their proposals on how to spend the funding. But what about the equestrian sports?

A grant of horse sport money went to a farrier and a veterinarian. Haydn Price DipWCF and John McEwen BVMS, MRCVS set out to see if they could possibly determine which horses were sound enough to compete, or which horses would likely stay sound, or which horses would need shoeing, veterinary, and therapy assistance. They would use high-tech tools from the human sports science field. And they would see where it would go.

One of the products of the work that Price and McEwen did (in addition to their regular jobs of serving as team farrier and team vet for Great Britain at several World Equestrian Games, European Championships and the Olympics) was the software program and horse movement data collection system now known as Equinalysis. The

This conference was co-produced by Equinalysis and Stromsholm Ltd., two British companies owned and directed by farrier entrepreneurs.

product has become a corporate entity since the Olympics ended, with Price as a director of the company and McEwen, who recently was appointed the FEI's worldwide chair of veterinary affairs, serving as veterinary advisor. Professor John Davies, a human sports medicine doctor with ties to Rugby Union in the UK, joined the company as chairman.

Equinalysis might have been operating in a vacuum, and enjoying the rarified air of international horse sports except for the inevitable question of how science can be applied to a subjective "art"-based task like farriery. No quantitative system appears to have been found in the world to judge how the trimming and shoeing of a horse affects its performance. A farrier is still judged by how well the horse performs and if the shoes stay on, the horse doesn't slip on the arena surface, and limbs don't touch each other in flight or landing.

The vacuum of elite equine sports farriery is leaking. But instead of leaking answers and solutions and formulas and shoe specifications, it is leaking questions. Equinalysis was a catalyst for change, and became a crack in the mirror into which many in Great Britain gazed with varying degrees of aversion, curiosity, and awe.

On April 12, 2006, a conference opened at the National Agricultural Center in Stoneleigh, Warwickshire, England. "Maximizing Equine Performance" was a rare privately-sponsored event in Britain. The venue was backed by Equinalysis and Stromsholm Ltd., a leading UK-based supplier of farrier goods.

Did anyone show up for a seminar on sports science?

The theater was filled to capacity. The majority of attendees were farriers, with a demographic skewed to an average age of about 30. And instead of carrying bags of handmade fullers, creasers, and hammers, many carried laptop computers, digital computers, PDAs, and the ubiquitous cell phones with creative ringtones.

The conference unfolded quite naturally in the way that speakers complemented each other's comments and suggestions in how to define farriery's place in the larger picture of equine sport science. There were no answers at the end of the day, but the questions asked and the enthusiasm of the audience guaranteed that more of these conferences will take place.

Professor John Davies

Professor Davies began the day with a correlation between the relative recent development of a "science" of rugby as a sport and compared its early days to the present status of science-poor equestrian sports. Rugby is the type of sport that seems chaotic and without much finesse; the players are tough and strong and flushed with adrenalin. Until recent years, no studies had been done of how rugby players are injured, or in what types of plays or what segment of a game. Davies detailed how data on certain types of injuries had been painstakingly collected and analyzed, with a goal of preventing injuries but not limiting or decreasing the highest levels of skill and performance. He suggested that equestrian sports had a long way to go in this area.

Richard Davison

British Olympic team dressage rider Richard Davison gave background of his evolution as a rider and trainer. He explained the process of customizing a horse, and the difficulty of a top horse changing hands and having to adapt to a new rider, and vice versa.

He recalled the evolution of his interactions with veterinarians over the years; he had been terribly frustrated by veterinarians who assumed that since the horse performed dressage, any subtle lameness would be in the hock. Davison explained that recent sports medicine research has shown that grand prix-level dressage horses do carry more weight on the hocks, but that the same is not true of warmblood-type sport horses coming up at the lower levels nor in other types of horses that are working on the forehand.

Davison recalled an international-level horse that had been put in his stable to ride after being bought in the US. The previous trainer advised Davison to continue with Dutch farrier consultant Rob Renirie to manage a crack as it grew out.

At Davison's suggestion, Rob was brought to England by the attending team of British consulting vets and farriers. At a special meeting to discuss the horse, Rob and his previous shoeing were ignored. The British experts advised Davison and the horse's owner to take their advice on how the horse should be shod. Disappointed in the way that the Dutch farrier had been treated, Davison decided to stay with the services of the farrier who had kept the horse sound, and competed on the horse for three years.

"Experts must work together, and not make the owner or rider decide between them," Davison advised. "There are always many experts, but there is only one horse. A consensus is needed."

Davison admitted that he was very defensive when Haydn Price wanted to start videotaping his horse before the Olympics. "I refused to let him video my horse," he recalled. "Then I went to a presentation of his and it made me think that video was a brilliant idea."

John McEwen

"What is the difference between a medal performance and an also-ran?" began FEI veterinary chairman John McEwen. "We need to develop systems to monitor fitness, to monitor response to training stress, to monitor recovery time, and to monitor the effect of foot balance."

"What is needed is to create a team of the physiotherapist, the farrier, and the veterinarian. And," he continued, looking around the room, "We have started with the foot."

McEwen conceded that it is not possible to impose the same training on different horses, but he criticized the way that many horses are negatively trained, and that it can lead to injury. "If the horse can't piaffe," he explained, "people spend most of their time on that movement. That may not be the best thing to do."

He explained principles used in Great Britain's World Class Performance cross-sports program, which encourages long-term fitness evaluation and training of athletes (humans and horses) who may represent their nation in international sport.

He gave examples of how hoof, hock, and pelvis problems in performance horses are inter-related. "We need to think in terms of prehabilitation," he stressed, borrowing a term for human physical therapy, "rather than rehabilitation. Injuries will of course still exist but we must do everything in our power to prevent them. One of our problems is that of maintaining peak performance for a long time. Tomorrow's competition always seems the most important, but we must have the long view."

McEwen's suggestions for prehabilitation included

• involve the veterinarian in the horse's training schedule, methods, surface;

• keep a close link between the horse's veterinarian and coach;

• consider the impact of travel stress, and the importance of protecting the horse during travel;

• riders must have faith in the ability of their horses and they must have faith in their team of experts.

He said that veterinarians must be prepared to provide options to clients and that veterinarians must be knowledgeable in aspects such as nutrition.

"Think laterally, think outside the box, to produce that extra percent of performance," McEwen continued. "I mean to stimulate debate on what we can practically use of recent scientific research. Science trundles away on its own because it is grant-based or funded by drug companies. We need to be more pro-active about research, but researchers are not practical people. Sport should have more input into what studies are done. We need to be ahead of the game. No, rather, we in sport should be running the game."

"There is no such thing as a sound grand-prix horse," he concluded. "A horse's career creates injuries. A horse's career depends on how we manage those injuries."

Rob Renirie

The next speaker was Rob Renirie, farrier consultant to the Dutch international equestrian teams. He was introduced as "the leading performance horse farrier in the world." His topic was "Shoeing the Competition Horse".

Renirie began with an image of the horse as a machine. "If the horse was a machine," he said, "We would all do the job the same."

"Some people make the excuse that the horse's legs are too weak for the job," he began, "but that is not true. Dressage is all about the exterior of the horse, the way the horse moves, the right choice of materials and supported and balanced, well-shod feet. It is most important to understand the materials and what they do."

"The horse needs the toe," he stressed from the start. "I see square toes, shoes set back, rasped toes. I believe that the horse needs the length of his foot to absorb shock and to load energy for his muscles to make the next move.

"Think about the horse after a jump. He is landing on one foot," he showed a slide of a horse descending from a jump, "but the rider is already turned, looking across to the next fence. He is changing his weight before the horse has even hit the ground."

Renirie took some time to reflect on the spate of injuries suffered by show jumpers in Athens in 2004. He blamed the injuries on the loose grass footing, and remarked, "I saw horses with four studs in each front shoe. Some countries really did that to their horses. The horses landed. But they could not turn."

One of Renirie's prime messages was to condemn the over-use of hoof repair materials.

"In the case of extremes in equestrian sports, when excessive demands are made of the horses, injuries occur more and more frequently, and solutions or stopgaps are sought to cope with these extremes (by farriers)," he said. "And the manufacturers have not been slow in responding! The market is flooded with all sorts of soles, artificial horn, adhesives, and other curiosities."

"Take more time to learn about the horses," he advised. "Don't just go looking for solutions when it is too late." Renirie went through his own routine of evaluating a horse, watching the horse move. He stressed the importance of the exterior of the horse, matching the proper materials to the horse, and the process of achieving a supported

and balanced, well-shod foot.

He also said that he thought that the frequency of shoeing was a critical element in successful farriery, and that it is an individual variation between horses. If a horse is shod more frequently, he contended, then fewer drastic changes were required.

"What is the point of a wedge or egg-bar if it has completely disappeared into the heel after eight weeks?" he questioned.

"I look at the shape that a farrier makes of a foot," Renirie intimated about his evaluation of a new horse to shoe, referring to the effect of repeated shoeing by a single farrier on a horse. "A good farrier will create a good shape but some farriers create an odd shape. My advice is to keep it simple, use good materials, and stay close to the basics.

"Once you start to add fillers, the basic skill is gone from the job," he commented. "Try to follow the coronary band. A horse with flares on the sides of his feet will collapse. Rounded, underrun heels cannot support a horse. Use small nails; most farriers use nails that are too big. Try to nail one-third of the way up the wall."

He showed a photograph of a horse taken at the Olympics in Athens; the heel of the shoe was over the frog, and obviously pinching. "I took the shoe off, ground down the heel to fit," Renirie recalled. "Everyone could see the problem. But still, this horse was at the Olympics and he had been shod that way."

He then showed the foot of an Irish horse that had won at the World Equestrian Games; the foot was badly broken back. "Why did such a great horse have such poor shoeing?" Renirie wondered aloud. "He won, but he never performed again."

Renirie criticized the choices that many farriers make, both of shoes and of nails. "They are very important," he stressed. "It is not true that Thoroughbreds have extra thin walls. Race plates create thin walls!"

Renirie mentioned that some people select a shoe that is too fine for a horse with a thick wall. "Some people file away the wall, while others nail outside the white line. In both cases, the wall deteriorates, leading to crumbling hooves, loose walls.

"But is that a problem?" he asked the audience. "No, of course not. There are plenty of synthetic resins or other adhesives for sale. Where is the limit for these stopgaps? It is fine that these materials are available to use in emergencies, but it was surely never intended that they should be used routinely for shoeing horses."

"Is there an ideal way of shoeing?" he mused. " Some of the things I do: Not too much extension outside the coronary band, please. I like flat steel shoes. I hammer (thin) the toe until it is wider by about 3 mm, and then I lift it a little bit. Not always clips for dressage horses. I want the wall to stay nice and straight.

"On the hind feet, I leave only 4.5 mm over the shoe. I do not bring the toe too far back. I hammer the toe of the shoe so it rolls easily. I like a rounded toe on a hind shoe."

"The coronary band usually makes the shape," he said of his shoeing. "I like a slight rolling toe for jumpers or dressage, with one-third of the hoof wall rolled. Some German horses have the rolling toe more on one side than the other. But I normally would not do that."

He advised the farriers in the audience to be careful with the use of studs. "Studs will change the foot. Be careful," he warned. "I tell my customers to use studs only when necessary. And use the smallest possible studs on dressage horses because of loss of movement. In Athens, though, our horses needed the biggest studs."

With a bow to the British shoeing styles, Renirie commented, "I never use concave steel on dressage horses. I want my horses to be able to pirouette. I always use flat shoes on the hind feet so the shoe stays more on top of the surface so the horse can easily turn without so many injuries."

While Renirie claimed to keep to the basics, he did mention some support shoes that he approved, such as the full rock-and-roll shoe, although not at the higher levels of sport and not for soft footing. He said that he will modify one side to be flat and one side rounded to help a horse turn in a given direction.

"The Germans still like egg-bar shoes," he smiled. "But I think they do more damage than they help. The bar really eats into the frog. The horse may not be lame, but he will compromise somewhere in his body for that shoe." He warned that a long-heeled egg bar will move pressure back and cause more palmar pain, not less. However, he did clarify that an egg bar for a stall-resting horses is different than an egg bar on a performance horse.

Renirie is a big fan of the frog. He likes to leave it as large as possible and went into detail about his ideas on the frog's role in traction and in shock absorption. He warned that many commercial products used on frogs will cause a horse to test positive under FEI drug rules and that some farriers will routinely treat the frog without thinking of the absorption possibilities.

On the Natural Balance shoe, Renirie commented that he did not see them at the upper levels of sport but that the theory behind them is not bad. "Like anything, it can be overdone, though," he said. "But in some horses, it is the shoe that really helps."

Digressing again to criticize the over-use of repair materials, Renirie also blasted wedges on horses that are in training. "The horses become tender in the soft tissue, shorten their stride, and put more stress on the extensor branches of the interosseus (muscle). This tends to encourage them to land more on the heel area. If we instead move the shoe back under the hoof, this seems to encourage them to extend their stride and so land on the entire ground surface of the foot.

"I roll, or at least break over, the toe of most the shoes that I fit," he continued. "In some cases, I will use rocker toe shoes."

"It all has to do with comfortable shoes," he concluded. "And the farrier must know what he can do and what he can't."

In Renirie's paper in the proceedings book, he wrote: "I hope with all my heart that this exceptional animal will be treated with respect and know-how, and that absurdities in trade and sport will not gain the upper hand.

"Make sure there are specialists who want to become farriers because of their love for horses, and the job.

"Make sure there are farriers who have common sense and use it. Set high standards in this field. (I must) emphasize the importance of calling in appropriate expertise….Colleagues should not hesitate to consult each other in the case of problems and difficulties. This can help prevent a great deal of misery, primarily for the animal but also for the owner."

In the discussion period that followed, Richard Davison and John McEwen engaged Rob on his experiences in international competition and drug testing. Davison said that he is very careful about all products that he uses on his horses. He said that, in his opinion, most people are far too lax about the products used topically on horses since so many contain carrying agents and contaminants. He told of testing an aloe vera product before using it, only to find out that it would have tested positive at a competition.

Chris Pardoe BSc., AWCF

Following Rob Renirie's micro-analysis of horseshoeing fashion, researcher/farrier Chris Pardoe of the Royal Veterinary College's Structure and Motion Laboratory headed in a new direction. He is pursuing a PhD in farriery and biomechanics.

Pardoe's presentation, "Equine Locomotion: A Research Farrier's Perspective" was informative and challenging. While he began with the obligatory review of terms and "what is biomechanics", the presentation turned into a raison d'etre for a new kinship between farriers, veterinarians and the world of biomechanics.

"Why do farriers abhor science?" Pardoe pondered. "We actually use it for x-rays and other related things. We don't need to fear it." He showed --a slide of Austrian researcher Christina Hinterhofer's images of finite element analysis of a horse's foot, which are stunningly beautiful and full of color but showing the stresses as the hoof wall loads and flexes.

A few problems in the perceptions of farriers were key to Pardoe's presentation. One was how he has learned to think of the horse as a dynamic object (being) that is constantly shifting its center of mass and thus adjusting the load on the feet, and that small subtle movements cannot be seen with the naked eye.

Basic definitions used in Pardoe's lecture included:

• kinematics is the study of movement

• kinetics is the study of the forces involved in movement

• "point of zero moment" is the theoretical point at which all forces balance.

• Stance phase is the time the foot is in contact with the ground

• Swing or aerial phase is the time spent in the air between ground contacts.

• the ratio of stance to swing is known as the "duty" factor

• definition of breakover: At about 85 percent of stance (phase), peak force in the deep digital flexor tendon is reached. This causes the heels to lift and as the animal moves forward, the foot rolls over the toe, eventually lifting away from the ground.

Pardoe's research has tested the effects of different shoes on breakover in the horse. But he extrapolated interesting points to pique farriers' interest in biomechanics, for instance:

• Because elephants are so big, they cannot trot. Their fast gait is actually a very fast walk. They need to keep a foot on the ground.

• Heavy draft horses lean on farriers because they have to. They cannot adjust the center of mass enough because their chests are so wide.

A dominant area of Pardoe's research has been slippage, and particularly the difference in slippage between materials used in shoes. He described slip as nature's way of lessening force.

Using slides of force plates and pressure mats, Pardoe showed how horses load their feet, and he showed that in a hind foot, the center of pressure moved medially toward the center as the foot made ground contact before moving forward as the foot rolls over and eventually slightly lateral again as foot off occurs.

To test shoe materials, Pardoe together with Dr. Alan Wilson, built a force plate covered with

tarmac, so he could simulate roadway conditions in England. For comparison, they also topped a force plate with concrete and have located plates under soft indoor arenas. Pardoe tested materials on feet to measure the distribution of pressure under the foot during stance, and then compared it with measurements from the force plate when the horse was moving over the plate. He can also link the force plate to three-dimensional video gait analysis systems and high speed video cameras for indepth analysis of equine locomotion.

Not only shoe materials but studs are of interest to Pardoe, who suggests that much more research is needed into types, sizes and how they are used in the shoes of horses to give either grip or prevent slip. He said that improper use of nails and studs with tungsten pin inserts (road nails) can cause point loading which overloads the structural integrity of the hoof wall and can create instability and imbalance.

For American readers who may not be familiar with the term, a "pin" is the central hardened core in some studs and nails; they are also available separately and can be placed anywhere on the shoe by simply drilling a hole and tapping in the tapered pin.

"People are often confused between slip and grip," Pardoe claimed, suggesting that too much of either can be harmful. "A stud can also be driven right through the shoe and injure the foot."

A problem in Britain is that so many people ride horses on paved roads. A new, cheaper surface is in use there, called stone mastic asphalt. It is dense, and low noise. The former procedure was to put tar down, and then top it with gravel; the new surface is pre-mixed like a pudding and applied in one coating. However, under high point pressures it can liquefy and lubricate the surface between steel shoe and roadway. "And then a horse slips," Pardoe warned.

Pardoe admitted that he sees lots of new shoe designs and materials, and that he is asked to consult on or test the slippage factor on two or three new designs each year.

In Pardoe's research, plastic shoes slip the most. Among the shoes he has tested are plain steel, steel with carbide traction, Ollov plastic shoes, and Ibex plastic shoes.

Research by colleague Dr Tom Witte had found that carbide not only prevented slip but also kept the foot on the ground slightly longer at foot off, but Pardoe admitted that he did not know the long-term consequences of this finding.

Forces on the navicular bone are a subject of research in Dr. Alan Wilson's lab. His group has reported that horses with navicular-type pain try to minimize pain by altering the loading pattern of the foot. He said that the horse will trade off potentially more painful parts of stance by altering the loading in a less painful area.

One new product shown by Pardoe was a carbon-fibre heel support patch, the 'Smart Patch'. Developed by colleague Peter Day, the RVC clinical farrier, and the locomotor research group, it is currently undergoing practical trials in the UK. Pardoe showed how the application of this small patch may have the potential to support and redirect the loads encountered by hooves that are predisposed to collapsed heels. A thoroughbred racehorse 'Chancellor' who had been out of the winners' enclosure for sometime recently won a valuable handicap race at the Epsom Derby meeting whilst wearing the patches.

Mark Caldwell FWCF

"The Shoeing Process: The Practical Use of Evidence-Based Evaluation" was to have been the topic of farrier instructor Mark Caldwell, who threw his topic to the wind and declared that there was no such thing as evidence-based anything in farriery and that the audience may as well have a good laugh at his expense.

Caldwell launched into an existentialist monologue of all the contradictions that modern farriery has inherited both from its traditional past and its budding scientific side. In particular, he noted that in farriery "one learns much more from one's failures than the successes" and that farriers need to have special mental attitudes that allow them to view failures as positive learning experiences, quoting "the definition of experience is the culmination of a life time's mistakes".

He lamented that except for some materials, the theory, the process and the techniques of shoeing are quite unchanged from Victorian times. With candor he announced, "We are looking down the wrong road! Today's modern equine athlete is a completely different animal from the Victorian draft horse."

He condemned the way that farriers and veterinarians look at diagnostic tools with admiration, yet ignore the cause of the injury. "Oh look, the leg is definitely broken," is heard more often than "why did the leg break?" in Caldwell's experience. "A successful prognosis is based on treatment of the cause and not the symptoms," he emphasized.

Another shortcoming, in Caldwell's opinion, is that two people look at a horse completely differently. "There are too many variables, but some of those variables have always been there," he said, and with regard to there being such a thing as evidence-based farriery.

"We need to establish a working model for the normal range of movement and loading throughout the axial skeleton during locomotion

and through the various gaits against which, that which we consider abnormal can be compared," he pronounced.

Caldwell showed a slide that was nothing but charts of numbers, data from a collection done with his Equinalysis system. "What do these numbers mean?" he wondered. "I don't know. I have to be able to compare these numbers to something else. I have to be able to pool it together, with lots of horses, to establish what 'normal' is before I can ever compare a horse to anything. Normal does not exist yet."

Caldwell used a video interface to show numerous high-speed video clips of horses in motion, with close-up footage of the feet landing. "Why video?" Caldwell asked. "You can speed it up, and you can slow it down. The human eye sees a certain range of motion, capturing it at less than 15 frames per second, but it can't see it all."

He showed a particularly graphic clip that detailed in slow motion the descent of the fetlock on a hind foot; the fetlock descended directly over the medial heel until the heel was obscured. Caldwell pointed out that any shoeing plan for this horse must not only include a method of relieving the lameness but also account for the biomechanical impact of asymmetric force and consider methods of re-establishing concentric force through the limb and ground-bearing surface.

Was Caldwell suggesting that the traditional tenets of farriery be discarded? He stopped short of that but quoted veterinarian Stephen May, from a paper in 1989: "Most of the claimed treatments of conditions of the foot are based on empirical and anecdotal evidence."

"Has anything changed since then?" Caldwell mused.

Caldwell said that he experienced an epiphany one day while looking down at the sets of shoes he had prepared for the horses to be shod that day. He had laid them all out on the floor in pairs.

"There wasn't a normal shoe there," he shouted. "Am I doing something wrong?"

Caldwell then switched to a more constructive mode, calling for reform in the education of farriers, so that it would be a combination of biomechanics, physiology, understanding of diagnostic techniques, adaptability, common sense and blacksmithing. In time, perhaps a term like "physiological shoeing" would describe a more ideal approach to the farrier's task.

"Currently, we are teaching and doing business based on a set of guidelines handed down from an era when a horse cost more than a house," he pointed out. "Before we conduct an in-depth diagnostic analysis, we must understand both normal anatomy and biomechanics."

According to Caldwell, working with video has changed his view of static hoof balance ("concentric" force loading) in favor of appreciating the dynamics of the horse. "The horse must collect itself to sync itself for the next stage of movement," he remarked as more slow-motion clips moved across the screen. "I used to use static balance (to shoe the horse) even though I watched the horse walk."

Caldwell gave an example of a horse that he thought needed a lateral extension shoe. After it was nailed on, the horse lost all flexion in its knee and winged out.

"Incorrect (concentric) load affects the capabilities of the foot and limb to function within acceptable limits. Keep in mind that all components of the limb act together as an integral unit; the mechanics of the locomotion system require that the limb must realign itself to keep pace with the beat of the individual gait," he expounded, bringing the use of video-based observation into a practical light for the attendees.

A final case study from Caldwell detailed a horse with collapsed heels, weak wall, a flared quarter, prolapsed frog, deficient bars. His video analysis indicated that the horse was loading medially. The horse was shod to land more acceptably.

However, looking at the horse and the video made him examine the shoulder, and notice a difference in muscle mass there. What Caldwell finally determined: "Whilst the limb appeared to present straight and as such it should land flat, it was actually impacting (landing on the) lateral toe and loading medial heel quarter.

"Closer inspection showed that when examined from an eye-line view through the carpus, there appeared to be a moderate fetlock varus deviation," he continued. When he experimented by placing wedges strategically under the foot in order to elevate the lateral plane of the hoof capsule, he watched the shoulder muscle mass fill out and eventually ended up shoeing the horse with a lateral wedge to return the foot axis to its true conformational stance whilst compensating for the defect rather than trying to correct it. "Shoeing the limb to appear straight by aligning the hoof to the long axis had actually been causing the horse pain and discomfort, by tying in the elbow and constricting the range of movement through the shoulder muscle mass," he concluded.

Caldwell's presentation was an eloquent call for change in the perception of how farriery is taught and how the farrier's role affects the whole horse. "If we don't do something serious soon, we'll go another 20 years," he said, referring back to Stephen May's dire observation. "We, the farriery profession, need to participate in the science by

conducting, with others, the relevant research that accounts for both the art and the science," he finished.

Rob Renirie

In a practical session after lunch, Dutch farrier Rob Renirie returned to the stage and detailed a case study.

"It may not be what you do, but how you do it," he began, showing a horse that had been imported from the USA. He had been shod for five weeks, was nailed outside the white line with an egg bar, and had brittle walls.

Regarding Caldwell's revealing slow-motion videos, Renirie scoffed, "I am glad I can't see everything!"

Amanda Sutton

Working on some of the world's most valuable performance horses is all in a day's work for physiotherapist Amanda Sutton. Observing sore horses and watching the way they move and stand have lead her to make many observations about how farriery affects a horse, for better and worse.

Sutton refers to the secondary effects of foot pain or imbalance as "compensatory" problems. She mentioned that the top of the poll, shoulder, and withers are three places on the body where she sees horses adjust their stance in reaction to foot pain.

"Whatever its cause, pain in the feet will result in an abnormal gait, and will eventually lead to lameness," Sutton wrote. "It will affect the horse's whole way of going and will severely compromise his muscle tone and fitness, and his ability to work."

She suggested that farriers spend more time observing how horses stand both before and after shoeing. "They re-balance themselves," she assured the audience. "You should report what you see to owners, involve them more in observing their horses. Pelvic instability is a particular problem that farriers become aware of."

She noted that the position of the horse's head and the length of stride affect the back.

She admitted that she wants to know all about how a client lunges a horse, but she does not like certain lunging harness rigs. She recommended lunging because it enables the horse to be schooled without any weight on the back or any interference from the rider, and because the horse has to find its own balance. It is also easy to notice when the horse starts to fatigue.

An interesting topic touched on by Sutton was the horse's proprioceptive nervous system. She showed her method of proprioceptive taping, and said that when the muscles are overworking, the brain does not tell the muscles to stop. Therefore, it is important to teach the horse to move correctly and efficiently, and the taping process helps the horse learn to bend, and identify which muscles are weak.

Andy Bathe MRCVS

Andy Bathe is a lameness-specialist veterinarian with a specialty in consulting on obscure or subtle lamenesses. He is a partner in the practice of Rossdale and Partners in Newmarket, England,

His topic was "Assessment and Treatment of More Subtle Causes of Lameness and Poor Performance" but his presentation was a more casual run-through of cases.

Bathe is fortunate to have access to every high-tech diagnostic tool, including both CT and MRI, and his cases revealed how those tools can sometimes supply too much information, or distract the diagnostician away from the actual problem. Keen observation is still a primary asset of the veterinarian aspiring to Bathe's level of expertise.

Bathe's first case was a valuable Thoroughbred filly that was exhibiting a gait abnormality. Evaluating the filly with the Equinalysis system in use at Rossdale's pinpointed the area of asymmetry, and an area of scar tissue in the gluteal muscle was discovered.

Bathe mentioned his use of the technique of drilling into the navicular bone to relieve pressure, as developed at Tufts University in the USA, on a 9-year-old jumper. He also showed a case of a 12-year-old high-level show jumper with intermittent severe forelimb lameness that had been treated with an infusion of the new bisphosphonate drug Tildren for navicular disease.

Other impressive techniques on Bathe's list included injection of the sacroiliac region, dorsal spinous process resection ("kissing spines" surgery), shockwave therapy, scintigraphy, and thermography.

In the end, Bathe showed a slide of what he said were his three most important tools: a syringe for nerve blocking, a flat surface for trotting up, and his watch.

Regarding shoeing and the practice of shortening the toe, he mused, "Load does not disappear. It is re-distributed."

"Advanced imaging techniques give us new insights into causes of lameness," he said, reading his slide. "And also the ability to charge the client more money for having a lame horse," he quipped to the audience. "Basic techniques are still the mainstay, but advances in treatment will allow us to keep high-level horses competitive longer."

Conclusion

Co-organizer Haydn Price summarized the day with a few words after Andy Bathe had finished. "Farriery is a key element in equine performance, not just because of what we do to the foot," Price said. "We have more contact with the high-performance horse and with the trainer than the other professionals on the team."

On the down side, Price criticized his colleagues, and himself. "We try to cram too much into our day," he said.

"We are the custodians of our profession," he closed. "Twelve months ago I'd have never believed that we would have farriers turn out to look at performance-level shoeing. This day has been diverse, but it was meant to be. Farriery has had a wake-up call."

Right on cue, a cell phone rang.

AN INTERESTING ASPECT OF THE CONFERENCE was a large room of exhibits. On close examination, what might have looked like a small "trade show" was actually a freeform entrepreneurial laboratory of farriers with new products, albeit serendipitous that the exhibits were all manned by farriers.

Andrew Poynton FWCF displayed his Imprint thermoplastic shoes, which have now been enhanced with new, more sophisticated designs. Co-organizer Carl Bettison AWCF displayed the latest in educational and shoeing products imported or manufactured by his company, Stromsholm Ltd.

Several Equinalysis "business partners", or franchise holders, had exhibits showing how they are using video analysis and developing ancillary businesses outside their shoeing or physiotherapy practices.

Throughout the conference, question and answer periods were scheduled and during breaks, speakers kindly made themselves available for private conversations with attendees. Most of the speakers supplied papers for a proceedings book, which was distributed to registrants.

Things may be changing quickly in Britain, but one thing that does not change is that people learn differently. Some listen and watch. Some must ask questions. Others go home and study their notes, or the proceedings book.

One by one, each will decide whether to answer or ignore the conference's wake-up call, each to his own vision of his or her role in the farrier profession and the care of the horse. This conference should have widened that vision in most of the attendees; if not, the re-dial will be coming up.

The text of this article appears in an illustrated format in Hoofcare & Lameness Journal. For more information, visit http://www.hoofcare.com.

TO LEARN MORE....

Visit the web site of Equinalysis: http://www.equinalysis.co.uk

Visit the web site of Stromsholm Ltd. Farrier Supplies: http://www.stromsholm.co.uk

Further reading:

The Dynamic Horse **by Clayton**

Equine Locomotion **by Back and Clayton**

The Horse in Motion **by Pilliner, Elmhurst and Davies**

The Injured Horse **and** *The Injury-Free Horse* **by Amanda Sutton**

Physical Therapy and Massage for the Horse **by Denoix and Pailloux**

Shoeing for Performance in the Sound and Lame Horse **by Price and Fisher**