

Horses InsideOut Conference 2013

Day 1 at The Ramada Hotel, Grantham.

Lecture 1

Development and Influence of Uneven Feet on Limb Loading and Performance.

Dr Meike van Heel

In English: A study of warmblood foals, looking at whether the way they choose to stand when grazing affects the development of their hoof shape and the ease with which they can work on both the left and right rein.

Dr Meike began by briefly discussing the evolution of the horse.

Most people are familiar with the fact that the horse evolved from a much smaller creature (around the size of a fox terrier), recognised as Eohippus, which is believed to have existed in forest habitat. Natural selection caused the species to evolve to be more suited to grazing in open fields, with the ability to outrun predators, ensuring “survival of the fittest”.

In the 20th Century, the need for working horses dropped drastically, as rapid advancements meant cars, tractors and other machinery replaced the horse. It was only when man started to use the horse for leisure and sports purposes on a much larger scale that numbers increased.

This was interesting, as when we look at the evolution of the horse as a whole, the use of it as a sport horse is still relatively new concept isn't it? I wonder what we will be doing different in 50 years time?

The key points from this introduction came down to the following (I think!)

*Breeding changed to produce “sport horses” rather than work horses.

*The most obvious change was in height – an increase of 2.5cm over 25 years. This means the sport horse is now a very large grazing creature compared to the rest of his equidae family which range from 120 -150cm

*Because a foal has to follow his mother soon after birth, his legs are longer in comparison to his trunk than they will be when he has matured.

*In order to reach the ground, the foal has to place his limbs far apart - one leg forward (protracted position), and one back (retracted)

***If the foal consistently adopts the same posture (eg left leg forward, right leg back) this can result in conformational traits (eg hoof shape) and “motor abilities” (ie the ability to work evenly in each direction)**

The following is from my hastily scribbled notes – I can't guarantee it's all correct, so where I'm not sure I've marked it with a (?) ☺

Breeders wishing their horses to be included into the Warmblood studbook have to be presented for admission, and unevenness of the feet (ie where the left and right feet do not match) is considered an undesirable quality, and therefore may not be accepted.

(?) In 1990 3.8% of horses presented failed due to uneven feet. This had increased to 9.2% in 2002. This could be due to more attention being paid to foot conformation, or it could simply be due to more horses being presented (?)

Of the 12000 foals born last year eligible for admission to the WB studbook, only 3500 of these were presented for admission.

Foreleg Dominance.

In Thoroughbred foals, 40.5% showed a preference for the left foreleg when grazing. 9.5% preferred the right, whilst 50% were ambidextrous.

In Quarterhorses, just 10% showed a preference for left, 7.5% for right. 82.5% were ambidextrous.

In standardbreds 40% showed left preference, 12.5% right and 47.5% ambidextrous.

So to do this study, they were looking at 24 warmblood foals, from 1 week old to 55 weeks.

They found that those foals that had a preference (left or right "hoofedness" ;-) were showing this at 12 weeks.

At 15 weeks there was no significant difference in the angle of the hoof, but by 27 weeks there was, and this increased with age.

The foals were all trimmed regularly (8 weeks I think) but the conclusion from the study was that trimming could not prevent the unevenness of the hoof development, nor the development of a preference for grazing with the left or right fore in protraction / retraction to the body.

The foals that had a greater preference at 15 weeks had longer heads and smaller heads, and at 55 weeks all of those with significance difference in the feet had longer legs and were taller in height.

They assessed the development of the foals' feet both visual and by scans. The conclusion was the foals with asymmetrical (non matching) feet had asymmetrical loading (ie one foot was taking more weight than the other) This meant that the flexor tendons and the navicular bone in one leg were having uneven stresses put on them, rather than bearing an equal portion of the horses weight.

Looking at horses that were being shod every 8 weeks (which is apparently the normal interval in the Netherlands, although it sounds a long time for horses over here I think?) there was a 3.3 degree change in the hoof angle (eg taking it from the optimum 55 degrees when shod to 51.7 degrees).

The change in the angle of the hoof resulted in substantial increase in joint movement – by an average of 17%.

The largest adaptation a horse has to make is after shoeing. This really made me think about the bigger impact when horses are left too long between shoeing's, something I've been more aware of for a few years now.

Apparently we should always determine the horses shoeing requirement by the lower angle foot – as the increase in joint movement here is 18.4%

Unexpectedly, they were able to study the group of foals again as 3 year olds, as they had been sold in one group to Rob Ehrens, the dutch SJ chef d'equipe.

The horses had continued with consistent management within the group (ie all were loose housed, none had started training, they were all being trimmed by the same farrier etc)

The conclusion was 25 % still had significant for protraction / retraction of a forelimb when feeding.

At 55 weeks, this had been 50 %, so half of those horses had lost their preference, and half had retained it. Two observations were made about the horses that had retained their preference:

- 1) They spread their limbs further apart when feeding than those which did not have a preference,
- 2) They had uneven feet – an average difference of 6.4 degrees between their 2 feet, as opposed to an average of 1.7 degrees difference between the front feet of those with no preference.

To sum up, Dr Meike van Heel concluded:

*The preference for protracted the left or right forelimb when grazing is seen first, the unevenness in the feet developed second.

*Therefore uneven feet may develop from preference from grazing – the horse does not choose a grazing pattern due to any unevenness.

*Preference for grazing is related to making correct trot – canter transitions, but at this stage insufficient work has been done on trained horses to make clear correlations.

*When breeding, we are not basing our selection criteria on science (or evolution, of how the horse as a species is meant to be) but on aesthetics. They called this “beautiful horse syndrome” :D

We want to breed long legged horses, with little heads, because they look more attractive. But the evidence suggests these horses are more prone to leg injury

Their studies suggested Grand Prix horses are not the aesthetic, long legged ones – in fact they are not even built uphill.

I thought that was really surprising, as we're always hearing that certain horses have conformation that give them a natural aptitude for a sport, due to their conformation. But this seems to suggest those horses don't necessarily stay sound? But is that because they can reach the standard quicker, and therefore less time is given to preparing them, and making them strong enough?

So a really interesting start to the day – even though I have no connection to breeding or rearing young stock, I've really enjoyed typing these up and seeing what they discovered 😊