Birth Trauma, Abnormal Wither & Ribcage Sensitivity of Horses

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A discussion on abnormal wither and ribcage sensitivity in horses, including associated observations and the proposal of a hypothesis on the link between this abnormal sensitivity and birth trauma.

Is There a Link Between Birth Trauma and Abnormal Wither and Ribcage Sensitivity in Horses? Could this also relate to one-sidedness?

In humans birth trauma is well recognised by chiropractors, osteopaths, some medical practitioners and physiotherapists. Rib fractures have been implicated as an important complication of the birth of foals by many studies including that by D Jean et al and Schambourg et al. Below is a discussion on abnormal wither and ribcage sensitivity in horses, including associated observations and the proposal of a hypothesis on the link between this abnormal sensitivity and birth trauma. Also discussed is a possible link between birth trauma and "one-sidedness" of horses.

Background Observations

Abnormal Girth and Ribcage Sensitivity

Observations that have been made by me and others regarding abnormal rib / girth sensitivity include:

- It is common in all horses, including horses that have never been ridden, or have not had a saddle on them for years. It is present in month old foals through to old stallions. All breeds, ridden and unridden, miniatures to draft.
- About 80% of my patients show significant signs of abnormal girth sensitivity, coupled with mobility restrictions of the associated spinal column.

  In my practice every patient is tested with a basic version of a subjective measure that I developed for my Master of Chiropractic Science thesis. The test results are recorded before and after treatment. Over 3000 treatments have been assessed and recorded over the past 5 years. I believe that for something to be present in 80% of this population there has to be a very common source of injury. The most common source of injury undoubtedly is birth. It is well recognised that virtually all foals undergo some damage during transit through the birth canal.
- The pattern of vertebral motion dysfunction associated with this abnormal sensitivity found clinically by me closely matches the outline of the wither. The higher the point of the wither the more commonly affected. ie the most commonly affected vertebrae are the 4th to 6th thoracic vertebrae. These represent the widest part of the foal that is presented to the birth canal. This part of the foal also has to do the most work as far as expanding the birth canal.
- The pattern of vertebral motion dysfunction also closely matches that pattern of rib fractures found by Schambourg and Laverty et al in "Thoracic Trauma in Foals" EVJ 35,1, 78-81 2003. The concept of common birth injury is also supported by the study of thoracic trauma in foals by D Jean and Laverty et al in "Thoracic trauma in newborn foals" EVJ 1999 31,2,149-152. Daniel Jean found evidence of thoracic trauma (including costo-chondral dislocation and fractured ribs) in 20% of 263 foals. Forty of the foals detected as having damage were xrayed with a field unit. In 9 of these 40 foals 1 to 5 ribs were found to be fractured. The author comments that there is a high chance that more rib fractures were present, as the field conditions were not great, and because they are often hard to see even in the best of situations. (Schambourg and Laverty noted in their paper that in 6 out of 7 cases of peri natal death where xrays were taken the xrays failed to detect the fractured ribs that were found at necropsy).

The amount of damage that is recognized in human chiropractic practice as being necessary for spinal vertebral mobility dysfunction is far below that required to cause physical signs of damage to the rib cage and fractures. If we have 20% of obvious trauma then 80% of damage causing a change in the pattern of conditioning or programming of the nervous system is well within reality.

Regarding one-sidedness. The right side of the ribcage and wither appear to be most commonly involved.

- I find abnormal girth sensitivity is most commonly present and more severe on the right side of the ribcage (80-90% of cases) For example in 22 thoroughbred yearlings that I treated in one week of January 2005 16 showed signs of significant abnormal sensitivity of the ribcage. 3 others were mild and only 3 showed no sign of trouble. Of the 16 - 2 were moderately active on the left side, 11 were moderately to quite badly affected on the right side (50% of total, 73% of moderately to badly affected) and 3 were quite badly affected on both sides.

- Most affected horses, ie 80% or more of the population, have trouble with their transitions from trot to canter on the right circle. Usually these horses are just considered to be naturally one sided like right handedness in humans. (This has close parallels with the common observation of equestrians that 80% of horses are better on their left lead than their right).

  This difficulty with transitions usually disappears with successful treatment of the abnormal girth sensitivity.

- Most affected horses have a smaller foot on the right side. The difference may be subtle or great. The smaller hoof also has a higher heel.

- Affected horses lean away from the abnormal side. Leaning of horses has been recognized for some time. Dr Deb Bennett is a famous source of this observation. She recognizes that foals from soon after birth choose to favor one leg. When grazing the favored leg is kept back and the good leg forward.

  In horses with abnormal girth sensitivity it is usually the left foreleg that is placed forward.

- Most affected horses have a smaller flatter shoulder on the right side. This is expected from studies of the changes in joint angle of the shoulder with changes in heel height. It is also obvious when a horse leans away from one shoulder. If you have not noticed this before just try pushing a horse lateral to medial on one shoulder then the next. Most of the time it will go easily to the left and resist going to the right. (The “Right” pattern also matches Joyce Harman’s observation in her new book – Pain free back and saddle fit – that “Almost 80% of the time, a horse’s right shoulder is flatter”)

- Independent equestrian observations are that most horses prefer their left lead than their right when it comes to transition from trot to canter.

Birth Trauma, its Adverse Affect on the Development of Vertebral Motor Unit Balance and Possibly the Predominance of Right Sided Damage.

Birth Trauma

All of us know that birth in horses is an explosive event, with second stage lasting from 2-20 minutes in most cases. The likelihood that birth trauma, and especially ribcage damage, is a very common event is illustrated by D Jean et al’s work at Coolmore Stud in Ireland. Physical damage such as rib fractures and costo-chondral dislocations are likely to heal within 2-3 weeks of birth. Likewise would any physical damage to the wither and vertebrae. Neither are likely to cause problems to horses in later life However damage to the spinal column and ribcage is likely to have a lasting effect on the “programming” of the nervous system.

If you think about it the neonatal nervous system has to make a great deal of adjustment from the basic in utero needs, to that of the outside world where it has to cope with standing, walking, nursing, prancing etc. The neonatal brain must undergo a huge amount of very rapid “program” development in order to quickly develop coordination of the limbs and body.

In the early neonatal period of the life of a wither damaged foal the multifidus muscles surrounding the damaged vertebrae would be tightened in order to protect the vertebrae and spinal cord while the vertebral joints and ligaments are healing.

An “injury program” would be running for the affected area. The rapidly learning, naïve nervous system of the neonate is very likely to accept this tightened pattern as normal, and thus maintain it, even when healing of the physical damage is complete. Also as this region of the spinal column is splinted by the scapulae and associated muscles, normal movement of the foal is less likely to re-initiate normal vertebral movement, as we expect would happen in other areas of the spine that are injured during falls etc.

The maintained “injury program” is, compared to the normal spinal mobility program, a dysfunctional program that is likely to produce changes in the environment of the spinal nerves. Such changes could distort the afferent feedback from the muscles and sensory nerves, with the resultant abnormal sensitivity, abnormal muscle tone and abnormal myofascial trigger point induction that I and others recognize commonly in “girthy” foals and horses.

The Predominance of Right Sided Spinal Damage.

Furthermore if we look at the abdominal contents of the peri-parturient mare we can see that there is a possibility that the forces exerted on the foal during birth may not be symmetrical. In the abdomen during birth the forceful abdominal contractions are likely to push both the foal and viscera into the birth canal. The caecum is itself a large viscus and presides in the right caudal quadrant of the abdominal cavity. Under pressure it possibly acts, in comparison to the large colon, like a relative closed sac.

The caecum has the ileocaecal valve at it input and cecocolic orifice at its output with the ingesta relatively trapped, where as the large colon, by way of its size, has much more room for its contents to re-distribute under pressure. I would expect that during the abdominal contractions the foal and the caecum, to a minor extent, fight for room in the pelvic inlet.

If this is so then the caecum could create a pressure gradient, with the higher pressure bearing on the left side of the foal’s ribcage. The force would be likely to becoming from ventral to dorsal and cranial to caudal, and would be likely to impact most on the left costo-chondral junction and left side of the ribcage. At the same time the foal’s ribcage would be compressed as it acts to dilate the birth canal.

If what I suggest where to be true then the unsupported left ribcage is likely to buckle under the force of both the caecum impacting on it and the birth canal compressing it. Considering this and the power of the abdominal contractions, the occurrence of fractured ribs and damaged costo-chondral junction of the left side of the chest should come as no surprise. Schambourg et al’s findings support this possibility. At the same time the wither, and thus vertebrae, of the right side of the foal are likely to be impacted onto the pelvic brim of the mare. This is likely to produce less obvious, but still very important, damage to the spinal column of the foal.

One Sidedness and Cerebral Dominance

Humans are well accepted as being commonly right handed because of left cerebral dominance. Even with this cerebral dominance humans still appear to be equally capable of running to the right or the left. It is the finer tasks that we manage better with one hand or foot. Horses probably have a better side for difficult dressage maneuvers and the like because of cerebral dominance, but for the basic matter of a transition from trot to canter there should be no such need for such fine body and limb control.

As mentioned above, it is well recognised in equestrian circles that horses much more frequently have trouble taking the right trot to canter transition than the left canter transition. This is considered by many as a “left footedness” that could be a reflection of right cerebral dominance in horses. My experience of the changes seen with the treatment of the spine of horses, and the fact that this is a basic movement, makes me believe that this common one-sidedness is more likely to be the result of birth trauma than cerebral dominance.

Finally, to summarise I believe there is evidence enough to devote a major research effort into the relationship between abnormal girth sensitivity, one sidedness and birth trauma of foals. I hypothesize that not only is birth trauma a very common and major cause of pain, discomfort, performance and behavioral problems, but that it also predominantly causes long term dysfunction of the right side of the upper thoracic vertebral column.