

CONFORMATION: FORGOTTEN ASPECT OF HORSE WORK?

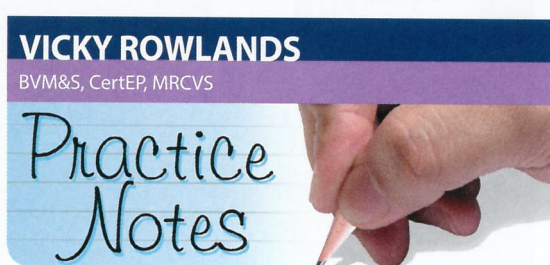
I WAS recently requested to talk to show pony judges regarding ideal conformation, common faults and problems that may result from poor conformation and the request stimulated me to consider the issues more carefully.

From a veterinary standpoint, conformation is most often scrutinised at pre-purchase examinations with regard to the horse's intended purpose, although it should also be carefully considered before breeding an animal. The other time conformation should be carefully assessed is when the horse is presented for a lameness examination.

Although I enjoy lameness investigations, I am guilty of jumping straight into diagnostics rather than standing back to view the horse overall, which can often provide valuable clues about the cause of the lameness.

Conformation is a very subjective area and, although plenty of information is available regarding its effect on horse soundness, very few evidence-based medicine studies are available looking at this objectively.

Objective methods that have been used include specified measurements, radiographic assessment or photographic



and videographic analyses.

As there are so many identified variables, including breed variations, foal and young-stock management and multiple conformational abnormalities, it is very hard to pinpoint every aspect and its effect on future athletic performance.

Conformation does not account for factors such as horse attitude, management, working practices and concurrent health status of the individual – there are plenty of examples of the imperfect horse competing and staying sound at the highest levels of competition.

Unfortunately, in any conformational study, horses are usually selected based on breed types, performance levels or existing lameness, so data will be biased and unlikely to include some of the more extreme conformational faults – these horses may be retired early or euthanised, thus avoiding critical analysis.

Conformational assessment

Static conformational assessment should be completed on a firm, level surface with the horse standing square and

the practitioner viewing from the cranial, lateral and caudal views. Dynamic conformation should also be assessed.

Many clinicians have their own methods, but looking at four basic cornerstones can help ensure a complete view of the horse is gained. Those four are balance, lengths and angles, musculature and limb conformation (Ross, 2003).

The proportions of the horse are important to gain an understanding of its overall balance. Some people suggest that, viewed from the side,

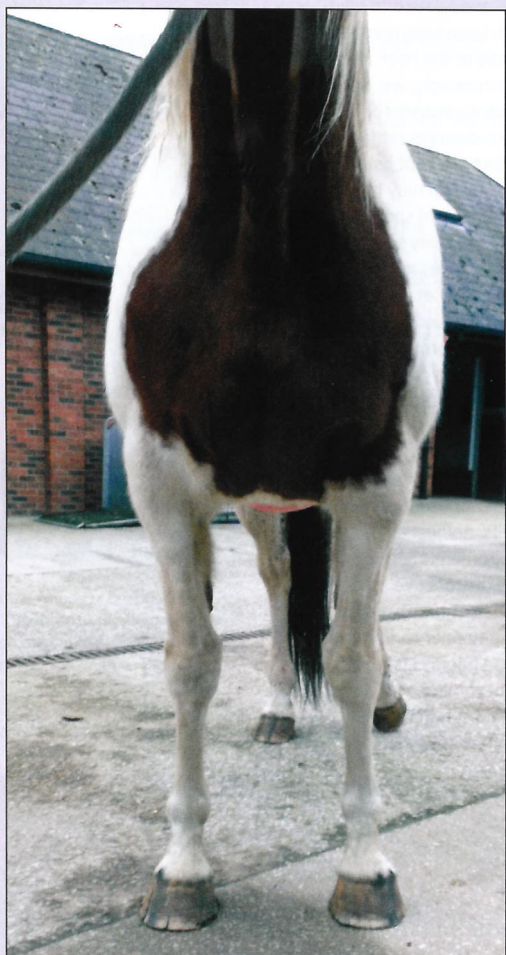
the horse should fit into a square box, with body length and height approximately equal. Other authors suggest using three interlocking circles over the shoulder area, mid-body area and hindquarters, which should overlap by about a third to achieve optimum proportions (Ross, 2003). The chest and pelvic widths should also be accounted for, with the chest width equalling the forelimb width from top to bottom, with no inward or outward deviations.

After assessing balance,

some time can be given to consideration of the lengths and angles of the long bones and the joints. Shoulder angles, pastern angles and croup angles are easily visualised from the lateral view. The hindfeet should have a slightly steeper hoof-pastern axis than of the forefeet. The long bones should appear in proportion to the size of horse. The withers should be equal in height or marginally lower than the croup height.

The musculing of the horse, while not to

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Cranial view of the horse using imaginary plumb lines.

do with its bone structure, is very important, especially when the animal is presented for lameness.

Again, muscling can only be assessed with the horse standing square on a firm, level surface. Symmetry of the shoulder musculature, viewed from in front and above the horse, is important, although it can be hard to assess. Muscling along the thoracic and lumbar spine is most easily assessed for symmetry by palpation and by standing on a step behind the horse (at a safe distance). The hindquarter muscling is also best viewed from behind, and care should be taken to assess symmetry of the gluteals, semi-membranous and semi-tendinous muscles. Viewing limb conformation from all angles is the final step in a complete examination of the horse's conformation.

Using imaginary plumb lines can be a very useful tool to help visualisation of the limb's structure (Gregory, 2014). From the cranial aspect of the forelimbs, a plumb line should drop from the greater tubercle of the humerus, through the centre of each of the joints, falling to the midline of the hoof. From a lateral aspect, the line should start at the

scapular spine tuberosity, falling through the centre of the long bones, carpus and metacarpophalangeal joints and ending about 5cm behind the heel of the front foot.

A line from the tuber ischii should skim the point of calcaneus, run along the caudal metatarsal area and end about 7cm to 10cm behind the heel of the back foot. Viewed caudally, the plumb line should run through the midline of all the joints and end midline between the heel bulbs. The joints should be flat and without any obvious swellings.

If plumb lines are used, it is easy to see any lateral or medial limb deviation when viewing the forelimbs cranially and the hindlimbs caudally. If a valgus or varus deviation is identified, it is important to assess which joint it arises from and also if the limb is rotated or truly deviated. Viewed from a lateral position, the canons should be of equal width from top to bottom.

Plumb lines will also help you identify back at the knee, over at the knee, sickle-hocked or straight-hocked conformations. Feet sizes should be symmetrical, with asymmetrical feet due to a primary conformational abnormality or secondary to chronic lameness or poor farriery.

Heritability

Heritability is vital for owners to consider before breeding. Again, evidence-based medicine studies are extremely limited and are subject to multiple confounding factors.

It does appear the dam contributes more to conformation than the sire, although this may be influenced by stringent stallion licensing in many breeds, which means breeding males have fewer inherent faults than females (Ross, 2003).

Despite the recognised heritability of some conditions, foal management and veterinary intervention can improve the resultant adult conformation so, arguably, assessing the foal at foot gives the best viewpoint of heritability.

This can be disputed as foal conformation will alter with maturity so early assessment can be misleading. This is evident when yearlings are re-examined as three-year-olds; back at the knee conformation improves with age (Anderson and McIlwraith, 2004).

Foot conformation was shown to be moderately heritable by Ducro et al (2009). Other conditions deemed to be heritable include back at the knee, tied in below the knee, toe in and toe out, offset knees and sickle or



Horse viewed from lateral aspect – balance of conformation.

straight hocks. Unfortunately, different studies and different breeds seem to show different heritability values for the same conditions, complicating any definitive statements regarding conformation.

Various attempts have been made to correlate heritable traits with elite performance with differing success. It does seem thoroughbreds are less likely to be elite athletes if they are back at the knee or have turned in or turned out feet (Love et al, 2006).

Specific examples

Different breeds have different performance requirements, but all these criteria must still be viewed in light of the future soundness of the horse or pony.

This means different conformational faults will have different effects on the horse depending on its performance requirements.

As already discussed, throughout maturation conformation will alter, so mild carpal hyperextension and carpal valgus may improve naturally. As foals mature, they will also often show an alteration in hoof-pastern axis from broken forward to straight or broken back. By examining the foal before growth plate closure, veterinary and farriery techniques can improve the mature conformation of the horse.

Horses with flatter feet and lower sole angles are more likely to injure their navicular area or deep digital flexor tendons (DDFT), while those with more upright foot conformation may be predisposed to suspensory ligament injuries (Lawson et al, 2007; Holroyd et al, 2013).

Again, these faults can be dramatically improved by correct and corrective farriery throughout the horse's life. Indeed, part of the management plan after DDFT or navicular-associated lamenesses includes addressing any cranio-caudal and medial-lateral foot imbalances.

Horses that are back at the

knee have a mildly hyperextended carpus, which usually originates at the level of the proximal carpal bones. This may be identified together with slightly upright pastern angles. Anecdotally, carpal hyperextension may predispose horses to carpal fractures, although a small study of thoroughbreds did not support this (Ross, 2003). Over at the knee is more often identified as an acquired conformational fault and may become more pronounced after extreme exercise.

Hocks are deemed to be sickle-hocked if the hock angle is less than 53°, although, interestingly, this defect is virtually not identified in performance horses (Ross, 2003). Much more commonly we recognise straight-hocked conformation and relate it to hindlimb lameness, predominantly of the hock area.

Increasingly, we diagnose proximal suspensory ligament desmitis rather than distal hock joint osteoarthritis, which again may reflect the population of sports horses we commonly see admitted for lameness investigations.

Gnagney et al (2006) hypothesised a straight-hock conformation will absorb less concussion than a sickle-hocked horse.

Summary

It is important to take time to identify conformational faults, not just as a veterinary practitioner, but also as a prospective breeder or judge of horses, although, despite poor conformation, some horses still confound us by becoming elite athletes.

Unfortunately, evidence-based medicine studies

are few and far between and therefore objective analysis of each conformational variation and its effects on future athletic ability remains debatable.

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