Conformational Limb Abnormalities and Corrective Farriery for Foals

For the past couple of years the general public has questioned the horse industry, and one of the questions is “Are we breeding horses more prone to breakdown with injuries”? It seems that we hear more often now that there are more leg and foot problems than ever before. Is it that we are more aware of conformational deficits and limb deviations, or are there some underlying factors that make our horses prone to injury? To improve, or even just maintain the breed, racing should prove soundness as well as speed and stamina.¹ The male side is usually removed from the bloodline if unable to produce good results at the racetrack. However, the female may have such poor conformation that she never even gets into training, but yet she enters the broodmare band. The generational effect of this must surely lead to an increase in the number of conformational deficits in our foals and yearlings.¹

Something that we hear quite often is “Whoever saw the perfect horse”? and “There are plenty of horses with poor conformation that win races”. That doesn’t mean we should not continue to attempt to produce horses with good conformation. There is an acceptable range of deviation from the ideal, and therefore these deformities have to be accepted if it does not jeopardize the overall athletic soundness of the horse. Although mild conformational deficits may not significantly impact soundness, more significant limb deformities cause abnormal limb loading, lameness, gait abnormalities, and interference issues.²

Developmental deformities of the limb include angular, flexural, and rotational limb deformities. Conformational deficits in the adult horse can predispose to chronic lameness. Therefore, it is important to closely monitor the growing foal and correct angular and flexural limb deformities in a timely manner to optimize on future soundness and athletic performance.² Many good horses have had their careers shortened by injury related to conformation faults that could have been corrected as foals. Ensuring that the foal develops healthy feet in balance with its limbs is an essential part of the development of a sound horse. Whether the foal is bred to sell or race should not affect how to approach conformational deficits. Severe deformities that do not correct on their own need to be distinguished from deviations that are a variation of the normal. The art of management of conformational deficits involves deciding which conditions require immediate aggressive management and which can tolerate a wait-and-see approach.³

Presently the approach to the treatment of conformational deformities is changing. While several years ago early recognition and early treatment was the aim, the recent trend goes more towards a selective approach.³ Two studies conducted in Thoroughbred horses have significantly changed the philosophy of the management of angular limb deformities (ALDs).⁴,⁵ One study documented conformational changes with age.⁵ There was a strong relationship between long bone lengths and wither height in all age groups, supporting the theory that horses grow proportionally. The other study investigated the relationship of conformation to injury ⁴, which found that offset knee contributed to fetlock joint problems. Long pasterns increased the odds of a fracture on the front limb. A certain degree of carpal
valgus deformity exhibited a protective mechanism, as the odds for a carpal fracture and carpal effusion decreased with an increase in the carpal angle to a certain point.  

Horses with ALDs present with either a valgus deformity (lateral deviation of the limb distal to the location of the deformity) or a varus deformity (medial deviation of the limb distal to the location of the problem) (Fig. 1). Either type of deviation is usually associated with a certain degree of axial rotation. In foals with valgus deformity, this is displayed as an outward rotation (splay foot), and in cases of varus deformity, as a medial rotation of the feet (pigeon toes). In most cases, these deformities are initially merely postural, through a rotation of the limb axis toward either the outside or the inside respectively. With time, however, the bone adapts to abnormal loading, and differential metaphyseal growth results in the development of a permanent rotational deformity.  

Angular limb deformities can be classified into two main categories: acquired and congenital ALDs. Congenital, in most instances, have normal physes and result from a disparity in growth of the physeal complex causing angulation of the long axis of the limb originating at the region of the physis. Acquired generally involves pathologic physes where normal anatomic alignment was present and disruption in normal bone formation have resulted in the creation of a weakened structural area collapses. Compensatory ALD can occur in remote sites in the affected limb because of disproportionate loading of a growth plate distally. Such compensatory deviations may strengthen the limb axis, but when the foal ambulates, the joint involved rotates outward, because the joint is not oriented at a right angle to the long axis of the limb (Fig 2).

Management of ALD in foals must begin early. Foals are seldom born “correct” if viewed in the light of desired adult conformation. Changes and corrections are brought about through physiologic controls, which guide the growth process toward a straighter, more balanced mature horse. The veterinarian’s role is to manage the process only when intervention is necessary, and to abstain from intervention in situations where it is likely that the foal will correct on its own. The foal is observed from several angles, most importantly from the front and back. To evaluate the limb, the clinician positions his or herself perpendicular to a frontal plane to the examined limb (Fig. 3). Observation of the foal as it walks toward and away from the clinician also provides valuable information. The only diagnostic aid that allows exact determination of the location and degree of the deformity is radiography.

Indications for intervention should be considered when evaluating the foal: 1. when the deformity is too severe to correct on its own within the foal’s expected growth potential, 2. when a deformity is being corrected too slowly by natural means to reach correct conformation before the end of the growth period, and 3. when the deformity is leading, or will lead to a secondary deformity or injury. Surgical correction is straightforward and often easier than the decision of when to apply the correction. The surgical procedures of hemicircumferencial periosteal transection and transphyseal bridging are widely used in today’s horse industry. Deciding between the two techniques is primarily a matter of the amount of correction necessary and the amount of growth left.
Foot management with corrective farriery is a frequent conservative treatment of ALDs. The relationship between limb conformation and hoof capsule shape plays an integral role in the conformational development of the growing horse. Therefore, maintaining a healthy hoof to support the bony column, and intervening with special foot management when necessary is important in the development of the young horse’s limb. Moderate to severe limb deformities cause abnormal limb loading creating hoof capsule distortions. This scenario in the growing horse can propagate a cycle with lack of limb support worsening the angular limb deformity which caused the original problem.

Foals are born with symmetrical and well balanced feet. Any alterations that occur later are invariably due to uneven weight bearing. It should be understood that even a small deviation in the limb will produce uneven wear and growth. If neglected, the foot will create a greater imbalance of load through the limb. Regular hoof trimming reduces the imbalance of deformities. The growth plates that affect lower limb conformation are stimulated by the stress of weight bearing or compression. Trimming the feet of foals with ALD back into balance places the foot more centrally under the limb and therefore aids the equalizing of compression through the growth plate. Radical over trimming (lowering) of one side of the hoof capsule distorts it without necessarily bringing about an improvement to the conformation. A medio-lateral extension is used where trimming alone is ineffective. As a rough guide it is difficult to alter growth plate alignment after 3 months at the proximal phalanx, 6 months at the distal large metacarpal, and 12 months at the distal radius.

In severe cases, where trimming alone is ineffective, medial-lateral extension with adhesives to compensate for the hoof capsule distortion is recommended (Fig.). This technique could create a lever effect on the hoof wall causing flares and hoof wall separations. Shoes with medial-lateral extension distribute the leverage over a larger area preserving the integrity of the hoof wall (Fig). Shoes of any type on foals are likely to restrict hoof capsule development causing contracture. With advances in technology, new methods and types of shoes allow heel expansion with less possibility of hoof capsule contracture (Fig.). Any type of corrective shoeing applied on the fast growing foal, should be closely monitored. The primary goal is to maintain a healthy strong foot to provide support.

Rotational deformities are a common finding in young foals (Fig.). This is a rotation along a horizontal plane of part or the entire limb. A slight outward rotation of the limb in the newborn foal is normal, and care should be taken not to confuse it with carpal valgus. Rotational deformities that originate high in the limb are likely to improve with time, but deformities originating distal to the carpus generally don’t improve. It is important to not try to correct rotational deformities through trimming or shoeing. Trimming to maintain a well-balanced foot reduces uneven stress on the hoof capsule and will reduce hoof capsule distortions.

Off set knees are a common axial deformity (Fig.). There is controversy whether these deformities can be improved by means of corrective trimming/shoeing or surgical manipulation. The most common axial deformity is the mal-alignment of the long axis of
the carpus and metacarpus with long axis of the radius, resulting in the distal limb being positioned more lateral than the radius.\textsuperscript{3} It is often associated with medial splints, fetlock varus and toeing in. This conformation accentuates the forces of weight bearing along the medial aspect of the limb and increases the probability of injury. While nothing can be done about axial deformity, it makes treatment of any varus deformity more important.\textsuperscript{3}

In closing it is important to emphasise that the management of conformational deficits requires careful judgment as to whether immediate intervention is necessary or if more time is needed. The farm manager / owner and the veterinarian / farrier must work together closely to make these critical decisions.

References;


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