Shoeing to manage conformation faults in the sport horse  
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For a foot to remain healthy and accommodate its basic functions, it needs to have proper form and structure. Balance is the term most widely used when describing the foot’s form and structure. A balanced foot is believed to be functionally efficient and capable of providing support to the limb. Balance can be broken down into dynamic and static. Static balance evaluates the foot in regards to its geometric shape. Dynamic balance assesses the foot in motion such as flight and landing patterns. A balanced foot isn’t necessarily perfectly symmetrical, but does posses a degree of symmetry and is free of hoof capsule distortions such as flares, dishes, bull noded dorsal wall, crushed/collapsed wall, contracted heel, etc. which are all signs of imbalance. Distortions are a sign of over or under loading a particular region of the foot. These distortions or shape changes are seen as collapsing or structural failure of an area of the hoof wall. These hooves don’t respond well to normal loading forces and are more susceptible to trauma and injury. The point of ground contact affects the manner in which the foot and all the structures above it are loaded. This is the essential concept underlying the importance of dynamic balance.

A preventative hoof care program should be implemented to effectively deal with and respond to hoof capsule distortions before they cause lameness. All horses should be evaluated walking and trotting before and after trimming/shoeing. Ideally the foot lands slightly heel first at faster gaits (thus the shock absorbing function of the heel). At the walk, however, landing flat is normal. Also it is ideal for the foot to land directly beneath the bone column in a limb with good conformation. Signs of dynamic imbalance are limb interference, toe first landing, and obvious medial or lateral landing, twisting or bowing of the limb when traveling in a straight line. Often lameness further up the limb corresponds to dynamic imbalance either as a cause or result. Other causes of dynamic imbalance which should be considered are: general weakness, immaturity, neurological disorders and rider induced.

In the growing horse, trimming and shoeing can have a huge influence on the growth and development of the bony column. The point of ground contact has a direct effect on limb position, which effects how all the structures of the limb are loaded. This is how foot manipulations alter physeal (growth plate) growth through altering compression/tension forces on different regions of the growth plate. (figure 1a, 1b) However in the adult horse, the limb conformation cannot be changed only managed. Several trimming and shoeing mechanisms can be implemented to prevent these adult feet from abnormal loading and becoming severely distorted. Shoeing modifications can influence the point of ground contact, offer additional support and therefore help optimize the efficiency and loading characteristics of the limb. Care must be taken when implementing these shoeing techniques, as there is a boundary between offering support and applying too much leverage or force. Simply stated there is a fine line between under shoeing, over shoeing, and getting it just right for each individual horse or limb. The concept is particularly important in athletes as these forces are magnified at greater speeds.

Flotation is a term used when describing the effects of some shoe modifications. An increased surface area on a particular region of the shoe can be created by widening an area of the shoe through welding more metal into an area or forging out a widened area of the shoe, this will promote that area to have more surface area to sit or float on the soft footing while the other areas of the shoe sink into the ground. (figure 2a,b,c) This can be used to alter foot position during weight bearing. Medial or lateral flotation can be used to compensate for some
conformational faults and alleviate stress on structures further up the limb. Wider branches are occasionally used to support a collateral ligament injury. Another example of the use of flotation would be the low heel hind feet on a dressage horse in soft footing that gets sore over the hamstrings and back. A conventional wedge may place too much force on the weak heels (in which they are “propped up” continuously). Another option would be to widen the heel branches and narrow the toe branch so that the toe sinks and the heel floats on the footing. This often gives these horses relief and improves propulsion behind. (figure 3) Conversely, a suspensory shoe is occasionally used in cases with chronic suspensory desmitis, in which the toe is broadened and the heels penciled or narrowed to encourage flotation of the toe and sinking of the heels to load the DDFT and decrease load on the suspensory ligaments. (figure 4a,b,c,d) Other examples are the base narrow hind end horse that twists the limb or bows the hocks outward when walking and sinks in excessively on the lateral heel in soft footing. These horses are often shod with a widened lateral branch and rockered toe. This case probably responds to the widened branch for its flotation effects, but the widened branch also affects the point of ground contact and foot placement, thus widening the stance. Of course anytime we alter a horse’s gait this much, we need to be careful not to over-do it and careful monitoring of the horse afterward is needed.

Shoes can also be used to compensate for poor foot conformation or to establish more ideal spatial arrangement and proportions of the weight bearing surface of the foot. Ideally the center of the coffin joint should line up to the center of the ground surface of the foot. Two properties of the shoe can help achieve this goal: heel position/fit and break over point. The heels are trimmed back to the widest part of the frog, if this is not possible, as in the severely under run heel, then the shoe can be fit to this point. The breakover point and heel position should both be located equidistant from the coffin joint. If the toe cannot be trimmed to achieve the ideal breakover point then shoe modifications such as rolled and rockered toes or a combination of both can be used to set the required breakover point.

Severely compromised or distorted feet usually require some form of axial support to redistribute weight off of compromised areas of wall. Axial support refers to recruiting structures within the margins of the wall for support. Shoe modifications such as heartbars, broadened branches, onion heels, heel plates, and sole support materials are various options. A good evaluation of the foot, horse footing, environment and discipline is required to properly utilize each of these.