

Balanced Hooves for Balanced Horses: Conformation and Trimming

Dr. Alexandra Carlson

Plough horse, performance horse or pasture ornament, no matter the role your horse plays they all depend on the people in their life to pay attention to their wellbeing. The age-old adage of “no hoof, no horse” says it best in describing the importance of the equine foot in keeping your horse up and going. Although multiple ideologies exist for how to care for feet, one thing that can be agreed on is without proper care and attention hooves go out of balance, resulting in an unbalanced horse. The following information is intended to highlight the role of hoof biomechanics in disease and lameness as well as provide descriptions of available options in addressing conditions of the hoof.

Hoof evaluation starts with simple observation. How a hoof looks – the shape, firmness, grooves – tells a lot about the environment a horse has been in and stresses they have overcome. Like the rings of a tree revealing its age, the grooves on your horse’s hooves reflect an event or change in your horse’s life that occurred at the time the groove was formed. Often referred to as fever rings, the grooves result from decreased blood supply or nutrition as a result of environmental stress, diet change or systemic inflammation/illness. Grooves apparent on only one or two hooves are indicative of stressors limited to the specific hoof, such as a laminitic episode.

Evaluation continues with the angle of the hoof wall and the coronary band. The common rule of thumb is for the angle of the hoof to match that of the pastern when your horse stands square. Specific recommended measurements for the degree of the angle range from 50 to 55 degrees dependent on front versus hind feet and on your horse’s breed. Hooves angled more upright/club foot or acutely angled (long-toe-low-heel) create strain on the soft tissue structures and predispose horses to injury. However, determining the ideal angle for your horse relies on taking into account the overall conformation and level of work expected.

A horse with an upright hoof tends to grow more heel than toe. Clubfoot specifically involves a component of congenital or developmental flexural deformity resulting in increased heel growth compared to toe. Depending on the severity of a clubfoot, conservative management of hoof trimming aimed at lowering the heels may be insufficient. Correction of flexural deformities in immature horses involves the use of heel or toe wedges to adjust the alignment of the bones and stretch out the deep digital flexor tendon. Addressing clubfoot in adult horses relies heavily on therapeutic farriery aimed at promoting weight bearing on the entire solar (bottom) surface and hoof wall. The more severe cases benefit from radiographic guidance to help determine how much the heels can be lowered and the need to help compensate for the shortened tendon structures by wedging up the heels with or without additional pad support. Whether the hoof is just a little more upright or clubfoot from a flexural deformity, horses with a higher heel benefit from more frequent trims (4 week schedule).

In contrast to the upright hoof is one with more of an acute angle often termed long-toe-low heel. In some disciplines focused on speed, the long-toe-low-heel

conformation has been believed to increase stride length and theoretically improve speed. However, this conformation places increased strain on the flexor tendons and pre-disposes horses to soft tissue injuries, laminitis and navicular syndrome. During normal hoof placement, the hoof should land flat or slightly heel first to absorb the initial shock through the caudal (back) soft tissue structures. Long-toe-low-heel horses have a greater tendency to land toe-first. The difference in placement may be directly related to the conformation or due to anticipation of heel pain associated with the conformation. In either case, the toe-first placement results in increased strain on the heel and soft tissue structures with an abrupt strain on the flexor tendon in particular. Over time the increased strain predisposes long-toe-low-heel horses to further heel pain, increased damage to the navicular bone, pain in the deep digital flexor tendon and potential development of suspensory ligament desmitis.

In addition to the strain placed on the tendons, ligaments and bones, the long-toe-low-heel horse must overcome a longer breakover point when lifting their hoof off the ground. Breakover is the last weight-bearing aspect of the hoof to leave the ground. A long-toe increases breakover and prolongs the time the hoof remains on the ground. In the case of forefeet, this predisposes horses to interference from the hind limb and may result in increased frequency of throwing front shoes. Long-toe-low-heel in the hind feet places strain not only on the distal (lower) limb but also the muscles higher up, contributing to back and hindquarter pain. Corrective trimming, with or without shoeing, aimed at reducing the toe, setting the breakover point closer to the center of rotation and bringing the heels back (as often times they are “underrun”), reduces the strain on the flexor tendons and sets the hoof up for a cleaner take-off.

Routine radiographs (x-rays) are not only helpful to diagnose a disease state, but also beneficial for routine trimming and shoeing. While evaluation of the external hoof can be informative, the interior does not always match the exterior. The most accurate measurements for hoof balance come from radiographs taken prior to trimming. Lateral radiographs (images taken from the side), provide information on the position of the coffin bone within the hoof and the alignment of the bone with those above it. Ideally, the solar margin (bottom aspect of the coffin bone) should be 2-10 degrees to the ground. A negative angle places increased stress on the deep digital flexor tendon and navicular bone. And increased angle places increased stress on the tip of the coffin bone and the structures that attach it to the hoof. Knowing the internal structures provides a more accurate guide for trimming the external structures. Additionally, the lateral radiograph provides farriers with how much sole they have to work with. A horse with too little sole is often quick to become foot sore and should be trimmed more conservatively.

Dorsal radiographs (images taken from the front of the hoof) help determine the presence or extent of a medial/lateral (side to side) imbalance. Medial/lateral imbalances place increased strain on one side of the limb over the other, increasing the risk of injury to ligaments (such as the suspensory branches). It is not uncommon for one side of the hoof to grow more than the other. Usually the result is the presence of flares on the faster growing side. As long as the imbalance is solely related to hoof growth, it can be managed with routine trimming. Dorsal radiographs help to determine if there is a component of conformational imbalance by evaluating the joint spaces. Asymmetry of the joint spaces suggests the imbalance is related to conformation. As with clubfoot, just trimming off the area of more growth can lead to increased risk of injury due to the

change in weight bearing surface. Conformational imbalances should be addressed based on the individual hoof and the factors contributing to the imbalance.

Radiographs taken at every trimming, while ideal, would be impractical. The external evaluation of a horse's hoof goes a long way in guiding a farrier's trim. However, taking survey radiographs of a new horse, changing from barefoot to shoes or vice versa, or changing the environment in which your horse lives can greatly benefit your horse by providing your veterinarian and farrier with the most accurate information to work with. While the clinical picture of the horse is the most important factor in decision-making, the additional information gleaned from radiographs can go a long way in guiding the direction of trimming and shoeing.

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