Broken back hoof pastern axis

Master farrier Larry Winters discusses hoof balance

A DEFINITION of balance is "an even distribution of weight enabling someone or something to remain upright and steady". Hoof balance is broken into static balance and dynamic balance, while static balance is broken into medial/lateral and anterior/posterior. The latter is classified into club foot and broken back hoof pastern axis (HP A). When recognising the balanced hoof and/or appropriately placed shoe, there are a few simple guides to follow; but it is imperative to realise these are ideals and not always obtainable. Your farrier and veterinarian are equipped with the best advice and solutions for individual cases.

THE hoof capsule is an extremely strong but pliable structure and many distortions in hoof balance are caused by poor limb conformation, pathologies and chronic lameness. One of the most recognised conformational issues is a broken back HP A and it is sometimes called 'long toes.'

This falls into the category of anterior/posterior balance and is visible by viewing the horse from the side. It is when the dorsal hoof angle is lower than the pastern angle and the heel angle is lower than the dorsal angle (image 1). The average front toe angle is 45° and 59° for the hind, with a 90° hair line. The pastern angle is usually parallel with the shoulder (image 2).

A broken back HP A can be caused by overextended shoeing intervals and/or shoeing too short. It causes constant strain on the coffin joint, increased strain on the deep digital flexor tendon and will encourage toe first landing and may also shorten the stride length. This can be due to laterality, which refers to preference of one limb over another. The problem is asymmetrical because the opposing hoof usually displays a different balance. Laterality can result in excessive caudal loading which manifests as low or disturbed heel growth on one foot.

With a broken back HP A a negative palmar angle may be visible under x-ray (image 3). When this is present, a graduated pad with frog support can relieve the strain on the deep digital flexor tendons, while helping restore healthy circulation by involving the natural pump mechanism of the foot. There is a saying: “A horse has five hearts” which originates from the mechanical role the hoof plays in the circulatory system. The heart will pump oxygenated blood to the hoof via arteries that reduce in size so the blood is supplied to the hoof, which in turn helps repair damaged tissue and improves growth and function of the foot.

The farrier’s part where anterior/posterior balance is concerned is to relieve strain on the flexor tendons, maintain healthy circulation and ease the transition between the stance and swing phase of the stride. This is called the breakover and will reduce stress on the coffin joint. The aim is to preserve the natural heel while shortening the toe and positioning the shoe under the centre of articulation of the coffin joint (image 4). A rolled toe will ease the breakover.

When dealing with anterior/posterior balance, farriers need to keep an open mind, as a technique that helps one animal may not necessary help another. There are a lot of modern shoes available (image 5). This specific bar shoe creates caudal float on a surface to reduce the strain on the back half of the foot and tension on the deep digital flexor tendon on soft surfaces. It is light weight aluminium which will reduce kinetic strain in motion. This shoe may help in the treatment of pain caused by a broken back HP A.

If white line disease (an anaerobic bacterial and fungal infection that digests hoof horn) is present, the heels that have compromised growth due to uneven hoof capsule loading may erode faster than the animal is able to grow new heel horn to correct the imbalance. When this is the case, a heart bar shoe (image 6) can transfer a portion of the load onto the healthy frog, relieving the hoof wall. This infection will need to be treated topically with medication.

There are many causes of caudal hoof pain and many shoeing techniques. The veterinarian needs an accurate diagnosis to give correct prog- nosis and treatments, while therapeutic shoeing must be sympathetic to the diagnosis.

Master farrier Larry Winters is based at Cannontown, Temonleckin, Co Louth and can be contacted at 086-8731506 or larry@farriers.ie

When dealing with HP A that are beyond correction with the shoe, a negative palmar angle is present. A new heel horn to correct the imbalance will be required. It is imperative to apply a shoe that will help in the treatment of pain caused by the broken back HP A.