

Equine Podiatry: Underrun Heels and Egg Bar Shoes

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It will be easier to understand and comprehend the traditional treatment of underrun heels using egg bar shoes (with or without wedges) if we again first review the causes and pathogenesis of compromised heels. The causes of underrun heels are a genetically weak foot, individual hoof/limb conformation, breed, type of terrain on which horse is ridden, amount of daily work, amount of turnout, moisture content of feet, diseases of the feet, and, finally (and very important), the farrier practices applied to the horse along with the intervals between hoof care.

It is generally a combination of the above causes that contributes to underrun heels. For example, a horse with a genetically weak foot that is not ridden, lives in a dry terrain, and is given unlimited access to pasture will maintain a healthy heel, whereas if the same horse is exercised hard with a rider, has a high moisture content in its feet, along with limited turnout, it will ultimately develop compromised heels.

If we consider these causes of underrun heels and the chronicity that often accompanies these cases that leads to severe damage, treatment aimed at maintenance rather than resolution of the condition might be all that can be accomplished.

The palmar/plantar section of the foot is made up of horny (weight-bearing) structures and soft tissue (supporting) structures. These structures complement each other and interact with each other; if one structure is damaged, it will invariably affect the other structures. The weight bearing structures are the hoof wall, the bars, and a thin strip of sole immediately adjacent to the hoof wall. The soft tissue-supporting structures are the frog, the digital cushion, and the deep digital flexor tendon. One can see the importance of the combined structures in supporting the weight of the horse and dissipating the energy of impact. A healthy, functional heel base as depicted in Figure 1 shows the hoof wall, buttress, angle of the sole, and bars intact as one solid structure.



Figure 1

Before discussing the traditional treatment of underrun heels or trying to formulate a rational approach to treating this problem, it might be helpful to understand the process in which the heel is damaged, thus, showing the dilemma encountered by veterinarians and farriers when trying to improve this structure.

The hoof wall at the heel is immature horn, making it less rigid and, hence, more flexible when compared to the hoof wall in the toe area. This increased flexibility allows the normal physiology of the foot in the form of expansion to take place, but, in turn, makes the heels more vulnerable to damage. As this syndrome begins, the heels stop growing and, over time, the horn tubules angle forward such that the most caudal (toward the rear) extent of the bearing surface of the wall is no longer at the base of the frog, but has moved forward toward the widest part of the foot. The heels become lower; the horn tubules lose their angle and bend until they reach the point where they are parallel (horizontal) to the ground. The hoof wall at the heels becomes thin, separates, and rolls under the heel. The rolled-under hoof wall at the heel puts pressure on the bar, which pushes it downward and laterally. This, coupled with the lack of growth in the heel area, makes the bar nonfunctional and basically nonexistent, which, in turn, allows the heels to become



Figure 2a

unstable. As the heels grow forward, the frog and digital cushion move backward. Figures 2a and 2b show a classic underrun heel.

The heels at this point lose their mechanical strength and can no longer bear weight, and the weight bearing function is shifted onto the soft tissue structures (frog, digital cushion, deep digital flexor tendon) in the palmar portion of the foot. The traditional treatment for underrun heels as I was taught in veterinary school was to use an egg bar shoe, which was often accompanied by a wedge pad to raise the angle of the heels and correct the broken-back hoof pastern axis that is usually associated with this condition. These shoes are fitted back to the bulbs of the heels, with the thought being that the increased ground surface of the shoe will support the palmar section of the foot, and the bar would stabilize the heels and, thus, correct the problem.

But how can one support compromised structures (heels) that no longer have the ability to bear weight? We can see right off that the egg bar shoe places the bulk of the weight-bearing on the supporting structures of the heel, which, over time, will damage these structures further. The egg bar shoe might also act as a moment arm or lever on the heels as shown on the radiograph in Figure 3.

The extra length of the shoe will force the horse to land heel first and by doing so, the length of the shoe will act as a lever upon the heels, which causes increased pressure on the already-damaged heels during weight-bearing, thus, preventing any chance of regrowth and actually damaging them further. Any positive effect of the bar in stabilizing the heels will be negated by this increased pressure placed on the heels. I have seen minimal encouraging results from using egg bar shoes in treating this condition over the years in our podiatry practice, and subsequently I rarely use them. In a future essay, I will discuss some rational treatments of underrun heels based on the extent of the damage to the heels.



Figure 2b



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Figure3--Note the length of the shoe behind the center of rotation.

Article and images courtesy Dr. Stephen O'Grady, Northern Virginia Equine, Marshall, Va. For more information see www.equipodiatry.com.

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