

## Hoof Wall Matrix

### The Matrix Loaded, Unloaded, Reloaded?

by KC La Pierre

What on earth am I talking about? I'm about to expose you to the latest information on hoof wall health. Information that will, I hope to change your entire perspective on hoof wall health.

For nearly a decade, I have taught the importance of inner wall health and the how inner wall health is vital to overall foot health. Where my explanation of hoof wall health may have been lacking is in the definition of the Matrix.

The Matrix The hoof capsule and the components that comprise it consist of zones (areas of differing matrix); each matrix is responsible for a multitude of functions. The Matrix is a blending, or combination of different types of horn that constitute a structure (hoof wall, sole, white line, or frog.) The outer hoof wall that you see consists mainly of horn tubules and provides protection against moisture loss and toxin ingress. It is also responsible for the storing of energy created by the stride, to be released during breakover. The outer wall must be strong and hard to resist the leverage forces that occur throughout the stride. The outer hoof wall however is only one part of a more complex matrix. The matrix of the hoof capsule is made up of tubules that originate at the coronary band. These tubules are bound tightly together by a specialized Intertubular horn that acts much like super glue. As we move deeper into the wall's matrix, we find horn produced by the lamellae blending with the newly developed tubules. This blending takes place just below the coronary band, in those areas covered by the periople. Periople is known as the stratum externum and serves to protect newly developing wall. Progressing further inward, the ratio of tubules to Intertubular horn (horn produced at the lamellae) is reduced, until we reach the zone of matrix known as the stratum internum, also known as the inner hoof wall. This inner most hoof wall, often described as the water line, is far more pliable than the outer wall, and is well suited to distortion without breakdown. The inner most wall is easily identified by its lack of pigment. Research has provided strong evidence that the Intertubular horn of the inner wall originates at the laminae layer of the foot, and grows from the inside out, blending with the tubules of the outer wall to form the matrix. The healthiest of hooves contain a strong Matrix (blending) of both types of horn. The inner most wall having fewer tubules is far more pliable than the outer most wall. This inner most wall (Stratum Internum) acts as a buffer zone between the sensitive structures of the foot and the dense matrix of the hoof capsule known as the (Stratum Medium). When the foot is asked to distort, it is the inner wall's responsibility to absorb much of the pressure created by the lever forces created by the outer wall and stride. Our research points to poor matrixing as a primary cause for reoccurring hoof wall cracks, wall separation, and white line disease.

Cause and Effect After much research, the logical conclusion is that hoof wall disorders are most commonly seen in those horses where correct foot function is lacking. The need for proper balance and distortion is very important to proper foot function and the resulting matrix. As stated, the matrix that is characteristic of the healthy hoof occurs just distal to the coronary band, in those areas covered by the periople, and grows distal to the ground. There can be several causes for poor matrix to occur, and often it is a combination of causes. • Lack of distortion, most commonly caused by shoeing or lack of exercise. • Imbalance resulting in improper distortion. • Poor hydration, leading to acidity, and pH imbalances. • Compromised nutrition, and vitamin/mineral imbalances. • Compromised immune system, often resulting

in infection of periople, and hoof wall. • Damaged periople, caused by toxins (toxic hoof dressings, shampoo, oils), or injury. Matrixing also occurs in other areas of the hoof capsule, including at the white line, frog, and sole. Wherever the mechanism needed for correct matrixing is lacking, areas of infiltration of bacteria and other micro-organisms can occur, this leading to horn failure (hoof wall cracks, wall separations, white line disease, frog infections, and sole cracking). Balance can play a huge role in hoof wall health. A weak matrix, coupled with imbalance in the shoeing process, cause excessive stresses to be placed on the hoof wall leading to cracks. It is not uncommon for the farrier to suggest removing the shoes for the winter, "to give the foot a break from shoeing." What often happens is that the foot is not given enough time to see a healthy matrix reaching the ground, and the wet spring environment plays havoc with the increased inner wall that is presented to the ground. The inner wall is very susceptible to infection when not matrixed correctly. With the matrix occurring higher up the hoof wall, it does need adequate time to grow down, and those hooves that do not present a strong matrix at the ground are more likely to develop infection, cracks and separations.

Treatments Now that we have a better understanding as to the cause of hoof wall problems, what can we do to cure or better yet prevent them? With the understanding that environmental stimulus (distortion) is responsible for the health of the matrix within the foot we can develop a treatment plan to cure an existing problem or develop a preventative strategy to prevent future problems. First and foremost, use a hoof disinfectant to rid the foot of harmful bacteria. I highly recommend a product called Clean Trax. Clean Trax is a deep penetrating hoof cleanser that is often effective in one treatment. Follow up with a daily treatment of Silvetrasol Hoof and Wound Wash, our non-necrotizing topical anti-bacterial solution. I recommend staying away from products that contain formaldehyde, bleach or other necrotizing ingredients. You may have come to the conclusion that I promote going shoeless for the health of the matrix, and for a foot with a hoof wall problem this is no exception. I have successfully treated toe cracks, wall separations, and white line disease shoeless for many years now. Though there are excellent products that can provide dynamic stability to the unstable foot. I, like many farriers, have tried resections, patching, lacing, and corrective shoeing. Don't get me wrong, there will be times when the foot has lost so much structure that the only course of action is to stabilize the capsule. We now have Energetics Brand Perfect Hoof Wear for cases where stabilization is needed. A balanced stable foot that is exposed to the proper environmental stimulus (distortions) for the return of healthy matrixing will be a foot that is not likely to develop severe hoof wall issues. What is the proper environmental stimulus you ask? Exercise! Provided stability exist or can be achieved, hand walks over uneven surfaces will do wonders for the horse with a lack of horn matrixing. Balance in the foot is critical allowing for correct distortion to occur, thus providing the necessary pressure for correct growth and matrixing to occur. Often thirty minutes a day of hand walking for eight weeks will produce visibly healthy growth of the stratum internum (inner most wall). It should be noted that it will take several months for the hoof wall to fully matrix, as the matrix is formed just below the coronary band and must grow to the ground before it is evidenced.

#### Diet as a Factor

Evaluate your diet program. A well-balanced diet will go a long way to developing a healthy matrix within the hoof capsule. It is best to consult with your veterinarian on dietary requirements for your horse, as requirements vary from region to region.

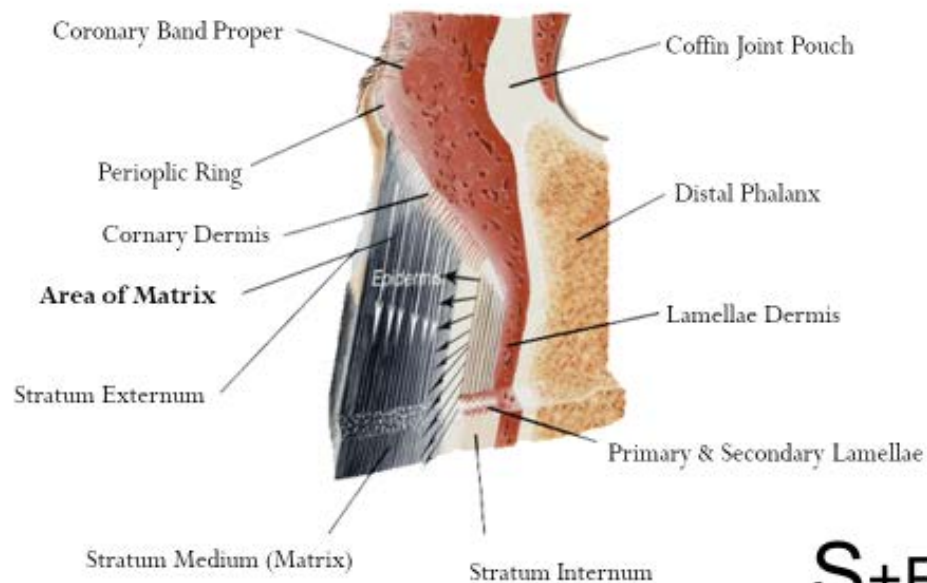
Regardless of the diet you have chosen for your horse, hydration is the most important factor in correct matrixing. Hoof wall cracks, and separations that occur in early spring can be signs of mild chronic dehydration having resulted in a poor matrix.

#### Conclusion

Your role in hoof care as an informed owner is to provide a dry, clean environment that is conducive to the health of the foot. Begin with a well-balanced foot, treat for infection, and provide a balanced diet, plenty of water and exercise.

## Hoof Wall Growth

(Understanding Matrix Development)



$$S+F=P$$

Strong Matrix defines Health