Breakover

2-15-05 Pete Ramey

Please don't read this article out of context and try to apply it to your horse. I am assuming that you have read my book, all of the other articles on this site, and have been succeeding with the methods in the field. Then and only then, should you start to bring this more advanced technique into your trimming. It's like driving a car. You shouldn't worry about tweaking up the engine, until you know you have mastered the use of the brakes!

This is done for one or two trims only, and then the need for it eliminates itself.

When I first heard "through the grapevine" that Gene Ovnicek was beveling (or rockering) into the soles at the toes of horses, I was very disappointed. I have always respected him and his work, but now I thought he had gone off the deep end. I have been a loud voice for respecting the callous under P3 and my initial interpretation was that Gene had started violating this critical area.

After digesting this "new" spin on trimming I realized I had been doing the exact same thing for years on cases with severe P3 rotation with incredible results: Basically, setting up P3 on a 0-5 degree palmer angle, leaving a massive heel buttress, and then loading and preserving the sole callous under P3 while unloading everything outside of the radius of that callous. The only difference was that I was not doing that on "sound" horses. I was always pleased if a horse compacted his own bevel into the sole at the toe; in fact if you look at the pictures of my personal horses at the trail riding facility in my book, you will see that most of them have bevels (rockers) in the soles at the toe. I was not trimming it, though. It was the product of natural wear. I would have been horrified by anyone cutting the sole, anywhere. Now, I do even less sole work than I did at the time I wrote my book, with even better results.

I do have enough respect for Gene's work that I couldn't get it out of my mind, though, so it wasn't with such a huge leap that I soon found myself giving it a lot of thought and cautiously beginning to experiment. The results have been spectacular. It has taken the soundness and performance of the horses in my care to an entirely new level, so now its time to share my findings and try to clarify what this is all about.

Every horse that is lucky enough to have the soles sharing in the support of its weight (as nature intended) and has no one hacking away at the sole, will develop very dense callous under the perimeter of P3. This compacted sole will be much harder than hoof horn will ever get if the horse is working. Mechanically, it is in a better position to support the horse than the walls ever "dreamed of".

If the walls are perfectly attached to P3 (no flare whatsoever) this callous lies immediately adjacent to the white line all the way around the perimeter of P3 and the lateral cartilages, from bar to bar. The callous will naturally concave itself to mirror the solar surface of P3 and to suit the terrain needs of the individual horse. It will rarely be visible from the outside in any way. If the bold bevel of the natural "mustang roll" is applied to the hoof wall, the breakover in any direction is at this callous, even if the walls are slightly (1/16 inch) longer than the sole, as they should be.

I should give MY definition of breakover, because different people use the term in so many different ways. Breakover is not the "front" of the hoof. It is the spot on the bottom of the foot that is still on the ground at the very moment the heels first leave the ground. (The "push-off" point, if you will.) This is not just at the center of the toe, but all the way around the toe, as horses do not always move in perfectly straight lines on perfectly flat ground. They do indeed turn, so breakover can occur anywhere around the perimeter of the foot.

There is a **tremendous** vertical force applied at the point of breakover. This force may sometimes even exceed impact force of landing! Try this experiment: Stand square and face forward, and then suddenly leap to the left or right at a 45 degree angle to the direction you are facing. You will find yourself applying great force to the ball of one foot; all of your weight plus all of your power. This does not hurt you, because nature gave you a very solid bone in that spot. Nature also covered that spot with skin that is packed into dense callous. There are definitely nerves there. You can very lightly touch that spot and you will feel it, yet applying all of your weight and energy to that spot doesn't hurt at all, does it.

Nature was kind enough to do the same thing for the horse (actually better). Now please get back up and do one more experiment for me. Stand square, and then rise up high onto your tiptoes. Now suddenly leap forward at a 45 degree angle to the direction you are facing. Ouch! Sorry about that. Nature gave you a great spot on your foot to leap from, but only one spot. The other parts of your foot have different purposes, don't they? The farthest forward part of your foot (your big toe) is not your breakover point, it is the ball of your foot. Well the horse is in the same boat, so you're not alone.

The only spot on a horse's foot that is mechanically strong enough to do this job well is the callous under P3. Again, in a truly healthy hoof with no flaring of the wall this callous is firmly attached to and is immediately adjacent to the white line. If, however, the wall deviates from the bone, there will be uncompacted, **unsupported** sole lying **between the callous and the white line**. (Actually it is not sole at all, but intertubular

hoof horn produced from the laminae!) This situation is common in domestic horses and can easily be addressed with proper trimming. Doing this does two things: First, it immediately improves the soundness and the performance of the horse. Second, it dramatically speeds the growing out of flare, placing a self concaved callous right up against the white line where it should be…. All the way around the perimeter of the toe.

So how do we apply it in the field? The most accurate way would be from detailed interpretation of radiographs, of course, but there are three key things I look at in the field to accomplish it on my own.

First and most conservative is to place breakover at a point ½ the length of the frog in front of the apex of the frog. Again, we are not just talking about the center of the toe, so breakover will form a radius shaped like a "normal" hoof through that point and around toward the quarters. I am not talking about a vertical cut here at all, but 25 degree (from the ground plane) "relief" of the area of sole in front of this radius. After that, remove any flare in the lower 1/3 of the hoof wall from the top, making it match the overall plane of the upper 2/3 of the hoof capsule, apply the normal roll or bevel to the wall and then wait for the well attached new wall to grow in.

There are several reasons this is a very conservative approach that can readily be applied on a setup trim. The growth corium of the frog is very consistent in its orientation to the internal structures (including P3), but the outer visible frog may be stretched forward in a flared foot, along with the sole, walls, and white line. In wild or domestic hooves with no flaring in the capsule, there will actually be ¼ to 1/3 the length of the frog in front of the apex to breakover. So given that the apex of the frog will be stretched forward in the beginning usually and that ½ the frog length is conservative anyway, it is a safe starting place to improve the mechanics of the horse in motion and begin growth of a better hoof.

After the horse has been bare for a while, the calloused area of sole under P3 will become readily visible as a rounded "bump" that mirrors the bone. (It is not under the bone vertically, but is in line with the dorsal aspect of P3; an extension of the bone.) When this becomes visible I will then "switch gears" and allow that calloused bump to be the breakover point on the bottom of the foot; again not just center of the toe, but all the way around the toe. I do this by relieving everything outside the radius with a slight bevel (around 25 degrees from the ground plane) and then carry on with my normal trim. Do not touch a tool to the actual toe callous. I mean not even one little rasp stroke!

Bringing breakover inside the white line really freaks out some traditional farriers that have a limited understanding of what is going on inside. Ignoring this fact does not mean you can't fix the problem. I succeeded for years at the growing out of toe flares and capsule rotation without this technique. When I see how much quicker I can do it now, though, I realize now that I was taking three steps forward and two steps back all along. Allow me to repeat myself; there will be no sole outside this callous if the walls are properly attached. The cases we are talking about have a loss or partial loss of wall attachment to the bone. This is done for one or two trims, and then any need for it will usually eliminate itself. The materials I am giving relief to are sole with no structure underneath to support it, hoof wall that is improperly attached to bone, separating laminae, and lamellar wedge. None of this can support the horse without spreading the damage, and definitely cannot bear the force of being the "push-off point" or breakover.

Let me back up and explain the lamellar wedge a bit. In a normal hoof, the dermal laminae (living, breathing, produced from and attached to the bone) intermesh perfectly with the epidermal laminae (leaves coming from the wall, produced at the coronet). The connection of the two is the connection of hoof to horse. The dermal laminae are constantly adding horn tubules to the mass of the hoof wall along the entire length of P3 (up to 60% of the hoof wall's total mass, according to studies by Dr. Bowker, Michigan State). These horn tubules should compact tightly under pressure into the rest of the hoof wall as they are produced. This is how the walls move down the bone as they grow, and it is why the hoof walls aren't stretched out to the thickness of a nickel by the time they get to the larger diameter of the hoof capsule at the ground.

When the dermal and epidermal laminae are torn apart (whether by unnatural mechanics, unnatural diet, or most commonly, the combination of both) these new horn tubules pile loosely between the two, pushing them farther apart as the walls (and thus the epidermal laminae) move toward the ground. The resulting "wedge" does a great job of padding the inner, sensitive structures from concussion (kicking a rock). It is less dense (read weaker), but seems to make up for it by being thicker. (A nice adaptation geared at survival, I think) As for a vertical support role, however, it is in no way set up to even begin to do the job without just spreading the damage.

In other words, relieving all of this tissue from a support role "Does no harm". Yes, the horse is at a disadvantage because it was allowed to get this way, but you will not increase this disadvantage by relieving the vertical pressure on the area. The callous formed between P3 and the ground is the only working weight-bearing structure we have at the toe until the well attached wall grows in to aid the task. The epidermal laminae will be visible at ground level and will appear to be the "white line". This is not the true "white line" at all!!! The white line is the combination of epidermal "leaves", and leaves that are produced at the distal border of P3 and would be bonding the toe callous to the hoof wall if not for the wall separation we are discussing here. The visible epidermal laminae at ground level create a false white line that tricks most farriers. Once you realize this, you can very quickly learn to tell the difference between the two with your naked eye.

Intertwine the fingers of both of your hands. This represents the dermal and epidermal laminae between P3 and the hoof wall and also the bond of the white line between wall and sole. This is how the white line should appear at ground level. Now pull your hands apart and look at one hand only with your fingers spread apart. This is what the false white line at ground level looks like. Since half of it is missing, the resulting "holes" are easy targets for opportunistic pathogens; fungus, bacteria, etc…… Most farriers think they are dealing with white line disease, and are not realizing that the white line does not even exist on that particular horse. This situation is not rare. You will see it every day, if you are around domestic horses.

When you set up mechanics for proper growth and eventually actually have a true white line, you will find it to be almost impervious to fungal infiltration. (Read "The End of White Line Disease" for more on the subject)

The third and final criteria I apply to placing the breakover is the simple projection of the upper, well attached growth to the ground. In other words, where will the hoof meet the ground when all flare is grown out and a mustang roll is applied to the wall? Sometimes, a toe callous forms under P3, and is later is pulled forward by the continued flaring of the walls. This can create a false toe callous, or at least one that is too far forward and unsupported by bone.

Whether to do this one or not is very subjective. Understand that I am very, very slow to back breakover into even a false toe callous. It gives me the "willies". I cannot forge a natural hoof without allowing natural movement, so sometimes I have to do this. In the field, it happens this way: On about the second or third trim, I will have about 1/3 of the well attached capsule grown in. It will be perfectly attached to the coffin bone and will be readily visible as a much steeper, tighter band of new growth. If I trim to my normal standard; using the callous ridge as my breakover point, and then put the foot down and the breakover appears to be too far forward, according to the truth told by the well attached new growth, I will pick the hoof back up and bring the 25 degree bevel back to the spot that the new growth would hit the ground. Again, it is rare that I find this need, and have never needed to do it to the same horse twice and have never caused any tenderness from it; just improved movement.

The same is true with the rest of the criteria I have presented here. Done correctly, this will not make your horse tender after a trim. It will only speed healing of the problem, and immediately improve movement. There are two key exceptions I will warn you about. If someone has cut or rasped the sole under P3 in the past four months, there may not be enough sole under P3 to allow this type of trimming. It may still be the right thing to do, but becomes a critical judgment call of the experienced professional. Also, backing up breakover mechanically lengthens stride, encouraging a heel first landing. This is good news. If, however, the back of the foot is too weak and sensitive to support a heel first landing at the moment, backing up the breakover can indirectly cause soreness at the **back** of the foot. If this happens, the horse will be on his toes when he hits rocky terrain. I wrote a whole article on that subject, and what to do about it (Digging for the Truth about Navicular Syndrome), but I thought I should reference it here as well. Also please read, "Heel Height; The Deciding Factor" to prevent this, and before applying this method.

This is going to feel strange at first, but try it gradually. You will be just as impressed with the results as I was, I'm sure.