

Has your Horse been “X-ray Labeled” ?

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There is always a time in the life of a horse when x-rays will be required either for a pre-purchase exam or for a lameness evaluation. Let us assume that your horse has been slightly off for a week and even though your veterinarian agrees that the hoof conformation looks fine, he or she decides to take a few x-rays of the front hooves. You are expecting the results of the x-rays with a little apprehension but you are not too worried, after all your horse is not seriously lame and so far your horse has been reasonably sound. Your veterinarian calls you back with the results and to your dismay you are told, for instance, that your horse has ‘pedal osteitis’ or that due to his poor phalange alignment your horse soundness is compromised ! These news may feel like a death sentence to your riding career. Now what? After prodding your veterinarian for the likely long term outcomes of such problems and reading whatever you could find on these subjects, you feel completely confused and depressed -- but before sinking into the thralls of despair you need to ask a few questions. The first one being: “How were the x-rays taken?”



Figure 1

The quality of the exposure is obviously very important and the majority of veterinarians are well aware of this, but how about the hoof placement at the time of the x-ray? A radiograph can show significant differences depending whether the horse's leg is placed in front of the shoulder point or behind, and/or whether the hoof is bearing full weight or not – meaning that either the opposite leg is lifted off the ground or the x-rayed hoof is placed on a higher block. The lateral radiographs shown in figures 1 through 4 were taken the same day with two horses under different situations. Each image shows the actual x-ray and an inset photo taken at the same time of the radiograph. In figure 1, the inset photo shows this particular horse (Gloria) standing with both feet on a 1 ½ inch block.

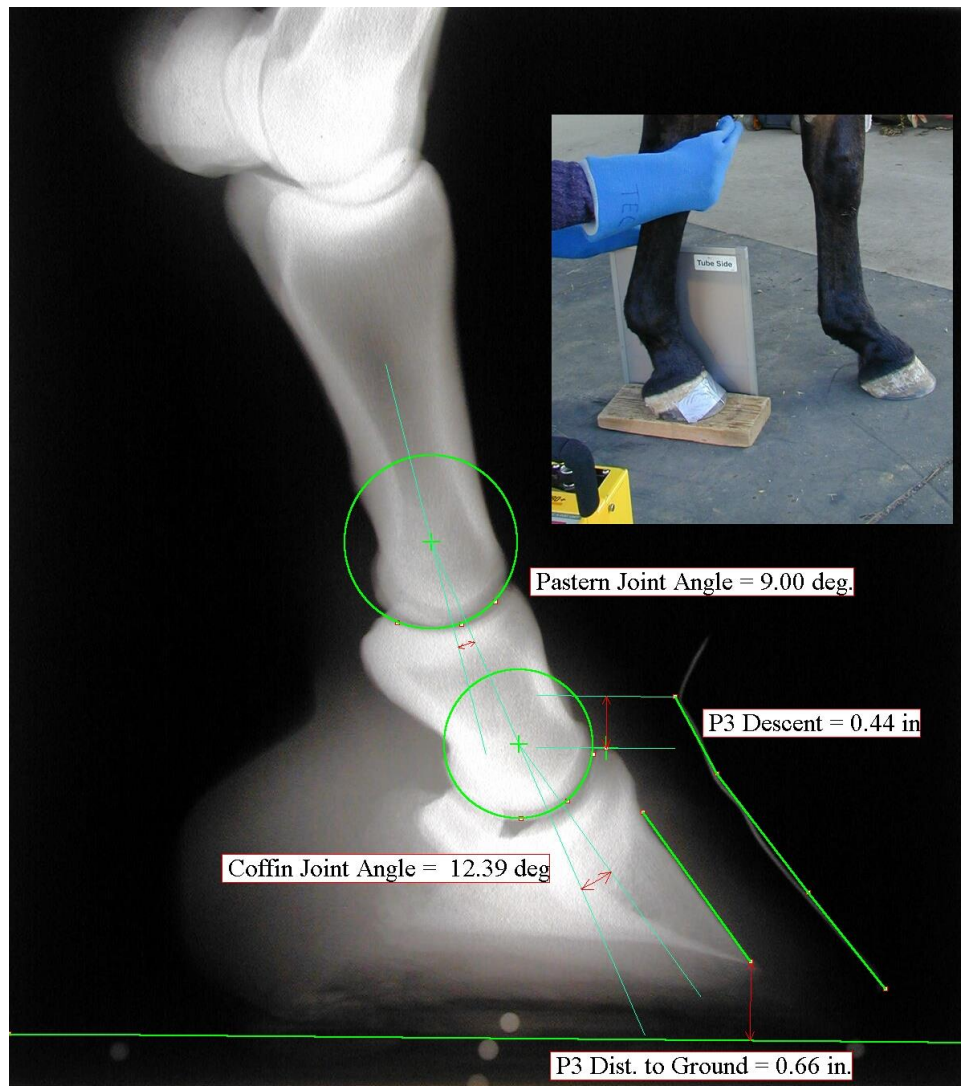


Figure 2

Figure 2 shows the x-rays of Gloria with her leg standing back while taking the x-rays. The horse may have moved and the practitioner was not careful to correct the stance of the horse.

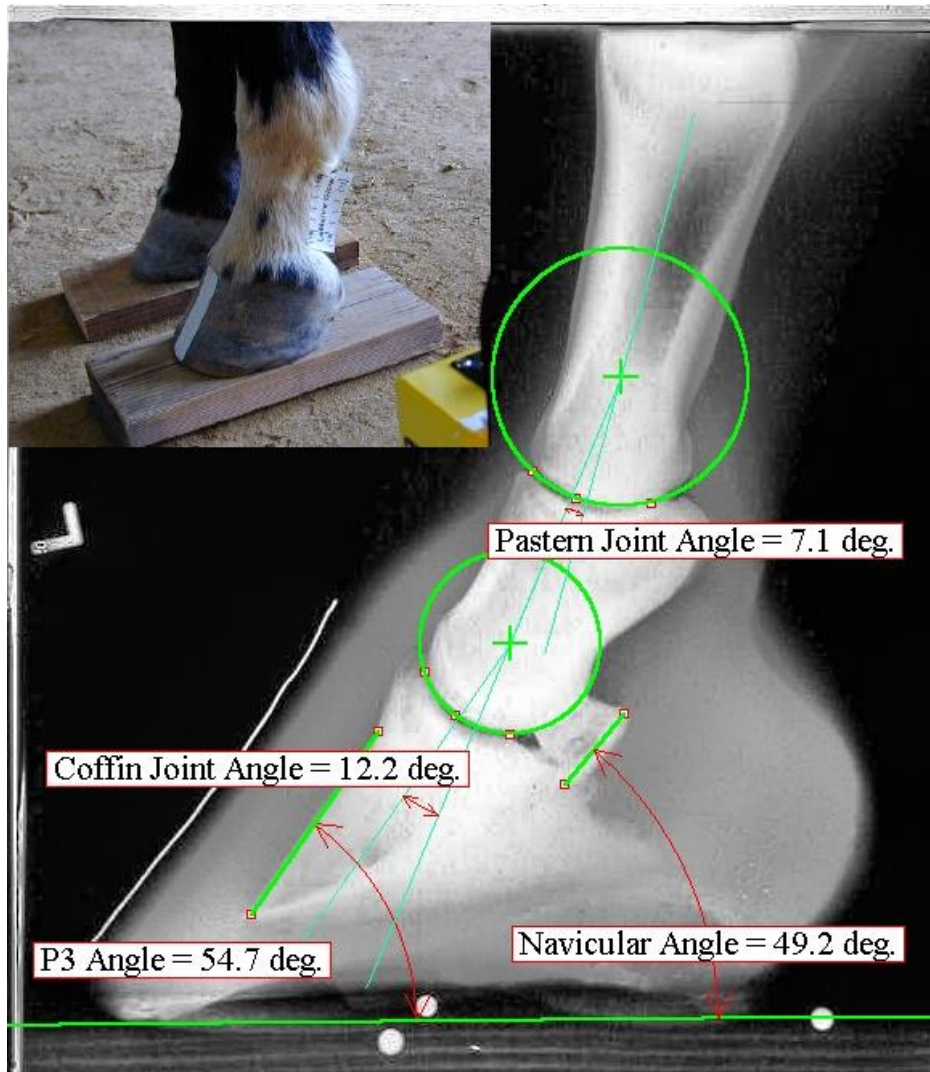


Figure 3

Figure 3 shows another horse (Gluck) standing with both feet on blocks of the same height at the time of the x-ray. Figure 4 shows the same foot when the opposite leg was lifted to “load” the x-rayed foot more heavily. This is to illustrate the differences that weight-bearing can make on the details of a radiograph.

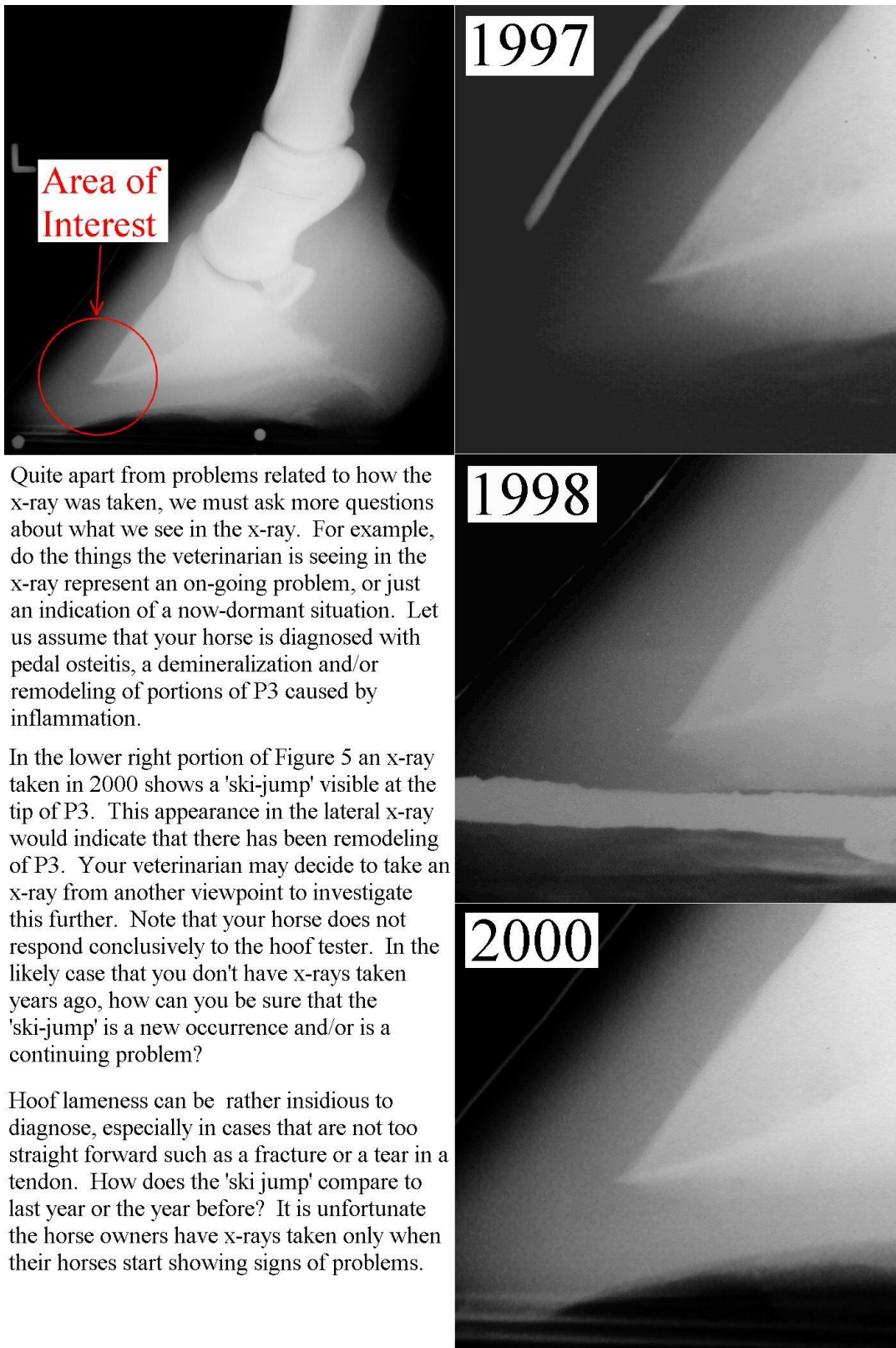
Terminology: the ‘navicular angle’ is the angle of the major axis of the navicular bone as imaged in the lateral view relative to the ground. The coffin-joint angle measures the angular position of the coffin joint at the instant that the x-ray was taken. Likewise, the pastern-joint angle measures the angular position of the pastern joint when the x-ray was taken. For more details see [Craig, Craig, and Weltner, 2001]. The ground is marked using metal BBs placed at the center of a wood block, so even if the x-ray machine was not parallel to the ground, accurate angles can be measured. Accuracy of the measurements: a software program (Metron-PX, for more information see www.eponatech.com) was used to mark up the radiographs. This program has an algorithm that takes into account the magnification factor inherent in radiographs and provides a way to calibrate the image.



Figure 4

It is hard to predict with certainty what the veterinary diagnosis would be of either of the two x-rays, but it is doubtful that the outcome would be the same. Perhaps in case of the x-ray in figure 4, a veterinarian may find the position of the navicular bone and the stress it creates in the deep digital flexor tendon worrisome. Your veterinarian may or may not decide to probe further (this depends on your pocket book too!) in this direction to find an answer to the lameness. He or she may advise you to change the shoeing to give more support at the heel and the sole! However, judging from the x-ray in figure 3, it seems that it would not be necessary and that the problem may lie somewhere else. So, a radically different conclusion may be drawn, simply because of how the horse was standing (and bearing weight) when the x-ray was taken.

What about standards for taking x-rays, you may ask? Unfortunately there are no definitive and universally accepted standards on how to take good x-rays and what to look for depending on it the hoof was loaded or unloaded. Further, due to these problems, veterinarians can have a difficult time in considering 'mechanical' aspects of lameness, which are problems due to conformation of the hoof and/or how it is shod and possibly other factors.



Quite apart from problems related to how the x-ray was taken, we must ask more questions about what we see in the x-ray. For example, do the things the veterinarian is seeing in the x-ray represent an on-going problem, or just an indication of a now-dormant situation. Let us assume that your horse is diagnosed with pedal osteitis, a demineralization and/or remodeling of portions of P3 caused by inflammation.

In the lower right portion of Figure 5 an x-ray taken in 2000 shows a 'ski-jump' visible at the tip of P3. This appearance in the lateral x-ray would indicate that there has been remodeling of P3. Your veterinarian may decide to take an x-ray from another viewpoint to investigate this further. Note that your horse does not respond conclusively to the hoof tester. In the likely case that you don't have x-rays taken years ago, how can you be sure that the 'ski-jump' is a new occurrence and/or is a continuing problem?

Hoof lameness can be rather insidious to diagnose, especially in cases that are not too straight forward such as a fracture or a tear in a tendon. How does the 'ski jump' compare to last year or the year before? It is unfortunate the horse owners have x-rays taken only when their horses start showing signs of problems.

Figure 5

In the midst of your fretting over this situation, you remember that a pre-purchase x-ray that was taken three years ago indeed exists! Figure 5 also shows this is a x-rays of the same horse taken in 1997 and 1998. Now you see, when comparing your new x-ray to the old one, that the ‘ski jump’ has not changed, or the changes are minor. In this case, the remodeling of P3 is a thing of the past – no changes are apparent over the last three years! This probably means, that the mild lameness you are seeing now is not due to the ‘ski-jump’ at the tip of P3.

Don’t blame your veterinarian -- there is only so much your veterinarian can do to figure out what is really happening if he or she is missing crucial information. Owners should consider asking their veterinarians to take yearly preventative x-rays to build a ‘base-line’ for their horses in case problems develop later. Remember an ounce of prevention worth a pound of cure!

As you see, a scary sounding diagnosis does not necessarily mean the end of the world. The cause of the lameness you saw might have been a change in shoeing, a minor injury, or temporary soreness from a bad step on poor footing. In the end, you may have a happy and sound horse to ride. In case you decide to sell your horse in the future, you can show documentation that the radiographic condition has not changed over the years. Taking good x-rays as part of a preventative health record for your horse can help you avoid being “x-ray labeled”!