



Correcting Crooked Legs in Foals

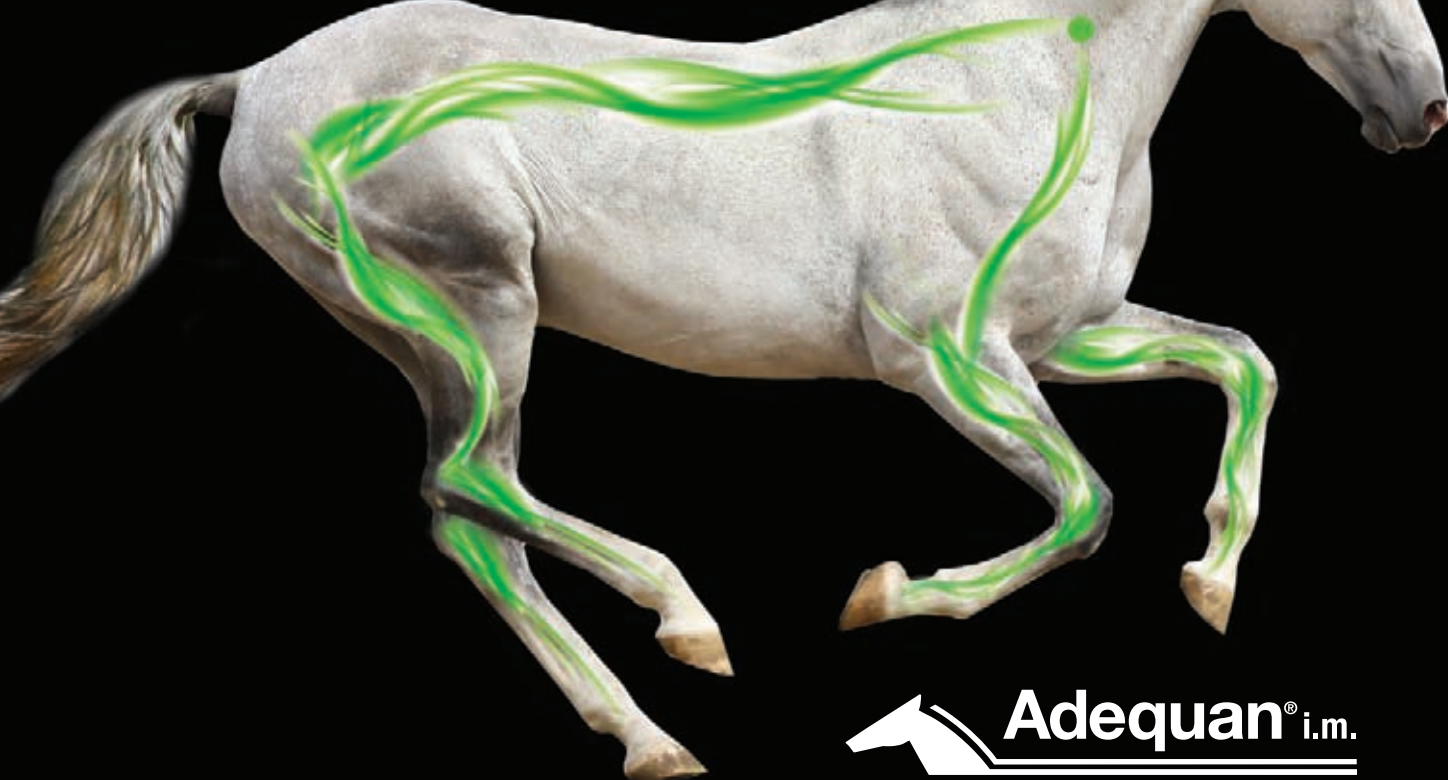
BY HEATHER SMITH THOMAS


MANY FOALS ARE BORN with some degree of angular limb deformity. Most common are knees too close together (carpal valgus), with fetlock joints wide apart. Next common is bowlegged at the knees (carpal varus), with fetlock joints too close together. Lax ligaments or tendons may cause the fetlock joint to drop to the ground and the toe to flip up. Sometimes a foal has windswept legs, with both front legs or both hind legs curved in the same direction. This deformity is thought to be due to the way the foal was lying in the uterus, perhaps with not quite enough room.



COURTESY DR. TIM LYNCH

While most leg abnormalities in foals will straighten on their own in time, some foals might have to undergo some procedures to help them out



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ANIMAL HEALTH

Most abnormalities straighten on their own, in a few days or weeks. Some foals need help, however, and various methods are used to support and protect the legs while they straighten (if ligaments are lax) or encourage leg bones to become better aligned. The correction technique selected depends upon location and severity of the problem—whether at knees, hocks, or fetlock joints, and how many degrees out of line the bones are slanted. Conservative methods (stall confinement and careful trimming\leveling of the feet) may correct mild cases, but for more severe deviations most owners opt for surgical intervention—to make sure the horse will have better conformation.

The simplest surgical treatment is periosteal stripping (sometimes called scraping), to encourage one side of the bone to grow faster. More complicated (but also more foolproof) is a procedure called transphyseal bridging—in which staples or screws are used to bridge the growth plate and halt growth on one side, allowing the other side to catch up. Some foals have such severe angular limb deformities that they need surgical bridging.

Dean A. Hendrickson, DVM, MS, Diplomate, American College of Veterinary Surgeons, Professor of Surgery, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences at Colorado State University said that when the leg is crooked, the growth plate on one side of the leg is growing slower than the other, and that's what makes the leg crooked.

“Why it does this is a challenging question. Most of the time when we see this, a foal is born with a little bit of crookedness and we think it happens in utero when the fetus is developing, rather than genetic. Sometimes, however, we see this happen in foal after foal from a certain bloodline, and then we wonder if there is a genetic factor. There may be multiple factors involved, and we don't always know what caused the deformity. In many cases the foal is born with just a little bit of angular deformity



Carpal valgus deformity occurs when the knees are too close together and the fetlocks too far apart

due to conditions in the uterus—and then bearing weight on the leg makes it worse,” said Hendrickson.

“A certain amount of pressure on the growth plate is good, since this encourages the bone to grow. But if there is



Carpal varus deformities occur when the foal is bowlegged at the knees and the fetlocks too close together

too much pressure—what we call supraphysiologic (more than normal) pressure—it shuts down the growth plate.” This much pressure is damaging rather than stimulating the bone to grow.

“We have to play it by ear with some of these foals, watching them closely for the first weeks of life as they grow. With crooked foals, we try to reduce their exercise a little so they aren't putting too much pressure on those growth plates on the inside of the curve. In many cases, reducing their exercise can be very helpful, and may be all that's needed for a mild case to straighten on its own,” he said.

TIMING

The urgency for intervention depends on how severely crooked the leg is, and where the angular deformity is located. Dr. Tim Lynch (Peterson and Smith Equine Hospital, Ocala, Fla.), said the window of opportunity to correct an out-of-line knee is much longer than for correcting a fetlock joint.

“Procedures to correct the fetlock joints are usually done fairly soon because their growth potential (hence the potential for straightening) is very limited, versus the knee or the distal radius or the hock. With those joints you have a longer time for potential growth and correcting that growth,” he said.

The foal's bones are all growing rapidly during the first 10 weeks of life, and then growth rate tapers off. The humerus (between shoulder and elbow) and femur (between hip and stifle) are still steadily growing, but growth rate of cannon bones and pasterns is slowing down. By about 4 months of age, cannons and pasterns have stopped growing.

“Your chance to correct fetlock joints is best before the foal is 8 weeks old. Fetlock joints with mild deviation will usually improve on their own within 2 to 4 weeks of age. If there's not significant improvement by that time, it's crucial to make a decision about resolving the deviation. The earlier you do it, the quicker it will respond. Toward the end of that time frame the bones are growing more

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slowly and you have less opportunity for improvement, said Lynch.

Hendrickson generally tells his clients that a deformity at the fetlock needs to be checked by a veterinarian by the time the foal is 2 weeks old, to help make a decision on what needs to be done. The window of opportunity for correcting a problem at the fetlock joint closes quickly.

“If the foal needs surgery for correction at the fetlock joint, it needs to be done no later than 4 weeks of age,” said Hendrickson. “The good thing is that usually the fetlock joint angle tends to straighten on its own, but it’s a situation where you can’t wait too long. You can’t come see us at 6 months of age for correction of a crooked fetlock because that would be too late. If the leg has not straightened by 4 weeks, you need to be planning surgery,” he explained.

Angular deformity at the hock or the carpus is not so crucial for early correction. “Unless it’s getting worse, I don’t get too worried until the foal is about 2 months old. You can have someone involved to help you make that judgement, but you can give the foal more time to see if the legs will straighten. By 4 months, if the legs have not straightened on their own, we need to be thinking about surgery,” Hendrickson said.

So the key for surgical timing is 4 weeks if it’s the fetlock, and 4 months if it’s the knee or hock unless the deformity is getting worse. “You need to have someone involved earlier if you want to try to treat these foals conservatively and monitor them. If intervention is necessary, there are a couple ways to deal with these. Typical methods are periosteal stripping (which has become controversial) and transphyseal bridging. There is one group of people who say the periosteal stripping is good and another group (and these opinions are about evenly divided) who say it is a waste of time. They say that the foals that get better with periosteal stripping would have gotten better on their own. I don’t know if we are going to resolve that controversy,” said Hendrickson.



The best chance for correcting fetlock joints is before the foal is eight weeks old

COURTESY HEATHER SMITH THOMAS

PERIOSTEAL STRIPPING

Periosteal stripping involves making a tiny skin incision above the growth plate of the joint (knee, hock, or fetlock joint) on the side that needs to grow faster, lifting off the membrane (periosteum) that surrounds the bone. “Stripping a section away seems to release tension off the growth plate on that side, allowing it to grow faster and catch up with the other side,” said Lynch.

One theory behind stripping is that the envelope around the bone is restricting growth. In a foal with knock knees, tension on the outside of the envelope seems to be greater than on the inside of the leg. “If the surgeon makes a cut down to the bone on the side growing too slowly, this allows the growth plate to respond and accelerate its growth on that side, without influencing the other side,” Lynch explained.

This is the least aggressive way to treat crooked foals, and is very straightforward, according to Hendrickson. “The foal is anesthetized and we cut the periosteum (covering that supplies the

blood supply to the outside of the bone). The idea is that by cutting this we can help that side straighten. There are two theories regarding how it works. One is the bowstringing theory. When we cut the periosteum on that side, it’s like cutting a bowstring and the bow straightens out. The thought is that with that side cut (the inside of the curve), the leg can straighten—if the periosteum is too thick on the inside of the leg in that angular deformity,” he said.

“The other theory is that if we cut it, this increases blood supply to the area, which encourages growth on that short inside of the curve. So either way, it enables that side to grow more. Thus we want to do that on the inside of the curve because that will give us the best chance of getting the leg to straighten,” said Hendrickson.

Most of the time, one procedure is enough for cases in which there is enough time for altering growth. “If the age of the foal or the location of the problem (knee versus fetlock joint) indicates you are ok with the window, periosteal stripping will generally work,” said Lynch.

“Stripping, for mild to moderate cases, works very well at an early stage of life, for a fetlock joint. For the knee, by contrast, in a month-old foal you might wait and see if the leg straightens on its own, because it is still quite early in the development and growth of that part of the leg. The problem is that often more than one joint has a problem,” he said.

“People have tried a wide range of corrections—including splints and tube casts. What your veterinarian might recommend will vary, depending on the case,” said Lynch. Many foals will straighten as they grow, but the question is: will they straighten enough?

“Periosteal stripping is a quick surgery, and the foal is back on its feet right away,” said Hendrickson. “An advantage to the stripping is that if the leg gets straighter, you don’t have to do a follow-up surgery.” If you do the bridging, you have to do another surgery at just the right time, to take out the screws,

wires, or staples when the leg becomes straight, because if you leave them in too long the leg becomes crooked in the opposite direction.

“I tend to wait a little bit longer, to see if the foal is going to straighten without the stripping. I don’t do as much periosteal stripping as I used to. I watch these foals closely, and talk with the clients. I tell them that we can do the periosteal stripping now, or we can wait a little longer and then do the transphyseal bridging if the leg doesn’t straighten—because I think the foal might have a chance to straighten out on its own.”

Or, the veterinarian might look at the foal and realize it’s so severe that it’s best to do everything to give it a chance to straighten. “In these situations we’ll do the stripping on the inside of the curve, and also the transphyseal bridging on the outside of the curve, to work on both

FOOT CARE AND TRIMMING

Dean A. Hendrickson, DVM, MS, Diplomate, American College of Veterinary Surgeons, Professor of Surgery, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences at Colorado State University said it is very important to keep the hoof balanced. From the time the foal is very young, the feet can be carefully trimmed to help straighten the legs, as well. “This is one of the things we do during conservative therapy, when we are limiting the foal’s exercise and hoping the legs will straighten without surgery. We trim the foot to leave the heel longer on the side away from the

angular deformity,” he said.

“If it’s a fetlock joint valgus (the pastern deviates to the outside from the fetlock to the ground), for instance, we use the foot to help us by trimming everything but the inside heel. We leave the inside heel long, to help rotate the foot to the inside, helping growth of the outside of the growth plate. That helps straighten the leg a little,” Hendrickson explained. Horse owners need to work with a good farrier as well as their veterinarian, to help correct a crooked foal. The team effort is very important, working together to accomplish that goal. —By Heather Smith Thomas

aspects for correction,” Hendrickson said.

The procedure chosen often depends on where in the country you are. “In

Kentucky, the veterinarian will probably do periosteal stripping. In some other areas they may wait a little bit, and be a little more conservative, to see if the



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leg will straighten,” said Hendrickson. It may also depend on the veterinarian and the case load, and what he/she has had the most success with, in his/her experience. Some breeds age and mature at different speeds, and this can have an impact on what the veterinarian chooses to do. With Thoroughbred racehorses, however, most of those foals will get stripped when they are very young, if they have a crooked leg. The owners want to make those corrections as soon as possible. If the stripping doesn't work, then the veterinarian will do transphyseal bridging to support and straighten the leg.

TRANSPHYSEAL BRIDGING

Treatment of choice in severe cases is transphyseal bridging—mechanically halting the growth on the longer side of the leg so the opposite (shorter) side can catch up. This is accomplished by making two tiny skin incisions above and below the growth plate of the affected joint in order to allow a tiny stainless steel screw to be inserted in each opening. A stainless steel wire is then wrapped around the screw heads to hold back the growth on that side of the joint, being careful to not invade the growth plate itself. Sometimes just a screw or a staple is placed across the growth plate on the outside of the curve—the side of the leg that is growing too fast.

“The idea is to slow the growth on that side, so we do that on the convex portion of the leg. The bridge goes across the growth plate, using a screw on either side—with a wire between them, or a staple on either side of the growth plate, or a screw that goes across the growth plate. All of these techniques are designed to stop the growth on that side, and let the other side catch up,” explained Hendrickson. Once the leg is straight, the screws, wires, or staples are taken out. The tricky part is removing them at the right time. “If you wait too long you end up with a crooked leg the other direction and have to put the screws on the other side.”

The original procedure, dating back to the 1950s, used surgical staples put in with a staple gun. Most surgeons today use screws and wires (like those used in fracture repair) since these are stronger and have more flexibility regarding fit, and need only a stab incision for the top screw and for the bottom screw. The wire is tunneled under the skin between the two without cutting the skin. By contrast, when using staples, the skin must be cut the width of the staple and chances are greater for creating a blemish. “A tiny stab incision for a screw reduces the risk for a scar or abnormal healing,” said Lynch.

After the correction is made and the leg is straight, the screws are taken out and the leg bandaged to protect it while the area heals. Many veterinarians recommend removing the stitches in about seven to 10 days. This is quite early, but results in fewer blemishes. If the skin is healing normally, it just needs to be held in place with stitches at first; then continues to heal very well on its own. Foals heal very quickly.

To do the bridging procedure, the foal is completely anesthetized. “We are drilling holes in the legs, and you don't want any movement; they have to be precisely placed,” Hendrickson said. It's a bit tricky anesthetizing young foals (compared to older animals) but if it's a young foal with deformity at the fetlocks, the surgery needs to be done early, at the proper time for the correction. “If you wait too long, you won't be able to make the correction,” he said. Anesthesia techniques are much better today, however, than they were in the past, and not as hard on the foal.

In the weeks following surgery, the legs must be monitored closely, to determine the proper time to remove the screws or staples. “They must be taken out at exactly the right time, or you'll overcorrect and the foal ends up with opposite deviation,” said Lynch. “If correcting a knock kneed condition, you don't want the foal to end up bowlegged.”

He said a person has to be careful with surgery. “A single-screw fixation across the growth plate can create problems if the screw is left in too long. Surgeries to try to manipulate the legs is not without potential complications later, or scarring,” Lynch added.

Hendrickson recommends that clients send him photos taken with their smart phones. “I show them the angle I want the photos taken from. This is important, because if you don't have the right angle, I can't tell whether the leg is straighten-

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ing or not. The client can take photos of the foal's legs and send them to me once a week. As soon as I think the leg is getting close to where we want it, we have them bring the foal in and we take the screw out," he said.

This is one of the advantages of cell phone technology, being able to take and send photos, so the veterinarian doesn't have to come out as often to see the foal. "Just about everyone has a camera on their phone now, so they don't have to digitize it; they can just take the photo and send it. We can help the client monitor the foal this way. In some cases we do this kind of monitoring until the leg starts getting close to where we want it, and then we go check on the foal ourselves every couple of days, just to be sure," said Hendrickson.

Removing the screws or staples is simpler than putting them in. "The lower you are on the legs, however (such as fetlocks versus knee or carpus), the more potential for the bone to grow over the screw, which makes it a little more challenging for removal. Generally, however, it's a simple out-patient procedure using short-acting anesthesia to go in and remove the screws or staples," he explained.

"The foal doesn't necessarily have to be under general anesthesia for the removal; in some cases we can just sedate them and use local anesthesia to take them out. In others we use a very short-acting injectable general anesthesia," said Hendrickson. After the screws/staples are removed the foal is monitored to make sure the legs are not changing one way or another and are doing what you want them to do.

The prognosis is usually quite good, in most cases. "Timing is critical. If we can do corrections at the proper time, we can do a lot for these foals. If we get them late, it's a lot harder for us to accomplish a correction. We have to do these procedures at the right time," he said.

A disadvantage of bridging compared to stripping is greater expense. The screws and wires or staples must be in-



PHOTOS COURTESY HEATHER SMITH THOMAS



The window for correcting an out of line knee is longer than for an out of line fetlock. The window for correcting a fetlock joint closes quickly.

serted with precision, to not affect the growth plate. The surgeon usually takes x-rays to determine placement. It also requires a second procedure to remove the implants once the correction is complete, which requires anesthetizing the foal again. "Angular limb deformities

and how to deal with them generates a lot of debate," Lynch said. "If surgical intervention fails, however, it's usually because people waited too long." **BH**

Heather Smith Thomas is a freelance writer based in Idaho.

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