



# Tendon Troubles

*Understanding tendon problems in young calves will help cattlemen respond to and treat the issue.*

by Heather Smith Thomas



Occasionally a calf is born with crooked legs or contracted or lax tendons. Some of these straighten out on their own with time and exercise, while others require intervention to resolve the condition. Some defects are so severe the calf must be euthanized.

Professor and head of the Department of Large Animal Clinical Sciences at the University of Tennessee David Anderson, DVM, says contracted tendons are the most common limb abnormality at birth and the challenging thing is trying to determine if it's a toxic, infectious or genetic cause. "Calves with these problems are much less likely to respond to treatment," Anderson says.

## Causes

Crooked calf syndrome has been associated with certain toxic plants like lupine and hemlock. Alkaloids in these plants, if consumed by the dam during early pregnancy (between 40 and 70 days for lupine), can affect the developing skeletal structure of the fetus. The toxins act as a sedative, and if the fetus is not moving as much as it normally would, the tendons become shortened and the joints tend to become fixed. Limbs may be twisted or fixed in flexed positions and cannot straighten. Often the bones themselves

develop abnormal structure and rotational defects.

"Because of the multiple defects caused by these toxins, the crooked limbs are unlikely to respond to therapy," Anderson says. "If we are reasonably certain this is the case, euthanasia is often the best option for some of these calves if the defect is severe, and the calf can't get up and get around." Some of these calves have mild defects, such as front legs cocked forward a little at the knee or fetlock joint, and can still move around enough to survive and grow to butcher size.

"Some viruses can cause contracted tendons," Anderson says. "When we see contracted tendons we may suspect BVD virus or Akabane virus. Normally, in calves that have limb contractures and fused joints (arthrogryposis) from viral infection, they also have neurological problems as well. If we think this is the case, we realize treatment will be unrewarding, and most of the time these calves are euthanized."

Anderson says in recent years, curly calf syndrome (Arthrogryposis Multiplex) has been identified in the Angus breed as a genetic problem. "We see a number of calves born with arthrogryposis or badly contracted, curved legs that we feel

are genetic. Those calves will not respond to therapy; it's a defect beyond our ability to treat. So with crooked calves we try to identify the cause, to know which ones cannot be helped. A person might otherwise spend a lot of money on a calf with no improvement."

Contracted tendons can also occur in calves because of nutritional deficiencies. "We see a fair number of herds, particularly with spring calving, where the cows have become thin over winter and people are trying to push nutrition to them during the final months of gestation," he explains. "When the stockman is trying to add weight to a cow and increase body condition score in late gestation we're more likely to get contracted tendons in the calves — particularly if the stockman is pushing a lot of energy and protein. Growth of the fetus is exponential during the last couple months."

The growing fetus increases the cow's nutrition needs, and therefore, Anderson says, there is some benefit in making sure there's adequate nutrition and mineral available during the later stage of pregnancy.

"The cow is putting a lot of calcium, phosphorus, magnesium, etc. into that calf for skeletal growth," he says. "But if we are not supplementing

the cow in a balanced way — if she's getting a lot of energy and protein but not as much in the way of minerals — she may have an oversized calf that is developed disproportionately. Essentially the calf's muscle/body mass grows faster than the bones," Anderson says.

When cows are pushed nutritionally during the last months of gestation, Anderson says he sees a higher incidence of contracted tendons and dystocias. "So we have two problems. There's an increased rate of dystocia (and the cows are more likely to have C-sections, or calves injured by pulling them) and the cows are more likely to have abnormal calves [contracted tendons] that need a little help to get going."

For these calves, usually the legs will straighten after a period of time once the calves are able to get up and walk around. "Most of the time we can get these calves corrected," Anderson explains. "We try to determine whether they will be able to get up and exercise, to straighten out those tendons. Most of these calves can get up and move around comfortably, and this will stretch the tendons."

Normally, the sole of the foot is flat on the ground and the hoof wall makes a 45 to 60 degree angle with the ground. "In calves where the hoof angle is more than 90 degrees and the wall is so upright it goes beyond vertical and tilted forward, the calf is standing on his toes with the heel completely off the ground," he says. "The hoof wall is angled forward instead of backward. Those calves need help." They are at risk of damaging their legs by walking on the front of the foot and fetlock joint.

## Treating contracted tendons

Clinical associate professor of beef production medicine at Purdue University W. Mark Hilton says he usually works with the owner and makes a decision as to whether conservative therapy (grabbing the leg three or four times a day and stretching it out) or more aggressive therapy will be best.



Contracted tendons make it difficult for this calf to stand up.



Splints can be created using various lengths and width of PVC pipe cut in two lengthwise.



## Limit exercise

"Whenever you see dramatic angulation abnormality in the limbs, such as lax tendons or angular limb deformity, make sure calves don't damage their limbs further, by traveling too much," says W. Mark Hilton, clinical associate professor of beef production medicine at Purdue University.

"It helps to keep the cow and calf in a small area, so they don't have to walk far to feed and water. They need enough room for exercise, but not in a big pasture."

For a calf with severe angulations, a lot of walking will make the problem worse instead of better, with too much trauma to the limb.

This is especially true with calves that have lax tendons, a condition in which the fetlock joint is completely down on the ground and they are walking on their heels and fetlock joints. The toe may be pointed upward.

"This is sometimes the case with premature calves, whose leg structure is not yet as strong as it should be, or some type of abnormal maturation in the uterus, or abnormal positioning in the uterus," he adds. "If calves with lax tendons are moving around too much — walking on the back of the fetlock joint — they continually put stretching pressure on those tendons and they won't tighten up. We like to confine those calves so they aren't traveling/moving very much."

Otherwise they won't straighten very quickly and are also at risk for trauma and damage to the back of the fetlock joint. **HW**



An extended toe "shoe" can help a calf stand and walk to keep stretching the tendons.



The causes of windswept syndrome are not fully understood; it's believed it may be linked to abnormal position in the uterus during the last 60 days of gestation.

"During that period of rapid growth in the calf, his movement in the uterus is diminished [not enough room to move around] and he is getting into position for birth," Anderson says. "We think positioning in the uterus may be the cause of crookedness, and it may also be nutritionally influenced, similar to what happens with contracted tendons, if the cow has an unbalanced ration during the last few months of pregnancy."

Anderson adds, "We've debated whether moving cows during the last month of gestation may contribute to this problem. Cows are often brought in from large pastures to a smaller maternity area during the last 30 days. I don't feel this is associated with the problem, but there's been some discussion about this. We don't know if there's a genetic reason. We tend to see windswept syndrome more frequently in larger calves, and in bull calves, and long-legged calves."

The good thing about this problem, however, is that the calves usually straighten on their own.

## Lax tendons

Occasionally a calf is born with weak tendons, a condition in which the fetlock joint drops down and the calf is walking on his heels and dewclaws, with toes pointing upward. In many cases, exercise will strengthen the tendons, and the legs straighten up.

Lax tendons are sometimes seen in "fawn" calves [a genetic defect known as Contractural Arachnodactyly, in which the leg bones seem too long]. Most of these calves have a long, arched back and short underline, with stifles and elbows close together, and hind legs bent at the hock joint with hind feet too far forward. The calf has long pasterns and walks on his heels and fetlock joints.

"It seems to occur more commonly in Angus calves in Australia where it was first described," Anderson says. "Fawn calf syndrome is thought to be an inherited genetic defect. Those calves have a better prognosis than curly calves, just because the fawn calves can usually get up and move around."

Many of the fawn calves can survive, but this is a limb problem that can't be resolved with treatment. **HW**

"We may need to put splints on and off several times a day to help stretch the tendons," he says. It is wise to call the veterinarian for a proper diagnosis because there are many degrees of abnormality.

Most of these calves get better after they can start putting weight on the leg, stretching the tendons. "As they get bigger, the legs straighten out. But it's good to have some kind of plan to know how to help these calves," Hilton says. Time, and the calf's own activity, will often help a leg straighten.

Some calves have so much contraction that the fetlock joints are knuckling over and need help to keep from damaging the front of the foot and leg. "We treat these immediately," Anderson says. "Most often we use splints; it's relatively rare that we see a calf that needs surgery. Most cases respond to some type of splinting. The biggest thing with using a splint is to make sure we protect the leg so the splint doesn't rub and damage the leg. It needs good padding so the splint doesn't rub sores on the leg, and so the tape attaching the splint to the leg doesn't strangulate or interfere with blood supply to the leg."

Some of the commercially available calf splints are quite effective. "These have the padding built in, and have Velcro straps, but we still advocate putting padding between the Velcro straps and the leg, so they don't tighten down on the limb," he says.

"We use a technique called a board splint. We use PVC pipe 2 to 3 inches in diameter, and cut it in half lengthwise. Calves that are so upright they are broken over toward the front, beyond the vertical plane, can be splinted with these. We drill holes through the hoof wall at the toe, where there is no blood supply (just hard hoof), and drill corresponding holes in the end of the splint. Then we run wires through the splint and the hoof wall so the splint is attached to the toe. This board splint is on the front of

the leg. When we pull it back to the leg it stretches the toe, and by taping the splint back to the cannon bone we keep that tension on it. It stretches the tendons rather quickly, and within two or three days we can usually remove the splint."

At that point, the calf walking around, putting weight on the leg and exercising will finish stretching the tendon.

Some calves are between those two categories — calves that can walk around and stretch the tendons on their own and calves that need splints. Some calves can stand up and walk, and the hoof wall is not beyond the vertical plane, but it is difficult for them to walk and move around.

"With some of those calves we put a rolled-toe shoe on them," Anderson says. "We use a cement (PMMA acrylic, called Technovit). This is the same material we use to glue wooden blocks to lame cows' feet. We attach the rolled-toe shoe to the bottom of the calf's foot with this, and use the shoe to change the hoof angle, extending the toe, with a rolled edge on the front. When the calf puts his foot down to the ground, this extension stretches the tendon." Some calves are too uncomfortable to move around and stretch the tendon on their own but not bad enough to splint, and this rolled-toe shoe will do the job.

## Windswept hind legs

Some calves have crooked legs at birth, like windswept hind legs, a condition in which both legs are bent or curved off to one side, the same direction. Most of those straighten up on their own, with time.

"Some are windswept to the degree that they have trouble getting up and moving around for the first couple of days, but normally they strengthen quite rapidly and we generally don't have to do anything more than help them get up at first," Anderson says.

## The need for diagnosis

"We all accept the fact that we'll see a crooked leg once in awhile, whether it's lax tendons, contracted tendons, or angular limb deformities," says David Anderson, DVM, professor and head of the Department of Large Animal Clinical Sciences at the University of Tennessee.

"If a herd has more of these situations than .5 to 1% of a calf crop, this would be reason to evaluate what might be going on. If you are seeing 10% of calves born with these conditions, there is an underlying cause that needs to be investigated. If it's nutrition you can readily get on top of it, but if it's an infectious cause like BVD we need to get this straightened out as quickly as possible. If it's something genetic, you are stuck with having to change things for next year like using different bulls, for instance."

Cattlemen may also want to identify the cows that produced those calves and to cull them or make sure they never keep offspring from them that might be carriers.

"It is important to get on top of limb problems early on," Anderson says. "If your first few calves have abnormalities, you need some diagnostics to identify the cause. If it's nutritional, you may have a chance to change some things during the calving season." If it's a problem caused by toxic alkaloids in plants such as hemlock or lupine, consider using a different pasture after the cows are bred or eradicating the poison plants.

Clinical associate professor of beef production medicine at Purdue University, W. Mark Hilton, tells clients that if they have a problem calf and have seen the condition before and know what it is — such as contracted tendons in which the leg is knuckling over a little — they can probably deal with this by massaging the legs and trying to stretch the tendons.

"If they're not sure what the problem is, they should call their veterinarian and get a diagnosis. Then we'll have a better idea how to treat it," Hilton says. **HW**