3) those that are so extensive and are located so that they cannot be expected to be salvaged as athletes. Oftentimes we make a bad condition worse and would be better off keeping our knives and scopes out of these.

We do use SH after the OCD's are removed. Some go right down after one injection, others require multiple injections. And with the big, outstanding bog, there's a chance they'll never go back down and stay down. I have found this also true in cases of bog spavin where no radiographic or arthroscopic reason for the bog can be found.

Another thing is that by the appearance of these lesions, I sometimes wonder if they are really all OCD's and perhaps some are related to a joint ill situation or something else. The changes on the distal tibia and tibiotarsal bone can be particularly widespread for young horses that really haven't exercised much. You may get a cauliflower appearance to the distal end of the tibia along with villi growing like hair onto the articular surface. I've never seen this in any other joint.

Berry:
My experience with the lateral malleolus OCD is almost a 100 percent recovery rate when they are taken off early. With a month to six weeks rest, these joints are already clinically tightened back down. These horses can be back in training a couple of months post-surgery.

Gabel:
At OSU we are regularly taking out bony lesions from hocks and stifles. We see a definite breed incidence with more hocks in Standardbreds and more stifles in Thoroughbreds and Quarter Horses.

Hawkins:
In Lexington, we operated on many OCD's to the medial aspect of the sagittal ridge of the tibia in yearling and young Thoroughbreds. Many of them weren't lame, and the diagnosis is usually obtained because of the bog. Commonly they are okay during early training but by the time they reach Lexington in the spring they have a big bog.

It is a mistake to lump these all together as OCD's. They are quite different, from the tiny fragment that might even be re-absorbed to the big cauliflower type with obvious subchondral bone involvement.

In the absence of lameness, in the well trained two-year-old, I won't recommend surgery for the sake of x-ray findings. I'm also convinced that the hock responds very well to a standard arthroscopy with recovery in four to eight weeks. It is a nice joint to do surgery on, but we take out many more than really need to be removed.

Gabel:
Only about one-half the horses with bog spavin have radiographic lesions. The opinion that the rest have a defect in cartilage is generally being verified at surgery.

In asking others about conservative management of bogs, if they are not really very sore, it seems that response to SH is less good than in the true inflammatory joint. In terms of tightening down these joint capsules and making them more normal looking, the response is not quite as dramatic as it is in horses with inflammation. Some of them just don't go down and get over their problem.

I'm not satisfied with what we know yet. We are still in the early stages of trying to use SH on bogs. The questions of dose and frequency of treatment haven't been addressed. To say we don't get very much improvement with a single injection, especially if there is a bony lesion or if there is a cartilage flap that doesn't show radiographically, maybe isn't enough. Needless to say, we have more to learn about this whole condition.

TREATING TENDINITIS WITH SODIUM HYALURONATE

Edwin A. Churchill, VMD

In order to give some background as to why I use sodium hyaluronate (SH) for tendinitis, I would like to relate an incident that happened some years ago. A trainer brought a horse into my clinic with chronic tendinitis. There was not much deformity to the tendon, but the horse was sore. The trainer said another veterinarian had injected the tendon with SH some weeks before. According to the trainer, the horse responded dramatically to the treatment and won several races thereafter. The horse was now getting sore again. The trainer wanted another injection of SH in the tendon.

I had never done such a thing, but at the insistence of the trainer I decided to try it. Of course, I was surprised to see the horse repeat its winning streak. Since then, I have used this therapy many times for bowed tendons, with good success.
In preparation for the tendon injection, we clip the hair over the posterior and the sides of the injured area of the tendon and shave as if we were going to do surgery. We do a complete scrub and then anesthetize the area with Carcobicaine.

Using a 25 gauge needle I inject small amounts of SH just on the posterior surface of the tendon in several spots one-half inch apart from two inches above the injury to two inches below. The needle is pushed through the skin and up against the tendon sheath, and then it is withdrawn slightly before injection. I inject only a few drops at each site, just enough to make a skin bleb. This is repeated at one-half inch intervals on each side of the tendon. I use a total of 20-24 mg of SH in each tendon. Of course, this procedure is used when the injury is in the superficial flexor tendon. I advise using cold therapy as a follow-up; no heat, just ice boots.

Some time after the first tendon injection I was presented with a horse of championship caliber which had developed tendinitis, traceable to a rear leg problem. The horse was in his last year of racing, so having nothing to lose I decided to try injecting SH again. I not only injected the hock with SH, but the front tendon as well. This was a Standardbred pacer. Two weeks after the injection he won a big race.

This was a good horse racing with the best. He continued to win for several weeks, but after the third race the trainer called and said the tendon was starting to look puffy again. He wanted another injection.

As it turned out, we injected that horse's tendon every three to four weeks throughout the entire racing season. Occasionally we had to inject the hock also.

I was presented with another case similar to the one previously described. This was a three-year-old pacer, also a very good horse. This horse also had a hock lameness which was injected along with the tendon. I felt certain that without treating the hock, the tendon would not respond to SH.

With periodic injections of the tendon this pacer continued to race and win. Neither this horse nor the previous case had significant enlargement of the tendon once the injections were started. I have the impression that the SH seems to reduce the amount of connective tissue that is deposited around the injured tendon. At the end of the racing season, both of these horses had normal-looking tendons. Without a very close examination, it would be impossible to determine that these horses had a tendon problem.

On the basis of these three experiences I began to inject more injured tendons on a regular basis. Mostly I injected those that were not severe and were recent injuries, the kind that you would normally pull out of the racing schedule. For example, a two-year-old would start with tendinitis. I would see him at a point where the tendon was sore, hot and painful, however, there was no great deformity.

I inject this type of case and turn the horse out, giving him time to recover. My rationale is to prevent scarring along the tendon. Most horses treated in this manner come back to where it is impossible to tell whether the horse had ever had tendinitis. I do not inject chronic bowed tendons. It is the freshly injured tendon, having at least a chance of recuperating without a lot of connective tissue reforming, that may benefit from the SH.

I have used this treatment in Thoroughbreds as well, not with the intention of racing the horse, but to reduce the possibility of scarring. I think it's very valuable in controlling the proliferation of connective tissue that we often get with traditional poultice and Bute routine.

We all know that a bowed tendon has great variation in damage to its internal structure. On cross-section we see cavitations with and without hemorrhage. Sometimes they look like a sponge. While we know this damage has to heal before the tendon is repaired with sufficient strength to race, it is impossible to evaluate this by the clinical signs. The ultrasound technology may be the only way to do this. With it we may be better able to monitor the success of any tendon treatment, including SH injection.

**DISCUSSION**

**Gabel:**
You're injecting into peritendinous tissue, over much of this area there is no tendon sheath.

**Churchill:**
You enter the tendon sheath distally; while proximally, the closer the involvement to the knee and the carpal sheath, the less successful the outcome, and that goes for SH injection or any other therapy we might use.

**Selway:**
Your rationale for SH here is similar to what I was working with some years ago with implantation of teflon sheets around the tendon. To be successful in prevention of adherent fibrous proliferation between tendon and surrounding tissue you must get these very early, before you've much fibroplasia started in the paratendon. In the normal state this paratendinous tissue is highly elastic and loosely attached to the tendon, but with inflammation both the elastic fiber and the space are quickly lost, making it difficult to deposit the SH where you want it. I'd also be concerned whether the material remained in place long enough to form a pseudosheath or biodegradable implant.

**Balazs:**
The molecular weight and concentration of the hyaluronate and the mobility of tissue may be significant factors here. For example, in our published study of flexor tendon adhesion in monkey hands, we used a high
weight 2 percent hyaluronate gel followed by post-treatment immobilization and demonstrated significant reduction in adhesion measured by joint flexibility. Similar experiments with traumatized rabbit Achilles tendons and transected monkey extraorbital muscles showed adhesion inhibition with 2 percent hyaluronate.

My theory is that physical separation of the tissues by the hyaluronate is the important mechanism, although some inhibiting effect of fibroblast adherence necessary for fibrous tissue organization may also be involved. If leakage of the SH occurs, so that tissue separation isn’t maintained for the first three days, you won’t duplicate the effect. High molecular weight hyaluronate is pseudoplastic, meaning you can clear a space with it and it will remain in place resisting low shear. This is important.

CASE SELECTION FOR SODIUM HYALURONATE
USE IN THE YOUNG THOROUGHBRED

By Douglass B. Berry, DVM

As race track practitioners, we are constantly confronted with the dilemma of which type of therapy is best for young racing horses that are starting to develop arthrosis of knee and ankle joints.

My first step is a critical clinical examination to determine which joints are contributing to any lameness. Diagnostic local anesthesia and radiographs are used to confirm a diagnosis. Obvious surgical cases should be handled in that manner. What is left, trainers call “puffy knees” and osselettes. Choices of therapy include rest, counterirritation, paints, intra-articular steroids, etc.

Before SH was available, I did use intra-articular steroids in those animals free of radiographic signs, and had success in my selected cases. I really didn’t have a fear of it. Short term phenylbutazone is also good for inflammation, but we’re all becoming aware of its potential toxicity. Once I started to do postmortems of race track horses and saw the ulcers to the stomach, intestine, esophagus and mouth, I became concerned about abuse and long term usage of this drug. I am now quite careful about this. The leg paint counterirritants, I don’t take very seriously. I’m not making any and dispense paints infrequently.

I do fire many horses. Not knees or tendons, but I will fire the ankle of the young horse, half the time because I believe it is of benefit and half the time, frankly, because owners insist upon it. The electrostimulators are being used by some trainers. They seem to confer some benefit when used rigorously everyday, but used sporadically don’t seem to produce any results.

Rest is really the hardest treatment of all. Some owners cannot afford to rest these horses. For the big stables, early in the year, it is often a question of trying to sell stud seasons of their stallions. Their young horses have to be racing and winning especially when the stud is young and unproven. Right now we see a large number of young stallion prospects in which money has been invested. Without the quick two-year-old winners, the yearlings do poorly at the sales and rebreeding to the stallion declines.

There’s a lot of pressure on the two-year-olds with much importance attached to their competing and winning quickly. In this context, provided the animals meet my radiographic criteria, I choose to inject SH. With some racing success, stallions can be marketed. It is quite a big problem. Rest is sometimes not the veterinarian’s decision to make.

When I do rest a young horse for a knee or an ankle, I want four months. I think it takes that long to quiet these joints down and get a meaningful response. Turning these animals out for a month, maybe with swimming thrown in, has not been at all successful.

Six years ago, I started using sodium hyaluronate (SH) in these inflamed joints with a good response while the horse was rested, but lameness returned in some cases after returning to training.

I began, therefore, to look for a prognostic indicator for injecting these young Thoroughbreds. Much had been published on synovial fluid analysis as an important