Chapter

13 DISSECTION

Your quest to become great at this trade can be greatly assisted by doing dissections. Doing a whole horse dissection can teach you a lot about this animal **(Figures 1 and 2)**, but I would start with the legs. Once you have mastered the anatomy of the leg, continue learning from there and never stop.

The goal of this dissection is to see where the extensor and flexor tendons traverse down the leg. Identify and explore the course and position of the suspensory ligament, check ligaments, sesamoidian ligaments, annular ligaments, and collateral ligaments. Identify and remove the horny portions of the hoof from their respective coriums, and ultimately remove the navicular bone from the coffin joint. You will see and learn about the digital cushion, lateral cartilages, sensitive frog, sole, laminae and coronary band.

There are few things that can teach you as much as dissecting a horse's leg. I prefer to have the leg cut off at the distal end of the radius or the distal end of the tibia. I will remove the leg with a saw. This allows me to have the entire carpus and tarsus to go with the dissection.

Begin the dissection by removing the skin. The first cut I make will be up the dorsal aspect of the cannon bone to the where the skin ends. When you remove the skin, try to avoid cutting into the tendons, ligaments, arteries, veins and nerves. The white connective tissue that you will be separating is called fascia. Place the hoof in a vise, and pull on the skin as you cut through the fascia. Once you get to the top of the hoof capsule, you can decide how much skin you wish to leave at the top of the foot. Generally, 1/2 inch is enough to see what is under the skin, yet still get the benefit of seeing the periople **(Figure 3)**.

The first thing that I like to do is to reflect back the tendons to a spot distal to the carpus or tarsus. You can cut them off if you prefer, but I like to have the extra piece to hold on to. If you are on good terms with your local vet, you can get clamps and tweezers to hold onto this slippery biological tissue. If not, needle-nosed vise grips will serve you well.

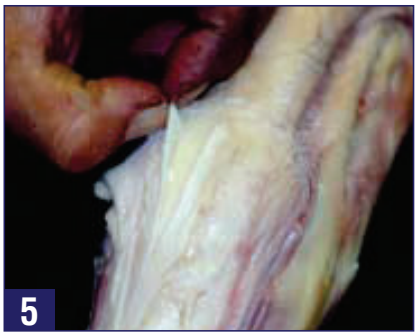
Numerous ligaments hold the carpus and tarsus together. You can decide whether or not you want to separate each bone from the others. This is time consuming, but rewarding as you get to see the exact position and shape of each carpal and tarsal bone. A quick note on time, if the dissection is going to take more time than you have, you can always put it back in the freezer. Depending on your situation,

Whole horse dissection.

Cody working on the carcass of a pony.

Skinned leg in vise.

Cutting through the palmar annular ligament.



Palmar annular ligament

Reflecting back the superficial flexor tendon.

Reflecting back the deep flexor tendon.

Detail of the subcarpal check ligament where it joins the deep flexor tendon.

you may need to disguise it in the freezer to keep your spouse happy.

Begin by reflecting the extensor tendons back from the cannon bone. You will notice that they are quite thin compared to the flexor tendons. Their job is to pull the leg forward against minimal resistance, while the flexor tendons have to have superior strength to push the weight of the horse forward.

With the hoof held in the vise, you can identify the tendons as you reflect them back from the leg. In **Figure 4**, I am cutting through the palmar annular ligament to allow me to pull the flexor tendons back. The palmar annular ligament is very thin and inelastic. You can see just how thin by looking at **Figures 5 and 6**. The palmar annular ligament is the piece that I am holding between my thumb and finger in **Figure 5**. The most external tendon is the superficial flexor tendon. You can see that I have reflected it away from the deep flexor tendon to the point where the superficial flexor makes a ring around the deep flexor tendon in **Figure 7**.

I like to cut through one side of the superficial flexor so that I can reflect it back and free the deep flexor tendon as it makes its way around the navicular bone to insert into the semi-lunar crest of P3. Run your fingers up and down the deep flexor, and you can feel how the dimensions change from round proximal, to flat and wide as it passes over the back of the pastern. In **Figure 8**, I have reflected back the lower portion of the superficial flexor tendon and removed the top portion of it all together. In the picture, the deep flexor tendon is being pulled away to expose the sesamoidian ligaments underneath.

he deep flexor tendon on the thoracic limb has a check ligament on it called the subcarpal (inferior) check ligament. It is quite a thick and strong check ligament, and in **Figure 9** you can see where it attaches to the deep flexor tendon. This is the largest and strongest of the 3 check ligaments.

At this point in the process, I generally go back to the palmar aspect of the cannon bone and remove the suspensory ligament. This is the largest ligament in the leg (bear in mind that the leg is technically from the knee or hock down). It originates at the palmar proximal cannon bone with adhesions to the carpals or tarsals, courses distad, and bifurcates at the distal nodules of the splint bones. If you look at **Figure 10**, you will see that the striations of this ligament at the bifurcation area are very pronounced in this horse. They are not always as

Striations in the suspensory ligament (interosseous muscle, interosseous tendon) at its' bifurcation point.

Freeing the suspensory ligament from the cannon bone,

Pulling the suspensory ligament back at the sesamoids.

Fetlock joint with the cannon bone still in the joint.

Fetlock joint with the cannon bone removed. Detail of the deep and short sesamoidian ligaments.

defined. The distal nodules are easy to find at this stage by running your fingers down the splint bones. Follow the suspensory ligament to its insertion on the sesamoids and then dorsodistad to the main extensor tendon.

Pull back on the suspensory ligament as you cut along both sides of it to reveal the proximal sesamoid bones **(Figures 11 and 12)**. The sesamoid bones make up a large portion of the fetlock joint (metacarpophalangeal joint), so when you cut through the collateral sesamoidian ligament that holds them in place, you should get into the synovial fluid of the fetlock joint.

Having found the fetlock joint, I cut around the joint to free the cannon bone from the pastern. It is amazing to feel how slick this joint surface is, and you can move the cannon around on top of P1 to feel the lack of friction.

There are 6 ligaments that are known as sesamoidian ligaments, and this is a good time to identify these. We have already cut through the bulk of the collateral sesamoidian ligament on the sides of the fetlock joint. By pulling on the suspensory ligament to reflect the sesamoidian bones away from the fetlock joint, you may be able to see the deep (X) sesamoidian ligaments and the short sesamoidian ligaments. **Figure 13** depicts the dorsal aspect of the sesamoids being pulled back and the cannon bone still attached to the proximal and dorsal aspects of P1. In **Figure 14**, the cannon bone has been removed, and the deep sesamoidian ligament is the X-shaped tissue in the middle of the picture, and the short sesamoidian ligament is the tissue on either sides of the deep sesamoidian ligament. Both of these connect the distal, dorsal aspect of the sesamoid bones to proximal P1. Use a towel to wipe away the synovial fluid to see it more clearly. They can also be found from a palmar route to resemble the drawings of these ligaments in the ligaments and tendon chapter.

Place the sesamoids back in position, and you can now see the palmar aspect of the sesamoidian ligaments and pastern. In **Figure 15**, the scalpel is touching the intersesamoidian ligament. To the right of the photo is a flap of tissue. This is part of the palmar annular ligament that was shown in **Figures**

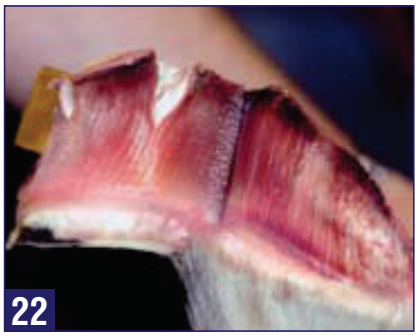
Intersesamoidian ligament with some of the palmar annular ligament attached.

Superficial sesamoidian ligament (Y or straight sesamoidian ligament).

Middle sesamoidian ligament (V or oblique sesamoidian ligament).

Pulling the sole off prior to removing the hoof wall.

Removing the sole after the hoof wall has been removed.



Pulling the hoof wall off of the coffin bone.

5 and 6. There are a lot of adhesions between the palmar annular ligament and the intersesamoidian ligament.

Below the intersesamoidian ligament, the straighter of the ligaments on the back of the pastern is the superficial (Y) sesamoidian ligament **(Figure 16)**. Cut this away, and you can see the middle (V) sesamoidian ligament that originates on the sesamoids and inserts into distal P1 **(Figure 17)**. If you cut it away as well and carefully cut under the sesamoid bones, you can find the deep and short sesamoidian ligaments from the palmar view.

Take the foot out of the vise and put P1 in its place. The hoof is now ready to be dissected. You can see the solar view, and this is a good time to identify all the parts. Nip from heel to heel at an angle, going right to the white line if possible. As you nip, be certain to point out to any onlookers that nipping like this is only done when working on dead feet. Depending on what you want to do, you can pull the sole off now, as in **Figure 18**, or do it after the wall is pulled away as in **Figures 19 and 20**.

To pull the wall away, grab the wall at one heel with the pulloffs. Move the reins of the pulloffs toward the toe, tearing apart the bond between the horny and sensitive laminae **(Figures 21-22)**. You will be exposing the coffin bone covered with sensitive laminae as you pull the hoof wall off. This is such a strong connection, that you may be surprised at just how difficult it is to get the hoof wall off of the coffin bone. With the wall and sole removed,

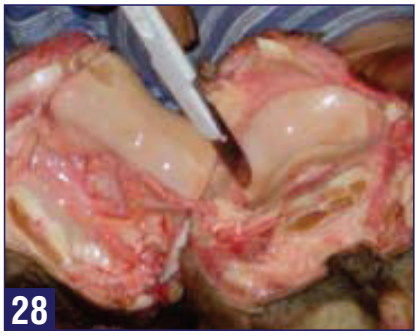
Sensitive sole.

Sensitive laminae

Coriums of the foot exposed.

Pushing back on the toe of the foot to cut into the coffin joint.

Access to the coffin joint and navicular bone with one of the collateral ligaments of the coffin joint still intact.



Cutting around the navicular bone.

you should be looking at the coriums of the hoof **(Figures 23-25)**.

Many basic dissections will stop at this point, but I like to cut into the coffin joint and remove the navicular bone. You can do this carefully or roughly, depending on what structures you are still trying to identify. To identify the collateral cartilages and their ligaments takes a lot of patience and careful cutting.

To remove the navicular bone in a rough manner, push back on the toe of the coffin bone as you cut into the deep flexor tendon, collateral cartilages, and eventually into the coffin joint **(Figure 26)**. I like to cut through one of the collateral ligaments of the coffin joint, but leave the other complete to hold the coffin bone for me **(Figure 27)**. Cut around the navicular bone with your scalpel as you attempt to release it from its position **(Figure 28)**.

You have now exposed, touched and defined many of the major structures of the horse's leg. The more dissections you do, the more you will learn. From time to time, you may even find unusual and abnormal anatomy, but you will always find more knowledge.