Jack Adams

Systematic Raising of Vessels used in Embalming

Part I

by Jack Adams

Back in 1963, when I was a student at Worsham College of Mortuary Science, I had the opportunity to observe many good embalmers. Some of these happened to be the top trade embalmers in the Chicagoland area. These observations were possible because, previous to my schooling, my father had operated a morticians' service. My brother and I were his assistants for removing and transporting remains. Consequently, we became acquainted with many embalmers who were willing to share their knowledge and techniques. However, there were some who weren't willing to share at all. After running into a few of that sort, I made up my mind that if at any time I could help or instruct young embalmers or conscientious embalmers wanting to increase their skills, I'd do my best to give them some useful assistance.

While observing these men in action, I noticed that they all seemed to raise vessels differently from one another. They made incisions for the same arteries in different locations. They searched through fascia differently to find the same vessels.

Several of these good embalmers had some difficulty in raising structures, and became very frustrated. While witnessing their stress and frustration, I decided that if I got that frustrated, this job wouldn't be for me. So I began to develop systems for raising vessels, and found these methods to make the raising of arteries and veins a much easier, far less stressful, and more predictable task. The idea of systematic vessel raising is to know where to start and know where your point of dissection is at all times—by using easy-to-follow anatomical road signs along the way to your final surgical destination. In doing this, you'll develop confidence, speed, and do the least amount of damage to the tissues.

Raising the Common Carotid Artery and Internal Jugular Vein

Begin by establishing an imaginary line drawn from the right earlobe to the articulation of the sternocleidomastoid muscle and the clavicle. Draw another imaginary line running from this articulation laterally along the clavicle. Refer to Figure 1. We can see that we've formed an angle with the center at the articulation.

We next make a 2″ incision that bisects this angle. However, we do not start the incision at the articulation. Instead, we move laterally and superiorly about 1″ from the articulation of the muscle and the clavicle. Our initial incision is very superficial, just separating the skin. We begin careful medial dissection, avoiding superficial vessels, until we identify the muscle tissue of the sternocleidomastoid. Now, we dissect to its posterior border—which runs parallel to the right carotid artery and jugular vein.

At this point, we should recognize

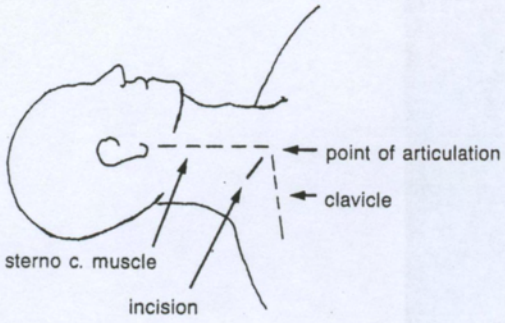

Figure 1

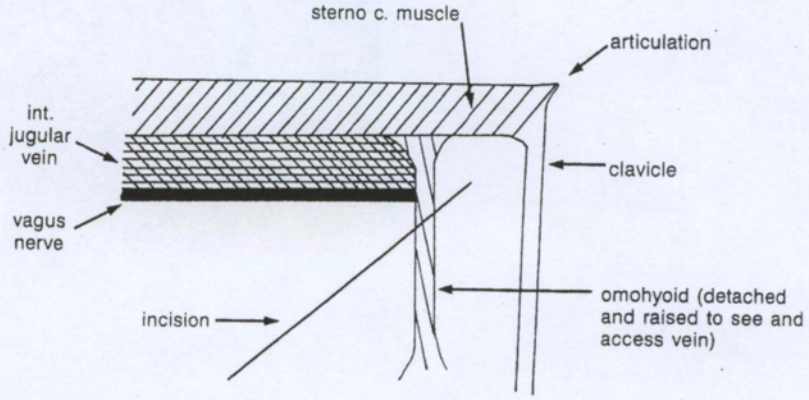

Figure 2

a tiny tendon-like muscle crossing into the sternocleidomastoid muscle at a right angle. This muscle is called the omohyoid (inferior belly). After identifying this muscle, we can detach its lateral connection. We then simply move the muscle from right to left with our finger or hemostat, and we can now access a tube-like fascial structure called the carotid sheath. This sheath contains the internal jugular vein, the common carotid artery, and the vagus nerve. When dissecting through the sheath, the internal jugular and vagus nerve will be observed first. The nerve is a white shiny structure running parallel to the vein and entwined in the fascia of the sheath.

I recommend you separate the vagus nerve from the internal jugular vein so that the insertion of a drain tube or angular forcep will be accomplished much more easily. After the separation of the nerve and vein, ligate the internal jugular vein, and dissect slightly medially and posteriorly, which will give you easy access to the right common carotid artery. The artery will be easily identified by its pink web-like covering of vasovasorum (the minute system carrying blood supply to the artery walls). Once you've mastered this system of raising the right jugular vein and common carotid, the same method of dissection can be used on the left carotid and internal jugular vein, because the anatomical guides are structured identically, including the omohyoid muscle.

To review: Make an incision in the center of the angle formed by the SCM muscle and the clavicle—beginning about 1" from the point where the muscle and the clavicle meet. Dissect superficially and medially until you identify the SCM muscle. Dissect to the lower border of that muscle until you identify a tendon-like muscle, the omohyoid. Detach its lateral end, raise it with a hemostat to the left or medially, and access the internal jugular vein and the carotid artery inside the carotid sheath.

In the next issue, we'll discuss similar "landmarks" that can be used in terms of raising the femorals.

Jack Adams

Systematic Raising of Vessels used in Embalming

Part II: The Femorals

by Jack Adams

Editor's Note: In the last issue, we had the first installment of this series. That article was also the first written for *The Dodge Magazine* by Jack Adams. Because Jack will be writing for the magazine on at least a semi-regular basis, we asked him for a "Bio." (Perhaps we should have put this together for the first article, but better late than never.) To our surprise, Jack sent us a little over a typewritten page of material. To our further surprise, we thought it was interesting enough—and thought you would find it interesting enough—so that we didn't edit it down to the usual two or three paragraphs. Following the next seven paragraphs, his series on locating points of injection will continue.

The Adams family are no strangers to the funeral industry. I'm a member of the fourth generation of Adamses to serve in the funeral profession in the Chicagoland area. When I was in fifth grade, my family lived in an apartment above a funeral home which my father managed. It was a very young community, so it did a relatively low volume of business. One of the benefits of this was that when we were not busy, we had our own private indoor sports arena. My brother and I enjoyed our favorite sports such as football and wrestling—at least until my mother put the whammy on our rough-house antics.

When I was eleven years old, my father went into a removal service, transporting remains within the Chicago metropolitan area. My father asked me if I'd be interested in a summer job which consisted of traveling around with him and assisting him in transporting these remains. It sounded good to me. The pay was a buck a call, and I'd be able to spend time with my dad, who was really a fun guy to spend time with. He was a busy man, so this was great for my personal finances. Besides, I had an ulterior motive for taking the job. I knew when I entered eighth grade I had a strong desire to make the freshman football squad—but I only weighed 95 pounds. This would give me the opportunity to build my strength and increase my weight in order to try out for the team. It wasn't your conventional pumping iron workout, but it worked for me. That summer I gained nearly 20 pounds, and I was able to make the freshman football squad when the time came.

I continued working with my father during future summers and in the course of this I was fortunate enough to meet many fine people in the funeral business. By the time I graduated from high school, my father had left the service work and, due to health reasons, returned to the profession as a funeral director. I went to college on a football scholarship, but my interest in the funeral industry, especially embalming, never left me. After my first year of college, I decided to enroll in Worsham College of Mortuary Science. My brother did the same, and in 1964 we graduated second and third in our class. Shortly thereafter my father Bill, my brother Tom, and I began a mortician service called William J. Adams and Sons. Within a few years, we built a successful business based on hard work, good service, and quality embalming. My father always stressed the importance of viewing the body, and we did our best to make the viewing a peaceful, pleasant experience.

In 1975 my father died, and it was this experience that made me and my family realize just how important a

traditional funeral and viewing can be. It was this incident that made me realize what grieving families feel, and just how significant an embalmer's work can be. I became a better embalmer because of my increased level of sensitivity to the feelings of families.

I've always been interested in sports, and have enjoyed teaching and coaching my only child Christy. Fishing, swimming, snorkeling, and scuba diving are some of the sports we shared before she went off to college. It was then that I realized how much I enjoyed coaching, and decided to try it at the 7 to 12 year old level. I coached boys wrestling and football for three very rewarding years. I loved the feeling of teaching a youngster a basic wrestling move or how to make a driving tackle in football, and seeing them practice the move to finally master it.

In 1986, I was asked to be an embalming instructor at Chicago-City-Wide College, and I accepted. I found myself enjoying teaching and coaching future embalmers. I still remain on the faculty of City-Wide. I've had a real estate license for the past 8 years, and a funeral director and embalmer's license for 26 years. I'm currently active on the Illinois Funeral Directors Association's technical seminar team and also with the Funeral Directors Service Association of Greater Chicago, on their seminar, infectious disease, and education committees.

I was fortunate early in my embalming career to have many good embalmers, including several top trade embalmers, take the time and effort to coach me. When I can pass along their teaching and my own, it allows me to experience personal rewards. An embalming well done can bring peace to a family and rewards to the embalmer. After 24 years of trade embalming and 2 years with Dodge Chemical, I still believe in the basics of a peaceful, pleasant viewing.

In the last issue of *The Dodge Magazine*, we discussed the concept of using a specific, systematic approach to raising a vessel for embalming purposes. The idea of developing a system for this is to make the surgical procedure less stressful or frustrating and more predictable for the embalmer. I have found that having these systems can make our procedures flow smoother, faster, and with the least amount of structural damage.

However, I realize these methods are not for everyone. If, without having any highly organized approach, an individual can find and raise the vessels they need every time in a quick and direct manner, changing one's style wouldn't make sense. On the other hand, a new embalmer entering the profession or an embalmer experiencing some difficulties in raising certain vessels could very well benefit from these systems. Even if the reader chooses not to adopt an illustrated method exactly, he or she may use these examples to develop systems of their own.

In the first part of this series, we covered the system for raising the right common carotid artery and the right internal jugular vein. It was pointed out that once this was mastered, the same system could be used on the left common carotid and the left internal jugular because the anatomical structures are the same, including the omohyoid muscle. The next vessels we'll cover will be the right femoral artery and vein. In school we were taught that these vessels are located in the femoral triangle, otherwise known as Scarpa's triangle. The borders of the triangle are the Sartorius muscle laterally, the Adductor Longus muscle medially, and the Inguinal ligament (a) superiorly. The main neurovascular bundle of the thigh (femoral nerve, artery, and vein—in that lateromedial order) (b) is contained within the triangle.

The incision will be made on perhaps a 3 inch segment along an imaginary line which runs from the center of the Inguinal ligament to the inner side of the knee joint. The femoral groove lies along this imaginary line—between the Sartorius and the Adductor Longus muscles. Place a long straight forcep atop the pubic bone (running parallel to the pubic bone) and allow it to extend out across the femoral groove. The point (c) where the forcep and the femoral groove intersect will be the center point of our incision.

Some people prefer to make the incision more inferior. I choose the more superior site for the following reasons: at this site the artery is somewhat larger and more superficial, thus making it easier to find and more practical for inserting an arterial tube into. Another reason that I like to make the incision at this location is that it gives you another injection option. At this point the deep femoral artery (d) branches off from the femoral. There have been times over the years when the injection of the femoral artery has been unsuccessful, but through the body's own collateral circulation, I was able to achieve good results by injecting the deep femoral artery.

The size of the incision is not important. As far as I know there are no prizes given for the smallest incision made. The important thing about incisions is when the job is complete, they should be dried, sewn, and sealed to prevent any leakage. Depending on the size of your fingers, make the incision large enough so that it is comfortable for you to work in. If you have to make a femoral incision on an obese person, you'll want to make a larger incision to be able to see better while dissecting deep through the additional fatty tissue. The Whitney Incision Spreader or the Adjustable Retractor from England can both be very useful in this situation.

Now that we have established our site, make an incision of approximately 3 inches with the center (c) at the level of the pubic bone, as discussed. Separate the skin from the fascia and connective tissue at the incision site in order to make the dissection easier. Be careful not to rupture any superficial vessels (the great saphenous vein, for example).

Dissect directly laterally and approximately at a 45 degree angle, un-

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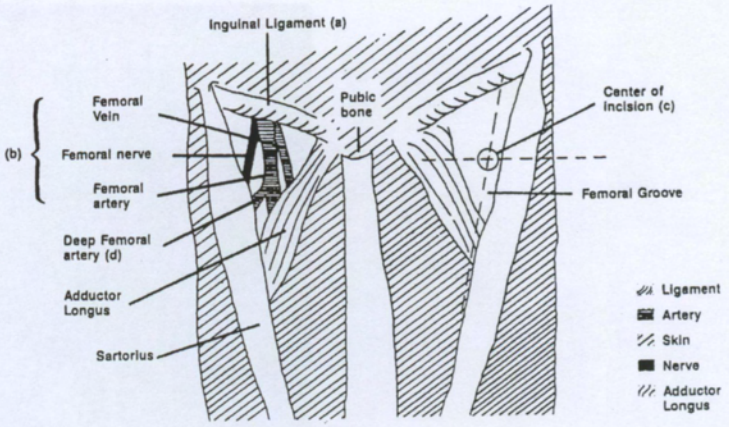
THE FEMORALS

continued from page 5



til you identify the Sartorius muscle. Now find the medial border and begin to dissect slightly medially (about a finger's width) within the femoral groove. We can now easily locate and access the neurovascular bundle containing the nerve, artery, and vein. The cream colored femoral artery will be easily recognizable with its pink web-like covering of vasovasorum (the minute system carrying blood supply to the artery walls). Once we have identified the femoral artery, we should dissect its borders, being careful not to rupture the vein lying directly medial and slightly posterior to the artery. Parallel dissecting maneuvers with blunt instruments are recommended to avoid excessive damage to surrounding vessels and tissues.

After cleaning fascia from our artery and successfully separating the artery and vein, we can raise the artery to the surface for injection purposes. Care should be taken in the dissection of a sclerotic artery in order to avoid rupturing of the vessel. In obese cases it may be impossible to raise the artery to the surface. In such cases the arterial tube will have to be inserted inside the incision. After we incise the artery, and before we insert the arterial tube, it's a good idea to lightly massage the leg upward from the inner side of the knee joint toward the incision. Many times we will be successful in removing potentially troublesome clots by using this technique.

Artery selection is often times just the preference of the embalmer. There are times, however, because of physical characteristics, diseases, or the condition of the remains that the embalmer has less choice and the case at hand dictates what vessels must be raised. This is why it is a good practice to have some methods for raising all arteries used for embalming purposes. Systems can make your job less time-consuming and frustrating. They can build confidence and help you use sound surgical techniques instead of using the fishing techniques you may now be employing.

Recapping:

1. Find the place of incision in the femoral groove with its center at the level of the pubic bone.
2. Dissect laterally, approximately at a 45 degree angle, until you identify the Sartorius muscle. Now find the medial border.
3. Work slightly medially until you identify the bundle containing the femoral nerve, artery, and vein.

RIGOR MORTIS

continued from page 6

The cause of death, of course, plays a large role also. Cancer and tuberculosis, regardless of duration, are debilitating diseases which cause rigor to appear early and pass quickly. After strenuous physical exercise, death is quickly followed by rigor. When convulsions precede death, rigor mortis sets in early, as a rule. Certain poisons, of course, cause convulsions, and thus bring on rigor more quickly. A body dead of drowning, and not recovered quickly, will undergo the process of rigor mortis at a very different rate from one exposed only to air. It usually comes on earlier, reaches full intensity rather quickly, and may well last longer too.

There is no unanimous agreement among authorities on all aspects of rigor mortis—causes, duration, etc. It is quite generally accepted, however, that the muscles are relaxed and pliable immediately following death. Then, at varying times, as we have discussed here, the muscles will stiffen and contract and the body tissues will become acid. Finally, and again at variable times, the muscles will relax, become soft, and the tissues will return to neutral or alkaline. From this point, decomposition will become more rapid.

If rigor has not been effectively relieved, the most immediate and apparent problems will be in properly positioning the body and in posing the facial features and hands. An even more serious problem—perhaps because it is less obvious—will be restricted circulation, caused by the contracted vessels. This can create resistance to the injected solution—and thus inadequate preservation of some areas.

Occasionally, we hear of the "mysterious" softening of the lips and the area around the mouth hours after the completion of embalming. Although not the only cause for this undesirable development, failure to relieve the rigor in the tissues of the area and the constriction it causes in the vessels, is often the underlying cause. Other

Jack Adams

Systematic Raising of Vessels used in Embalming

Part III: The Brachials

by Jack Adams

In the last issue of *The Dodge Magazine*, we discussed a method for raising the femoral artery and vein. In the issue before that, we discussed a system used for raising the carotid artery and jugular vein. Each time you learn a new system and are able to utilize it, it can make your job that much easier. With widespread use of chemotherapeutic drugs and addictive drugs, one commonly encounters bodies which should be an "average case," but which instead present a variety of difficulties during the embalming process.

These difficulties may include such things as hepatic insufficiency, renal failure, and circulatory obstructions. Jaundice is common, and so is tissue saturated with nitrogenous waste. Artery walls break down, either weakening or collapsing altogether—and shutting off the channels for chemical distribution. Fungal fibers often form in the circulatory system due to heavy doses of antibiotics being administered.

Permeation of the tissues with ammonia and uric acid by-products make them spongy and difficult to preserve. Sometimes just being aware of these problems and having the right chemicals to do the job are not enough. When the going gets tough, we've got to return to good common-sense basics. In many of these difficult cases, this would mean raising as many arteries as is needed to inject the proper amount of a preservative chemical so as to achieve thorough preservation.

One of the most common errors I see occurs when an embalmer fails to raise a femoral for an edematous leg. A dilute fluid concentration is prepared, based on the tissue condition of the near-normal upper body. But the lower extremities, with their extremely edematous tissues, would require a much stronger solution. The embalmer injects the body with the normal solution which preserves everything but the water-logged legs. He says to himself, "There's color in the lower extremities, so that should be enough fluid to do the job." Wrong! The extreme edema in the legs calls for a strong arterial solution with little or no water.

Some excuses for not raising the arteries are: I'm afraid that if I raise an additional artery, the incision might leak, and besides, I see some fluid color in that leg anyway. Color alone in an edematous leg doesn't mean anything. We can get color by adding dye to water and injecting it. If a normal mixture of arterial solution (eight ounces of a 25 index chemical to a gallon of solution) is used for a very edematous body, one might as well be injecting straight water for all the preservative punch you can expect to derive.

The last thing a water-logged leg needs is more water. The only way to adequately preserve such an extremity is to treat it with a separate injection of its own and use a solution with little or no water, depending on the severity of the edema. And it's not just the water in the water-logged tissue we must deal with. This condition will invariably also involve compounds which neutralize preservatives, such as ammonia and uremic acid. Therefore, we have further need of stronger arterial solution—as well as further need for raising and injecting whatever arteries it takes to achieve proper preservation.

Systematic vessel raising makes the job easier and quicker, so we are less reluctant to do what we know we ought to do when the possibility of sectional embalming is considered. You'll find yourself raising vessels in less than a minute on a regular basis, and sometimes in seconds. This comes through practice and repetition, until finally you find the groove in the same way a professional golfer masters his swing . . . until he reaches a consistent predictable swing.

How much longer does it take from start to finish to raise a vessel and inject a limb? With a system, it doesn't take much time at all! Maybe five minutes . . . and add to this another minute to sew the incision. This sure doesn't seem like a very long time to invest for the peace of mind you'll get—not to mention the prevention of a possible lawsuit due to improper embalming and body preservation. As a matter of fact, the number one cause of tissue gas which we all dread so much is poor embalming. If we fail to do thorough embalming and neglect to raise and inject the necessary vessels, gaps may develop, skin slip could occur, and finally putrefaction may follow. This unpleasant chain of

events might very well end up in a lawsuit involving not only the funeral home but the embalmer as well.

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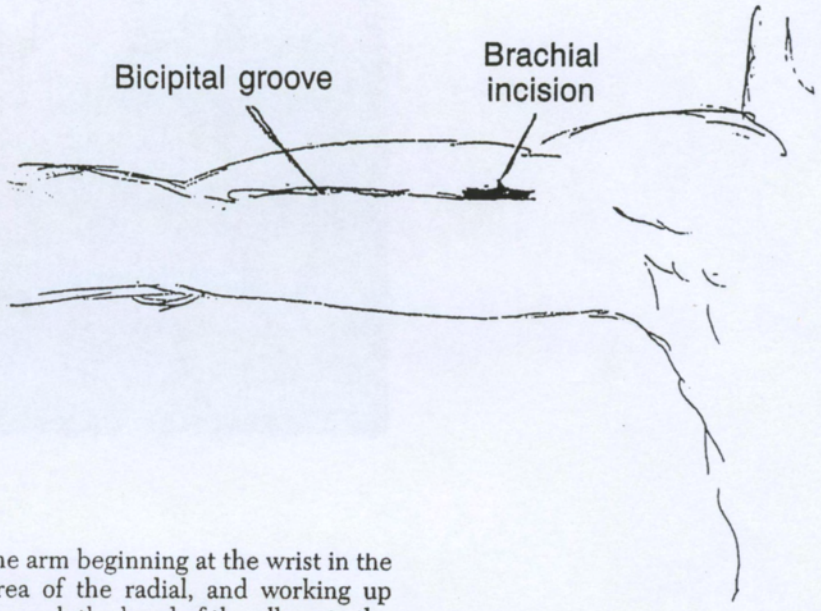
In this installment, we'll specifically discuss the brachial artery and vein. Here again, the same vessel raising system can be used for either the right or the left brachial artery and vein, because of the identical anatomical structuring in both arms. The brachial artery begins at the lower border of the teres major muscle, as a continuation of the axillary artery. From here it extends to the bend of the elbow, where it divides into the radial and ulnar arteries.

Some embalmers prefer raising the axillary artery. Personally, I find it awkward working in the axillary space (arm pit), so I choose the brachial artery. We begin by positioning the arm at a right angle to the body, to make our work easier. The vessels will lie in the groove (bicipetal groove) between the biceps and triceps muscles. The brachial artery and vein will be found in a sheath with the median nerve. The vein will be medial and superficial to the artery.

The incision point will be approximately two inches inferior to the axillary space, at a level slightly above (perhaps a half inch above) and parallel to the groove. The first step after making the incision would be to dissect directly to the biceps muscle which lies straight below the incision. After identifying the muscle, we dissect to its medial border—and slightly deeper or posterially, until we see the bundle or sheath containing the major neurovascular structures of the arm. Care should be taken in using gentle parallel dissecting strokes to avoid excess damage to minute collateral vessels.

Again, the artery will be recognized by its pink web-like blood supply covering (vaso vasorum). Now it is just a matter of separating the cream-colored artery from the sheath containing the vein and the white shiny nerves. When that is done, the vessel can be prepared for injection. Once the brachial is raised to the surface and ligated, we can incise it. It is usually advisable to gently massage



the arm beginning at the wrist in the area of the radial, and working up through the bend of the elbow to the incision one has made in the artery. We should do the same on the ulnar side of the wrist, again ending at the raised artery. This massaging may remove some potentially troublesome blood clots from the arteries.

To recap:

1. Find the bicipetal groove.
2. Make the incision about two inches from the axillary space, slightly above and parallel to the groove.
3. Begin careful dissection directly to the biceps muscle, and then work to its medial border.
4. Dissect slightly medially, and deeper—until you identify the bundle containing the brachial artery and vein.

Jack Adams

Systematic Raising of Vessels used in Embalming

Part IV: The Radial and Ulnar Arteries

by Jack Adams

The Radial Artery

In the last installment, we talked about injecting the brachial artery. If after injecting from there you still do not have proper distribution of fluids into the hands and fingers, then the embalmer should raise either the radial or the ulnar artery. Some embalmers make an incision in the bend of the elbow, at the point where the brachial artery bifurcates into the radial ulnar arteries. At this point either artery can be reached easily. Because of the many circulatory blockages which can occur in the lower half of the arm (particularly the formation of glucose gel from intravenous feeding), direct incisions into the wrist are preferred by most of us. Some make a large incision into the middle of the wrist, parallel to both arteries. If the incision is large enough, either artery can be raised or injected. The following is the system I use for raising the radial artery.

As mentioned, the radial is one half of the bifurcation of the brachial at the elbow's bend. It is the smallest of the two branches, and appears to be a continuation of the brachial. With the palm of the hand turned upward, the line of the radial would be drawn starting at the center of the inside of the elbow, from which point it would swing outward toward the thumb-side of the arm. From here it proceeds in a fairly straight line through the base of the thumb and on through the index finger. Immediately beside this same line you'll find the substantial tendon of the flexor carpi radialis muscle. Just slightly lateral to this tendon, where the pulse can easily be taken, is the line along which I make the incision. The incision is made about two inches superior to (or above) the wrist, and it is parallel to the tendon, but just a whisker lateral to it. I prefer to use a #20 scalpel blade for the incision, just superficially separating the skin no wider than the width of the blade. This makes it possible to close the incision by merely inserting a trocar button.

Once incised, the fascia connecting the skin should be separated around the inside of the incision using the blunt hooked end of an aneurism hook. This will make the work easier in the tiny incision. Now we work the hook about half an inch deep, adjacent to the tendon, and slowly turn it laterally or toward the thumb. The first time or two that you attempt this could result in your raising one of the flexor tendons of the wrist area. But, you'll be pleasantly surprised at how, with a little practice, you will be raising radials in just a matter of seconds. After injecting the hand, the cannula can be reversed, and more chemical can be injected up into the arm, if additional preservation is needed.

To Summarize Raising the Radial:

1. Find the major tendon in the wrist at the base of the thumb. This can be done by drawing a line from the center of the inside of the elbow to a point in the center of the index finger. Bending the wrist forward may make finding the tendon even easier. This is the tendon of the flexor carpi muscle.

2. Make your incision a couple of inches above or superior to the base of the thumb and just lateral to the tendon. Use whatever size incision you feel comfortable with.

3. Work adjacent to the tendon and about half an inch deep. Use gentle parallel strokes, slowly turning the blunt hooked end of an aneurism hook toward the thumb. Use smooth twisting motions in order to locate and raise the radial.

The Ulnar Artery

The ulnar artery is the largest of the two branches into which the brachial divides. Because it is larger, it can be beneficial to raise the ulnar for proper fluid distribution to the hand—especially when the arteries are sclerotic. In fact, if sclerosis is present, you may not be able to inject the smaller radial at all. For this reason, the ulnar is preferred by many embalmers.

The method I choose to use for raising the ulnar is similar to that which I described for raising the radial. I like to use a small incision, just the width of a #20 scalpel blade. I find that less sewing can mean less leakage. The ulnar artery runs on a line drawn from the center of the bend of the elbow to a point between the third and fourth fingers. The incision is made on this line, about two inches above the base of the wrist—just enough to be below the sleeve

line when the body is dressed. Again, make the incision any size that you feel comfortable with.

The ulnar artery lies deeper than the radial artery in the wrist area. After making the incision, take your aneurism hook, and gently separate the fascia around the incision to make dissection easier. Next you work the aneurism hook parallel and adjacent to the tendon of the flexor carpus ulnaris muscle. Use a light back-and-forth stroke, working your way to about one half or three quarters of an inch deep (depending upon the size of the wrist).

Now we turn the hook in a slow twisting motion at a right angle, or toward the thumb, and then we raise our artery. Until you get used to raising this vessel, you may raise a few nerves as well. You can easily sort out the nerves by using a basic identification method. That is, arteries have about them vaso vasorum (the pink, web-like blood supply to the arteries).

With repetitive experience, you'll find yourself raising the ulnar artery in very little time. I'd like to mention here that some embalmers prefer using an 18 gauge plastic catheter instead of the usual radial arterial tube for injection. This tube is flexible, and can be adapted to fit either a stopcock or a hypodermic syringe. The same catheter is widely used for injecting the vessels of infants.

To Summarize Raising the Ulnar:

1. Make your incision in the groove between the tendons that are on the line between the third and fourth fingers. These tendons are the flexor carpi ulnaris and the flexor digitorum subliminus. The incision should be about two inches from the base of the wrist. Make it high enough so a plastic sleeve or latex leak-proof bandage could cover the incision. If leakage problems do occur, they will still be above the sleeve line.

2. Direct the aneurism hook parallel to the flexor carpi ulnaris and to its lateral border. Slowly work the hook in with a gentle stroking motion. Follow the same line as the artery, working at a depth of one half to three quarters of an inch.

3. Finally, carefully turn the hook toward the thumb to raise the artery.

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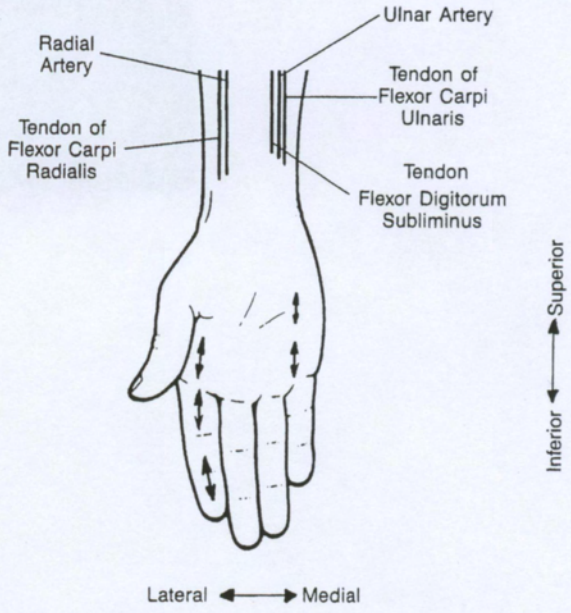
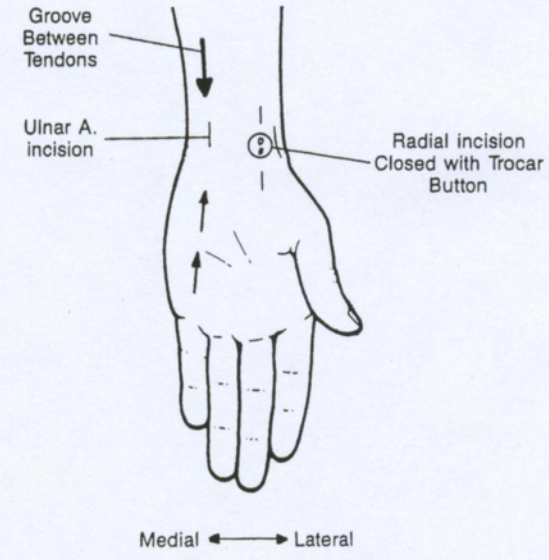
Whether you learn to use the systems we've discussed for raising vessels, or you develop your own methods, the fact is that vessel raising systems can help an embalmer work with confidence and consistency. Being aware of the embalming problems caused by chemotherapy, antibiotics, and addictive drugs (or knowing what chemicals are to be used to overcome such problems) is sometimes not enough. Even the best chemicals must be delivered to the cellular level to do their job. It is the basic responsibility of the embalmer to raise whatever vessels are necessary to overcome difficulties and achieve thorough preservation.



Palm Surface of the Right Hand
figure 1



Palm Surface of the Left Hand
figure 2