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### The art and business of medical legal illustration

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ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the faculty of  
The College of Imaging Arts and Sciences  
In Candidacy for the Degree of  
MASTER OF FINE ARTS

The Art and Business of  
Medical Legal Illustration  
by  
Jeff Davis  
2004

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Date: 08/02/04

The original draft of this thesis was written in 1999. At the time I knew I had a strong interest in the art and business of medical legal illustration. Since writing this first draft, which has now been adjusted based on your comments, I have worked for four years as a professional medical illustrator. I went on to work full time as a senior medical illustrator for The Presentation Group in Orlando, FL for three years. I experienced what I had researched and written about in my Masters thesis first hand on a daily basis. I am now the owner of Legal Art Works Inc., a legal exhibit service in Jacksonville, FL. As I am in the midst of my first months of business, I often find myself reflecting back to 1999, when I was creating this thesis and learning the in's and out's of the industry for the very first time.

Though my knowledge of anatomy, medical conditions, and surgical procedures is more sophisticated than at the time of writing this thesis, it has been left in its original form as written in 1999, however the appropriate corrections have been made.

Before creating the four medical legal exhibits that I created for my thesis, I researched the field of medical legal art and spoke with professionals that illustrate for such companies as well as the company heads. In addition I researched via the Internet several medical legal art firms around the country to get a better understanding of the services and prices. The companies I looked into were: The Presentation Group in Orlando, Florida, Medical Visions in Marietta, Georgia, Howell Medigraphics in New Orleans, Louisiana, Evidential in Claremont, California, Medical Legal Art in Atlanta, Georgia, Trial FX in Woodstock, Georgia, Rusty Jones in McKinney, Texas, Coulter Medical Legal Exhibits in Pittsburgh, Pennsylvania, and BioImage in Durham, North Carolina. I found that the services offered by these companies are fairly similar and the same type of exhibit's price could range from \$500 up to \$1450.

The exhibits that these companies create for trials illustrate a specific case situation to both a professional and lay audience. Since the average jury member has only an 8<sup>th</sup> grade education, describing in detail a surgical procedure or a specific type of injury to a jury would be meaningless if they did not understand exactly what it was that occurred. These exhibits make it understandable and if done well can be dramatic images that can have a strong effect on the viewer. Often these illustrations are created in a manner that is "bloody" or "violent" causing jury members to really feel for the plaintiff or defense. For example, a "30 x 40" exhibit of a boy with severe head trauma could be left sitting in front of the jury for a lengthy amount of time. While the case is ongoing members of the jury quite often just stare at the art in front of them. Eileen Desterno, an employee at Medical Visions in Marietta, Georgia, says that there have been several occasions when a jury member actually fainted when viewing one of their exhibits. In many cases the winnings are in the multi millions. Medical legal art years ago was expensive, because each exhibit had to be done by hand and was used infrequently. With today's technology the same thing can be done



quite rapidly digitally in Adobe Photoshop, laid out in Quark Xpress or Corel, then printed on a large scale printer for a fraction of the price. Overall, the business of medical legal art exclusively is fairly new. In doing my research, the oldest company I could find was Coulter Medical Exhibits, who have been in business for 20 years.

When a medical legal art firm is initially contacted by a law firm, they are usually given a letter that has a short summary of what is involved in the particular case, a rough description of what they would like depicted in the exhibit, and a request for a written proposal. The illustrators are usually given a copy of the operation report, a discharge summary, X-rays and radiology reports. Upon the lawyer's approval of the written proposal, the sketch process begins. The "sketch" is usually actually a finished fully rendered image done in Adobe Photoshop, which can be changed if necessary fairly easily. The sketch is seen by the law firm via Federal express or more often recently via the Internet. Once it is approved the image is printed full scale (up to 30" x 40") and mounted on a foam core backing. Medical legal art firms have similar services but some expand beyond surgical and trauma illustrations. I researched ten medical legal art firms and found out what services they offer their clients.

*Coulter Medical Legal Exhibits* services include anatomical exhibits, surgical and medical procedures, injury mechanisms, case specific trauma visuals, timeliness, charts and graphs, site reconstruction video animation, and 3-D modeling.

*Biolmage*, which has been in operation for 12 years, services include medical illustration exhibits, 3-D models exhibits from 8 x 10 – 42 x 60, timelines with documents, images, and charts and graphs.

*The Presentation Group*, only five years old, services include color X-rays and MRI/CT scans medical illustrations, models, animations, accident diagrams, graphs/charts, timeliness and document enlargements. The recently did 80 document enlargements in 36 hours for the Bill Clinton case and received \$30,000 for the job. Lonny Mead, president of The Presentation Group, told me

that the company estimates earnings for the year to be around *three million dollars*.

Five-year-old *Medical Visions* services include custom and reusable exhibits, charts graphs timeliness, animations, anatomical models, X-ray, photo and document enlargements.

*Howell Medi Graphics* services include medical art, graphic art, X-ray prints and accident scene reconstructions.

*Evidential's* services include document enlargements, computer animation, medical illustrations, diagram charts, drawings, and scale models.

*Medical Legal Art's* services include custom illustrations, animations, charts and graphs, documents, X-rays, anatomical models and reusable exhibits.

*Trial FX*, which has been in business over ten years exclusively in medical illustration, is primarily focused on custom and reusable trial exhibits.

*Rusty Jones Medical Legal Illustrations* services include custom medical exhibits, reusable medical exhibits, 3-D animation, charts, graphs, timeliness, and video of low speed impact collisions.

*Legal Ease Litigation Exhibits* services include charts, graphs, models, easel graphics, photographs, drawings, illustrations, and maps.

The average medical illustrator at a medical legal art firm starts at an average of \$25,000 to \$30,000 a year, and generates \$150,000 a year and up worth of profits for the firm. The average medical legal art firm charges the client \$65 an hour if there is not a set rate for the exhibit. Medical Legal Art in Atlanta charges \$1450 for a custom exhibit. Jim Perkins, a former employee with the company for five years, says that the several medical illustrators that work there average an exhibit a day and sometimes more. Other employees at medical legal art firms stated the same, that they did an average of at least one exhibit per illustrator a day. This includes researching the subject matter all the way through completing the illustration and layout. A custom exhibit by Rusty Jones is \$900, and at Trial FX a custom exhibit is \$695.

After about six months of operation, the medical legal art firms begin to build quite a vast library of digital images that can be reused in different



situations. For example, if the illustration calls for a gloved hand holding a scalpel, the illustrator can bring it up off the computer and place a fully rendered hand and scalpel in its necessary place in a matter of seconds. The illustrator has a large library of already fully rendered surgical tools, orientation drawings, and textures. By using the clone stamp tool and selecting Edit→Define Pattern from the menu bar in Adobe Photoshop, the artist can literally paint fully rendered fat or the inside of a bone texture with a single stroke. The artist can draw a 3" by 3" square of generic fat and reuse it by using the define pattern technique over and over. A large part of the medical illustrator's job is cutting and pasting images together. In a select few already finished cases, the only thing necessary for change is the name at the top of a layout in Quark Xpress.

I was given the surgical reports and summaries of court cases as well as example cases from an Association of Medical Illustrators workshop on medical legal art. I also received the necessary materials given to an illustrator creating an actual medical legal exhibit for a legal firm. My intention was to select four cases and create four exhibits. When I began to research the first two cases, I, along with Glen Hintz, decided that these first two cases could be helped by two separate exhibits each. The four exhibits demonstrate 1) Below the knee amputation, 2) Compartment Syndrome, 3) Undetected foreign body in the eyeball, and 4) Removal of the eye. So I created four large scale 30" x 40" exhibits, two for one case and two for another.

The first step of the process of creating an effective exhibit is research. In some cases nearly every other word must be looked up in a medical dictionary before you get a clear understanding of what the injury was and the surgical process that was necessary for correction. The surgeon's operative reports are extremely technical and detailed.



# Case Studies

## Exhibit 1 – Below the Knee Amputation

In the first case was a 29-year-old male who was injured in a vehicular accident. He sustained comminuted fractures of the left femur, tibia, and fibula. Approximately three weeks after the injury the plaintiff developed complications and gangrene set in. The final result was a below the knee amputation.

The plaintiff's position alleges malpractice due to failure to diagnose and treat compartment syndrome in the anterior and deep posterior compartments of the left leg, resulting in gangrene and, consequently, below the knee amputation.

Unfamiliar with the type of fracture called a comminuted fracture I consulted the Bantam Medical Dictionary, which describes a comminuted fracture as a fracture in which the bone is broken into more than two pieces. A crushing force is usually responsible and there is often extensive injury to surrounding soft tissues.

The other term I had not been familiar with was "compartment syndrome." The Bantam Medical Dictionary describes "compartment syndrome" as any of the neural or muscular disabilities of the limbs that can be produced by tight bandages or plasters in the treatment of fractures. The tissues of the limbs are divided by thick sheets of fascia into separate compartments. If tensions arise in these compartments due to internal bleeding and edema, the blood supply may be cut off and both neural and muscular ischemia may ensue with serious resulting disabilities.

After learning this, the case was beginning to make sense. The doctor failed to diagnose or treat this swelling of the muscle, which causes arteries and nerves to be crushed restricting blood flow. I went to the Miner Library at the University of Rochester School of Medicine and Dentistry. There I was able to find several books that would both help give me a better understanding of what happened and give me references for effective illustrations. I checked out several books on fractures of the lower limbs as well as a book about compartment syndrome and a book about amputations of the lower extremities.

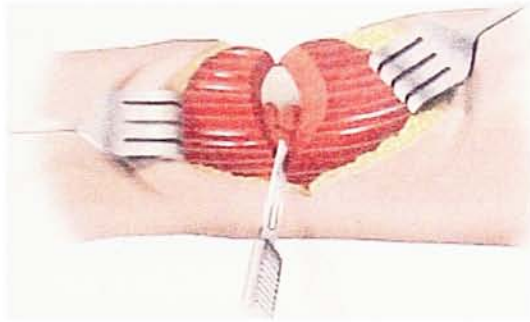
The first step was to create pencil sketches. Although it was not in the order of events that transpired in the actual case I chose to begin illustrations for the leg amputation first, simply because I was more excited about drawing the steps of a below the knee amputation. Initially I sketched six to seven steps of the procedure. It is important, however, to remember whom the audience of your artwork is. This is not intended for medical students to learn the necessary steps of the procedure but intended for persons averaging an 8<sup>th</sup> grade education. These illustrations must explain what happened to the patient and get that visual in the juror's head along with a basic understanding. I reduced the number of steps to four; I scanned each of the four pencil sketches in Adobe Photoshop at a resolution of 300 dpi in gray scale mode, and saved each sketch individually.

Once all four stages of the amputation were scanned and saved I was ready to begin coloring them. The first step was to change the mode from grayscale to RGB mode. I began to color the first illustration by first adding a new layer by selecting "add new layer" from the layers dialog box. By using the pen tool I traced on top of my pencil sketch using anchor points to fit where the lines of my sketch were drawn. By then choosing the paths option at the top of the layers box and clicking at the bottom of the paths box on the dotted outlines circle icon, I masked off everything outside of the area I wished to render, much like the way a stencil blocks off the outside of what is being painted. The area became a selection and then I chose "save path" so that I can repeat the process, should I need to use it at a later time.

The first illustrated step in the below the knee amputation is cutting through the muscle and revealing the tibia. Retractors were drawn separately in Adobe Illustrator using the pen tool and a black stroke. I then brought the outline drawing of a retractor into Adobe Photoshop. With the magic wand tool I selected the inside of the retractor and began to color it in with the paintbrush tool and various swatches of gray, black, and white. Later, colors of reflected light from skin, fat, and muscle would be added. In a separate file I rendered a 3" x 3" square of generic fat that I would be able to use throughout the series, by using the previously mentioned define pattern technique.

# Justin Case

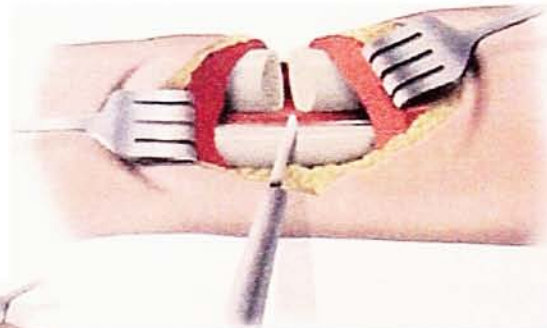
## Below knee amputation



A. Muscles of the anterior compartment are divided.



Comminuted fracture of tibia and fibula



B. Tibia and Fibula are transected with a saw



C. Posterior musculature is transected



D. Skin flap is closed and covered over fibul stump



Each part of the illustration was given its own layer. For example, the fat was a layer, the skin was a separate layer, the tibia a separate layer. By using separate layers each object could be fixed if necessary with no complications to any of the other nearby areas of the illustration.

The second step was very similar to the first step. However, in this step the retractors are pulling back muscle, rather than skin, and both the tibia and the fibula are exposed. The tibia has been transected and the fibula is in the process of being cut. To show the inside of the muscle texture, I created a generic "cut" of muscle texture in a separate 3" x 3" file. I also created a cancellous bone texture that I could use inside of the tibia and fibula (each were painted in the appropriate places by using define pattern and the clone stamp). In both the first and second steps, the shadows beneath the retractors are on a separate layer. I pressed the control key and clicked on the new layer below the retractor. I picked a swatch of black and chose fill from the edit menu. I chose fill with foreground color. I then chose "select all" from the selection menu and under the filter menu chose "blur." From the sub-menu that came up I chose "Gaussian blur" and experimented with the amount of blur that I wanted the edges of the shadow to have. Usually a Gaussian blur of about 3 to 3.5 works well. I then lowered the opacity of the entire layer to 20. I added another layer between the retractor and the shadow for the part of the shadow that is closest to where the retractor is touching the skin. This portion of the shadow must be darker, so with the paintbrush tool at an opacity of 20 and a black swatch I added darkness to that portion of the shadow.

The third step is a different orientation drawing. Both the tibia and the fibula have been cut, and the way that the skin must be cut is demonstrated to show how the skin will eventually be folded over at the edge of the stump. The part of the leg that is being removed is a separate layer from the portion that remains. The muscle that is in view is also a separate layer.

The fourth step shows the stump that remains with the sutures being applied. The sutures are almost completed, allowing the viewer to see how they are inserted into the skin. I did a lot of experimentation with how to draw the

sutures. Without the use of wacom tablet it is very difficult to get a realistic look by drawing with a mouse. The technique that worked the most effectively was to create the sutures by using the elliptical marquee and stretching it out to the desired shape, picking "stroke sub path" from the menu bar and choosing a line width of 2.1, then using the eraser tool to get rid of the portion of the angled line I did not want. By using the eraser tool I could make the ends pointed as if descending into skin. I then selected the curved line that I had created and put it into the appropriate place. While it is still selected, I held down the option key and dragged the mouse button down and copied the curved line and repeated again and again for multiple sutures. By using "transform" the "rotate", adjustments can be made to the angles of the lines if necessary.

The orientation drawing was created by scanning an X-ray of a comminuted fracture of the tibia and fibula, adding a new layer, then using the pen tool to trace the outline of the bones, converting the path to a selection, then using the paintbrush tool and bone colored swatches. The dodge and burn tools were used as well, to lighten and darken certain areas.

I put the entire layout together using Quark Xpress. I placed empty squares, on a 30" x 40" layout, the size and location where I wanted the Photoshop rendered images to be placed. In Quark I wrote down the approximate size the individual images needed to be, based on the squares and the ruler provided within the program. With a little experimentation the correct dimensions were figured out and the size changes were made in Photoshop under image size with constrain proportions selected and saved as an EPS file. By selecting "get picture" in Quark the individual images are put into place and the captions and headings are entered as well.

## Exhibit II- Compartment Syndrome

For the Compartment Syndrome exhibit I wanted to explain what happens to a person suffering from compartment syndrome in the lower limbs. I began by sketching the leg at an angle, focusing on the individual compartments. The completed sketch was scanned into Photoshop at 300 dpi in gray scale mode then transferred to RGB mode. Like before, a new layer was added and similar drawing techniques were achieved using the pen tool, paths, and the paintbrush. The define pattern and clone stamp tools were used with fat and the cut muscle texture. The leg with compartment syndrome was illustrated by taking the first illustration and adding muscle to the anterior and deep posterior compartments, to give the appearance of swollen muscle. The arteries and veins in the normal compartments illustration are squeezed closed in the illustration depicting compartment syndrome.

For the illustration of gangrene, I illustrated a normal foot first. Then, using references found on the Internet, painted gangrene on top. All of the images were flattened and saved as EPS files and the layout was done in the same manner as below the knee amputation in Quark Xpress.

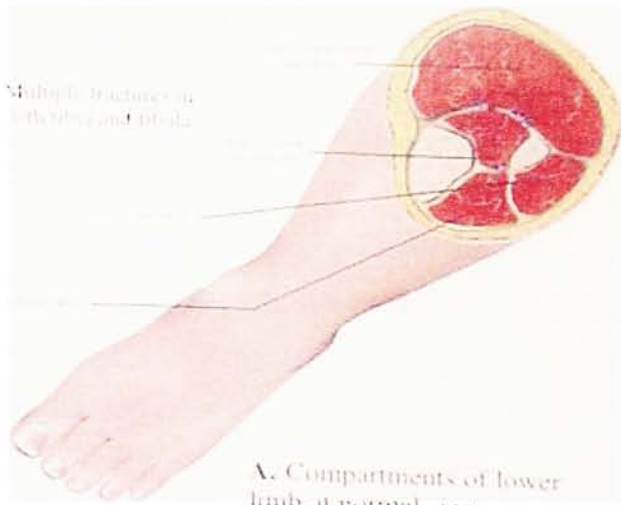


# Justin Case

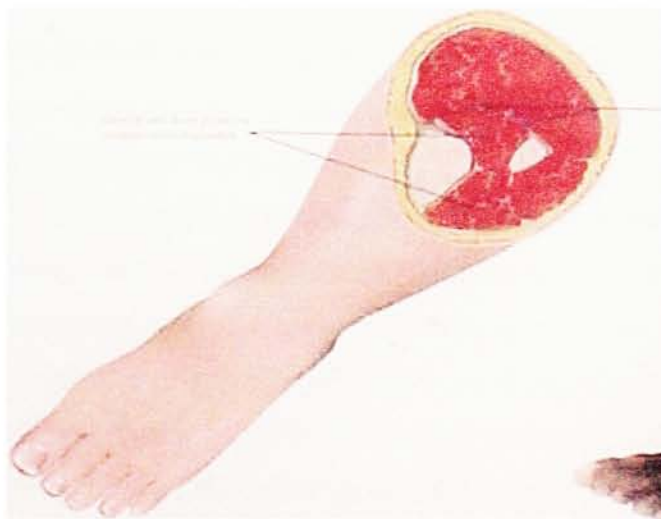
## Compartment syndrome



Multiple fractures in  
tibia and fibula



A. Compartments of lower limb at normal size



B. Compartments of lower limb with compartment syndrome



C. Three weeks after injury, gangrene sets in



## Exhibit III—Undetected Foreign Body in the Eyeball

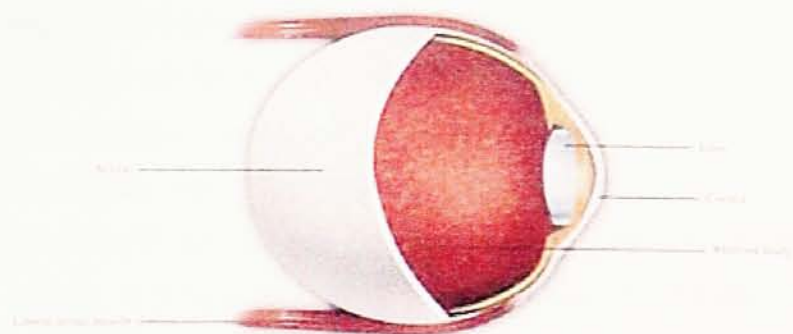
In the second case, for which I created two exhibits, the information I was given was that the plaintiff suffered a lacerated cornea and vitreous hemorrhage after splintered metal from an axe penetrated the eyeball. A splinter was removed and the eye repaired, but the eye was ultimately lost to infection. After removal of the eye, a pathology report disclosed a piece of metal remaining in the eye. The plaintiff's position: alleged malpractice. Treating surgeon should have detected all the foreign bodies in the eyeball.

Initially I had a fairly clear understanding of what a lacerated cornea was. However, I researched into exactly how it looked and exactly where the cornea is located. I was unfamiliar with the term vitreous hemorrhage. When looked up in the Bantam Medical dictionary, I found that vitreous was a jelly-like filling behind the eye lens, and hemorrhage is simply bleeding. Several books were checked out of the Miner Library on the subjects of ocular injury eye infection, and so on. After reading about lacerated corneas, the removal of the eye process, and infected eyes and studying the reference photographs and illustrations, was getting a good understanding of what types of illustrations would best benefit the plaintiff in this particular case.

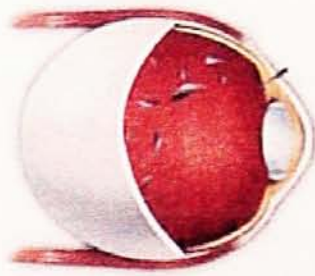
The first exhibit to create would be a sequential layout of the eye becoming infected by undetected metal. I decided to make a four step illustration, beginning with a sagittal view of the eye in its normal state, another sagittal view with metal splinters entering the eye and lacerating the cornea, a view of the eye with a single piece of metal remaining undetected, still with the same sagittal view, and the final stage being an anterior view of the eye in an infected state requiring enucleation. At the top an orientation illustration of the eye with significant features of the eye labeled. The first step was to create an effective sagittal view of the eyes that could be used to show the metal splinters inside. Unlike the previous illustrations, for the eye drawing no sketches were scanned initially. The sagittal view of the eye was rendered completely digitally from the beginning. A series of about five or six separate sagittal views of the eye were used as references for my illustration. The sagittal view of the eye has been

# Dana Foreman

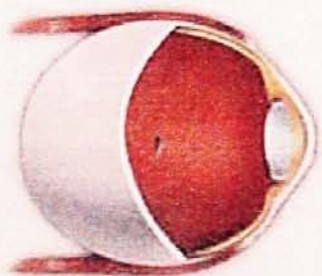
## Undetected foreign body in the eyeball



B. Eye with normal vitreous body (no injury)



C. Eye with multiple small vitreous hemorrhages



D. Large vitreous hemorrhage (no injury)



E. Eye with large vitreous hemorrhage and a foreign body



illustrated countless times in very similar ways and it was my intention to create my view a bit more unique than the typical one. To achieve this I featured the eye as not completely sagittal but sagittal in the sense that a large portion of the eye has been cut away, revealing a sagittal view inside of the cut away space. The illustration began with a large circle that would become the sclera. Just inside of that circle on a separate layer a smaller circle was placed on top. This circle would become choroids. Then again, the same process for the retina, then finally for the vitreous humor, each having its own layer. To create the inside of the eye texture, again a 3" x 3" square was created as a separate file and by using the paintbrush, dodge, and burn tools an inside of the eye texture was created and then selected, then the define pattern and clone stamp technique was used to fill the area. Shading was applied to the top and bottom areas to create a three-dimensional feeling of depth, as well as lightening the area in the middle farthest from the viewer. The metal splinters were created by the pen tool in Photoshop by selecting the path on a separate layer. The individual splinters were created by copying one splinter and using the transform commands rotate, skew, and perspective to create different appearing splinters. To create the anterior view of the infected eye, an eye was drawn again completely in Photoshop simply by having approximately eight or nine photographs of the human eye in front of me while using Photoshop. The first step was to create the skin. I filled the file with a solid flesh color, then created a square of generic skin texture. I used the define pattern and clone stamp with a lowered opacity and painted on top of the skin color with a lifelike texture of skin in certain areas. The infected portion of the eye was created on a separate layer by using the pen tool and creating a path. The eye at first was filled with white, then different shades of reds and pinks were added in the appropriate places. Highlights were created by using white at the opacity of around 70 and a fade to transparent of 20 or so. The portion of the white line that did not fade I faded by using the finger smudge tool. With a smaller brush and an opacity of 100, a little more white is added on top. The same technique is used in highlighting the muscle in all of the illustrations, as well as portions of fat that were at angles receiving more light than others.

Eyelashes were created in the same manner as the sutures on the stump of the below the knee amputation. Portions of the eyebrow were also created as the eyelashes and some hairs were drawn by using the mouse and paintbrush. The finished images were flattened and saved as EPS files. In Quark Xpress the same technique was used for figuring out the necessary dimensions as before, that would be adjusted in Photoshop and not Quark Xpress. When images' sizes are altered in Quark Xpress, the quality of the image degenerates. The name of the patient was placed at the top as well as the title. The images were put into the layout and heading and captions were added as well.

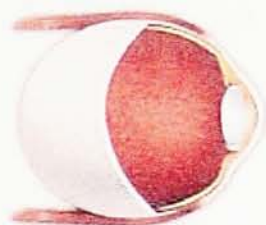


## Exhibit IV—Removal of the Eye

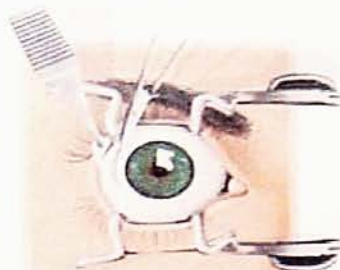
The final of the four exhibits was the removal of the eye. This exhibit would require five steps to be illustrated demonstrating the key stages of the procedure. The first step was to create a good illustration of the eye opened with retractors that could be used throughout the series. The skin and eyebrow from the infected eye were used as a start. On a separate layer a new white of the eye was created. The iris and pupil were created on a separate layer as well so that they could be moved from side to side and have the perspective altered, giving the appearance of the eye being turned left or right. Retractors and other surgical tools were first sketched then scanned and fully rendered in Photoshop, using the paintbrush tool and the dodge and burn tools. In the last step of the removal, a new eye was created on a separate layer by using the elliptical marquee tool and filling it with a light gray and choosing a background color of a darker gray, then using the gradient tool and stretching out the desired fade from light gray to darker gray. By using the paintbrush and white, set at an opacity of about 95%, highlights are added. The iris and pupil are added later on a separate layer with their perspective altered to fit with the angle of the rest of the eye. The separate images are flattened and saved as EPS files, brought into Quark like the others and a layout was designed in the same way.

# Dana Foreman

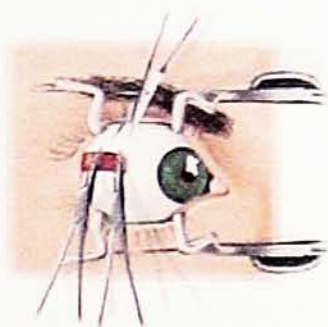
## Removal of the eye



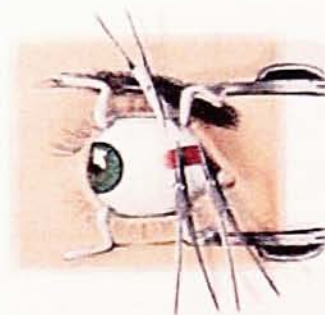
Sagittal view of the eye



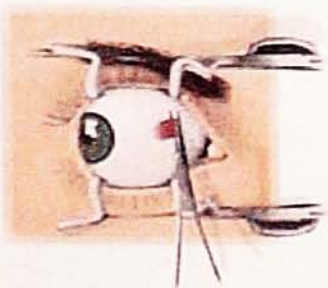
1. The eyelids are retracted and the conjunctiva is incised and swept back from the cornea and to the



2. The conjunctiva has been retracted and the sclera is exposed. The incision is divided horizontally along the equator.



3. The conjunctiva is divided.



4. The conjunctiva is retracted and the sclera is exposed.



5. The globe is being lifted out of the orbit and the conjunctiva is being retracted.

## Output

For each exhibit one entire zip disk was used. In a Quark file all of the Photoshop images being used together must be included in the same folder with the Quark file. Since I was going to be printing the images on a large scale I wanted the resolution to be fairly high. Color test prints were done on individual images on an 8.5 x 11 format. Prints were made at resolutions of 120, 150, 200, and 300 dpi. A dpi of 200 was chosen and required a great deal of memory to be used. Each zip disk's memory was used up to its maximum capacity in some cases with only one megabyte remaining available.

The finished four exhibits on the four separate zip disks were then ready to go to print. The files were taken to Kinkos for 30" by 40" prints to be made. The large scale printer's rates are \$10.95 a square foot for unglossy paper. Each print costs roughly \$80, which is why most medical legal art firms either own or rent their own large scale printers. Kinkos offers the service of mounting the prints onto a foam core backing, but the rates are extremely high priced. Four 30" x 40" pieces of foam core were purchased at \$8 apiece from MJ Designs. The four prints were placed on the four pieces of foam core with a small piece of double stick tape in each corner, then taken to Jerry's Artaroma, where the final stage of shrink wrapping them was completed.

## Summary

I had completed the process from the initial research and review of the surgeon's operative report to researching the subjects, creating sketches, then from the sketches creating fully rendered digital images. I took the finished images and designed an informative and compositionally pleasing layout in Quark, printed the layouts on a large scale 30" x 40" print and mounted the images onto a thick backing. In a real case situation it would be at this time that the exhibits would be sent by UPS or Federal Express to the client and hopefully millions of dollars would be won due to my illustrations.

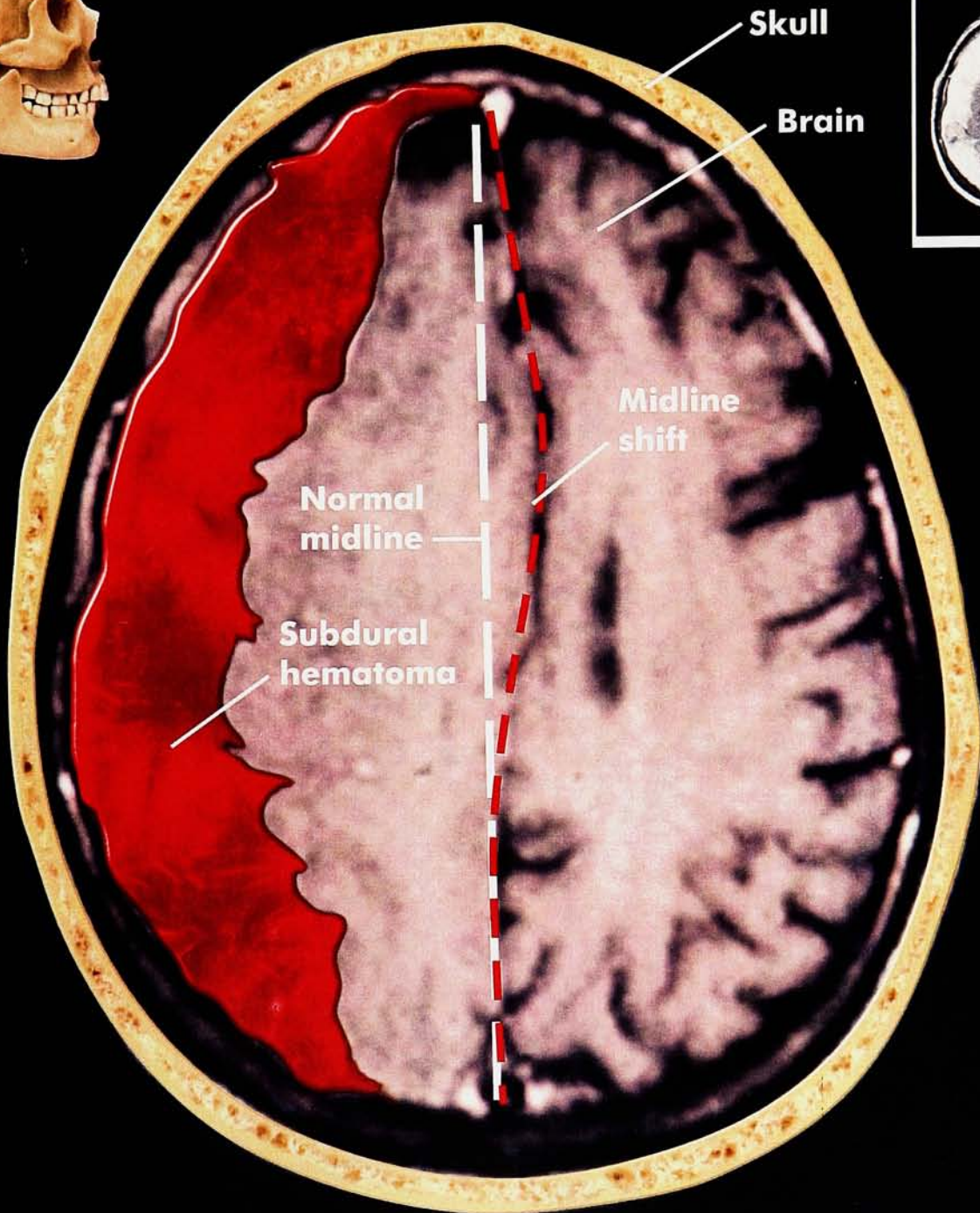
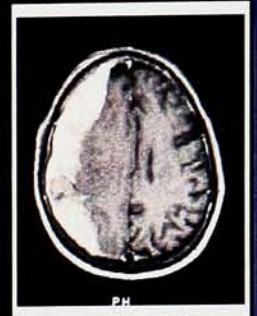
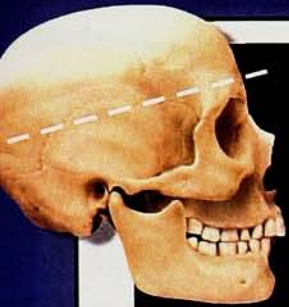


In addition to the exhibits that I created for this thesis back in 1999, you will find in the following pages more examples of my work in the area of medical legal illustration. Included are samples of a color illustrated CT, MRI, Pre Operative and Post Operative X-Rays, generic reusable illustrations, surgical illustrations and anatomical illustrations.

# JOHN DOE

## CT SCAN OF HEAD

07/19/99



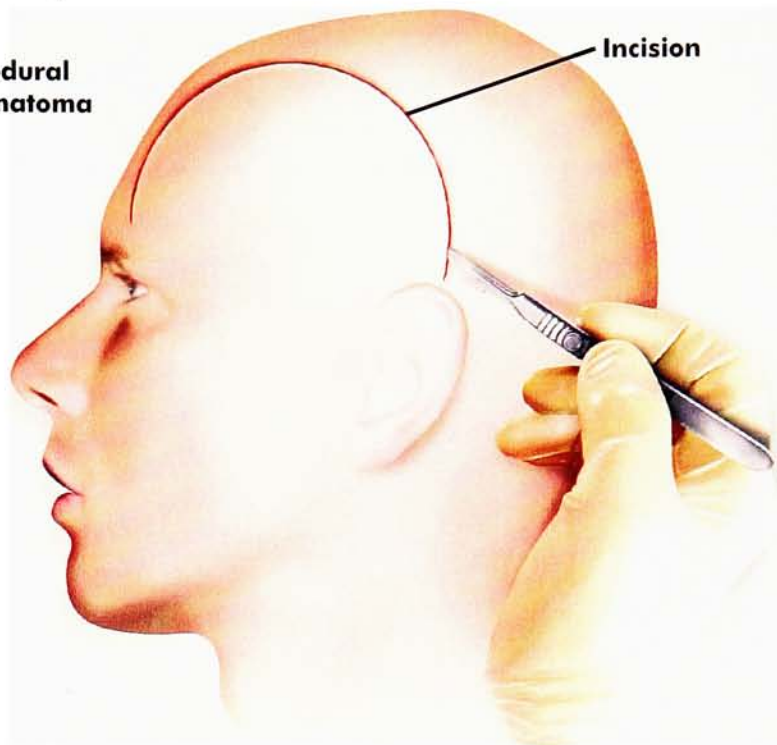
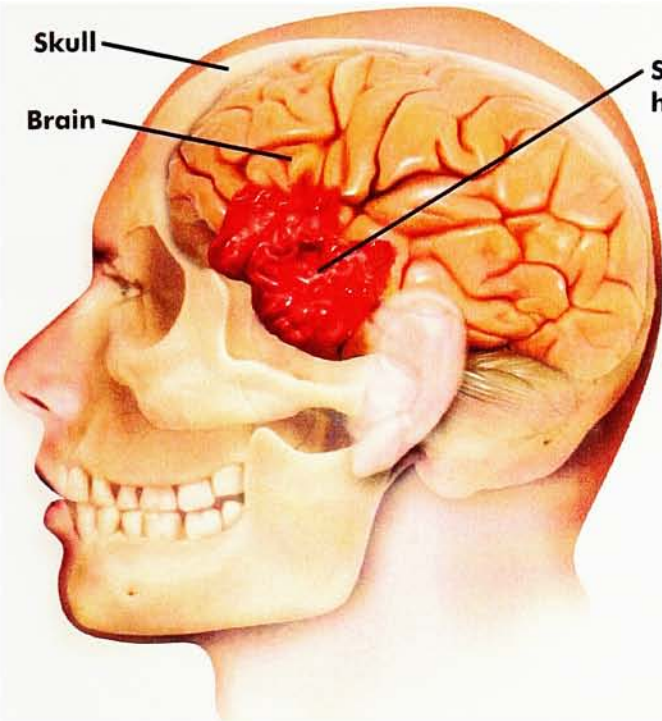
**SUBDURAL HEMATOMA  
WITH MIDLINE SHIFT**



# JOHN DOE

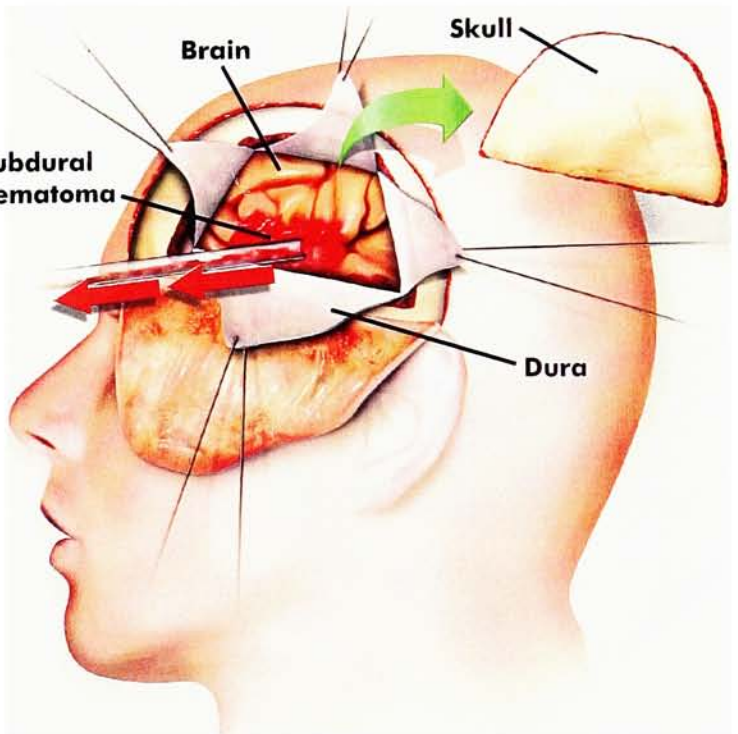
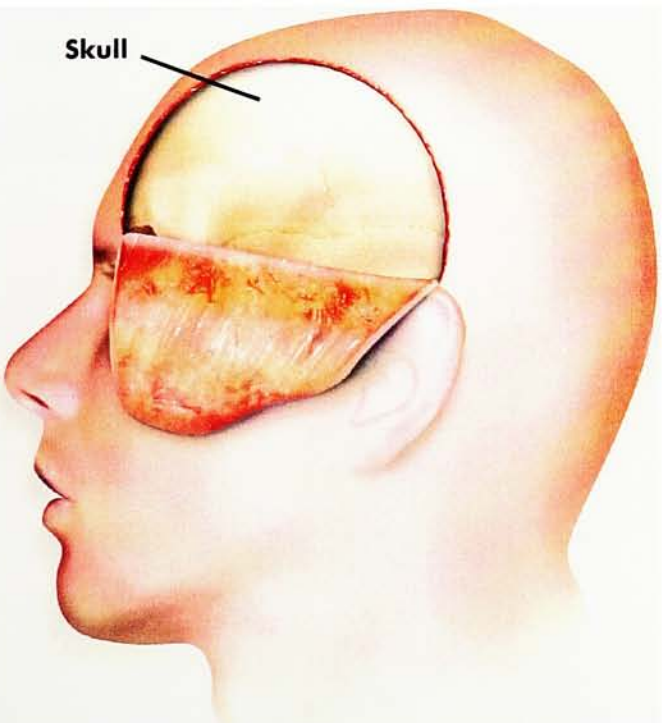
## SUBDURAL HEMATOMA WITH SURGICAL CRANIOTOMY

08/01/99



### 1. FRONTOTEMPORAL SUBDURAL HEMATOMA

### 2. AN INCISION IS MADE



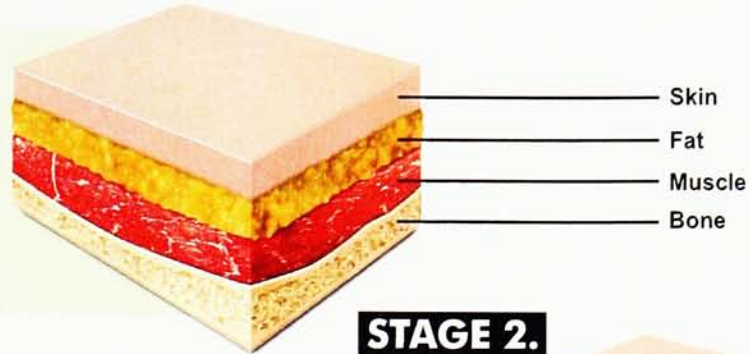
### 3. SCALP IS REFLECTED EXPOSING THE SKULL

### 4. PORTION OF SKULL REMOVED, SUBDURAL HEMATOMA EVACUATED FROM THE BRAIN



# DECUBITUS ULCER

## STAGES OF WOUNDS

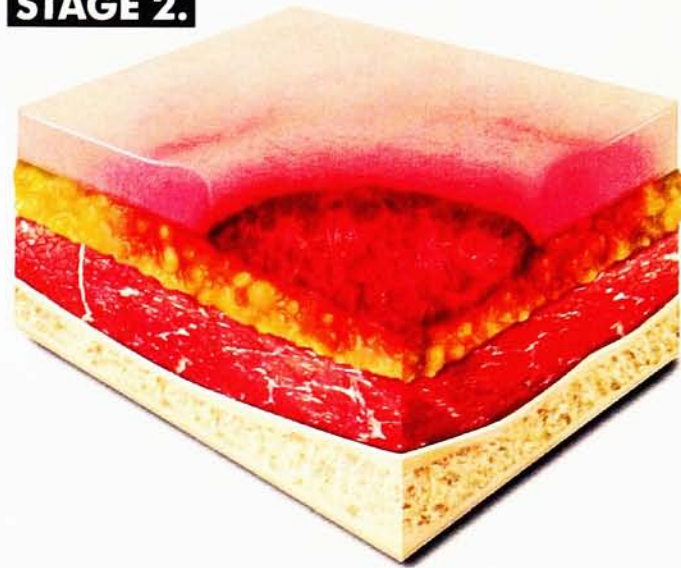


### STAGE 1.



The skin surface becomes red. The wound is unbroken and superficial.

### STAGE 2.



The skin begins to blister. The wound is no longer superficial.

### STAGE 3.



The wound extends through all layers of skin into subcutaneous tissue.

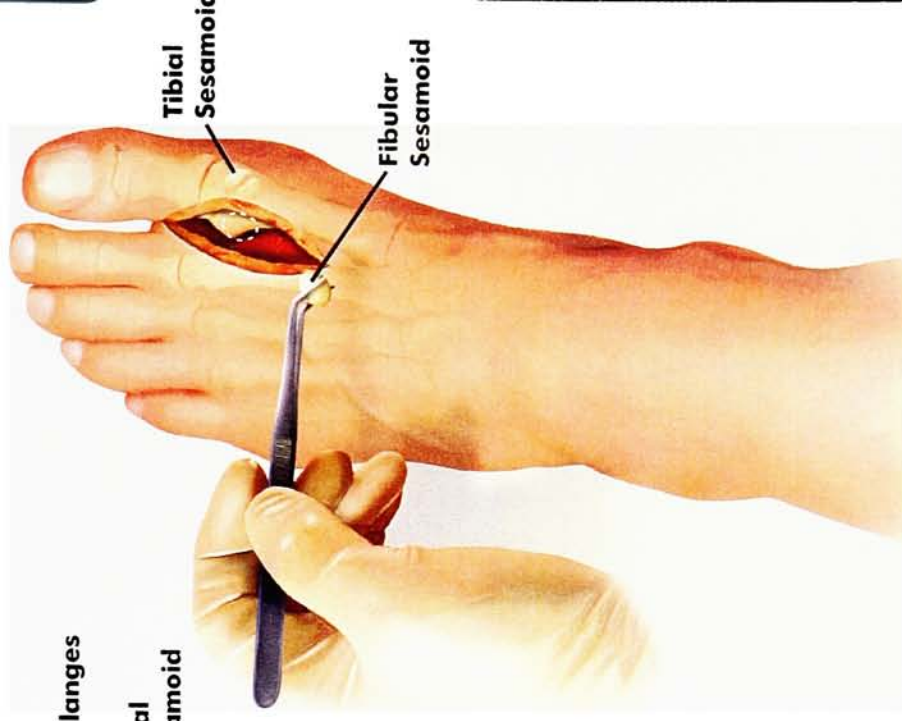
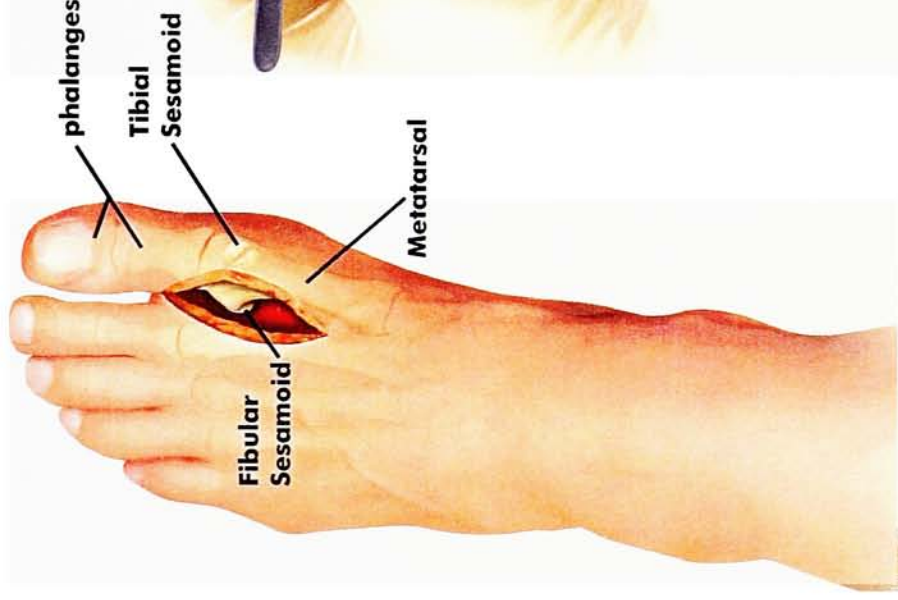
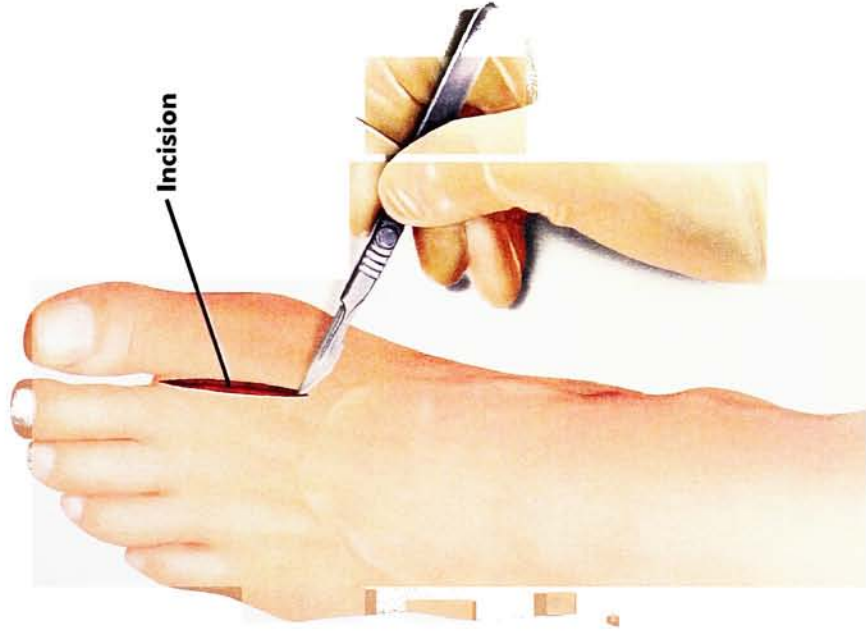
### STAGE 4.



The wound extends through the skin, subcutaneous tissue and into muscle, tendon and bone.

# JANE DOE

## EXCISION OF FIBULAR SESAMOID LEFT FOOT 05/15/99



1. INCISION MADE DORSALLY  
AT FIRST INTERSPACE

2. LOCATION OF FIBULAR SESAMOID

3. FIBULAR SESAMOID IS REMOVED



# JOHN DOE

## MRI OF LUMBAR SPINE

07/16/99



2 OSP

1

(2)



Vertebral  
body

Intervertebral  
disc

L1

L2

L3

L4

L5

S1

F

Spinal  
cord

Disc  
protrusion

Disc  
bulge

10 SQ  
6x256

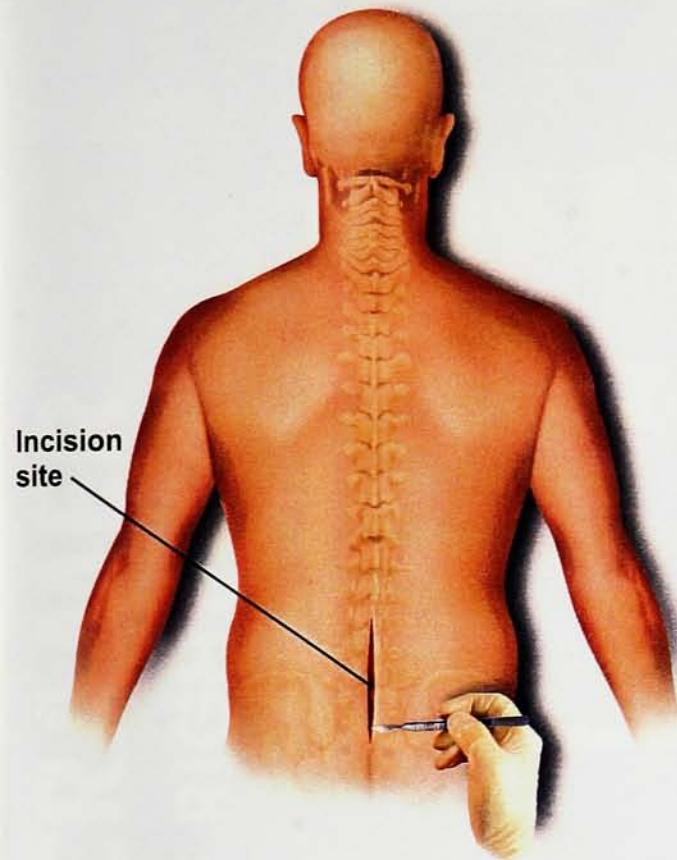
W: 1215 L:

**SAGITTAL VIEW**  
**DISC PROTRUSION AT L4-5**  
**DISC BULGE AT L5-S1**

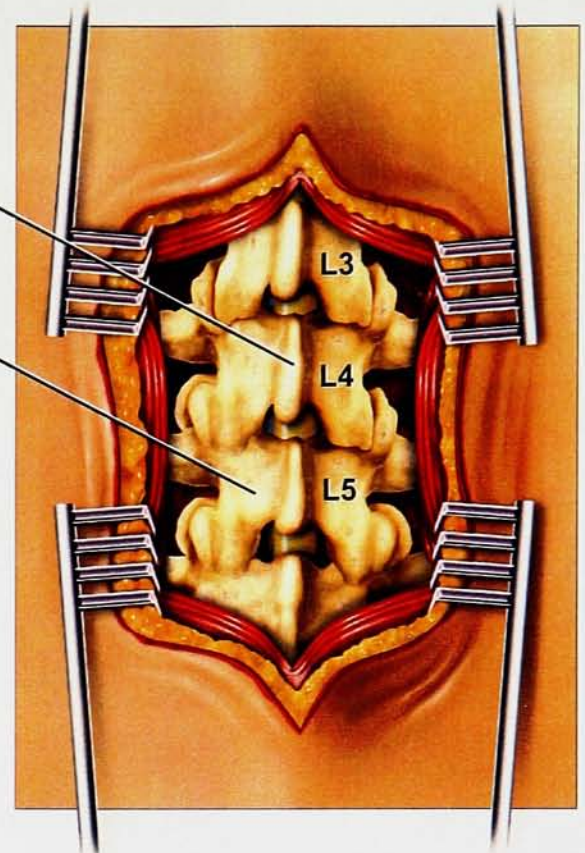


# JOHN DOE

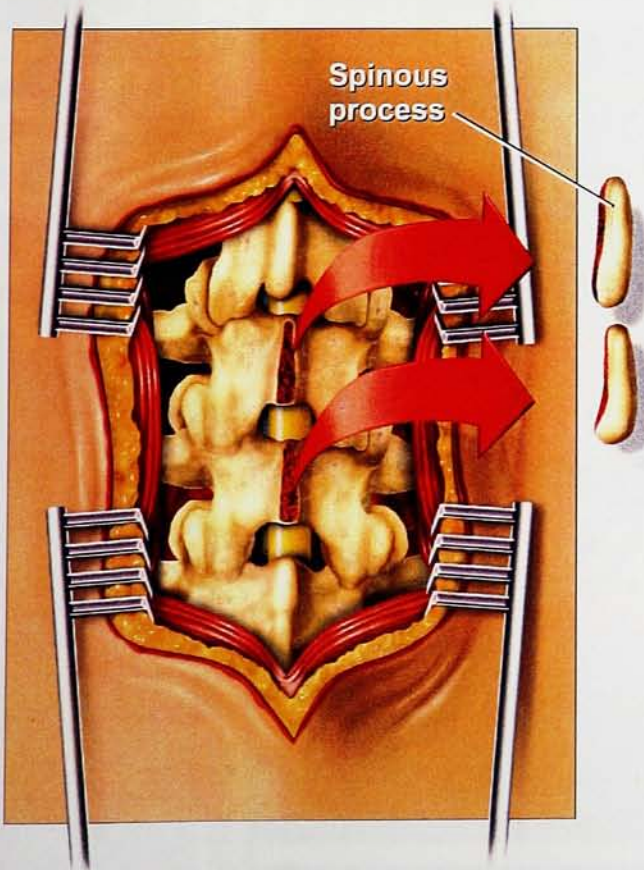
## LAMINECTOMY OF L4 AND L5 07/16/02



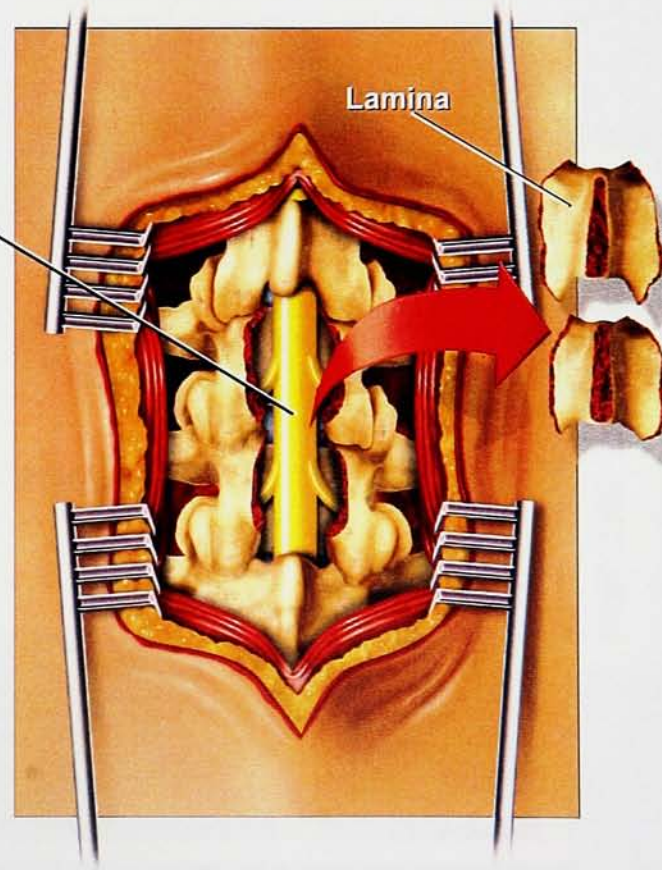
**1. AN INCISION IS MADE**



**2. EXPOSURE OF LUMBAR SPINE**



**3 REMOVAL OF SPINOUS PROCESS**



**4 LAMINA OF L4 AND L5 ARE REMOVED**

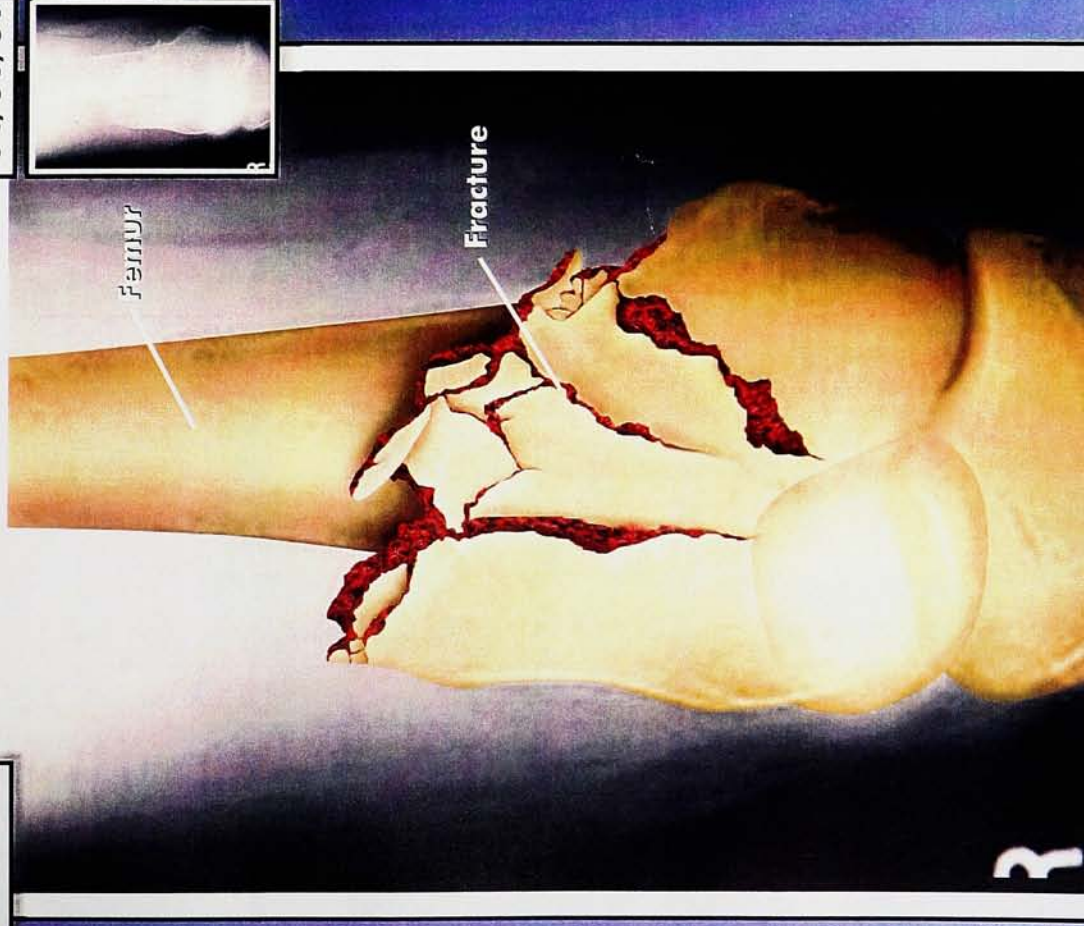


# JEAN CRAMER

## X-RAYS OF RIGHT LEG

PRE-OP

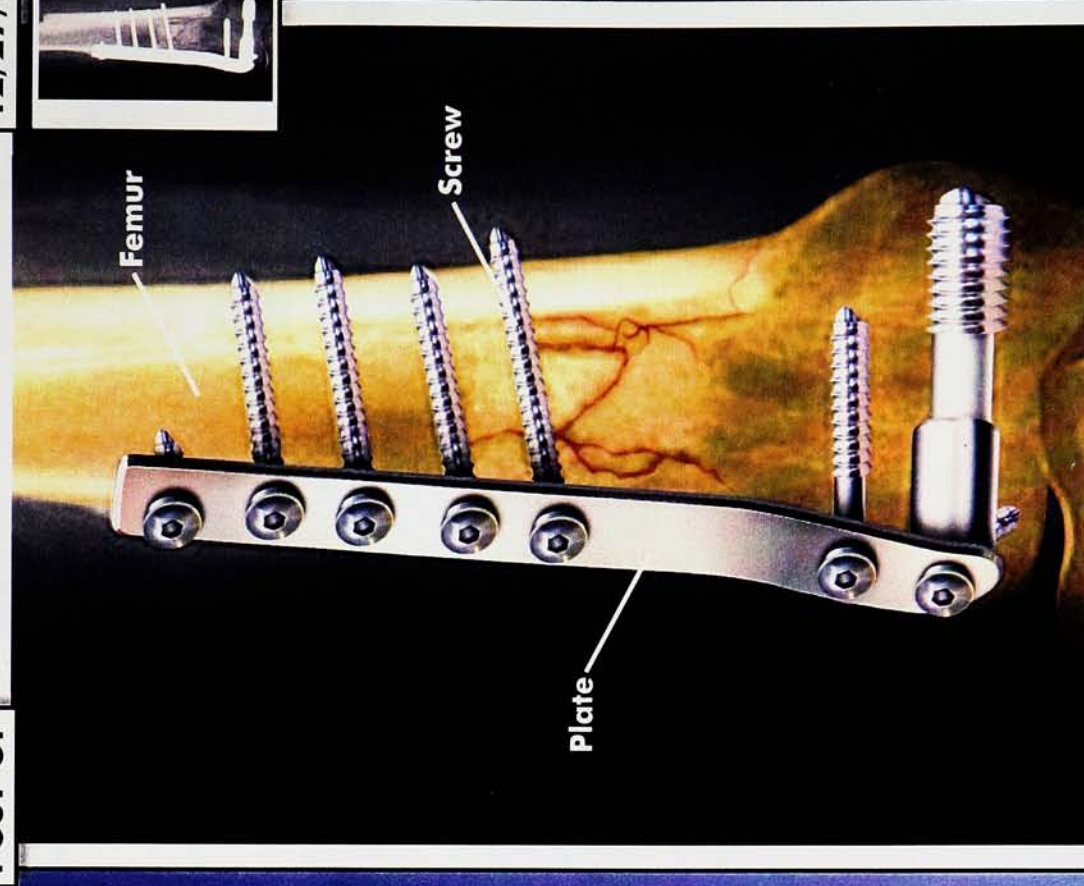
04/01/01



FRACTURE OF RIGHT FEMUR

POST-OP

12/27/02

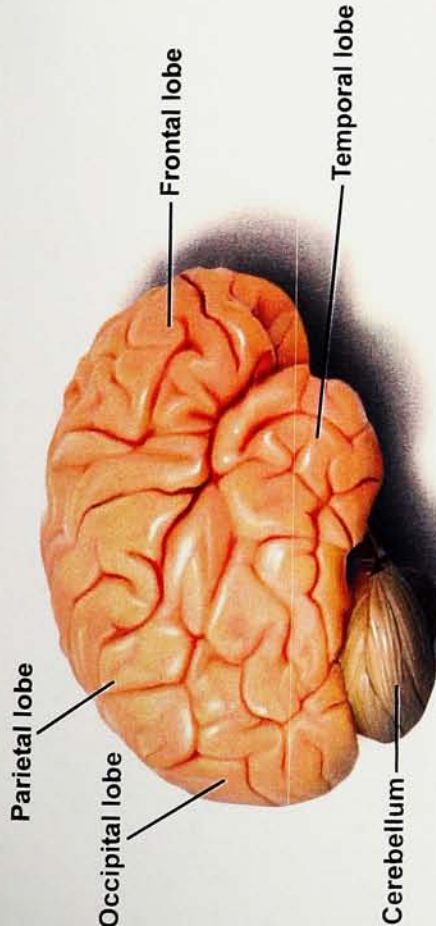


OPEN REDUCTION  
INTERNAL FIXATION

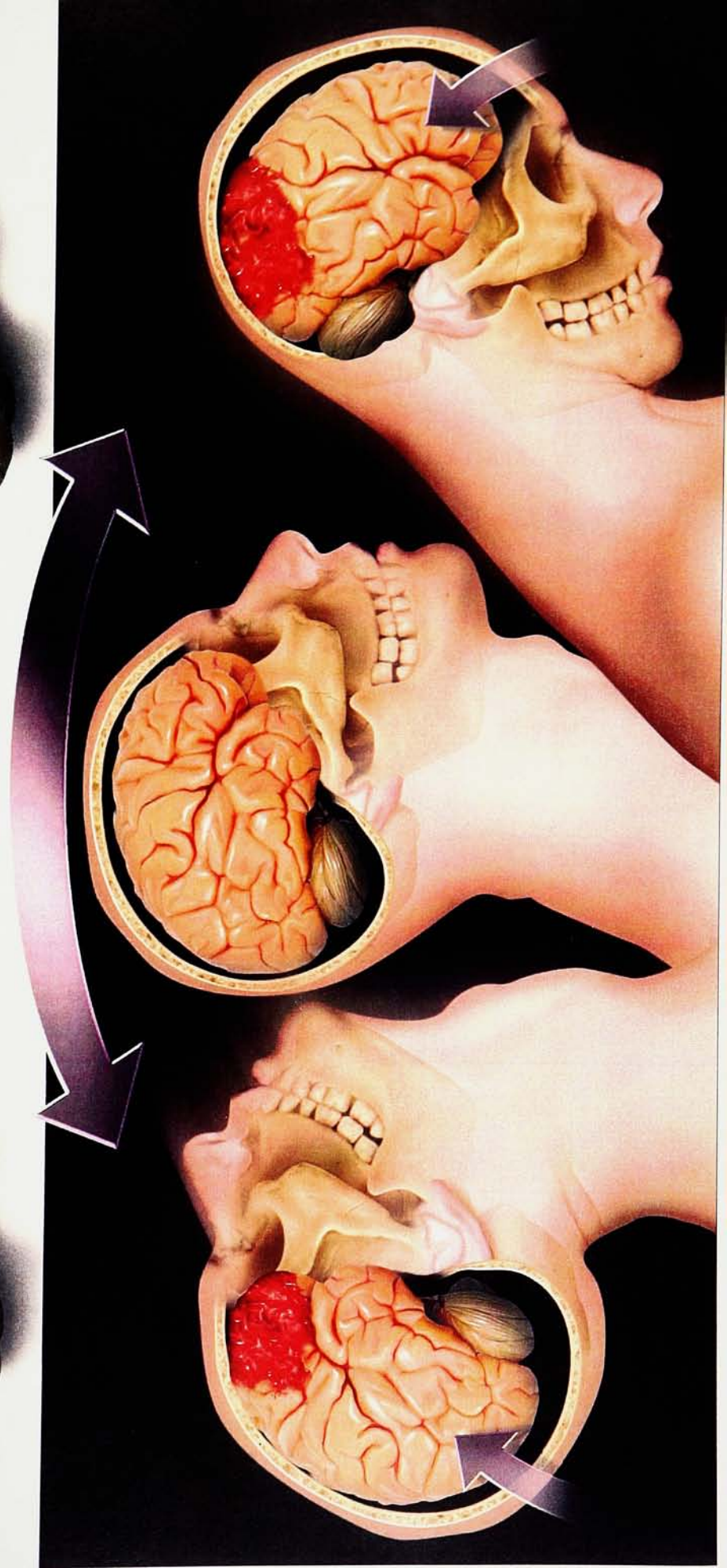
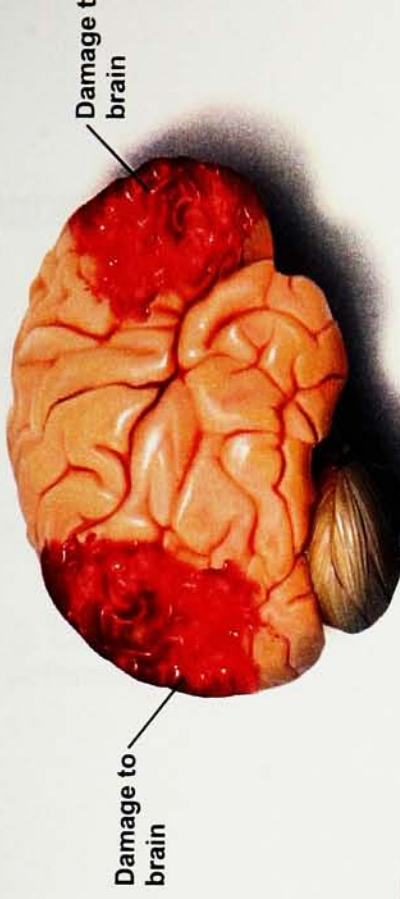


# CLOSED HEAD INJURY

**NORMAL BRAIN**



**BRAIN WITH  
COUP AND CONTRECOUP**





## **Bibliography**

The Bantam Medical Dictionary. New York, New York: Random House, Inc.,  
Copyright 1981, 1990, 1994, p. 107

Frank H. Netter M.D. Atlas of Human Anatomy. Canada: Friesens Corporation, Copyright 1997  
pp. 76-84, 471

Carmin D. Clemente. Anatomy A Regional Atlas of the Human Body. Baltimore, Maryland:  
Urban & Schwarzenberg, Inc., 1987, pp. 418-427