

Leonardo da Vinci and Radiology

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When I hear the name Leonardo da Vinci, I think of his famous *Mona Lisa* and *The Last Supper*. I would've never thought about the field of radiology. But my professor mentioned that Leonardo was not just a master at painting, but also a genius—a polymath—one who does everything he or she works at extremely well. When I say everything, I really mean everything! He was good at math, science, music, engineering, inventing, sculpting, architecting, and writing.

Leonardo was born in Italy. His name means Leonardo of the town of Vinci. Leonardo came from a poor family, but his ambitions and creativity made him legendary. While he was young he apprenticed with a prominent artist named Verrocchio. He learned a lot from Verrocchio and he left many masterpieces for us to admire. Leonardo was a self-taught man and a teacher. He wrote many journals and he gave us his knowledge of science, art, and engineering. Some of his journals discuss linearity, color, and shadow. These topics all relate to my major, which is Radiologic Technology and Medical Imaging.

In the first section of his journal, “Why When an Object Is Placed Close to the Eye Its Edges Are Indistinct,” he compares the eye with light. They are similar because if you bring an object very close to the eye, you won't be able to see its edges clearly. Also, when you put an object close to a source of light, the shadows that are cast are not sharp, but instead large and faint. In the radiology field, if I tried to take an x-ray of a person's hand and I placed the person's hand very close to the source of the x-ray beam and far away from the image receptor, the image produced would be blurry and magnified. Again comparing the eye with the light, “in all cases of linear perspective, the eye acts in the same way as the light... the eye has one leading line (of vision) which dilates with distance and embraces with true discernment large objects at a distance as well as small ones that are close.” Our eyes dilate when we look at objects that are far away and contract when we are looking at an object that is close by. Vision works like light and the x-ray beam. They both give a large divergent beam when directed to a farther distance and a smaller beam when directed to a closer distance. Leonardo also pointed out that the center of the eye has a greater power of differentiating edges than the peripherals do. In radiology, this is the same as with an x-ray beam. The center of the beam has a higher power that is able to penetrate the body and provide more information recorded on the film. The beam's center has better penetration because it has more photons. The peripheral beams are less penetrating and therefore give less information and sharpness.

In the second section of his journal, “Painter” he talks about the mind of a painter. He says a painter should always know the color of an object, and how

to draw what nature has given us and how to select the best examples. He points out that even though a painter is not working, he or she cannot relax, because everything around them reminds them of objects to paint. They get so tired that when they finally see someone they know, they don't realize that they are there, and instead perceive them as objects to paint. In the radiology field, it is kind of similar. We must know how the image should come out before we x-ray the patient. If we can't get all the images picture-perfect because of the patient's medical condition, we have to find a way to get the projections that will provide the most useful information so the doctors can diagnose the patient's problem. Like painters, sometimes we get so caught up when a patient walks in, we only see them as a body part to radiograph and not a whole person.

In another journal, Leonardo emphasizes how important it is to pick the right shade of color to correspond to the specific light or shade. He explains how we can pick the right shade of color for a painting based on the painting's position relative to the light. We might need a darker shade if something is located in the back or if something is in front of it; or a lighter shade if it is located in the front and nothing is in front of it. He explains that you can use your finger, putting it in front of the painting and then bringing it closer or farther away to see if the shade is correct. In radiography, we too must make sure that the shade and color of the image are correct, in other words, that the density and contrast are right. Without the proper density and contrast, the image will be useless for the radiologist to read.

Finally, Leonardo teaches us that the shadows must be smooth according to the shape of the object. Each object must have at least two shadows, the one that it casts behind it and a shadow that is cast on it from the object in front of it. The concept is a little different in radiology. When an object is in front of another object, the shadow that is cast on the radiograph is a lighter shadow because more photons are absorbed by the object. Also images that are farther away from the image receptor cast a more magnified shadow.

Leonardo is much more than an artist; he is a teacher. He shares his knowledge of linear perspective, color, and shade. His journals inspired me to draw because I was so astonished when I read about how to make shades and color. It is amazing how eyes, light, and x-ray beams are all similar. Furthermore, it's interesting how painters and radiographers think alike. We both must take into consideration distance, color, shade, and linear perspective.

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