



GETTING IN TOUCH WITH YOUR INNER SELF

By Lisa Rapple M.Ed, RRT

The effectiveness of education improves with every sense that is engaged in the process of providing that education. To quote Maria Montessori, teacher and physician, "First the education of the senses, then the education of the intellect." One of the most memorable learning experiences that I had was in 10th grade biology class when we dissected living frogs. Of course most of the frogs didn't survive the first incision by the less than enthusiastic teens in my class. But by some miracle one of the frogs did (not mine) and I was able to witness for a brief second an actual beating heart and breathing lungs. It was breathtaking (for me and the frog). I went on to college where I dissected a cat and studied human cadavers, but the living model that the frog provided was, for me, the most meaningful lesson in anatomy.

When studying the human body and its many functioning parts we are challenged by the fact that most of it is hidden within and/or out of reach for the human senses. Historically, to study

anatomy scientists had to make educational guesses (Hippocrates) or dissect the dead (DaVinci). Drawings enhanced visual learning in the 17th & 18th centuries and into the 19th century (Gray's Anatomy). Methods to study anatomy then advanced dramatically, moving from examination of ani-

of a free enterprise society. And so I approach the evaluation of the site for this issue of Focus with all these concerns in mind.

The site I visited this time is at <http://www.innerbody.com>, the site for "Human Anatomy Online". This website is owned by INTELLIMED International, Corporation. They are a private corporation who purchased the website in 1999 with the purpose being to extend a portion of its health care information and education resources to the public. INTELLIMED is a private corporation which began operations in 1983, and provides analytical software with inpatient and outpatient databases to hundreds of health care related organizations in several states. Innerbody's vision is "To provide high quality educational content through low bandwidth Internet access worldwide." The site contains plenty of advertisements in the header, in the sidebars and even bordering on the page content sometimes. But all that advertising is as tolerable as the commercial breaks on public television.

The many, many illustrations and animations are excellent, keeping in mind the limitation of bandwidth that they promise. So, the illustrations/animations look much like a high quality coloring book or comic strip illustration, but they animate very effectively. A fair trade off in my mind, because there is no waiting and no "glitching".

The site is broken into ten body systems. By choosing a system you are given a body model to explore to any depth or breadth that you wish. It will take you as far as the microscopic level in some areas. There are frontal and back views. Using "pick points" on each model, you can hover to read the label, click for a written narration and more detailed illustrations, or "zoom" to further dissect and examine the model. If you choose not to use the pick points, there is a *continued on next page*

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mals through dissection of cadavers to technologically complex techniques developed in the 20th century. Now we are able to "view" human anatomy and its functions using all manner of life-like simulations.

Clinical practice incorporates hearing, seeing, touching, smelling; all the senses to assess and treat our patients. So, engaging the senses is a particularly important aspect of medical education. Logically, in this modern age, we have looked to our technological prowess to provide methods to enhance learning by adding multi-sensory techniques to our teaching of anatomy. The downsides to technology (and there are some) are that it can be expensive, cumbersome, or malfunction. A wealth of resources has cropped up on the Internet, a very inexpensive way to share technology. Many high quality sites are absolutely free. I say absolutely free, however I need to retract that. The "free" part means that we pay the "price" by tolerating advertisements. Just like watching television and sitting through the commercials, we have to share some visual space on Internet sites to let commerce pay our way. I can accept that as part



"We're not a good match, Dave. I need a man with a full tank of gas."

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menu to the right with similar functions, click for written narrations, zoom to further examine, or hover and the "pick point" will light up. A not very obvious feature at the top of each section is a list called "See Also...". The choices include some but not all of these; a back view of the anatomical model, "Did you know?" for interesting facts, cross-sections, and details of involved organs. Each topic has animations, 100's of graphics, and thousands of descriptive links. The left sidebar has links to each system and also has direct links to animations, tutorials, and descriptions. The descriptions button takes you to an index of hundreds of terms and "Did you know?" facts. A couple of examples of the "Did you know" are – "Did you know that your brain continues to send out electrical wave signals approximately 37 hours after death?" or "The eye muscle is the fastest reacting muscle of the whole body. It contracts in less than 1/100th of a second."

There were a few navigation difficulties that I had. One was that the advertisements are so close to the page content that I ended up clicking on some of them by mistake and having to back track to the page again. Also, some of the drop-down menus lay over other clickable parts of the page and I had to open and close the menus a couple of times to get what I wanted. That was a bit awkward. I also really had to explore the site a couple of sessions before I realized the breadth of the information. I did find it fun. The interactive aspect makes it very engaging to use. It would make an excellent reference for educators. And, of course, a great place to get in touch with your "Inner Self". I think it would knock the socks off of Socrates (pronounced So-CRATE-eez, if you are a Bill and Ted fan) and Aristotle.

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er flows and with inhalation of test gases. Air filters also change the dynamics of BTPS calculations and we have found that reported volumes can be off by 7%.

Calibration checks with either volume displacement or pneumotach systems should be done at least once per day. A three liter syringe should be injected at least three times to give a range of flows varying between 0.5 and 12 liters per second. The volume of each injection should meet the accuracy requirement of $\pm 3.5\%$. A linearity check should be performed weekly using a three liter syringe to deliver three relatively constant flows at a low flow, then three at a mid range flow, and then three at a high flow, also with an accuracy of $\pm 3.5\%$. All calibration checks should be recorded. Finally, once per week, a standard subject should be tested for validation of flow volume shape and the general performance of the device.

Spirometry seems like the simplest test we perform and the devices also seem simple with relatively few moving parts. But in reality, it has dawned on me, after having written these articles, that spirometry might be the most complex test we pulmonary physiology technologists have in our arsenal and certainly the most widely used and important.

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