

The Sonic Flashlight

By Jenna Lipka

Medical doctors perform several different procedures per day. To date, they can use x-rays and ultrasounds in order to see the insides of their patient's body. Ultrasounds are used to move around inside of the body with tubes and needles. The downfall to this is that the doctor must keep shifting his eyes back and forth between the patient that is being operating on and the ultrasound screen, which ultimately decreases his hand-eye coordination. The solution to this problem is called the "sonic flashlight", which can be held in one hand, leaving the other free to use a needle or which ever piece of equipment is desired. This way the doctor can focus all of his attention on the patient in front of him. The sonic flashlight gives doctors "ultrasonic vision", which makes human skin appear to be translucent. It creates a 3-D image of the patient's troubled area, allowing doctors to view blood vessels, muscle tissue, and other internal anatomy. The sonic flashlight allows doctors to see things that are six inches beneath the skin. The device merges the outer surface of a patient's skin with a live ultrasound scan of what lies under the skin. It creates a translucent ultrasound image floating in its actual 3-D location in the patient. This is called "tomographic reflection." An ultrasound scanner and an ultrasound display are strategically placed on opposite sides of a half-silvered, translucent mirror. The doctor looks through the mirror to see the patient and the ultrasound scanner, which is positioned on the patient's skin. The ultrasound image is projected on the viewer's side of the mirror in perfect alignment with the corresponding location in the patient's body. This makes the ultrasound image appear to be on the same spot as the body part being imaged. Even if the viewing angle changes, the combined images remain the same. This relies on precise geometric relationships between



the ultrasound slice being scanned, the monitor displaying the slice, and the mirror.

The Sonic Flashlight can be used to guide invasive procedures such as:

- 1.) Taking blood without missing the vein
- 2.) Catheterizations
- 3.) Amniocenteses
- 4.) Needle Biopsies
- 5.) Anesthetizing the eye
- 6.) Placing central intravenous lines in the chest in trauma victims
- 7.) Various Surgeries

The sonic flashlight was invented in 2001 by Dr. George Stetten, a biomedical engineer at the University of Pittsburg. Doctors are very optimistic about the use of the sonic flashlight, which will facilitate surgeries. It has been privately funded thus far, but requires outside funding for further development and clinical trials. A price has not yet been determined because it is still in the early stages.

Sources

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