VR in Radiology

Virtual reality (VR) refers to a computer-generated simulation of a near-to-real-life experience that is created using an interactive three-dimensional (3D) image or environment. VR fools the senses by eliminating distractions from the outside world, which provides the user with an immersive experience. Radiology departments are exploring the use of virtual reality in clinical care and radiology training.

Virtual Reality in Radiology

The virtual reality display of a patient’s anatomy can be utilized for pre-procedural planning, which can ultimately affect the way a patient’s procedure is performed. Virtual reality uses a fully-enclosed headset to create a 3D environment. Interactions within this virtual world are possible through the use of special electronic equipment, such as gloves that are fitted with sensors and helmets that have screens inside.

Moving Around in the Virtual Environment

Radiologists and radiology students can maneuver the 3D environment by walking around using external camera tracking systems or by performing head movements while wearing head-mounted display tracking systems. Other ways environment interaction can take place include handheld devices with haptic feedback as well as with voice gestures.

Ways Virtual Reality is Changing
Radiology:

- **VR-Based Images for Radiology Students** – virtual reality is ideal for assisting radiology students. With VR-based programs, radiology students, residents and radiologists can view 3D images in real time. Additionally, they can interact with the image and manipulate it to allow for viewing from several different perspectives.

- **VR-Based Teaching Applications use interactive lectures** – students use stereoscopic viewers that are attached to their own smartphones to view interventional procedure suites. These interactive lectures are designed to present a case to the students and then ask them a variety of management questions.

The management questions typically asked include:

1. Diagnosis.
2. Indications.
3. Contraindications.
4. Type of sedation.
5. Type of equipment.

- **Quick Response Code (QR)** – after answering the questions, the student scans a Quick Response (QR) code. This QR code transports the student to a virtual interventional radiology suite. Once the student enters this virtual area, he or she can look around and decide which type of equipment should be used for the hypothetical case.

- **How and Where Radiologists View Diagnostic Images** – virtual reality can change how and where radiologists view images. As VR images improve, 3D imaging may become standard practice, providing radiologists with flexibility by eliminating the need for a workstation.
Radiologists can view virtual reality images using VR headsets, which means they can view images from almost anywhere.

- **To Help Ease Patient Anxiety** – the virtual reality display of a patient’s anatomy can be utilized for pre-procedural planning, ultimately affecting the way a patient’s procedure is performed. Simulating a radiology procedure with virtual reality can help a patient feel more comfortable. With immersive reality, patients can become familiar with procedure suits and recovery rooms. In addition, this immersive reality can be used to simulate a procedure; thus, helping the patient understand the steps of a procedure and what he or she should expect. Once a procedure is demystified, most patients feel more comfortable about having it.

The fact that the FDA is approving these innovative, 3D virtual-reality technologies for use in the medical field makes it clear that there is a paradigm shift under way and although the use of VR in radiology is relatively new, it is likely that at some point in the near future virtual reality will play a substantial role in diagnostic radiology.

**Sources:**

4. https://siim.org/page/15pr_echopixel_launc