

Conventional interstitial brachytherapy is often characterized by suboptimal implant geometries and lengthy treatment planning sessions. We have developed a virtual reality (VR) based prototype which will lead to improvements in both areas. Its use has been demonstrated on a phantom for a base-of-tongue implant.

A wax head-and-neck phantom was CT scanned and the resulting data set segmented and displayed in a virtual world. The physician then donned a VR headset to become completely immersed and began to insert implant needles into the real phantom while viewing only the virtual world. The motion of the needles was tracked using an electromagnetic system to provide real-time information regarding their respective locations relative to the phantom. The physician's head was also tracked to provide the correct viewpoint in the virtual world. By making skin and overlaying structures translucent, the physician was provided with an "x-ray" view and could visualize the location of needles at depth in the phantom.

Once the last needle was inserted, the physician immediately began to move virtual radioactive sources into the virtual needles and evaluate various source arrangements on the basis of computer generated isodose distributions. The need to acquire orthogonal radiographs of the phantom and implant geometry and digitize these into a planning computer was not necessary as the complete 3-dimensional representation of both already existed.

This presentation will summarize the prototype as utilized for a base-of-tongue implant on the wax phantom as well as present an estimate of treatment errors due to tracking device limitations.