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Development of a microscope embedded training system for neurosurgery.

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Summary: Virtual reality based training systems for surgery, have recently shown great potential as an alternative to traditional training methods. In neurosurgery, state of art training devices is limited to a few examples. They are based either on traditional displays or head-mounted displays. The aim of this research is the development of the first virtual reality training system for neurosurgical interventions based on a real surgical microscope for a better visual and ergonomic realism. The simulation takes advantage of an accurate tissue modeling, a force feedback device and a rendering of the virtual scene directly to the oculars of the operating microscope. A prototype of a stereoscopic Augmented Reality microscope for intra-operative presentation of preoperative three-dimensional data has been realized in our laboratory. We are reusing the image injection component of this existing platform developing a training system for educational and preoperative purposes based on virtual organs reconstructed from real patients' images.

Keywords: virtual reality; training systems; visualization; image guided therapy; neurosurgery
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