Holographic-Guided Surgery

The implementation of augmented reality (AR) in image-guided surgery (IGS) can improve surgical interventions by presenting the image data directly on the patient at the correct position and in the actual orientation. This approach can resolve the switching focus problem, which occurs in conventional IGS systems when the surgeon has to look away from the operation field to consult the image data on a 2-dimensional screen. The Microsoft HoloLens, a head-mounted AR display, was combined with an optical navigation system to create an AR-based IGS system. Experiments were performed on a phantom model to determine the accuracy of the complete system and to evaluate the effect of adding AR. The results demonstrated a mean Euclidean distance of 2.3 mm with a maximum error of 3.5 mm for the complete system. Adding AR visualization to a conventional system increased the mean error by 1.6 mm. The introduction of AR in IGS was promising. The presented system provided a solution for the switching focus problem and created a more intuitive guidance system. With a further reduction in the error and more research to optimize the visualization, many surgical applications could benefit from the advantages of AR guidance. [1].

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Meulstee JW, Nijsink J, Schreurs R, Verhamme LM, Xi T, Delye HHK, Borstlap WA, Maal TJJ. Toward Holographic-Guided Surgery. Surg Innov. 2019 Feb;26(1):86-94. doi: 10.1177/1553350618799552. Epub 2018 Sep 27. PMID: 30261829.