**Holographic displays: the next revolution in augmented-reality-guided surgery?**

Laura Pérez-Pachón1, Matthieu Poyade2, Terry Lowe3 and Flora Gröning1

1 School of Medicine, Medical Sciences and Nutrition, University of Aberdeen

2 School of Simulation and Visualisation, Glasgow School of Art

3 Head and Neck Oncology Unit, Aberdeen Royal Infirmary (NHS Grampian)

Augmented Reality (AR) applied to surgical guidance is becoming increasingly important. The overlay of patient-specific 3D models onto the patient’s body surface provides access to information not normally available during surgery. Recent advances in tracking and display technologies open new opportunities to develop more efficient AR-guided surgery systems. To understand the current state of AR-guided surgery, we reviewed publications on systems which overlay virtual data onto patients. Our research shows that these systems have been used for numerous applications, e.g. to locate tumours or visualise the correct position of implants. However, many of these systems are technically complex and present poor ergonomics and limited accuracy. Novel holographic Head Mounted Displays (HMDs) which integrate tracking and registration technology (e.g. Microsoft HoloLens® or Magic Leap®) and Software Development Kits (SDKs) help to overcome these shortcomings: holographic HMDs have reduced technical complexity and improved ergonomics and the release of SDKs in recent years has allowed for a wide range of users to easily create AR applications. Their combined use can, therefore, facilitate the implementation of more sophisticated AR-guided surgery systems in the operating room. However, maximising surgical accuracy still remains a challenge for manufacturers and researchers.

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