

## ACS 2025 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

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### Research Abstracts

#### Augmented Reality in Plastic Surgery: A Systematic Review

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**Introduction:** Augmented reality (AR) overlays digital elements onto the real world, enhancing surgical procedures across many specialties. This review examines AR implementations in plastic and reconstructive surgery.

**Methods:** Google Scholar, PubMed, and Cochrane Library were searched with keywords "Augmented Reality" and "Plastic Surgery." Studies were included if they reported using AR in plastic surgery cases and excluded if they lacked AR usage, patient cases, or were systematic reviews. Studies yielded from the literature search were screened using Covidence, with four reviewers analyzing measures, outcomes, procedures, body regions, complication rates, AR platforms/software, and changes in costs and operation duration. Descriptive statistics were performed using Jamovi.

**Results:** Thirty-nine articles with remarkable clinical heterogeneity were reviewed, totaling fifteen unique AR devices and 478 cases primarily in the craniomaxillofacial region. Head-mounted devices were studied most, but Smartphones were implemented in more patient cases. Positive outcomes were generally reported, except in the breast region, and measured by a wide variety of qualitative or quantitative measures, rarely were both used simultaneously. Only seven studies reported an 8.76% complication rate among 137 patients. Thirteen and fifteen studies briefly discussed cost and operation duration changes, respectively.

**Conclusions:** The included studies demonstrate diverse approaches and measures of success, highlighting AR's versatility but complicating analysis of efficacy. Cost and availability of AR devices appear to influence device selection as Smartphones were used in the greatest number of cases, but Head-mounted devices were the most investigated across studies. Although no studies reported major outcomes opposing AR usage in plastic surgery, the vast majority of studies did not consistently report complications which may explain the low complication rate. More research is needed on AR's effectiveness in operative duration and cost implications, non-craniomaxillofacial regions like the breast, and implementing standardized reporting measures.