

12th International Conference on

SURGERY AND ANESTHESIA

August 17-18, 2018 Singapore

Three-Dimensional Printing in Surgery: Fab or Fad? A review of current progress in the literature

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Statement of the Problem: Despite emerging uses in various disciplines, 3D-printing in surgery remains in its infancy. With developing technology, there has been a recent explosion of research in this field. In this review, we will cover the science behind the technology, highlight the most prolific medical disciplines currently utilising 3D-printing, discuss emerging clinical applications, and highlight the strengths and shortcomings of the current state of 3D-printing in the medical space.

Methodology & Theoretical Orientation: A PubMed and Medline literature search for relevant terms related to 3D-printing and Surgery was performed between February 1980 to February 2017 to capture all literature on the topic. We then analysed the data collected to ascertain the main medical subspecialties currently utilising 3D-printing. We further plotted the data against time in years to highlight the rapid emergence of literature in this field.

Findings: We identified 392 related articles in the field of 3D-printing and Surgery and determined the 5 main Surgical specialties utilising 3D-printing to be: Maxillofacial surgery, plastic surgery, orthopaedic surgery, cardiac surgery, and neurosurgery. We also were able to demonstrate exponential growth in literature in the past 3 years.

Conclusion & Significance: Interest in 3D-printing in medicine is exponentially growing. As the technology develops and becomes more accessible, we expect to see its presence across a wider range of subspecialties. Whether it becomes entrenched into mainstream medical practice is yet to be seen, but clinicians would be remiss to not be aware of this promising technology.

Biography

Jasmine Coles-Black is a surgical resident at Austin Health, Melbourne, Australia, where she is part of the hospital's 3D Med Lab. Her research interests are in the emerging applications of 3D printing in the medical field, and in the dissemination of 3D printing knowledge and skills to fellow health professionals. To date, she has published numerous articles in the field, and her research has received both local and international media attention. She is also a Research Engagement Officer at Research Platforms Services at the University of Melbourne, where she runs workshops upskilling clinicians in medical 3D printing and raises the general public's awareness of the technology via traditional and non-traditional media.

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