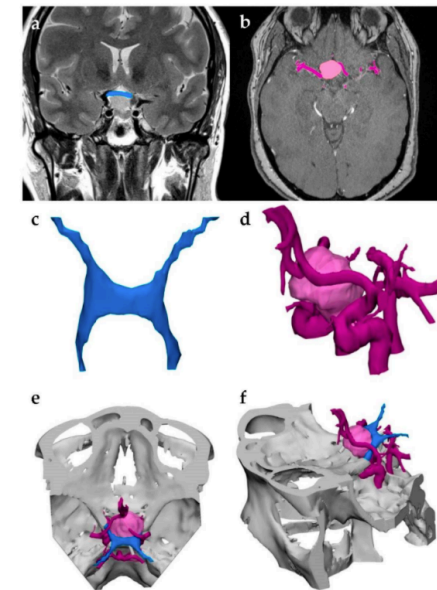


**Introduction:** Bone augmentation is a procedure in a patient who has been affected by tissue defects. The aim of this study is to demonstrate which technique and materials are suitable for tissue reconstruction by using novel printing technologies.

**Results:** Shape-memory polymers using in recent bioprinters are useable as the prosthesis's fabrications due to the treatments of patients in reconstructive surgeries. These methods exhibit the precise hard and soft tissue implanted in orthopedic sites as well as the oral and maxillofacial region. 3D and recent 5D printed tissue grafts permit precise design in complex human body defects, due to trauma or cancer. The accuracy to cover the defect, modified these techniques, from the range of diagnostics towards ultimate treatment plans, for a patient; with the feature of less post-operative discomfort and expedited human body tissue healing.

**Conclusion:** Recent researches on different techniques of multi-dimension applications have shown positive results in the tissue engineering field, which needs more researches in the case of quality, efficiency, and accessibility to surgeons.



**Methodology:** A literature search was performed using the PubMed and Medline databases, with the keywords of ((((((3D printing) AND (4d printing)) OR (5d printing))) AND (materials)) AND (techniques)) AND (surgery) has performed; A total of 18 papers were included in the following review until January 2021.

## References:

1. KhorsandiKhorsandi, Danial, et al. "3D and 4D printing in dentistry and maxillofacial surgery: Printing techniques, materials, and applications." *Acta Biomaterialia* (2020).
2. Segaran, Nicole, et al. "Application of 3D Printing in Preoperative Planning." *Journal of Clinical Medicine* 10.5 (2021): 917.