

Role of Using three Dimensional (3D) Tablet in Plastic Surgery

Jacob Antony Chakiath¹, Nishad. K², Ravi Kumar Chittoria³, Neljo Thomas⁴,
Barath Kumar Singh⁵

How to cite this article:

Jacob Antony Chakiath, Nishad. K, Ravi Kumar Chittoria, *et al.* / Role of Using three Dimensional (3D) Tablet in Plastic Surgery / Journal of Plastic Surgery and Transplantation. 2023;4(1):27-29.

Abstract

Three dimensional (3D) tablets have been in use over recent years. It is mainly used in the entertainment and media industry to provide a better experience from the usual two dimensional effect of visualization. The third dimension ie. Depth allows for a more wholesome experience as our normal vision is three dimensional and not two dimensional. We have tried in this article to identify if three dimensional imaging using 3D tablet can be used in plastic surgery as the specialty involves identification of the three dimension defect and reconstruction of the same defect in the three dimensions of reconstruction (length, breadth, and depth).

Keyword: dimensional (3D) tablet; plastic surgeryreconstruction length.

INTRODUCTION

Plastic surgery is often considered an art rather than a science as it tries to exemplify the divine in reconstructing what is lost or redoing what could have been. The traditional methods of identifying the defect by clinical examination and conventional radiologic imaging to identify the abnormalities

and anomalies and correct them by the skill and imagination of the surgeon were both cumbersome and sometimes futile as the defect might be having a completely different anatomy from the plan that was made. Hence better imaging and an in-depth understanding of the anatomy is essential for the plastic surgeon. Three dimensional tablets allow for the better visualization of the body defects and also allows for the planning of the procedure which can improve the outcome of these complex procedures

Author Affiliation: ^{1,2,4-5}Senior Resident, ³Professor, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

E-mail: drchittoria@yahoo.com

Received on: 13-12-2022

Accepted on: 31.12.2022

MATERIALS AND METHODS

This was a study conducted in the department of plastic surgery in a tertiary care hospital. The study was conducted by using a 3D tablet and was used for planning and viewing of the radiology images in 3d with procedures carried out accordingly.

RESULTS

The 3D tablet was found to be very useful in surgical planning, allowed for better depth perception.

DISCUSSION

Computer assisted surgery (CAS) is a term used to describe surgery planning or execution that includes various forms of advanced imaging, software, analysis, and planning, rapid prototyping (RP) technology, robotics, and image guidance systems. Skeletal surgery is well suited to CAS. The skeleton is easy to image well with CT scan and, represents an invariant data set that is easily manipulated in the virtual environment. The acceleration in interest in CAS is due to the increased availability of lower cost, low radiation imaging technology and powerful software packages that allow a surgeon, to visualize and simulate operations.

Virtual surgery planning (VSP) is needed for educational and clinical applications. It establishes a reference for surgical goals and comparative postoperative assessment. VSP is performed with the patient's anatomy and provides an unlimited virtual environment for achieving the required morphological outcomes. VSP is a valuable tool in both preoperative planning and intraoperative decision making for bony craniofacial reconstruction.¹⁻⁴ VSP has been demonstrated to decrease the operative time in mandible reconstruction.^{3,5} It involves making 3D model from imaging studies like 3D CT and MRI and making templates by using 3D printing and planning the surgery. However, 3D printers are costly and not available everywhere. Instead, a 3D tablet can be used to better understand the anatomy and the corrections done. It may not give the full tactile sensation of the 3D printed model, however, can be used for planning complex surgery.

The 3D tablet also allows for better patient education of the procedures they are going to be taken up. This allows for doubt clearing sessions and lesser litigations in the event of a mishap. 3D tablets also allow for resident education and training when the number of patients is decreased especially in the event of a pandemic. It allows for better visualization and understanding of the anatomy and allows for planning teaching sessions for the residents.

FUTURE OF 3D TABLETS

Aesthetic surgery: Breast implants can be planned and imaged according to the patient's needs and satisfaction as it allows the patient to see the implant in 3D. Also, 3D printing can be done based on the image which allows for better results because of the ability to print in layers where adipose tissue can be deposited to allow for better contour and structure.⁶

Hand surgery: In amputated parts, the various prosthesis that can be used for the patient can be shown in 3D and this allows for better rehabilitation of the patient. It allows for a better color match and if the prosthesis is myoelectric it allows for better patient compliance.

Conclusion: 3D tablet was found useful in the management of patients by providing a 3D visualization of the images and allows for better planning and reconstruction.

DECLARATIONS

ACKNOWLEDGMENT

Authors' contributions: All authors made contributions to the article

Availability of data and materials: Not applicable.

Financial support and sponsorship: None.

Conflicts of interest: None.

Consent for publication: Not applicable.

REFERENCES

1. Chopra K, Manson PN, Gastman BR. Stereolithographic modelling in reconstructive surgery of the craniofacial skeleton after tumor resection. *Plast Reconstr Surg.* 2012;129:743e-745e.
2. Gerstle TL, Ibrahim AM, Kim PS, et al. A plastic surgery application in evolution: three-dimensional printing. *Plast Reconstr Surg.* 2014;133:446-451.
3. Mazzoni S, Marchetti C, Sgarzani R, et al. Prosthetically guided maxillofacial surgery: evaluation of the accuracy of a surgical guide and custom-made bone plate in oncology patients after mandibular reconstruction. *Plast Reconstr Surg.* 2013;131:1376-1385.
4. Emmez H, Küçüködük I, Börcek AO, et al. Effectiveness of skull models and surgical simulation: comparison of outcome between different surgical techniques in patients with isolated brachycephaly. *Childs Nerv Syst.* 2009;25:1605-1612.

5. Cohen A, Laviv A, Berman P, et al. Mandibular reconstruction using stereolithographic 3-dimensional printing modelling technology. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009; 108:661-666.
6. Melchels FPW, Domingos MAN, Klein TJ, Malda J, Bartolo PJ, Huttmacher DW. Additive manufacturing of tissues and organs. *Prog Polym Sci.* 2012;37:1079-1104

