

Three Dimensional Printing: An innovation in Otorhinolaryngology Practice

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The three dimensional digital (3D) printing was first mentioned and developed by C. Hull in 1986, who had also developed the “Standard Triangulation Language” (.STL) file format to create the surface of a three-dimensional object in a series of triangles. The .STL file format is the main key part in 3D printing which can be obtained from a 3D “Computer-Aided Design” (CAD) software, a medical scan data (e.g. CT scan, MRI), or from existing objects by using point or laser scanners.¹

The 3D printing has received increased attention and opened the new avenues in recent years in the medical field. In the field of otorhinolaryngology surgery, 3D-printed models have uncountable educational value. This provides an opportunity for trainees to gain good exposure which is comparable to the cadaver dissection. So this has the extra important role in the today’s scenario where the cadaver dissection is expensive and of the limited supply. The use of 3D printing technique in otorhinolaryngology has mainly for surgical and pre-clinical education (e.g., temporal bone dissection training, endoscopic ear surgery training model, functioning anatomical middle ear model, endoscopic sinonasal and skull base training, septoplasty training model, laryngeal model, carotid artery model and tracheostoma model), customized surgical planning (e.g., temporal bone surgical simulation, template-guided surgery, navigation for otoneurosurgery, lateral skull base approaches, endoscopic sinus surgery simulation, guided surgery for mandibular resection and reconstruction, carotid artery model, MRI compatible laryngoscope), tissue engineering and in implantable prosthesis (e.g., prosthesis for superior canal dehiscence, customised prosthesis for mandibular reconstruction).²

There are enormous possibility of the use of 3D printing techniques in otorhinolaryngology as well as in the other medical fields. Though there are some cost issues which can be overcome by the benefits gain by trainees, surgeons and physicians themselves with the use of this innovative methods in education and clinical practice. So the future of medical education and service can be made precise and meticulous with the use of 3D printing as it can provide the realistic simulation training models, bio-printed functional grafts and accurate models for pre-operative planning, patient and student education.³

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