Editorial

Will 3D printing take away surgical planning from doctors?

Surgical planning is a preoperative way of pre-emptive surgical procedure to structure operational steps. Extensive preparation is required to execute a precise surgical plan. 3D printing is a new solution, which can aid patient specific pre-surgical planning. It is a promising technology in the preoperative planning of complex cases, education, custom manufacturing (implants, prosthetics, and surgical guides) and potential for biological applications.^{1–5}

3D printing is possible once there is a soft copy available of any structure. It can be modified into a computer language, which a 3D printer understands. The raw data in DICOM format is processed into a 3D model, which can be manipulated and used as a template for virtual planning. Hence, the question that is 3D printing taking away surgical planning from doctor's hands and offering it to software engineers. All the biomechanics and genetic research and solutions have already been taken away by the software colleagues.⁶ 3D printing in itself is not possible until a rehearsal of the virtual surgical plan is done on a computer. Meaning, 3D printing is not possible until there is extensive input from a doctor on the team. Maybe it is time for us to become more tech-savvy and learned the application of virtual planning and 3D printing to deliver optimal care to our patients. To put it into simple language 3D printing is the hardware part and virtual planning is the software part. So as surgeons we need to learn virtual planning for which lots of free trial software are also available. e.g., 3D slicer, Vesalius, Osirix, etc.

The articles published in this special issue dedicated to 3D printing bring forward the application of this new technology in diverse orthopedic regions also the reader gets insight into the basics of the steps in 3D printing. 3D printing is now extensively used in Dental and Maxillofacial surgery for patient-specific implants.⁷ 3D printing is a new technology, embracing it in clinical practice by most surgeons is not easy, but in future, our patients may demand the use 3D printing for understanding their disease and the surgical solution for it.

Cost of 3D printers has dropped a lot in the last five years. Each one of us can have in-house personal or shared facility is 1000–1500 US \$. The material cost for prototyping is again very cheap amounting to 15–20 US \$ for a kg material. Institutions, in fact, should invest in high-end virtual planning software which can be used by all departments to make the cost justifiable. We believe that the application of 3-D printing in Orthopaedics will experience rapid translation from bench to bedside.

Metal 3D printing is of particular relevance to orthopedic practice, as it allows customized implants or devices to be made. These printers are still very costly and not readily available; however, these would also become an affordable reality in future. 3D printed implants and devices will also open a new avenue of the research model. It needs to be established that the biomechanical proportions are acceptable before implanting the devices. This special issue also introduces the area of bioprinting which could be ultimate game changer in healthcare delivery.

We believe that this technology will not take away pre-surgical planning from the surgeon

On the other hand, it will get surgeons even closer to the details of the problem to be addressed. This technological progress has merely provided us with more efficient means for going forward, and a “real world” clinical translation would reveal the value and future of 3-D printing in Orthopaedics.

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