3-D printed organs offer ultra-realistic practice models

March 10 2015, by Shingo Ito

Professor Toshiaki Morikawa (L) gives a lesson while using a 3D-printed lung at the Jikei University hospital in Tokyo

An incision from the surgeon's scalpel sends liquid oozing over the surface of a the lung, but on this occasion it doesn't matter if something goes wrong—the doctor can simply create another model with a 3D printer.

The ultra-realistic lung—wet, soft, and complete with tumours and blood

vessels—is one of a range of organs being produced by a Japanese firm that will allow surgeons to hone their skills without hurting anyone.

"With the wet model, doctors can experience the softness of organs and see them bleed," said Tomohiro Kinoshita of creator Fasotec, a company based in Chiba, southeast of Tokyo.

"We aim to help doctors improve their skills with the models," he added.

From guns to cars, prosthetics and works of art, 3D printing is predicted to transform our lives in the coming decades, researchers say, as dramatically as the Internet did before it.

The so-called Biotexture Wet Model, which will come onto the market for surgery training and medical equipment-testing in Japan in as early as April, is created by scanning a real organ in minute detail and creating molds on a 3D printer.

That shell is then injected with gel-type synthetic resin to give it a wet, lifelike feeling in the surgeon's hands.

Each one is designed to exactly mimic the texture and weight of a real organ so it can react to the surgical knife in exactly the same way.

'Close to living organ'

Maki Sugimoto, a medical doctor who has tried samples, said the wet models are almost "too realistic".

Professor Toshiaki Morikawa holds a 3D-printed lung at the Jikei University hospital in Tokyo

Seen without their context, he said, it would be easy to mistake them for the real thing.

"The touch is similar to that of the real liver," said Sugimoto, who is also a special instructor at Kobe University Graduate School of Medicine in Kobe, western Japan.

"I suppose that not only young, inexperienced doctors but also experienced doctors can perform a better operation if they can have a rehearsal first," he said.

Toshiaki Morikawa, a medical doctor at Jikei University Hospital in Tokyo, also said: "The current models are too simple and details of anatomy are not accurately reflected."

"But this is obviously superior as it's produced precisely and is very close to the living organ in quality," he said.

For Morikawa, the world of 3D printing, which works by building up layers of material, offers endless possibilities for medicine, including maybe one day functional organs for use in transplants.

"Considering future progress in life sciences, I think it is an urgent and significant theme that this outstanding technology should be modified for application to biology," he said.

Fasotec began pre-sales of wet model bladders and urethral tubes in October, with a price tag of 15,000 yen ($127).

The firm plans to expand sales overseas and has already received enquiries from other Asian countries, the company's Kinoshita said.

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