

# THE CASE OF SURGITATE SYNTHETIC BREAST MODELS

## The challenge

Breast cancer is the second most common cancer in the world and the most frequent cancer among women. It is estimated that worldwide over 522,000 women died in 2012 due to breast cancer (GLOBOCAN 2012). The disease occurs in women both in more and less developed regions, with slightly more cases occurring in less developed than in more developed regions (GLOBOCAN 2012). It is the most frequent cause of cancer-related death in women in less developed regions and the second cause of cancer-related death in more developed regions after lung cancer (GLOBOCAN 2012).

These alarming numbers call for effective early detection methods, enhanced surgical procedures and skills as well as safe breast reconstruction techniques. Successful performance of all surgeries largely depends on the skills of doctors. There are many types of breast surgeries and it is crucial that medical staff have significant experience in performing surgical procedures to restore health and the body's appearance. Opportunities to acquire experience and skills used to be limited to the operating room. However, this paradigm has changed. Inexpensive and lifelike training possibilities, which do not compromise patient safety, have become increasingly relevant.

Training medical students' and young surgeons' practical skills is essential. Innovators, for instance the Turkish start-up Surgitate, have developed realistic models that allow them to simulate an operative procedure and become proficient in critical surgical techniques. The models developed by Surgitate can serve as a platform on which senior doctors can teach junior staff and medical students.

## Technology solution developed by Surgitate

Medically and aesthetically successful surgeries are at the heart of Surgitate's business. Surgitate produces synthetic breast models in different sizes that surgeons, medical, veterinary students, and other medical staff can use to practice and learn. The models are designed to mimic the real organ, and they react to the surgical knife in exactly the same way. Surgitate fabricates synthetic breast models that surgeons can: 1. cut with scalpel and scissors; 2. sew; 3. remove a small/large volume then sew; 4. feel malign/benign tumours in the model; and 5. manipulate position of the nipple. This tactile simulation platform assists surgeons to improve their surgical skills and facilitates their learning process. The company also supplies the models for workshops in which experts teach surgeons how to use them. Surgitate uses feedback from surgeons to improve its products.



In addition to the breast models for medical training, the company designed a self-diagnosis breast model that can be used to teach women how to check their breast for possible lumps. This product is distributed on a not-for-profit basis to women in under-served areas.

Apart from breast models, in Surgitate's product portfolio, there are different types of skin pads and vascular models to practice a variety of techniques from basic suturing to vascular trauma surgery. Moreover, the company is seeking to expand its pipeline and is currently working on an ultrasonography model and, in collaboration with anatomic experts, on a trauma model.

### **Technology dissemination**

Surgitate, a start-up, was established in October 2014 to commercialize university-generated research for simulated skin and breast surgeries. The company was created at Sabancı University, Turkey. The founder of Surgitate, Özge Akbulut, has a doctorate in material sciences from MIT and has received numerous fellowships, grants, and distinctions, such as the European Marie Curie Reintegration Grant, a fellowship by L'Oreal (L'Oreal/ UNESCO Turkey Women in Science Fellowship). Most notably, Surgitate is the first company to receive the Sakıp Sabancı Entrepreneurship Grant created to support product-oriented research and entrepreneurship efforts of Sabancı University faculty. Surgitate is also the first enterprise to obtain investment from Arya Women's Investment Platform.

The company has two investors: Farplas, a leading plastic automotive parts manufacturer in Turkey, and Inovent, Turkey's first technology commercialization accelerator and seed funding company. Surgitate relies on the expertise of Farplas in process development, moulding, and painting for the mass scale production of synthetic body parts. Inovent's role is to assure that Surgitate is connected to the right potential investors and customers.

The idea behind Surgitate was to create a more sustainable platform for the development of synthetic organs. Dr. Akbulut, Surgitate's founder, completed a post-doctoral fellowship in the Whitesides Group at Harvard University on developing tools/techniques for resource-limited settings. This knowledge on how to design for not-for-profit environments is reflected in company's business model. Surgitate's products are priced affordably and the portfolio includes not-for-profit products, such as the self-diagnosis breast model, which serves as a platform to teach how to detect lumps. Indeed, in areas with limited diagnostic equipment and the shortage of health workers, self-examination can contribute to reducing breast cancer mortality.



In July 2014, Sabancı University filed a European patent application for the model for medical training and production method thereof of which Surgitate is the exclusive licensee. As a result Surgitate company has been able disseminate the research results by bringing the underlying technology to market.

Surgitate currently focuses on supplying its models. Even though the company is still very young, it has been successfully expanding its market and working with various actors internationally. Surgitate's aim is to become the leading firm on models for simulated oncoplastic breast surgeries and to achieve the broadest dissemination of its technology possible. Presently, it is negotiating with international distributors who expressed interest in Surgitate's models.

In Turkey, the company also cooperates with NGOs and others focused on women's health to organize workshops on breast cancer. In these workshops, an expert surgeon will explain breast cancer in a simple language and teach self-check up using the models developed by the company. Moreover, Surgitate is looking for appropriate distributors in other parts of the world; for instance, it wishes to provide self-diagnosis models to under-served areas of Africa.

