



Diagnostic Imaging

Products for diagnostic imaging use can be roughly categorized into X-ray equipment, CT, MRI, ultrasonic diagnostic equipment, and nuclear medicine equipment¹⁾. Among these, ultrasonic diagnostic equipment showed a dramatic improvement as pocket-sized devices were marketed in 2010.



Pocket-sized ultrasonic diagnostic equipment

Thereafter, several improvements have been made. Taking this product as an example from the perspective of innovation in medical devices, we hereby discuss its significance.

Ultrasound diagnostic devices in the size of a conventional laptop have been available; however, the best feature of this product is its small size that can fit in a shirt pocket and can be operated intuitively with a single thumb. A probe is connected to the main body that has a 3.5-inch LCD panel. Since its launch, it has been presumed that the device is used in home medical care, emergency / disaster medical care, and remote medical care²⁾, and its usage scenes and users are expected to expand. Product feature is not limited to its compact size. One user comments its clear image and 20 seconds to start up as excellent features of the device³⁾. The fast start-up time is one of the needs in emergency outpatient calls, where speed is everything. Apart from its size, the product feature factors in actual use in the medical field.

This product continues to be improved. In 2014, a 2-in-1 probe model was launched; the model has a probe at each end and can depict deep organs and superficial organs. With built-in probe that can depict superficial organs, visualization of superficial blood vessels, prostate, thyroid gland, and lung echo (pneumothorax) is possible⁴⁾.



2-in-1 probe (processed image)

The model eliminated the need to replace probes. This time-saving feature was useful for home care and emergency outpatient calls and disasters.

In 2017, a new model was launched. It realized operability similar to a smartphone, and was equipped with a touch screen function, a 5-inch LCD display, and a Wi-Fi function. The start-up time was further shortened to one second, addressing the need for a quick diagnosis in life-saving emergencies⁵⁾. In a clinical setting where a user may need to perform breathing and circulation assessments in a short time (in emergencies), the user listens to the patient's chest with a stethoscope with the right hand, while starting the product with the left hand⁶⁾. Further shortening of start-up times was prompted by such needs from users. Smartphone use was not spreading widely in 2010 when the first model became available, but in 2016, smartphone usage rate exceeded 70%⁷⁾. With the incorporation of smartphone-level operability into the

device at that time, users could use the device intuitively. This model had a built-in measurement application for residual urine volume. It had been in high demand in the primary care field where patients have no or fading sensation of residual urine. Residual urine volume can be measured semi-automatically⁸⁾. These elements are also seen as improvements from the user's perspective.

Moreover, a new model launched in 2018 was equipped with new functions useful for diagnosis, and quantitative measurement and analysis applications. Output function to an external monitor allowed test images to be displayed on a large-screen, and patients, family members and medical staff can view the screen together. Function to create and register procedures for surgeons, and function to adjust images and assist various users were also added⁹⁾. The improvements for usability of users were achieved this time using software.

At the time of the launch, the device attracted attention for its potential usage environments, enabled by its pocket size. As it turned out, various improvements continue to be made in order to keep reflecting the needs of users, suitable for their method and purpose of use other than the expected usage environments. "Innovation" is a status deemed where a new or improved technology has become prevalent. It is only after the technology is prevalent that it begins to contribute to the needs of medical sites, and is called innovation. Since its first launch in 2010, over 5,200 of the devices have been sold in Japan (as of April 2017)¹⁰⁾. Going forward, we must continue to understand medical needs and play a role in innovation that underpins medical setting.

Reference

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