

Development of a perimetry system using a new testing technique has begun through joint research involving the Faculty of Engineering (Ehime University) and the Faculty of Medicine (Kyoto University)

Moving toward the development of a new business through the creation of a new market and utilizing Big Data in the healthcare field

We have begun conducting “Research and Development of a Perimeter using a New Visual Characteristics Measuring Technique” with Ehime University (President: Yuichi Ohashi) and “Research and Development of a Medical Device for a Visual Function Evaluation Program” with Kyoto University (President: Juichi Yamagiwa). Both institutions are National University Corporations.

For the development of this system, we will conduct joint research with Ehime University and Kyoto University with a view to the commercialization of a “Vision Guided Perimetry System” by using a new testing technique that is an outcome of this research. In the joint research with Ehime University, our intention is to conduct research and development of technology and a program for a visual field testing technique that will allow a range of visual characteristics to be measured accurately. This has been developed by the university’s Center of Information Technology at its Kawahara Laboratory.

In the joint research with the Faculty of Medicine at Kyoto University, we are going to work toward the clinical implementation of and obtain medical device approval for the perimetry program developed with Ehime University. It is also our intention to develop a new testing technique for a variety of diseases that cause visual field abnormalities and to demonstrate its value as a product in order to commercialize the new perimeter as well as to analyze and effectively utilize the test data epidemiologically and clinically.

A perimetry test is generally performed to detect abnormalities in the visual field such as narrowing or partial loss of vision. Visual field abnormalities are associated with various diseases including glaucoma, retina detachment, and stroke. Of these diseases, glaucoma is the number one cause of vision loss. One out of 20 people aged 40 years or older are affected by this disease, and there are approximately 300,000 patients currently being treated in Japan. The number of potential patients is estimated to be 4 million, and it is also known that for the people aged 40 years or older, approximately 90% could be potentially affected by glaucoma.

At present, successful treatment of visual field loss caused by glaucoma is difficult. Accordingly, delaying the progression of the disease becomes the primary goal of patient care in many cases. However, because, particularly in the early stage, glaucoma has few symptoms, many are often unaware that they have the disease. Early detection and treatment are the key to preventing glaucoma from becoming severe. It is therefore of vital importance to undergo a periodic perimetry test. The test is not performed as part of Specific Health Checkups (so called “Metabolic Syndrome Checkups”) or as part of the company-based periodic health checkups required by the Industrial Safety and Health Act. Even when a driver’s license is issued or renewed, unless there are problems with corrected vision, a perimetry test is not performed. For these reasons, unless an individual takes the test

voluntarily hoping for early detection, the disease may have progressed to the point where it is too late to save the person's vision and before the individual concerned is even aware that he/she has the disease.

Even though taking a perimetry test is crucial to avoid the risk of vision loss, the reason that the test has not received the same level of recognition as visual acuity tests may be not only because glaucoma has few symptoms that would otherwise motivate patients to see their doctors, but also certain problems associated with the test itself. Many perimetry tests are performed using a specialized test device called a perimeter. The visual field is measured by having the patient fix his/her gaze on one point in a dark examination room and press a button when he/she sees a light peripherally. Many perimeters are excellent test devices that have been proven in clinical use, but since patients have to fix their gaze constantly on one spot and look at the light carefully throughout the test, fatigue can be an issue. The test for just one eye may exceed 10 minutes if no abnormalities are found, but if there are areas where the patient's vision is compromised, the test may exceed 30 minutes for one eye. This clearly imposes a considerable burden on the patient. In reality, because the test device is expensive and can only be performed by a technician with specialized knowledge such as an orthoptist, it is often difficult to perform a perimetry test in general health checkup facilities.

The new visual field testing technique recently developed by Ehime University does not require patients to fix their gaze on one spot during the test, as the existing technique does, which significantly reduces the burden on the patient. Furthermore, no specialized testing devices are required, and the test can be performed using a commonly used computer or a tablet, meaning that the workload on the technicians and the facilities providing the test is also reduced. Since patients are able to take the test casually at their home or workplaces without having to visit a doctor, it is expected that its use will lead to the early detection of diseases.

The visual field testing technique that Ehime University has developed is a proprietary technique and the university owns the patent to which we have the exclusive license. In the joint research with Ehime University, we intend to improve the accuracy of this patented technique to a level that makes it suitable for actual testing and to select the most compatible device in order to market the technique. Furthermore, we will provide clinical data to support the program developed with Ehime University in the joint research with Kyoto University so that it can be marketed a "medical device." We are going to clarify the basis of the testing technique and the process of obtaining test results to show that they are sufficient to allow the program to determine whether a patient has a disease or not and the state of the disease, based on clinical data.

Because this system is less expensive and makes it easier to perform tests compared to existing specialized test devices, perimetry tests would be readily available to and widely accepted by patients, which would lead to the early detection of potential patients. By applying the know-how that we have acquired in the medical field to healthcare, we will create a new market not only at health checkup facilities, but also at companies as part of their in-house healthcare management for employees and at optician shops where additional services can be offered to customers. Individuals have become increasingly conscious about managing their health in recent years. Many healthcare management applications are available for smartphones and tablets. Similarly, by providing our system as a free application for individuals to use casually, we can support them in their health management activities by providing periodic perimetry tests. In addition, we can develop a new business by collecting information from around the world through the application and utilizing the information as Big Data.