

By Howard Larkin

Heidelberg Engineering develops new gold standard for ophthalmic diagnostics

Innovative technology and clinical collaboration key to advancing state of the art

Since the days of alchemy, society has turned to research and technology to improve life. But even if medieval proto-scientists had succeeded in transforming base metal into gold, their accomplishment would pale before the achievements of modern ophthalmic research and technology. For who could disagree that preserving and restoring sight is a gift more valuable than gold?

Advancing the state of the art in ophthalmic diagnostics has been the goal of Heidelberg Engineering since it was founded 15 years ago. "We are not interested in developing me-too products," insists Dr Michael Müller, Head of Sales and Marketing. "We are always looking to create something new that is helpful for the patients as well as the doctors."

Indeed, the Heidelberg Retina Tomograph (HRT), introduced in 1991 and updated as the HRT II in 1999, revolutionised the diagnosis of glaucoma. By comparing highly detailed digital images to normative data bases and earlier scans, HRT makes it possible to objectively quantify changes in optic disc and nerve fibre layer. This allows earlier detection and tracking of glaucoma, even in patients not experiencing declining vision, making possible more-effective prevention and treatment. More than 400 clinical studies have validated the effectiveness of HRT, making it the gold standard in glaucoma diagnosis.

"The recent publication of the OHTS Study shows that a positive result on the HRT is the best single predictor for glaucoma in ocular hypertensives," Dr Müller says. "This proves that the HRT is an excellent tool for Early Detection of Glaucoma."

To add value to the HRT, the company has introduced modules to detect retinal diseases and examine the cornea over the years. "We have really fulfilled a wish of all MDs – an instrument that can do more than one thing – retina, glaucoma, and cornea," Dr Müller notes. "It is a very good return on investment because you buy one instrument which provides three applications."

Providing such versatility and precision of diagnosis is especially important in today's economic environment, where many national health systems do not follow up with the speed of innovation and do, thus, not pay for new technologies. While government systems in Switzerland, Turkey, and the United States reimburse HRT scans, many other countries only have analogous but no specific compensation.

Even so, HRT has achieved high penetration in England and Germany because of its accuracy.



Michael Müller



Christophe Baudouin

In Germany, for instance, many physicians bill patients separately for HRT, a practice Dr Müller believes will become more widespread. Indeed, some German ophthalmologists report that they are able to finance the technology with revenues of approximately 20% of patients with private insurance or self-pay, and then are able to use it for state-insured patients as well. About 50% of German practices have access to the technology; about 130 have been installed in the UK, Dr Müller adds.

To make HRT even more attractive to cost-conscious practices, Heidelberg this year introduced the portable HRT 3, allowing ophthalmologists to use the device at multiple practice locations. "We created HRT 3 in response to the wishes of our customers in the US and Germany who wanted to share the equipment," Müller explains.

Another recent advance is the new Glaucoma Software which includes augmenting the company's shared normative database to include data on individuals of Asian and African descent in addition to the existing store of Caucasian information. Heidelberg continues to build its database as users around the world contribute new clinical cases. The normative databases are used to help generate probabilities for developing glaucoma based on HRT scan data.

Besides other improvements regarding the Moorfields Regression and the Topographic Change Analysis, a second module for Early Detection was introduced. The new Glaucoma Probability Score (GPS) takes into account the complete shape of the optic nerve head and does not require manual interaction. This will make the use of the instrument much easier and user independent.

Heidelberg's second important product the Heidelberg Retina Angiograph (HRA) offers angiography images of unsurpassed quality together with unique scanning and image features for the retina. The company also offers a pocket pachymeter and

has acquired optical coherence tomography (OCT) technology including a non-contact pachymeter for measuring corneal thickness and an anterior chamber imaging device that provides cross-sectional images of the front of the eye. Heidelberg plans to incorporate OCT technology on a slit lamp and introduce it next year.

Currently, HRT accounts for about half of Heidelberg's sales with HRA making up another third. Due to the enhanced features of the HRT 3, Dr Müller expects a continuation of the HRT success story while sales of other technologies increase. "From the beginning of the company's history, we were tightly focused on research and development," Dr Müller recalls. "This shows in the quality and advancement of our products."

The importance of clinical partnerships

Dr Müller attributes Heidelberg's success to its clinical collaborators. "We maintain very close contact with our customers. In effect, we have 5,000 potential developers to help us with new ideas and improvements."

Feedback from physicians allowed Heidelberg to refine the HRT with simplified software and a compact design, making it easier and more efficient to use in clinical practice. As a result, about 5,000 HRT II systems have been sold, compared with about 350 HRT systems. "We have to respond to the needs of the customers if we are going to make a useful product," Dr Müller says.

Clinical collaboration has also been essential to developing new applications. For example, the new cornea module was developed in collaboration with researchers at Rostock University in Germany.

Once a prototype is built, Heidelberg works closely with ophthalmologists around

the world to refine it – collaboration valuable to the company and physicians alike. "To have new prototypes to test is an excellent opportunity," says Christophe Baudouin MD, PhD, professor of ophthalmology at Quinze-Vingts National Ophthalmology Hospital, in Paris. Prof. Baudouin has collaborated with Heidelberg in refining the HRT cornea module, which resulted in changes not only to the machine, but also to the development of teaching methods to help ophthalmologists develop skill in using it.

"This is a new generation of confocal microscope that gives eye high resolution pictures and it's a major advance for understanding pathological conditions and better treating them," Prof. Baudouin explains. "There were improvements made based on our input with prototypes. We were also able to discuss teaching strategies and communications. We are planning to make books with the new images to help improve diagnoses."

Educating physicians and technicians on the use of new diagnostic technology is a major focus for Heidelberg. To cover the need of education Heidelberg Engineering has established its own Academy to provide user meetings, courses and technical trainings for their products all over the world.

For example, 200 participants attended the 4th International Heidelberg Retina Angiograph Symposium (IHRAS) in Bonn, Germany in September, where they heard presentations from eminent researchers and clinicians hosted by Prof. Frank G. Holz, MD, medical director at the University Eye Clinic Bonn. Other established retina specialists included Jacques Darmon, MD (Nice), Bart P. Leroy, MD (Ghent), Jerzy Mackiewicz, MD (Lublin), Prof. Daniel Pauleikhoff, MD (Muenster), Prof. Giovanni Staurenghi, MD (Milan), Adnan Tufail, MD (London), and Prof. Sebastian Wolf, MD (Bern). The IHRAS is an annual event which takes place on another continent each year.

A complete booklet for the upcoming seminars is available as hardcopy as well as on the website.

Supporting doctors in the field and responding to both clinical and practice management needs is essential for Heidelberg's success – and for future advances in diagnostic technology, Dr Müller says. "We try to make our technical innovations meet their wishes, in order to prevent vision loss."

The next educational meetings for HRT will take place on:
5 November Heidelberg, Germany
9 December Moscow, Russia