UltraVision

A world class specialist in developing leading edge technology for contact lenses

UltraVision’s business relies on two main strands: its manufacture of specialist soft contact lenses for complicated conditions, alongside a licensing arm. The licensing side of the business invents and innovates, bringing new products to market, often for the mass-produced contact lens industry.

“A good KTP opens your eyes to the possibilities. Licensing is a major income for us and in order to expand it we had to have scientific proof – a major reason for doing the KTP. I have access to tools I could only have dreamt about – it’s made a massive difference in our lens design. We can visualise what it’ll do before I make it, speeding up the process massively. It really couldn’t have happened without a KTP.”

Lynn White, Clinical Director, UltraVision

Overview

The KTP’s initial aim was to develop a finite element model of the keratoconic cornea, to enable the development of state-of-the-art contact lenses for people suffering from visual loss due to irregular corneas (keratoconus disease). The model would allow UltraVision to produce new contact lenses that are straightforward to fit, improving visual acuity from previous products whilst providing scientific evidence of their effectiveness. While the project initially focused on distorted corneal profiles, as it developed, the team was able to build different software codes to deal with all types of corneas.

“The KTP with UltraVision has been a major success, achieving significantly beyond our initial plans. It has been a very profitable demonstration of what we can do to help industry and to develop technology with real benefit. We have learned much about contact lenses, the design challenges and the knowledge gaps that can be exploited for the benefit of patients and industry.”

Professor Ahmed Elsheikh, Dean of School of Engineering, University of Liverpool

“I’m an engineer, not a clinician, so you couldn’t imagine how happy I was when a patient came to my office and shook my hand. Our work had sorted out a problem he’d been struggling with for five years.”

Ahmed Abass, KTP Associate
KNOWLEDGE TRANSFER PARTNERSHIPS

Challenge

Generally, people with distorted corneas can’t see well through spectacles; the condition is managed with hard contact lenses, which can be extremely uncomfortable, or specialist soft contact lenses. As many Eye Care Practitioners do not feel soft lenses can improve the vision of people with irregular corneas, the initial KTP challenge was to establish proof of the current design. This would serve as education for the market and increase UltraVision’s income by licensing the design worldwide.

At the same time, it was hoped that the project would improve the design process by increasing understanding of how soft contact lenses perform on eye and thus enabling development of a new, improved design. The modelling system would increase the speed of innovation because designs could be trialed virtually, rather than going through the process of manufacturing and trials directly on eye.

Supporting innovation with facts with scientific backing was a crucial part of the KTP process, proving clear outcomes to a wider audience.

Solutions

Using data from scanning more than 180 sets of eyes, the University of Liverpool’s engineering department created a patient-specific finite element model, which takes into account the properties of the eye and lens, demonstrating how soft lenses drape, stretch and settle onto the cornea.

This type of software modelling dramatically improves the efficiency of the design process – which was previously based on trial and error, and could take up to three visits to a clinician to resolve. The eye profile software can be used to compare the fit of lenses directly between individual eyes, and also across different populations.

Benefits

Innovate UK has graded the KTP partnership between the University and UltraVision, ‘outstanding’.

As a result of the project, UltraVision was able to explain why KeraSoft Thin works at 2018’s Global Specialty Lens Symposium, relaunching the product with new branding, and will launch the next version at the 2020 event.

The company now has an established finite element modelling process, precluding the need to fit the lens onto the eye itself. While initial aims targeted UltraVision’s KeraSoft Thin lens, it has ended up with software able to model any contact lens. For the University of Liverpool, that work has also fed into two research papers, titled ‘Non-orthogonal astigmatism among normal and keratoconic Brazilian and Chinese populations’ and ‘Positions of ocular geometrical and visual axes in Brazilian, Chinese and Italian populations.’

Early on, the software showed clear fitting differences between Taiwanese and Caucasian eyes. The ability to explain and quantify those differences has given rise to opportunities to access markets across Asia and was integral in its acquisition by Japanese lens manufacturer SEED earlier in 2018.

UltraVision’s evaluation of the KTP estimates that the development of new products is worth £1,905,000 in licensing income, alongside a further £1,330,000 in direct sales.