

Contact Lens SPECTRUM®

Reader and Industry Forum

Paying Tribute to a Contact Lens Innovator

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BY PAUL BLAZE, OD

The development of the contact lens was central to the advancement of optometry. This development was pioneered in part by a young optometrist by the name of David Ewell, OD, an early innovator in the contact lens industry. Infrequently published and never a keynote speaker, Dr. Ewell humbly pushed the contact lens industry forward with his creative genius. His curiosity to invent and discover drove his learning and motivation. He was a quiet man with little pretense but continues to stand tall behind the scenes in the history of soft lens development.

Early Years

Hard contact lenses were introduced in the 1940s, and the industry grew rapidly into the 1970s. Dr. Ewell started Kontur Contact Lenses in his garage in 1955. Teamed with Harold Gates, OD, he ventured into contact lens manufacturing. Kontur gained early success with the No-Jump Bifocal, Thinlite lenticular and Front Cylinder/Bitoric hard PMMA lens designs.

Dr. Ewell's inspection of soft contact lenses was meticulous; he often placed the lenses on his own eye to observe the optics and over-refraction. His practical approach resulted in the Hydracon toric fitting guides, which recommended reducing minus sphere power and cylinder due to lens flexure in thick, soft toric lenses. Soon after, Dr. Ewell was making soft contact lenses at Kontur. To get his lenses approved by the FDA, Dr. Ewell put in more than a year of work and paid \$150,000 in fees.

Soft Lens Development

In the early 1960s, Dr. Ewell worked with the now popular HEMA material after his brother, Ray, was introduced to Dr. Otto Wichterle of the Macro-Molecular Institute in Prague, where research was conducted on plastics and medical devices. Ray Ewell was a research engineer who had worked at the Manhattan Project in Alamogordo, N.M. (where the first nuclear weapon was developed by the United States, the United Kingdom, and Canada). He acquired the HEMA material from Dr. Wichterle for Dr. Ewell. At this time, HEMA plastic was being used as a semi-permeable membrane in batteries and was found to have optical properties. Dr. Wichterle's research spawned the soft contact lens industry through discovery of this material's optical qualities and the development of the spin casting process.

Alan Eisen of Frontier Labs, Robert Morrison, and Martin Pollack began vying for the rights to the technology. Dr. Morrison, who also obtained some of the material from Dr. Wichterle and became the first

American to fit the lenses in practice, wanted the patents to continue his own work with soft contact lenses, but he had to share them with the National Patent Development Corporation (NPDC). The NPDC bought out Morrison's share and eventually licensed the technology to Bausch & Lomb.

Around this time, renowned Czech director Milos Forman made a motion picture in Dr. Wichterle's lab. This motion picture convinced Bausch and Lomb to take on the project. B&L refined the material and brought the first soft hydrogel contact lens, the Soflens (polymacon), to market in 1971.

Material Advancements

Dr. Ewell was not satisfied with the low permeability and lack of deposit resistance in the HEMA sheets from Dr. Wichterle's stock. A year later, Dr. Ewell pursued developing HEMA lenses without the yellow inhibitor, and by 1970 he had tried many types of monomers. By 1972, Dr. Ewell had received a patent on the pyrillidone additive, but studies later revealed that this additive would leave room for viruses and spores to foster. Later discovered to be an error with the slides that were observed, the HEMA industry became more simplistic by adding less elements to the lenses.

In the early days, the chemistry of soft contact lenses was difficult to deal with — they needed Vaseline for polishing and kerosene to clean them off. B&L went ahead with commercialization, while Eisen became more interested in therapeutics.

Subsequently, Dr. Ewell obtained FDA approval for spherical and toric daily wear contact lenses. During that time, he was visited by many other lab owners including Drs. Donald Korb, George Tsuetaki, John de Carle, and Lee Wesley.

Toric Lens Innovation

Dr. Ewell claimed that only 45 percent of soft contact lens wearers were fully corrected (55 percent of the population has 1.00D or more of astigmatism), which drove him to develop the very popular Hydracon toric soft lens. Stephen Downs, OD, and Randy Briggs, OD, were his partners at that time, and the three brought the Hydracon toric lens to market with their FDA approval in 1983. Competitors were truncating toric soft lenses at the time, and Hydracon's eccentric lenticulation provided equal edge thickness despite 2.00D of prism. This innovation catapulted toric soft lenses into the offices of eyecare practitioners and onto the eyes of their patients because of superior lens stability and unwavering vision.

Invaluable to the Industry

Vistakon later developed a toric soft contact lens by working with Dr. Ewell. Dave's generous nature and his willingness to share his insights gave birth to more than 10 labs. His passion for problem solving and for making a better contact lens helped spawn the soft lens era, especially the toric soft lens business.

In addition, his work with Leroy Meschel, MD, at Narcissus Labs has helped many patients who have scarred eyes and damaged pupils. His ability to understand the mechanical workings of a lab, the chemistry of polymers, and the optics of a contact lens greatly contributed to the growth of the soft lens industry.

The contact lens industry is now mature, but we will need more creative minds, like that of Dr. Ewell, to develop its future. CLS

Dr. Blaze practices in Huntington Beach, Calif. where he specializes in keratoconic and post-refractive surgery contact lens fitting. He is a consultant with MedLens Innovations, Inc. for scleral GP design and training. Visit his Web site at www.drblaze.com.