

Ophthalmic Lasers Reflect 60 Years of Technological Advances

Carl Zeiss Meditec is celebrating 20 years of ophthalmic lasers, but our technological legacy, the cornerstone of photocoagulation, goes back more than 60 years. Today, photocoagulation lasers are the standard of care for the world's leading cause of blindness: trabeculoplasty for glaucoma, focal coagulation for diabetic macular edema, pan retinal photocoagulation for proliferative diabetic retinopathy and cauterization of neovascular lesions. How photocoagulation was invented six decades ago by Carl Zeiss is a fascinating story.

In the spring of 1946, there was a solar eclipse over Germany. While admiring this rare celestial event, many observers developed eye injuries because they were only equipped with soot-covered lanternslides for protection. Dr. Gerd Meyer-Schwickerath, an assistant doctor at the ophthalmic university in Hamburg, treated many of these patients. He observed that these patients actually had developed a scar on their retina. In fact, the scar was characterized as literally "welding" the retina to the adjacent choroidal tissue layer. Dr. Meyer-Schwickerath realized that the same energy that damaged a patient's vision might be harnessed for repairing damage and disease. Dr. Meyer-Schwickerath, collaborating with Carl Zeiss, and utilizing precision magnification optics, used natural solar radiation to reattach retinas. It almost seems unbelievable today, but Dr. Meyer-Schwickerath was on the roof of the clinic performing these procedures with the ZEISS Sun Coagulator. Relying on weather for health care is not an optimal, long term solution. Fortunately, xenon lamp technology improved and the Sun Coagulator was replaced with the ZEISS Light Coagulator (Xenon) in 1956. Xenon gave way to Argon lasers in the 1980's, and then solid-state diode lasers replaced Argon in the 1990's.

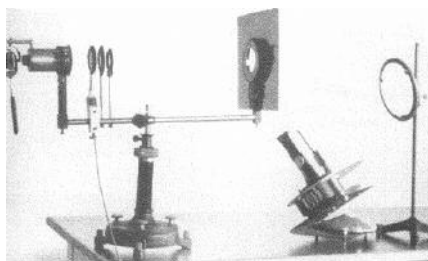


Figure 1 Sun Coagulator (left) and ZEISS Light Coagulator (right)



This historical example of collaboration between leading physicians and ZEISS precision engineering has resulted in today's laser product family.

Figure 2 ZEISS Laser Product Family — VISULAS 532s for photocoagulation (top left), VISULAS YAG III for photodisruption (top right), VISULAS YAG III Combi for photocoagulation & photodisruption (bottom right), VISULAS 690s for photodynamic therapy (bottom left).



In addition to legendary optics, each ZEISS laser incorporates unique technological advances that address the physicians' needs in both the office and operating room. The VISULAS 532s includes the electronic micromanipulator that guides both laser and slit lamp illumination coaxially for more efficient multi-spot treatments and greater view. The VISULAS YAG III offers a finely sculpted ZEISS Super-Gaussian beam profile that allows typical clinical procedures to be performed with 40% less energy. As a result, the patient is exposed to less energy, thus reducing potential thermal damage caused to adjacent tissue.

Figure 3 Typical Multi-Mode (left) versus the finely sculpted ZEISS Super-Gaussian (right)

Carl Zeiss Meditec laser technology, springing from the interest of early eclipse observers and the ingenuity of Dr. Meyer-Schwickerath, will continue to advance the field of optical engineering and ensure its preeminent place into the future.