

Press Release

New: Corneal collagen cross-linking with SCHWIND AMARIS laser systems

Integration of the innovative SCHWIND CXL-365 vario system

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SCHWIND eye-tech-solutions is consistently expanding its competence in therapeutic corneal surgery. The company is the first and only manufacturer of excimer laser systems to offer the integrated SCHWIND CXL-365 vario system for the so-called corneal collagen crosslinking (CXL). CXL using ultraviolet A (UVA) light and riboflavin (vitamin B2) was introduced as a clinical application to stabilize the cornea by inducing cross-links within and between collagen fibers. CXL has been investigated extensively and has been shown clinically not only to arrest the progression of keratoconic or post-LASIK ectasia but also to exert a moderately positive effect on visual status.^{1,2,3} With its minimal cost, simplicity and proven positive clinical outcomes, CXL can be regarded as a very useful approach to reduce the number of keratoplasties performed. Small case series have also indicated that CXL is beneficial in corneal edema by reducing stromal swelling behaviour^{4,5} and in keratitis by inhibiting pathogen growth.^{6,7}

By use of CXL with the SCHWIND AMARIS laser system, the first step is application of riboflavin at short intervals to protect the cornea from drying out. The widely accepted standard protocol for CXL involves corneal epithelial removal to facilitate the penetration of riboflavin into the stroma. Here, the epithelium is removed either as transepithelial approach with SCHWIND AMARIS laser systems or as manual or alcohol-assisted debridement. A variant of the standard CXL technique is possible by using a modified riboflavin solution, which penetrates into the stroma without deepithelialization. The long-term efficacy and possible side

effects of CXL without deepithelialization require further assessment in randomized, controlled studies with longer observation periods.⁸

With both techniques, the cornea is homogeneously irradiated with UVA light afterwards. The innovative SCHWIND CXL-365 vario system was designed paying special attention to effectiveness, safety and user comfort. The system is equipped with three power levels of 3, 9, and 18 mW/cm². The highest power level enables a cross-linking within five minutes. To protect the limbal stem cells and to focus the beam on the clear cornea the irradiation diameter can be variably adjusted from 7 mm to 11.3 mm on the patient's eye. The CXL-365 comes with a high performance diode and special optics which ensure homogeneous illumination and constant irradiation intensity over the entire corneal surface. Thus hot spots are avoided and the endothelium is sufficiently protected.

The SCHWIND CXL-365 vario system is installed under the laser arm and can be moved back and forth. It can also be swivelled by 90°. In the parking position, the aperture is positioned above the external sensor. The energy check is easy to perform prior to treatment. A small display shows the remaining treatment time. For treatment the system is moved to the left and swivelled by 90°. The treatment planes of the SCHWIND AMARIS laser systems and the SCHWIND CXL-365 vario are identical. The precise x/y adjustment of the patient bed ensures easy patient positioning. All laser systems in the SCHWIND AMARIS product range can be optionally equipped with the SCHWIND CXL-365 vario system.

¹ G. Wollensak, E. Spoerl, and T. Seiler. Riboflavin/ultraviolet-A-induced collagen crosslinking for the treatment of keratoconus. American Journal of Ophthalmology, vol.135, no. 5, 2003.

² P. Vinciguerra, E. Albè, S. Trazza et al. Refractive, topographic, tomographic, and aberrometric analysis of keratoconic eyes undergoing corneal cross-linking, *Ophthalmology*, vol. 116, no. 3, 2009

³ M. Sedaghat, M. Naderi, and M. Zarei-Ghanavati. Biomechanical parameters of the cornea after collagen crosslinking measured by waveform analysis. *Journal of Cataract and Refractive Surgery*, vol. 36, no. 10, 2010.

⁴ G. Wollensak, H. Aurich, D. T. Pham, and C. Wirbelauer, Hydration behavior of porcine cornea crosslinked with riboflavin and ultraviolet A, *Journal of Cataract and Refractive Surgery*, vol. 33, no. 3, 2007.

⁵ V. Kozobolis, G. Labiris, M. Gkika et al., UV-A collagen cross-linking treatment of bullous keratopathy combined with corneal ulcer, *Cornea*, vol. 29, no. 2, 2010.

⁶ H. P. Iseli, M. A. Thiel, F. Hafezi, J. Kampmeier, and T. Seiler, Ultraviolet a/riboflavin corneal cross-linking for infectious keratitis associated with corneal melts, *Cornea*, vol. 27, no. 5, 2008.

⁷ K. Makdoui, J. Mortensen, and S. Crafoord, Infectious keratitis treated with corneal crosslinking, *Cornea*, vol. 29, no. 12, 2010.

⁸ M. Hovakimyan, R. F. Guthoff, and O. Stachs, Collagen Cross-Linking: Current Status and Future Directions, *Journal of Ophthalmology*, vol. 2012.