

news

Anniversary Edition 2/2017

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Vector Planning with the SCHWIND AMARIS 1050RS

Noel Alpins AM, MD, New Vision Clinics, Melbourne, Australia

Improved astigmatism correction is considered to be one of the major challenges in refractive surgery. The objective is to increase the patient's satisfaction with regard to quality of vision. Many of us come across patients who are dissatisfied with their visual outcome following treatment, despite an uncorrected postoperative visual acuity of 20/20 without residual refraction. The cause of their dissatisfaction can be postoperative corneal residual astigmatism, even if this does not manifest in the refraction. A study documents that, in seven percent of all cases when exclusively refractive parameters (manifest, cycloplegic, wavefront) are used in the treatment plan, without considering corneal astigmatism, there is greater corneal astigmatism postoperatively than preoperatively.¹

When planning refractive treatments particularly for patients with astigmatism, it is very important to calculate the ocular residual astigmatism (ORA) preoperatively. This is defined as the vectorial difference between the corneal astigmatism and the refractive cylinder (VD=0) and is expressed in diopters. A previously cited study shows that about one-third of the eyes have an ORA greater than 1.0 D pre-operatively.¹ In



Figure 1: Calculation of the ocular residual astigmatism (ORA) on the basis of refractive and corneal parameters. An emphasis of 60% by refraction and 40% by topography is placed on the ORA to combine the refractive and corneal parameters into the treatment plan.

such cases with high ORA (>1.00 D), the surgeon should plan the cylinder correction particularly carefully to avoid a high degree of postoperative corneal astigmatism.

With Vector Planning, I have developed a method which systematically incorporates corneal parameters in the refractive treatment plan. This results in a more natural corneal shape with fewer aberrations and a reduction in postoperative symptoms, such as glare or halos. Treatments based exclusively on refractive parameters aim to neutralise the ORA on the cornea. In terms of astigmatism correction, this approach leads in many cases to a worse result than preoperatively measured. In the case of treatments based solely on corneal parameters

(topography-guided), the total extent of the ORA remains in the refraction, and in turn does not lead to optimal cylinder correction. Studies with vector planning^{2,3} have shown that an optimal effect is achieved with a weighting of the refractive astigmatism from 50 to 65 percent and of the corneal astigmatism from 35 to 50 percent of the ORA. As an example, let us take Figure 1, which is based on a manifest refraction of -3.00/-2.50 Ax 20 and a corneal astigmatism with topographically simulated keratometry values of 42.25 @ 30/45.75 @ 120. This results in an ORA of 1.58D Ax 45. With a 60 percent weighting of the ORA by refractive astigmatism, the targeted refractive cylinder is -0.63D Ax 135, and correspondingly the corneal cylinder is 0.95D @ 135.

The astigmatism treatment is determined according to the planned cylinder correction. This is defined via the vectorial difference between the pre-operative parameters (VD=0) and the intended astigmatism correction (Fig. 2). Half of the intended refractive cylinder should be compensated for by a spherical component in order to achieve a spherical equivalent of zero (0.32/-0.63 Ax 135). This compensation is highly appreciated by the patients. If the treatment is based on 100 percent of the manifest refraction, the ORA of 1.58 D in our example, is neutralised on the cornea postoperatively. If the treatment is based 100 percent on corneal parameters, ocular residual astigmatism is seen in the refraction. For the purpose of vector planning (VD=0), the target value (0.32/-0.63 Ax 135) is subtracted from the manifest refraction (-2.89/-2.25 Ax 20) to give the following values: -2.66/-2.71 Ax 25. The result is a reduction in post-operative corneal residual astigmatism with a simultaneous decrease in higher-order aberrations, a reduction in refractive cylinder in practice due to the better corneal shape and the potential to improve the best corrected visual acuity. By utilizing the Vector Planning method for all astigmatic eyes, benefits would be gained for patients with high ORA (the higher the ORA, the larger the potential benefit of using the Vector Planning method),

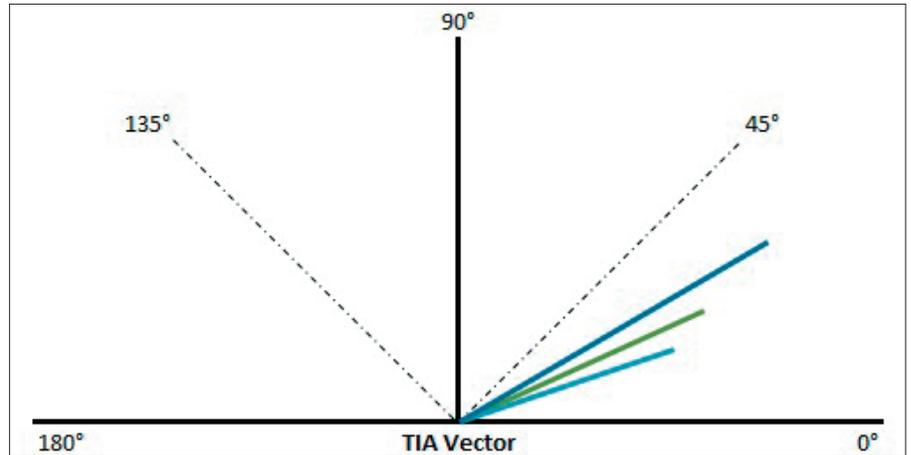


Figure 2: The surgical treatment vectors (TIA). The graphic shows a cylinder value (D) of -3.5 @ 30 at 100% corneal astigmatism (dark blue), -2.71 Ax 25 at 60% refractive astigmatism (green) and -2.25 Ax 20 at 100% refractive astigmatism (cyan).

whereas the risks are less significant for patients with low ORA (the lower the ORA, the lesser the difference between refractive planning and Vector Planning). Hence, by using Vector Planning, one gains corneal regularization and reduction of corneal toricity in the patients at risk (high ORA) for no noticeable changes in refraction with a lesser penalty for patients with low ORA (where the Vector Planning method results in a treatment plan very similar to refractive planning). The use of Vector Planning in treatment with the SCHWIND AMARIS is an effective method for optimising visual outcomes and reducing corneal aberrations. With the SCHWIND AMARIS – unlike the VISX STAR S4 IR previously used in a Vector Planning study³ – I can incorporate corneal parameters into wavefront treatment by means of Vector Planning. Both the magnitude and the axis position of the refractive parameters

can be individually changed. This is why, for me, the AMARIS laser is the ideal platform for optimising refractive results.

References

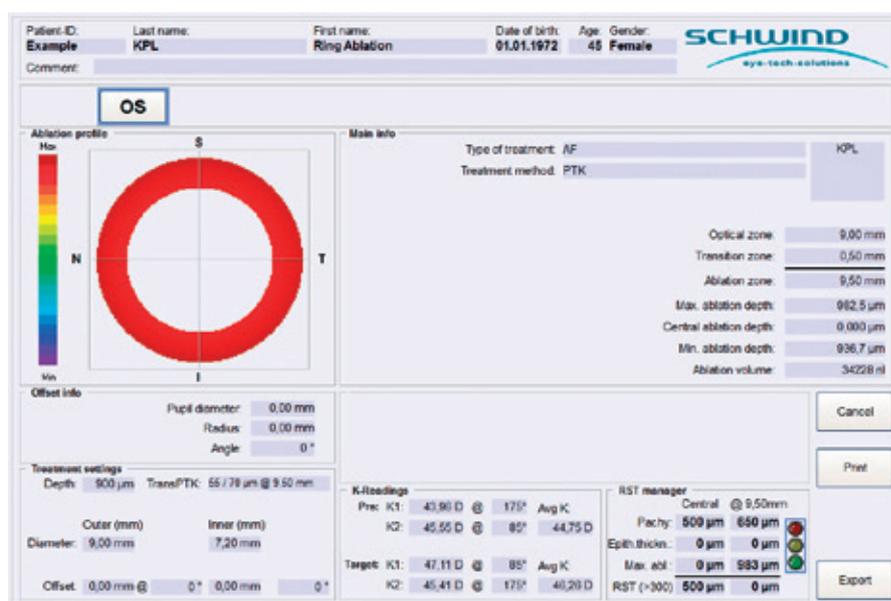
- ¹ Alpíns NA. New method of targeting vectors to treat astigmatism. *J Cataract Refract Surg* 1997; 23:65-75
- ² Alpíns NA, Stamatelatos G. Customized photoastigmatic refractive keratectomy using combined topographic and refractive data for myopia and astigmatism in eyes with forme fruste and mild keratoconus. *J Cataract Refract Surg* 2007; 33:591-602
- ³ Alpíns NA, Stamatelatos G. Clinical Outcomes for laser in situ keratomileusis using combined topography and refractive wavefront treatments for myopic astigmatism. *J Cataract Refract Surg* 2008; 34:1250-1259



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Keratoplasty with SCHWIND AMARIS Technology New PTK-CAM Option for Therapeutic Treatments

SCHWIND now offers the KPL (Keratoplasty) option for safe and precise corneal transplants. This method is suitable for all patients for whom keratoplasty is indicated: for example for treating deep corneal scars following injuries, corneal dystrophies and advanced keratoconus. No eye suction is required with laser-assisted KPL. With KPL, corneas can be treated up to a maximum depth of 999 micrometres. Depending on the indication, KPL can be used for both lamellar and penetrating treatments.



Example: Preparation of a penetrating keratoplasty with PTK-CAM

Special Ring Masks

With penetrating keratoplasty, the donor and recipient cornea are treated, without contact, using the AMARIS laser system. In the case of lamellar keratoplasty, only the recipient cornea is prepared for the graft using the laser. As a rule, the physician employs special ring masks in order to achieve sharp cornea edges and a perfect fit.

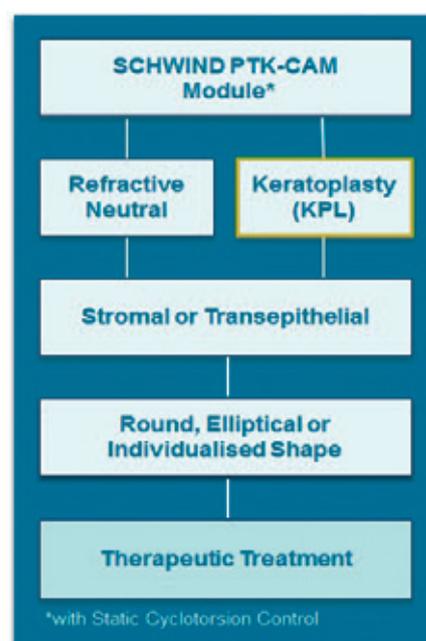
Whilst separation of the tissue with the excimer laser takes somewhat longer compared with a femtosecond laser, the results in terms of centration and alignment are considerably more precise. Result: less astigmatism, a more homogeneous cornea and an improved vision outcome.¹

Separate activation

KPL is part of the PTK-CAM toolbox and module of SCHWIND CAM software. The KPL application requires a separate activation for each AMARIS laser system. Prior to each application, an additional safety message appears to check whether corneal perforation is indeed desired.

Therapeutic treatment

The PTK-CAM module provides support for therapeutic treatments: both superficial and deep corneal scars and corneal degeneration can be corrected precisely. You can choose between superficial refractive-neutral or deep ablation for keratoplasty. PTK-CAM is based on the method of phototherapeutic keratectomy (PTK).



¹ PKP for Keratoconus From Hand/Motor Trephine to Excimer Laser and Back to Femtosecond Laser. Seitz B, Szentmáry N, Langenbacher A, Hager T, Viestenz A, Janunts E, El-Husseiny M. Klinische Monatsblätter für Augenheilkunde. 233(6): 727-36. June 2016.

Surgeon has laser treatment with AMARIS 1050RS

Ludger Hanneken, MD, VallmedicVision, elects to undergo TransPRK treatment



Dr. Ludger Hanneken knows the AMARIS 1050RS from both a user and patient perspective. The ophthalmic surgeon recently had his own visual deficiency (right eye: -3.25/-1.5 @ 20, left eye: -4.0/-1.5 @ 169) corrected with the flagship of the AMARIS product family. "I found wearing glasses every day extremely inconvenient, and they were a nuisance when operating and playing sports especially. Contact lenses proved a good alternative for a long time, but the really dry air in Andorra reduced the wearing comfort significantly," said Dr. Hanneken. In addition, although he was spared presbyopia for a long time, he had been noticing for a while that without his glasses he had to sit too close to the

screen, and even with his glasses he could no longer read small print very well. The resulting head posture was increasingly causing him neck issues. Taking all of this into consideration, the decision to have laser surgery proved a simple one to take. His eyes tolerated a monovision test without any problem at all. "The excellent AMARIS outcomes achieved in my patients convinced me so comprehensively that I was sure I wanted to utilise the same technology for my own treatment", said Dr. Hanneken. Finally, he decided on aberration-free TransPRK treatment because, with a central corneal thickness of 510 micro-

metres, he wanted to rule out all possible risk. Compared with LASIK, this procedure is associated with a somewhat longer recovery period, but he was happy to accept this in the interest of maximum safety. "Immediately post-op, any complaints were easily overcome by wearing contact lenses; the epithelium healed quickly and without any problems. I was able to perform intraocular cataract operations again just a week after my treatment. Three months after the surgery, my dominant eye attained an uncorrected visual acuity of 1.5. The goal for the non-dominant eye was -1.5 D. I can also read even the smallest print with no difficulty at all."



Dr. Hanneken is head of the VallmedicVision eye clinic with facilities in Andorra (pictured), Sitges (close to Barcelona) and Majorca

Complete satisfaction with the result

CEO of the Oftalmika Eye Clinic treated with AMARIS 750S and SmartSurf^{ACE}

They work together well as a team: Dr. Bartłomiej Kaluzny, a refractive surgeon, directs the anterior eye segment division of the Oftalmika Eye Clinic in Bydgoszcz, Poland. His wife Agnieszka Kaluzna is the managing director of the clinic. However, their medical colleague Dr. Iwona Jaworowska-Cieslinska was in charge of the recent Smart-Surf^{ACE} treatment with the AMARIS 750S. "My wife and I decided to avoid a situation that may compromise professional objectivity. I only checked the laser setting and was present during the treatment," says Dr. Kaluzny. A laser correction had been discussed for a long time. Allergic conjunctival reactions were making it increasingly difficult for Agnieszka Kaluzna to wear contact lenses. However, a crucial factor for the decision was also the consistently very good vision results achieved so far in patients of the Oftalmika Eye Clinic with Smart-Surf^{ACE}.

Agnieszka Kaluzna underwent treatment for defective vision of -3.25 and 0.5 D cylinders in the right eye and -3.0 and 0.25 D cylinders in the left eye. Based on presbyopic symptoms to be expected in the future, both eyes received mild myopic target refraction (-0.15 D in



From left to right: Surgeon Dr. Iwona Jaworowska-Cieslinska, Agnieszka Kaluzna and Dr. Bartłomiej Kaluzny immediately after the AMARIS SmartSurf^{ACE} treatment

the dominant and -0.6 D in the non-dominant eye). "During the first few hours after the treatment, I didn't feel any pain but I had to cope with intense sensitivity to light, more tearing and itching. By the next day, I already felt much better and the healing process of the cornea moved along quickly," Agnieszka Kaluzna remembers. One week after the treatment, her uncorrected distance visual acuity (UDVA) was 0.8 and 0.6. After one and a half weeks, she was able to resume her regular daily activities in full, including driving. Healing was nearly complete after six to eight weeks. "A course that is typical for all laser patients in our

clinic. In general, we observe that the visual acuity recovery time is significantly shortened with Smart-Surf^{ACE}," summarises Dr. Kaluzny. And Agnieszka Kaluzna says: "If I had to decide all over again, I am absolutely certain that I would undergo SmartSurf^{ACE} treatment again. My new vision represents a big gain in quality of life for me."



Agnieszka Kaluzna during treatment

Launch for AMARIS 1050RS in China

Curtain up for the AMARIS 1050RS in China: In May 2017, more than 150 Chinese doctors attended the launch of the highest-performance AMARIS laser in Shanghai. The event was hosted and organised by SCHWIND distribution partner MingWang. In ad-



Rolf Schwind presents the ERA Pioneer Award to the first AMARIS 1050RS users in China



From left to right: Feng Gao, Global Vision, Rolf Schwind, SCHWIND eye-tech-solutions, Prof. Wan Qinmei; Wenzhou Eye Hospital, Prof. Xinghuai Sun, Eye and ENT Hospital of Fudan University, Prof. Li Ying, Peking Union College Hospital, Jianjun Zhang, Global Vision.

dition to the official unveiling and presentation of the product, there were also scientific presentations and in-

terviews on the podium with experienced AMARIS users. More impressions at www.bit.ly/Launch1050.

SmartSurf^{ACE} Practical Workshop at DOC 2017

At DOC 2017, the SCHWIND practical workshop on SmartSurf^{ACE} attracted more than 50 participants. Moderated by Prof. Theo Seiler, Switzerland, the workshop looked in detail at all aspects of this economical and easy-to-perform surface treatment. The guest speakers,



Our moderator, Prof. Theo Seiler



Sharing experiences after the practical workshop

Dr. Victor Derhartunian, Austria, Prof. Farhad Hafezi, Switzerland, and Dr. Diego de Ortueta, Germany, discussed the scientific principles, presented clinical outcomes and

offered recommendations for suitable medication. Special attention was also paid to the cost benefits of SmartSurf^{ACE}.

Modern Ablation Profiles in SCHWIND AMARIS

Samuel Arba Mosquera, PhD, Msc, Optical Visual Researcher, SCHWIND

The past few decades have seen improving standards of refractive surgery on the human eye and an incremental growth in the effort to achieve perfect vision through surgical means. Achieving accurate clinical outcomes and reducing the likelihood of a retreatment procedure are major goals of refractive surgery.

Cartesian-oval cornea

An ideal ablation profile should achieve these goals without the need for nomograms. A Cartesian-oval results from the condition of stigmatism and represents the free-of-aberrations surface for the infinity-point (far-point in a person). If the anterior corneal surface were a Cartesian-oval it would have no aberrations. However, the anterior cornea is typically different from this shape and possesses its own aberration pattern.

The concept of an Aberration-Free profile is based on a Cartesian-oval cornea with different dioptric power as a result of treatment planning. The focus shift due to tissue removal is theoretically balanced through the consideration of an aspheric anterior corneal surface, which preserves the optical focus location of the corrected anterior corneal surface,

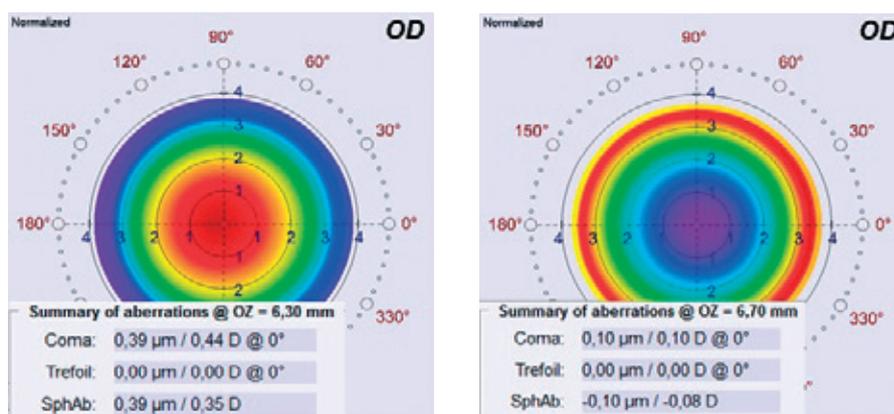


Figure 1: Example of a spheric myopia and hyperopia treatment (-4,00 D respectively +1,00 D) with asymmetric offset including HOA compensation.

avoiding the induction of post-operative hyperopic shift. In addition, the Aberration-Free concept involves different aspheric compensation as a function of the optical zone of treatment, further reducing the induction of spherical aberration and higher order astigmatism¹. This compensation is however implemented in discrete steps of 0.5 mm of optical zone size.

Asymmetric offset

Centration of the ablation profile is critical and often a controversial topic of discussion. The determination of the true visual axis is still an open quest. The SCHWIND AMARIS uses a centration method for ablation profiles called asymmetric offset, which considers Pupil Center and Corneal Vertex information simultaneously² (fig.1). The ablation pro-

files cover the pupil aperture while respecting the Corneal Vertex as the optical axis of the ablation, where the refraction values are referred to the corneal vertex and the higher order aberrations are referred to the pupil center. This centration method avoids induction of coma aberration from defocus correction (but also trefoil aberration from astigmatism correction), saving tissue at the same time.

Dehydration model

Dehydration of the cornea during the treatment can affect the ablation efficiency and the laser tissue interaction. The cornea is a layered structure with different cellular properties at different layers, rendering different refractive indices, water content and ablation properties to each layer. Further, (planar) flaps

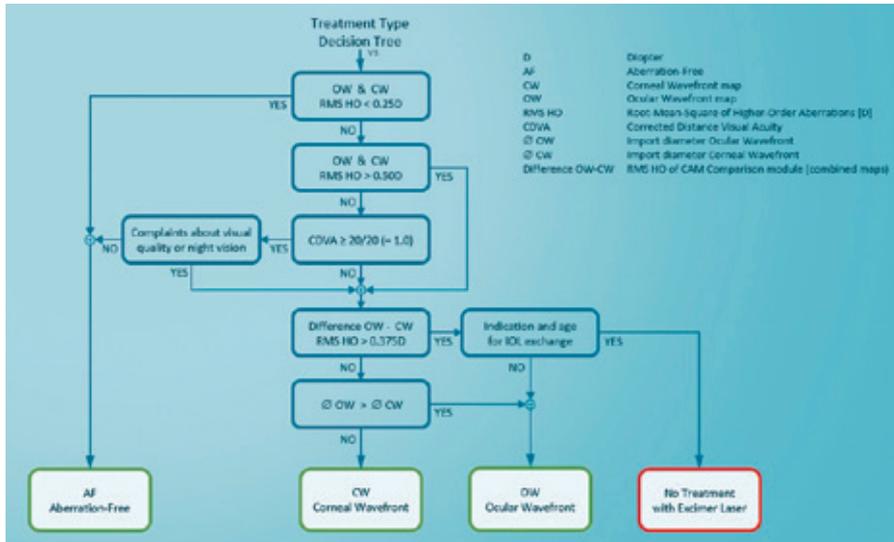


Figure 2: The Decision Tree is a powerful tool to select the treatment mode best suited to the needs and condition of the patient, in a step-by-step fashion.

in (Femto-)LASIK result in small changes of the stromal corneal curvature. SCHWIND AMARIS counterbalances these effects through a multi-variate dehydration model³, and cornea and flap thickness compensation algorithm, respectively. In addition, treatment modalities associated with different ablation depths within the cornea (stromal ablation methods compared to surface ablation methods), are implemented with appropriate ablation spots within the SCHWIND AMARIS.

Ease in treatment planning

The SCHWIND AMARIS features an automatic dynamic transition zone calculation. On the one hand, this feature may limit a surgeon's possibilities for exploring different transition zone sizes, but on the other hand, it also offers an ease in treatment planning,

always ensuring that identical treatments receive the same transition zone. Patient's age not only affects their ability to accommodate, but also the water content in the cornea⁴. This and other factors are compensated in the ablation profiles through a correlation based algorithm calculating a compensation factor for different ages.

Powerful Tool

With a myriad of customization possibilities, each with their own benefits, limitations and implications, it may become immensely complicated to decide the optimum individualized treatment method for a patient. The "Decision Tree" by SCHWIND is a powerful tool to select the treatment mode best suited to the needs and condition of the patient, in a step-by-step fashion (fig. 2).

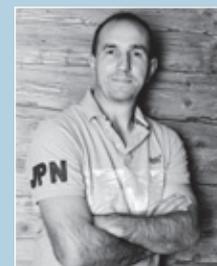
These features succinctly highlight the state-of-the-art technological advancements and useful tools offered by the modern ablation profiles. Even with their associated physical limitations, these integrated features bring the Aberration-Free concept very close to realizing its goal of delivering what it promises, a truly "Aberration-Free" treatment.

¹ Arba Mosquera S, de Ortueta D. Analysis of optimized profiles for 'aberration-free' refractive surgery. *Ophthalmic Physiol Opt.* 2009; 29: 535-548

² Arba Mosquera S, Ewering T. New asymmetric centration strategy combining pupil and corneal vertex information for ablation procedures in refractive surgery: theoretical background. *J Refract Surg.* 2012 Aug;28(8):567-75

³ de Ortueta D, von Rűden D, Magnago T, Arba Mosquera S. Influence of stromal refractive index and hydration on corneal laser refractive surgery. *J Cataract Refract Surg.* 2014 Jun;40(6):897-904

⁴ Luger MH, Ewering T, Arba-Mosquera S. Influence of patient age on high myopic correction in corneal laser refractive surgery. *J Cataract Refract Surg.* 2013 Feb;39(2):204-10



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Welcome to the SCHWIND User Family

Prof. Michael Knorz and Dr. Roberto Zaldivar decide for AMARIS 1050RS

SCHWIND welcomes two renowned eye surgeons as new AMARIS users.



Michael Knorz, MD, began his clinical career as Senior Physician at the University Eye Clinic Mannheim (1988 to 1998). He qualified as a professor for ophthalmology in 1992. In 1993, he introduced the LASIK procedure in Germany. At the same time, he established the first German LASIK center at the University Eye Clinic Mannheim which in 1999 was converted into the FreeVis LASIK Center Mannheim. In February 2000, Prof. Knorz was appointed professor of ophthalmology at the Medical Faculty of Mannheim, Heidelberg University. His main research areas are in cataract and refractive surgery, intraocular lenses and femtosecond laser technology. He has published

over 80 original articles in peer-reviewed journals, 50 book chapters, and more than 200 scientific reviews. In addition, Prof. Knorz has held more than 500 lectures and operational courses at national and international congresses. From 2010 to 2011, he was President of the International Intraocular Implant Club (IIIC). Prof. Knorz had already worked with the SCHWIND ESIRIS for several years: "I have decided for the AMARIS 1050RS, as this highly innovative realises the ideal of touch-free laser surgery using SmartSurf^{ACE} technology."



Roberto Zaldivar, MD, obtained his medical degree in Argentina at the age of 22 years. 1983 to 1984 he conducted fellowship training for cataract and glaucoma at the New

England Glaucoma Foundation in Boston. In 1985, after returning to Argentina, he started along with his father his private practice with focus on Cataract and Refractive Surgery. Among his most important achievements was not only the introduction of excimer laser technology in Latin America, but also his significant contributions to the development and innovations in the field of phakic intraocular lenses design and surgical techniques. In 1996 he developed the Bioptics method, in which a lens implant is combined with an eye laser treatment. He has held more than 1000 lectures at congresses, moderated more than 350 discussion panels in his area of expertise and published a wide range of publications and book contributions.

Dr. Zaldivar has received numerous awards, for example the Lans Lecture Award (ISRS) in 1998 – as the first non U.S. resident to receive this award, the Jan Worst Medal Award (IIIC) in 2010, the Rayner Medal Lecture Award (UKISCRS) and the Applied Research Development Award (ESCRS) in 2012. "The AMARIS 1050RS allows me to correct important visual defects with high precision due to its great speed and fantastic eye tracker", said Dr. Zaldivar.

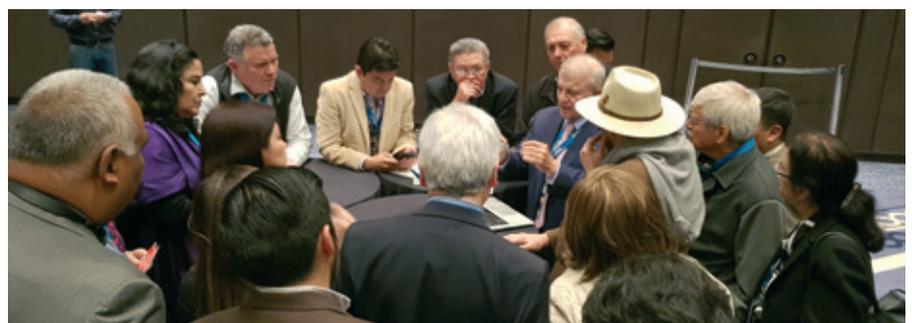
17th International SCHWIND User Meeting

More than 200 users met from 6 to 8 August in Lima, Peru



Three fully packed days with high quality lectures, exchange of experience and personal encounters beyond the scientific programme characterised the 2017 user meeting in Peru. At the "Customised to the Max" workshop, experienced users presented numerous examples of what can be achieved with customised treatments. Centration strategies and the possibilities for determining the correct refraction were vividly discussed in the plenum. Further topics on the agenda: Experiences with SmartSurf^{ACE} including intensive discussions and tips pertaining to pain management and prevention of pain (medication, bandage lens and cooling), the PERAMIS high-resolution diagnostic system and satisfied patients with PresbyMAX. A free paper

session and round table discussions about, for example, TransPRK, hyperopia and diagnostics as well as the presentation of difficult cases completed the scientific programme.



SCHWIND arrives on social media

Increasing brand recognition with Facebook, LinkedIn, YouTube and Twitter

At this moment, you are holding a copy of our SCHWIND News. Or to be more precise: our last ever printed edition! SCHWIND News is an important communication medium for us, allowing us to inform our users, distributors and interested eye surgeons about the latest events and innovations in the SCHWIND world. In future, our NEWS will be sent out digitally in the form of an email newsletter. If you haven't subscribed yet, you can do so here: www.bit.ly/SchwindNews.

In addition, you are able to follow us on LinkedIn, Facebook, Twitter and YouTube since February. These social networks enable us to keep you right up to date with all the latest news concerning the SCHWIND company, our product range, news



from SCHWIND users and a wide range of interesting topics from the field of refractive surgery.

What's more, our social media presence is also aimed at increasing awareness of our medium-sized family company, establishing the SCHWIND brand among (potential) patients and boosting confidence in laser eye treatments. And our efforts are already bearing fruit. The first enquiries from people interested in SmartSurf^{ACE} have already reached us via Facebook – one of them from as far away as the US.

Active involvement is what keeps our social media platforms alive:

Subscribe to our YouTube channel: www.youtube.com/SchwindLaser, become a fan on Facebook: www.facebook.com/SchwindLaser and follow us on LinkedIn: www.linkedin.com/company/schwind-eye-tech-solutions and Twitter: www.twitter.com/SCHWINDLaser.

Of course, you are also welcome to share our posts and adapt them if and as necessary. For your own posts, we recommend using the hashtags #SchwindLaser and #trustyoureyes and tagging our social media profiles.

We will also be delighted to post your news! Simply send us an email at marketing@eye-tech.net.



Imprint

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