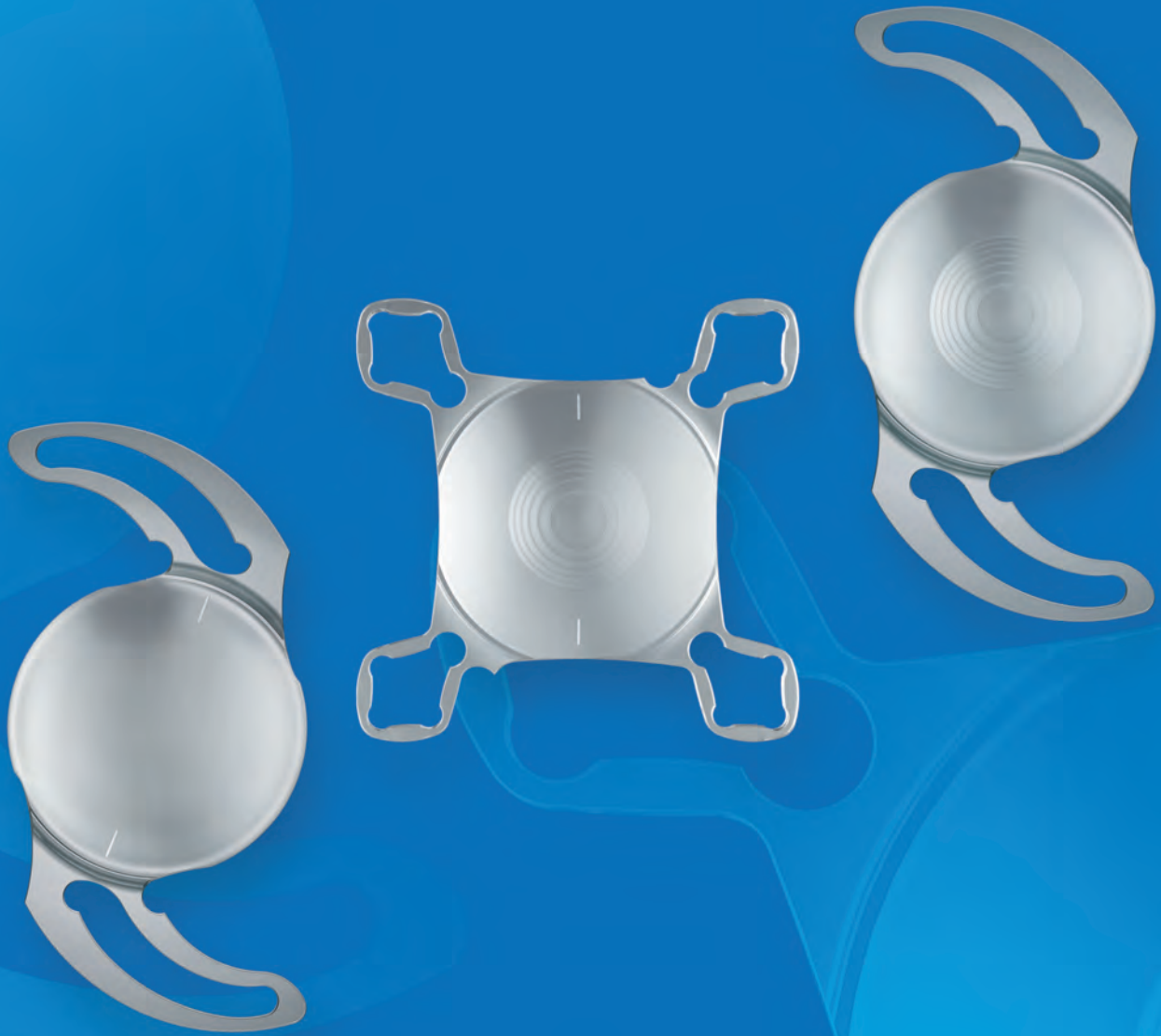


BIBLIOGRAPHY



MEDI**NTUR**

Material. Design. Optics.

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Fernández J, Rodríguez-Vallejo M, Martínez J, Tauste A, Piñero D.

New approach for the calculation of the intraocular lens power based on the fictitious corneal refractive index estimation

Published in **Journal of Ophthalmology 2019, Article ID 2796126, 9 pages.** doi: 10.1155/2019/2796126, accepted: will be published in 2020 January.

Purpose: To identify the sources of error in predictability beyond the effective lens position and to develop two new thick lens equations.

Number of eyes: 43; Follow-up: 3 months.

Conclusions: The predictability with the trifocal IOL evaluated is not explained by an error in the ELP. An adjustment fitting the fictitious index with the axial length improves the predictability without false estimations of the ELP.

Györy J, Madar E, Srinivasan S.

Implantation of a diffractive–refractive trifocal intraocular lens with centralized diffractive rings: Two-year results

Published in **J Cataract Refract Surg. 2019 May;45(5):639-646.** doi: 10.1016/j.jcrs.2019.01.024.

Purpose: To compare the optical performance and quality of life after implantation of a new progressively apodized diffractive multifocal intraocular lens (IOL) and report the visual and patient-reported outcomes and contrast sensitivity.

Number of eyes: 100; Follow-up: 24 months

Conclusions: Bilateral implantation of a new trifocal IOL with centralized diffractive rings provided good functional vision at all distances. The levels of spectacle independence and patient satisfaction were high with minimal dysphotopsia symptoms.

Fernández J, Rodríguez-Vallejo M, Martínez J, Tauste A, Piñero DP.

Biometric Factors Associated with the Visual Performance of a High Addition Multifocal Intraocular Lens

Published in **Curr Eye Res. 2018 Aug;43(8):998-1005.** doi: 10.1080/02713683.2018.1478981.

Purpose: To evaluate the impact of ocular parameters on the visual performance achieved with the multifocal intraocular lens (IOL) Bi-Flex 677MY by means of computing the area under the visual acuity defocus curve and correlate it with several biometric parameters.

Number of eyes: 26; Follow-up: 3 months

Conclusions: The visual performance at near distance with the IOL evaluated improved in eyes with less corneal power. On the other hand, a slight temporal IOL decentration from vertex normal also improved intermediate visual acuity. The binocular defocus curve was similar to other trifocal IOLs.

García-Bella J, Ventura-Abreu N, Morales-Fernández L, Talavera-González P, Carballo-Álvarez J, Sanz-Fernández JC, Vázquez-Moliní JM, Martínez-de-la-Casa JM.

Visual outcomes after progressive apodized diffractive intraocular lens implantation

Published in **Eur J Ophthalmol. 2018 May;28(3):282-286.** doi: 10.5301/ejo.5001030.

Purpose: To assess photopic and mesopic vision with best distance correction in patients implanted with the Bi-Flex 677MY intraocular lens (IOL).

Number of eyes: 50; Follow-up: 3 months

Conclusions: Corrected far and intermediate vision (at 70 cm) results were similar to those found after 2 months FineVision (Phys-IOL) implantation. Near visual acuity results at 40 cm were similar to FineVision (PhysIOL) as well as to AT LISA (Zeiss) results 3

months after surgery. The evaluated apodized diffractive design IOL provides effective restoration of visual function in far and near vision distance with an adequate intermediate visual quality between -1.00 and -1.50 focus

Law EM, Aggarwal, RK, Kasaby, HE, Buckhurst H, Buckhurst PJ.

Visual Function and Spectacle Independence following bilateral implantation of monofocal and multifocal intraocular lenses: A randomised clinical trial.

Presented at the Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019

Purpose: To compare monocular and binocular visual performance in cases of bilateral implantation of multifocal intraocular lens (MIOL) or Monofocal Intraocular lens (IOL) implantation, and to compare the subjective perception of near vision.

Number of eyes: 100.

Conclusions: Unaided near visual acuity was significantly better with the MIOL, and greater spectacle independence was found in this group. Halos and glare were reported in the MIOL group, but the prevalence did not show an adverse effect on overall satisfaction.

Györy J.

Long-term evaluation of contrast sensitivity prior to and after the implantation of the Liberty 677MY trifocal intraocular lens

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019**

Purpose: To monitor contrast sensitivity of patients undergone cataract surgery and bilateral implantation of the trifocal Liberty 677MY capsular bag intraocular lens (IOL), in different light conditions, through a 2 year-follow-up period.

Number of eyes: 100; Follow-up: 24 months.

Conclusions: Our data suggest, that the trifocal Liberty 677MY IOL provides good contrast sensitivity, and maintains CS in the range considered physiologic for elderly people. This level is shown to be acceptable by patients, especially as dysphotopic phenomena were rarely reported, and easy to tolerate.

García-Montesinos J, Rodríguez-Vallejo M, Martínez J, Piñero DP, Fernández J.

Posterior capsular opacification and contrast sensitivity defocus curve with two trifocal intraocular lenses

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019**

Purpose: To assess the degree of posterior capsular opacification (PCO) and its influence on contrast sensitivity defocus curve (CSDC) after 12 months of two intraocular lenses (IOLs) implantation, Alsafit Trifocal (AT) [Alsanza] and Liberty (L) [Medicontur].

Number of eyes: 42; Follow-up: 12 months.

Conclusions: PCO produced a decrease on CSDC between 3 and 12 months after surgery with trifocal IOLs. This reduction was statistically significant only for AT. This difference between two lenses is explained by a less percent of eyes with a subjective grading of PCO at level 0 for AT than for L. Despite using the same hydrophilic material, L present less PCO rating than AT, that could be explained by the transition between optic and haptics or the definition of posterior squared edges of the lenses.

Fernández J., Rodríguez-Vallejo M, Martínez J, Tauste A, Piñero DP.

Bias Correction in the Intraocular Lens Power Calculation Beyond The Effective Lens Position Through the Corneal Fictitious Index Fitting with a Thick Lens Paraxial Formula

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019**

Purpose: To identify the sources of error in predictability beyond the Effective Lens Position and to develop two new thick lens equations.

Number of eyes: 43.

Conclusions: The predictability with the trifocal IOL evaluated was not completely explained by an error in the ELP prediction. An adjustment fitting the fictitious index with the axial length improved the predictability without false estimations of the ELP.

Rodríguez-Vallejo M, Garçon N, Martínez J, Zhou Y, Poyales F, Fernández J,

New method for assessing the accuracy of formulas for intraocular lens power calculation according to the normal eye biometric parameters

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019**

Purpose: To introduce a new graphical method for assessing the accuracy of intraocular lens power calculation depending on the deviation from the normality for several eye biometric parameters obtained from a population of subjects candidates to cataract surgery, including: Axial Length (AXL), Anterior Chamber Depth (ACD), Lens Thickness (LT), White-to-White (WTW) and mean Anterior Corneal Radius (Rm).

Number of eyes: 142.

Conclusions: We developed a new graphical method that allows to evaluate the accuracy of a formula for intraocular lens power calculation depending on the eye characteristics. The eyes were classified according to their location in the normal population distribution for each parameter. This method allows to evaluate not only the accuracy depending on axial length but in all the parameters that are usually used by the formulas allowing to detect the weakness and strengths of a particular formula in comparison to others.

Van Acker E.

Clinical outcomes and patient satisfaction after the implantation of two different types of trifocal diffractive IOLs

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: The aim of the study was to evaluate and compare the functional & morphological clinical outcomes and patient satisfaction after the implantation of two different types of trifocal diffractive apodized IOLs: Bi-Flex 677MY (Medicontur) and FineVision (PhysIOL).

Number of eyes: 78 (Medicontur Bi-Flex 677MY: 40; PhysIOL FineVision: 38); Follow-up: 12 months

Conclusions: Both trifocal lenses provided excellent distance, intermediate and near vision. The results demonstrate similar performance in terms of all clinical and functional tests implemented. Contrast sensitivity in mesopic conditions showed better results for Bi-Flex 677MY but the difference was not statistically significant. The binocular defocus curves did not differ significantly at any of evaluated vergences (-4.0D to plus +4.0D), and no significant difference was observed in the areas under the defocus curves either. Both the Bi-Flex 677MY and the FineVision IOLs provided high patient satisfaction, and all patients in both study groups were glass independent after the IOL implantations.

Fernández J, Rodríguez-Vallejo M, Tauste A, Martínez J, Piñero DP.

Parameters related to the visual performance achieved with high and low addition trifocal intraocular lenses

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To evaluate the parameters related to the visual performance achieved with low and high addition trifocal intraocular lens (IOLs) and to propose a model for the prediction of the visual acuity defocus curve at the near range.

Number of eyes: 60.

Conclusions: Eyes with less corneal power have higher near area under the defocus curve. Previous theoretical studies have recommended low addition multifocal lenses for hyperopes arguing that a lower ALP results in higher addition. However, our clinical results are not in agreement with this hypothesis and this can be explained because, in the balance of Km and ALP, Km has higher importance than ALP and even though addition increases with decreasing ALP, at the same time Km increases, which result in less performance of hyperopes at near. Furthermore, LA lens is more sensitive to lose near vision by eye parameters.

Rodriguez Vallejo M, Tauste A, Lopez-Artero E, Matamoros A, Martinez Amat A, Poyales F, Fernandez J.

Incorporation of the area under the fast-visual acuity defocus curve in clinical practice for detecting differences among multifocal intraocular lenses

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To evaluate the visual acuity (VA) agreement at far, intermediate and near distances with the corresponding defocus lenses (DLs) obtained from fast visual acuity defocus curves (FVADC) and to assess the sensitivity of these metrics in comparison to area under the FVADC for detecting differences among multifocal intraocular lenses (MIOLs)

Conclusions: Defocus lenses (DLs) obtained from fast visual acuity defocus curves (FVADC) showed a good agreement with the ETDRS with a high percentage of eyes within a 1 line of VA. Our results are not in agreement with the only previous published paper that reported overestimation of defocus curves in comparison to proximal VA. On the other hand, our results are in agreement with previous authors who reported the highest sensitivity of the area under the VADC for detecting differences among MIOLs. New technologies such as FVADC can help to incorporate the metric of area under the VADC in the clinical practice.

Assouline M.

Long Term Comparative Outcome of 5 Multifocal Intraocular Lenses

Presented at the **Annual Meeting of Asia-Pacific Association of Cataract and Refractive Surgeons (APACRS) Chiang Mai 2018** and **Asia-Pacific Academy of Ophthalmology Congress (APAO), Hong Kong 2018**

Best Scientific Paper Award

Purpose: To compare the outcome of 5 different multifocal intraocular lens (MFIOL) designs in a consecutive series of 1711 cases performed by a single surgeon.

Number of eyes: 1711 (Medicontur Bi-Flex 677MY: 409, Oculentis Lentis Mplus: 714, Lentis Comfort: 161, PhysiOL FineVision: 234, Zeiss AT LISA 809M: 193); Follow-up: 44 months

Conclusions: Advanced multifocal intraocular lens designs provide an excellent intermediate vision ability as compared to standard bifocal diffractive designs. Bi-Flex 677MY accounted for 1/3 of all implanted multifocal IOLs between 2010 and 2017 in my praxis. In the period of 2017-2018 the number of implanted Bi-Flex 677MY increased and it represents ½ of all implanted multifocal IOLs.

Tran Hai Y, Ho Thi BV.

Distance, Intermediate, Near Visual Outcomes after Implantation of Medicontur Multifocal Diffractive Apodized IOL – Bi-Flex 677MY - First evaluation feedback

Presented at **Asia-Pacific Association of Cataract and Refractive Surgeons (APACRS) Chiang Mai 2018**

Purpose: To evaluate visual outcome after cataract surgery in myopic and non-myopic eyes

Number of eyes: 26; Follow-up: 6 months

Conclusions: The results demonstrated, that for trifocal IOL implantation careful patient selection is necessary. In non-myopic patients, significant improvements were observed in far, intermediate and near visual acuities, postoperatively. High patient satisfaction was observed, also in high myopic group (AL>24mm). Contentment of patients is more consistent after implantation of Bi-Flex

677MY, compared to other trifocal IOLs. There was no need to perform YAG capsulotomy in the follow-up period. Longer follow-up is needed to determine PCO-rate. The implantation of Bi-Flex 677MY was safe and easy, no tilt and no decentration were observed in the follow-up period.

Fernández J., Rodríguez-Vallejo M, Martínez J, Piñero DP,

EPS technology for trifocality. Visual performance of patients implanted with trifocal Bi-Flex MY analysed by the Multifocal Lens Analyzer for iPad

Presented at the **World Congress of Ophthalmology (WOC) Barcelona 2018**

Purpose: Conventional methods based on visual acuity at three particular distances (far, intermediate and near) do not completely describe the clinical performance of a MIOL. Area under visual acuity defocus curves is a better descriptor of visual performance. The Multifocal Lens Analyzer App enables the fast measurement of defocus curves and the big data for this metric.

Number of eyes: 50; Follow-up: 3 months

Conclusions: Bi-Flex centers over the normal position of the crystalline lens. Predictability: mean spherical equivalent residual error of -0.15 ± 0.33 D and 88% of eyes in ± 0.50 D. Accuracy of refractive outcome of Liberty notably exceeded literature average of 75.1% within the ± 0.50 D range. The intermediate and near vision remain almost similar with and without best correction. Binocular defocus curves were around one line of visual acuity better than monocular defocus curves. Younger patients achieved better results in terms of visual acuity defocus curves.

Meijide N.

Visual outcomes After Bilateral Implantation of an Apodized Diffractive Trifocal IOL

Presented at the **Annual Meeting of the American Society of Cataract and Refractive Surgery (ASCRS) Washington 2018**

Purpose: To evaluate visual outcomes of patients undergoing bilateral cataract surgery and bilateral implantation with Bi-Flex 677MY.

Number of eyes: 34; Follow-up: 6 months

Conclusions: Bi-Flex 677MY does not compromise distance and near vision. Competitive intermediate vision was achieved. All patients were glass independent (for all distances). Glare, halo presented without disturbing vision. High patient satisfaction and fast visual rehabilitation.

Naval C.

Clinical Experience with the Bi-Flex 677M

Presented at **Asia-Pacific Academy of Ophthalmology Congress (APAO), Hong Kong 2018**

Purpose: To evaluate visual outcomes after the implantation of Bi-Flex 677M.

Number of eyes: 49; Follow up: 6 months

Conclusions: Bi-flex 677M works well for patients who desire to be spectacle independent. Data shows 92% of eyes can read J4 or better. The 88% of the patients are within $+0.50/-0.50$ post-op (SEQ). Bi-flex 677M is our choice of multifocal IOL especially in patients who would be sensitive to photopsia and those with suspected zonular instability.

Law E, Buckhurst P, Aggarwal R, Buckhurst H, Kasaby H.

Randomised clinical trial of the Bi-Flex M multifocal intraocular lens

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: A prospective, double blind, randomised control trial (RCT) to evaluate visual outcomes of patients undergoing bilateral cataract surgery and bilateral implantation with either a multifocal intraocular lens (IOL) or a monofocal control IOL.

Number of eyes: 200 (Bi-Flex 677AB: 100, Bi-Flex 677MY: 100); Follow-up: 6 months

Conclusions: As expected, the near visual acuity was shown to be better in the multifocal group, and patient satisfaction questionnaire confirmed that the multifocal group were satisfied with their near vision. No statistically significant difference was found between the mono- and multifocal group when contrast sensitivity was measured with the Pelli-Robson and CSV-1000 charts. Maximum reading speed was similar as well between mono- and multifocal groups.

Dunai A, Kranitz K, Juhasz E, Sandor G, Filkorn T, Nagy ZZs.

Comparison of two multifocal IOL types: long-term visual outcomes

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To compare the refractive and visual outcomes collected during the first postoperative year, after the implantation of two different types of one-piece acrylic diffractive multifocal intraocular lenses (IOL).

Number of eyes: 100 (Medicontur Bi-Flex 677MY: 50, Alcon AcrySof IQ ReSTOR SN6AD1: 50); Follow-up: 24 months

Conclusions: Multifocal IOL implantation is a well-calculable and lastingly efficient method for the cataract surgery of patients who wish to achieve spectacle independence. In Medicontur group, superior uncorrected far, intermediate and near vision, and better depth of focus was found 12 and 24 months after surgery, compared to patients in the Alcon ReSTOR group.

Fernández J, Rodríguez-Vallejo M, Tauste A, Martínez J, Piñero DP.

Visual performance of patients implanted with progressive Bi-Flex M analysed by the Qvision iPad Multifocal Lens Analyzer

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: Performing conventional defocus curve measurements have several disadvantages. The Multifocal Lens Analyzer enables the fast measurement of defocus curves.

Number of eyes: 50; Follow-up: 3 months

Conclusions: Monocular efficacy: UDVA: 0.1 ± 0.16 , CDVA: 0.00 ± 0.08 ; UIVA: 0.20 ± 0.14 , CIVA 0.22 ± 0.16 ; UNVA: 0.09 ± 0.10 , CNVA: 0.08 ± 0.10). The intermediate and near vision remain almost similar with and without best correction. Binocular defocus curves were around one line of visual acuity better, than monocular defocus curves. Younger patients achieved better results in terms of visual acuity defocus curves.

Van Acker E.

Comparison of clinical outcomes and patient satisfaction after implantation of two different types of diffractive apodized IOLs

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To compare the refractive and visual outcome, contrast sensitivity and patient satisfaction after the implantation of two diffractive IOLs.

Number of eyes: 78 (Medicontur Bi-Flex 677MY: 40, PhysiIOL FineVision (Micro F): 38); Follow-up: 12 months

Conclusions: Our results demonstrate identical clinical performance of the two IOLs in terms of all clinical and functional tests performed, none of the analyses have shown significant differences in any of the parameters examined. All patients were spectacle independent. Furthermore, the study confirmed clinical trifocal performance of the Bi-Flex M intraocular lenses.

Győry J.

Long term functional and morphological outcomes and patient satisfaction after cataract surgery with Bi-Flex M implantation with/without posterior central circular capsulorhexis (PCCC).

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To evaluate visual outcomes, residual refractive errors, contrast sensitivity and patient satisfaction with particular regard to visual artefacts in patients implanted with the Bi-Flex M diffractive multifocal IOL.

Number of eyes: 100; Follow-up: 24months

Conclusions: The 2-year results of 98 Bi-Flex M implantation provided spectacle independence for distance, intermediate and near vision in this study. Visual artefacts were of low level and easy to tolerate, improving with time. The position of the lens in the bag was stable. PCCC did not have significant influence on visual functions and lens position. YAG-laser capsulotomy was performed in 9 cases of no-PCCC eyes during the 2-year follow-up. Suboptimal functions were measured only in patients with minor non-cataract related (mostly macular) alterations discovered during the follow-up period.

Kránitz K, Kovacs I, Juhasz E, Sandor G, Dunai A, Nagy ZZs.

Aberration profile of two multifocal IOLs and the effect of angle kappa on postoperative aberrations

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To compare aberration profile of two multifocal IOLs and to evaluate the effect of postoperative angle kappa on higher order aberrations.

Number of eyes: 50 (Medicontur Bi-Flex 677MY: 22, Alcon AcrySof IQ ReSTOR SN6AD1: 28); Follow-up: 3 months

Conclusions: Values of angle kappa decrease significantly after cataract surgery. In case of larger preoperative angle kappa values in eyes with short axial length this change can even reach 0.4 mm. Type of implanted multifocal IOLs has no influence on postoperative angle kappa values. The significant displacement of visual axis after multifocal IOL implantation is related to the position of the IOL centre.

Blanco I, Duch F, Reyes J, Marti M, Escude R.

Comparative prospective study of intraocular multifocal lenses in refractive lens exchange surgery: FineVision versus Bi-Flex M 677MY – results at 3 months

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To study the visual outcomes in far, middle and near vision of patients undergoing refractive lens exchange surgery with these multifocal lenses. As secondary objectives, complications, refractive results, visual quality, vision-related quality of life and patient satisfaction are assessed.

Number of eyes: 22 (Medicontur Bi-Flex 677MY: 10, PhysiOL FineVision (Micro F): 12); Follow-up: 3 months

Conclusions: Both lenses provide good refractive and functional results, with a statistically significant improvement in vision-related quality of life (VF14). All patients had high satisfaction with the surgery, and 100% would return to intervene with the same technique. The main complain in both groups has been the presence of halos being for most patients a moderate problem. A statistically significant change was observed in the pupillary size in mesopic and photopic conditions. At the level of the defocus curve, for the intermediate vision, the FineVision lens presents a more stable plateau image.

Dunai AF, Kranitz K, Juhasz E, Sandor G, Filkorn T, Nagy ZZs.

Comparison of two multifocal IOL types – short and medium-term visual outcomes

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To compare the refractive and visual outcomes collected during the first six postoperative months after the implantation of two types of different one-piece acrylic diffractive multifocal intraocular lenses (IOL).

Number of eyes: 100 (Medicontur Bi-Flex 677MY: 50, Alcon AcrySof IQ ReSTOR SN6AD1: 50); Follow-up: 6 months

Conclusions: In Medicontur Bi-Flex 677MY group, significantly better uncorrected far and intermediate vision and depth of focus was found three and six months after the surgery, compared to the patients in the Alcon ReSTOR group. Similarly, good near visual acuity was found during the follow-up of both IOL types. Medicontur 677MY may be recommended for patients for whom it is important to achieve stable visual rehabilitation on the long term and excellent far and near visual acuity and good intermediate vision for different work distances.

Juhasz E.

Multifocal intraocular lens implantation's effect on the eye's higher order aberrations

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To evaluate higher order aberration data of patients underwent multifocal intraocular lens implantation.

Number of eyes: 63 (Medicontur Bi-Flex 677MY: 30, Alcon AcrySof IQ ReSTOR SN6AD1: 33); Follow-up: 3 months

Conclusions: Implantation of multifocal intraocular lenses has an effect on the eye's higher order aberrations, but no statistically significant difference could be found between the two different types of examined multifocal lenses.

Dexl AK, Pasta J, Nemcova I, Novacek L, Sutter F, Lingg M, Grabner G.

Visual outcome, patient satisfaction and spectacle independency after implantation of Progressive Bi-Flex M. Final result of a multicentric trial with 50 consecutive patients

Presented at **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Barcelona 2015**

Purpose: The aim of the study was to evaluate refractive outcomes and patient satisfaction in patients bilaterally implanted with Bi-Flex 677MY more objectively in 3 centers in Europe as Austria, the Czech Republic and Switzerland.

Number of eyes: 50; Follow-up: 6 months

Conclusions: The study revealed very good uncorrected mono- and binocular far and near and good intermediate visual acuity, complete spectacle independence and low incidence of adverse dysphotopsia. Patients were very satisfied (9.5/10).

Győry J.

Functional and morphological outcomes and patient satisfaction after cataract surgery with apodized diffractive multifocal intraocular lens implantation with and without posterior central circular capsulorhexis (PCCC)

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Barcelona 2015**

Purpose: To evaluate visual and morphological outcomes as well as patient satisfaction and spectacle independence after Mf-IOL implantation in patients with cataract operated with and without PCCC.

Number of eyes: 64; Follow-up: 6 months

Conclusions: Bi-Flex M implantation in patients with cataract provided good distance, intermediate and near vision outcomes. Residual refractive error of less than ± 0.50 dioptre was achieved over 90% for all distances. Contrast sensitivity levels were high. Visual artefacts were at low level and well tolerable. The position of the lens in the bag was stable.

Pasta J, Nemcova I.

Distance, Intermediate, Near Visual Outcomes, and Patient Satisfaction After Implantation of Progressive IOL

Presented at the **Annual Meeting of the American Society of Cataract and Refractive Surgery (ASCRS) San Diego 2015**

Purpose: To present preliminary results of Czech part of an international multicentric study with implantation of progressive IOL – Bi-Flex M.

Number of eyes: 20; Follow-up: 6 months

Conclusions: Bi-Flex M provides patients with above average distance and near vision (median=1.0 and 0.8 respectively) and by competitive intermediate vision (median=0.8, binocular). 100% of patients were spectacle independent. Photopic phenomena were minimally reported. High satisfaction of patients was observed.

Naval C.

The evolution of my multifocal practice

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) 2014**

Purpose: The aim of the study was to find alternative solution for the replacement of Alcon ReSTOR +4D lens: introduction of Bi-Flex 677M.

Number of eyes: 29; Follow-up: 6 months

Conclusions: Clinical performance of the Bi-flex 677M is promising. Data shows that 93% of eyes can read J3 or better. In the Medicontur group, 83% of the eyes were within +0.50/-0.50 post-op (SEQ). Refractive outcomes can improve with personalised IOL constants and more patients.

Assouline M, Bessede L.

Les implants Bi-Flex M (Medicontur 677M) et Q-Flex M (Medicontur 640MY): deux designs multifocaux diffractifs / réfractifs pour une amélioration de la vision intermédiaire

Published at **RéfleXions Ophtalmologiques, October 2016, No 198; 29-40 (Paris)**

Purpose: To introduce two different lens designs, the Bi-Flex 677MY with double loop haptics and the Q-Flex 640MY with 4 closed loops.

Conclusions: The objective and subjective results show that the latest multifocal implants consistently and safely improve patients' visual autonomy and quality of life. This should be encouraging enough for ophthalmic surgeons to change their routine.

Assouline M, Bessede L.

Comparison of four multifocal implants to compensate for presbyopia during cataract surgery

Published at Visya – www.cliniquevision.com and presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) London 2015, Istanbul 2014**

Purpose: To compare three multifocal implants designed to compensate intermediate vision more efficiently to a benchmark bifocal implant in a consecutive series of 826 eyes, operated by a single surgeon.

Number of eyes: 826 (Medicontur Bi-Flex 677MY: 88, Zeiss AT LISA 809M: 94, PhysiOL FineVision: 230, Oculentis Lentis Mplus: 414); Follow-up: 3 months

Conclusions: Oculentis Lentis Mplus, PhysiOL FineVision and Medicontur Bi-Flex 677MY provided better uncorrected intermediate visual acuity at 65 cm, than the classic bifocal implant, AT LISA Bifocal. Oculentis Lentis Mplus, PhysiOL FineVision and Medicontur Bi-Flex 677MY all made from hydrophilic acrylic materials provide far better PCO-prevention, because of their better adapted geom-

etry: 5° haptic angulation and 360° square edge in the case of the FineVision and Medicontur IOLs and large overall diameter and significant volume in case of Lentis Mplus.

Zadok D.

Clinical experience with the Bi-Flex M IOL

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Amsterdam 2013**

Purpose: To determine the visual outcomes and patient satisfaction with bilateral implantation of the Bi Flex M (Medicontur) - multifocal apodized diffractive aspheric hydrophylic acrylic IOL

Number of eyes: 20; Follow-up: 6 months

Conclusions: The Bi-Flex M IOL (Medicontur) provided adequate distance, intermediate and near vision. High rates of spectacle freedom. Photic phenomena were experienced in a small percentage of patients. High degree of patient satisfaction.

Bachernegg A, Rückl T, Strohmaier C, Jell G, Grabner G, Dextl AK.

Vector Analysis, Rotational Stability, and Visual Outcome After Implantation of a New Aspheric Toric IOL.

Published in *J Refract Surg.* 2015 Aug;**31(8):513-20**. doi: 10.3928/1081597X-20150727-01.

Purpose: The aim of the study was to evaluate vector analysis, rotational stability, and refractive and visual outcome of a new toric intraocular lens (IOL) for correction of pre-existing corneal astigmatism during routine cataract surgery.

Number of eyes: 30; Follow-up: 12 months

Conclusions: At 12 months postoperatively, a reduction of the refractive astigmatism from 1.93 ± 0.90 D (range: 0.50 to 4.00 D) to 0.28 ± 0.61 D (range: 0.00 to 1.50 D) could be found. Intraoperative to 12-month postoperative comparison of IOL axis alignment showed low level of rotation: $0.2^\circ \pm 2.41^\circ$. Implantation of the new Bi-Flex T IOL was a safe, stable, and effective method to correct pre-existing regular corneal astigmatism during cataract surgery.

Bachernegg A, Rückl T, Riha W, Grabner G, Dextl AK.

Rotational stability and visual outcome after implantation of a new toric intraocular lens for the correction of corneal astigmatism during cataract surgery.

Published in *J Cataract Refract Surg.* 2013 Sep;**39(9):1390-8**. doi: 10.1016/j.jcrs.2013.03.033.

Purpose: To evaluate rotational stability and the refractive and visual outcomes of a new aspheric toric intraocular lens (IOL) for correction of pre-existing corneal astigmatism during routine cataract surgery.

Number of eyes: 30; Follow-up: 3 months

Conclusions: The mean refractive astigmatism decreased from $1.93 \text{ D} \pm 0.90$ to 0.30 ± 0.54 D at 3 months. The median IOL rotation between 1 day and 3 months was 0 degree. Implantation of the new aspheric toric IOL (Bi-Flex 677TA) was effective, safe, and stable in correcting pre-existing regular corneal astigmatism during cataract surgery. Combined imaging and eye tracking seem to be a promising technology to evaluate the correct axis for IOL torus alignment.

Einan-Lifshitz A, Barkana Y, Goldich Y, Gutfreund S, Avni I, Zadok D.

Results of cataract surgery with Z-flex hydrophilic acrylic toric IOL

Published in *Eur J Ophthalmol.* 2013 May-Jun;**23(3):333-8**. doi: 10.5301/ejo.5000235.

Purpose: To report the outcome of cataract surgery with implantation of the Z-flex 690TA hydrophilic acrylic toric intraocular lens (IOL).

Number of eyes: 19; Follow-up: average 4 months

Conclusions: The mean keratometric astigmatism decreased from 3.05 ± 0.74 D to $+0.23 \pm 0.39$ D. The Z-flex 690TA hydrophilic acrylic toric IOL implantation was safe, effective and predictable in correcting corneal astigmatism during cataract surgery.

Novacek L, Nemcova M.

Clinical outcomes after implantation of monofocal toric IOL

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: The aim of the study was to evaluate clinical outcomes, rotational and refractive stability after the implantation of monofocal toric IOL: Bi-Flex 677TY.

Number of eyes: 20; Follow-up: 3 months

Conclusion: The evaluated toric IOL provides safe and effective correction of pre-existing regular corneal astigmatism in patients after cataract surgery. The lens provides very good level of refractive precision and rotational stability

Fernandez J.

Toric and multifocal toric new trends

Presented at the **World Congress of Ophthalmology (WOC) Barcelona 2018**

Purpose: To provide an overview about indications and contraindications, alternative solutions, sources of error in astigmatism correction, IOL power calculation, rotation and refractive stability.

Conclusions: Considering the posterior corneal astigmatism is mandatory nowadays. Medicontur calculator includes the Abulafia regression for posterior corneal astigmatism estimation. Bi-Flex T and MT are evidence-based solutions for correcting. New findings about IOL centration can lead to better understanding of visual performance results of astigmatisms (≥ 1.00 D).

Harrisberg B.

Outcomes associated with the use of the Barrett Calculator in cataract patients implanted with Medicontur toric intraocular lenses

Presented at the **Asia-Pacific Academy of Ophthalmology Congress (APAO), Hong Kong 2018**

Purpose: To evaluate the refractive and visual acuity (VA) outcomes following the implantation of the hydrophilic acrylic Bi-Flex 677TA toric intraocular lenses (Medicontur) with calculations performed with the Barrett toric calculator.

Number of the eyes: 49

Conclusions: Postoperative refractive outcomes show that the IOL can reliably correct corneal astigmatism. The combined use of the Barrett Toric Calculator and Medicontur 677TA toric IOLs resulted in highly predictable outcomes.

Němcová I, Hladíková K, Madunický J, Pašta J.

Visual Outcome, refractive & rotational stability after implantation with PIL-MA preloaded progressive toric Bi-Flex MT.

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To assess efficacy, safety, refractive outcomes, rotation stability and patient satisfaction after implantation with a premium IOL – Bi-Flex 677MTY with PIL-MA preloaded injector.

Number of eyes: 20; Follow-up: 6 months

Conclusions: First preliminary results with progressive toric Bi-Flex MTY show that there is no compromised distance, near-, and competitive intermediate vision. Results confirm outstanding rotational stability of Bi-Flex family platform IOLs and refractive stability within the time. Some of the patients were not able to reach 1.0 for distance vision (without any correction), most probably because of slight amblyopia, but all patients were highly satisfied experiencing minimal photopic phenomena and they are spectacle independent. There was no need to perform YAG capsulotomy (longer follow-up is needed).

Bator G, Kardos Z, Zelko A.

Cataract surgery after penetrating keratoplasty with implantation of individual-made toric intraocular lenses

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: After surgery of penetrating keratoplasty high regular astigmatism remained in this 2 demonstrated cases. Our aim is to demonstrate the efficiency of implantation of individual-made toric intraocular lenses during cataract surgery.

Number of eyes: 2. Follow up: 2 years for patient A; 1.5 years for patient B.

Conclusions: During cataract surgery after penetrating keratoplasty with implantation of individual-made bitoric convex-concave intraocular lenses efficient visual improvement was achieved in both cases.

Vámosi P.

Our experience with the Medicontrur Flex toric intraocular lens

Presented at the **Winter Meeting of the European Society of Cataract and Refractive Surgeons (WESCRS) Athens 2016**

Purpose: To investigate the reduction of astigmatism and visual outcomes after implantation with Z-Flex 690TAY intraocular lenses.

Number of eyes: 125; Follow-up: 6 months

Conclusions: Medicontrur Z-Flex 690TAY IOL has overall good rotational stability. All rotations occurred within 1 day postoperatively and most of the cases in highly myopic eyes. Despite of the high level of preoperative amblyopia (20.8%), the postoperative BCDVA was good: 0.82 ± 0.18 . The mean refractive cylinder decreased from the preoperative -2.89 ± 2.75 D to -0.71 ± 0.56 D at 6 months postoperatively.

Simo L, Remon L, Mobayed G.

Visual outcomes after cataract surgery with toric intraocular lens implantation

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Barcelona 2015**

Purpose: To evaluate the reduction of astigmatism and visual outcomes after toric intraocular lens Bi-Flex 677TA (Medicontrur) during cataract surgery in patients with cataract and pre-existing corneal astigmatism.

Number of eyes: 22; Follow-up: 1 month

Conclusions: The implantation of the toric Bi-Flex is a safe procedure, effective and precise for the correction of moderate and high astigmatism in subjects submitted to the operation of cataract.

Remon ML, Simo I, Furlan W, Mobayed G.

Power vector analysis of the optical outcome after cataract surgery with toric intraocular lens

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Barcelona 2015**

Purpose: To analyse the astigmatic changes after cataract surgery with toric lens (IOL) implantation and examine the relationship between pre- and postoperative corneal and refractive changes using power factors.

Number of eyes: 22; Follow-up: 1 month

Conclusions: The toric Bi-Flex 677TA lenses can be reliably used to correct corneal astigmatism and power vector analysis is a useful method to analyse the results.

Dexl A, Grabner G.

Vector analysis, rotational stability and visual outcome after implantation of a new toric lens for the compensation of regular corneal astigmatism during cataract surgery

Presented at the **Winter Meeting of the European Society of Cataract and Refractive Surgeons (WESCRS) Istanbul 2015, ESCRS 2014**

Purpose: To evaluate vector analysis, rotational stability, refractive and visual outcome of a new toric intraocular lens for correction of pre-existing corneal astigmatism during routine cataract surgery.

Number of eyes: 30; Follow-up: 12 months

Conclusions: Implantation of the new Bi-Flex T IOL was a safe and effective method to correct pre-existing regular corneal astigmatism during cataract surgery. To evaluate the correct axis for IOL torus alignment combined imaging/eye-tracking technology seems to be a promising technology.

Němcová I, Hladíková K, Madunický J, Pašta J.

Clinical outcomes and patient satisfaction after implantation of trifocal toric IOL

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To evaluate clinical outcomes, rotational stability and patient satisfaction after the implantation of trifocal diffractive toric IOL: Bi-Flex 677MY.

Number of eyes: 20; Follow-up: 12 months

Conclusions: The evaluated trifocal toric IOL provides a successful restoration of visual functions for all three evaluated distances with very good level of refractive precision and rotational stability in patients after cataract surgery with pre-existing regular corneal astigmatism.

Gharaee H, Zabihifard M, Eslampour A, Hassanzadeh S, Shafiee M.

A comparative study on visual and optical performance of Akreos AO and Kontur AB IOLs after phacoemulsification cataract surgery

Published in *J Curr Ophthalmol*. 2016 Mar 28;28(1):12-6. doi: 10.1016/j.joco.2016.02.001.

Purpose: Akreos AO and Kontur AB are two commonly used intraocular lenses (IOLs) in Iran. This study was designed to evaluate the visual performance of these lenses.

Number of eyes: 70 eyes (Medicontur Q-Flex 640AB: 35, Bausch&Lomb Akreos AO: 35); Follow up: 3 months

Conclusion: Visual performance of Akreos AO and Kontur AB is similar.

Schwartz R, Yatziv Y.

The effect of cataract surgery on ocular dominance

Published in *Clin Ophthalmol*. 2015 Dec 14; 9:2329-33. doi: 10.2147/OPHTH.S93142.

Purpose: The aim of this study is to assess whether eye dominance may change after cataract surgery.

Number of eyes: 33 eyes, Follow up: 1 month

Conclusion: This is the first study reported in the literature to show that ocular dominance is a plastic characteristic following cataract surgery. The results may change the importance given to eye dominance measurement prior to surgeries that rely on this examination, such as monovision surgeries.

Schaeffel F, Kaymak H.

A Rapid and Convenient Procedure to Evaluate Optical Performance of Intraocular Lenses

Published in *Photonics* 2014, 1(3), 267-282; <https://doi.org/10.3390/photonics1030267>

Purpose: A new portable lens scanner was developed and tested for measuring focal lengths and relative contrast transfer of mono- and multifocal intraocular lenses (IOLs).

Conclusions: Six monofocal (J&J Tecnis ZCB00, Zeiss CT Spheris 204, Zeiss Aspheris 509M, Zeiss CT Asphina 509M, Alcon SN60WF, Polytec-Domilens/Medicontur Bi-Flex 677AB), and four multifocal IOLs (Zeiss AT Lisa 809M, J&J Tecnis ZMB00, Alcon SN6AD3 and SN6AD1), as well as two radial refractive gradient lenses (RRG, custom made by Rodenstock GmbH) were measured. Refractive power profiles measured in RRG lenses closely matched data obtained from the manufacturer. The lens scanner uses a rapidly operating procedure, is portable and can be used to verify positions of the focal planes of mono - and multifocal IOLs in less than 3 seconds.

Gerbec H, Hudovernik M, Trpin S.

First results with Medicontur Bi-Flex 677AB hydrophilic aspheric IOL

Presented at **Winter Meeting of the European Society of Cataract and Refractive Surgeons (WESCRS) Ljubljana 2014**

Purpose: Retrospective analysis of posterior capsule opacification (PCO) rate and/or other late complication rates of the IOL.

Number of eyes: 856 eyes, Follow-up: 30 months

Conclusions: In a relatively short time of 33 months Medicontur Bi-Flex 677AB IOL was found to have a low rate of PCO (1%) and low rate of other complications. Prospective studies are necessary as retrospective study might underestimate PCO rate.

Dunai A, Filkorn T, Kiss H, Nagy ZZs.

Comparison of postoperative results after implantation of preloaded and manually loaded versions of the same hydrophobic acrylic intraocular lens (IOL)

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To evaluate and compare the predictability of IOL power calculation using two implantation methods of the same hydrophobic acrylic, one-piece intraocular lens.

Number of eyes: 344 (Medicontur Bi-Flex 877PA: 159; Bi-Flex 877FAB: 185); Follow-up: 6 months

Conclusions: Based on our investigations, postoperative refractive results of the 877 Bi-Flex IOL are more predictable using the preloaded version, compared to the manually loaded variant. The cause of this phenomenon is probably the lower amount of damage and distortion, that effects the preloaded IOL. The positive mean error in Group Bi-flex 877FAB suggests, that the IOL constants of the lens needs to be corrected.

Argay A, Rupnik Z, Fekete J, Nagy Z, Vámosi P.

Evaluation of glistening in two different types of intraocular lenses using Scheimpflug technique

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To compare the development of glistening in two different hydrophobic acrylic intraocular lenses (IOLs) by a quantitative and a semiquantitative examination method.

Number of eyes: 51 (Medicontur: Z-Flex 860FAB: 26, Alcon AcrySof IQ SN60WF: 25); Follow-up: 4 years

Conclusions: Statistically significant differences in glistening values were observed in the two hydrophobic IOLs (Medicontur 860FAB IOL and Alcon AcrySof IQ SN60WF IOL) by both the slit lamp biomicroscope grading and the Scheimpflug image analysis. More glistening was observed in the SN60WF IOLs by both quantification methods. Both diagnostic methods showed the same tendency. The Scheimpflug images analysis quantification method is a new, innovative technique to obtain objective and quantitative measurement data. This method could be adopted either for everyday use or for scientific measurements.

Werner L.

Laboratory study evaluating the new preloaded hydrophobic acrylic IOL – Medicontur–Bi-Flex

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: The aim of the study was to assess the surface and optic micro edges of 5 commercially available IOLs.

Conclusions: Anterior and posterior surfaces of the lenses, including optic and loop components are overall smooth and regular. The 360-degree square edge is present in all lenses. No marks, folds, damage, or any other alteration of the lens surface could be observed under SEM and light microscopy after injection.

Vámosi P, Argay A, Rupnik Zs, Fekete J.

Comparison of the Medicontur 860FAB hydrophobic IOL and the Acrysof IQ long-term follow-up

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To compare the performance of two hydrophobic IOLs retrospectively.

Number of eyes: 51 (Medicontur: Z-Flex 860FAB: 26, Alcon AcrySof IQ SN60WF: 25); Follow-up: average 4 years

Conclusions: Medicontur hydrophobic IOLs have unique material and lens design, which provide good visual performance of these lenses. Contrary to other hydrophobic materials these IOLs are less sticky, very flexible and easy to implant. Medicontur hydrophobic IOLs are firm competitors on the hydrophobic market. There was statistically significant difference between Medicontur 860FAB

IOL and Alcon AcrySof IQ SN60WF IOL in glistening values measured by both objective and subjective methods. In case of SN60WF IOLs significantly more glistening and higher PCO-rate was observed, compared to the Medicontur 860FAB IOL.

Bellucci R, Cagnoni M.

Same design hydrophobic and hydrophilic intraocular lenses: intra-individual comparison

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) London 2014**

Purpose: The value of IOL material over IOL design in obtaining good visual results and in preventing PCO has been debated for a long time. This study compared two IOLs of the same design and different material, hydrophobic and hydrophilic, implanted in the same patients at the time of cataract surgery.

Number of eyes: 50 (Medicontur Bi-Flex 677AB: 25, Bi-Flex 877FAB: 25); Follow-up: 6-30 months

Conclusion: Visual acuity and refraction did not vary between 677AB hydrophilic and 877FAB hydrophobic IOLs. The IOL material, hydrophilic or hydrophobic, was completely unimportant in this series of eyes. IOL design appeared to be a more important factor for PCO-prevention.

Scharioth G.

24-months results of the comparative study of Medicontur hydrophobic and Alcon AcrySof

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) London 2014**

Purpose: To evaluate the PCO-rate after one and two years of hydrophobic single piece IOL with 360° sharp edge (Z-Flex 860FAB, Medicontur, Hungary) vs. interrupted sharp edge design (AcrySof SA60AT, Alcon, USA) implantation a prospective intraindividual and interindividual study was performed.

Number of eyes: 70 (Z-Flex 860FAB: 35, Alcon AcrySof SA60AT: 35); Follow-up: 24 months

Conclusions: PCO-rate at 12 months and YAG capsulotomy rate at 24 months show significant difference. At year 1 there was no PCO detected in case of Medicontur Z-flex 860FAB lenses compared to 8 lenses of Alcon AcrySof SA60AT. At 24 months follow-up YAG capsulotomy was performed in 8 cases: 5 eyes with SA60AT lenses and 3 eyes with Z-Flex 860FAB lenses.

Scharioth G.

Does rotational stability play a role in PCO development?

Presented at the **Annual Meeting of the American Society of Cataract and Refractive Surgery (ASCRS) 2014**

Purpose: To evaluate the rotational stability during capsular bag shrinkage of hydrophobic single piece IOL with different haptic design and 360° sharp edge (Medicontur Z-Flex 860FAB and Bi-Flex 877FAB) vs. interrupted sharp edge design (Alcon AcrySof SA60AT) a prospective study was initiated.

Number of eyes: 150 (Medicontur Bi-Flex 877FAB: 50, Z-Flex 860FAB: 50, Alcon AcrySof SA60AT: 50); Follow-up: 3 months

Conclusions: Today phacoemulsification with in-the-bag implantation of a single piece IOL is standard of care in most parts of the world. Hydrophobic material and sharp edge design of the optics have proven to lower the PCO-rate after in-the-bag implantation. We found a tendency of ingrowth of lens epithelial cells at the optic-haptic-junction and higher PCO-rate in IOL with interrupted sharp edge design. As PCO-development is a continuous process, longer follow-up is recommended, and it may prove a significant difference between the different IOL designs.

Dmitriew A, Kociecki J, Zalecki K.

Unfolding time of 3 different types of hydrophobic acrylic IOLs

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (WESCRS) Prague 2012**

CLINICAL RESULTS WITH MONOFOCAL HYDROPHOBIC LENSES

Purpose: The long unfolding time of hydrophobic acrylic IOLs is one of the main disadvantages of this material. The purpose of this study was to evaluate and determine the IOL with the shortest unfolding time.

Conclusions: 3 hydrophobic IOLs were compared: Polytech PolyLens Y10, Alcon AcrySof SA60AT and Z-Flex 860FAB. The shorter unfolding time of Polytech PolyLens Y10 might be considered an advantage when compared to other hydrophobic IOLs.

Srinivasan S, Scharioth G, Riehl A, Tanev I, Rozsival P, Van Acker E, Nagy ZZ, Balta F, Nekolova J.

Implantation of Scharioth macula lens in patients with age-related macular degeneration: results of a prospective European multicentre clinical trial

Published in **BMJ Open Ophthalmology 2019;4: e000322**. doi: 10.1136/bmjophth-2019-000322

Purpose: To report the visual and refractive outcomes following monocular implantation of a supplementary (piggyback) Scharioth macula lens (SML) in previously pseudophakic eyes with age-related macular degeneration (AMD).

Number of eyes: 50; Follow-up: 12 months.

Conclusions: The SML appears to be safe and effective in improving the CNVA in patients with AMD. Data suggest that the CDVA remains unaffected following implantation. Further data are needed to assess the long-term safety and efficacy.

Chantarasorn Y, Kim EL, Thabsuwan K.

Macular add-on intraocular lens successfully restores reading vision in eyes with end-stage diabetic macular disease

Published in **Retin Cases Brief Rep. 2019 Jun 25**. doi: 10.1097/ICB.0000000000000885.

Purpose: To report the outcomes of macular add-on intraocular lens implantation in improving reading vision in patients with bilateral advanced diabetic maculopathy.

Number of eyes: 5; Follow-up: 3 months

Conclusions: The macular add-on intraocular lens improves reading vision in visually impaired patients due to end-stage diabetic macular disease.

Bereczki Á.

Experiences with the Scharioth Macula Lens – new hope for patients with dry macular degeneration

Published in **Rom J Ophthalmol. 2019 Apr-Jun; 63(2): 128–134**.

Purpose: Age-related macular degeneration (AMD) is the main cause of visual impairment in developed countries among the elderly. Our aim was to share our experiences with an implant designed to help improve near vision of patients with the non-exudative form of the disease.

Number of eyes: 15; Follow-up: 3 months.

Conclusions: The preoperative test is a reliable tool to predict the effectiveness of the implant. Our results suggested that the SML significantly improves near visual acuity without affecting distance vision; therefore, the SML can be an effective method to ameliorate the quality of life for these patients.

Dunbar HMP, Dhawahir-Scala FE.

A discussion of commercially available intraocular telescopic implants for patients with age-related macular degeneration

Published in **Ophthalmol Ther. 2018 Jun;7(1):33-48**. doi: 10.1007/s40123-018-0129-7

Purpose: To examine the literature on commercially available telescopic devices discussing their design, mode of action, surgical procedure and published outcomes on visual acuity, quality of life, surgical complication rates and cost effectiveness data where available.

Conclusions: When considering telescopic implants, not only is there a need to carefully consider the available evidence, but also the expectations and goals of each individual patient in relation to the expected outcome for any device under consideration. Only then will successful outcomes be achieved.

Grzybowski A, Wasinska-Borowiec W, Jorge L, Alio JL, Amat-Peral P, Tabernero J.

Intraocular lenses in age-related macular degeneration

Published in **Graefes Arch Clin Exp Ophthalmol.** 2017 255:1687–1696 doi 10.1007/s00417-017-3740-8

Purpose: To review the lenses, assessing their advantages and disadvantages. A total of seven types of intraocular lenses (IOLs) recommended for age-related macular degeneration (AMD) are discussed. Namely, an implantable miniature telescope (IMT); IOL-VIP System; Lipshitz macular implant (LMI) and sulcus-implanted Lipshitz macular implant; Fresnel Prism Intraocular Lens; iolAMD and Scharioth Macula Lens.

Conclusions: To objectively ascertain the effectiveness and safety of these lenses, further independent clinical studies with longer follow-up data are necessary prior to the general use of these optical devices.

Nekolová J, Rozsival P, Sin M, Jiraskova N.

Scharioth Macula Lens: A new intraocular implant for low-vision patients with stabilized maculopathy- first experience

Published in **Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.** 2017 Jun;161(2):206-209. doi: 10.5507/bp.2017.014.

Purpose: To present the initial results of Scharioth Macula Lens (SML) implantation. The SML is a new Add-on intraocular lens designed to increase uncorrected near visual acuity in patients with stabilized maculopathy.

Number of eyes: 8; Follow-up: 6 months

Conclusions: The SML is a new hope for low-vision patients. It acts as a magnifier in the eye. It is a suitable method for increasing near visual acuity in patients with inactive maculopathy.

Reiter N, Werner L, Guan J, Li J, Tsaousis KT, Mamalis N, Srinivasan S.

Assessment of a new hydrophilic acrylic supplementary IOL for sulcus fixation in pseudophakic cadaver eyes.

Published in **Eye (Lond).** 2017 May;31(5):802-809. doi: 10.1038/eye.2016.310.

Purpose: Management of refractive errors after cataract surgery includes spectacles or contact lens, secondary laser vision correction, intraocular lens (IOL) exchange, or piggyback lens implantation. We evaluated for the first time a single-piece hydrophilic acrylic IOL designed for supplementary sulcus fixation in postmortem pseudophakic human eyes.

Number of eyes: 12.

Conclusions: The A4 Addon IOL was designed for sulcus fixation as a supplementary lens, with a large diameter, a square-shaped optic, four smooth loop haptics, and a convex-concave optical surface. It exhibited appropriate centration and interlenticular distance with different primary in-the-bag IOLs.

Scharioth GB.

New add-on intraocular lens for patients with age-related macular degeneration.

Published in **J Cataract Refract Surg.** 2015 Aug;41(8):1559-63. doi: 10.1016/j.jcrs.2015.07.018.

Purpose: To present a new option for visual rehabilitation of patients with advanced macular degeneration.

Number of eyes: 8, Follow-up: 1 months

Conclusions: Near vision improved in 7 eyes and was stable in 1 eye. The corrected near visual acuity improved by 4.4 lines with the macular add-on IOL at 15 cm versus with glasses at 40 cm; it improved by 2.1 lines with the macular add-on IOL at 15 cm versus with glasses at 15 cm. Distance vision was stable in all eyes. No intraoperative or postoperative complication occurred. The macular add-on IOL has the potential of improving near vision and reading ability in patients with advanced age-related macular degeneration.

Scharioth G.

Published in **Ophthalmologische Nachrichten** 02.2015 - German

Miniatursierte vergrößernde Sehhilfe

Purpose: To introduce the new add-on IOL for patients with macular degeneration.

Conclusions: No intraoperative or postoperative complication occurred. The macular add-on IOL has the potential of improving near vision and reading ability in patients with advanced age-related macular degeneration. The continuous training after surgery is of utmost importance and if applicable the necessary continuation of intravitreal therapy in case of wet AMD.

Scharioth G.

Scharioth Macula Lens: proper interlenticular space provides long-term safety in polypseudophakia

Presented at **the Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019**

Purpose: To evaluate the safety of the Scharioth Macula Lens (SML) designed for patients with dry type age-related macular degeneration (AMD), in terms of the distance of the lens from the primary capsular bag intraocular lens (IOL).

Number of eyes: 22 eyes.

Conclusions: Based on our investigation, SML-implantation seems to be safe and feasible in eyes with average size, as the position of the SML lens leaves the posterior iris surface intact, and the risk of interlenticular opacification is also negligible due to the sufficient space between the surfaces of the two IOLs. The possible effect of the type and power of the primary IOL on interlenticular distance however requires further investigation with the inclusion of more patients.

Scharioth G.

Scharioth Macula Lens for patients with high myopia: a novel approach to achieve spectacle independence (binocular trifocal monovision)

Purpose: to test the efficacy of a novel concept based on multiple IOL-implantation, aiming spectacle independence for patients with high and excessive myopia.

Number of eyes: 5 eyes.

Conclusions: the new concept using the SML in patients with extreme or high myopia (26.0 mm < axial length AXL; 6.0 D < refractive error) seems to be an efficient approach in achieving appropriate vision at all distances, by creating a binocular trifocal monovision. Patients welcomed the visual outcome with high satisfaction, however our initial favourable results with this novel management of high myopia requires further evaluation.

Harb G, Harb W.

Results after implantation of the Scharioth Macula Lens in patients with age-related macular degeneration: 12-month follow-up

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To report visual outcomes and improvement after the implantation of the Scharioth Macula Lens (Medicontur, Hungary), an add-on type intraocular implant that was designed to improve the near vision of pseudophakic patients suffering from the non-exudative forms of macular degeneration.

Number of eyes: 8; Follow-up: 12 months

Conclusions: The special add-on SML implant is a safe and effective device that helps improving the near vision of patients with dry AMD. The eligible patients had their CNVA measured with a +2.5D and a +6.0D addition, which proved to be a reliable preliminary testing method. Postoperative CNVA confirms that there was significant improvement in near vision for all patients, even 1 year

after the surgery. Both the corrected and the uncorrected far visual acuities were unaffected by the SML. The SML implantation is a promising method for enhancing the quality of life of patients who suffer from non-exudative AMD.

Srinivasan S, Scharioth G, Riehl A, Tanev I, Rozsival P, Nekolova J, Nagy, ZZs, Van Acker E.

Implantation of the Scharioth macular lens in patients with age-related macular degeneration: results of a prospective European multicentre clinical trial

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To report the twelve months visual outcomes following implantation of the Scharioth Add-On injectable Macula Lens (SML) in previously pseudophakic eyes with age related macular degeneration (AMD).

Number of eyes: 46; Follow-up: 12 months

Conclusion: The injectable Add-On SML appears to be safe and effective in the short to medium term in improving the CNVA in patients with AMD. Data suggests that the CDVA remains unaffected following the implantation of SML. Testing of CNVA at 15 cms with a +6.0 D near addition seems to be effective screening tool in patient selection. Further data is needed to assess the long-term safety and efficacy of this implant.

Nielsen NV, Helgesen A, Muus G.

Scharioth Macula Lens for AMD: Quality of life study

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Vienna 2018**

Purpose: To register and analyse changes in vision and quality of life in patients with AMD after implantation of the Scharioth Macula Lens (SML).

Number of eyes: 25; Follow-up: 6 months

Conclusion: Near vision improved according to the preoperative predictable measurements, whereas far vision was unchanged. Quality of life surprisingly improved in the group with legal blindness i.e improvement of daily activities.

Srinivasan S, Scharioth G.

Implantation of macular lens in patients with age-related macular degeneration: prospective European multicentre clinical trial

Presented at the **Annual Meeting of the American Society of Cataract and Refractive Surgery (ASCRS) Washington 2018**

Purpose: To report the 1-year visual outcomes following implantation of Scharioth add-on injectable macula lens (SML) in pseudophakic eyes with age-related macular degeneration (AMD).

Number of eyes: 25; Follow-up: 12 months

Conclusion: SML is safe and effective in improving the CNVA. CDVA remains unaffected following implantation.

Harb W, Harb G.

Results after the implantation of the Scharioth Macula Lens in patients with age-related macular degeneration: 12-month follow-up

Presented at **Conference of the European Society of Retina Specialists (EURETINA) Budapest 2018**

Purpose: To report visual outcomes and improvement after the implantation of the Scharioth Macula Lens (Medicontur, Hungary), an add-on type intraocular implant that was designed to improve the near vision of pseudophakic patients suffering from the non-exudative forms of macular degeneration.

Number of eyes: 8; Follow-up: 12 months

Conclusions: In our experience, the special add-on SML implant is a safe and effective device that helps improving the near vision of patients with the dry forms of AMD, even in the long term. The eligible patients had been selected after a basic test: their CNVA was measured with a +2.5D and a +6.0D addition, which proved to be a reliable preliminary testing method. Postoperative CNVA results confirm that there was significant improvement in near vision for all patients, even 1 year after the surgery. Both the corrected and the uncorrected far visual acuities were unaffected by the SML. Overall, the SML implantation is a promising method for enhancing the quality of life of patients who suffer from non-exudative AMD.

Srinivasan S, Scharioth G, Riehl A, Tanev I, Rozsival P, Nekolova P.

Implantation of Scharioth Macula Lens in patients with age related macular degeneration: Results of a prospective European Multicenter Clinical Trial

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To report the twelve months visual outcomes following implantation of the Scharioth add-on injectable macular lens (SML) in previously pseudophakic eyes with age related macular degeneration (AMD).

Number of eyes: 25; Follow-up: 12 months

Conclusions: There were no intraoperative or postoperative complications. The injectable add-on SML appears to be safe and effective in the short - to medium-term in improving the CNVA in patients with AMD. Data suggests that the CDVA remains unaffected following the implantation of SML. Testing of CNVA at 15 cm with a +6.0 D near addition seems to be effective screening tool in patient selection. Further data is needed to assess the long-term safety and efficacy of this implant.

Bereczki A.

Our experiences with the Scharioth Macula Lens (SML), a new hope for patients with dry macular degeneration.

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Lisbon 2017**

Purpose: To share our experiences with the Scharioth Macula Lens (A45SML, Medicontur, Hungary), an implant designed to help to improve near vision of patients with non-exudative macular degeneration.

Number of eyes: 15; Follow-up: 3 months

Conclusions: In our center we have implanted a small group of patients with a sulcus IOL designed to act as a built-in magnifier for those suffering from certain types of non-neovascular maculopathies. Based on postoperative BCNVA results, preoperative testing of CNVA with a +2.5D and +6.0D addition can be a reliable tool to determine prospective postoperative visual improvement of patients. CDVA results suggest that the implant does not affect distance vision and we had very good uncorrected near visual acuity outcomes at 3 months. However, further follow-up is necessary to validate our results.

Srinivasan S, Scharioth G, Riehl A, Tanev I, Rozsival P, Balta F, Van Acker E

Implantation of Scharioth Macula Lens in Patients with AMD: Results of a Prospective European Multicenter Clinical Trial

Presented at the **Annual Meeting of the American Academy of Ophthalmology (AAO) Chicago 2016**

Best Paper of Session Winner

Purpose: To compare the existing magnifying treatments and introduce the new technology.

Number of eyes: 35; Follow-up: 3 months

Conclusions: Interim results show that SML seems to increase near visual acuity without affecting distance vision. Patient selection is the key. Post-operational visual training is necessary.

Nekolová J.

Motivation & training techniques of patients after SML implantation

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: Macular degenerations and dystrophies often result in significant visual impairment that limits a patient's daily activities requiring good central vision, such as self-care, reading, recognizing facial features, driving, watching television, and other social activities. Thus, impaired vision is an important cause of depression and anxiety.

Number of eyes: 8, Follow up: 12 months

Conclusions: Postoperative recovery was rapid and no complaints of diplopia or glare were recorded. After SML implantation, distance vision or visual field was not affected. Patient must understand the nature of his/her disease and the principles of reduced reading distance. Patient realistic expectations should be established before surgery. Patient should be motivated and should exercise reading at distance of 10-15 centimetres every day with training charts in good light conditions. Doctor/optician should repeat recommendations and improve patient's reading technique. After SML implantation, care begins, not finishes.

Nielsen NV, Helgesen A, Eisgart F, Jessen EM, Bohnsack C, Muus G

Implantation of the Scharioth Macula Lens - SML - Preliminary results of quality of life study in patients with end-staged AMD

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To investigate the visual acuity and quality of life of patients implanted with SML.

Number of eyes: 20; Follow-up: 6 months

Conclusions: Post-operative improvement in daily activities and social life was found. Legally blind patients surprisingly showed best results in VFQ-25. The greatest challenge is the follow-up care.

Meyer C, Anhalm H.

Novel intraocular macular lenses to restore reading vision in AMD patients with poor vision

Presented at the **Conference of the European Society of Retina Specialists (EURETINA) Nice 2015**

Purpose: Although retinal pharmacotherapy can limit the progression of vascular AMD, many patients may suffer from loss of their reading ability due to geographic atrophy, dry AMD or scar formation. When intravitreal injections are no longer useful to increase their vision, magnifying lenses are the last option to achieve reading vision.

Number of eyes: 8,

Conclusions: Untreatable macular conditions with poor central vision may benefit from unilateral macular IOL implantation.

Gundersen KG, Potvin R.

A review of results after implantation of a secondary intraocular lens to correct residual refractive error after cataract surgery

Published in *Clin Ophthalmol.* 2017 Oct 3; 11:1791-1796. doi: 10.2147/OPTH.S144675.

Purpose: The purpose of this study was to provide clinical outcomes data related to secondary intraocular lens (IOL) implantation for the correction of residual refractive error after cataract surgery.

Number of eyes: 46; Follow-up: 3 months

Conclusions: The secondary IOL studied here, implanted in the sulcus, appears to be a viable method to correct residual refractive error after primary IOL implantation.

Reiter N, Werner L, Guan J, Li J, Tsaousis KT, Mamalis N, Srinivasan S.

Assessment of a new hydrophilic acrylic supplementary IOL for sulcus fixation in pseudophakic cadaver eyes.

Published in *Eye (Lond).* 2017 May;31(5):802-809. doi: 10.1038/eye.2016.310.

Purpose: Management of refractive errors after cataract surgery includes spectacles or contact lens, secondary laser vision correction, intraocular lens (IOL) exchange, or piggyback lens implantation. We evaluated for the first time a single-piece hydrophilic acrylic IOL designed for supplementary sulcus fixation in post-mortem pseudophakic human eyes.

Number of eyes: 12 eyes

Conclusions: The A4 Add-on IOL was designed for sulcus fixation as a supplementary lens, with a large diameter, a square-shaped optic, four smooth loop haptics, and a convex-concave optical surface. It exhibited appropriate centration and interlenticular distance with different primary in-the-bag IOLs.

Bautista PC.

How to make from monofocal pseudophakic patients multifocal ones.

Presented at the Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris 2019

Purpose: To evaluate the refractive and functional outcome of the trifocal 1stQ AddOn supplementary intraocular lens (IOL) designed for implantation into the ciliary sulcus.

Number of eyes: 22; Follow-up: 12 months.

Conclusions: According to our results, the Add-On Trifocal supplementary IOL by 1stQ Medicontur seems to be a safe, efficient and stable solution even in the long-term, for achieving spectacle independence in pseudophakic patients with monofocal primary IOLs.

Bautista PC.

ADD-ON – complex solution: refractive precision, trifocality, toricity

Presented at the **World Congress of Ophthalmology (WOC) Barcelona 2018**

Purpose: Pseudophakic patients implanted with monocular IOLs were multi-focused with Add-On Q-progressive (trifocal) bilaterally or monolaterally.

Number of eyes: 10 eyes; Follow-up: 6 months

Conclusions: Spectacle independence was achieved at all distances after the Add-on implantation. All multi-focused patients were satisfied with the Add-on implant. However, the sample size was limited we conclude that Add-on progressive is a good and safe option for multi-focalising pseudophakic patients with monofocal lenses.

Werner L, Reiter N, Guan J, Li J, Tsaousis K, Marnalis N, Srinavasan S.

Evaluation of a new hydrophilic acrylic supplementary IOL for sulcus fixation in pseudophakic cadaver eyes

Presented at the **Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Copenhagen 2016**

Purpose: To evaluate for the first time a single-piece hydrophilic acrylic intraocular lens (IOL) designed for supplementary sulcus fixation in postmortem pseudophakic human eyes.

Number of eyes: 12.

Conclusions: The A4 Addon IOL was designed for sulcus fixation as a supplementary lens, with a large diameter and a square-shaped optic to exclude pupillary capture, and 4 smooth loop haptics and convex-concave optical surface to minimize pigment dispersion syndrome. It exhibited appropriate centration and interlenticular distance with different primary in-the-bag IOLs.

Reiter N, Werner L, Guan J, Li J, Tsaousis K, Marnalis N, Srinavasan S.

Assessment of a new hydrophilic acrylic supplementary IOL for sulcus fixation in pseudophakic cadaver eyes

Presented at the **Annual Meeting of the American Society of Cataract and Refractive Surgery (ASCRS) New Orleans 2016**

Purpose: To evaluate for the first time a single-piece hydrophilic acrylic intraocular lens (IOL) designed for supplementary sulcus fixation in postmortem pseudophakic human eyes.

Number of eyes: 12.

Conclusions: The A4 Addon IOL was designed for sulcus fixation as a supplementary lens, with a large diameter and a square-shaped optic to exclude pupillary capture, and 4 smooth loop haptics and convex-concave optical surface to minimize pigment dispersion syndrome. It exhibited appropriate centration and interlenticular distance with different primary in-the-bag IOLs.

MEDICNTUR

Medicentur
Medical Engineering Ltd
export@medicentur.com
www.medicentur.com

Head Office
Herceghalmi Road 1.
2072 Zsámbék
Hungary

International Office
Chemin des Aulx 18
1228 Plan-les-Ouates
Geneva / Switzerland