

Visual Rehabilitation in Keratokonus after

Crosslinking with Toric Phakic IOL: A Case Presentation

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No financial interest

Methods

• UV-Riboflavin-Collagen-Crosslinking

UV-Crosslinking is performed by first inducing an epithelial abrasio and then applying 1% riboflavin eye drops in 2-minute intervals for the duration of 30 minutes. The UV-wavelength used is 360-380 nm and the exposure zone has a radius of 7-9 mm.

• Toric ICL

Before implantation of the toric ICL (Visian toric ICL STAAR Surgical Company) under topical anesthesia, a corneal limbus marking of the positional axis is necessary. The implantation of the ICL was provided by a 2.4 mm limbal incision. We also performed peripheral iridectomy preoperatively.

Lens type	1-piece
Optic material	HEMA- polymer
Refractive index	1,453 by 35°C
Specific weight	1.21 g / mm
Optical diameter	4,90 -5,80 mm
Correction range of refractive errors	•Myopia -0,5 to -18 D •Hyperopie 0 to +10 D •Astigmatism up to +6,00 D

Biometry measurement







http://www.domedics.ch/refraktiv/visian-icl.html

Case Report

We are reporting on therapy and visual outcome of a 41 year old man who presented with bilateral keratoconus. Except for high myopia and corneal signs of keratokonus, no further clinical pathologies were present. 2008 the best corrected visual acuity was:

- OD -6,00 -3,00 165° = 0,7pp
- OS -7,00 -2,75 13° = 0,9

Due to the progression of keratoconus and increasing visual impairment, we decided for UV-Riboflavin-Collagen-Crosslinking on the right eye in January 2008 und left eye in November 2008 in order to stabilize the cornea.





Figure 1 Topography OD/ OS pre-crosslinking

Case Report



In 2009, apart from the stable regular central astigmatism, no further signs of progression of keratoconus could be seen.



Figure 2 Topography OD/ OS post-crosslinking

Case Report



Because of increasing intolerance of contact lenses and the patient's subjective unsatisfactory visual acuity we decided on implanting toric ICL on both eyes October 2010.

<u>Jncorrected</u>	Best corrected	
• OD 0,1	OD -2,25 -3,75 170° = 0,8	3

• OS < 0,05 OS -7,25 -3,00 5° = 1,0

Postoperative healing was without any complications and with regular intraocular pressure.

One month after ICL Implantation the visual acuity was:

<u>Uncorrected</u>

Best corrected

- OD 0, 7
- OS 1,0

OD -1,5 -1,75 100= 0,8 OS refraction does not improve

and the patient reached a visual acuity:

Uncorrected

- OD 1,0
- OS 1,2p

Best corrected

- OD +0,25 -0,75 30° = 1,2
- OS +0,25 -0,50 115° = 1,2

Case Report









Figure 4 Slit lamp photo of ICL distance to crystalline lens





Figure 5 UBM picture: distance of ICL to crystaline lens

Discussion



• Studies prove the positive effect of crosslinking [1;2;].

• The implantation of a toric ICL is an effective and elegant surgical option [3] for the recovery of visual acuity, after stabilization of keratoconus by UV-Riboflavin crosslinking. The indication is limited and should be provided only in keratoconus with a regular central astigmatism.

• In the presented case, the follow-up examinations after combined therapy with crosslinking and ICL, a stabile visual acuity and topography were observed til today.

• The possibility of achieving an emmetropic target refraction is a huge benefit especially for younger patients.

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2. Kohlhaas M. (2008) Collagen crosslinking with riboflavin and UVA-light in keratoconus. Ophthalmologe 105(8):785-93

3. Kamiya K, Shimizu K, Kobashi H, Komatsu M, Nakamura A, Nakamura T, Ichikawa K. (2011) Clinical outcomes of posterior chamber toric phakic intraocular lens implantation for the correction of high myopic astigmatism in eyes with keratoconus: 6-month follow-up. Graefes Arch Clin Exp Ophthalmol 249(7):1073-80



• The reversibility of this procedure is an advantage compared to alternative therapeutical options.

• Especially for toric ICLs, a minimal deviation from the calculated positional axis due to lens rotation can lead to a considerable reduction in visual acuity.

• A potential risk of iatrogenic cataract exists if the appropriate distance between the ICL and crystalline lens is not maintained and by an intraoperativ touch of the natural lens.

• In current models of ICL with an incorporated aquaport is the preoperative iridectomy as a measure to prevent pupillary block is not essential.

Conclusion



Our report shows that for the rehabilitation of visual acuity in keratoconus patients, besides other operative methods such as intrastromal corneal ring segments [4], circular keratotomy [5] and PRK [6], crosslinking followed by toric ICL can provide an accurate and good result, which we achieved in this case.

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^{5.} Krumeich JH, Knülle A, Daniel J. (1997) Improved technique of circular keratotomy for the correction of corneal astigmatism. J Refract Surg 13(3):255-62

Thank you for your interest



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