Artiflex Phakic Intraocular Lens Implantation After Corneal Collagen Cross-linking in Keratoconic Eyes

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ABSTRACT

PURPOSE: To evaluate the safety, efficacy, and stability of the Artiflex (Ophtec BV) foldable anterior iris-claw phakic intraocular lens (PIOL) following corneal collagen cross-linking (CXL) in select cases of progressive keratoconus.

METHODS: This prospective, comparative study, conducted between March 2007 and June 2008, involved 11 eyes with progressive keratoconus. Inclusion criteria were progressive keratoconus (Amsler-Krumeich classification grades I and II) with no corneal opacities, corneal thickness >450 μm, endothelial cell count >2500 cells/mm^2, anterior chamber depth >3.2 mm, spherical equivalent refraction >4.50 diopters (D) (with a cylinder component <2.00 D), and no other treatment for keratoconus other than contact lens. Each patient underwent CXL in the keratoconic eye with implantation of the Artiflex IOL 6 months thereafter. Uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), and refraction and topographic profiles were examined at 1, 6, and 12 months after the CXL procedure.

RESULTS: All eyes achieved UDVA of 0.3 logMAR or better. Final spherical and cylindrical error ranged from 0 to −1.50 D and 0 to −1.75 D, respectively. No eyes lost lines of preoperative CDVA. Statistically significant reductions in mean maximum (2.14 D, $P<.001$) and minimum (1.17 D, $P=.02$) keratometry values were present 12 months after the CXL procedure. No complications were observed.

CONCLUSIONS: Combined CXL and Artiflex implantation was a safe and effective treatment in this subset of eyes with progressive keratoconus. Good results in terms of visual acuity, postoperative residual refractive error, and keratometry values were identified. [*J Refract Surg.* 2011;27(7):482-487.]

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Keratoconus is a noninflammatory disorder in which the central or paracentral cornea undergoes progressive thinning and bulging, eventually resulting in corneal ectasia.[1] It is associated with decreased biomechanical strength of the tissue, which is likely caused by diminished intra- and interfibrillar cross-linking of the collagen fibers.[2]

Corneal collagen cross-linking (CXL) using a photosensitizer, riboflavin, and ultraviolet A (UVA) light has been shown to result in increased stiffness of the cornea,[3-8] improved biomechanical strength,[3-8] keratocyte apoptosis,[3] and increased resistance to enzymatic digestion.[8,9] As a result of these effects, the procedure has been used to limit the progression of keratoconus.[10-12]

The phakic intraocular lens (PIOL) has been demonstrated to correct moderate and high refractive errors, resulting in good visual quality, especially in myopic patients.[13-16] The foldable, iris-fixated Artiflex PIOL is the new version of the Artisan lens (Ophtec BV, Groningen, The Netherlands). An identical IOL manufactured by Ophtec BV called Verisyse (distributed by Abbott Medical Optics Inc, Abbott Park, Illinois) was approved by the US Food and Drug Administration (FDA) for highly myopic eyes.[17]

The aim of this study was to assess the safety and efficacy of CXL combined with Artiflex PIOL implantation for the treatment of select cases of progressive keratoconus.

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