PHAKIC INTRAOCULAR LENS

Essay
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List of Abbreviations

AC	Anterior Chamber
ACD	Anterior Chamber Depth
AC PIOL	Anterior Chamber Phakic Intraocular Lens
ACW	Anterior Chamber Width
AMO	Advanced Medical Optics
AS-OCT	anterior segment optical coherence tomography
ATPIOLs	Artisan toric phakic intraocular lenses
BAB	Blood-Aqueous Barrier
BCVA	Best Corrected Visual Acuity
BSS	Balanced Salt Solution
D	Diopter
DSAEK	Descemet's Stripping Automated Endothelial Keratoplasty
ECC	Endothelial Cell Count
ECL	Equivalent contact lens power
ELP	Effective Lens Position
EPI-LASIK	Epithelial Laser In-Situ Keratomileusis
FDA	Food and Drug Association
Fig.	Figure
HEMA	Hydroxyethylmethacrylate
I/A	Irrigation/Aspiration
ICGA	Indocyanine green angiography
ICL	Implantable Contact Lens or Implantable Collamer Lens.
ICRS	Intrastromal Corneal Ring Segments

IOL	Intraocular Lens
IOP	Intraocular Pressure
ISO	International Organization for Standardization
LASEK	laser assisted sub-epithelium Keratomileusis
LASIK	laser in situ Keratomileusis
LOCS	Lens opacity classification system
mm	Millimeter
MTF	Modulation Transfer Function
Nd:YAG	Neodymium -doped Yttrium Aluminum Garnet
nm	Nanometer
OCT	Optical coherence tomography
OVD	Ophthalmic Viscosurgical Device
PC	Posterior Chamber
PC PIOL	Posterior Chamber Phakic Intraocular Lens
PI	Peripheral Iridectomy
PIOL	Phakic Intraocular Lens
PMMA	Polymethyl Methacrylate
PRK	Photorefractive keratectomy
PRL	Phakic Refractive Lens
RD	Retinal Detachment
RK	Radial keratotomy
RLE	Refractive Lens Exchange
RRD	Rhegmatogenous retinal detachment
SE	Spherical Equivalent
TICL	Toric Implantable Contact Lens

UBM	Ultrasound Biomicroscopy
UCVA	Uncorrected Visual Acuity
US	Ultra sound
UV	Ultra violet
VA	Visual Acuity
WTW	White to White diameter
µm	Micrometer

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Introduction

Refractive error correction has become a long standing debate, from the traditional use of spectacles and contact lenses to the era of keratotomy and LASIK. Another alternative for the refractive errors' management is the phakic intraocular lens (PIOL). Phakic intraocular implants overcome the disadvantages of corneal refractive surgeries and have been shown to correct ametropia successfully. **(Baton Rouge et al, 2006)**

Many patients with high myopia cannot see well with glasses, and their thickness may cause psychological problems. Others cannot tolerate contact lenses. So these patients need other solutions for their myopia. **(Fechner and worst, 1989)**

Refractive surgery using excimer laser has proven to be very useful in the correction of a wide spectrum errors of refraction. However, common options like laser assisted in situ keratomileusis (LASIK), photorefractive keratectomy (PRK), Laser-Assisted Subepithelial Keratectomy (LASEK) and Epi-LASIK have shown their limitations for the correction of higher myopia. (**Mertens E, 2006)**

In these cases undesired effects of the photoablative procedure, such as loss of contrast and night vision symptoms may occur. Furthermore, excessive ablation of corneal tissue may cause iatrogenic keratectasia. **(Galvis V et al, 2008)**

Intrastromal Corneal Ring Segments (ICRS) is another technology for correction of myopia but limited to low degrees. **(Assil et al, 1995)**

Clear lens extraction with IOL implantation is one of the surgical solutions, but leads to loss of accommodation, especially disadvantageous in young patients. In addition, the risk of retinal detachment is nearly doubled for patients with myopia of more than -10.0 diopters (D) without surgery. **(Arne JL, 2004)**

The outcome of phakic IOL implantation has been rather favorable, with significant improvement in uncorrected visual acuity, and tolerable visual symptoms in terms of glare and halo. **(Batra and Mc leod, 2001)**

Angle supported IOL for treatment of myopia demonstrated good efficiency during two years of follow up. Long term complications such as iris retraction and endothelial cell loss remain a concern. **(Alleman N et al, 2000)**

Angle supported anterior chamber implant will be successfully tolerated if it is correctly adapted to the diameter of the anterior chamber. **(Baikoff G et al, 2004)**

The iris-fixated (Fechner-Worst) anterior implant was developed as a modification of Lobster-Claw lens used for aphakia. The lens is concave, so there is sufficient space between the implant and the corneal endothelium. As it is an iris claw lens, so the angle is free for normal aqueous drainage. One of its important advantages is the reversible

techniques. If indicated, lens removal would not be difficult and not more traumatic than implantation. Generally the phakic implant respects totally corneal architecture. **(Baikoff G, 1997)**

Posterior chamber phakic IOLs fit in the space between the iris and the crystalline lens. The two available posterior phakic IOLs are the Implantable Contact Lens and the Phakic Refractive Lens .The design of the Staar lens (ICL-V4) with greater vaulting than the V2 and V3 models, and the increased surgical experience with this lens, has been associated with a decrease in the frequency of lens opacification. **(Chang JS and Meau AY, 2007)**

AIM OF THE WORK

The aim of this work is evaluating different types, indications, methods of implantation, methods of calculation of power of phakic intraocular lenses and complications with possible management.