Fachhochschule Jena
University of Applied Sciences Jena

Fachbereich SciTec
Präzision – Optik – Materialien – Umwelt

Abstract zur Diplomarbeit

Fachgebiet: Kontaktlinse
Name: Scholz, Katja

Thema: **Möglichkeiten und Grenzen diffraktiver multifokaler Intraokularlinsen**

Jahr: 2005

Betreuer: Dr. C. Wicher
Dr. A. Meßner
Dipl.- Ing. S. Gabriel

Purpose

The common way to eliminate the cataract (loss of transparency of the crystalline lens) is the surgical removal of the opaque lens and the replacement with an artificial lens. The accommodative capabilitiy of the eye which allows a focus of an image over a range of distances is lost after a cataract surgery.
It was the subject of the diploma thesis to realize a prototype of a diffractive multifocal intraocular lens. Compared to conventional monofocal IOL's, which only provide single focus vision, multifocal IOL's are able to restore both near and distance vision simultaneously.
Concurrent purpose was to eliminate the known disadvantages of reduced contrast and mesopic vision of diffractive multifocal IOL´s.

Procedure

Followed designing the diffractive mutlifocal IOL and improving by means of a RAY-TRACE-software of the Optocraft GmbH, Erlangen, two PMMA lenses both with an optimized surface profile (PMMA BF1) and a reference model (PMMA BF2) were manufactured. On the optical bench the properties of the lenses were tested (in accordance with DIN EN ISO 11979-2) with regard to resolution efficiency of both far focus and near focus and the results were compared.

Results

In comparison with the reference IOL the optimized IOL achieved superior image-forming properties. The resolution efficiency of both IOL's depends on the diameter of the aperture of the optical system.
As the size of aperture decreases, an increase of the resolution efficiency was observed in particular in near focus.

Keywords

intraocular lens, diffractive optical element, cataract, presbyopia

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Specific Field:	Contact Lenses
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Diploma Thesis:	**Möglichkeiten und Grenzen diffraktiver multifokaler Intraokularlinsen**
Year:	2005
Supervising Tutor:	Dr. C. Wicher
	Dr. A. Meßner
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