

ACMIT

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TRIFOCAL LENS TECHNOLOGY FOR APPLICATION IN OPHTHALMOLOGY

THE SUCCESSFUL IMPLEMENTATION OF TRIFOCAL LENS DESIGNS FOR IMPROVED QUALITY OF LIFE

The continuous diminution of the ability for accommodation with increasing age as well as its complete loss after cataract surgery due to the implantation of an intraocular lens (IOL) implant for replacement of an opacified crystalline lens are consequences of aging societies.

Accommodation is the natural ability of the human lens to change its shape and thereby to focus at varying distances for sharp sight at objects located far away as well as down to small distances – as for example reading newspapers. Mainly due to the continuously increasing expectation of life, cataract surgery has become one of the most frequently performed surgical interventions worldwide. In Western societies there is also a trend for sporting activities in later periods of life, which is strongly accompanied by the wish for spectacle independence. Altogether, this situation triggers development of products that help patients to remain unaffected

from impaired accommodation and to stay spectacle-independent.

Trifocal technology offers an innovative solution to this problem. Today, trifocal design approaches are based on lens surface variations in the range of microns. These so-called diffractive structures allow a wide range of design possibilities and can be used not only to create far vision and near vision foci as in the beginning of these developments, but also for intermediate vision. Nowadays intermediate vision is becoming even more important for performing daily tasks such as using a computer, tablet, or smartphone and therefore patients are continually demanding better intermediate vision. As an additional result of this new design, diffractive side-effects – for example haloes or similar photic phenomena – are much less frequently reported than with other designs on the market.

SUCCESS STORY

ACMIT has been working on trifocal lens designs for nearly a decade. Several design versions have been tested in clinical investigations without implantation at our scientific partners in the past. The design was continuously improved so that finally the light loss, which is inevitable for all diffractive designs, could be minimized by making use of higher orders of diffraction. The latest design was successfully patented and a collaboration with the company partner Rayner Intraocular Lenses Ltd initiated to develop the optical concept into a range of implantable fully preloaded intraocular lenses.

Impact and effects

Trifocal lenses may offer complete independence from spectacles at several distances. Published reports indicate high levels of both spectacle freedom as well as patient satisfaction.

The ACMIT trifocal lens design was introduced onto the Rayner RayOne hydrophilic capsular bag intraocular lens platform in 2017, and positive experiences with first implantations have been widely presented, for example by Prof. Oliver Findl from the Hanusch hospital in Vienna, Austria.



Professor Oliver Findl presenting the RayOne Trifocal IOL at the ESCRS in Lisbon.

The trifocal lens design is currently also implemented on other lens platforms including the Rayner Sulcoflex lens. The Sulcoflex Trifocal IOL is designed to be implanted in the ciliary sulcus avoiding the problems associated with conventional "piggybacking". It can be used for fine-tuning of vision after cataract surgery, adding multifocality to existing monofocal patients and offering toric correction, all with the added bonus of reversibility and/or exchange. Professor Michael Amon, Head of the Department of Ophthalmology at the Hospital of St. John, Vienna, is a specialist in Supplementary IOLs and the inventor of the Sulcoflex IOL Family. He performed the world's first in-eye implantation of the Sulcoflex Trifocal IOL in 2018 and clinical trials are currently underway, which will entail further spread of the trifocal technology across global markets.

Project coordination (Story)

Dipl.-Ing. Dr. techn. Christian Krutzler
 Research Area Manager
 ACMIT GmbH

T +43 (0) 2622 22859 40
christian.krutzler@acmit.at

ACMIT / Applied Optics ACMIT GmbH

Viktor-Kaplan-Straße 2/1, Building A
 2700 Wiener Neustadt
 T +43 (0) 2622 22859 0
office@acmit.at
www.acmit.at

Project partner

- Medical University of Vienna, Center for Medical Physics and Biomedical Engineering, Austria
- Department of Ophthalmology at the Hospital of St. John, Vienna, Austria
- Rayner Intraocular Lenses Limited, United Kingdom

This success story was provided by the consortium leader/centre management and by the mentioned project partners for the purpose of being published on the FFG website. Further information on COMET: www.ffg.at/comet