Contrast sensitivity as a component of functional vision of polyfocal, bioanalogic intraocular lens

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Clinical evaluation of functional results and quality of vision after bilateral implantation of a bioanalogic, polyfocal intraocular lens WIOL-CF.

* Negative spherical aberration of polyfocal optics leads to low modulation transfer function (MTF) in vitro and correlation with clinical results of contrast sensitivity examination is expected.
* The contrast sensitivity represents a robust indicator of functional vision.
* The contrast sensitivity function, measured under varying conditions of luminance, establishes the limits of visual perception.
* The contrast sensitivity examinations is able to detect differences in functional vision when simple VA test cannot.

Different patterns of MTF function in multifocal and polyfocal optical design
Methods and patients

* The WIOL-CF bioanalogic, polyfocal intraocular lens was implanted bilaterally after phacoemulsification.
* Patient with any other ophthalmic pathology were excluded.
* Contrast sensitivity under different lighting conditions (photopic-85 cd/m² and mesopic-6 cd/m² were examined (CSV 1000) 3-months after surgery.
* Glare/Halo level based on solicited reporting (patients were actively asked)
* Patients from 12 centers in Czech Republic
* 52 patients (104 eyes), mean age 64.1 year (48-82)
Results

The WIOL-CF polyfocal, bioanalogic intraocular lens despite low in vitro MTF shows very good contrast sensitivity results in mesopic conditions and low level of severe optical phenomena.

91% of WIOL-CF patients is 6 months after surgery without disturbing optical phenomena.*

56% patients have no optical phenomena.

No explantation due to severe optical phenomena.

Mesopic contrast sensitivity is above population limit for healthy young 20-55 years.

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* Solicited reporting
Negative spherical aberration of bioanalogic WIOL-CF which mimic the young NCL optics does not negatively affect vision. The retinal and neural image processing should be taken into account.

Bioanalogic, polyfocal optics differs from the other multifocal designs and show better mesopic contrast sensitivity results.

2/Allo JL. Experiences with multifocal IOLs FineVision (Physiol): 1st trifocal Diffractive IOL ESCRS 2012 Milan
Conclusions

* Very good contrast sensitivity under different light conditions and low level of severe and disturbing glare and halo are crucial for a good functional vision.

* Polyfocal optics mimic the young NCL optics and do not negatively affect vision as expected. The retinal and neural image processing should be taken into account.