

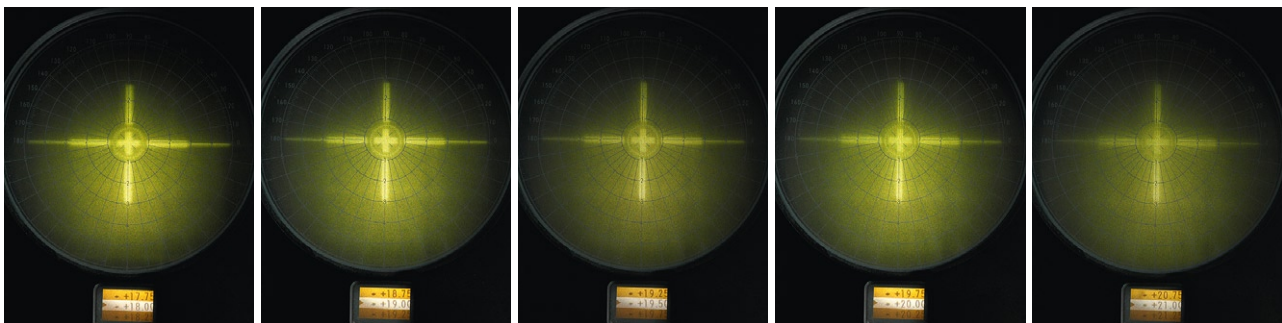
POLYFOCALITY IS MORE THAN MULTIFOCALITY

Unlike multifocal or trifocal intraocular lenses using a principle based on pure physical optics, the ability of WIOL-CF[®] to focus on all distances is achieved by unique combination of three modes of actions used by human eye: polyfocality of the lens, pseudo-accommodation driven by pupil constriction and true accommodation.

POLYFOCALITY

Polyfocality (depth of focus) of WIOL-CF[®] is achieved through negative spherical aberration derived from smooth hyperbolic shape of its optics. Optical power decreases continuously from center to the periphery of the lens and creates infinite number of focal points. This creates an image with large depth of focus using one of the mechanisms of action that are used also by young crystalline lens to enable sharp vision on all distances.^{1,2}

Polyfocality of WIOL-CF[®] demonstrated on optical bench³



Best Focus
-1.5D (18.0D)

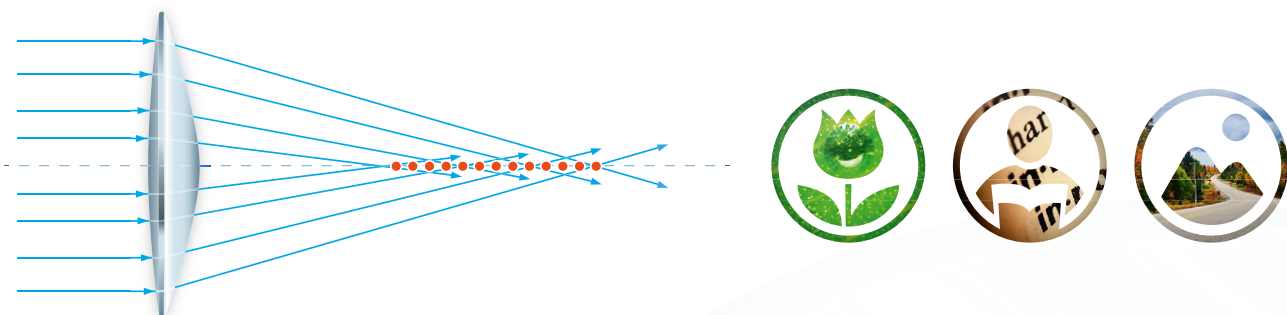
Best Focus
-0.5D (19.0D)

Best Focus
19.5D

Best Focus
+0.5D (20.0D)

Best Focus
+1.5D (21.0D)

Presented pictures were captured on optical bench and demonstrate polyfocality of WIOL-CF[®] in action. Lens with nominal power of 19.5 diopters provides sharp picture not only at best focus but within the range of 3.0 diopters.



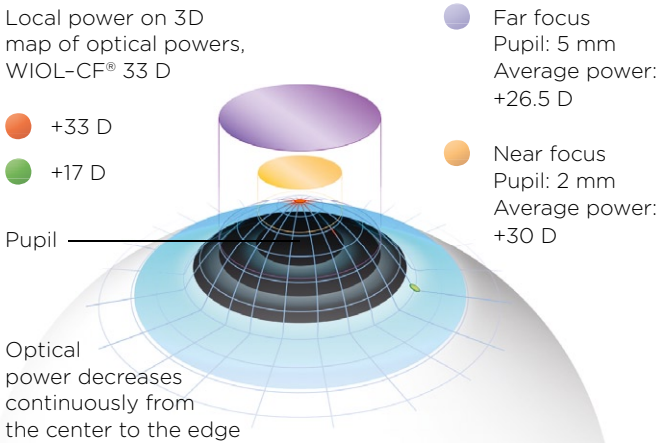
Hyperbolic curvature of the lens creates an infinite number of focal points

WIOL-CF[®] has a hyperbolic shape which can be found in the natural crystalline lens of a young eye. Similarly to the human lens, WIOL-CF[®] creates an infinite number of focal points.

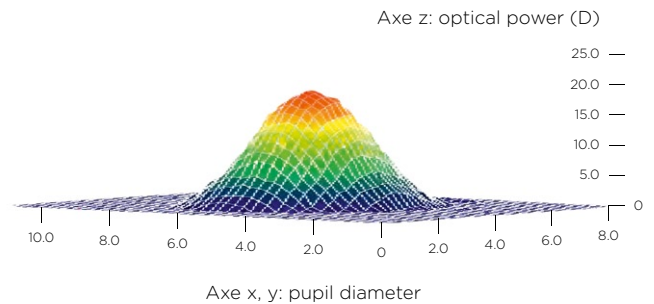
PSEUDO-ACCOMMODATION

Optical power of WIOL-CF® decreases continuously from center to the periphery. This enables natural influence of pupil's constriction on focus: the constricted pupil defines an area with a higher average optical power compared to the area defined by the dilated pupil, similarly to the human lens.

Effect of pupil constriction or dilation on the actual optical power of the active area of the lens (illustration for WIOL-CF® +33 D)



Example of 3D distribution of local dioptric powers of WIOL-CF® (+20 D)³



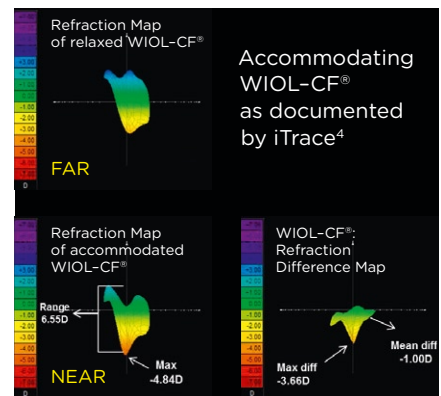
Similarly to natural human lens
WIOL-CF® uses constriction and dilation of the pupil for better close focus.

ACCOMMODATION

Changes of the shape caused by contraction or relaxation of the ciliary muscle has been demonstrated on the natural crystalline lens and WIOL-CF®. Flattening or thickening of the lens profile contributes to change of the optical power.

Similar to the natural crystalline lens, WIOL-CF® can react on contraction or relaxation of the ciliary muscle by changing the shape. This is enabled by its unique flexible material and large size.

Accommodating natural crystalline lens as documented by MR imaging²



WIOL-CF® RESTORES IMPORTANT FUNCTIONS OF THE NATURAL CRYSTALLINE LENS TO THE EYE

Polyfocality, pseudo-accommodation and accommodation combined, provide WIOL-CF® with continuous focus and visual acuity for all distances. The natural shape of optics without rings and zones helps to ensure good vision under all light conditions and with minimal incidence of disturbing optical phenomena. Adhesion of WIOL-CF® on the posterior capsule and highly hydrated material with the negatively charged surface prevents biofilm formation and PCO. Moreover, WIOL-CF® demonstrates long-term stability of its function.^{5,6}

References:

- 1) Manns F et al: Experimental Eye Research 78, 2004;
Dubbelman M et al: Vision Research 4, 2005;
Dubbelman M et al: Vision Research 43, 2003;
Vision Research 41, 2001
- 2) Kasthurirangan S et al: Journal of Vision, 2011
- 3) Medcem, Data on File
- 4) Pallikaris IG et al: ESCRS, Prague, 2012
- 5) Pasta J et al: ESCRS, Munich, 2003
- 6) Pasta J et al: ASCRS, San Francisco, 2006

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