

Evaluation of C2Toric

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The subject of this study was to evaluate the Visual Acuity (VA) both near and distance and the efficacy of the new Nanotechnology Stabilization Design of the C2Toric from the Precilens laboratory, soft lenses for astigmatic presbyopes.

With a predicted high increase of new presbyopes over the next 10 years [1], the potential of contact lenses users is very high, particularly because refractive surgery for astigmatic presbyopes is not scheduled.

The correction of presbyopia in soft contact lenses uses the principle of simultaneous vision. It consists in receiving simultaneously on the retina the images of objects located from infinity to the usual distance for reading. The visual system then analyses and selects the correct image.

The design of classic simultaneous lenses has an aspheric surface creating a totally progressive zone.

Material and method

C2Toric has a unique and patented design.

Its point-by-point conception and its nanotechnological manufacture allow for the creation on the back of the lens of an optic surface combining a central zone of stabilized power aimed at near vision, an intermediate zone where the aspherical variation is slight in the beginning in order to create the depth of field. This variation then increases for an effective intermediate vision, and then cancels itself out for a peripheral zone of stabilized power for distance vision. The eccentricity of the front surface aspheric design of the lens is calculated to minimize aberrations.

The stabilization design of the C2Toric replaces uncomfortable prism by an even distribution of pressure on the eyelids allowing for immediate stability. Twenty patients, 15 women and 5 men aged between 44 and 67 and free of all pathologies, participated in this evaluation.

Three patients did not come to check the fit therefore the results concerned only 17 patients (27 eyes).

Seven patients were new wearers, four patients wore spherical multifocal lenses, four soft toric lenses, one progressive toric lenses and one progressive hard lenses. Refraction was effected according to the fog method, with cylindrical correction, first monocularly, then binocularly with duochrome tests and polarized spectacles.

The addition power of near vision was calculated through the minima addition and the accommodative reserve.

[1] Source INED 01/2009

The selected power of the lens was that of the refraction including vertex distance. The first choice of the BC was the same as that of the C2, i.e. km + 0.70

	C2	C2T
Design	Back: Progressiv Front: Aspherical spheric	Back: Progressiv Front Toric optical zone Dynamic stabilization
BC	8,00 to 9,50 by 0,30mm step	
ØT	14,20mm	
F'V	-25,00 to +25,00 by 0,25D step	-20,00 to +20,00 by 0,25D step
Add Power	Progression 1 (add ≤ 2) / Progression 2 (add > 2)	
Cylinder		-0,75 to -5,50 by 0,75 step
Axis		0° to 180° by 5° step
Material	Hioxiflicon B 49% with UV-filter	

Parameters of C2Toric and C2 spheric version

Results

48% of refractive astigmatisms were against-the-rule with power between -0.75 and -2.75. Three of them were corneal astigmatisms and not purely internal. With-the-rule astigmatisms represented 30% with power between -0.75 and -3.75 with also three corneal astigmatisms.

(Fig 1-2).

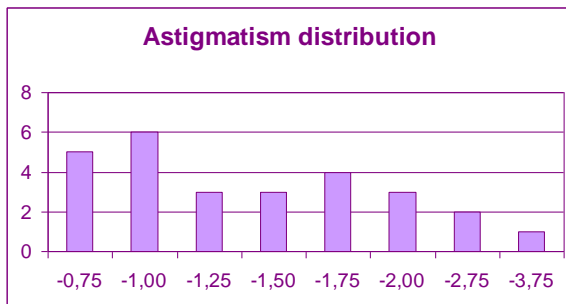


Fig. 1

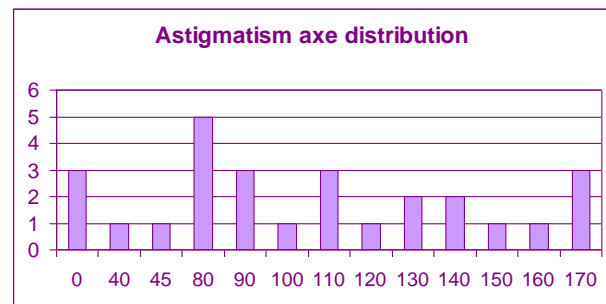


Fig. 2

The proportion of astigmatic myopes was 52%, 30% astigmatic hyperopes and 19% mixed astigmatisms (Fig 1-3).

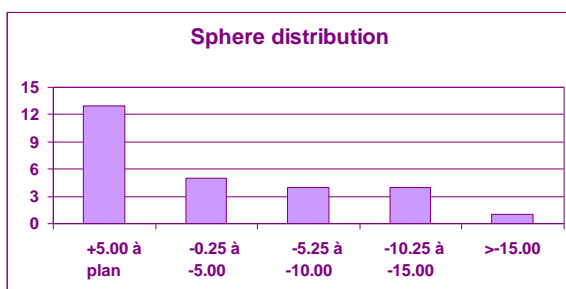


Fig. 3

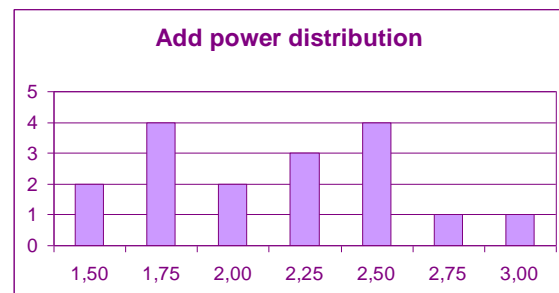


Fig. 4

47% of the patients had a VA in distance similar both with C2Toric and with spectacles, 41% had a difference of 1/10 (**Fig 5**).

With near vision 63% of the patients read P2 the same as with spectacles (**Fig. 6**).

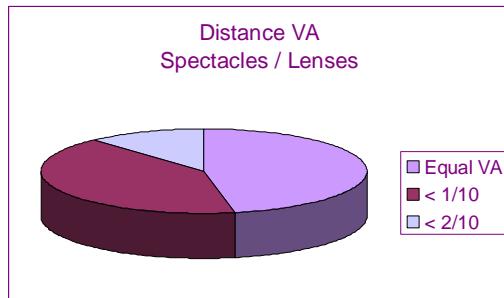


Fig. 5

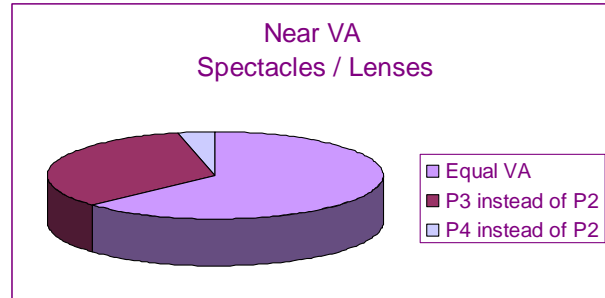


Fig. 6

Lens stabilization was revealed to be very satisfactory. In no case was it necessary to modify the axis of the lens.

Discussion

Analysis of the results showed that 82% of the patients were fitted with C2Toric of which 65% were greatly satisfied. Of the two patients who were not well-fitted one had very poor vision and the other found the lenses uncomfortable on the eyes.

Average keratometries had values between 7.31 mm and 8.25 mm, with the fitting rule being validated at km +0.70.

In 60% of the cases the lenses of the first choice were acceptable without changing their power. It is to be noted that these patients were part of the 65% who were greatly satisfied.

The main complaints were related to distance vision.

For the 40% where modification was necessary 84% was on the distance spheric power, 8% was a change on the sphere and cylinder and 8% on the sphere and progression.

The stabilization system was revealed to be very efficacious in 100% of the cases.

Conclusion

The C2Toric lens is a new generation, multifocal, toric, soft lens, with central near vision. It has a very extensive range, which allows for the correction of spheres from +20 to -20D, all types of astigmatism up to 5.50D, and extreme keratometries.

Its stabilization system coupled with the variety of its range of curvatures make it a very stable lens on the cornea.

Thanks to the zones of stabilized near and distance vision its optical design allows for easier analysis and selection of the right image; the adjustment period is reduced and echo effects are lessened. The contrast, as for visual comfort both day and night, is optimized. It represents a supplementary and essential asset to easily and quickly equip our astigmatic and presbyopic patients.

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