

SOFT CONTACT LENS(TORIS K) FITTING IN PATIENTS WITH KERATOKONUS

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Introduction:

Keratoconus, a degenerative disorder characterized by thinning of the cornea, can result in substantial distortion of vision.

Traditionally defined keratoconus occurs in approximately 4 to 600 persons per 100,000 (0.004% to 0.6%) in the general population, but a considerably higher percentage (5.7% to 10%) of patients with previously undiagnosed clinical keratoconus or keratoconus-like topographic patterns seek relief from their irregular astigmatism at contact lens and refractive surgery clinics. Many treatment choices include spectacle correction and contact lens wear, collagen cross linking, intracorneal ring segments implantation and finally keratoplasty. Contact lenses are commonly used to reduce astigmatism and increase vision.

In this study ,we evaluate the visual outcomes of Toris-K contact lenses for patients who can not be corrected with spectacles.

Matherial-method:

Ninty-six eyes of 72 keratoconus patients who had keratometric values from 44.5 to 72.44 were included to the study. Forty percent of patients had mild (<50D), 30% had moderate (50-55D,%30 had severe keratoconus.>55)keratoconus was graded according to the table 1. Toris K silicone hydrogel soft contact trial lenses were fitted to these eyes with keratoconus (table 2). The initial trial lens was selected according to the protocol shown on table 3. Final lens selection was based on clinical performance . Lens stabilisation and movement was assessed after 30 minutes lens fitting.

Afterwards the proper lens diopter was found with over refraction and best corrected visual acuity (BCVA) was determined.

Table1: Grading of keratoconus

Classification of stages of Keratoconus using Videokeratometry								
	VA with glasses	VA with C.Lens	Cor.Indices ISV	KI	Eccentricity in 30°	RMin	Retinoscopy	Cornea
Pre-stage (early signs)	20/20 to 20/15	20/20 to 20/15	<30	1.04 to 1.07	All four values are normal	7.8 to 6.7	No clear light or shadow movement. Hint of scissors effect.	Cornea clear, unobtrusive. Horizontal, oval or round shades central or slightly decentered, when observed under direct ophthalmoscopy.
Level 1	20/25 to 20/15	20/20	30 to 55	1.07 to 1.15	Sometimes one value is abnormal	7.5 to 6.5	Distorted retinoscopic reflex. Scissors effect. Severe placido ring distortion.	Clear cornea. Fleischer's ring at apex base. Cone and cone base are clearly visible with direct ophthalmoscopy. Decrease in apex thickness is not visible, but can be measured.
Level 2	20/60 to 20/20	20/30 to 20/20	55 to 90	1.10 to 1.25	Often one value is abnormal	6.9 to 5.3	Clear scissors effect, retinoscopy is difficult to perform.	Often cornea is still clear, apex has become slightly thinner and will eventually decenter. Partial or circular Fleischer's ring. Vogt-Striae (parallel striae) may be visible.
Level 3	20/125 to 20/30	20/40 to 20/20	90 to 150	1.15 to 1.45	At least one value is abnormal	6.6 to 4.8	Distinct scissors effect, retinoscopy is nearly impossible to perform.	Apex has become thinner, decentered, and is often slightly cloudy. Clear and mostly circular Fleischer's ring. Vogt-Striae are clearly visible. Eventually Munson-sign will appear.
Level 4	<20/400 to 20/100	20/100 to 20/40	>150	>1.50	At least one value is abnormal	<5 or not measured	Retinoscopy is impossible to perform.	The cornea is often scarred and opaque in the area of the apex. Munson-sign evident. This is eventual end stage of Keratoconus.

Remarks:

- Pre-stage (early signs): The diagnosis of the pre-stage of Keratoconus is always based on clinical criteria such as a change in power and the axis of the astigmatism, fluctuating refraction values, conspicuous changes in retinoscopy and corneal shadows during observation with the direct ophthalmoscope. Videokeratometry provides supplementary information, but a diagnosis can not be based solely on the results. Corneal tear film irregularities and fixation problems can yield similar images, without the presence of a true Keratoconus.
- This classification was adapted from the classical Amsler- and Muckenhirn standards. It is a topography based graduation and not a clinical one.
- ISV = Index of surface variance KI = Keratoconus index Rmin = minimum value of the curvature of the cornea Eccentricity in 30° refers to the four measuring values nasal, temporal, superior and inferior.
- If visual acuity of 20/25 to 20/20 is achieved with a spectacle correction, contact lenses are not necessarily indicated.
- Munson-sign: The cornea bulges forward. The conical shape is easily recognized in profile, particularly by the acute bulge observed at the lower lid when the patient looks down.

Table 2: Type of Toris-K lenses.

Toris-K12	Toric contact lens for keratoconus grade 1 and 2		
Toris-K34	Toric contact lens for keratoconus grade 3 and 4		
Torelis-K12	Multifocal toric contact lens for keratoconus grade 1 and 2		
Torelis-K34	Multifocal toric contact lens for keratoconus grade 3 and 4		
	Parameters		Trial set
	min	max	
Diameter	12.00 ->	17.00 mm	Toris-K12 14.00
Base curve	7.20 ->	10.80 mm	Toris-K34 13.70
Sphere	-40.00 ->	+40.00 dpt	7.80 / 8.00 / 8.20
Cylinder	-0.25 ->	-8.00 dpt	Plan
Axis	0° ->	180°	Plan
Addition	+0.50 ->	+4.00 dpt	-0.01 dpt
Flattening	strong (+) / very stark (++)		0°
Center thickness	0.35 ->	0.59 mm	strong (+)
Central optic zone	5.00 ->	7.50 mm	very strong (++)
Materials	Definitive 74 / Igel 77		0.45 mm
			6.00 mm
			Igel 77
			Igel 77

Table 3: Fitting protocols for Toris-K contact lenses

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- 1. a) Determine the grade of keratoconus (topography) 1-2 or 3-4**
 - b) Vcc > 0.6 and/or keratometry > 6.80 mm: (Toris K12)**
 - Vcc < 0.6 and/or keratometry < 6.80 mm: (Toris K34)**
 - 2. Determine the base curve & diameter:**
 - grade 1-2: r0 = 8,00 / ØT = 14,00 mm**
 - grade 3-4: r0 = 7,80 / ØT = 13,70 mm**
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Results:

Best-corrected spectacle visual acuity of 20/40 or better was noted in 30.2% of eyes and increased to 85% after the toris-k contact lens fitting. BCVA increased to 20/20 in 90% of mild keratoconus patients. Moderate keratoconus patients gained at least three lines increase and 10% of patients did not have any progress (table 3). None of the patients stated a problem during lens fitting. No complication was observed.

Table 3: Distribution of BCVA with spectacles and toris k lens fitting.

Visual acuity (feet:decimal)	BCVA of eyes with spectacle(%)	BCVA of eyes with Toris-k(%)
20/20:(1.0)	0 (%0)	26 (%27)
20/25(0.8)	1 (%1.01)	22 (%23)
20/30(0.7)	3 (%0.31)	20 (%20.8)
20/40(0.5)	25 (%26)	14 (%14.5)
20/50(0.4)	24 (%25)	12 (%12.5)
20/60(0.3)	12 (%12.5)	2 (%2.02)
20/80-20/100(0.2)	17 (%17.7)	0 (%0)
20/120-20/200(0.1)	14 (%14.5)	0 (%0)

Conclusions:

In the initial stages of keratocone, it is likely that the visual acuity can be improved with spectacles or spherical or toric hydrophilic contact lenses. But when the disease progresses, the cornea becomes more irregular and common optical corrections fail to improve visual acuity. At this time, it is necessary to consider the adaptation of other types of contact lenses. Using the described fitting technique, excellent visual results were obtained with the soft lens alone in those eyes with astigmatic errors no greater than 4D . Jain and Sukhija reported BCVA better than 20/40 as 100% for moderate and 96% for severe keratoconus with Rose K contact lenses. Sengor et al reported improvement in visual acuity with piggyback systems compared with rigid lenses alone. They noted improvement in visual acuity in 89.7% and no alteration in 10.3% of the eyes. Similarly, visual acuity 20/40 or better was found in %85 of eyes with Toris K soft lenses in our study.

In conclusion, Toris K silicone hydrogel soft contact lenses increase the BCVA successfully. They can be considered in mild and moderate keratoconus when spectacles do not increase BCVA adequately.