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Cessation of soft contact lens wear prior to refractive LASER surgery- is two weeks long enough?

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Introduction

- Soft contact lens (CL) wear can result in changes to corneal structure. Resolution time, following removal of the CL, can vary with recovery rates of between 2.5 ± 2.1 to 11.6 ± 8.5 weeks depending on lens type¹.
- Regulations regarding cessation of CL wear prior to refractive laser surgery can vary according to the regulating body. Current FDA guidelines recommend soft CLs are left out for "at least two weeks prior to examination and treatment"².
- The Royal College of Ophthalmologists (U.K.) recommend leaving out CL for 1 day before consultation and do not specify any time before refractive surgery treatment³.

Aims

- To investigate the influence of CL wear on corneal measurements prior to refractive surgery.
- To assess impact of CL wear on outcomes of refractive laser surgery.

Materials and methods

- A retrospective analysis was undertaken for a group of full-time soft CL wearing patients, CL group (n=45); and a group of patients that did not wear CL, NCL group (n=45), who presented for refractive laser surgery between 2007 and 2009.
- Myopic patients with astigmatism of <1.50DC were included for analysis.
- Full-time CL wear was termed as wearing soft CL >5 days a week in the previous year.
- Data was obtained from the first consultation (C1) and at the second consultation (C2) when the CL wearers had ceased CL wear for 2 weeks.

Anterior segment image using a Pentacam

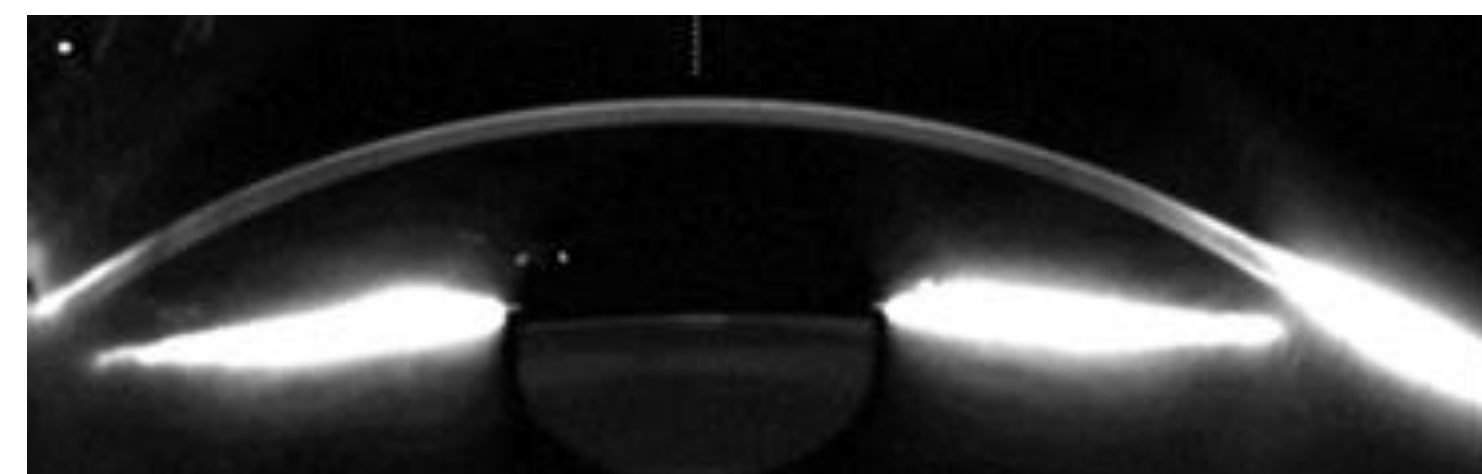


Figure 1. Corneal curvature and thickness data were obtained using a Pentacam ocular tomographer, this instrument uses a Scheimpflug camera to scan the anterior segment of the eye.

- Post-operative refractive results between the groups were examined at 1,3 & 6 months.
- Corneal measurements were taken using the Pentacam (Oculus, Germany), figure 1. Corneal curvature parameters assessed were: flattest and steepest simulated keratometry values within the central 3mm; sagittal and tangential topography from the anterior and posterior corneal surfaces at pupil centre and inferior and superior to centre, see figure 2.
- Corneal thickness values examined were: pupil centre, thinnest corneal location and 4 peripheral points- inferior, nasal, superior and temporal, see figure 3.
- Manifest refraction and best-corrected spectacle visual acuity (VA) were measured at C2. The unaided distance vision and residual refractive correction were measured post-operatively.

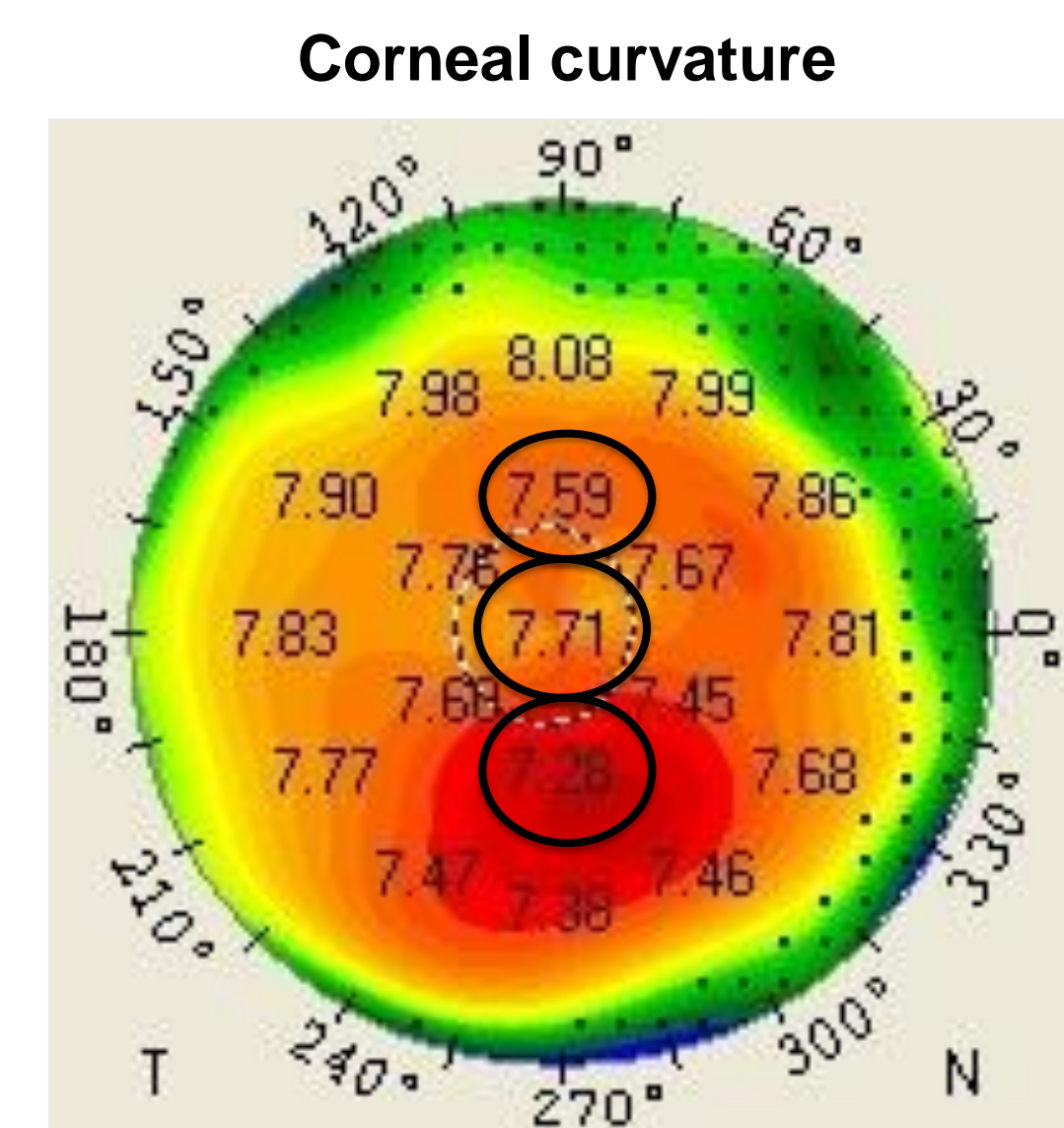


Figure 2. Sagittal and tangential corneal topography was measured at the pupil centre and 4.5mm superior and inferior to this value on the anterior and posterior surfaces.

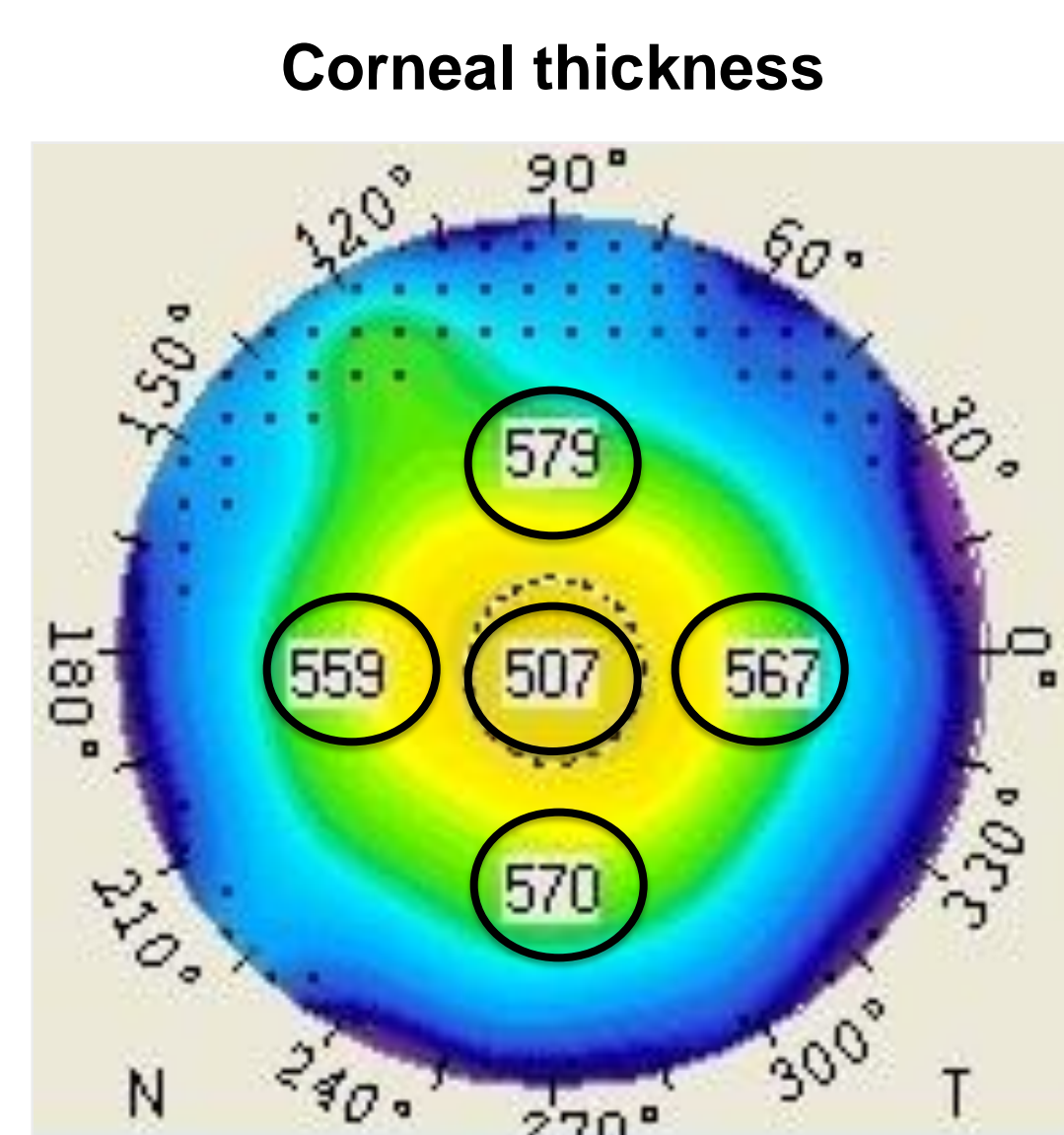


Figure 3. Corneal thickness was measured at the pupil centre, thinnest location and 4.5mm superior, temporal, nasal and inferior to pupil centre.

Results

The profile of the CL and NCL groups are described in table 1.

	Demographic data		
	CL (n=45) Mean ± S.D.	NCL (n=45) Mean ± S.D.	P value
Age (years)	32 ± 7.5	37 ± 10	0.015
Sex	23 males 22 females	29 males 16 females	0.200
Rx (D)	-3.97 ± 1.84	-2.75 ± 1.66	0.001
CL wear (years)	9 ± 4.5	N/A	N/A

Table 1. Analysis of demographic data obtained from the CL and NCL groups showed the CL group to be significantly younger, and to have a significantly higher myopic refractive error compared to the NCL group. There were no statistically significant differences between the gender of the groups (P<0.05).

Corneal thickness

- At C1 no significant differences in corneal thickness between the CL and NCL groups.
- At C2, after a two week cessation of CL wear, central and nasal corneal thickness were significantly increased in the CL group.

Corneal Curvature

- Central keratometry and sagittal curvature showed no statistically significant differences between groups (CL v.s. NCL).
- Tangential curvature was significantly steeper at the inferior cornea for the CL group at C1.
- Differences between first and second visit were not significant in neither the CL nor the NCL groups with exception of the inferior cornea which flattened in the CL group and steepened in the control group at C2.

CL (n=45) Mean ± SD	Tangential curvature					
	NCL (n=45) Mean ± SD	P value	CL (n=38) Mean ± SD	NCL (n=37) Mean ± SD	P Value	Z value
7.83 ± 0.32	7.81 ± 0.34	0.806	-0.05 ± 0.17	-0.05 ± 0.17	0.984	0.592
7.84 ± 0.26	7.93 ± 0.26	0.121	0.00 ± 0.90	-0.02 ± 0.12	0.417	0.811
7.77 ± 0.30	7.90 ± 0.30	0.042	-0.08 ± 0.18	0.01 ± 0.08	0.015	0.003

Table 2. Tangential curvature data measurements taken for the CL and NCL groups at C1 and C2. Data show significant inferior steepness in the CL group at C1. Repeated measurements show relative stability between C1 and C2. A mean flattening was found in the CL group at C2, this difference was statistically significant compared with the NCL group (p<0.05).

Refractive surgery outcomes

- VA in Lasik surgery patients showed no significant differences between CL wearers and non CL wearers.

	Post-operative visual acuity measurements					
	LASIK			LASEK/ PRK		
	CL (n=23)	NCL (n=22)	P value	CL (n=22)	NCL (n=22)	P value
1 month						
VAR* VA	103 ± 6	102 ± 8	0.532	102 ± 5	99 ± 5	0.043
Mean ± SD	100 to 105.5	98 to 106		85 to 110	94 to 108	
Snellen VA	6/6+2	6/6-1		6/6+2	6/6	
3 months						
VAR* VA	103 ± 6	102 ± 7	0.312	105 ± 2	103 ± 3	0.070
Mean ± SD	84 to 110	80 to 108		98 to 108	99 to 110	
Snellen VA	6/5-2	6/6+1		6/5	6/5-2	
6 months						
VAR* VA	105 ± 5	103 ± 4	0.058	105 ± 4	102 ± 4	0.031
Mean ± SD	89 to 110	95 to 110		95 to 110	96 to 110	
Snellen VA	6/5-1	6/5-2		6/5	6/5-2	

Table 3. Unaided distance VA measurements taken post-operatively at 1,3 and 6 months show that results at 1 month were maintained at 6 months. LASIK patients showed no significant difference in VA measured between pre-operative CL and NCL groups. LASEK/ PRK patients had improved VA in CL group at 1 and 6 months compared with the NCL group (P<0.05). *Visual Acuity rating VA.

Refractive surgery outcomes

- The difference in VA between the CL and NCL groups that underwent LASEK surgery was statistically significant but not clinically significant.
- Improved vision was found in the CL group at 1 and 6 months post- LASEK/ PRK procedures compared to the NCL group.

Conclusions

- Central and sagittal curvature showed no significant differences between CL groups at C1 or C2. This would indicate corneal stability between the two visits.
- The significant flattening in tangential curvature seen at the inferior cornea in the CL group could indicate that there was a resolution of inferior steepening following cessation of CL wear as the cornea returned to a normal prolate shape. This reinforces the fact that tangential curvature is more sensitive than keratometry or sagittal curvature in the detection of small changes in corneal shape⁴.
- Central and nasal corneal thickness following 2 weeks cessation of CL wear were increased in the CL group, which indicated a restoration of the normal shape after corneal warping.
- Contact lens wear appeared to have an influence on corneal measurements prior to refractive LASER surgery; however, it did not appear to have a negative implication for outcomes following refractive surgery.

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Acknowledgments

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