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The Effect of Two Weeks and Twenty-Four Hours Soft Contact Lens Cessation Times on Corneal Refractive Surgery Outcomes

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The effect of two weeks and twenty-four hours soft contact lens cessation times on corneal refractive surgery outcomes

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INTRODUCTION

Soft contact lens (SCL) wear can reduce accuracy of pre-operative corneal measurements and outcomes of corneal refractive surgery (CRS)[1,2]. Hypoxia induced by over-wear of SCLs can result in reduced corneal metabolism[1,2] and alterations to endothelial structure resulting in increased light scatter and less light transmission[3,4]. This may affect corneal healing following CRS. The time required for resolution of SCL-induced corneal changes can vary and can be longer than 2 weeks[5,6,7]. Despite this, prior to CRS, a standard SCL cessation time is advised for all patients. This cessation time varies according to governing bodies. United States Food and Drug Administration (FDA) guidelines recommend that SCL be left out for at least 2 weeks prior to initial consultation[8]. Whereas, the Royal College of Ophthalmologists in the United Kingdom recommend removing SCL for 1 day before CRS[9]. Short SCL cessation times prior to CRS may be insufficient for resolution of SCL-induced corneal changes.

HYPOTHESIS

Visual and refractive CRS outcomes would be worse in a SCL group compared to a non-contact lens (NCL) group and worse in a SCL group who ceased SCL wear for 24 hours when compared to those who ceased SCL wear for two weeks prior to examination and treatment.

Figure1. A: pre-operative topography profile. B: topography profile following CRS for myopia.

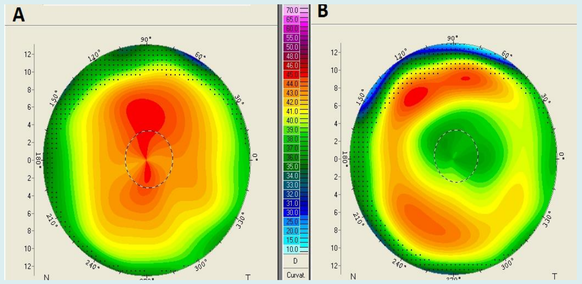

Table 1.

	LASIK			LASEK/ PRK		
	SCL (n = 23)	NCL (n = 23)	Sig	SCL (n = 22)	NCL (n = 22)	Sig
2 weeks cessation group						
LogMAR BCSVA	-0.13 ± 0.06	-0.13 ± 0.04	0.19	-0.13 ± 0.05	-0.10 ± 0.07	0.25
MSE (D)	-3.97 ± 1.84	-2.75 ± 1.66	0.01	-3.98 ± 1.43	-2.95 ± 1.33	0.02
Age (years)	32.6 ± 7.50	36.0 ± 9.60	0.16	31.4 ± 8.0	37.2 ± 11.0	0.22
24 hours cessation group						
	SCL (n = 33)	NCL (n = 39)	Sig	SCL (n = 16)	NCL (n = 10)	Sig
LogMAR BCSVA	-0.11 ± 0.02	-0.10 ± 0.03	0.14	-0.10 ± 0.03	-0.10 ± 0.01	0.74
MSE (D)	-3.78 ± 1.46	-2.57 ± 1.46	0.001	-3.73 ± 1.78	-3.29 ± 1.38	0.51
Age (years)	30.2 ± 8.25	34.8 ± 8.85	0.05	28.0 ± 5.23	30.9 ± 8.08	0.14

METHODS

CRS outcomes of dominant eyes for two groups of previous full-time SCL wearing patients were analysed retrospectively; those who ceased SCL wear for two weeks (n = 45) and twenty four hours (n = 49) prior to examination and treatment. In both groups results were compared to a NCL control group (2 weeks NCL group n = 45; 24 hours NCL group n = 49).

LASIK and PRK/LASEK outcomes at one, three and six months post-operative visits were assessed for efficacy (unaided distance visual acuity (UDVA) and residual refractive error), predictability (number of eyes within ± 0.25D and ± 0.50D of desired refractive outcome) and safety.

SPSS 22 was used for statistical analysis. Normality for continuous data were assessed using the Shapiro-Wilks method. Two-way ANOVA parametric testing was used for comparisons of groups. P < 0.05 was considered statistically significant.

RESULTS

The demographics of the groups tested can be seen in Table 1. There was a trend towards superior CRS outcomes for efficacy, predictability and safety in the two weeks SCL cessation group compared to NCL group. These results were significantly better for LogMAR UDVA in the SCL group and were maintained to the six month post-operative visit (LASIK p = 0.03, LASEK/PRK p = 0.03; Table 2).

Table 2: Six month post-operative VA and refraction parameters for the 2 weeks SCL cessation group

	LASIK			LASEK/PRK		
	SCL (n = 19)	NCL (n = 16)	Sig	SCL (n = 18)	NCL (n = 18)	Sig
Efficacy						
UDVA (mean ± SD) LogMAR	-0.10 ± 0.10	-0.06 ± 0.07	0.03	-0.10 ± 0.08	-0.04 ± 0.08	0.03
Efficacy index	97%	98%		98%	97%	
0.3, < 6/12 n (%)	0	0		0	0	
< 0.3, > 6/12 n (%)	19 (83%)	16 (70%)	0.13	18 (82%)	18 (82%)	0.10
< 0.0, > 6/6 n (%)	17 (74%)	12 (52%)		16 (73%)	15 (68%)	
< -0.1, > 6/5 n (%)	14 (61%)	9 (39%)		14 (64%)	6 (27%)	
Predictability						
Within ± 0.25D	14 (61%)	9 (39%)		8 (36%)	7 (32%)	
Within ± 0.50D	18 (78%)	13 (56.5%)	0.92	10 (45.5%)	11 (50%)	0.71
Greater than ± 0.50D	1 (4%)	3 (13%)		6 (27%)	4 (18%)	
Safety						
Loss 1 line VA	4(21%)	6(37.5%)	0.11	3(17%)	9(50%)	0.25
Loss 2 or more lines VA	4(21%)	6(37.5%)		2(11%)	0(0%)	

RESULTS

These findings were reiterated in the 24 hours SCL cessation group where the trend towards superior CRS outcomes for efficacy, predictability and safety in the SCL group compared to the NCL group was continued. UDVA efficacy outcomes following LASEK/PRK were significantly better in the SCL group at the six month post-operative visit (p = 0.03, Table 3).

Figure 2. Efficacy index for the 2 weeks SCL cessation group.

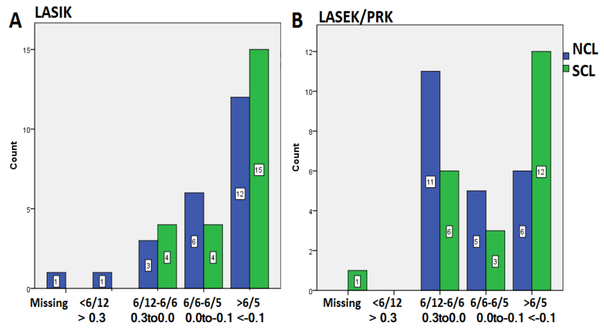

Table 3: Six month post-operative VA and refraction parameters for the 24 hours SCL cessation group

	LASIK			LASEK/PRK		
	SCL (n = 17)	NCL (n = 20)	Sig	SCL (n = 7)	NCL (n = 6)	Sig
Efficacy						
UDVA (mean ± SD) LogMAR	-0.06 ± 0.09	-0.04 ± 0.10	0.53	-0.11 ± 0.03	-0.04 ± 0.07	0.03
Efficacy index	98%	97%		100%	97%	
> 0.3, < 6/12 n (%)	0	0		0	0	
< 0.3, > 6/12 n (%)	3 (9.1%)	4 (10.3%)	0.74	0	2 (20%)	0.14
< 0.0, > 6/6 n (%)	2 (6.1%)	5 (12.8%)		0	1 (10%)	
< -0.1, > 6/5 n (%)	12 (36.4%)	11 (28.2%)		7 (43.8%)	3 (30%)	
Predictability						
Within ± 0.25D	10 (30.3%)	17 (43.6%)		5 (31.3%)	3 (30%)	
Within ± 0.50D	2 (6.1%)	2 (5.1%)	0.23	1 (6.3%)	2 (20%)	0.69
Greater than ± 0.50D	5 (15.2%)	1 (2.6%)		1 (6.3%)	1 (10%)	
Safety						
Loss of 2 or more lines	2 (6.1%)	2 (5.1%)		0	0	
Loss of 1 line	4 (12.1%)	4 (10.3%)		0	3 (30%)	
Maintain VA or loss < 1 line	9 (27.3%)	10 (25.6%)	0.76	5 (31.3%)	3 (30%)	0.17
Gain of 1 line	1 (3%)	4 (10.3%)		1 (6.3%)	0	
Gain of 2 or more lines	1 (3%)	0		1 (6.3%)	0	

CONCLUSION

Previous SCL wear did not negatively impact on the outcomes of CRS, and SCL cessation times of 2 weeks and 24 hours did not result in negative outcomes compared to a NCL control group.

While these results were statistically significant, the number of letters difference in UDVA between the SCL and NCL groups was low. Therefore one cannot conclude that these results are clinically significant, as the standard uncertainty value for visual acuity outlined in the International Standards Organisation guidelines is two letters of Snellen VA (0.04 LogMAR), with a 95% confidence level of 4 letters[10].

It is likely that the SCL wearers had previously adapted to some under-correction of astigmatism in their SCLs and to the increased surface irregularity with SCL wear[11]. Therefore previous SCL wears may have coped with the flatter topography profile following CRS (Figure 1) and post-operative haze[12]. However, these results are surprising when one considers the effect of the larger image size on VA in the NCL group following CRS. One would expect this would improve VA in this group compared to the SCL group who were accustomed to the larger image size in SCLs, compared to spectacle lenses pre-operatively[13].

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