The impact of modern soft contact lens wear on corneal curvature and thickness & on the outcomes of refractive LASER surgery

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Aoife Lloyd FAOI
Background

RESEARCH WITH PLYMOUTH UNIVERSITY

DIT
Dublin Institute of Technology

ultralase
the specialists in correcting vision

Shaping optometry and optics in Europe | www.eaoe.info
Refractive laser surgery

• A large number of laser candidates are previous CL wearers $^{1,2}$
• Accurate topography & pachymetry vital - corneal refractive surgery (CRS) outcomes

Topography: Pre-op, Post-op
Pachymetry: Pre-op, Post-op
Changes to corneal structure with SCL wear

- Reduced epithelial thickness \(^1_2\)
- Stroma:
  - reduced transparency \(^3_4\)
  - oedema \(^4_5_6_7_8\)
  - reduced healing \(^9_10\)
- Reduced endothelial cell function \(^11\)

Resolution of corneal changes following cessation of CL wear

• Recovery may take more than 2 weeks for some patients\textsuperscript{1,3}

• Recovery rates vary according to lens type: $2.5 \pm 2.1$ to $11.6 \pm 8.5$ weeks\textsuperscript{2}

• No study looked at effect on CRS outcomes

Current guidelines regarding cessation of soft contact lenses

- Unregulated: large amount of discrepancy

- FDA guidelines: remove SCL “at least two weeks prior to examination and treatment” (FDA 2011)

- The Royal Collage of Ophthalmologists: remove SCL 24 hrs prior to consultation (RCOO 2011)
Aims

Proposal:

• examine the impact of SCL wear on corneal thickness and curvature
• investigate if 2 weeks sufficient for recovery
  assess outcome of CRS
Methods

• Retrospective analysis
• Comparison of corneal parameters (Pentacam, Oculus)
• Dominant eye only

• First visit (C1)
• Second visit (C2)
• Post-operatively (PO)

SCL
• N=45
• CLs worn >5/7 days

NCL
• N=45
• no CL > 12/12
## Results: demographics

<table>
<thead>
<tr>
<th></th>
<th>SCL n=45</th>
<th>NCL n=45</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>$32 \pm 7.5$</td>
<td>$37 \pm 10$</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>MSE (D)</strong></td>
<td>$-3.98 \pm 1.64$</td>
<td>$-2.85 \pm 1.49$</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>23M 22F</td>
<td>29M 19F</td>
<td>0.20</td>
</tr>
<tr>
<td><strong>BCSVA (VAR)</strong></td>
<td>$107 \pm 2$</td>
<td>$105 \pm 3$</td>
<td>0.50</td>
</tr>
<tr>
<td><strong>BCSVA (Snellen)</strong></td>
<td>$6/5 +2 \pm 2$</td>
<td>$6/5 \pm 3$</td>
<td>0.50</td>
</tr>
</tbody>
</table>
### Results: topography

#### Tangential curvature

<table>
<thead>
<tr>
<th>First Visit</th>
<th></th>
<th>Difference between first and second visit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCL</strong> (n=45) Mean ± SD mm</td>
<td><strong>NCL</strong> (n=45) Mean ± SD mm</td>
<td><strong>Sig. P-value</strong></td>
<td><strong>SCL</strong> (n=38) Mean ± SD mm</td>
</tr>
<tr>
<td>7.83 ± 0.32</td>
<td>7.81 ± 0.34</td>
<td>0.806</td>
<td>-0.05 ± 0.17</td>
</tr>
<tr>
<td>7.84 ± 0.26</td>
<td>7.93 ± 0.26</td>
<td>0.121</td>
<td>0.00 ± 0.90</td>
</tr>
<tr>
<td>7.77 ± 0.30</td>
<td>7.90 ± 0.30</td>
<td>0.042</td>
<td>-0.08 ± 0.18</td>
</tr>
</tbody>
</table>
Results: pachymetry

• At C1: no significant differences in corneal thickness between the SCL and NCL groups.

• At C2, nasal CT was significantly increased in SCL group (SCL >6.30 ± 8.38μm ; NCL <4.64 ± 10.60μm, p= 0.028).
## Results: post-operative

<table>
<thead>
<tr>
<th></th>
<th>LASIK</th>
<th></th>
<th>LASEK/ PRK</th>
<th></th>
<th>P value</th>
<th>LASEK/ PRK</th>
<th></th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>CL (n=23)</strong></td>
<td><strong>NCL (n=22)</strong></td>
<td><strong>P value</strong></td>
<td><strong>CL (n=22)</strong></td>
<td><strong>NCL (n=22)</strong></td>
<td><strong>P value</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1 month</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR VA</td>
<td>103 ± 6</td>
<td>102 ± 8</td>
<td>.532</td>
<td>102 ± 5</td>
<td>99 ± 5</td>
<td>.043</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>100 to 105.5</td>
<td>98 to 106</td>
<td></td>
<td>85 to 110</td>
<td>94 to 108</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snellen VA</td>
<td>6/6+2</td>
<td>6/6-1</td>
<td></td>
<td>6/6+2</td>
<td>6/6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 months</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>VAR VA</td>
<td>103 ± 6</td>
<td>102 ± 7</td>
<td>.312</td>
<td>105 ± 2</td>
<td>103 ± 3</td>
<td>.070</td>
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<tr>
<td>Mean ± SD</td>
<td>84 to 110</td>
<td>80 to 108</td>
<td></td>
<td>98 to 108</td>
<td>99 to 110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snellen VA</td>
<td>6/5-2</td>
<td>6/6+1</td>
<td></td>
<td>6/5</td>
<td>6/5-2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>6 months</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VAR VA</td>
<td>105 ± 5</td>
<td>103 ± 4</td>
<td>.058</td>
<td>105 ± 4</td>
<td>102 ± 4</td>
<td>.031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>89 to 110</td>
<td>95 to 110</td>
<td></td>
<td>95 to 110</td>
<td>96 to 110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snellen VA</td>
<td>6/5-1</td>
<td>6/5-2</td>
<td></td>
<td>6/5</td>
<td>6/5-2</td>
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</tr>
</tbody>
</table>
Conclusion

Despite the influence of previous SCL on corneal parameters, there were no negative implications on CRS outcomes.
Many thanks for your attention!