New option in conventional silicone hydrogel contact lenses:
The Brazilian Experience

ABSTRACT

PURPOSE: To evaluate the clinical performance of a new conventional silicone hydrogel contact lens in spherical and toric designs.

METHODS: We fitted the Perfect SH and Perfect Toric SH (World Vision Ophthalmic®, Brazil) in 19 patients (33 eyes). Contact lens material was Filcon II (hydration: 74%; Dk: 60 x 10-11@35°C). We evaluated demographics (sex, age), also if the patient had tried to wear contact lenses before, best-corrected visual acuity with spectacles and with contact lenses, spherical equivalent of the refraction, design of the fitted lenses (between spherical and toric), keratometry, the base-curve of the fitted lenses, the occurrence of complications, and patient's satisfaction with the new lenses.

RESULTS: Fourteen patients were female (73.7%) and five were male (26.3%). The average spectacle-corrected visual acuity (LogMAR) was 0.31 ±0.35. The LogMar visual acuity with contact lenses was 0.25±0.29. Seventeen (89.4%) patients were satisfied with the new contact lens and 2 (10.6%) were not.

CONCLUSION: This new conventional silicone hydrogel contact lens could be considered an useful option for contact lens fitting in Brazil.

Keywords: contact lenses; silicone hydrogel; extended wear; daily wear.

INTRODUCTION

Launched in the late nineties, silicone hydrogel contact lenses (SHCL) have had an important role in improving corneal physiological response in comparison to hydrogel contact lenses, which are made of hydroxyethyl methacrylate (HEMA) copolymers, and have low oxygen permeability (DK).

Cavanagh et al demonstrated that lenses with higher oxygen transmissibility caused no or only small increases in bacterial binding to corneal surface cells in either daily or extended wear. This could lead to a decreasing on lens-related microbial infection risks.

Particularly with low DK materials, overnight contact lens wear is known to be associated with serious complications, such as microbial keratitis. In relation to corneal edema, Holden & Mertz showed that no swelling would occur under daily wear conditions if the average oxygen transmissibility (DK / Lavg) was at least 24.1±2.7 X 10 -9 (cm X ml O2) / (sec X ml X mmHg) , an Equivalent Oxygen Percentage (E.O.P.) of 9.9%. The Dk / Lavg needed to limit overnight corneal edema to 4.5% (level experienced without CL in place) was found to be 87.0±3.3 X 10-9 (cm X ml O2) / (sec X ml X mmHg), an Equivalent Oxygen Percentage of 17.9%. Although silicone hydrogels were at first thought to be safe for daily and extended wear, complications associated with this material are still present. Even with the release of high oxygen transmissibility materials, daily wear remains the major way of use.

Silicone hydrogels became available in Brazil in 1999, and until 2010 all the lenses...
in Brazil were for frequent replacement (15 to 30 days). The purpose of this study was to evaluate the clinical and subjective performance of the first conventional silicone hydrogel launched in Brazil.

**METHODS**

We conducted a retrospective study reviewing the charts of 19 patients (33 eyes) from the Contact Lens sector at the Federal University of São Paulo, Brazil, who were fitted with the Perfect Silicone Hydrogel™ CL (World Vision®, São Paulo, Brazil) during the year of 2011. The material of this CL is the Filcon II 3. The DK of this material is 60 x 10\(^{-9}\) (cm X ml O\(_2\)), and it has 74% of hydration. The available base curves are 7.8; 8.1; 8.4; 8.7; 9.0 and 9.3 millimeters, and the diameters are 13.5; 14.5 and 15.0 millimeters. The diopteric power ranges from +20.00 to -20.00 spherical diopters, and from -0.75 to -8.00 cylinder diopters.

We noted the sex, age, spherical equivalent, best-corrected spectacle visual acuity, keratometry, type of CL used, refraction of the CL (in spherical equivalent), visual acuity with CL, previous CL wear, complications, and patient’s satisfaction.

We used descriptive analysis of the data. Qualitative variables are presented as frequency of occurrence. We used the paired t-test to calculate the comparison between the visual acuity with spectacles and with CL. Level of significance was adjusted to 5%.

Fourteen patients were female (73.7%) and five were male (26.3%). The age ranged from 17 to 42 years old (average 27.71 ± 7.62).

**RESULTS**

The spherical equivalent ranged from plano to -22.00 D (average -5.59 ± 6.86 D). The average spectacle-corrected visual acuity (LogMAR) was 0.31 ± 0.35. Keratometry was 43.96 ± 2.13.

In relation to the type of CL used, twenty four (73%) were toric CL, and nine (17%) were spherical. The average spherical equivalent of the CL was -4.96 ± 6.10. The base curve (BC) of the CL varied from 7.8 to 9.0 mm, and the average BC was 8.43 ± 0.27 mm. The visual acuity with CL was 0.25 ± 0.29 LogMar.

Seventeen patients (89.4%) were CL wearers before this study, and 2 (10.6%) were first time users. Of the previous wearers, 8 (47%), wore conventional hydrogel toric CL; 5 (29.4%) used rigid gas-permeable (RGP) CL; 2 (11.7%) used conventional hydrogel CL, 2 (11.7%) used frequent replacement hydrogel CL. Regarding complications, one patient (5.2%) presented giant papillary

<table>
<thead>
<tr>
<th>Sex</th>
<th>14 Fem (73.7%) / 5 Male (26.3%)</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>27.71 ± 7.62</td>
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<tr>
<td>Spherical equivalent</td>
<td>-5.59 ± 6.86</td>
</tr>
<tr>
<td>Spectacle visual acuity</td>
<td>0.31 ± 0.35 (LogMAR)</td>
</tr>
<tr>
<td>Keratometry</td>
<td>43.96 ± 2.13D</td>
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<tr>
<td>Type of CL</td>
<td>24 Toric (73%) / 9 Spherical (17%)</td>
</tr>
<tr>
<td>CL spherical equivalent</td>
<td>-4.96 ± 6.10D</td>
</tr>
<tr>
<td>Base curve</td>
<td>8.43 ± 0.27mm</td>
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<tr>
<td>CL visual acuity</td>
<td>0.25 ± 0.29</td>
</tr>
<tr>
<td>Previous CL wear?</td>
<td>Yes: 17 (89.4%) / No: 2 (10.6%)</td>
</tr>
<tr>
<td>CL previously used</td>
<td>Conventional toric CL: 8 (47%)</td>
</tr>
<tr>
<td></td>
<td>RGP: 5 (29.4%)</td>
</tr>
<tr>
<td></td>
<td>Conventional hydrogel: 2 (11.7%)</td>
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<tr>
<td></td>
<td>Disposable hydrogel: 2 (11.7%)</td>
</tr>
<tr>
<td>Satisfied with the CL</td>
<td>Yes: 17 (89.4%) / No: 2 (10.6%)</td>
</tr>
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Table 1 Summary of the results
conjunctivitis. Seventeen (89.4%) patients were satisfied with the new CL, and 2 (10.6%) were not.

Results are displayed in Table 1.

**DISCUSSION**

Silicone hydrogels CL have higher oxygen transmissibility rates, what was thought to decrease CL-related complications, such as microbial keratitis. Depending on central thickness, silicone hydrogel CL could even be used for extended wear, without leading to corneal edema outside physiological parameters. However, studies have shown that this new lens type did not reduce the incidence of complications, especially in overnight wear schedule. Most of the prescribers worldwide seem to prefer daily wear schedule, and 30-day replacement CL.

Extended wear represents 7.8% of all soft lens fits, ranging from 0.6% in Malaysia to 27% in Norway. Contact lens non-compliance increases the risk of complications, and one of the reasons is failing on CL replacement at the right time. In Brazil, especially due to economic factors, patients don’t replace their CL as oriented by the ophthalmologist and by the manufacturer, exposing their eyes to possible complications.

The present study was performed with the first Brazilian silicone hydrogel CL to be replaced once a year. We fitted 33 eyes of 19 patients, 89.4% of which were satisfied with this new CL. It appears to be a very useful option for our practice.

### Table 2: Comparison between visual acuity (LogMAR) with spectacles and with CL.

<table>
<thead>
<tr>
<th></th>
<th>Spectacles (n=33)</th>
<th>CL (n=24)</th>
<th>p</th>
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<tbody>
<tr>
<td>Spherical</td>
<td>0.44 ± 0.53</td>
<td>0.33 ± 0.49</td>
<td>0.74</td>
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<tr>
<td>Toric (n=9)</td>
<td>0.31 ± 0.53</td>
<td>0.22 ± 0.17</td>
<td>0.27</td>
</tr>
<tr>
<td>Total (n=33)</td>
<td>0.25 ± 0.29</td>
<td>0.20 ± 0.19</td>
<td>0.67</td>
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</tbody>
</table>

**REFERENCES**