

Efficacy of Scleral Contact Lenses in Keratoconus: Clinical Parameters and Visual Outcomes

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INTRODUCTION

The aim was to analyze the clinical parameters and visual outcomes of scleral contact lenses applied to keratoconus patients.

SETTING

Patients who were followed up at the Izmir City Hospital Contact Lens Unit and who applied scleral lenses between October 2023 and December 2024 were included. Cases with a history of ocular surgery other than CXL, cases with different brands of scleral lenses (SL), and cases that would not benefit from scleral lenses were excluded.

METHODS

53 eyes of 36 keratoconus patients were examined. Corrected visual acuity (CVA), biomicroscopic examination, and corneal tomographic analysis were performed in the clinical evaluation. Misa scleral lens application was performed in all cases.

RESULTS

20 male and 16 female patients were evaluated as part of the study (mean age: 37.18 years; age range: 22-55 years).

In visual acuity measurements, the mean best CVA decreased to a minimum of 0.22 LogMAR (range: 0.0-0.22) after scleral lens application. A statistically significant improvement in best CVA was noted following scleral contact lens application ($p < 0.05$).

Optimal lens parameters were determined as follows: 7.8 mm base curve value, 16.5 and 17.0 mm diameter values, and 325-450 micron vault range.

Of the 36 patients included in the treatment program, 12 (15 eyes) obtained scleral contact lenses.

| Parameter 1 | Parameter 2 | Avg 1 | Avg 2 | Avg Difference | p-value |
|--------------|----------------|---------------|---------------|----------------|---------|
| VA with SL | Corrected VA | 0.1 ± 0.12 | 0.55 ± 0.32 | 0.44 ± 0.33 | <0.001 |
| | | 0.1 (0 - 0.7) | 0.5 (0 - 1.8) | 0.4 (0 - 1.8) | |
| VA with SL | Uncorrected VA | 0.1 ± 0.12 | 0.89 ± 0.46 | 0.78 ± 0.48 | <0.001 |
| | | 0.1 (0 - 0.7) | 0.7 (0 - 1.8) | 0.7 (0 - 1.8) | |
| Corrected VA | Uncorrected VA | 0.55 ± 0.32 | 0.89 ± 0.46 | 0.34 ± 0.36 | <0.001 |
| | | 0.5 (0 - 1.8) | 0.7 (0 - 1.8) | 0.3 (0 - 1.4) | |

Stats: Mean ± SD / Paired T-Test

| Lens Acquisition | Not Acquired (n=38) | Acquired (n=15) | p-value |
|------------------|---------------------|-----------------|----------|
| VA with SL | 0.12 ± 0.13 | 0.07 ± 0.06 | 0.222(m) |
| | 0.1 (0.03 - 0.1) | 0.1 (0 - 0.1) | |
| Corrected VA | 0.55 ± 0.32 | 0.55 ± 0.31 | 0.762(m) |
| | 0.5 (0.3 - 0.7) | 0.5 (0.3 - 0.6) | |
| Uncorrected VA | 0.87 ± 0.49 | 0.92 ± 0.41 | 0.54(m) |
| | 0.7 (0.52 - 1) | 0.9 (0.7 - 1.1) | |

Stats: Mean ± SD/Median (IQR), (m) Mann Whitney U Test

DISCUSSION

Scleral contact lenses improve visual acuity and quality of life in keratoconus. They provide short-term improvement in topographic parameters. They are superior to rigid gas permeable (RGP) lenses in that they do not cause dryness, microtrauma, or suboptimal oxygenation.

Keratoconus is a common indication for penetrating keratoplasty.

Scleral lenses are currently an option for patients who do not benefit from soft or RGP contact lenses.

In our study, visual acuity improved with scleral contact lenses ($p < 0.01$), however, most patients did not acquire scleral contact lenses despite improving their visual acuity (72.3%). There was no difference in visual acuity between those who acquired scleral contact lenses and those who did not ($p = 0.222$).

CONCLUSION

Scleral contact lenses offer an effective treatment option for visual rehabilitation in keratoconus patients and can postpone the need for corneal transplantation in advanced cases.

However, the high cost of these lenses is considered a significant factor limiting access to treatment, particularly in developing countries.

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