

Corneal Cross-Linking as a Treatment for Keratoconus: Four-Year Morphologic and Clinical Outcomes with Respect to Patient Age

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Purpose

To report the 4-year outcomes of corneal cross-linking (CXL) for progressive keratoconus in a population of different age groups.

Design

Retrospective, single-center, nonrandomized clinical study.

Participants

Four hundred consecutive eyes treated with corneal CXL for progressive keratoconus from April 2006 through April 2010.

Intervention

After removal of the epithelium, the cornea was irrigated for 30 minutes with a solution of 0.1% riboflavin and 20% dextran, followed by irradiation with an ultraviolet A light of 3 mW/cm² for 30 minutes.

Main Outcome Measures

Best-corrected visual acuity (BCVA), sphere and cylinder refraction, corneal topography, Scheimpflug tomography, and aberrometry were assessed at baseline and at 1, 6, 12, 24, 36, and 48 months after corneal CXL treatment. The compiled data were stratified according to age (group A, younger than 18 years; group B, 18–29 years; group C, 30–39 years; and group D, older than 40 years).

Results

Comparative analysis included 400 eyes of 301 patients. Functional results showed a significant increase in BCVA in group A by a mean reduction of -0.11 logarithm of the minimum angle of resolution (logMAR) after 12 months, in group B by a mean reduction of -0.31 logMAR after 36 months, in group C by a mean reduction of -0.33 logMAR after 36 months, and in group D by a mean reduction of -0.26 logMAR after 36 months. Morphologic results showed an analogous regularization of corneal shape with a significant reduction of opposite sector index by a mean value of -0.53 at 12 months in group A, -1.14 at 36 months in group B, -1.10 at 36 months in group C, and -0.55 at 12 months for group D. Optical quality improvement was demonstrated by a mean significant reduction of coma -1.52 μm after 12 months in group A, -1.58 μm after 24 months in group B, -2.57 μm after 36 months for group C, and -0.25 μm after 36 months in group D.

Conclusions

Outcomes stratified by age indicate the efficacy of corneal CXL in stabilizing the progression of ectatic disease in all age groups and improving the functional and morphologic parameters in select groups. Results indicated better functional and morphologic results in the population between 18 and 39 years of age.

[Full Abstract](#)