Ceratocone - Surgical Treatment

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Keratoconus is a bilateral, asymmetric, progressive and noninflammatory disease of the cornea. It is characterized by thinning and ectasia of the corneal tissue [1]. Despite numerous clinical and laboratory investigations, its etiology remains uncertain [2]. Studies suggest genetic predisposition represented by abnormalities in chromosome 21 [3] and possible forms of familial transmission [4]. Its symptoms usually begin in adolescence with low visual acuity and tend to stabilize by the third or fourth decade of life.

The use of rigid glasses and contact lenses are the main forms of treatment in the early stages of the disease [5], but with the increase of astigmatism and the decrease of corneal transparency, the efficacy of these therapeutic modalities decreases and corneal penetrating transplantation to be one of the alternatives to reestablish the patient’s vision [6].

In the attempt to prevent or delay corneal transplantation, intrathromal ring implantation has been described as a less invasive option in the treatment of keratoconus in patients without corneal opacifications and intolerant to contact lenses [7].

Intra-spherical rings aim to alter the corneal curvature, and research shows that the greater the thickness of the segments, the greater the central flattening obtained [8] and consequently the greater the correction of myopia and irregular astigmatism [9-12].

Techniques with single incisions for the implantation of symmetric intra-oestrous rings have been developed in recent years, with an improvement in the mean postoperative corrected visual acuity, corneal flattening and lower postoperative risks [13].

Recent studies have shown that implanting asymmetric segments may further reduce corneal irregularity and satisfactorily improve visual acuity in patients with keratoconus [14-16].

The position of the rings followed a nomogram established for this study (Figure 1), which consisted of the division of the corneal surface into 5 points, being X, Y, W, Z and C. The point X being the site of the incision (upper), on the most curved axis; the Y point at 180° from “X”, also on the curved; the point W perpendicular to the line “X” and “Y”, in the hemicornea comprising the curved area of the keratoconus and the point Z perpendicular to the line “X” and “Y”, in the hemicornea comprising the flatter area of the keratoconus. The point C corresponds to the central region of the topographic map (Figure 1).

Intraestromal ring segments were introduced, one on each side of the incision, in the most curved hemicorne of all patients, point W, the thinnest ring (100 microns) was positioned.

In the flatter hemicornea, Z point, the thicker ring was positioned. Based on the curvature of the apex of the cornea, up to 59 D ring of 300 micra and between 60 and 65 D ring of 350 micra (Figure 1).
Figure 1: Illustration of the positioning of segments of intraestromais.

- X = incision site, on the most curved axis;
- Y = 180° of "X", on the most curved axis;
- Z = perpendicular to line "X" and "Y" in the flatter hemicornea of keratoconus;
- W = perpendicular to the line "X" and "Y" in the hemicornea more curl of keratoconus;
- C = intersection of the two bisectors

Conclusion

Based on the data from this study, it can be concluded that asymmetric intrathromal ring implantation improves postoperative visual acuity both without correction and with correction and a keratometric reduction at all points, thus obtaining a decrease in distortions by the topographic flattening of the central region of the cornea.

Bibliography


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