FRONT CORNEAL VERSUS CENTRAL AND PARACENTRAL CORNEAL CHANGES AFTER BOWMAN LAYER TRANSPLANT FOR KERATOCONUS IN A TERTIARY HOSPITAL IN THE UK

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BACKGROUND

Bowman Layer Transplant (BLT) is a novel treatment for advanced keratoconus where patients are unable to tolerate contact lenses.

We hereby report the findings of our retrospective case series of BLT.

MATERIALS AND METHODS

Keratoconic patients with stage III – IV using AK classification and unable to tolerate CLs were included in this study.

Mean age was 31.6 years (Range 21 – 40 years).

A single surgeon performed surgery on all patients.

8 eyes underwent BLT between Nov 2018 to Jan 2020, of which 5 eyes had uncomplicated surgery.

Pre-op and Post-op vision, Kmax, Kmean, Corneal cylinder (front cornea, 4.5mm, 6mm) and thickness at the thinnest point were analyzed at each visit.

Follow-up regime; Day 1, week 1, month 1-3, and a final review at 10-14 months.

RESULTS

Visual outcome outline in Table.

Kmax (from 77.36 D +/- 12.59 D to 69.98 D +/- 3.92 D).

Kmean (from 64.4 D +/- 9.78 D to 62.12 D +/- 5.64 D).

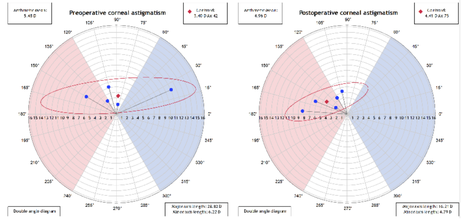
Corneal cylinder (from 5.48 D to 4.94 D) in the front axial map (Graph 1).

Corneal cylinder at the 4.5-mm (from 5.77 D to 2.61 D) (Graph 2).

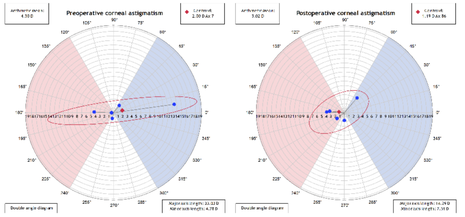
Corneal cylinder at the 6mm (from 5.078 D to 3.014 D) (Graph 3).

Increase in thickness at the thinnest point noted in all patients.

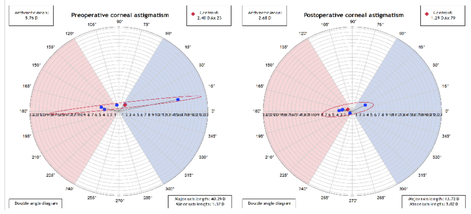
Four patients remained stable at last follow-up, however one patient showed progression due to persistent eye rubbing.



Graph 1. Double angle diagram for pre and postoperative front corneal astigmatism. Note slight overall reduction in astigmatism.



Graph 3. Double angle diagram for pre and postoperative corneal cylinder within the 6.0 mm zone. Note significant reduction of corneal astigmatism and centroid compared to front cornea analysis only.



Graph 2. Double angle diagram for pre and postoperative corneal cylinder within the 4.5mm zone. Note significant reduction of corneal astigmatism and centroid compared to front cornea analysis only.

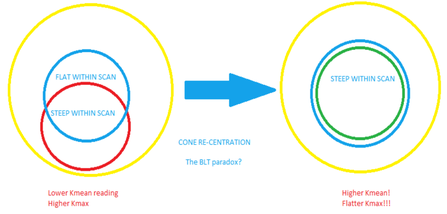


Fig showing "Bowman Layer Transplant paradox". Flattening of the cornea at its steepest point (flatter Kmax) with "recentration" of the cone and overall greater steep area scanned by the topographer, yielding a greater Kmean.

CASE	VA PRE-OP	VA POST-OP
1	Unaided CF RGCPL 6/18 (No tolerance)	Unaided 6/60 Refused RGPCL trial
2	Unaided 6/60 Nontolerant to RGPCL	Unaided CF RGPCL 6/18*
3	Unaided 6/60 Spectacles 6/24 Nontolerant to RGPCL	Unaided 6/60 Spectacles 6/24 RGPCL 6/18
4	Unaided 6/60 Nontolerant to RGPCL	Unaided 6/60 RGPCL 6/18
5	Unaided CF Nontolerant to RGP	Unaided 6/36 RGPCL 6/12

Table shows VA pre-op and post-op
Comparable means of correction pre and post have been included where possible.
Spectacles – Best spectacle corrections.
(RGPCL) – Rigid gas permeable contact lenses.
* Case 2 admitted persistent eye rubbing with keratoconic progression and progressively poorer CL tolerance.

COMPLICATIONS

One patient had intraoperative micro-perforation of host cornea (12.5%).

Two patient had donor tissue wastage (25%).

CONCLUSION

BLT offers numerous advantages over other procedures such as the lack of risk for rejection, reduced risk for steroid-related problems, reduced number of visits, and improved corneal biomechanics.

Moreover, if BLT was unsuccessful, these patients could still opt for DALK or PKP afterward.