

Evaluation of Cornea Topometric Parameters and Visual Rehabilitation in Clear Cornea Cataract Surgery



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Introduction: Clear Corneal cataract surgery has become the standard of care worldwide for cataract management. Clear cornea incisions are becoming smaller (depending on Phacoemulsification instrumentation and IOL implantation materials, designs and techniques). There is nevertheless growing concern on how astigmatic change even with small incisions affects visual function in an era where emmetropia is the desired standard postoperatively. We have too, observed for years that although refractive astigmatic changes with clear cornea surgery are minimal, topographic and tomographic changes show significant irregular astigmatism near the incision site, This may affect visual function especially with multifocal and accommodating IOLs.



Purpose:

to determine the specificity and sensitivity of Index of Height Decentration (IHD) and Index of Surface Variance (ISV) with visual function.

Background: Pentacam – Derived Anterior Surface Analysis

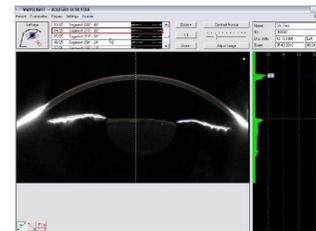
Developed for Keratoconus Severity grading

Amsler – Krumeich criteria

Problem? Post-operative assessment.

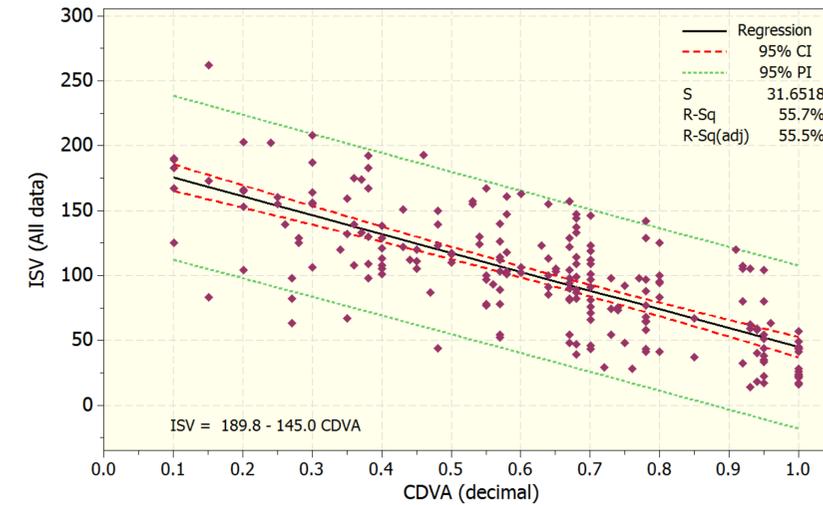
Most such criteria consider corneal thickness as a factor.

Cataract surgery causes fluctuations (short-term) of corneal thickness.

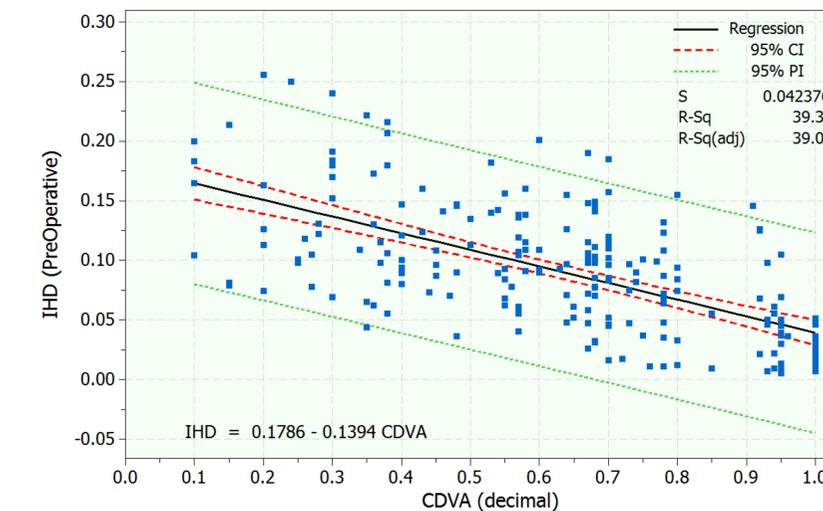


Correlation with CDVA

212 Keratoconic Patients, 12-month Follow-up

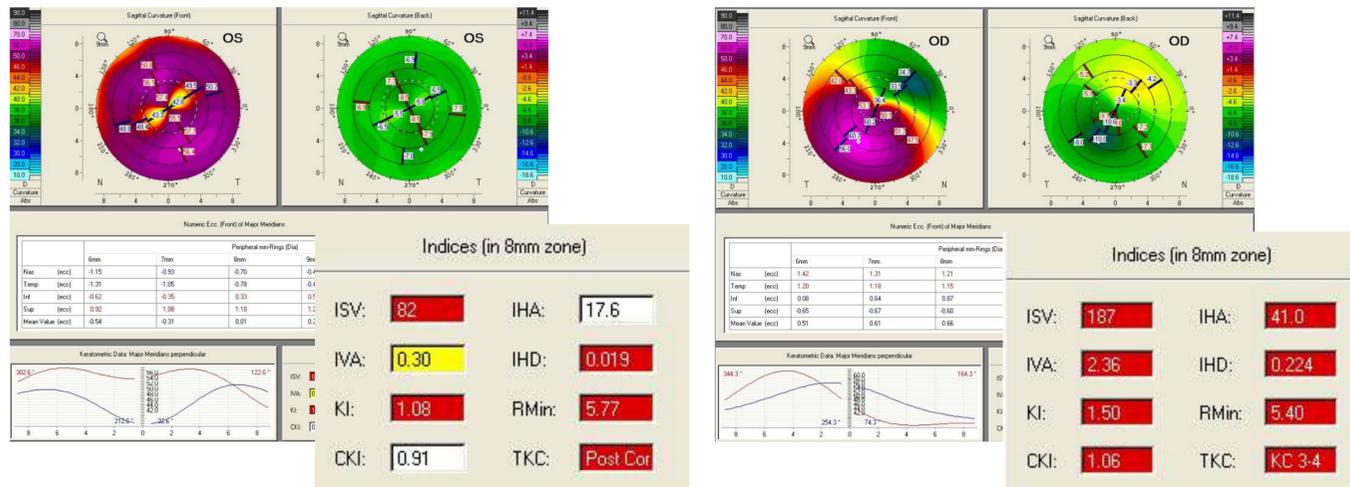


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|----------------------------------------|----------------------------------------------------------------------------|------------------------------------------------|------|------|------|
| Index of Surface Variance (ISV) | The value of deviation of individual corneal radii from the mean curvature | Expression of the corneal surface irregularity | < 37 | > 37 | > 41 |
|----------------------------------------|----------------------------------------------------------------------------|------------------------------------------------|------|------|------|



| | | | | | |
|-------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------|---------|---------|---------|
| Index of Height Decentration (IHD) | Decentration of elevation data in the vertical direction | Provides the degree of decentration in the vertical direction | < 0.014 | > 0.014 | > 0.016 |
|-------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------|---------|---------|---------|

The Anterior Segment Topometric Indices



Methods

235 cataract procedures were included and two types of IOLs were studied: toric aspheric and monofocal aspheric.

Sequential tomographic measurements were taken, pre-operatively, at 1 week, months 1 and 3, and every 6 months following the procedure.

Analysis:

- The Index of Surface Variance (ISV) and the Index of Height Decentration (IHD) were correlated with keratometry, UDVA, CDVA with up to 2 years follow-up.
- UDVA: improvement (= increase)
- ISV: improvement (= reduction)
- IHD: improvement (= reduction)

Results:

ISV and IHD

dropped by 40% at week one and slowly recovered to 10% worse of the pre-op measurement

Correlating well with UDVA 20/35 at day 1, 20/32 week 1 and 20/22 at month 1.

Corneal minimal thickness went from 535 pre-op, to 615 on day 1, 590 at week 1 and 545 at month 1.

Conclusions:

- Clear cornea cataract surgery appears to distort significantly these topometric indices, as well as corneal thickness in the early post-operative period.
- Increased pachymetry, especially centrally may result in a more hyperopic correction in the first week. mid-peripheral irregularity may distort quality of vision. Tomographic and pachymetric cornea monitoring may facilitate the evaluation of the amount and quality of vision in these cases.

