Macular status as a predictor of refractive outcome after phacovitrectomy.

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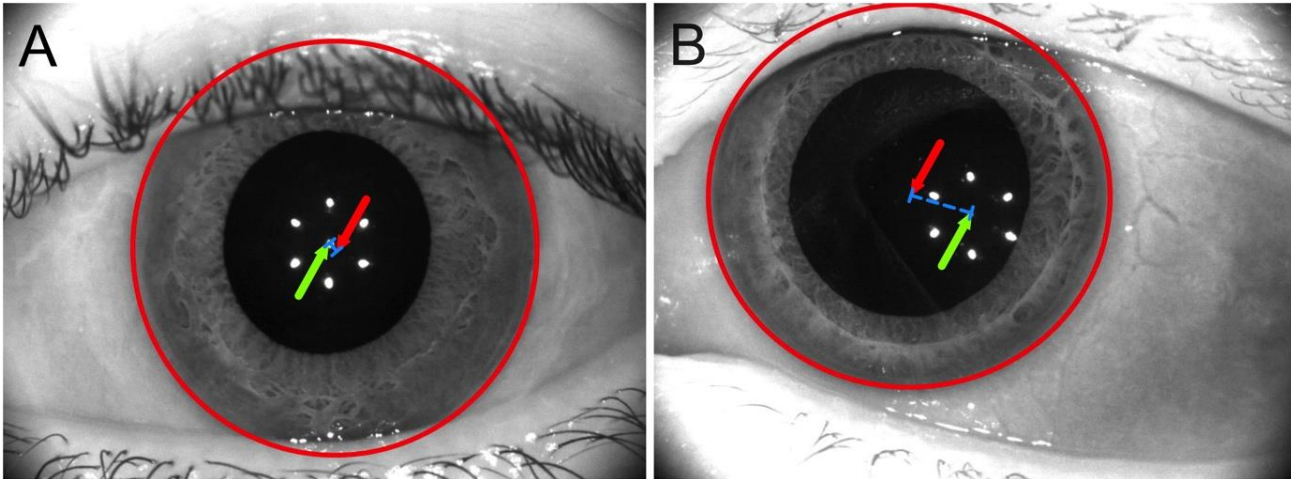Department of Ophthalmology, Ulm University

Ärztl. Direktor: Prof. Dr. med. Armin Wolf
57. Panhellenic Ophthalmology Congress; 30.5.-1.6.2024; Thessaloniki

Purpose

- To evaluate the impact of macular status and fixation (as determined by chord alpha) on the refractive outcome after combined phacovitrectomy for retinal detachment (RRD).

Methods

- Single center retrospective study
- 305 eyes (150 with macular involvement) from 302 patients
- combined phacovitrectomy for RRD (2016-2023)
- Swept-source OCT-based biometry (IOL Master 700) with successful integrated check for IOL-Power
- Additional parameters:
  i. Preoperative macular status,
  ii. chord alpha length (mm)
 iii. resulting refractive prediction error (PE)

Two photographs were taken by the biometer during the biometric examination. The red arrows indicate the approximate center of the circle around the limbus, while the green arrows indicate the center of the Purkinje reflex. The chord-alpha distance is marked with a blue line. Patient (A) had an attached macula, good fixation, and a small chord alpha distance. The patient in (B) had a detached macula and showed upward and medial gaze during the biometry examination, likely due to loss of central fixation with a long chord alpha.

Results

- Eyes with macular detachment -> higher rate of refractive PE when compared to eyes without (p < 0.001)
- % of patients with an absolute refractive error > 1D:
  -> 31% in macular-off RRD
  -> 12% in the macular-on RRD
- Macular-off eyes -> higher length of chord alpha possibly as a sign for central fixation loss
- Linear regression analysis: higher length of chord alpha -> myopic refractive prediction error (PE)
- The regression fit significantly deviated from zero (p < 0.0001) and had a slope of -0.64 dioptres/mm length
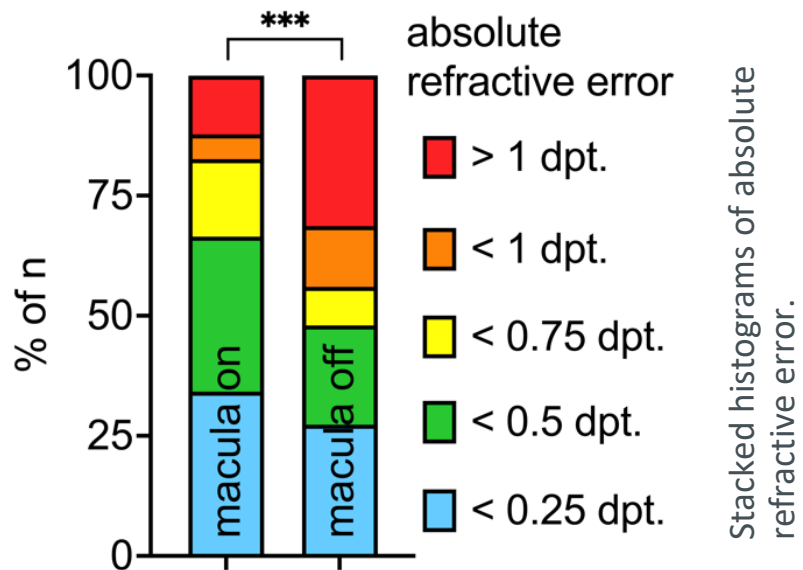
Stacked histograms of absolute refractive error.

absolute refractive error
- > 1 dpt.
- < 1 dpt.
- < 0.75 dpt.
- < 0.5 dpt.
- < 0.25 dpt.
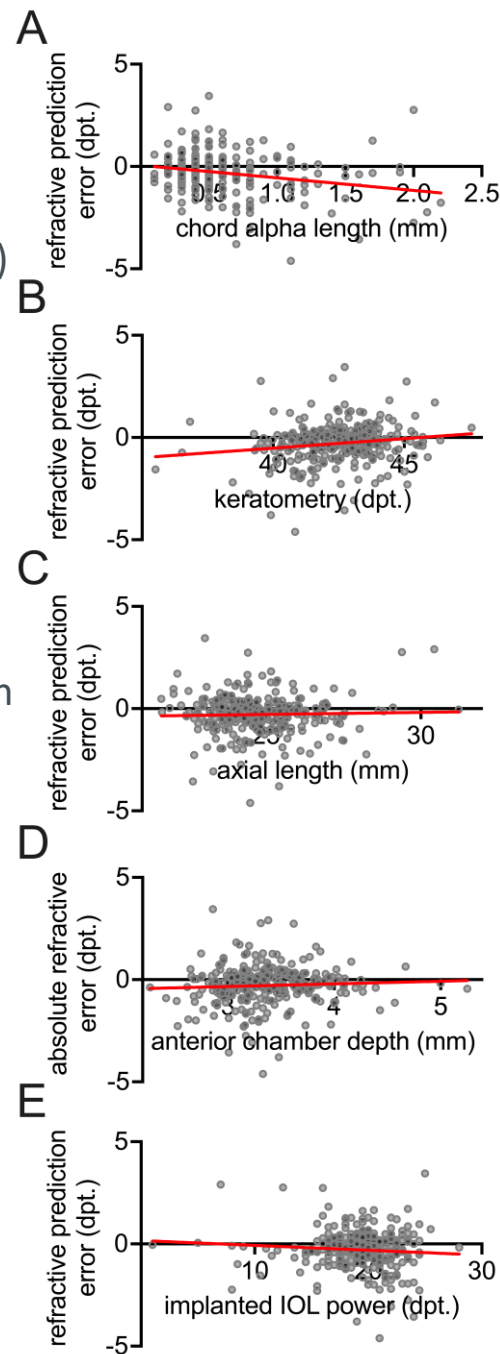
Correlations between the refractive PE and factors that may influence the refractive outcome:

- Chord alpha (p < 0.0001)
- Keratometry (p = 0.007)
- Axial length (p = 0.6)
- Anterior chamber depth (p = 0.03)
- Implanted IOL-Power (p = 0.2)

These results highlight the multifactorial pathogenesis of refractive PE.

Conclusions

- Fixation loss during biometry may be a contributing factor to postoperative refractive errors in macular-off RRD.
- Further research is needed to determine if sequential surgery is more beneficial in eyes with macular detachment.