Longitudinal Assessment of Ellipsoid Zone Recovery using *En Face* OCT after Retinal Detachment Surgery


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Patients with rhegmatogenous retinal detachment (RRD) often experience poor functional outcomes. This study was undertaken to provide quantitative assessment on en face OCT findings in patients with macula-off RRD.

**Purpose**

This is a post hoc analysis of the PIVOT RCT. SD-OCT en face images of the EZ slab at 3, 6, 12, and 24 months post surgery were analyzed. Hyporeflective areas were manually measured by two graders using ImageJ.

**Methods**

- A statistically significant reduction was observed in the mean area of hyporeflectivity over time, $F(3, 87) = 14.85, p < .0005$.
- There was moderate negative correlation between change in hyporeflective area and change in ETDRS letters from 3 to 24 months, $r(31) = -0.46, p = .007$.

**Results**

- EZ recovery can be quantitatively documented after RRD surgery using enface OCT.
- A steady reduction in the area of abnormal central EZ was observed over time and correlated with ETDRS improvement in patients with macula-off RRD.

**Conclusions**
Anatomic Reattachment

Poor functional outcome
EZ abnormalities
Hyporeflective regions on *en face* OCT
Objectives:

- To quantitatively assess EZ recovery using en face OCT after RRD surgery.
- To determine the correlation between EZ recovery and improvement in visual acuity.
• This is a *post hoc* analysis of patients enrolled in the PIVOT RCT with *macula-off RRD*.
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*En face* images of the EZ slab at 3, 6, 12, and 24 months post-operatively.
• This is a post hoc analysis of patients enrolled in the PIVOT RCT with macula-off RRD.
• En face images of the EZ slab at 3, 6, 12, and 24 months post-operatively.
• Hyporeflective areas were co-localized with EZ abnormalities on the B-Scan and manually measured by two masked graders using ImageJ.
### Methods

#### Introduction and Purpose

#### Results

<table>
<thead>
<tr>
<th></th>
<th>Intraocular Pressure</th>
<th>95% Confidence Interval</th>
<th>F Test with True Value</th>
<th>df1</th>
<th>df2</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intraclass Correlation</strong></td>
<td></td>
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<tr>
<td>Single Measures</td>
<td>0.813</td>
<td>0.674 - 0.896</td>
<td>9.979</td>
<td>39</td>
<td>39</td>
<td>0.000</td>
</tr>
<tr>
<td>Average Measures</td>
<td>0.897</td>
<td>0.805 - 0.945</td>
<td>9.979</td>
<td>39</td>
<td>39</td>
<td>0.000</td>
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![Image of OCT scan](image.png)
• The region of interest was defined as a circle with 4mm diameter in the center of the enface image.
181 images of 52 patients were analyzed.
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A statistically significant reduction was observed in the mean area of the hyporeflectivity over time.

\[ F(3,87) = 14.85, \ p < .0005 \]

6.08 ± 2.31 mm²
5.43 ± 2.99 mm²
4.06 ± 2.69 mm²
3.26 ± 2.76 mm²
The mean abnormal area significantly decreased from 3 to 12 months (2.01 (95% CI, 0.64-3.38) mm², p = .002), and from 3 to 24 months (2.81 (95% CI, 1.34-4.28) mm², p < .0001).
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• Additionally, there was moderate negative correlation between change in hyporeflective area and change in ETDRS letters from 3 to 24 months, $r(31) = -0.46$, $p = .007$. 
... going back to the patient
• EZ recovery can be quantitatively documented after RRD surgery using enface OCT.
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• A steady reduction in the area of abnormal central EZ was observed over time and correlated with ETDRS improvement in patients with macula-off RRD.
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A steady reduction in the area of abnormal central EZ was observed over time and correlated with ETDRS improvement in patients with macula-off RRD.

Hyporeflective areas on en face OCT may serve as a useful biomarker for EZ integrity, functional outcomes and long-term visual prognosis following RRD repair.
Thank you!

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