# Bridging the Gap:

## A Novel Treatment of Recurrent Corneal Erosion Secondary to Gaping Astigmatic Keratotomy

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# Disclosures

- No financial disclosures

# DoD Disclaimer

- ***"The views expressed are those of the presenter and do not reflect the official views or policy of the Department of Defense or its Components"***

# HPI / POH

- 57-year-old F presented to our ophthalmology clinic complaining of sharp pain and photophobia in the left eye.

- POHx:
  - Radial Keratotomy (RK) OU: ~1998
  - Astigmatic Keratotomy (AK) OU: ~1998
  - Recurrent corneal erosions (RCE) OS:
    - Previously treated with bandage contact lenses (BCLs), moxifloxacin, sodium chloride hypertonicity solution, artificial tears, and stromal puncture at varying encounters.

# Past History

- Ocular meds: None
- PMHx: None
- PSHx: None
- Soc Hx: None
- Allergies: NKDA
- Fam OHx: None

# Exam

| | **OD** | **OS** |
|---|---|---|
| BCVA | 20/40->PH 20/20 | 20/50->PH 20/25 |
| EOM | Full | Full |
| Pupils | Reactive, no rAPD | Reactive, no rAPD |
| Tp | WNL | WNL |
| CVF | Full | Full |

# SLE:

| | **OD** | **OS** |
|---|---|---|
| Ext | No ptosis/proptosis | No ptosis/proptosis |
| LLL | Normal | Normal |
| C/S | W&Q | W&Q |
| K | Clear, No haze, 8 RK& 2 AK scars | Erosion over temporal AK w/ gaping of wound, 8 RK and 2 AK scars |
| A/C | D&Q | D&Q |
| I | R&F | R&F |
| L | Clear | Clear |
| Vit | Clear | Clear |

# Dilated Fundus Exam

- OD: Disc: C/D 0.30; Vitreous clear; Macula: flat; Vessels: wnl; Periphery: flat 360
- OS: Disc: C/D 0.30; Vitreous clear; Macula: flat; Vessels: wnl; Periphery: flat 360

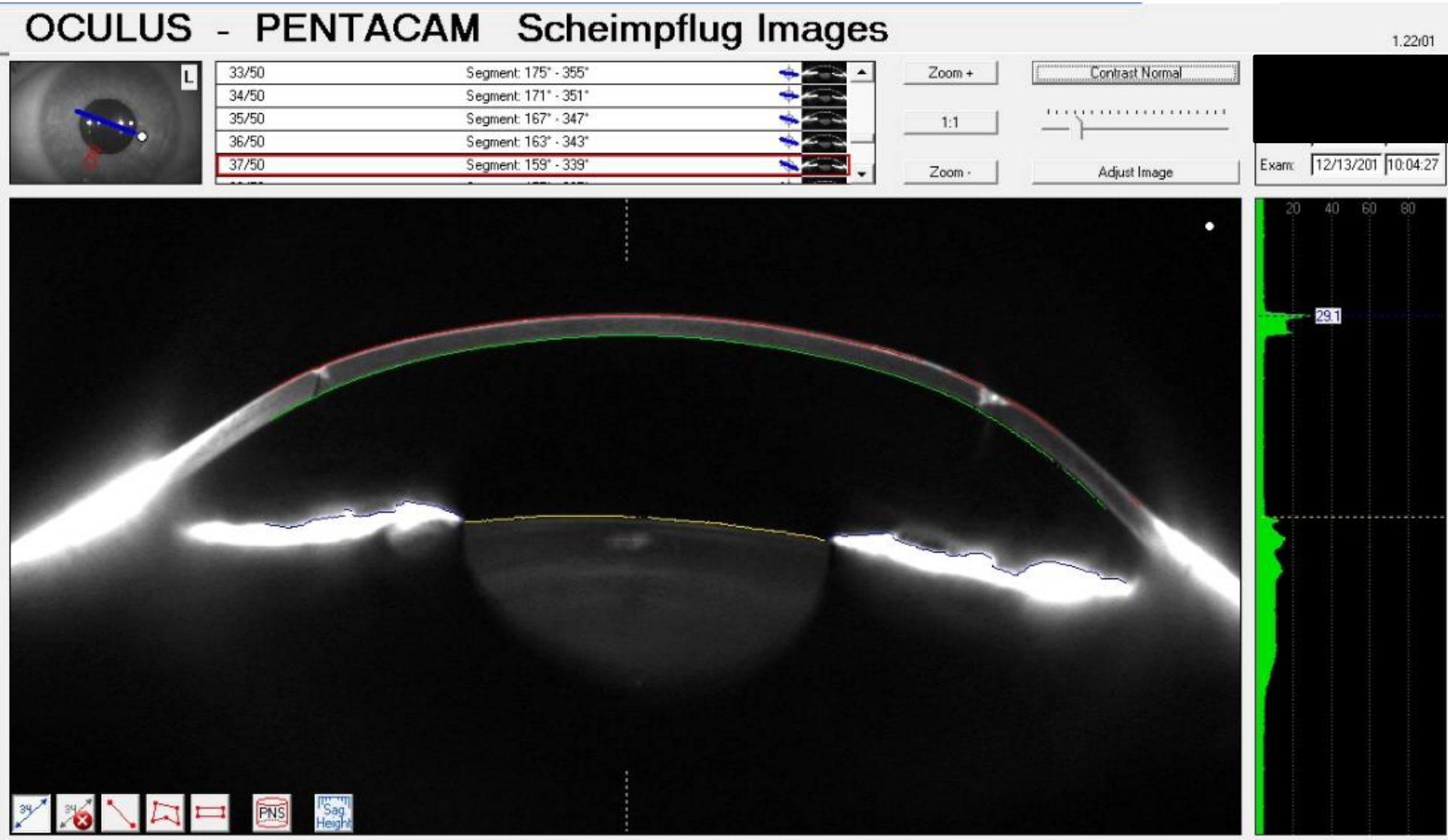
# DDx

- Recurrent Corneal Erosion:
  - Underlying gaping AK
  - Prior Trauma
  - Corneal Dystrophies
- Corneal Abrasion
- Corneal Ulcer
- Corneal Foreign Body
- Dry Eye Syndrome

# Initial Treatments

- BCL
- Moxifloxacin
- Sodium Chloride Hypertonicity solution
- Cyclosporine
- Muro
- Anterior Stromal Puncture

# Pre-Op: 13 Dec 2018



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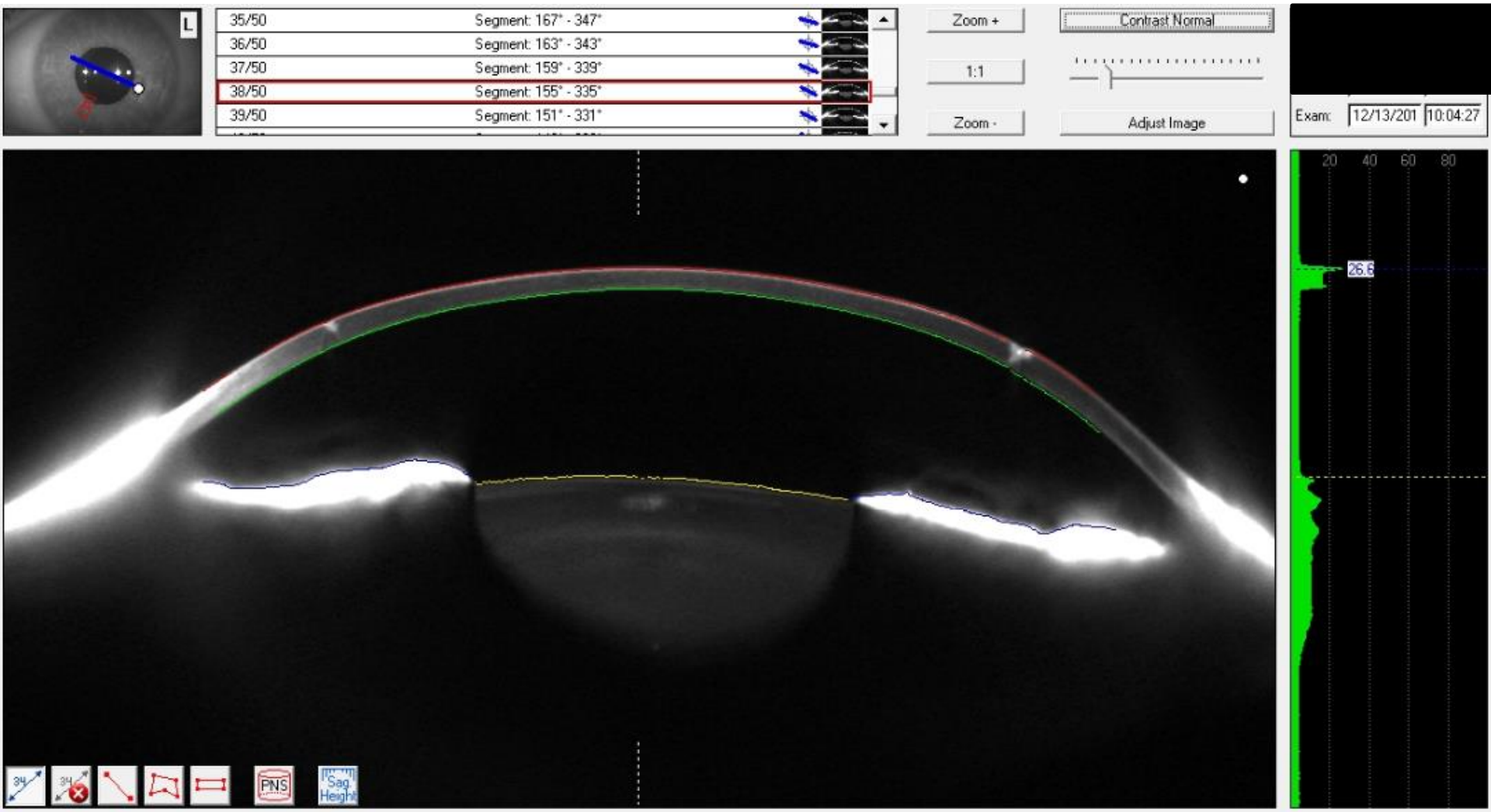

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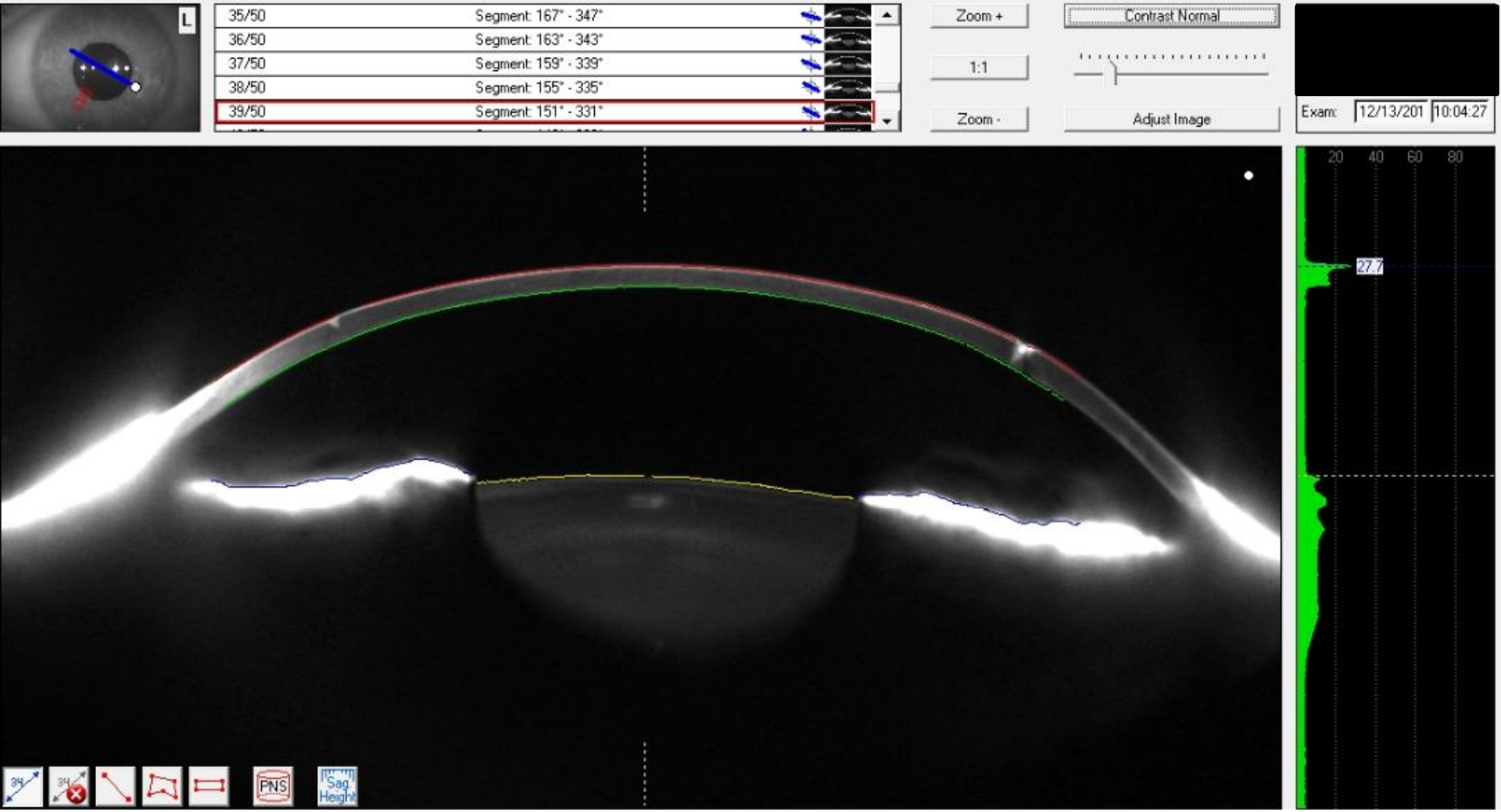

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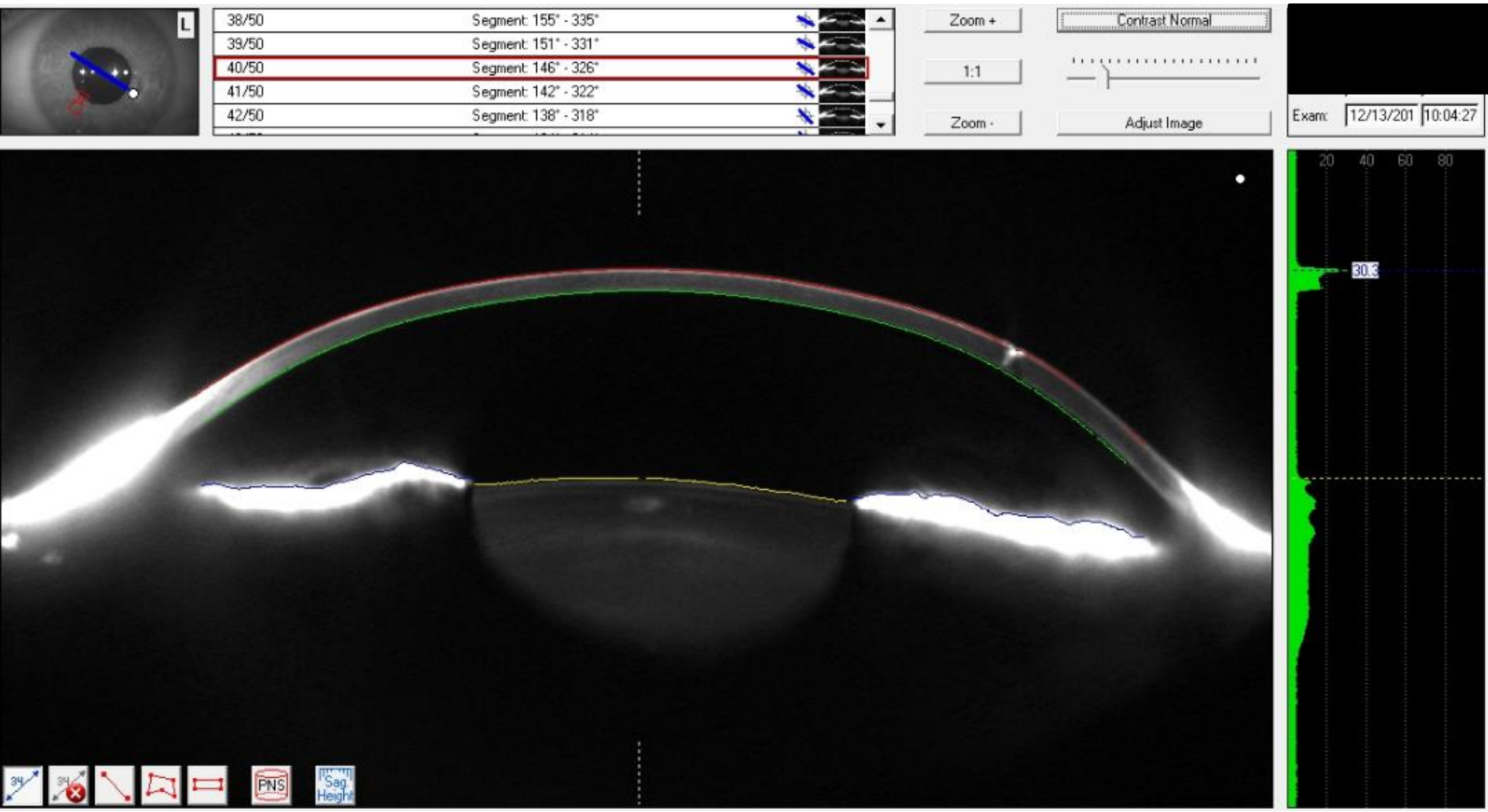

# A New Treatment

- Plan: Corneal suture w/ subsequent CXL
- Procedure:
  - Epi debrided
  - 11-0 suture placed
    - Trace aqueous humor leak noted. Globe stable.
  - CXL w/ Riboflavin and UV light for 30 mins
    - Trace fluid noted
    - Suture removed
    - ReSure and BCL

# POD#0: 13 Dec 2018 s/p CXL

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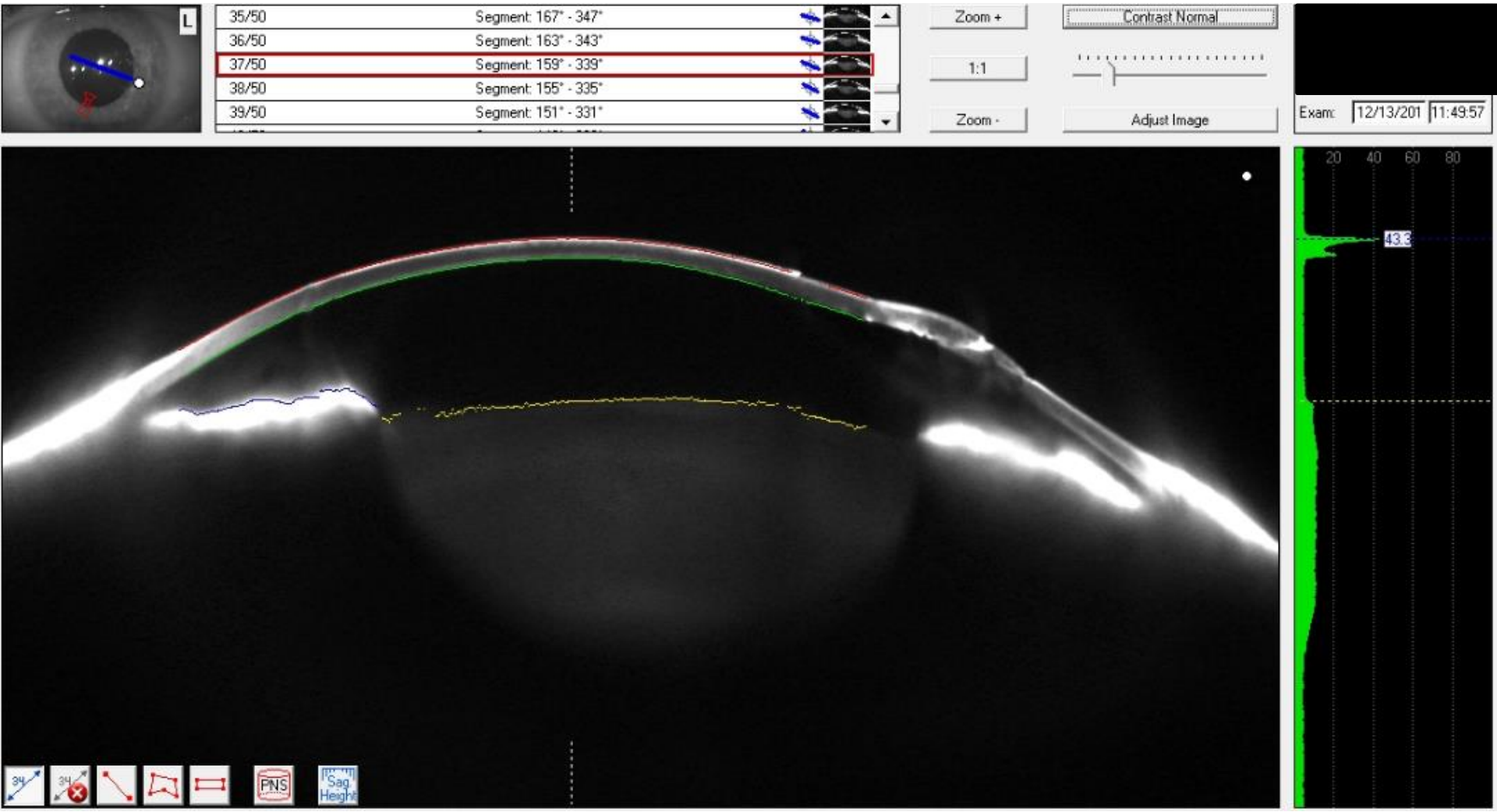

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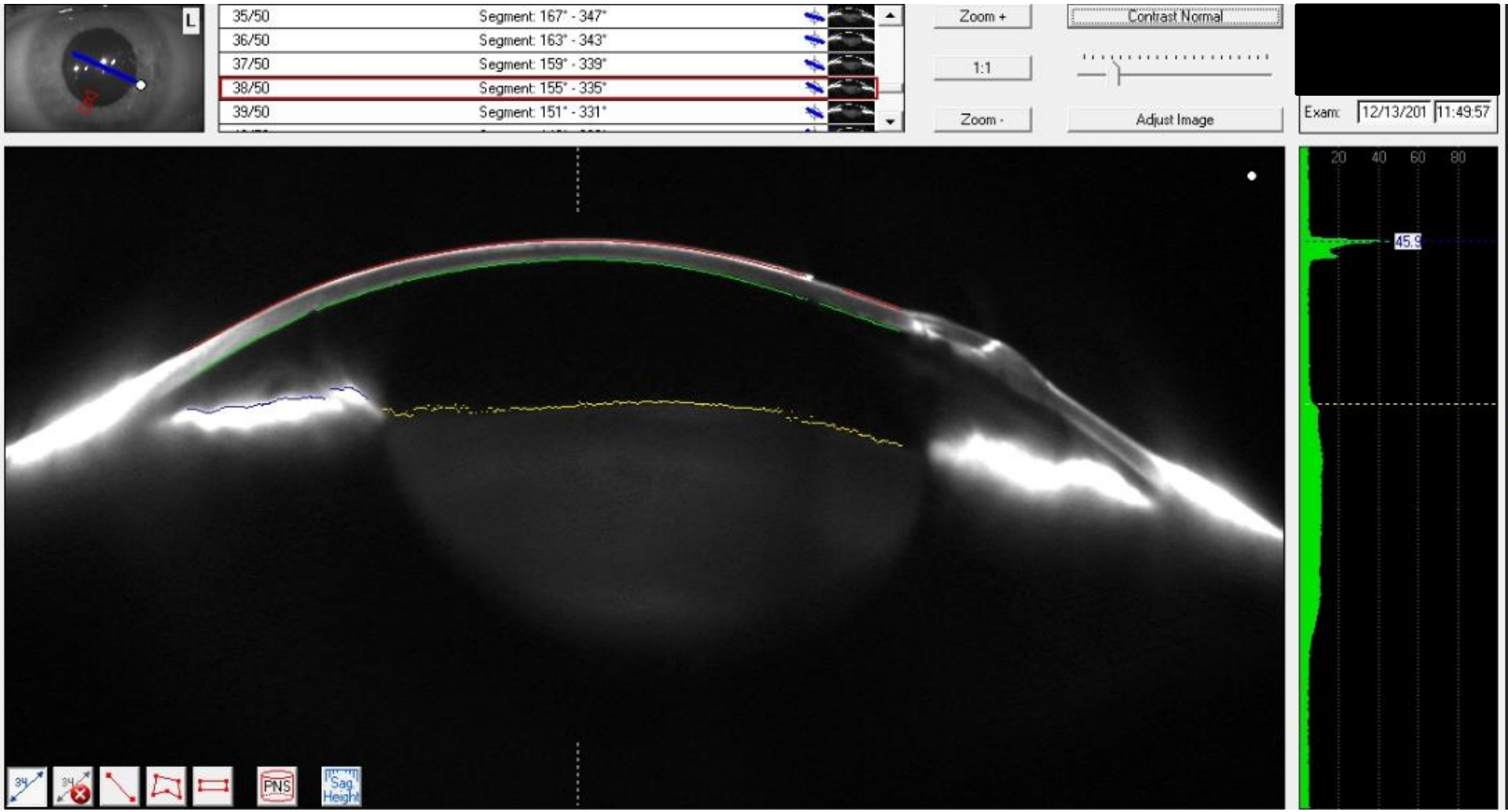

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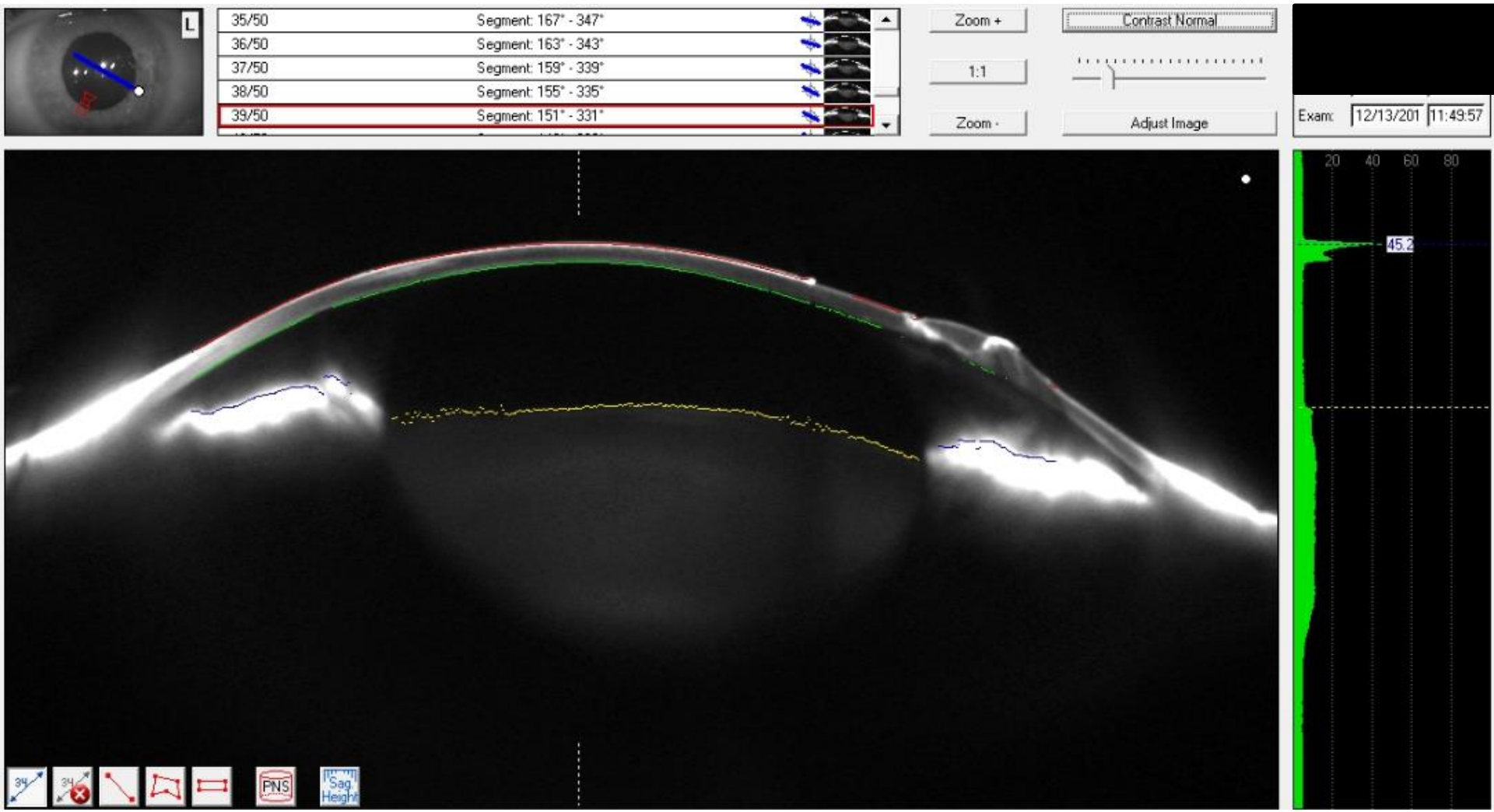

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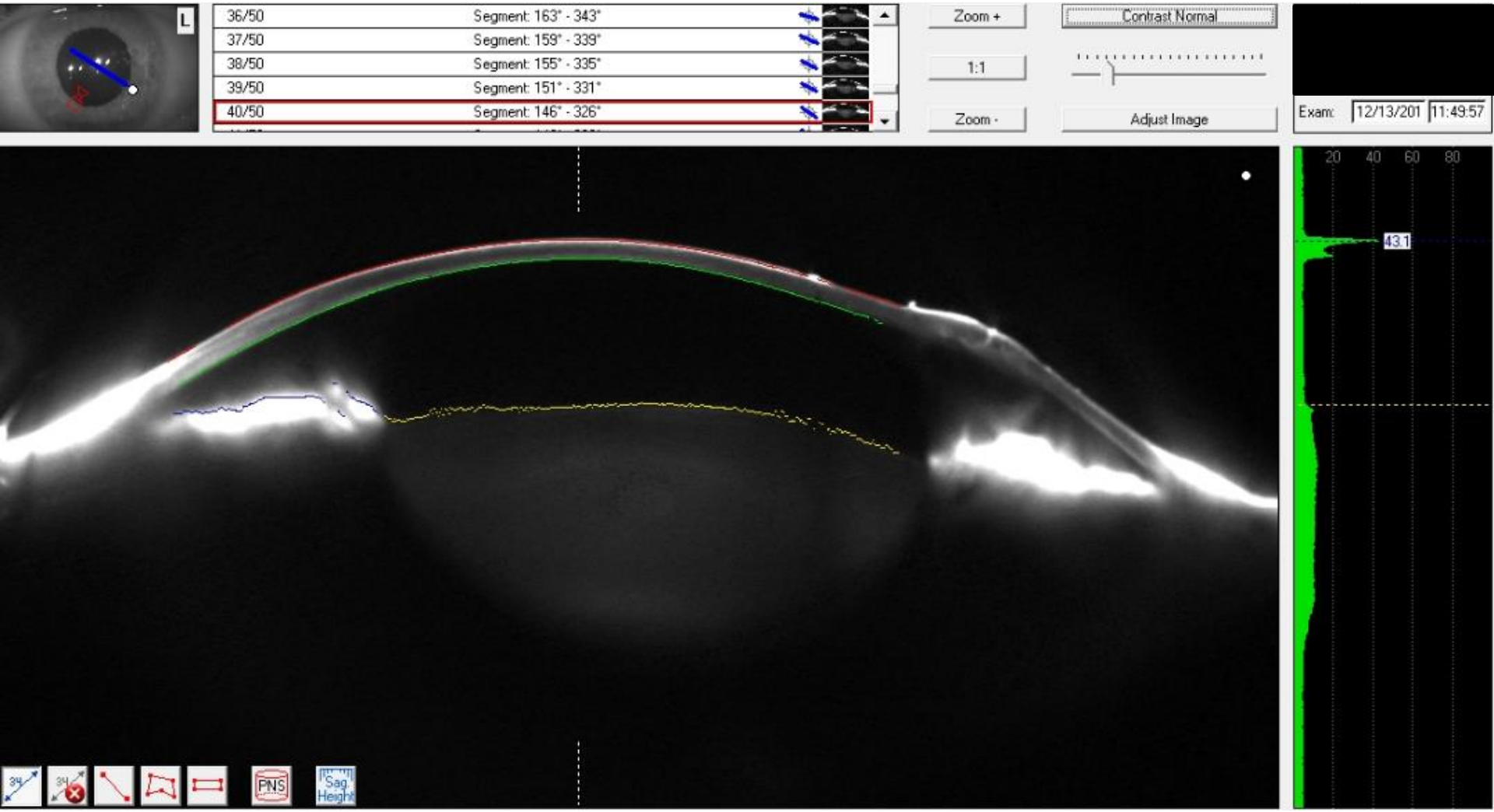

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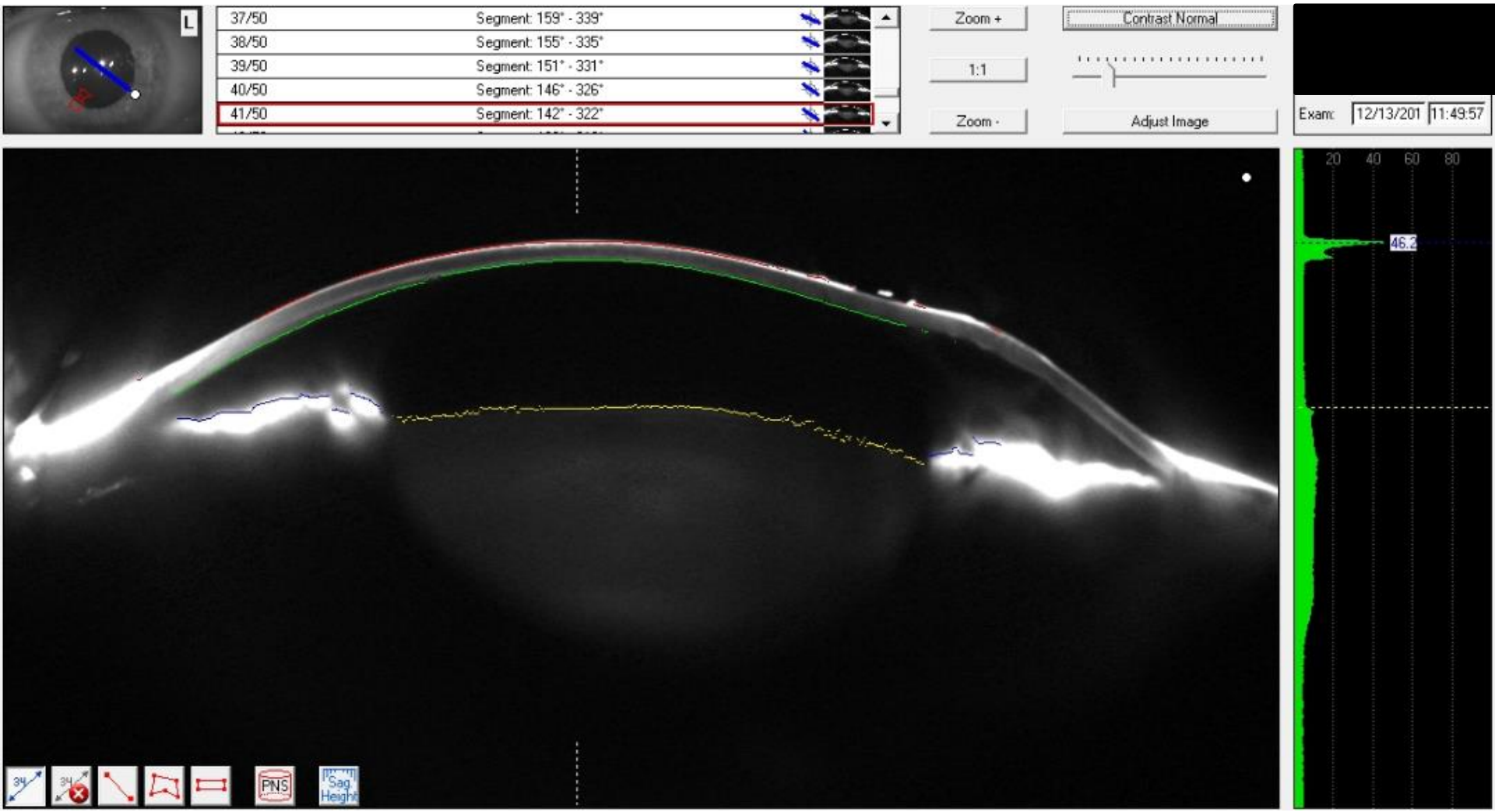

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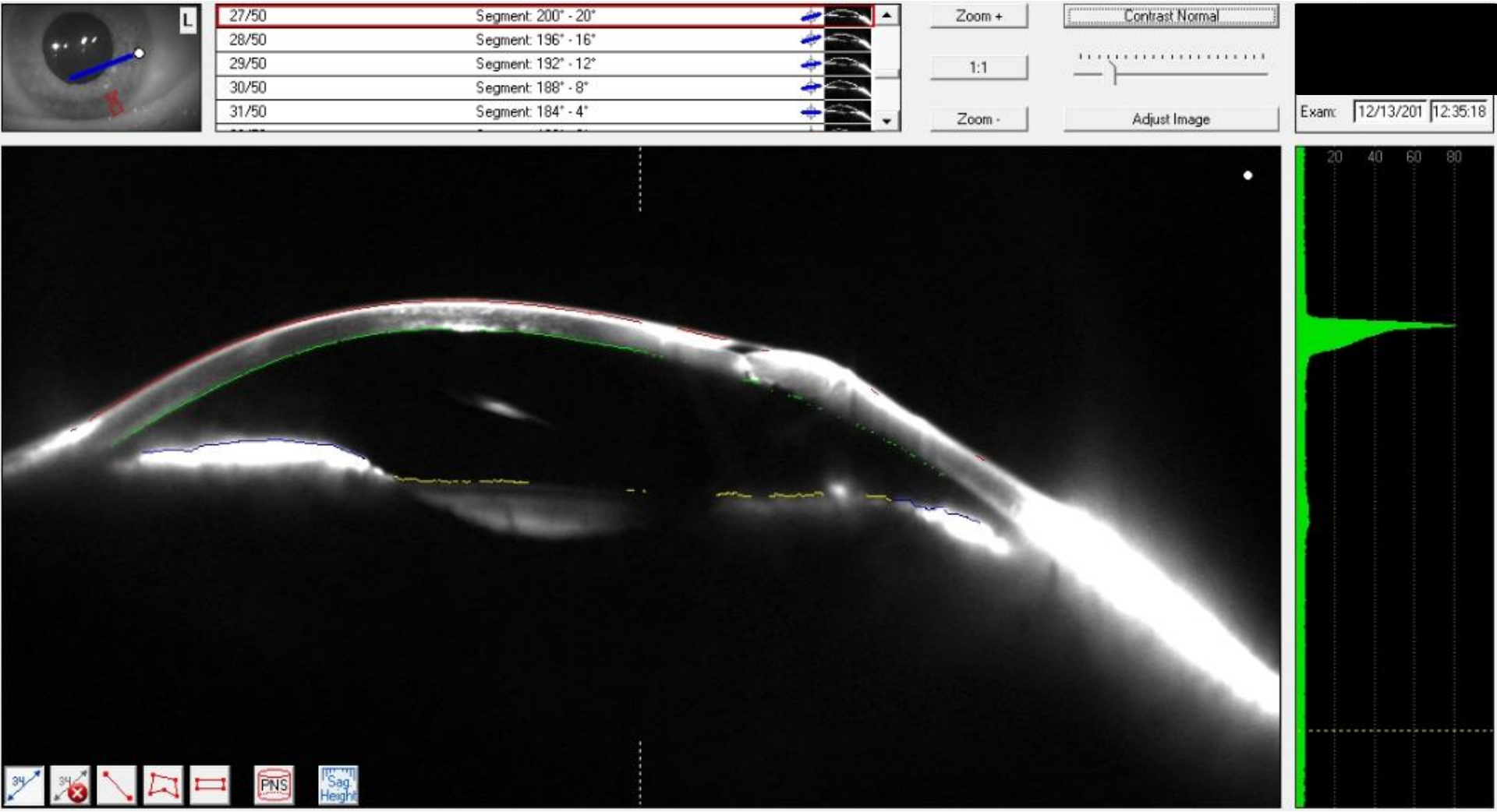

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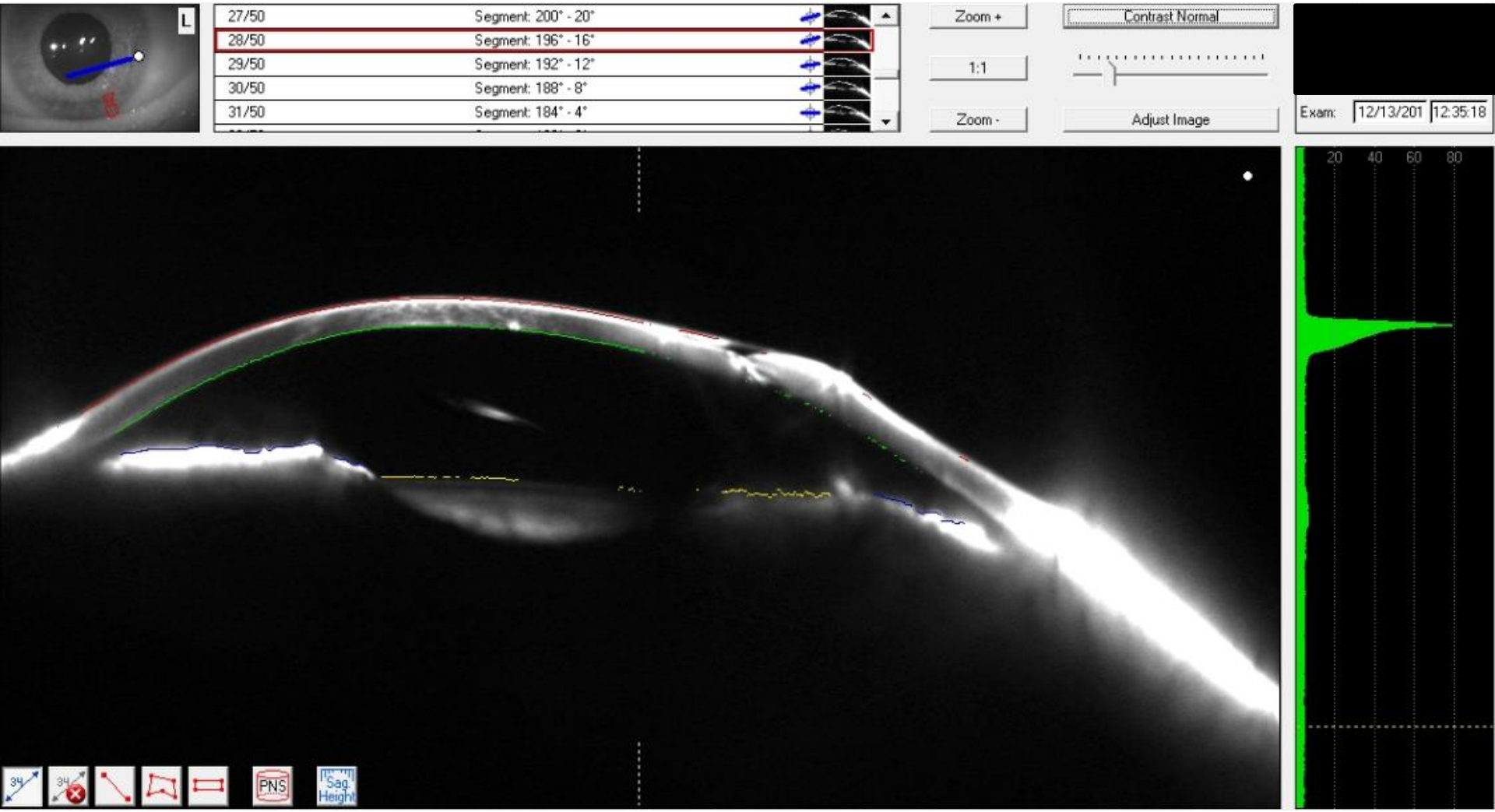

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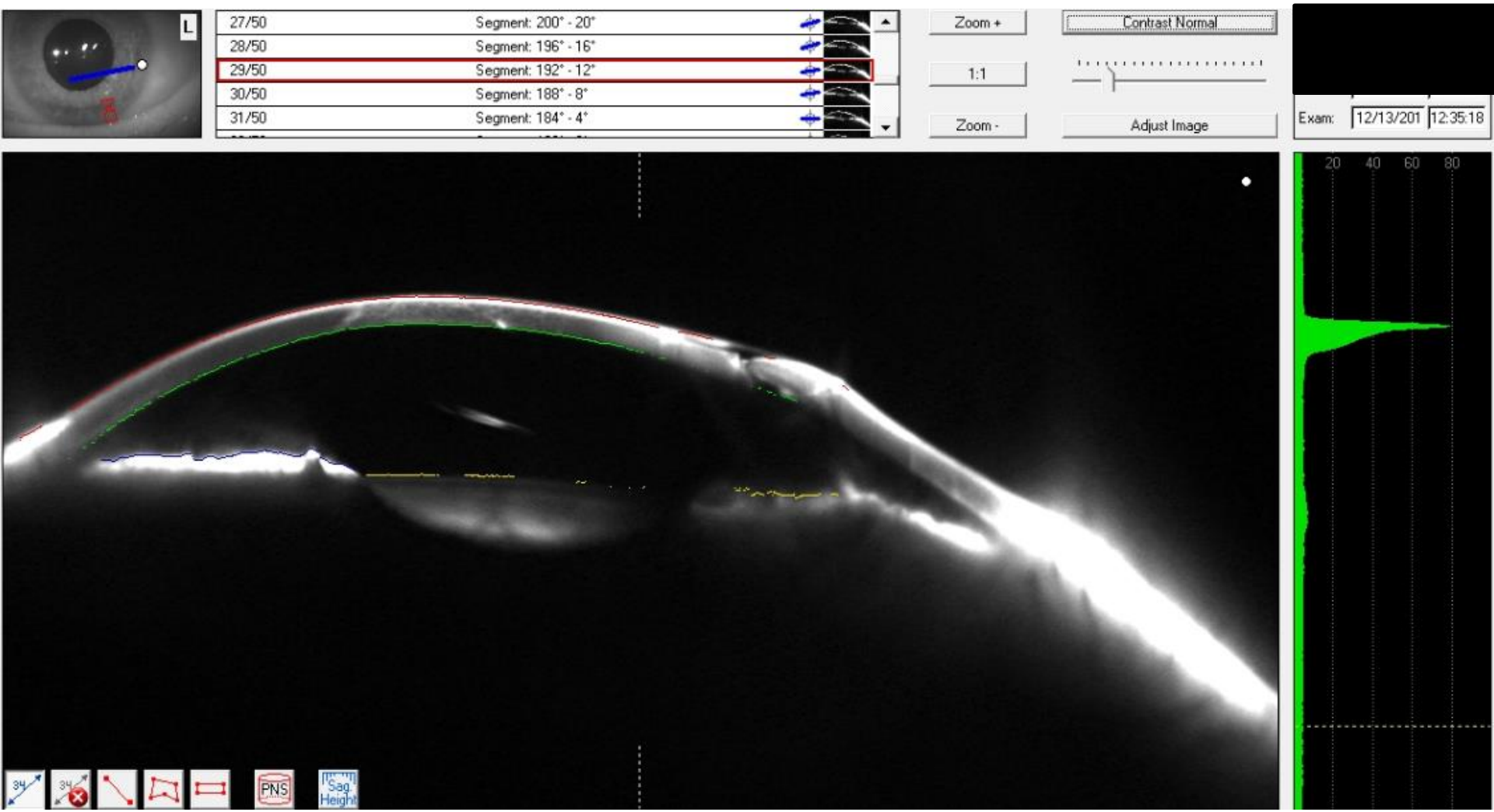

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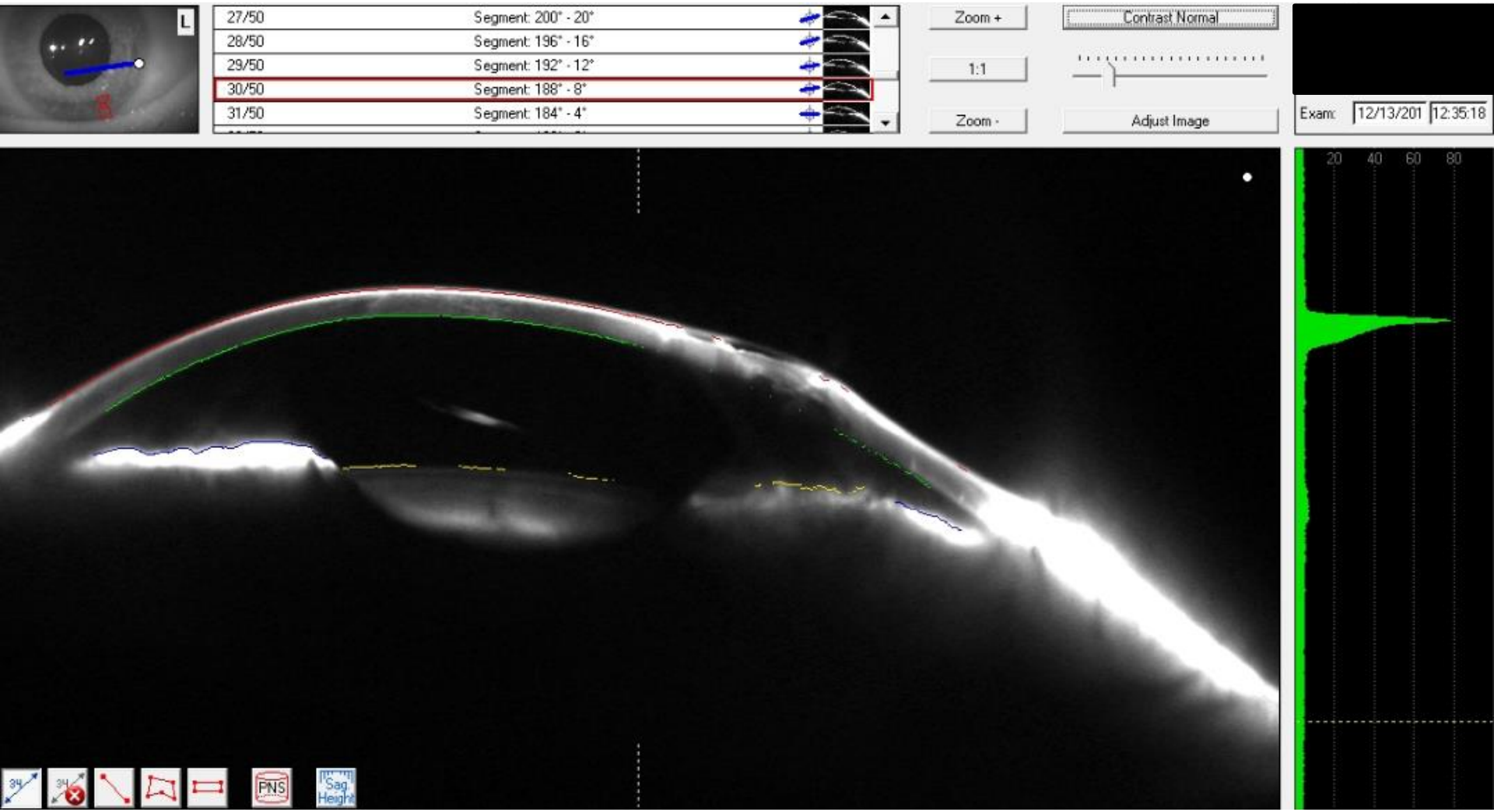

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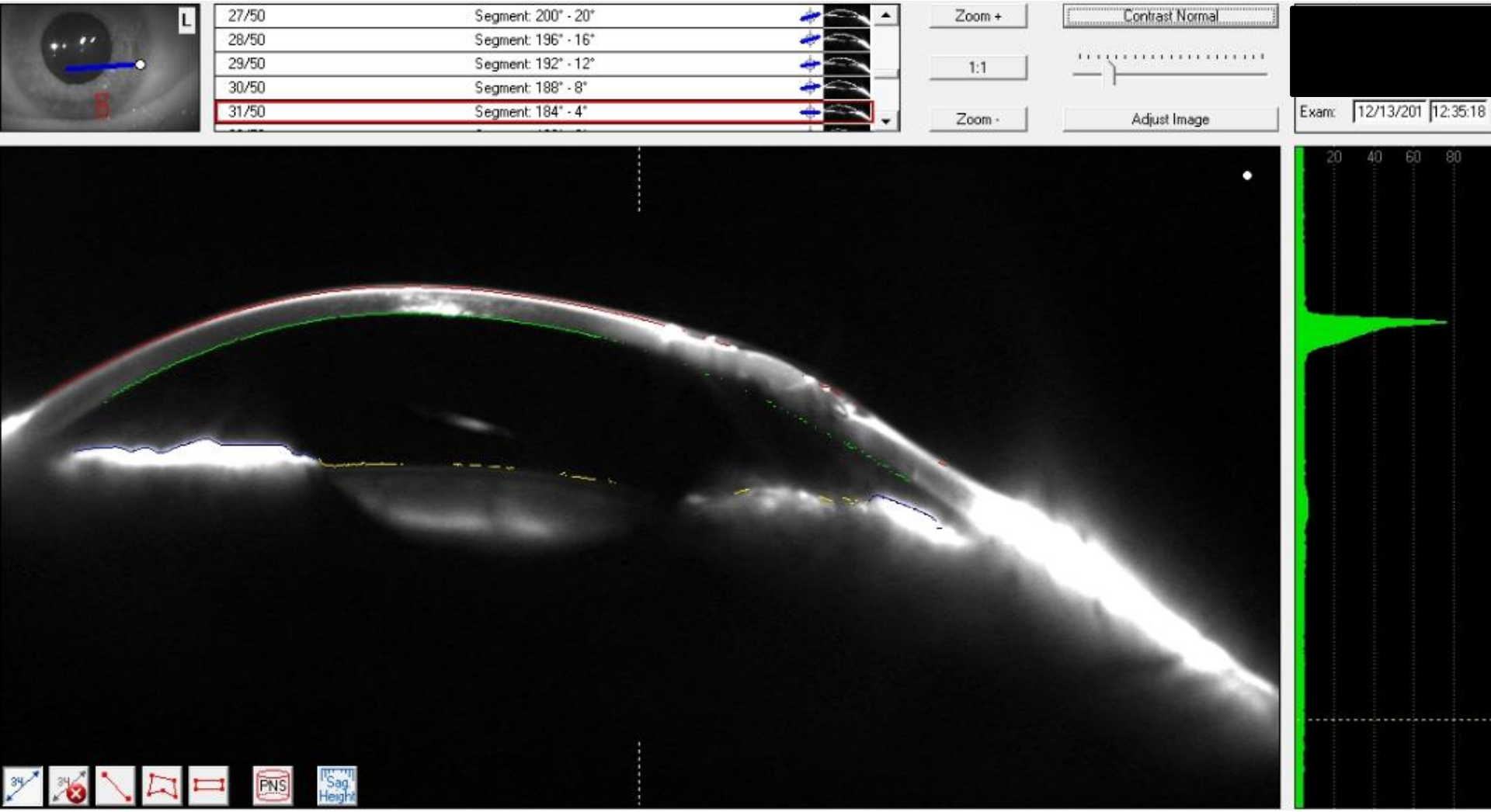


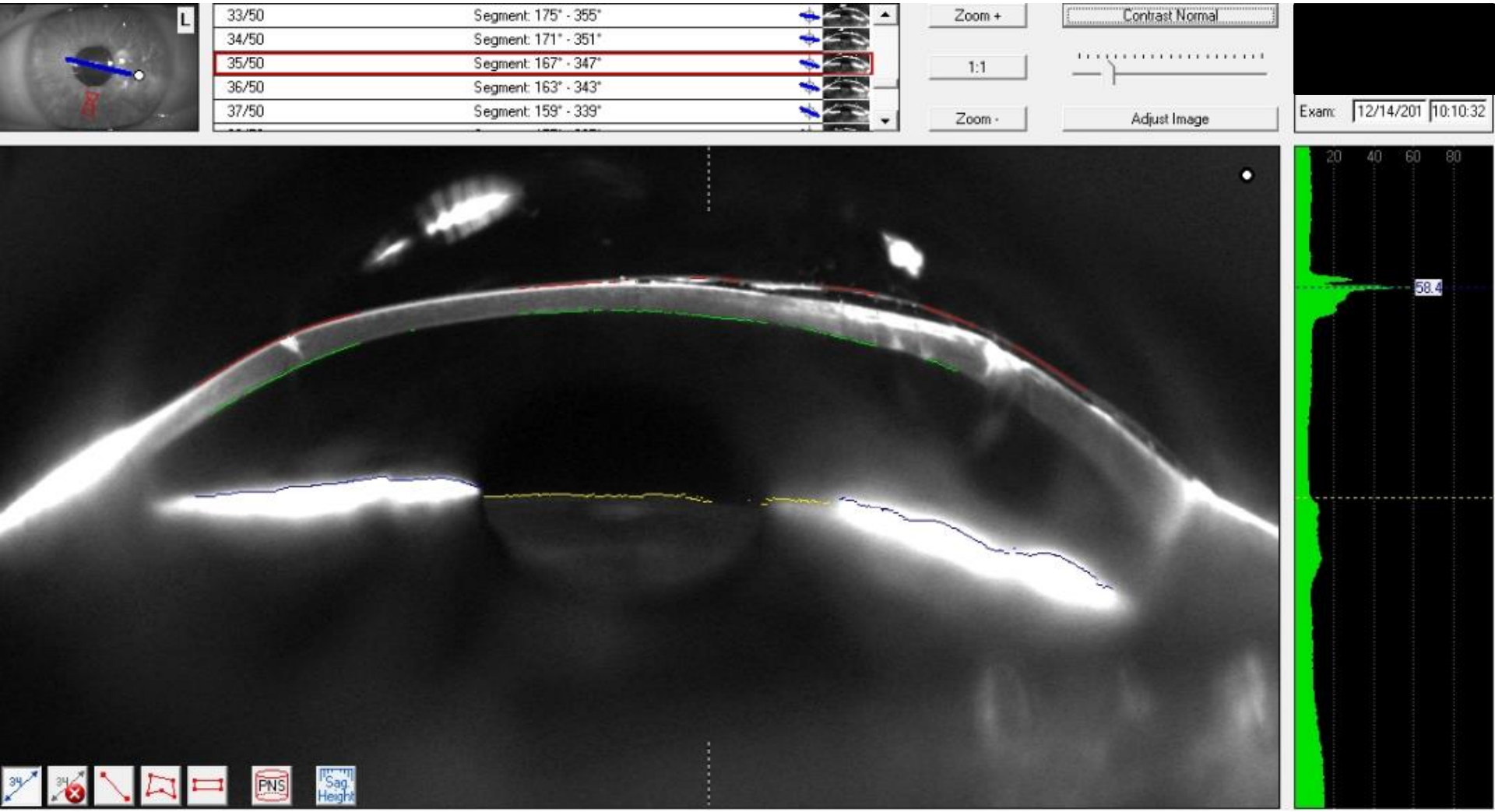
# Post-op regimen

- Vigamox
- Refresh
- Pred Forte
- Oral Vitamin C 500mg BID

# POD#1

- Va OS: 20/400 -> PH 20/60-2
- Seidel (-)
- Trace K edema and AC rxn

# POD#1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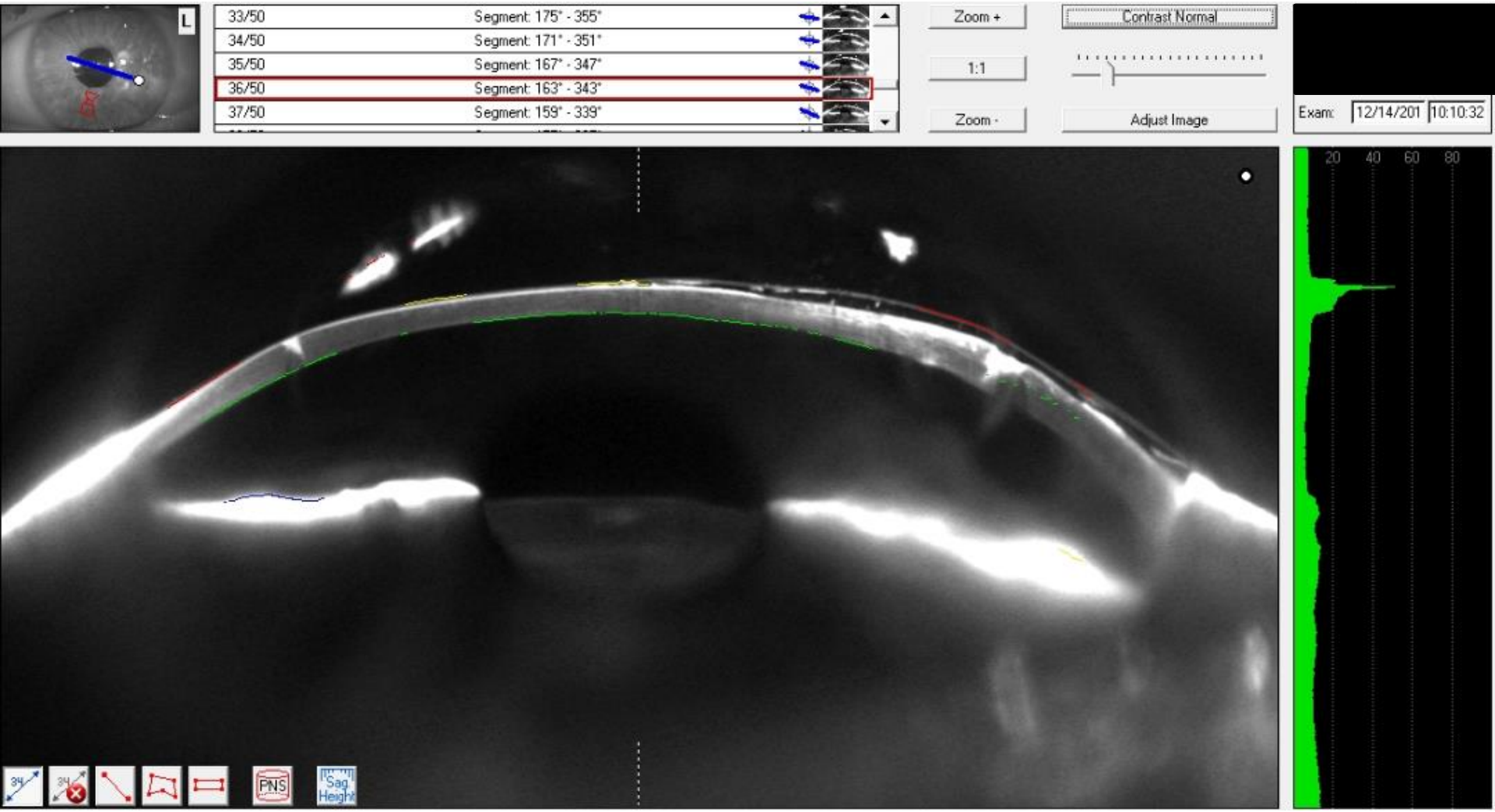
# POD#1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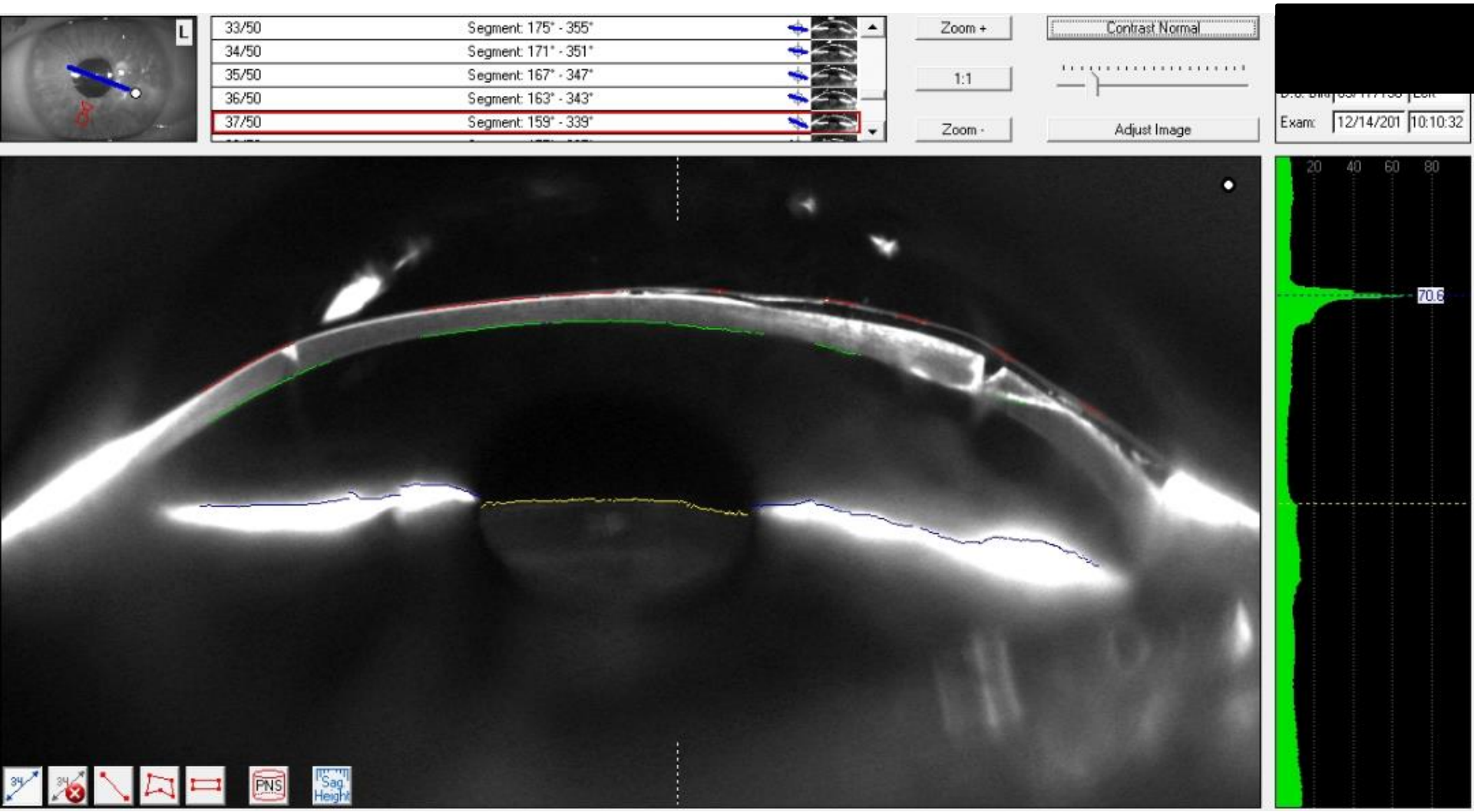
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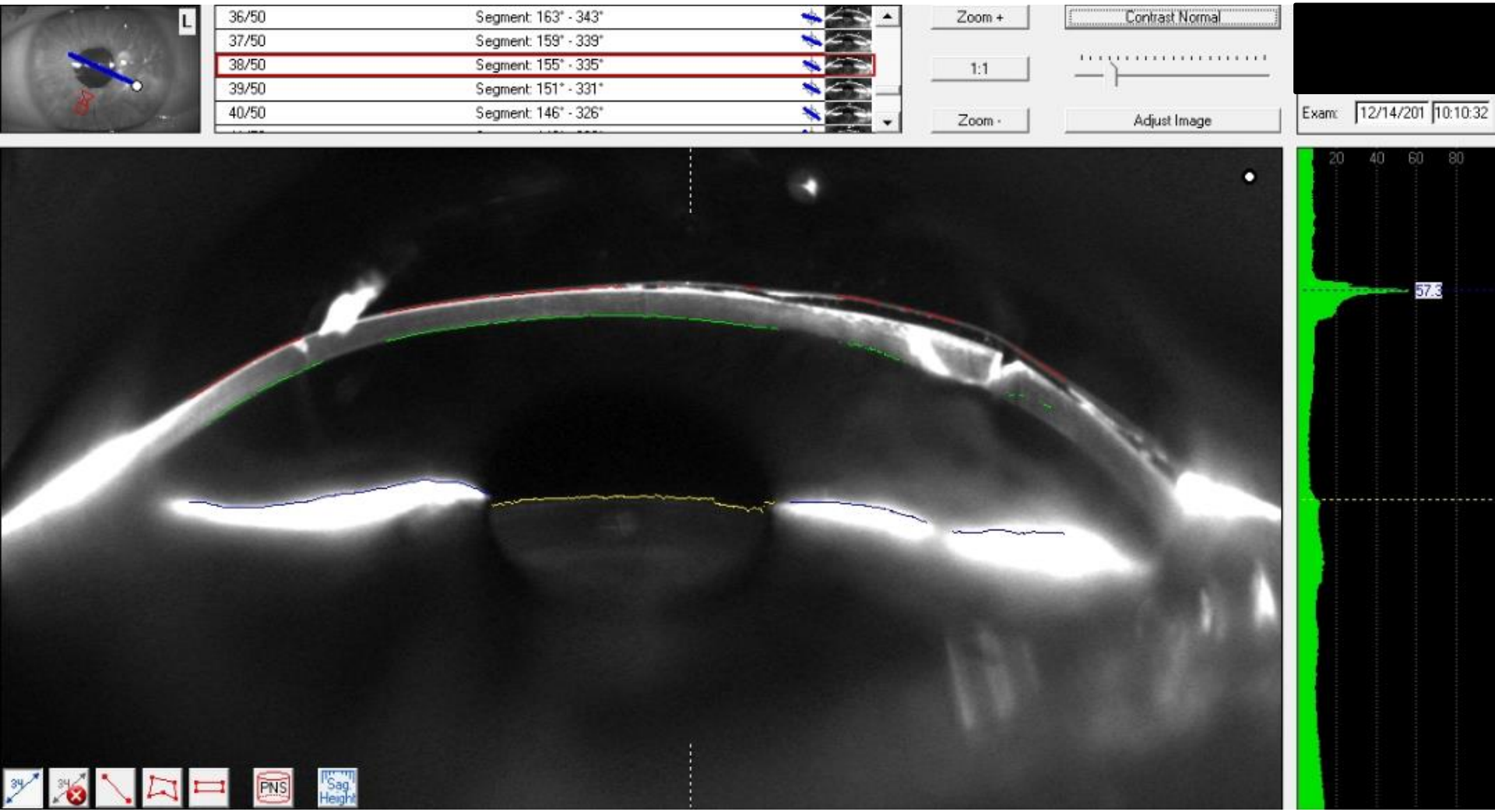
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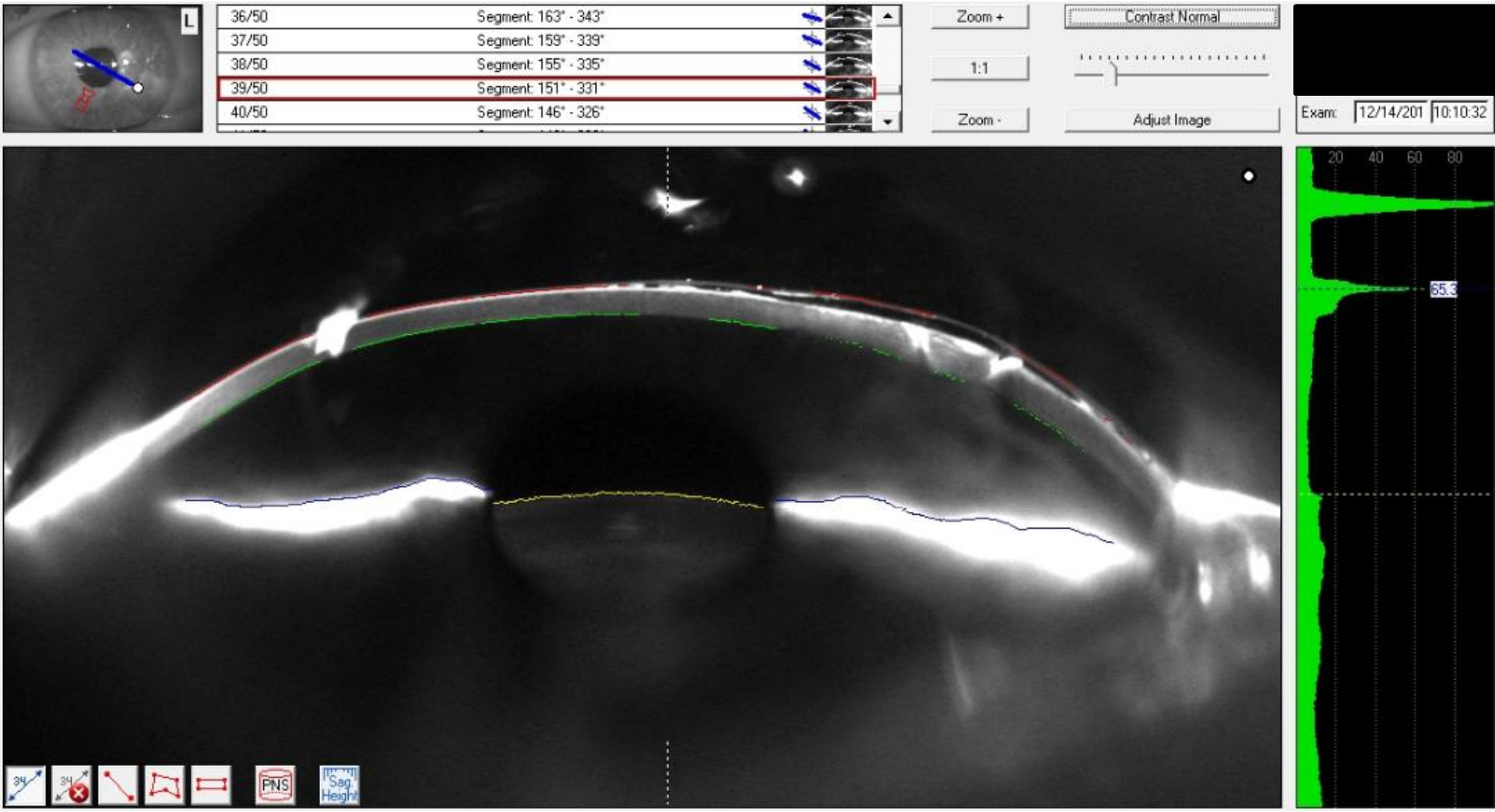
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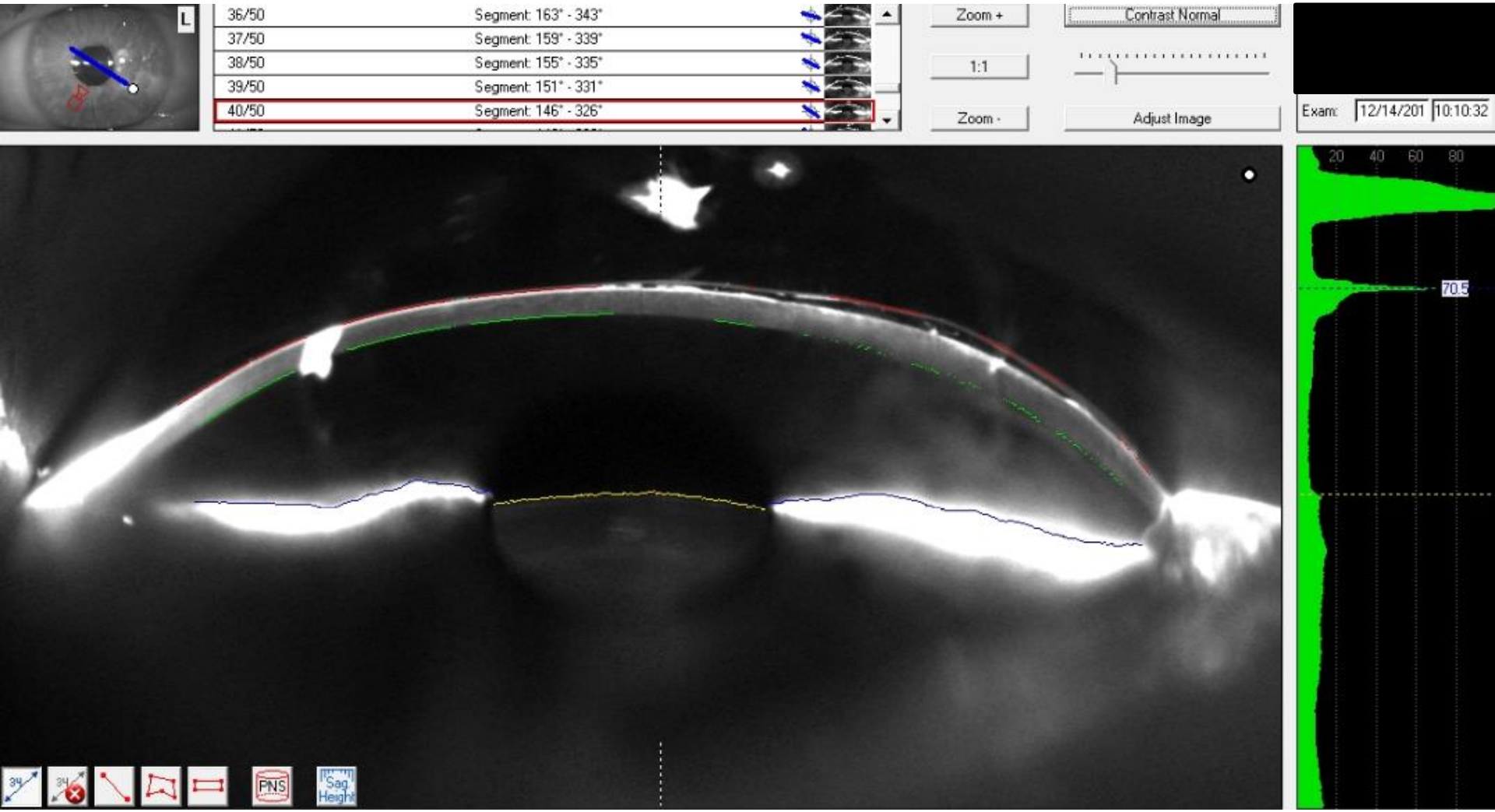
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# POW#1: 19 Dec 2018

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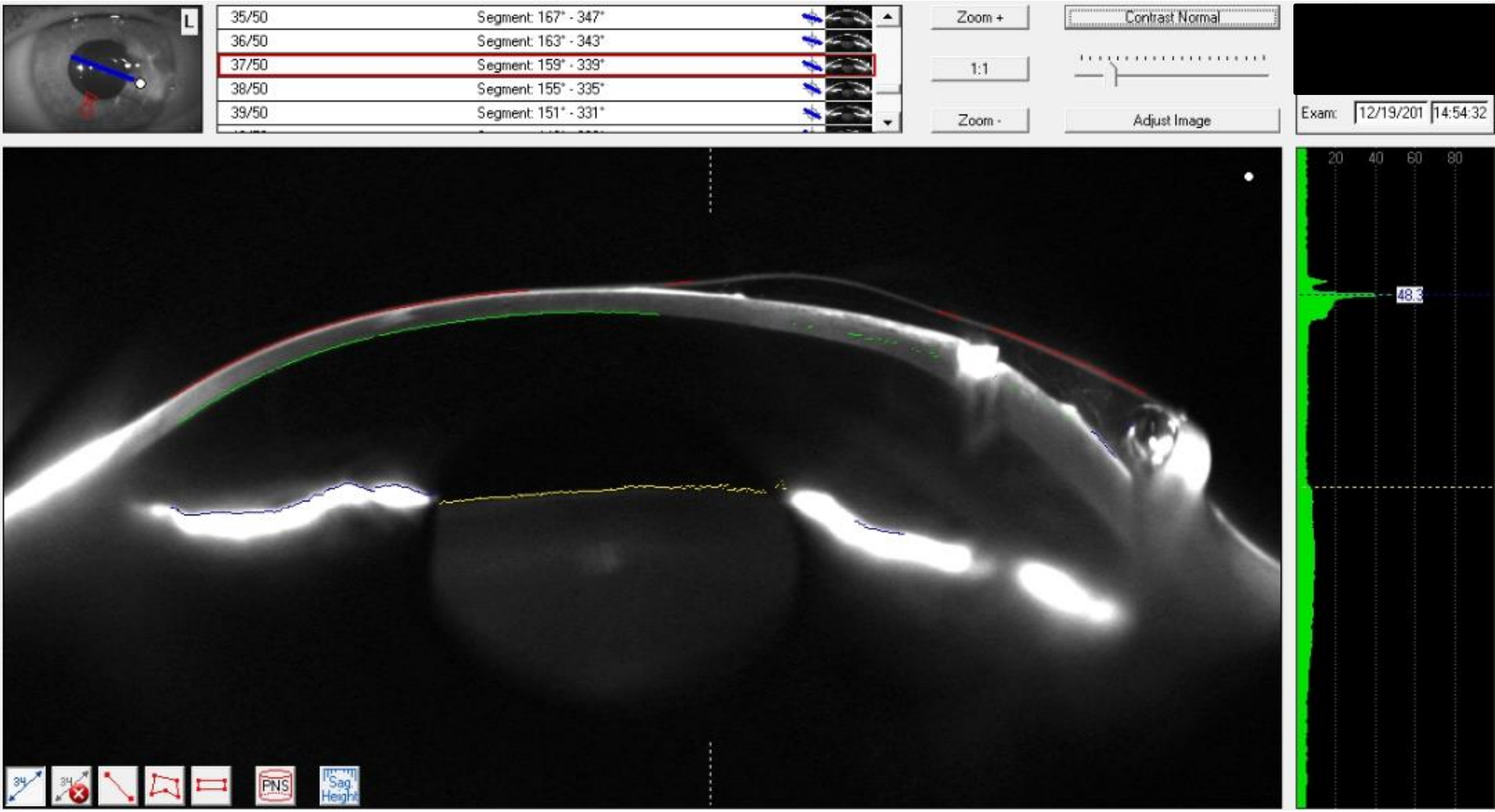

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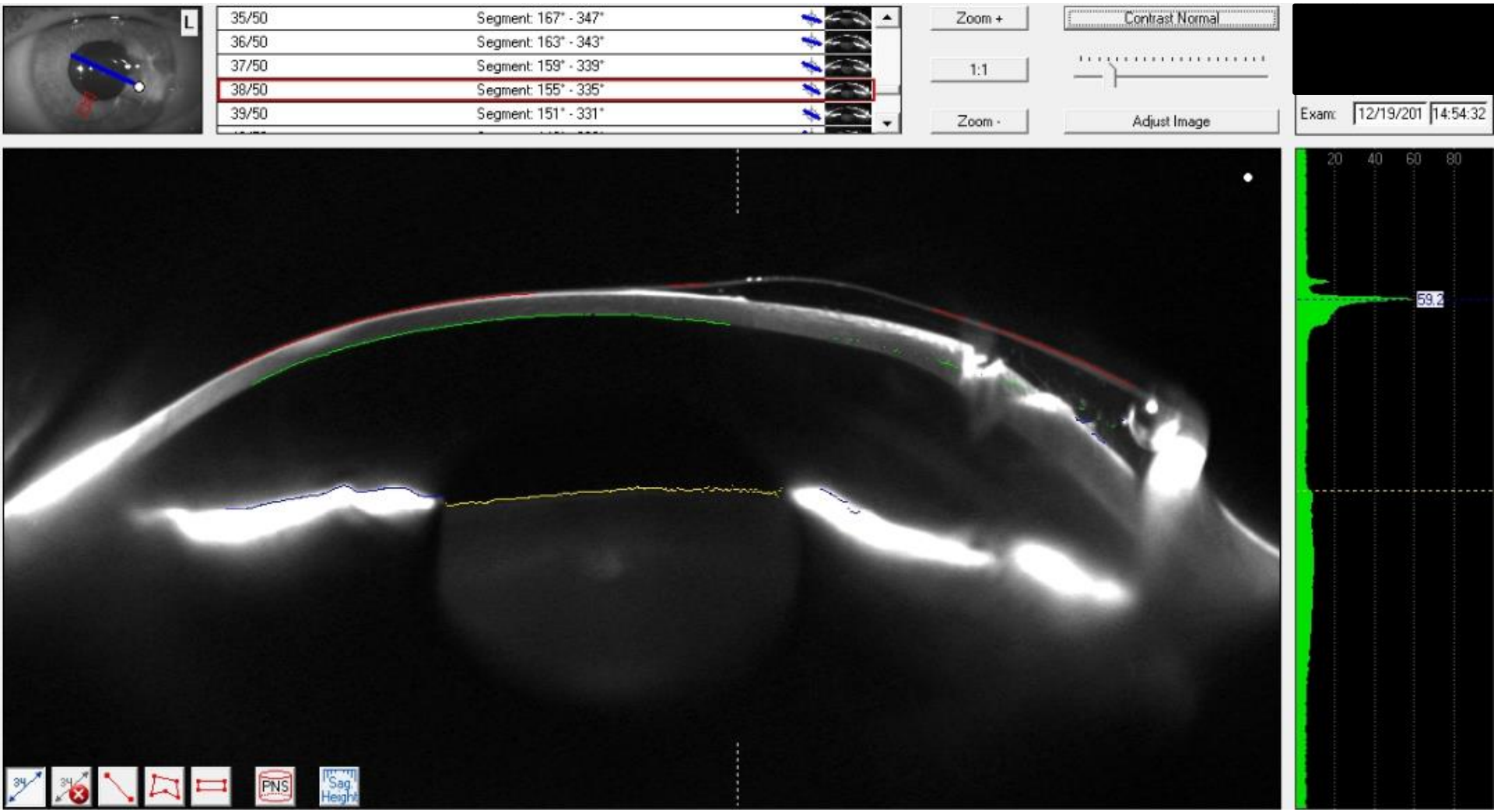

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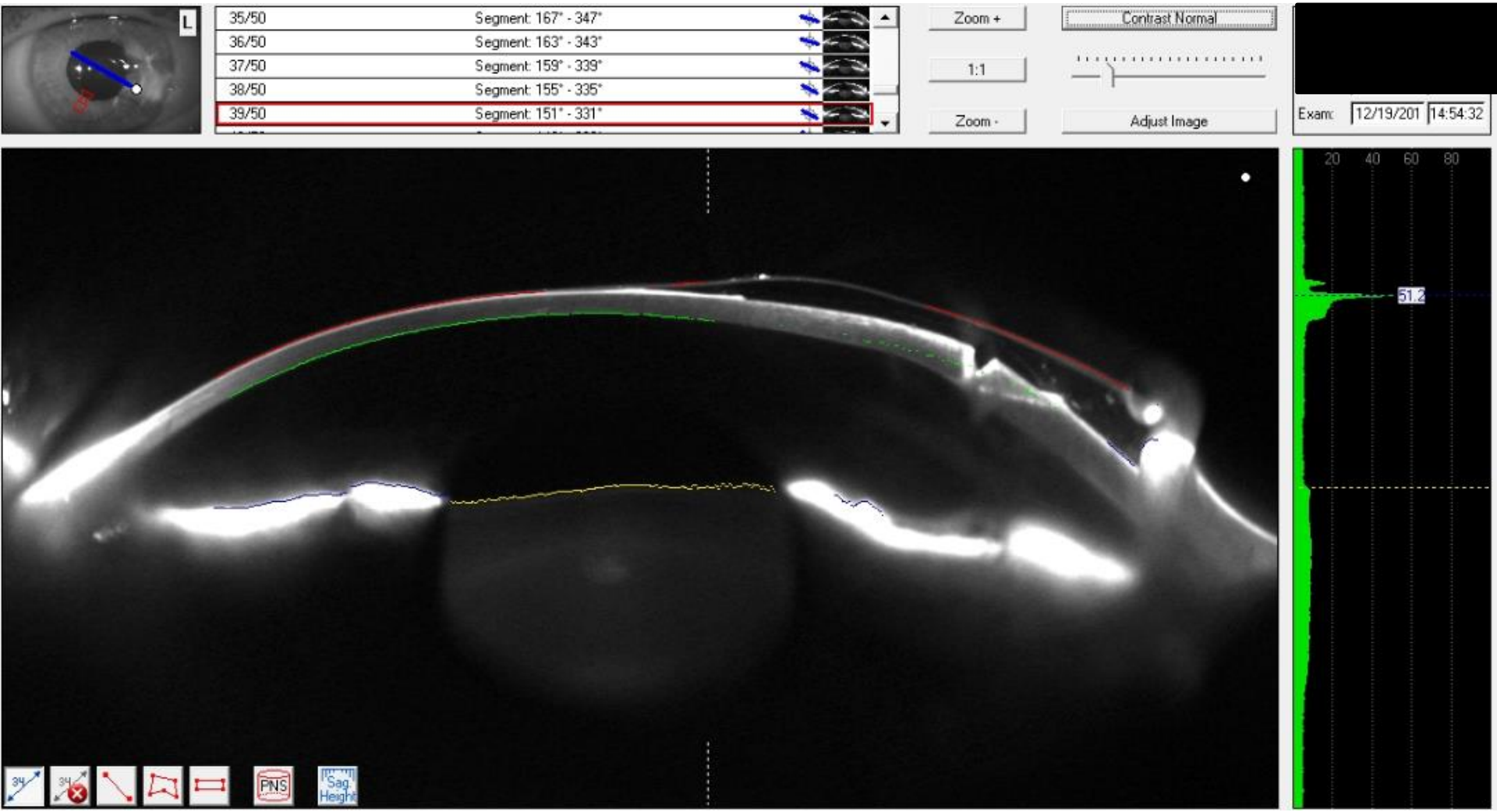

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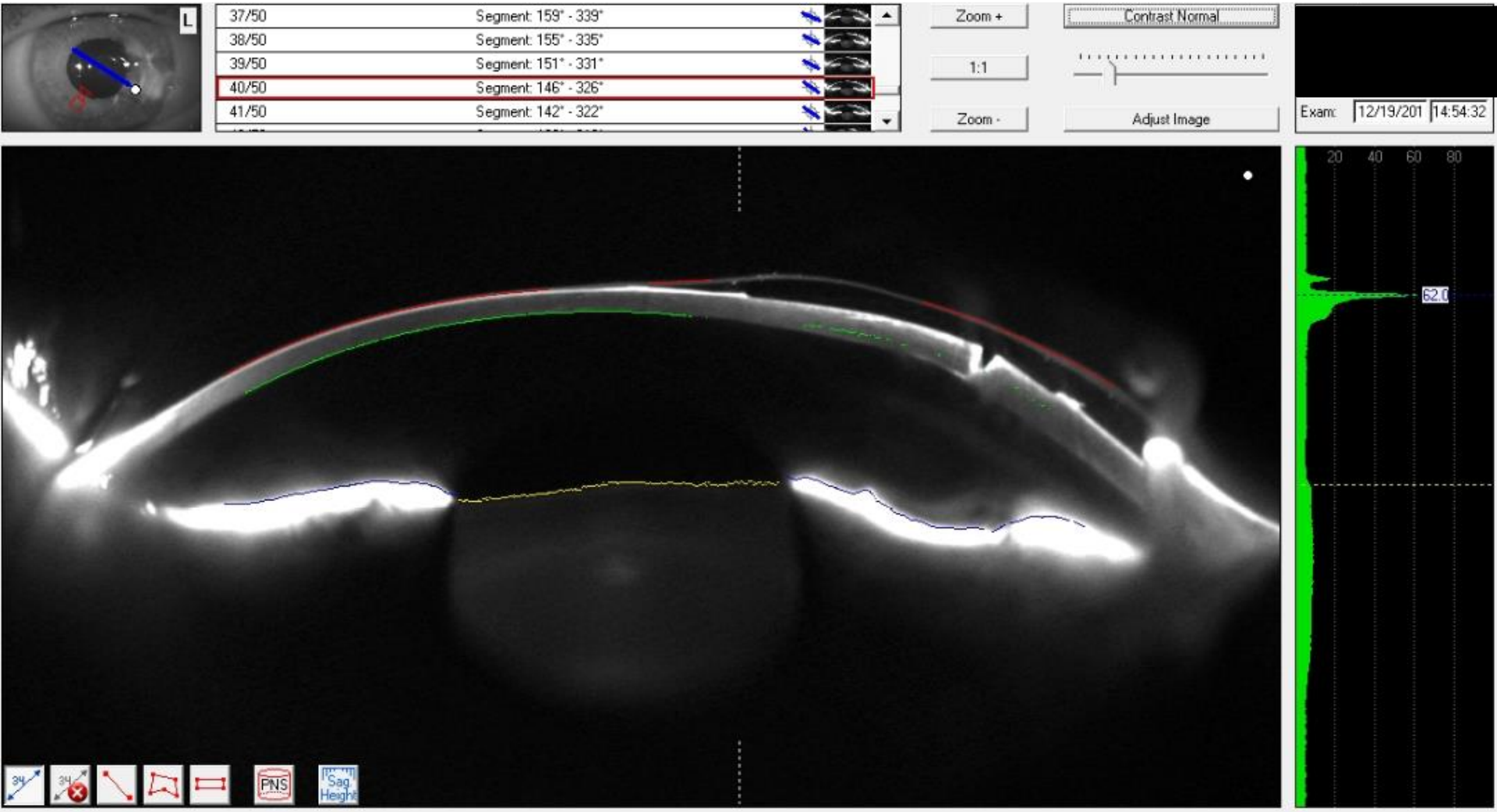

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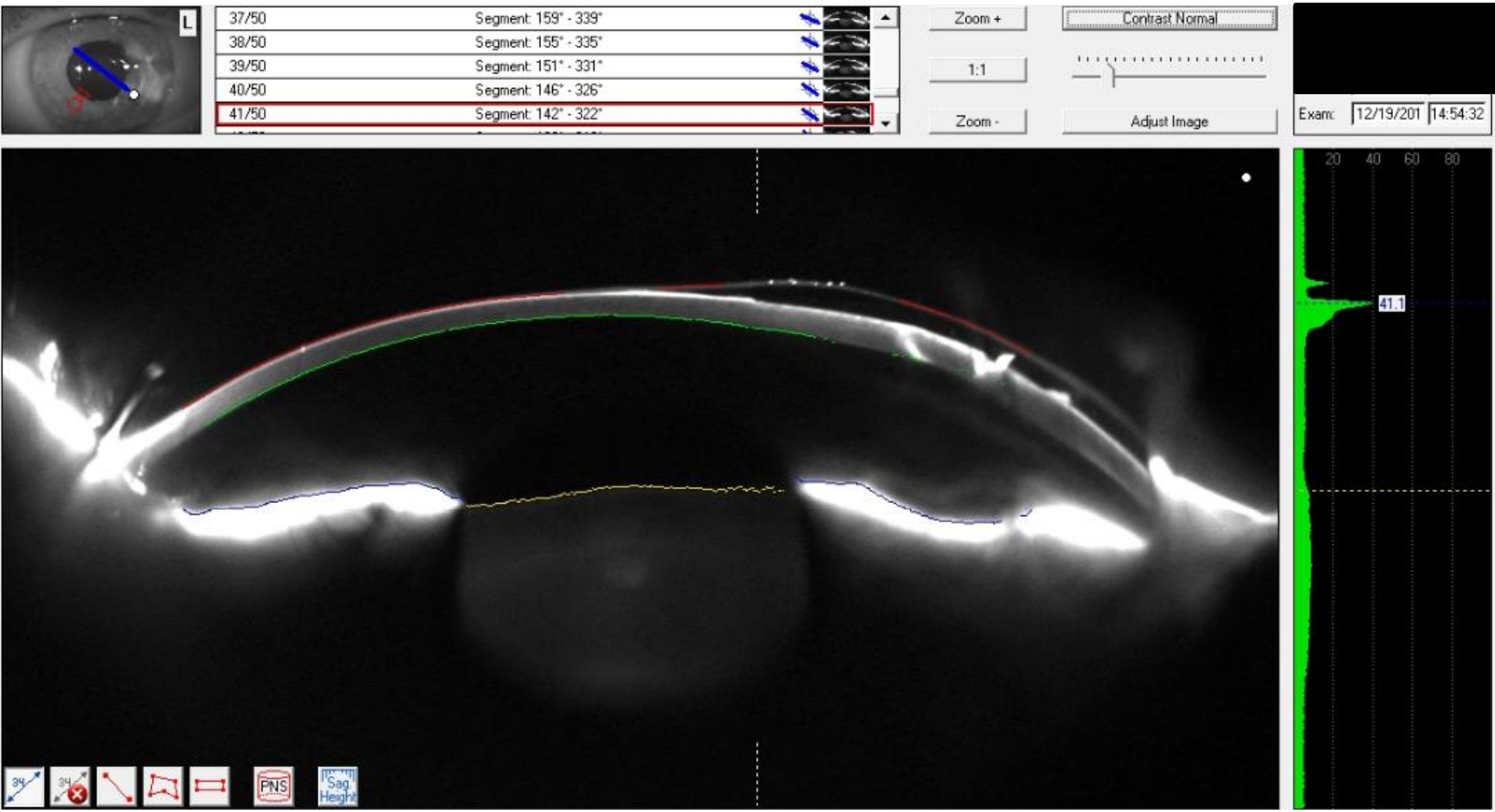

# POW#2: 27 Dec 2018

- Complete epithelium closure

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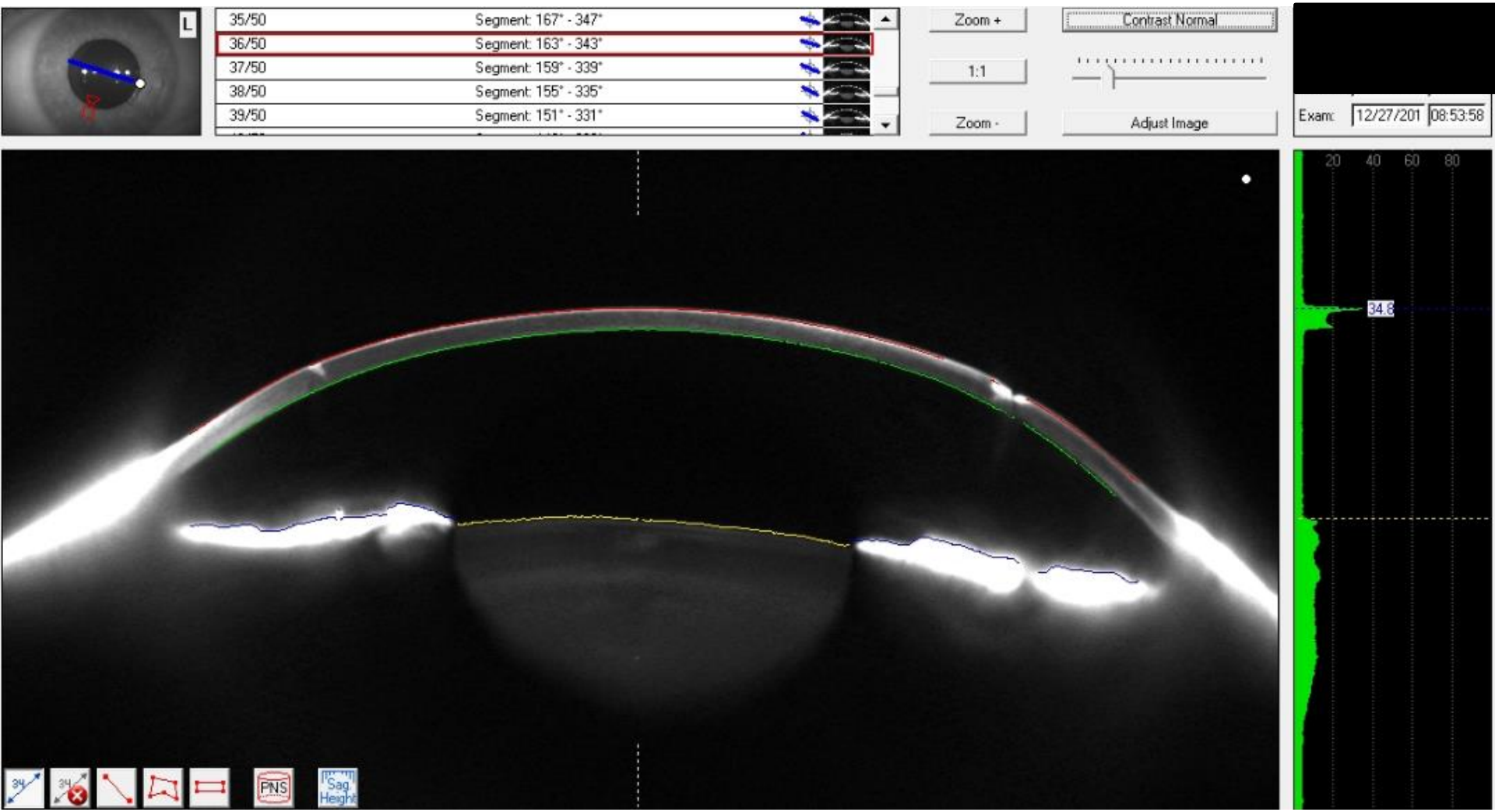

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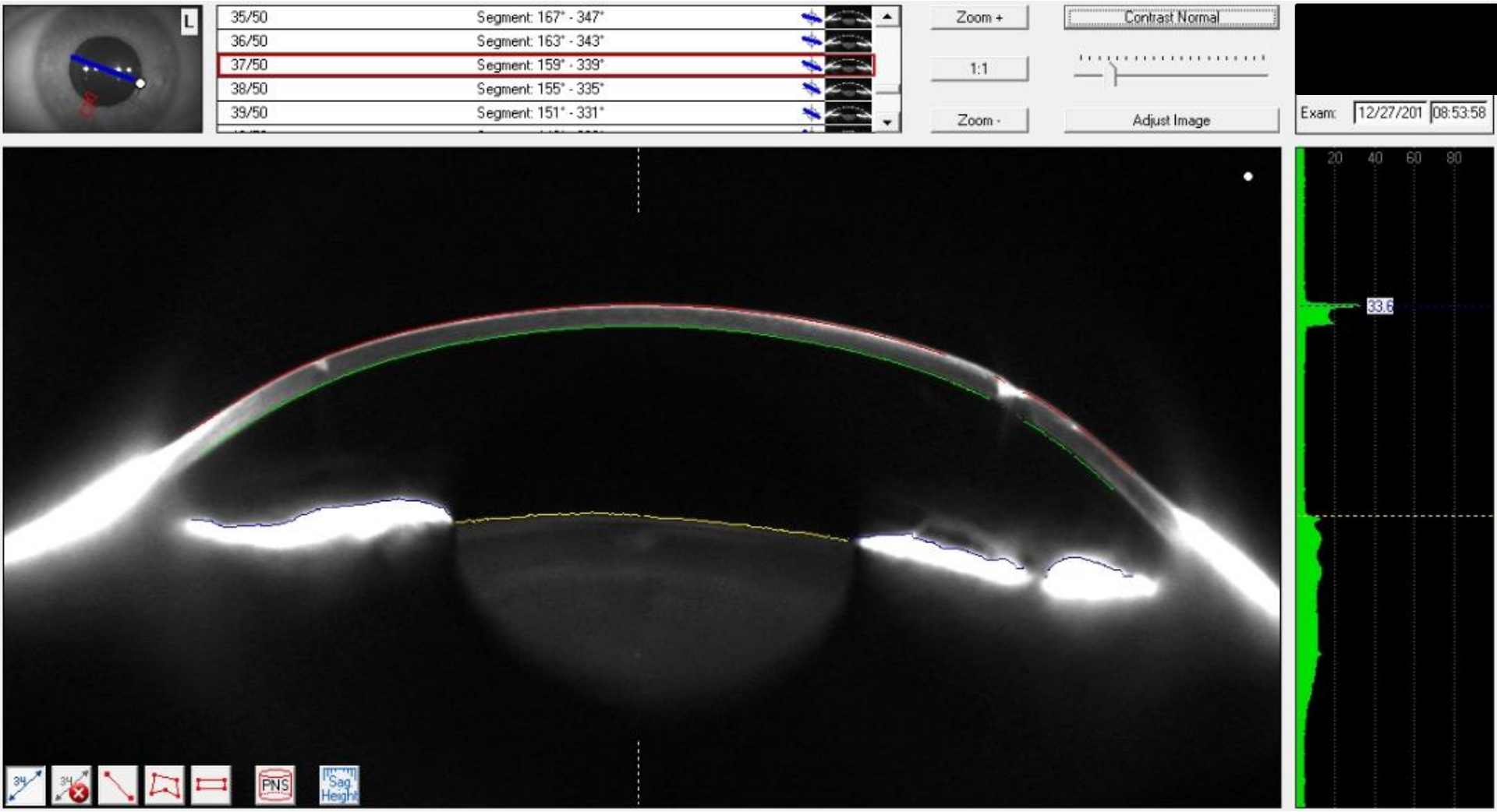

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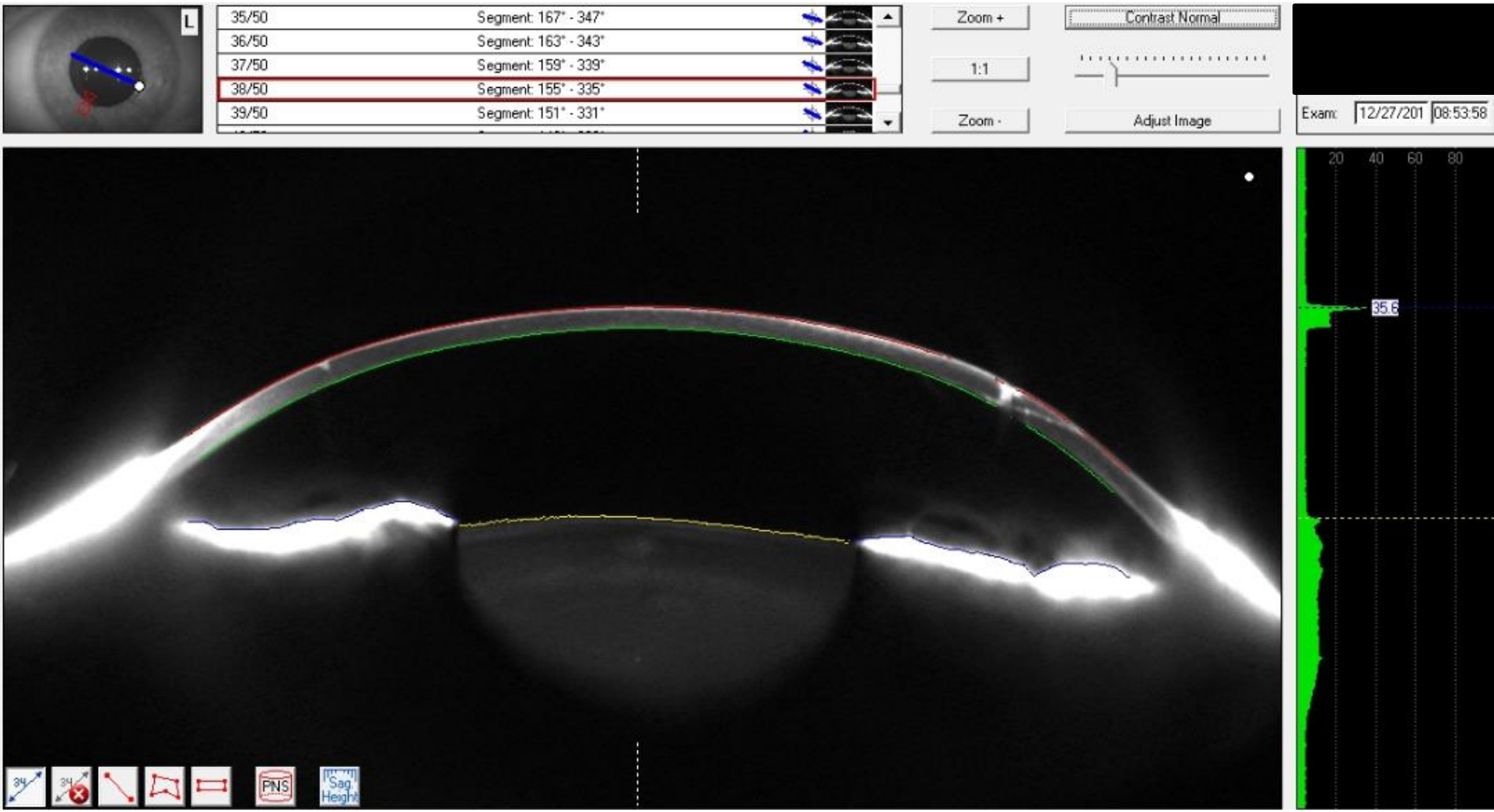

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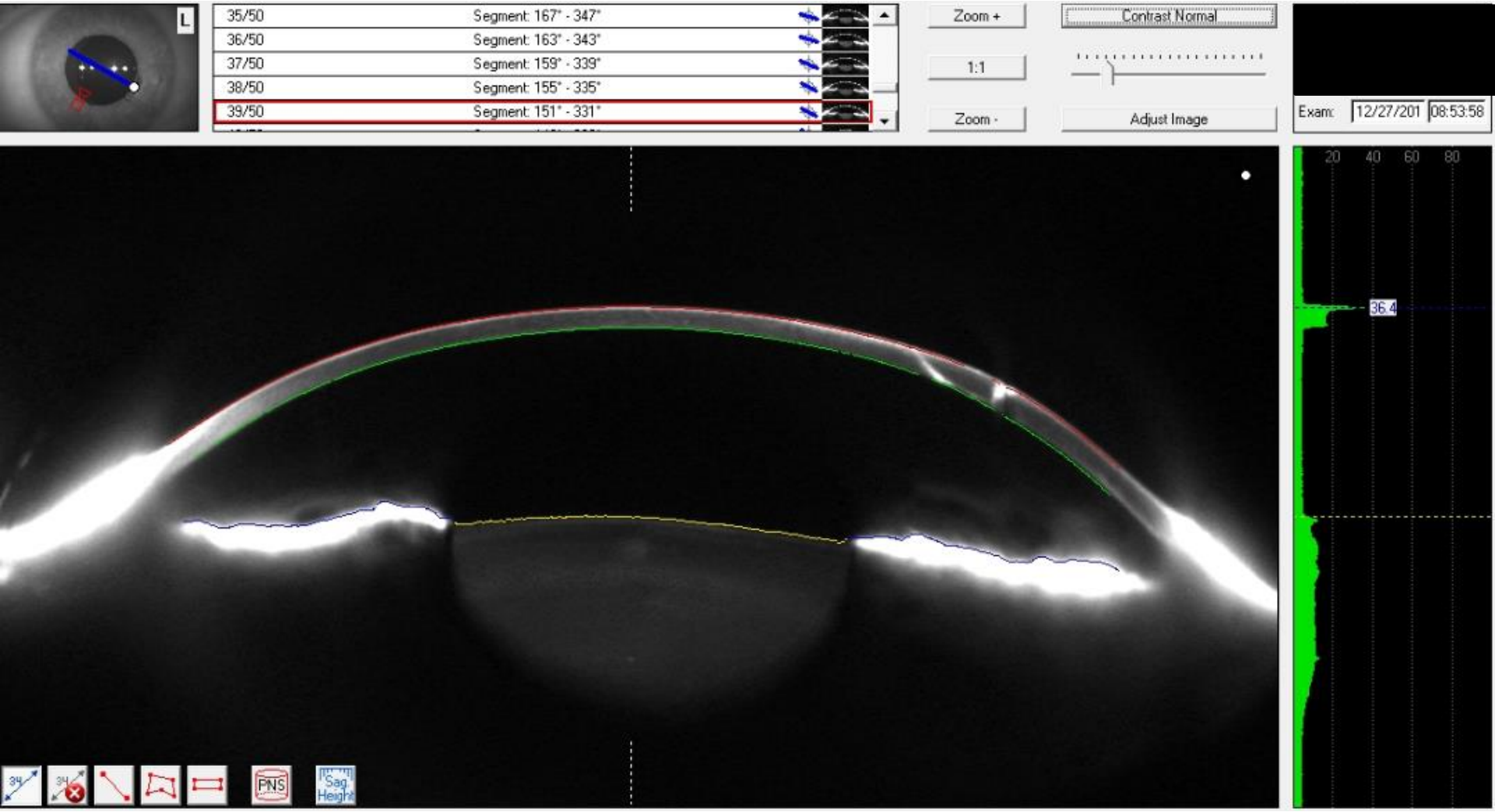

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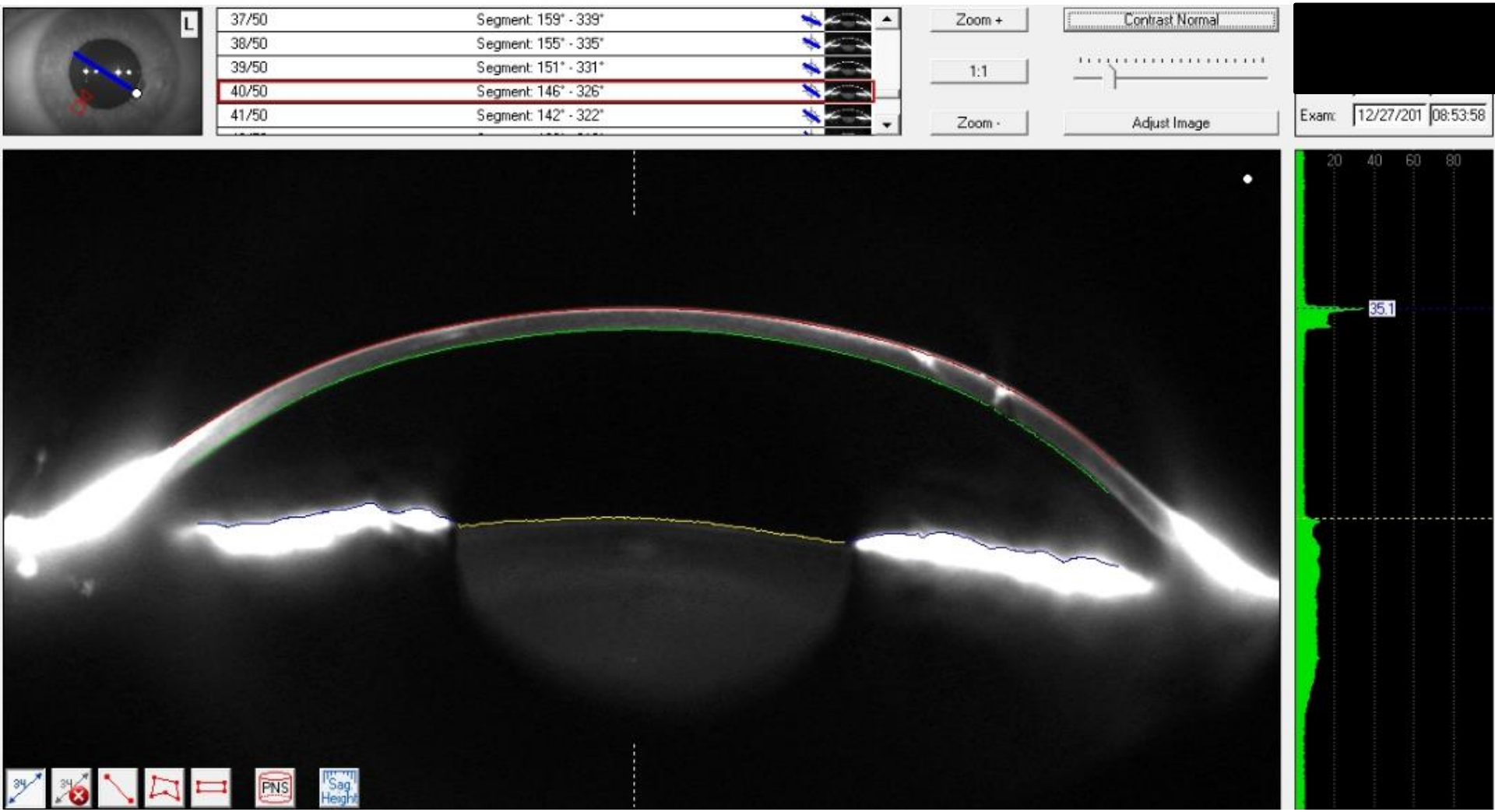

# POW#4: 11 Jan 2019

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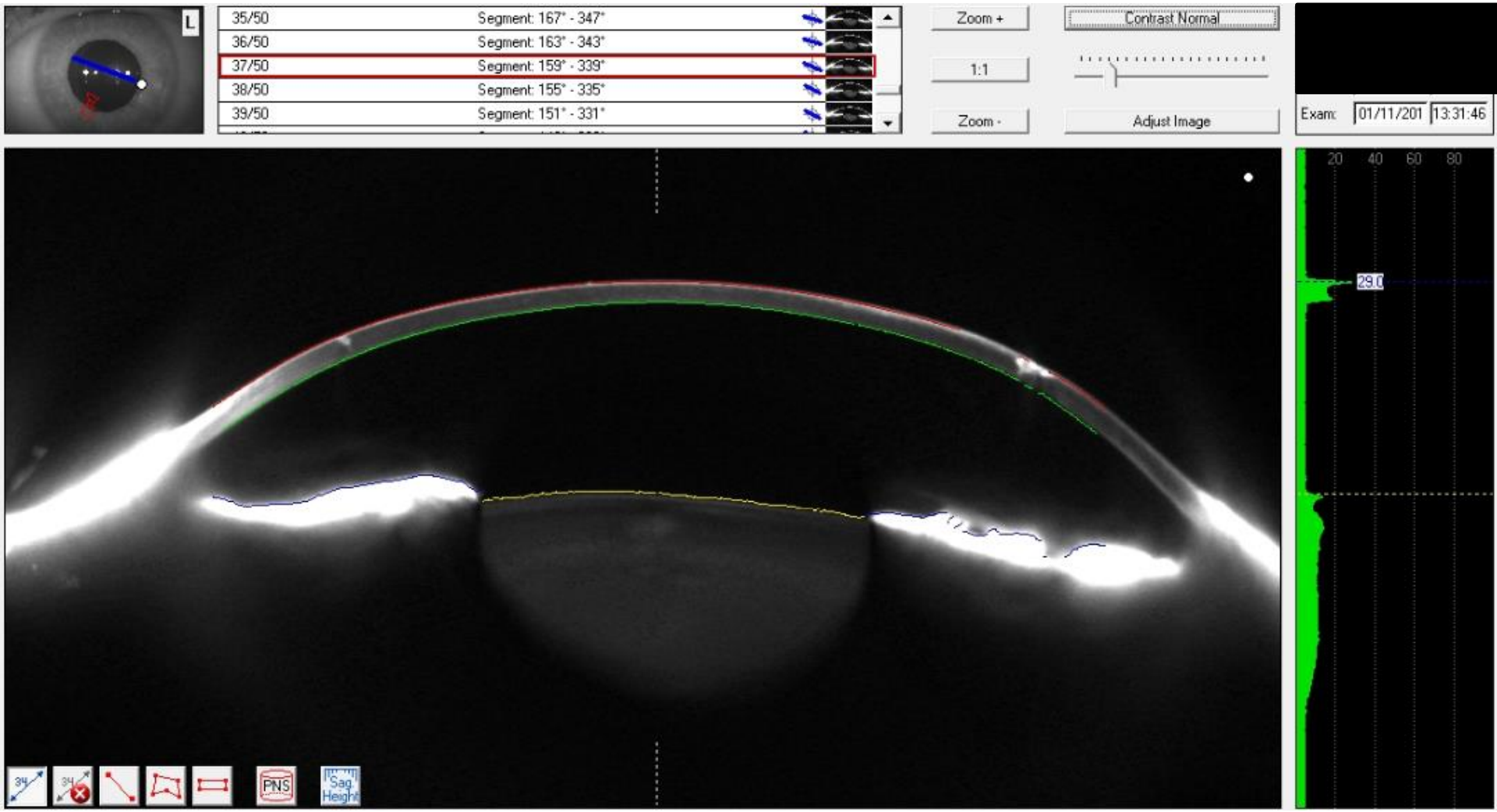

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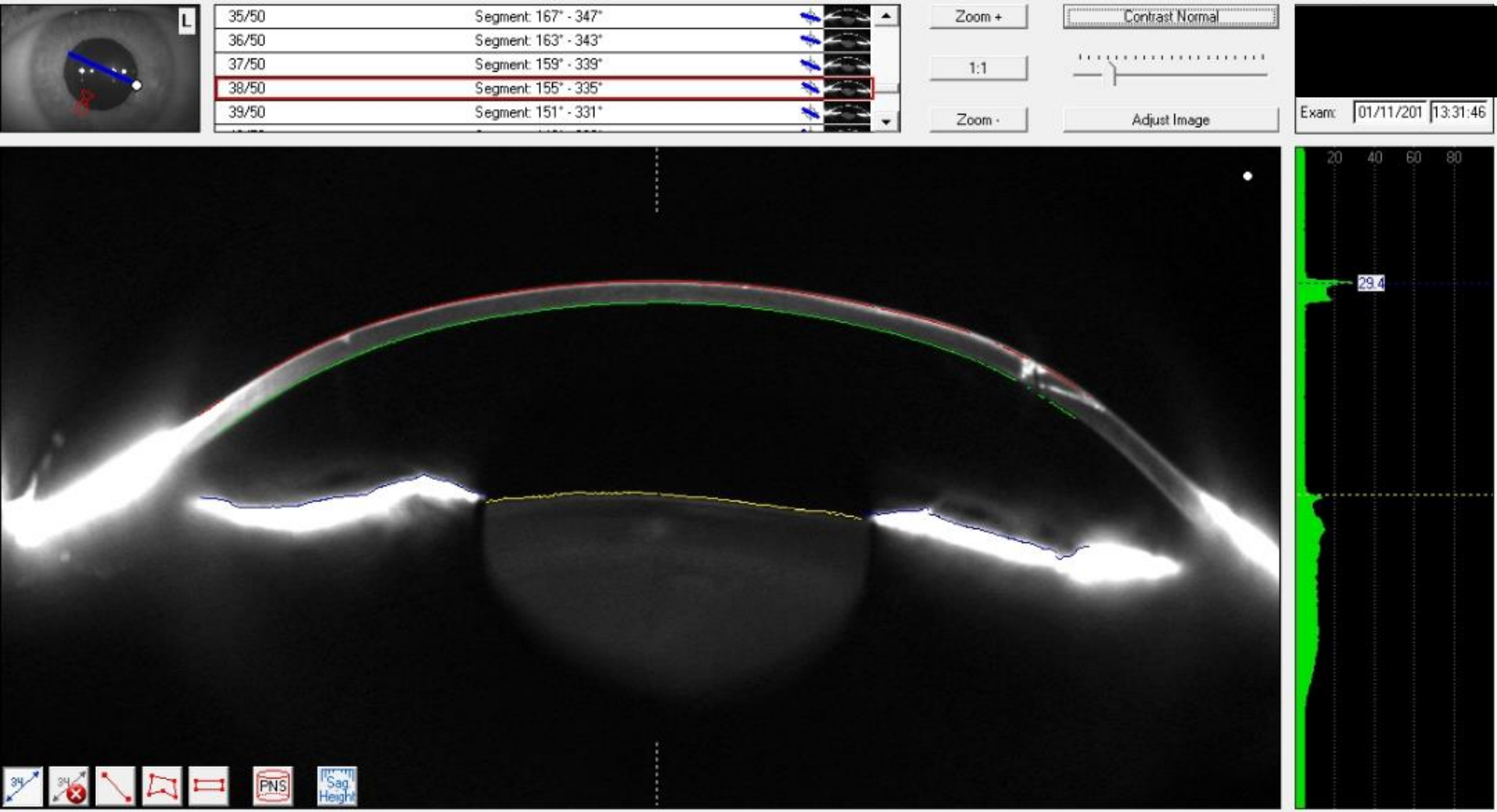

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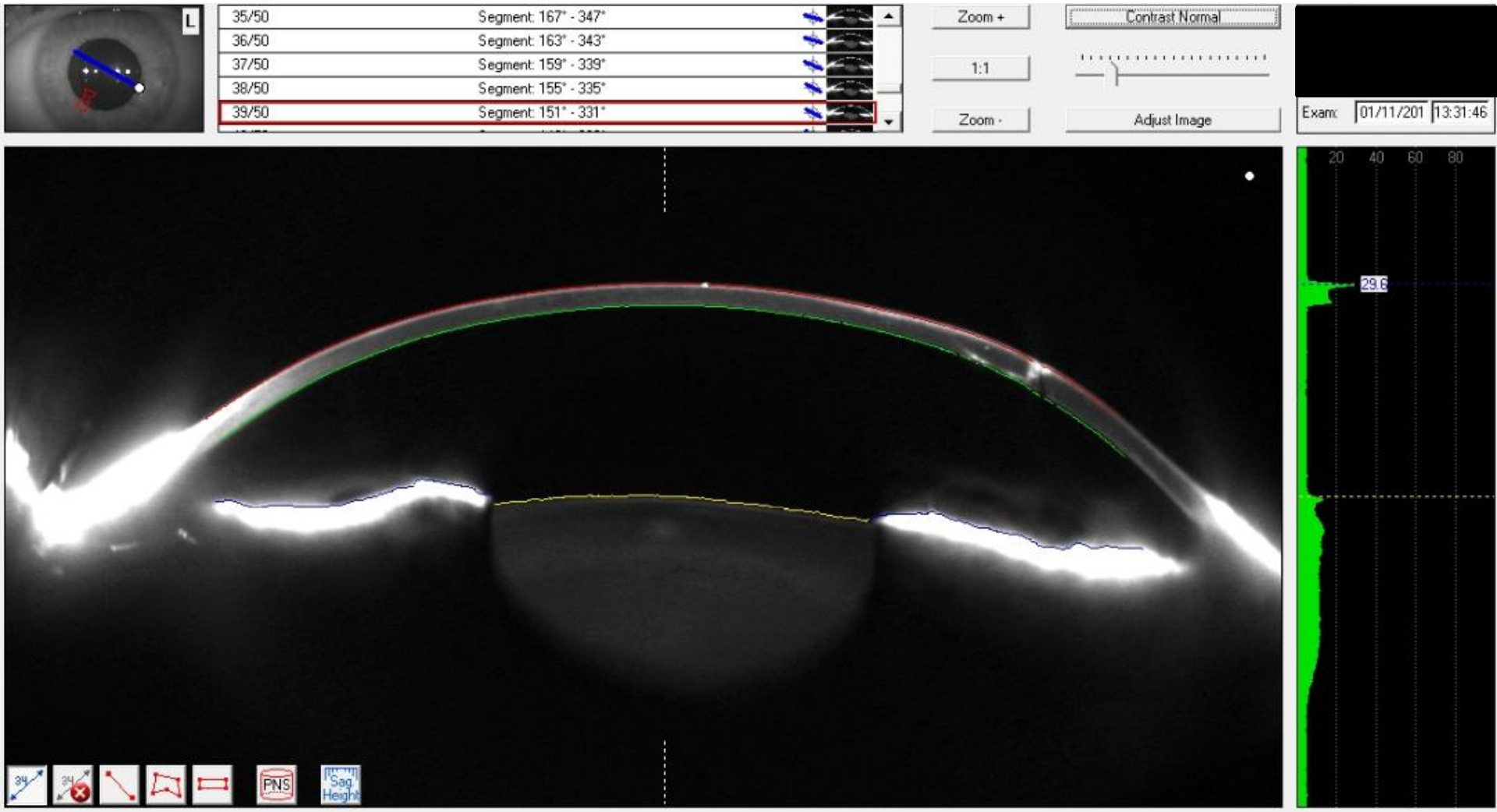

# POW#6: 30 Jan 2019

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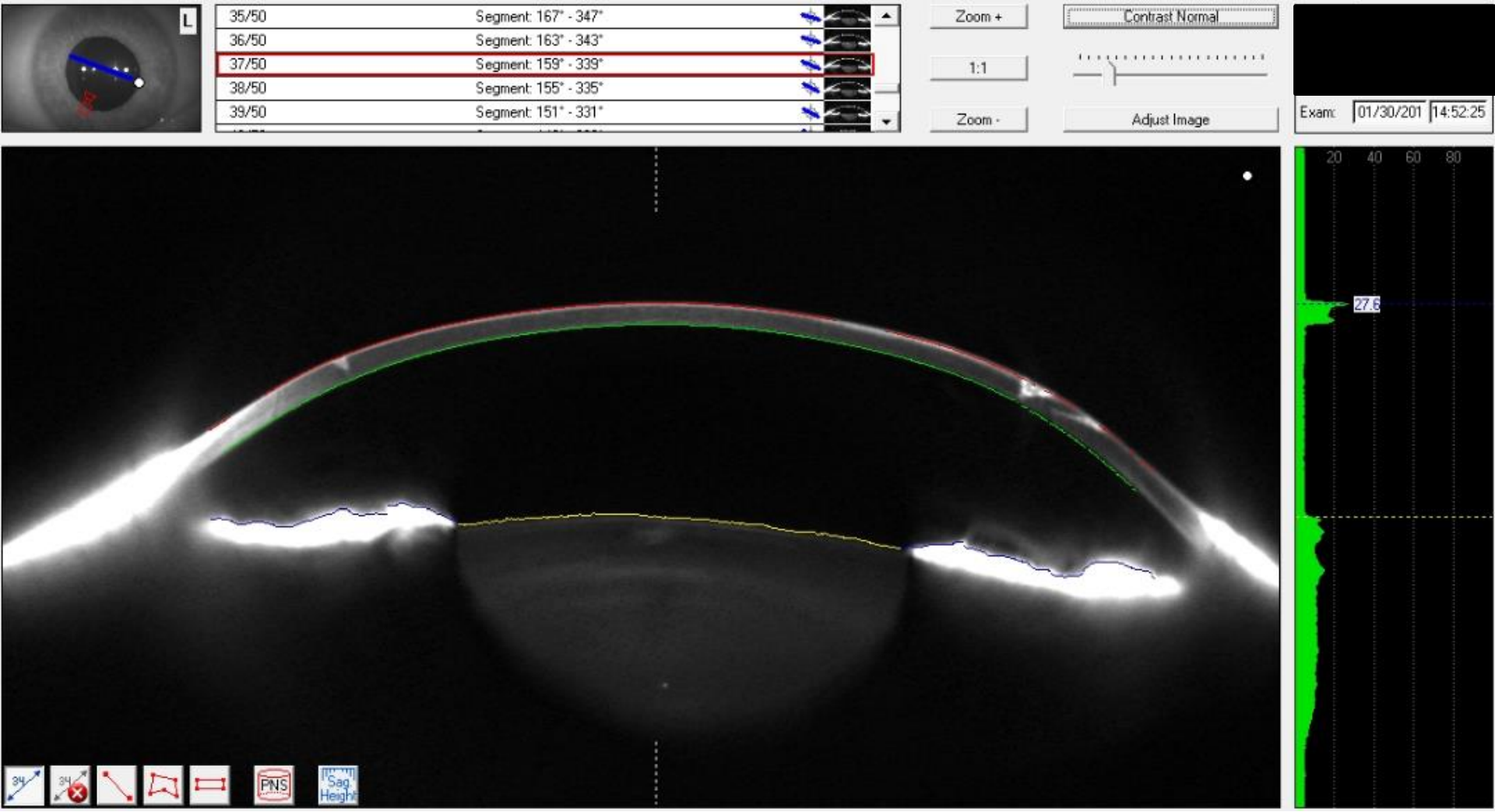

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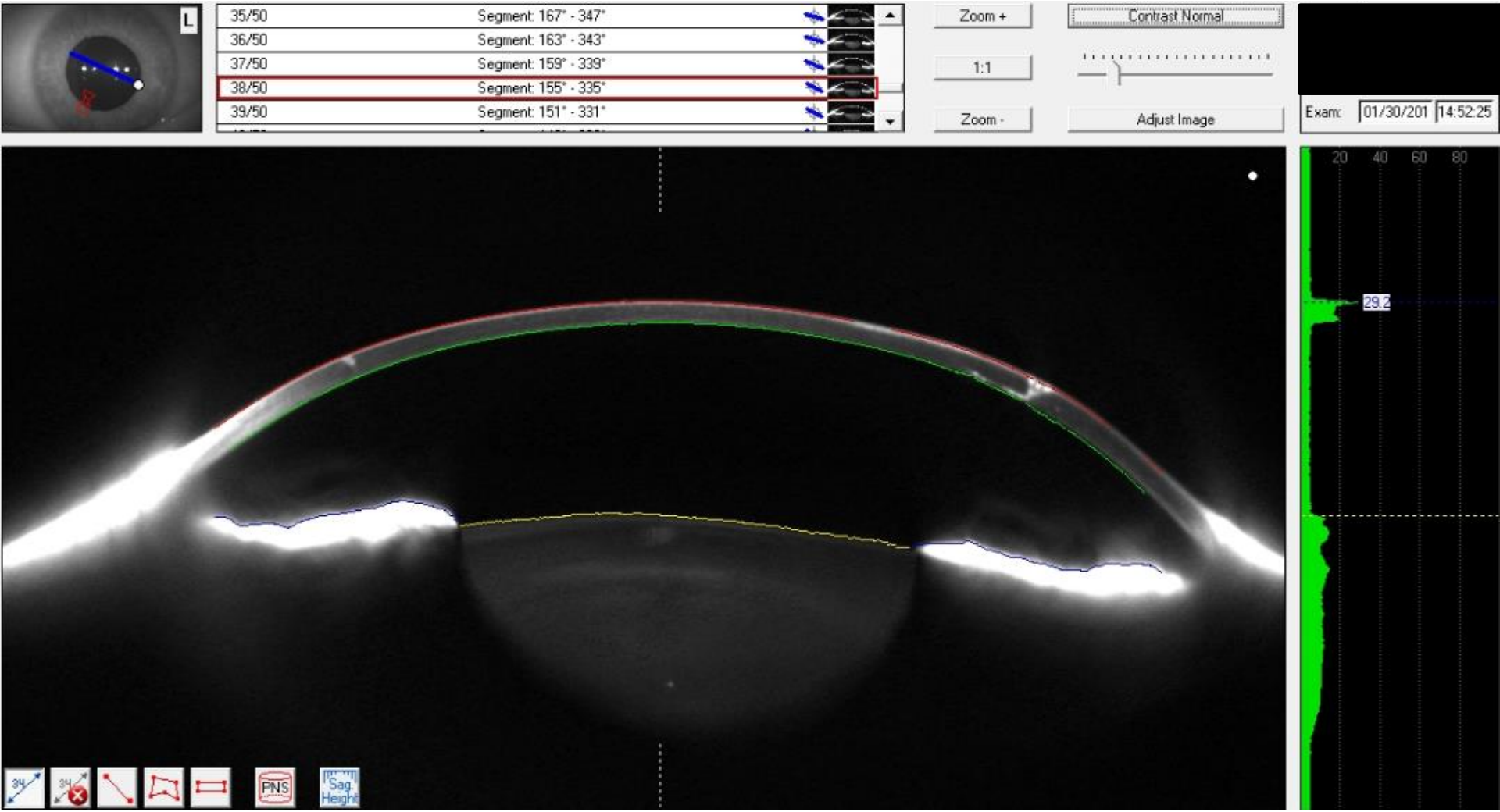

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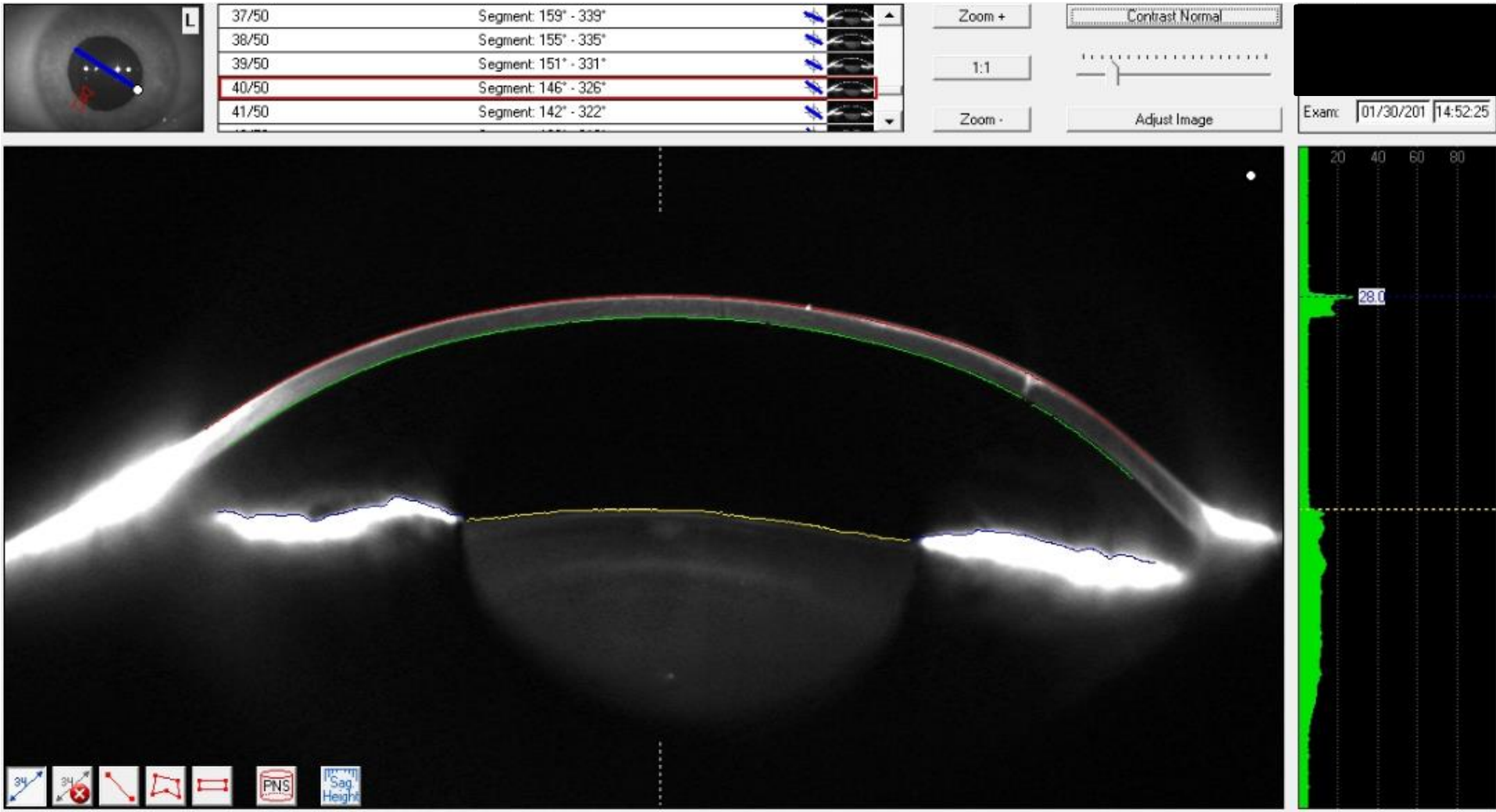

# POM#2: 20 Feb 2019

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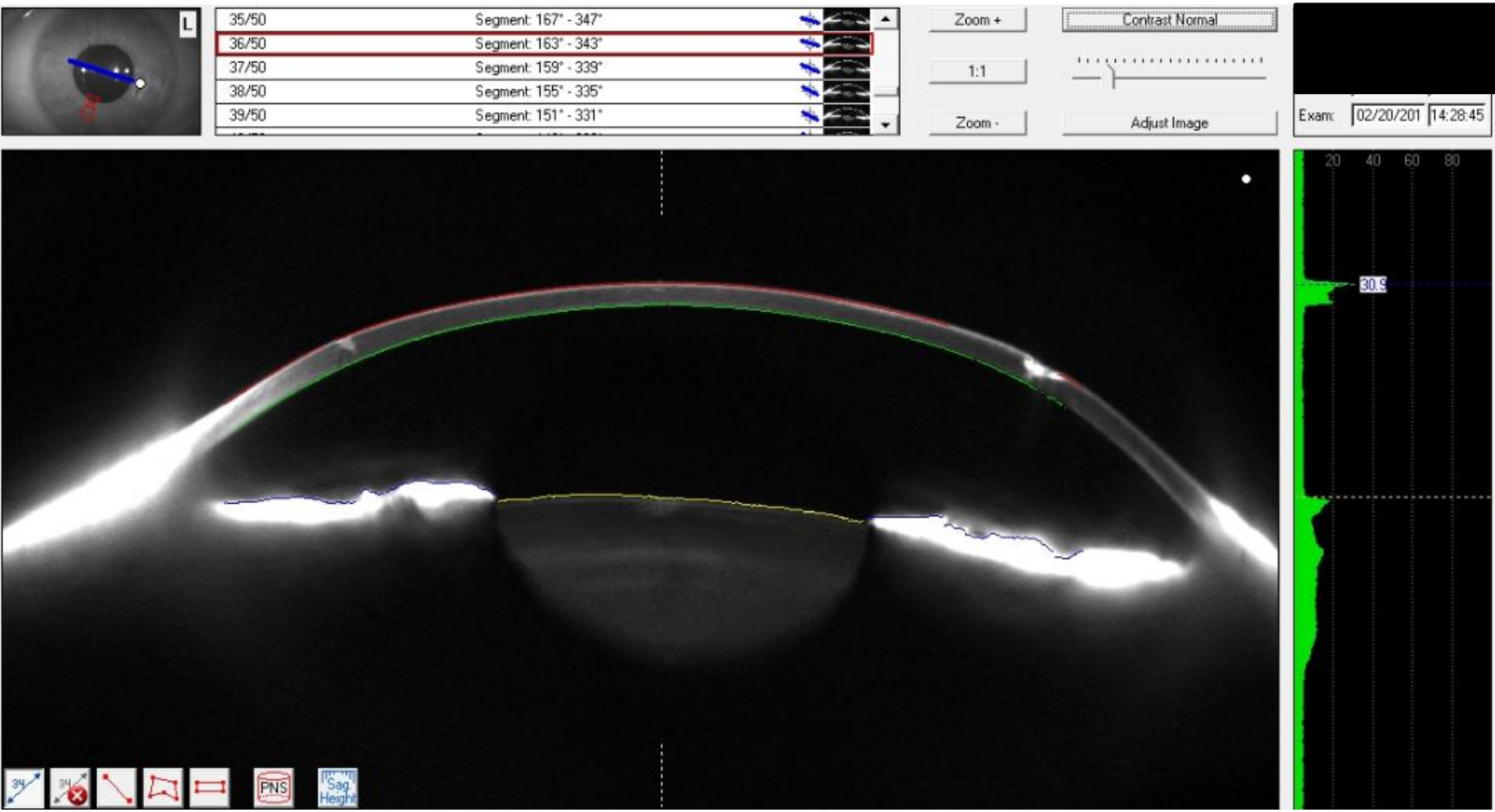

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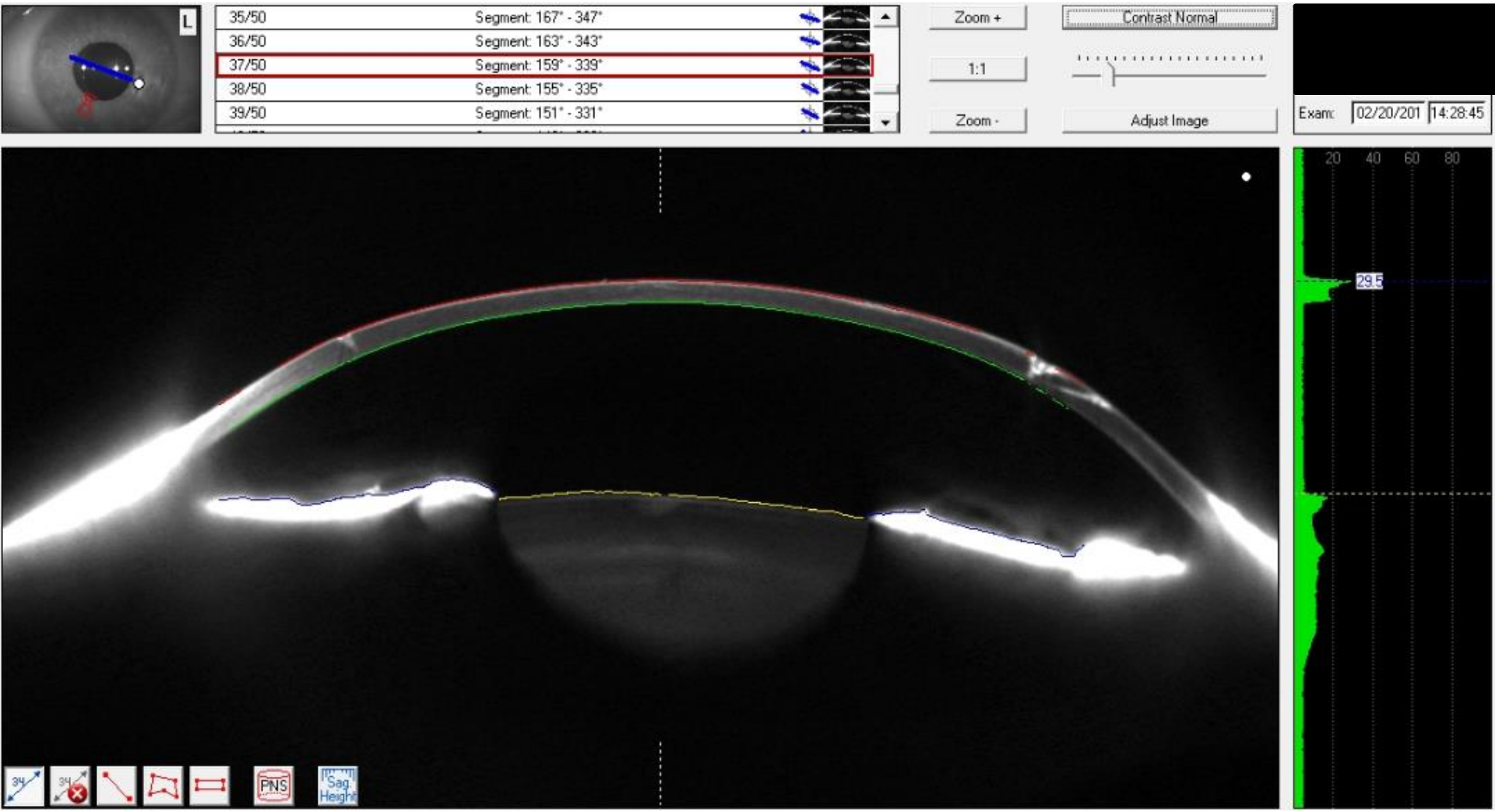

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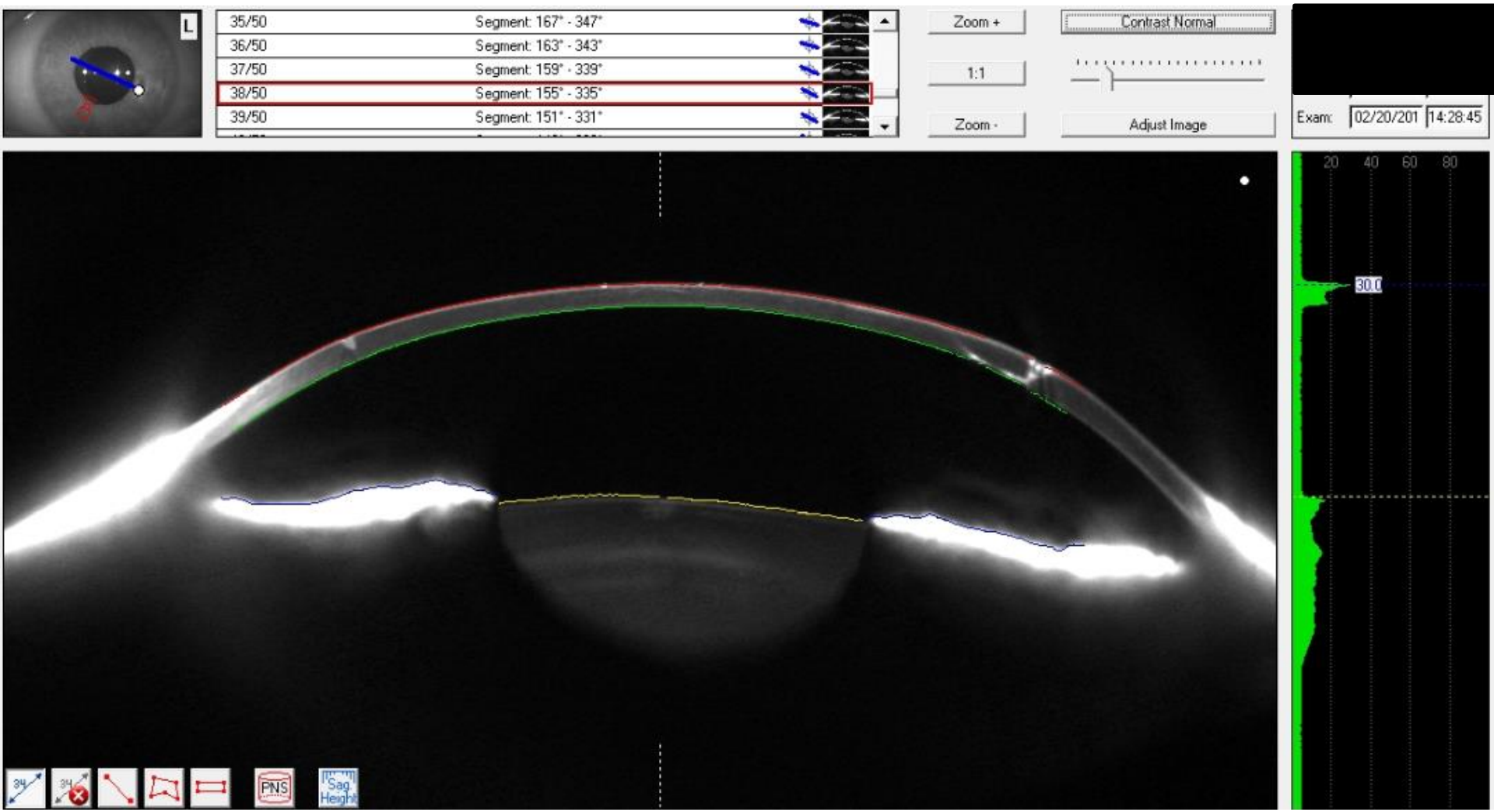

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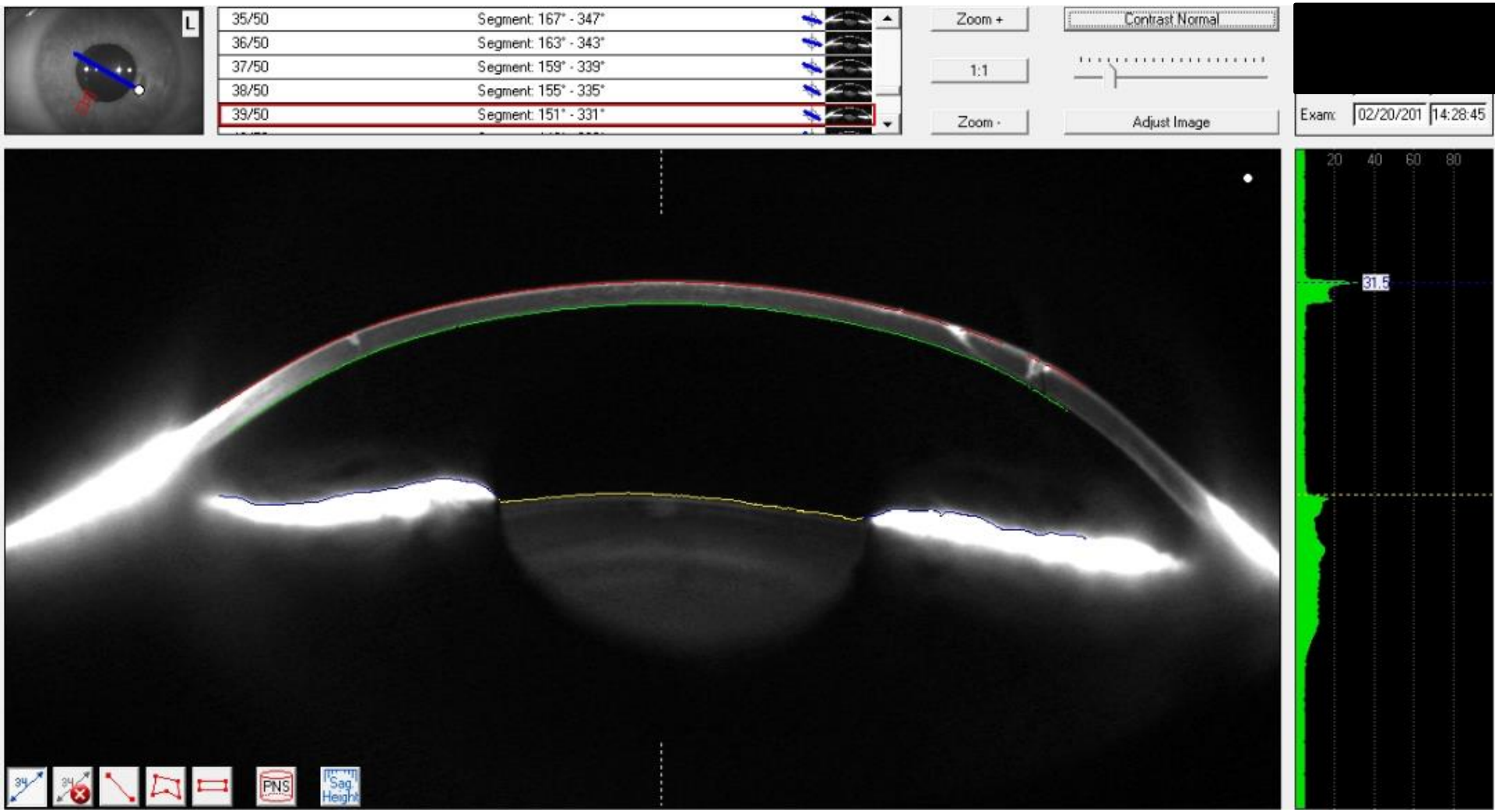

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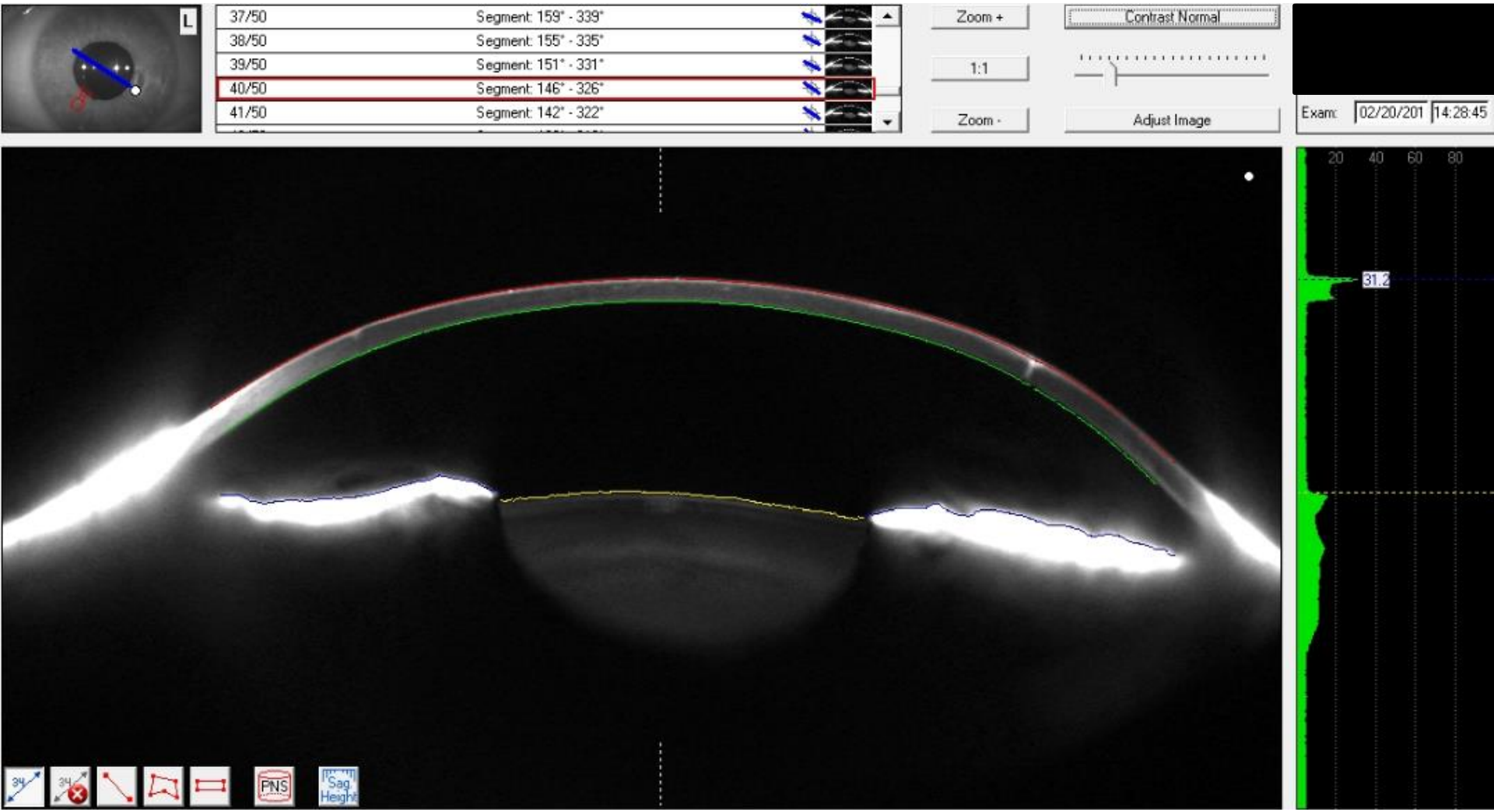

# POM#3

- Complete AK closure w/ intact overlying epithelium
- Va OS: 20/40-1 (Initial Va 20/50)

# Gaping Keratotomy Wounds: Signs / Sx

- Sx:
  - Pain
  - Photophobia
  - Glares / halos
  - Blurred / fluctuating vision
- Signs:
  - Positive staining w/ fluorescein dye
  - Pentacam topography
  - Anterior Segment OCT

# Gaping Keratotomy Wounds: Etiologies

- Patient factors:
  - Underlying collagen vascular diseases (RA, KCS)
  - Post-op ocular massage
  - Movement/Bell reflex during procedure
- Surgical Technique:
  - Micro/Macroperforation
  - Inexperience of surgeon
  - Repeat enhancements
  - Crossed incisions

# Gaping Keratotomy Wounds w/ RCE: Management

- Medical:
  - BCL
  - Muro
  - Cyclosporine
- Surgical:
  - Anterior Stromal Puncture
  - Nd:YAG Laser Stromal Puncture
  - Superficial Keratectomy
  - Corneal Suture

# Novel Treatment

- Collagen cross-linking

# Discussion: Collagen Cross-Linking

- FDA approved:
  - Indications:
    - KCN
    - Post-LASIK ectasia
  - 30 minutes
  - Riboflavin & UV light
- Mechanism:
  - Oxidation triggers release of oxygen free radicals
  - Strengthens chemical bonds between collagen fibrils

# Discussion

- Recent uses of CXL:
  - Infectious keratitis
    - Kozobolis V, et al. Cornea 2010
  - Corneal edema:
    - Laborante A, et al. Clin Ter 2012
  - Bullous keratopathy
    - Kozobolis V, et al. Cornea 2010
    - Sanz-Marco E, et al. Arch Soc Esp Oftalmol 2011
- Potential use of CXL for gaping AK/RK
- Military relevance
  - Use of CXL for corneal laceration

# S/p CXL

| Post-op | | OS UCVA | OS BCVA |
|---|---|---|---|
| POD #1 | | 20/400 BCL | |
| POW #1 | | 20/70-1 BCL | |
| POW #2 | | 20/40 BCL | |
| POW #4 | | 20/30 BCL | |
| POW #6 | | 20/50 | |
| POM #2 | | 20/40+2 | 20/16 |
| POM #3 | | 20/40-1 | 20/15-2 |
| POM #5 | | 20/60 | 20/20+2 |
| POY #1 | | No known RCEs | |

# Conclusion:

## Tx of RCE secondary to Gaping AK with CXL

- Numerous treatments
  - BCL, Muro, Corneal suture, Anterior Stromal puncture, Superficial Keratectomy
- Complete resolution remains difficult
  - Varying outcomes
- Treatment continues to improve
  - CXL

# Special Thanks

- Dr. Gary Legault
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# Bridging the Gap:

## A Novel Application of CXL in Treatment of RCE secondary to Gaping AK

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Thank you