

**PRELIMINARY RESULTS**  
**COMPARING OBJECTIVE FIXATION TESTING**  
**WITH**  
**THE RIGHTEYE AND NIDEKMP3 MICRO PERIMETER**

Kristin Adams OD

Kraskin Invitational Skeffington Symposium

Washington DC, 2018

# NIDEK MP-3 MICROPERIMETER

Measures local retinal sensitivity

Functional assessment of retina

Results displayed over a correlating  
color fundus image

Corrects from -25 to +15 diopters



# RIGHT EYE

Tracks and quantifies eye movements

Objective, repeatable and contains age norms

Provides visual evidence to those tested of eye movement abnormalities

Allows patient to wear own correction



# THE STUDY AND PARTICIPANTS

Southern College of Optometry

November 29 to December 6, 2017

49 subjects = 98 eyes

Male and Female

Ages 22 to 42 years - average age 25 years

Randomly performed 3 tests

Nidek MP-3 Microperimeter Fixation

RightEye Fixation

RightEye Fixation with chin rest



# FIXATION WITH THE NIDEK MP-3 MICROPERIMETER

Background: 31.4 asb (white)

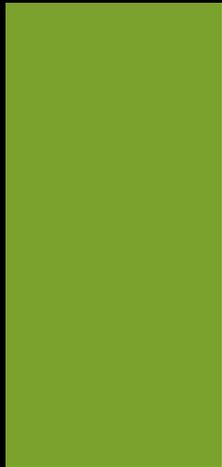
Fixation Target: 1.0° red cross

Tracks 40 seconds

Measures stability within a circle at 2°, and a circle at 4°

Has chin/head rest

Measures right eye and left eye fixation separately







MICROPERIMETER

PATIENT: 009 Steven Weifebach (30y 4m)

# FIXATION

## PARAMETERS

Configuration **Fixation**  
 Background **31.4 asb (white)**  
 Fixation Target **Single Cross (red, 1.0°)**  
 Options **Color Fundus**

## STATUS

Tracking **Success**  
 Fixation Stability **Stable**  
 Elapsed **2:01 (0:50)**  
 Tracked **0:35**  
 Remaining **0:06**  
 Completion **85.0%**

**OD**



**OS**

- Pupil Alignment
- Retina Alignment
- Retina Focusing
- Position Check
- IR Control
- Auto Shot

\$ ◀ 9 ▶  
 ◀ ▾ ▶  
 ◀ ▾ ▶  
 ◀ ▾ ▶  
 ⚙ Configure

Exam In progress...

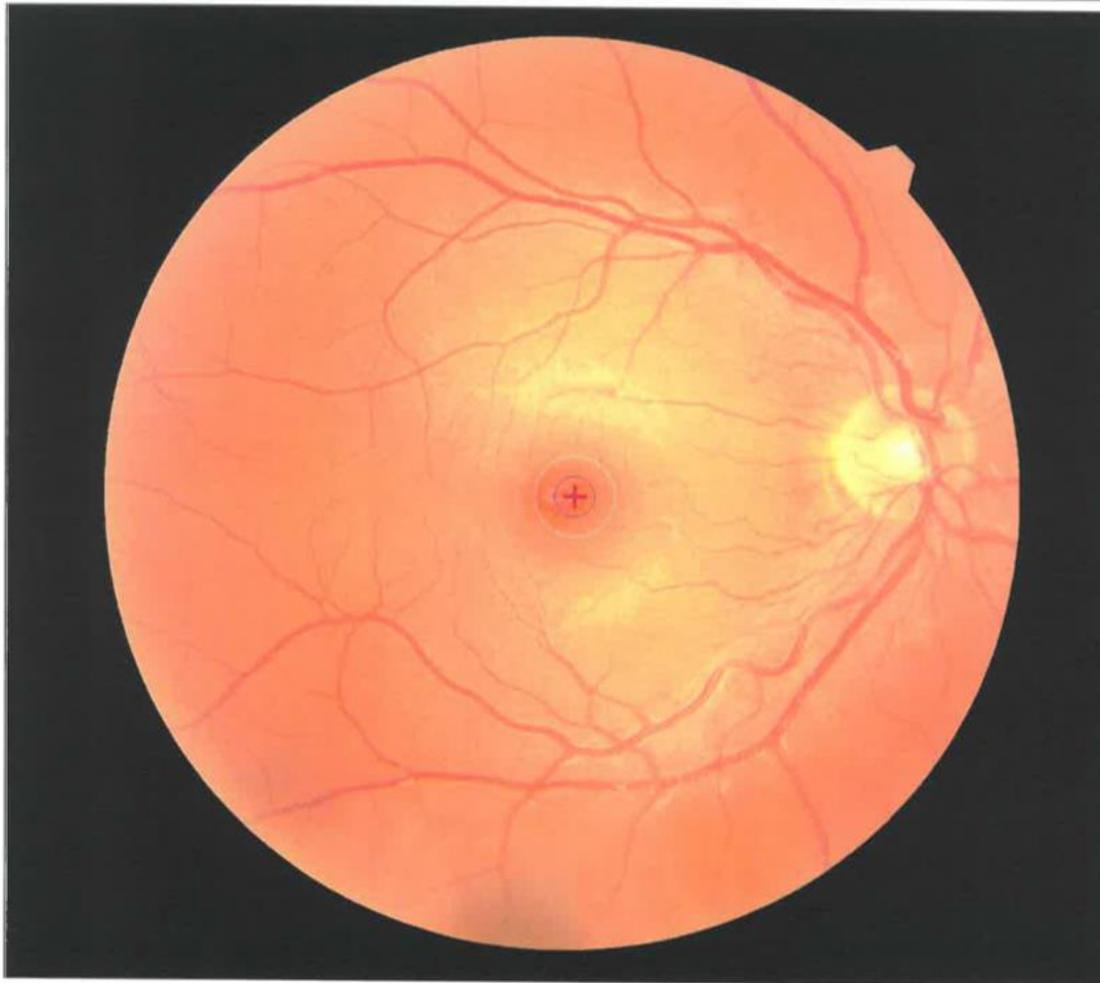
■ Stop

|| Pause

Name		ID	
BD		Date	12/6/2017
		Sex	Female

## MP-3 MICROPERIMETER

Exam Type	FIXATION	Eye	R
Date	12/6/2017 10:35		
Comment			



### PARAMETERS

Configuration	Fixation
Background	31.4 asb (white)
Fixation Target	Single Cross (red, 1.0°)
Options	Color Fundus

### RESULTS

Elapsed	2:16 (1:07)
Tracked	0:40
Completion	100.0%
Fixation Stability	Stable

### FIXATION

Stability: **Stable** (circle at 2° (∅) 100 % - circle at 4° (∅) 100 %)

### BCEA

Ellipse 68.2% (1 Std Dev)  
 Area 0.0°² - Major axes 0.2° - Minor axes 0.1°  
 Ellipse 95.4% (2 Std Dev)  
 Area 0.1°² - Major axes 0.3° - Minor axes 0.1°  
 Ellipse 99.6% (3 Std Dev)  
 Area 0.3°² - Major axes 0.4° - Minor axes 0.2°  
 Axes slope 19.6°

Zoom ratio : 100%

# FIXATION WITH THE RIGHT EYE

Background: White

Fixation Targets: series of 6 different targets

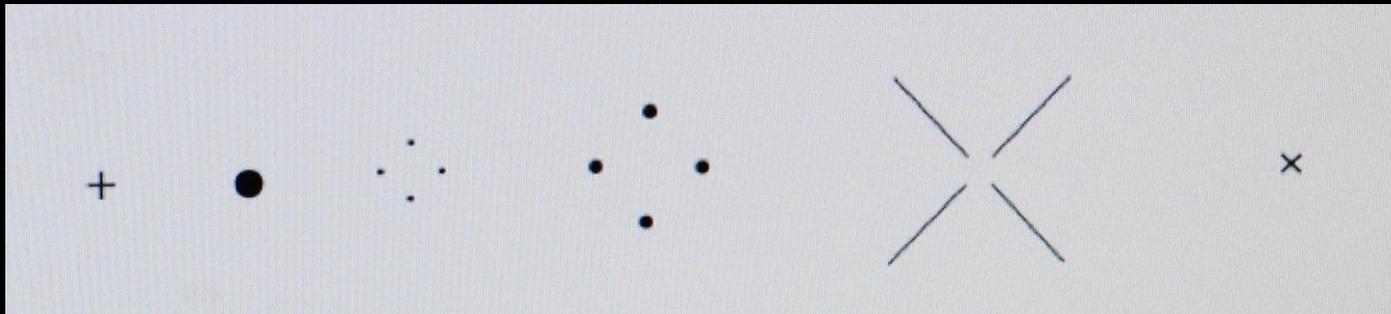
Each target appears for 7 seconds

3 second break between targets

Measures stability within a circle at  $1^\circ$ , between  $1^\circ$  and  $2^\circ$ , between  $2^\circ$  and  $4^\circ$ , and over  $4^\circ$

Patient in free space

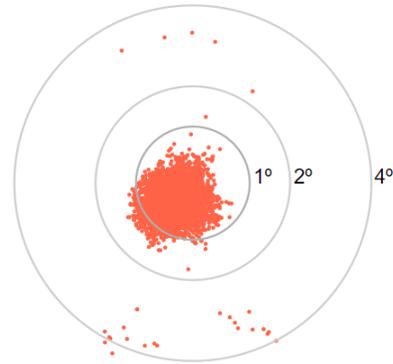




# Fixation Stability

Both Eyes

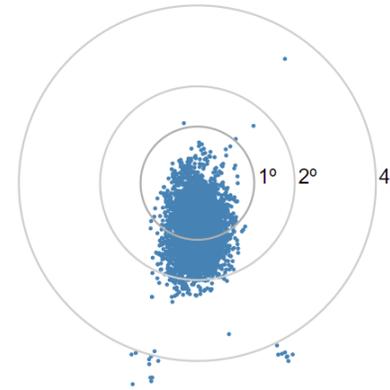
Right Gaze Plot



My Right Eye

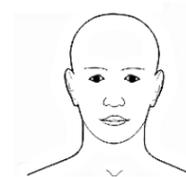
- ≤ 1° :: 93.86%
- > 1° and ≤ 2° :: 6.02%
- > 2° and ≤ 4° :: 0.08%
- > 4° :: 0.04%

Left Gaze Plot



My Left Eye

- ≤ 1° :: 62.31%
- > 1° and ≤ 2° :: 35.53%
- > 2° and ≤ 4° :: 2.16%
- > 4° :: 0.00%



Metrics	My Eyes	Population	Range
Fixation Location (%)	Predominately central-right Predominately central-left Predominately central-binocular	Predominantly central	Predominately central, poor central fixation, predominately eccentric
Fixation Stability (%)	Stable-right Stable-left Stable-binocular	Stable	Stable, relatively stable, unstable
Bivariate Contour Ellipse Area - BCEA (pixels squared)	6.44	10.32	10.32

# DOES A CHIN REST VERSUS NO CHIN REST AFFECT THE RESULTS OF THE RIGHT EYE FIXATION STABILITY TEST?

## Data Analysis

The comparison of chin rest vs no chin rest was evaluated using repeated measures ANOVA on the four bandwidth measures and Bivariate Contour Ellipse Area. In addition, Pearson correlation coefficients were calculated comparing chin rest vs no chin rest. Alpha level was set at  $p < .05$  for all statistical test. The correlation coefficients indicate the relative reliability and are interpreted using the following criteria  $CC > 0.65$  specifies a high correlation,  $0.40 < CC < 0.65$  represents moderate correlation, and below 0.4 is a low correlation.

# DOES A CHIN REST VERSUS NO CHIN REST AFFECT THE RESULTS OF THE RIGHT EYE FIXATION STABILITY TEST?

## Results

The repeated measures ANOVA for all bandwidths and the Bivariate Contour Ellipse Area revealed no significant differences between chin rest and no chin rest. In addition, all the correlation coefficients were significant ( $p < .05$ ) and all but one variable (Bandwidth 2) produced a high correlation between Chin Rest and No Chin Rest. The test-retest reliability provides a clear indication that using a chin rest or not using a chin rest will result in a similar measure.

# DOES A CHIN REST VERSUS NO CHIN REST AFFECT THE RESULTS OF THE RIGHT EYE FIXATION STABILITY TEST?

Fixation Stability	Chin Rest	No Chin Rest	F-Stat	P-value	Correlation
Bandwidth 1	25.31 (33.67)	26.09 (31.14)	.076	.784	.851
Bandwidth 2	23.45 (19.55)	27.84 (20.78)	1.767	.192	.479
Bandwidth 3	38.51 (34.84)	34.7 (30.94)	2.033	.163	.727
Bandwidth 4	8.51 (17.89)	8.45 (20.34)	.013	.910	.683
Bivariate Contour Ellipse Area	11.37 (15.79)	7.86 (1.14)	.350	.558	.719

# NIDEK MP3 FIXATION STABILITY RESULTS

<b>Fixation Stability</b>	<b>OD and OS</b>
<b>&lt; 2 degrees</b>	<b>99.88 (0.33)</b>
<b>&lt; 4 degrees</b>	<b>99.97 (0.17)</b>

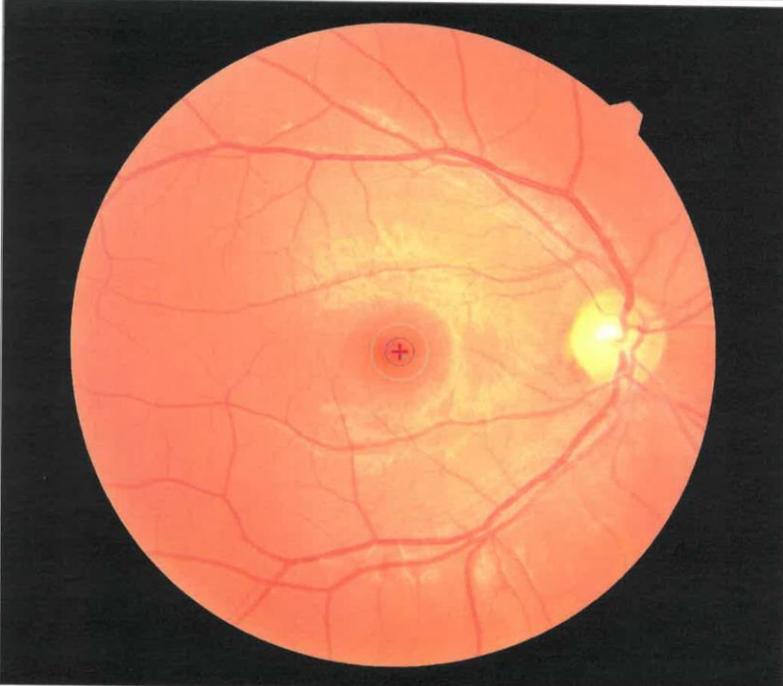
# FIXATION STABILITY REPORTS

# NIDEK MP-3 RESULTS OF A 30 YEAR OLD MALE

Name	ID
BD	Date
	11/30/2017
Sex	Male

## MP-3 MICROPERIMETER

Exam Type	FIXATION	Eye	R
Date	11/30/2017 13:36		
Comment			



PARAMETERS	
Configuration	Fixation
Background	31.4 asb (white)
Fixation Target	Single Cross (red, 1.0°)
Options	Color Fundus

RESULTS	
Elapsed	2:58 (0:59)
Tracked	0:40
Completion	100.0%
Fixation Stability	Stable

**FIXATION**  
Stability: **Stable** (circle at 2° (Ø) 100% - circle at 4° (Ø) 100%)

**BCEA**  
 Ellipse 68.2% (1 Std Dev)  
 Area 0.0°² - Major axes 0.1° - Minor axes 0.1°  
 Ellipse 95.4% (2 Std Dev)  
 Area 0.1°² - Major axes 0.2° - Minor axes 0.2°  
 Ellipse 99.6% (3 Std Dev)  
 Area 0.2°² - Major axes 0.2° - Minor axes 0.2°  
 Axes slope 115.1°

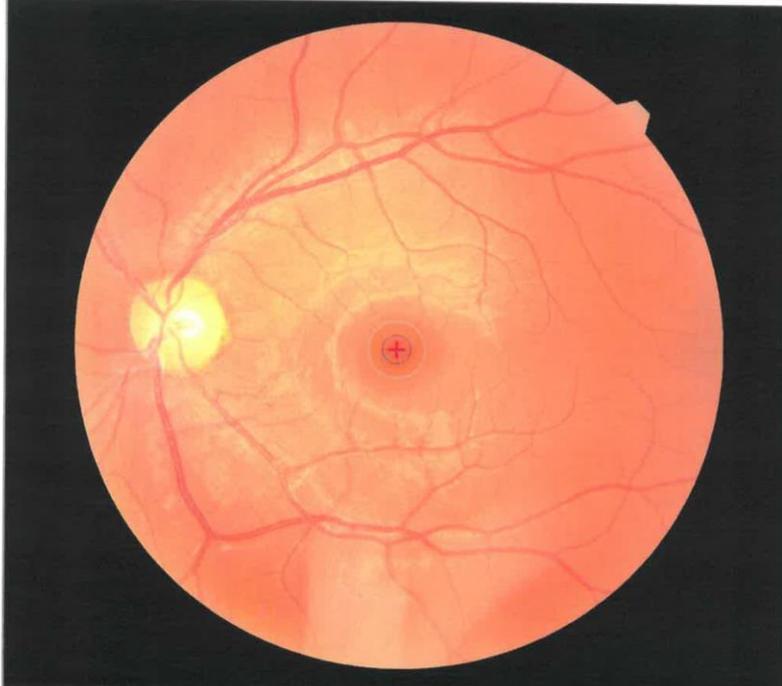
Zoom ratio : 100%

Ver.1.2.1 : MP Viewer for NAVIS-EX

Name	ID
BD	Date
	11/30/2017
Sex	Male

## MP-3 MICROPERIMETER

Exam Type	FIXATION	Eye	L
Date	11/30/2017 13:39		
Comment			



PARAMETERS	
Configuration	Fixation
Background	31.4 asb (white)
Fixation Target	Single Cross (red, 1.0°)
Options	Color Fundus

RESULTS	
Elapsed	2:10 (1:00)
Tracked	0:40
Completion	100.0%
Fixation Stability	Stable

**FIXATION**  
Stability: **Stable** (circle at 2° (Ø) 100% - circle at 4° (Ø) 100%)

**BCEA**  
 Ellipse 68.2% (1 Std Dev)  
 Area 0.0°² - Major axes 0.1° - Minor axes 0.1°  
 Ellipse 95.4% (2 Std Dev)  
 Area 0.0°² - Major axes 0.1° - Minor axes 0.1°  
 Ellipse 99.6% (3 Std Dev)  
 Area 0.1°² - Major axes 0.2° - Minor axes 0.2°  
 Axes slope 90.0°

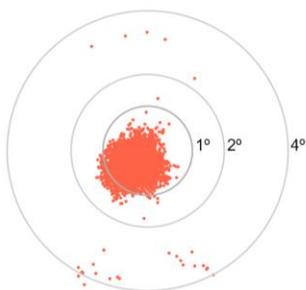
Zoom ratio : 100%

Ver.1.2.1 : MP Viewer for NAVIS-EX

# RIGHT EYE RESULTS OF A 30 YEAR OLD MALE

Both Eyes

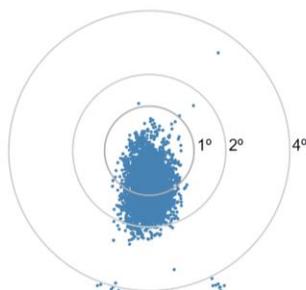
Right Gaze Plot



My Right Eye

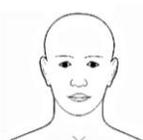
≤ 1° :: 93.86%  
> 1° and ≤ 2° :: 6.02%  
> 2° and ≤ 4° :: 0.08%  
> 4° :: 0.04%

Left Gaze Plot



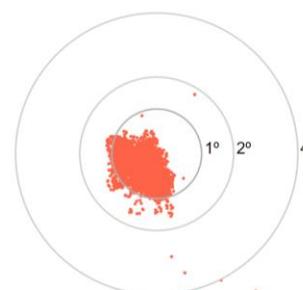
My Left Eye

≤ 1° :: 62.31%  
> 1° and ≤ 2° :: 35.53%  
> 2° and ≤ 4° :: 2.16%  
> 4° :: 0.00%



Both Eyes

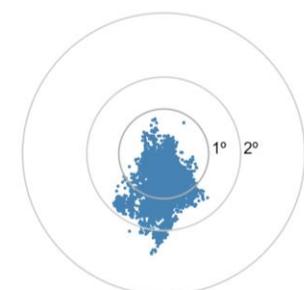
Right Gaze Plot



My Right Eye

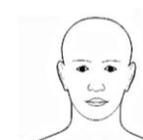
≤ 1° :: 96.67%  
> 1° and ≤ 2° :: 2.91%  
> 2° and ≤ 4° :: 0.04%  
> 4° :: 0.38%

Left Gaze Plot



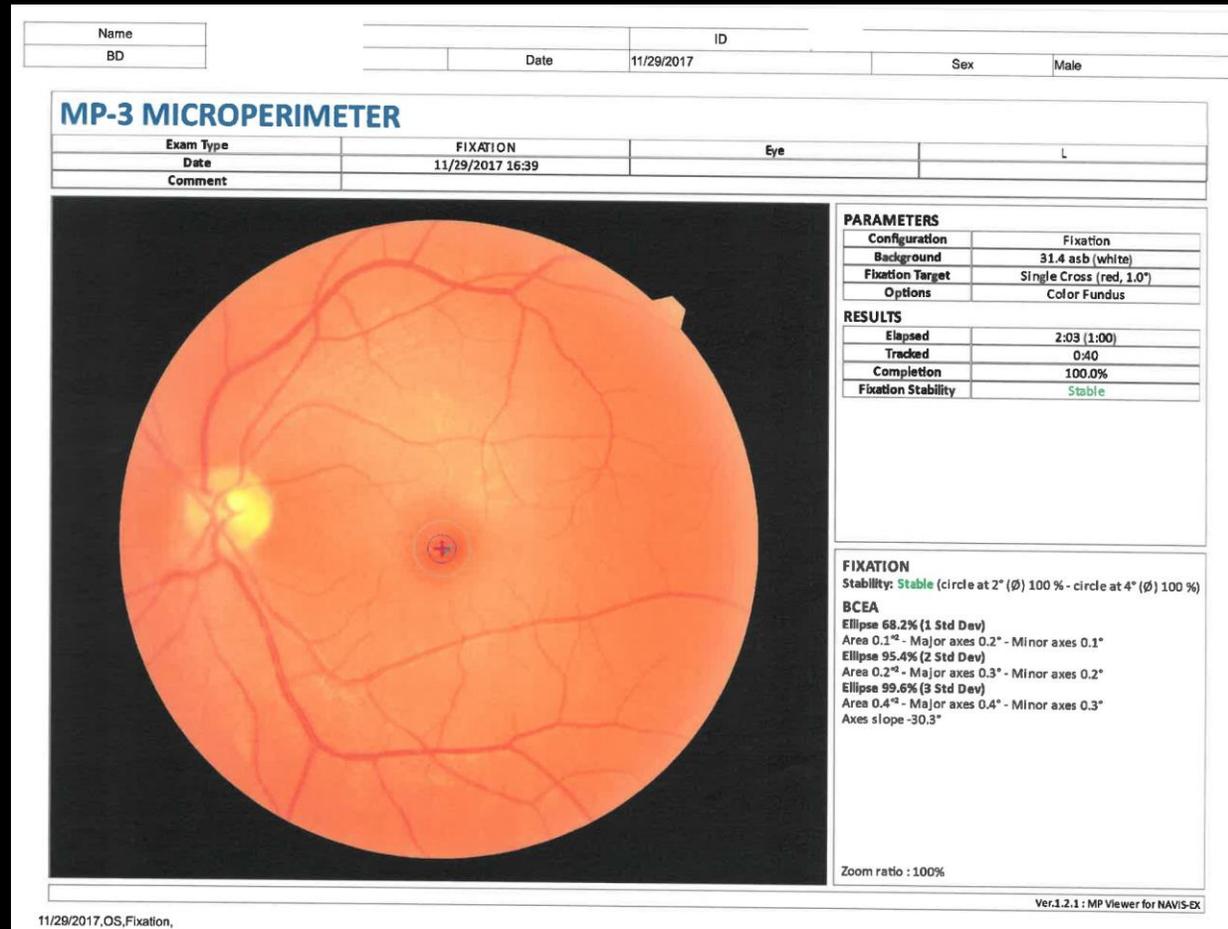
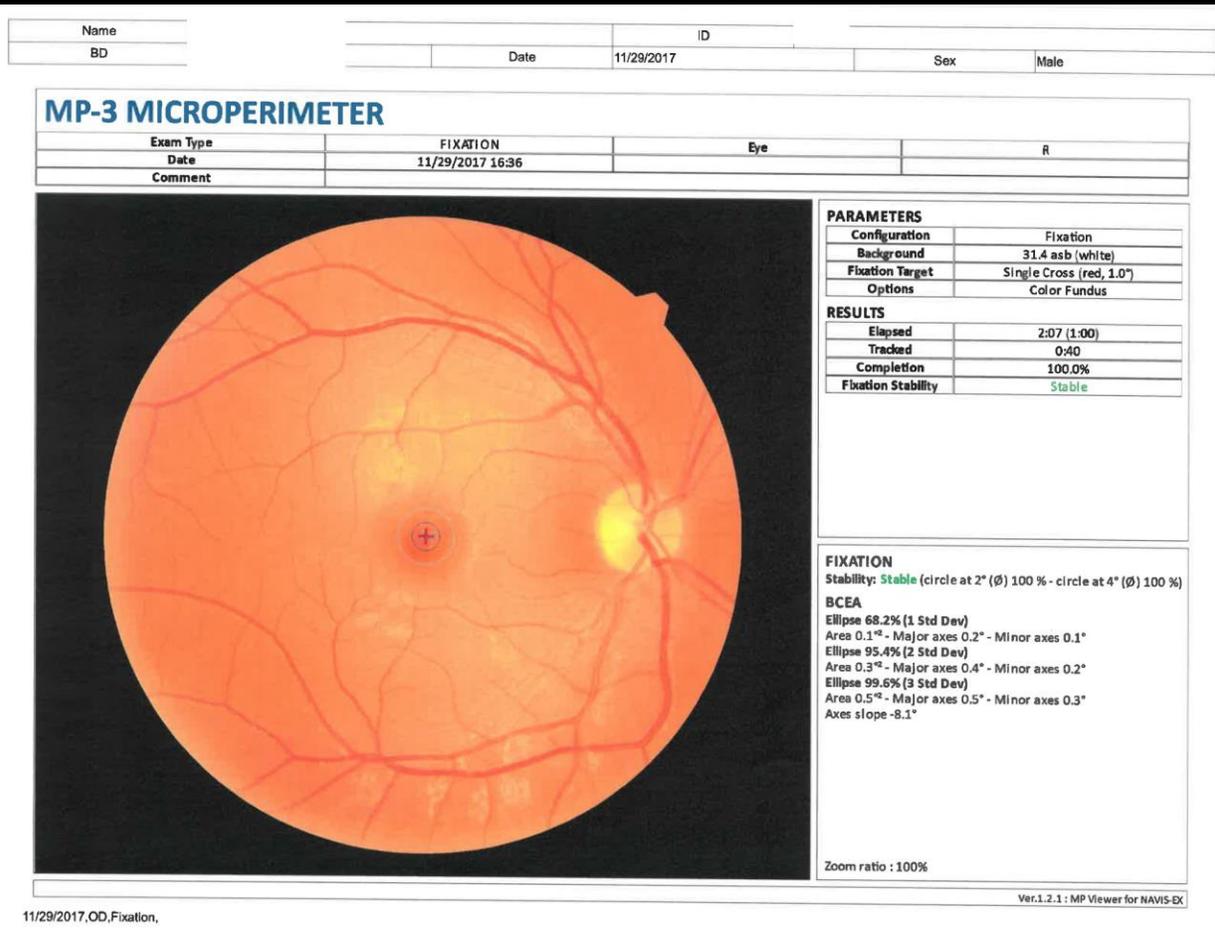
My Left Eye

≤ 1° :: 68.76%  
> 1° and ≤ 2° :: 30.71%  
> 2° and ≤ 4° :: 0.38%  
> 4° :: 0.15%

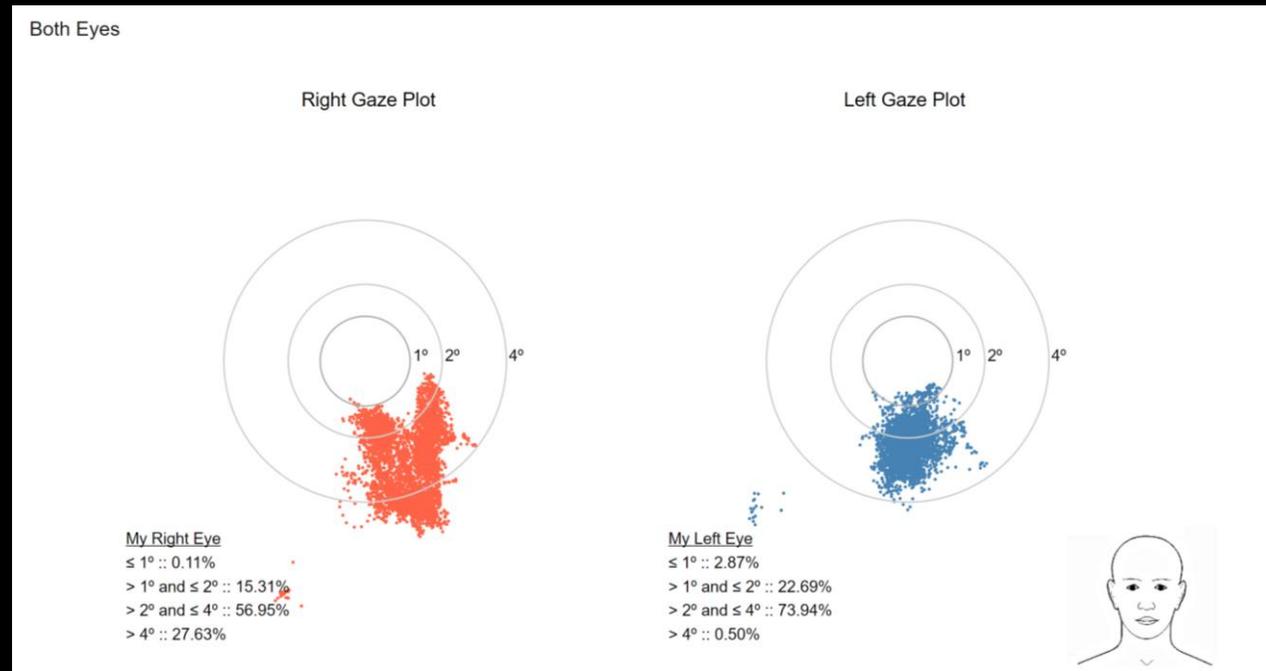
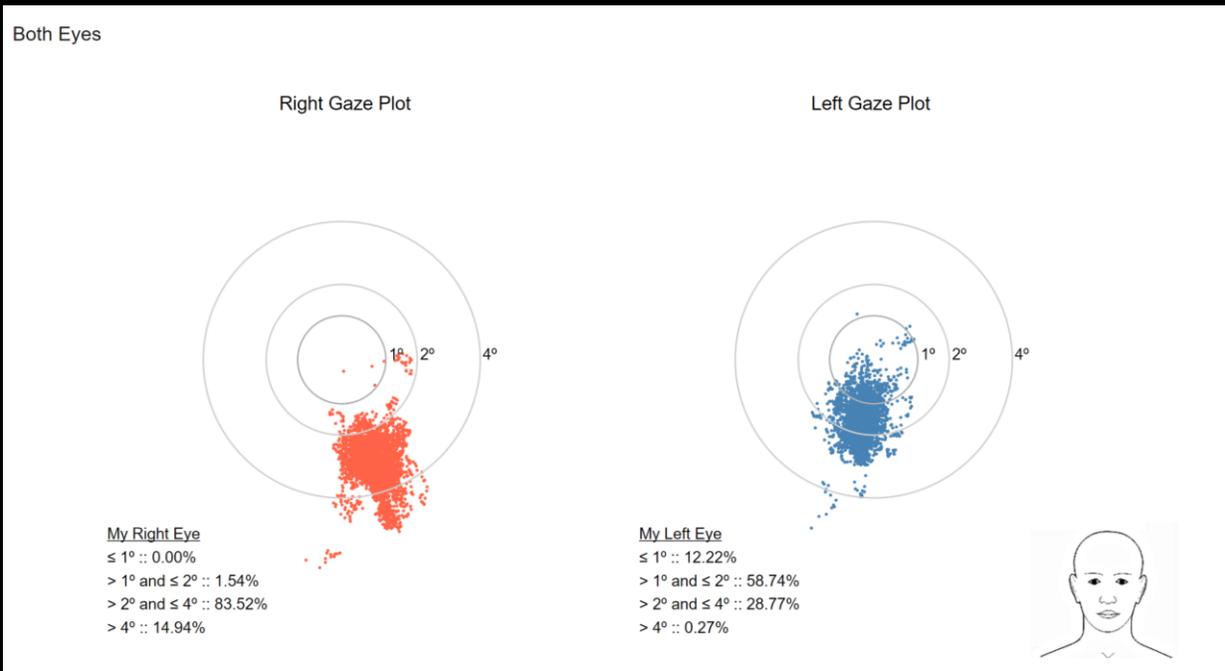


With Chin Rest

# NIDEK MP-3 RESULTS OF A 34 YEAR OLD MALE

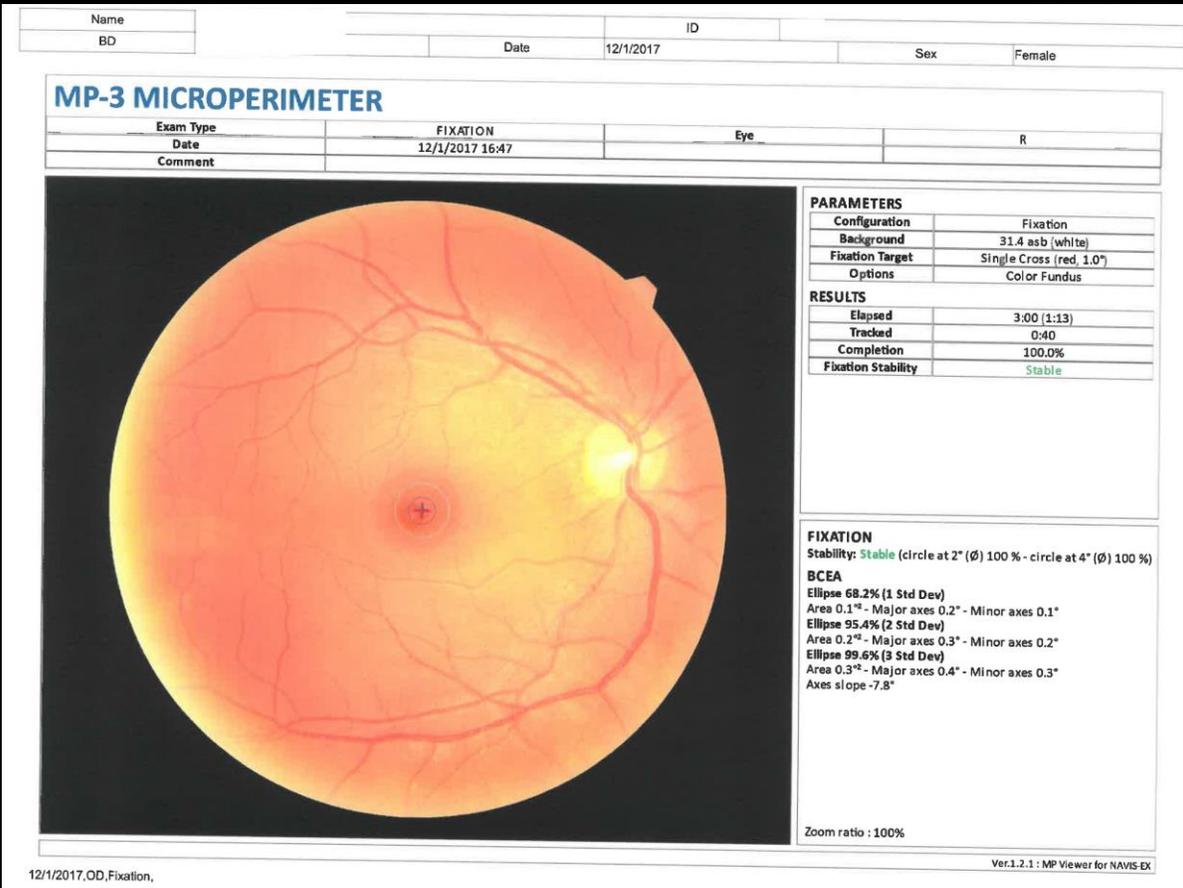


# RIGHT EYE RESULTS OF A 34 YEAR OLD MALE

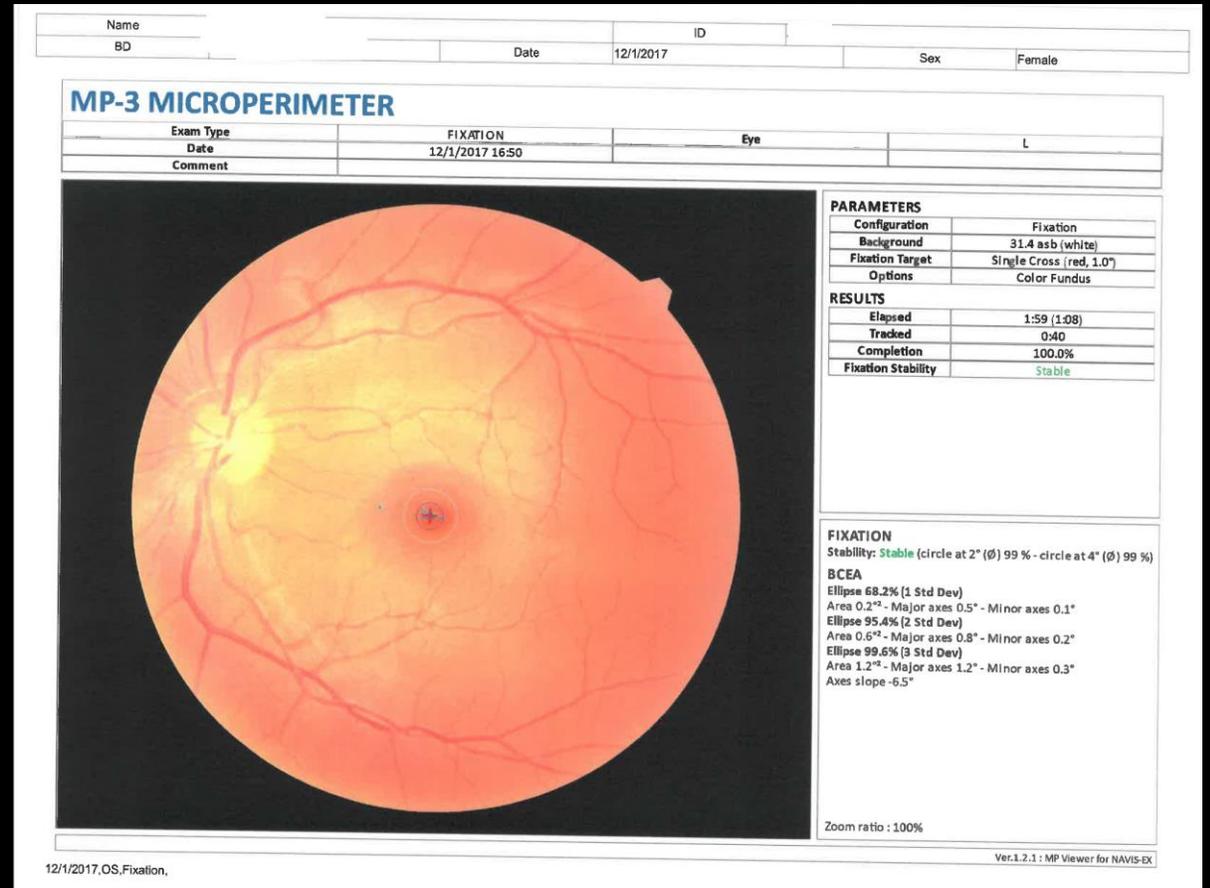


With Chin Rest

# NIDEK MP-3 RESULTS OF A 24 YEAR OLD FEMALE WITH HISTORY OF 4 STRABISMUS SURGERIES



12/1/2017,OD,Fixation,

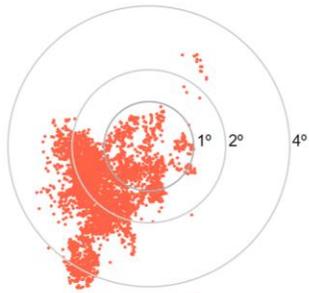


12/1/2017,OS,Fixation,

# RIGHT EYE RESULTS OF A 24 YEAR OLD FEMALE WITH HISTORY OF 3 STRABISMUS SURGERIES

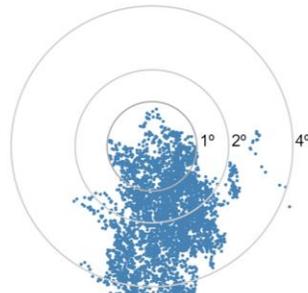
Both Eyes

Right Gaze Plot

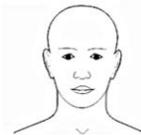


My Right Eye  
 $\leq 1^\circ$  :: 18.75%  
 $> 1^\circ$  and  $\leq 2^\circ$  :: 39.90%  
 $> 2^\circ$  and  $\leq 4^\circ$  :: 32.99%  
 $> 4^\circ$  :: 8.36%

Left Gaze Plot

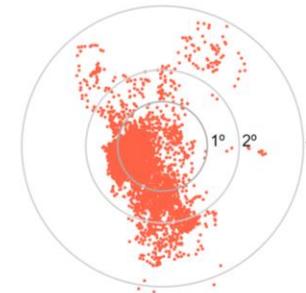


My Left Eye  
 $\leq 1^\circ$  :: 16.49%  
 $> 1^\circ$  and  $\leq 2^\circ$  :: 27.68%  
 $> 2^\circ$  and  $\leq 4^\circ$  :: 48.64%  
 $> 4^\circ$  :: 7.18%



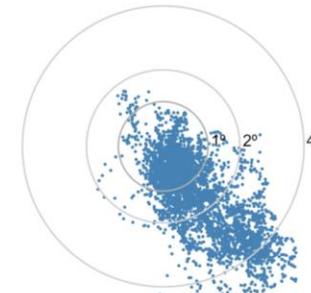
Both Eyes

Right Gaze Plot

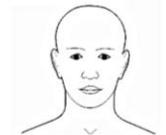


My Right Eye  
 $\leq 1^\circ$  :: 50.82%  
 $> 1^\circ$  and  $\leq 2^\circ$  :: 35.30%  
 $> 2^\circ$  and  $\leq 4^\circ$  :: 13.02%  
 $> 4^\circ$  :: 0.86%

Left Gaze Plot

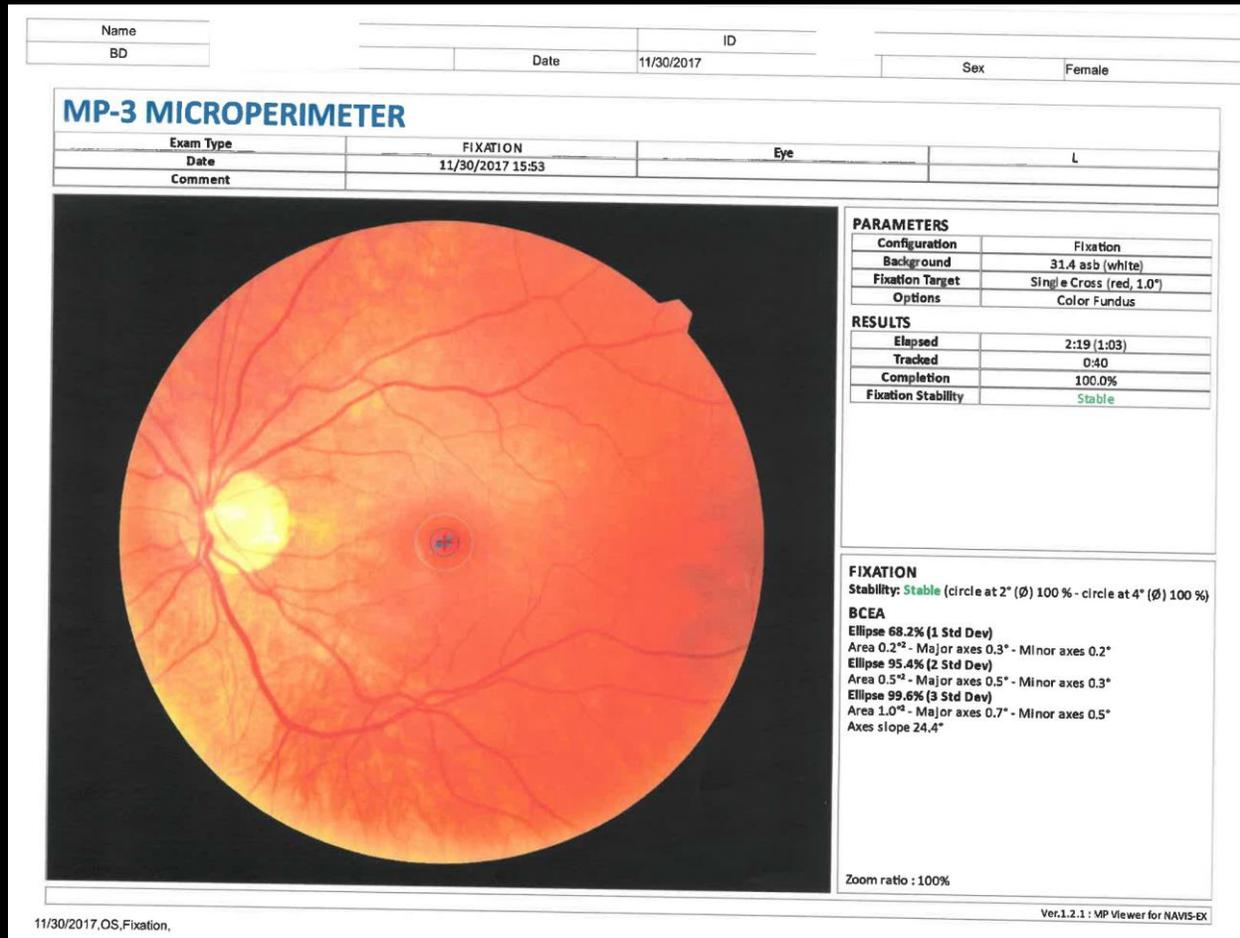
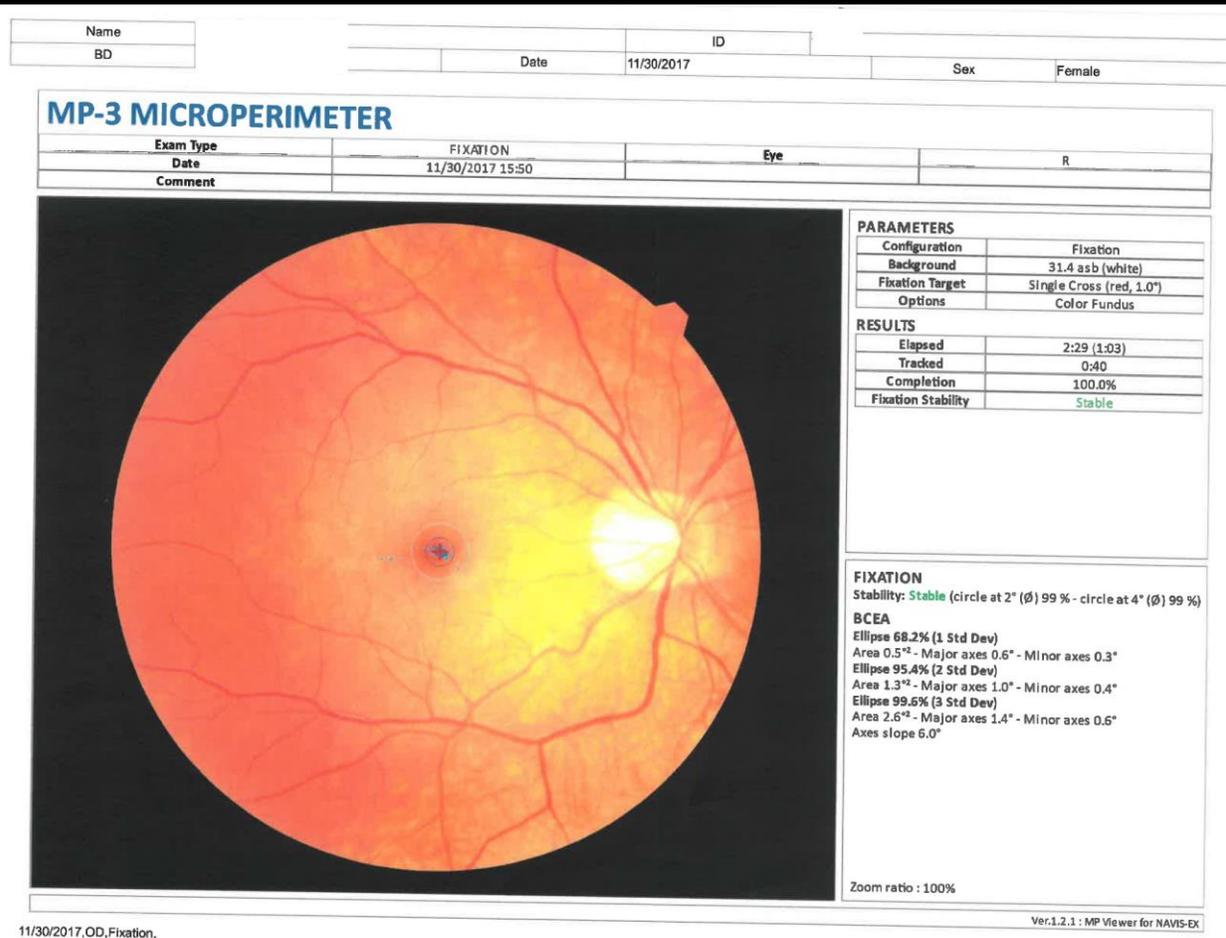


My Left Eye  
 $\leq 1^\circ$  :: 38.88%  
 $> 1^\circ$  and  $\leq 2^\circ$  :: 20.10%  
 $> 2^\circ$  and  $\leq 4^\circ$  :: 30.37%  
 $> 4^\circ$  :: 10.65%

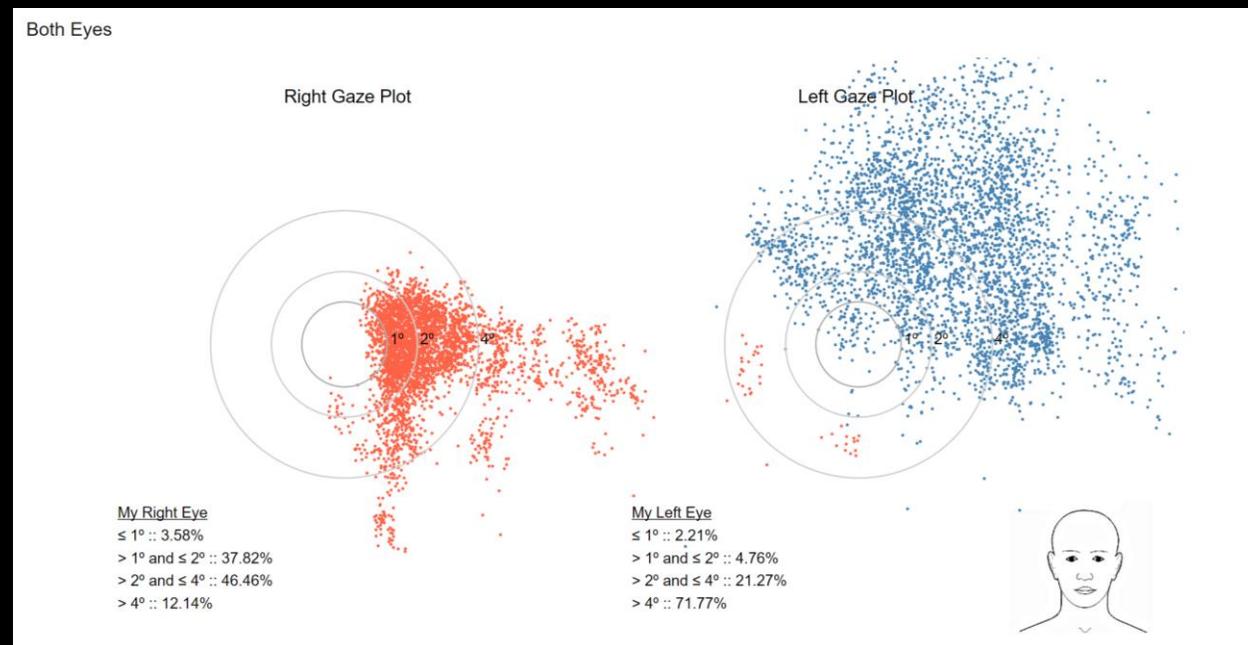
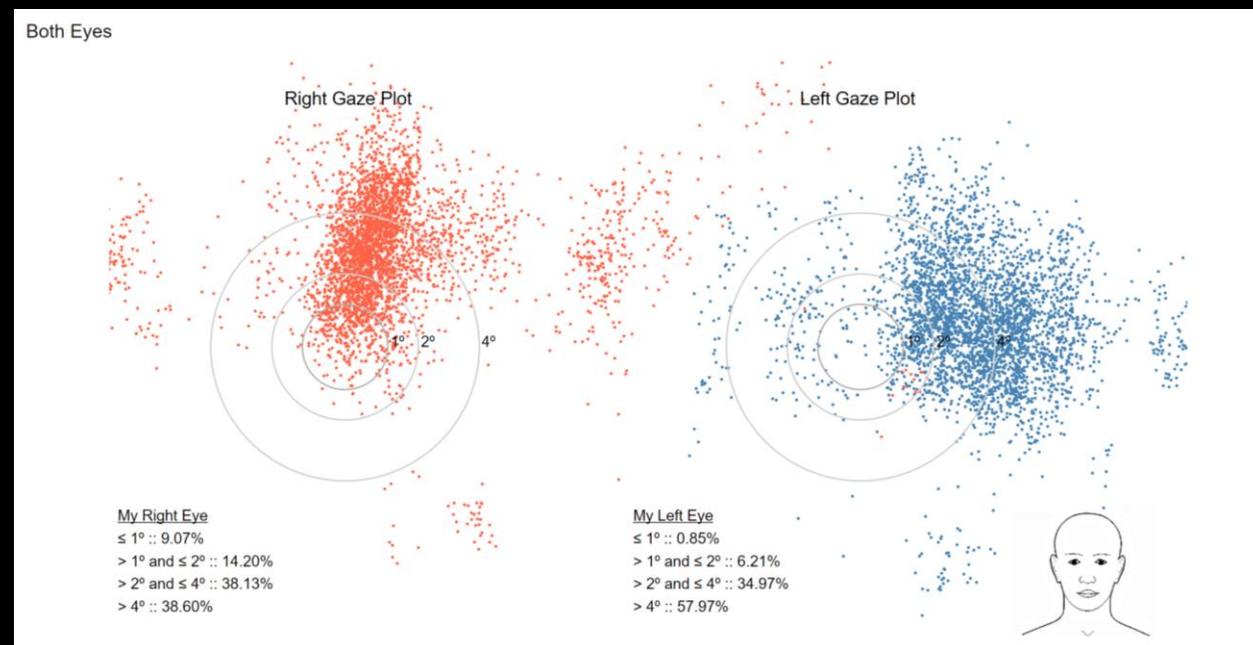


With Chin Rest

# NIDEK MP-3 RESULTS OF A 22 YEAR OLD FEMALE WITH HISTORY OF 2 STRABISMUS SURGERIES



# RIGHT EYE RESULTS OF A 22 YEAR OLD FEMALE WITH HISTORY OF STRABISMUS SURGERIES



With Chin Rest

# THOUGHTS AT THIS TIME

Both devices are convenient in use

The RightEye Fixation Stability Test results are not significantly different with and without a chin rest

RightEye can test right eye, left eye, or binocular

Nidek MP-3 can test right eye or left eye

RightEye gives a detailed graphic depiction of fixation

Nidek MP-3 displays fixation on a color fundus photograph

Further analysis of data will be performed