Steady State Pattern Electroretinography (ssPERG) in Age-Related Macular Degeneration (AMD) compared to controls.

Peter H. Derr[1], Alberto Gonzalez-Garcia[1], Carlos Urgiles[2], Priyanka Seshadri[2], Ronald Gentile[2,3], Richard Rosen[2], Celso Tello[2],

[1]Diopsys Inc. Pine Brook, NJ, [2]Einhorn Clinical Research Center and Departments of Ophthalmology, New York Eye & Ear Infirmary, Mt. Sinai Health System, New York, NY and New York Medical College, Valhalla, NY, [3]Department of Ophthalmology, Winthrop University Hospital, Mineola, NY.

Purpose

To evaluate the ssPERG in eyes with AMD compared to normal controls.

Methods

Nineteen eyes of 19 patients with AMD (7 dry, 12 neovascular or wet) were enrolled. The ssPERGs were recorded from each patient's selected eye using the Diopsys NOVA Vision Testing System (Diopsys, Inc. Pine Brook, NJ) following best-corrected visual acuity (BCVA) testing. Two concentric field sizes (large and small) were presented during each recording. Concentric field size ratios (CFR) were calculated by dividing the small field magnitude by the large field magnitude. Dry AMD and wet AMD eyes were compared to 24 normal controls. Area-under-curve (AUC) analyses of the ssPERG parameters were performed. One-way ANOVA analysis was used to compare the large field magnitudes and the CFR of the AMD eyes to the controls and linear regression analysis was used to investigate the relationship between the ssPERG and LogMAR BCVA.

Results

Mean LogMAR BCVAs for the groups were 0.139±0.13 (dry AMD), 0.206±0.160 (wet AMD), and 0.034±0.09 (controls). The mean large field magnitude ssPERG responses for the dry (0.996±0.378uV) and wet AMD (1.053±0.445uV) eyes were similar, both significantly less then that of the normal control eyes (1.673±0.497uV), (p=0.0024, p=0.0009, respectively). The control eyes had a mean CRF of 0.705(±0.145) compared to the dry and wet AMD eyes, 0.912(±0.119) (p=0.0018) and 0.937(±0.234) (p=0.0008), respectively. The AUC of dry AMD eyes compared to controls was 0.88 (0.71 – 1.00) and the AUC of wet AMD compared to controls was .86 (0.73 – 0.99). Linear regression analysis revealed the following relationship: CFR = 0.715 + 0.891BCVA, (p < 0.0001).

Conclusions

ROC analysis of the ssPERG responses may provide a way to discriminate both dry and wet AMD eyes from healthy eyes. The ssPERG may also be beneficial in detecting early visual function loss due to macular degeneration and may prove to be useful in monitoring the treatment of AMD.

**CONTACT INFO:** Peter Derr, PE pderr@diopsys.com
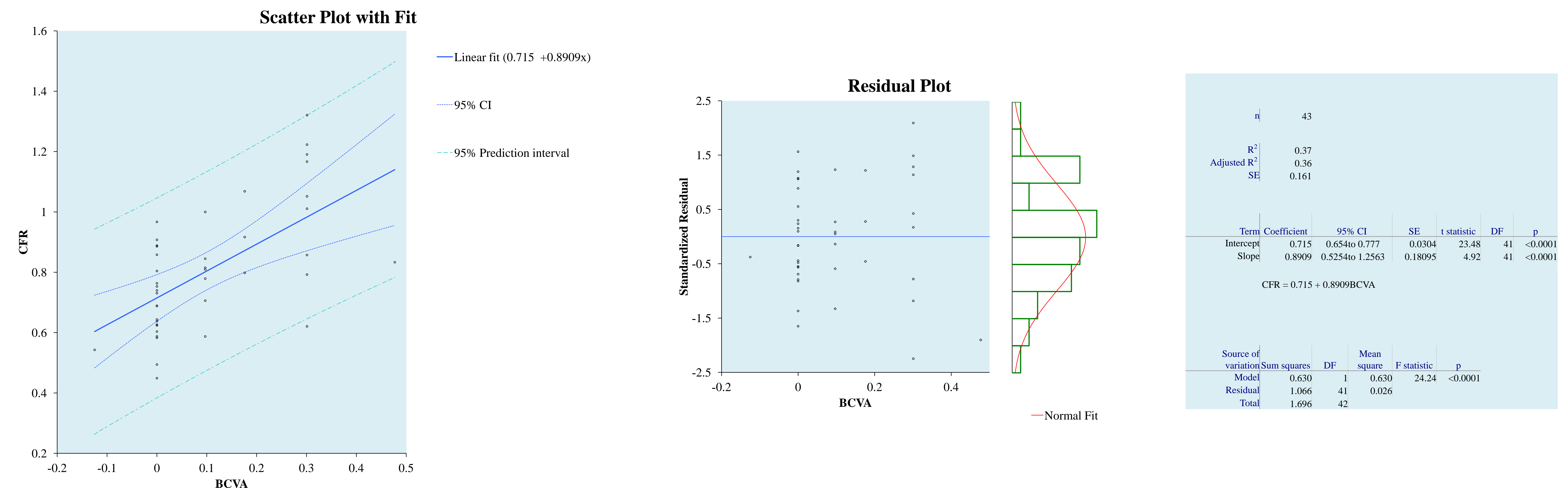
Figure 1. Scatter plot of the Concentric Field Ratio (CFR) versus the BCVA. Standardized Residual plot of the CFR versus BCVA plot. The residuals are within 3 standard deviations and the data is normally distributed.
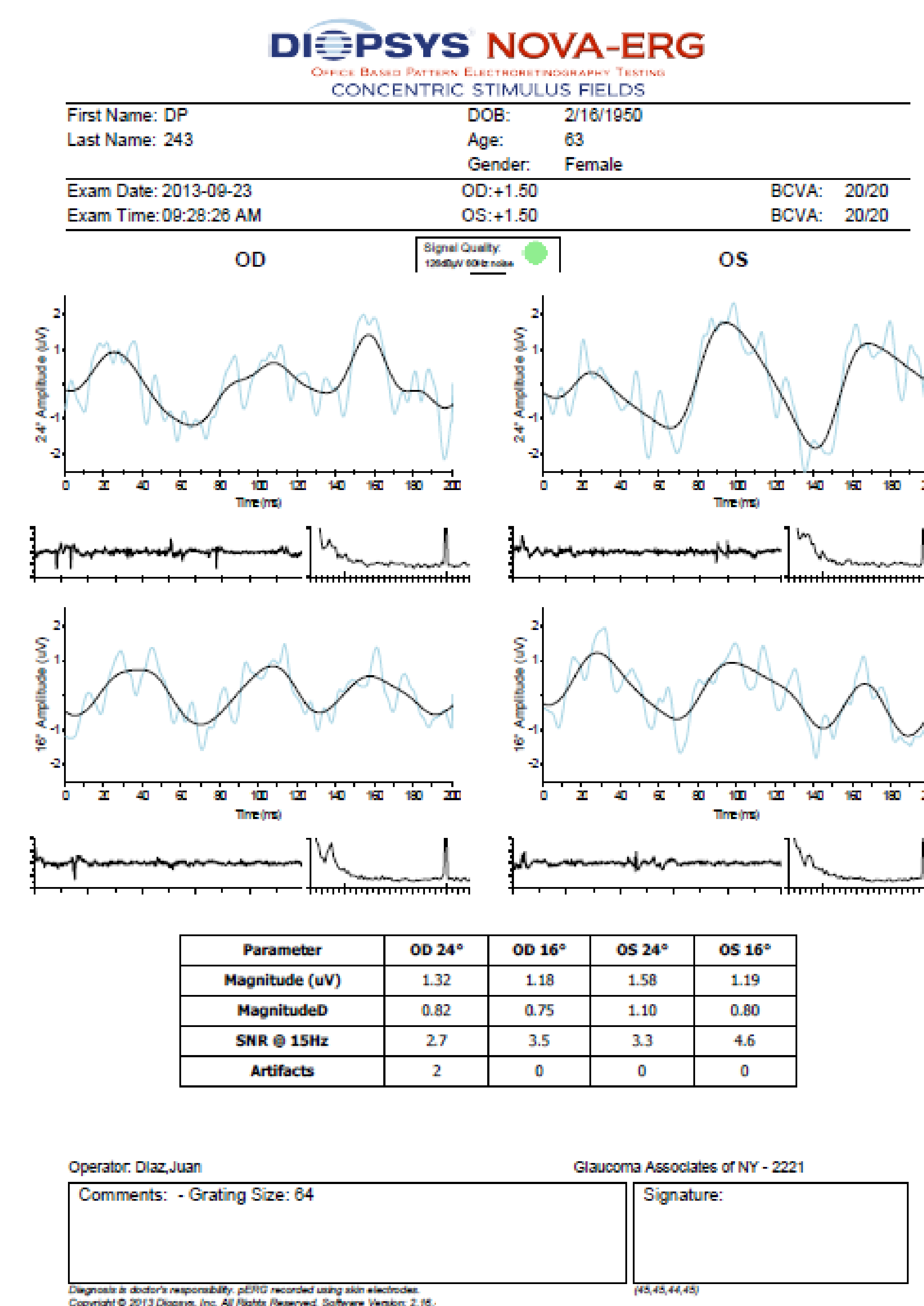
Figure 2. Patient was classified as normal for the left eye. The Concentric Field Ratio (CFR) for OS is 0.75. The Large Field Magnitude of OS is greater than 1.2 uV. OD's acuity was logMAR 0.602, while OS's acuity was logMAR 0.0.
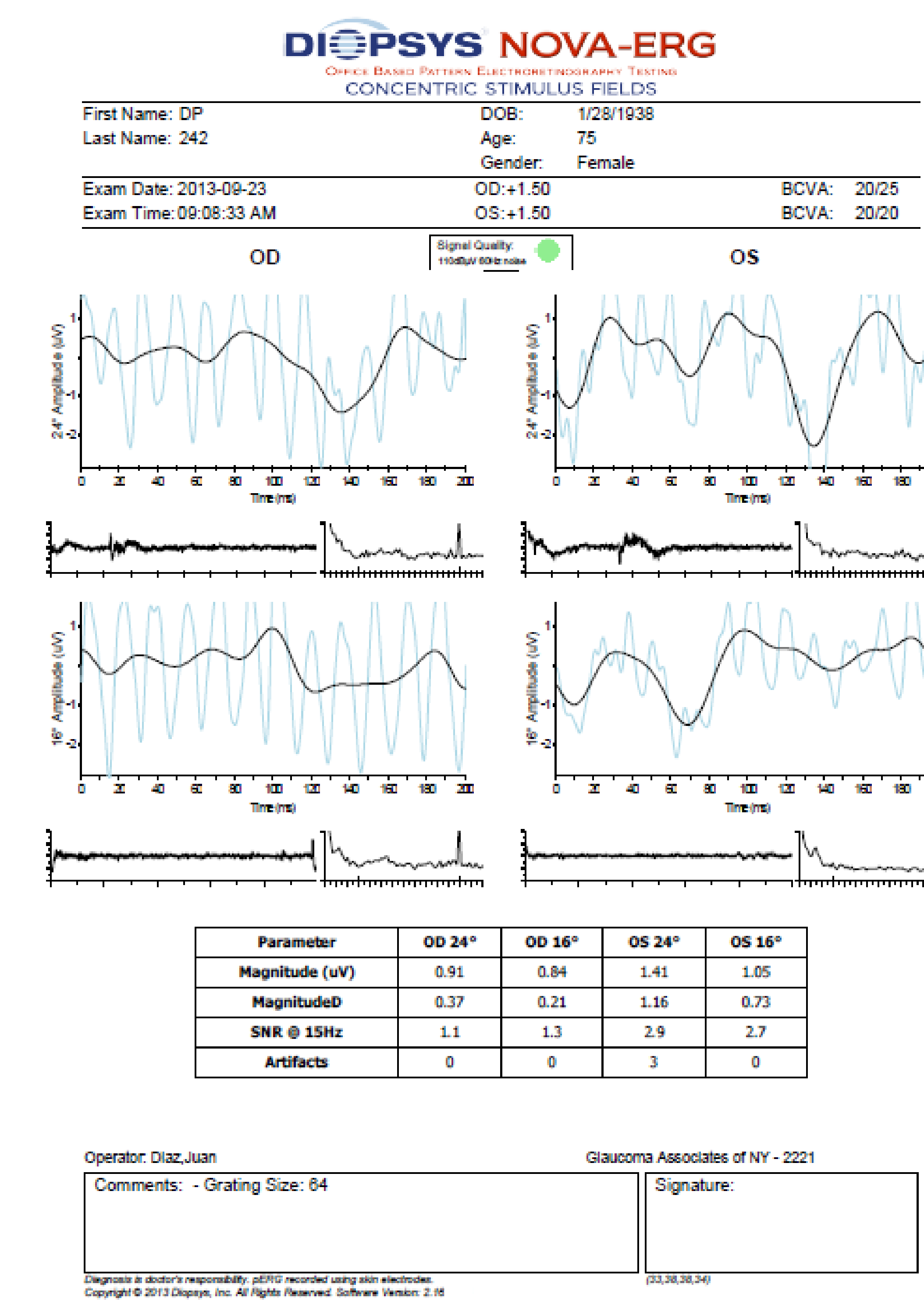
Figure 3. Patient classified as having Dry AMD in the right eye. CRF for OD is .92. The Magnitude of OD is significantly less 1.2 uV. OD's acuity was logMAR 0.097. OS is considered normal with a CRF of .72 and Large Field Magnitude > 1.2
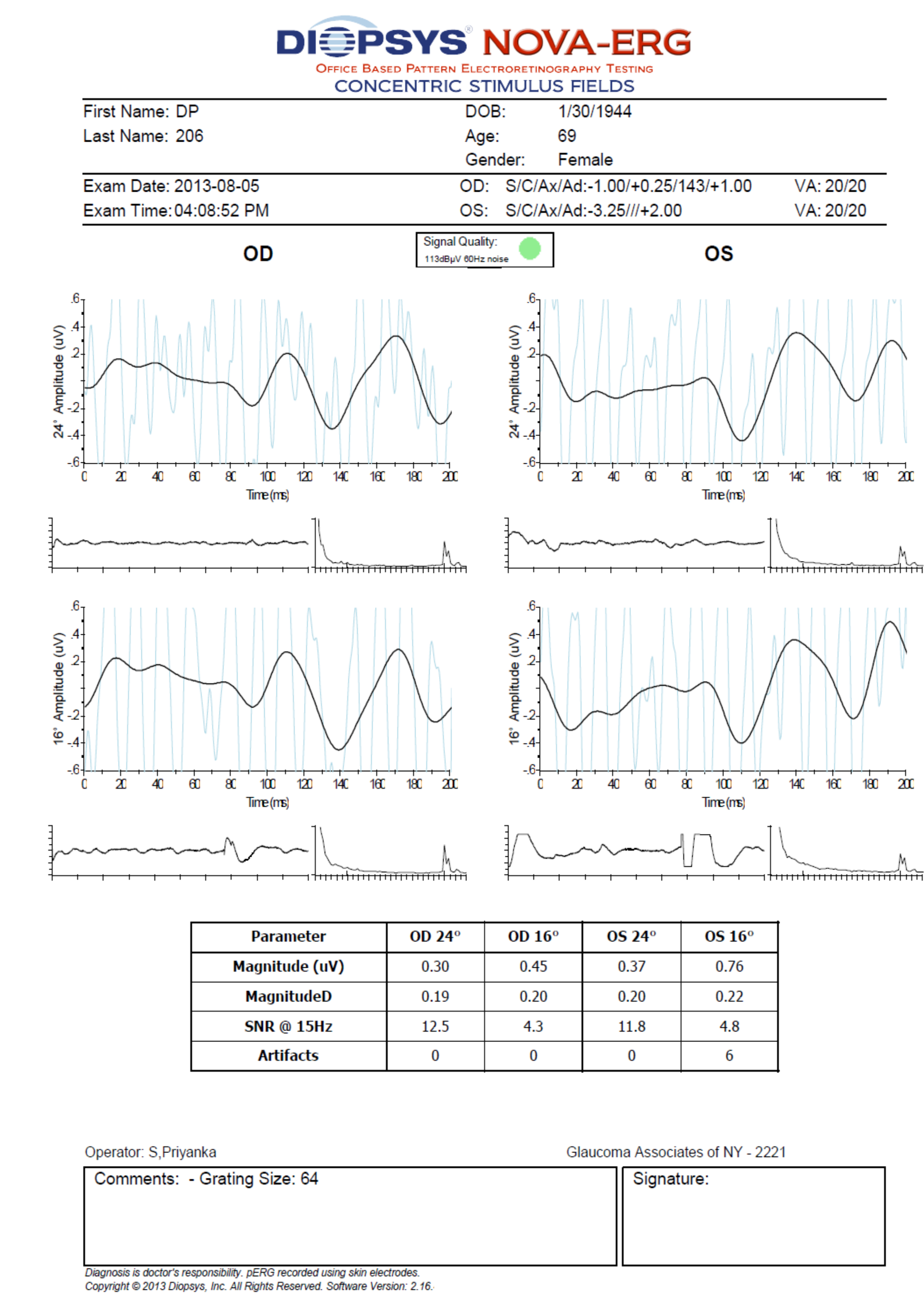
Figure 4. Patient classified as having Wet AMD in OD. CRF for OD is 1.5. However, the Magnitude of OS is significantly less 1.2 uV. OD's acuity was logMAR 0.0.