



Repeatability of Fast Transient Visual Evoked Potentials in Normal Subjects

J. Patel¹, C. Tello², P.H. Derr¹, C.G.V. De Moraes², E. Kim², T.S. Prata², J.M. Liebmann^{2,3}, R. Ritch². ¹Diopsys Inc, Pine Brook, NJ; ²Einhorn Clinical Research Center, New York Eye and Ear Infirmary, New York, NY; ³NYU School of Medicine, New York, NY.

Purpose: To evaluate the within-session repeatability of a new fast transient visual evoked potential (tVEP) device testing normal individuals.

Methods: We tested 30 normal subjects (20/20 visual acuity, normal 24-2 SITA Standard VF) with tVEP. Test duration was 20 seconds/eye. Synchronized single-channel tVEPs were recorded using a modified Diopsys Infant System (Diopsys, Inc., Pine Brook, New Jersey, USA), which generated a time series of 240 data points per analysis window. Two checkerboard contrast reversal patterns were used in the study: 85% and 10% Michelson contrast. Each eye was tested 10 times (5 with 10% and 5 with 85% contrast). The stimulus was presented on an LCD monitor optically adjusted for < 4% residual flicker. The following parameters were identified from the filtered N75-P100-N135 complex: N75 amplitude, N75 latency, P100 amplitude, P100 latency, Delta P100-N75 amplitude, and Delta P100-N75 latency. The standard deviations for the five tVEPs for each OS, OD and OU at each contrast level were calculated. The standard deviations for OD were grouped into two data sets based on contrast level.

Results: Mean age was 27.3±5.2 yrs. The total number of tests was 300 [30 patients x 5 (re-tests) x 2 (10% and 85% contrast levels)]. The results were bilaterally filtered with bandpass frequencies of 5 Hz to 30 Hz. Only the right eye was evaluated. The mean P100 latency at 10% and 85% contrast were 114.7 ms (95% CI: 112.6-116.7) and 102.3 ms (101.5-105.1), respectively. The table summarizes the repeatability data. The N75-P100 amplitudes were 5.3uV (4.5– 6.1) and 8.0uV (6.2-9.8), respectively.

Conclusions: The device using our procedure showed good within-session repeatability for both contrast levels.

Mean values of tVEP parameters. Right Eye Only

Contrast 10 % (30 Samples x 5 Trials each = 150 Tests)

Parameter	Mean	95% CI Range	Median	95% CI Range
P100 Latency(ms)	114.7	(112.6 - 116.7)	115.1	(112.0 - 117.7)
Delta Amplitude (P100-N75) (uV)	5.35	(4.54-6.16)	4.62	(4.12 - 5.89)

Contrast 85% (30 Samples x 5 Trials each = 150 Tests)

Parameter	Mean	95% CI Range	Median	95% CI Range
P100 Latency(ms)	102.3	(101.5 - 105.1)	104	(99.96 - 106.00)
Delta Amplitude (P100-N75) (uV)	8	(6.23 - 9.78)	7.12	(5.14 - 9.31)

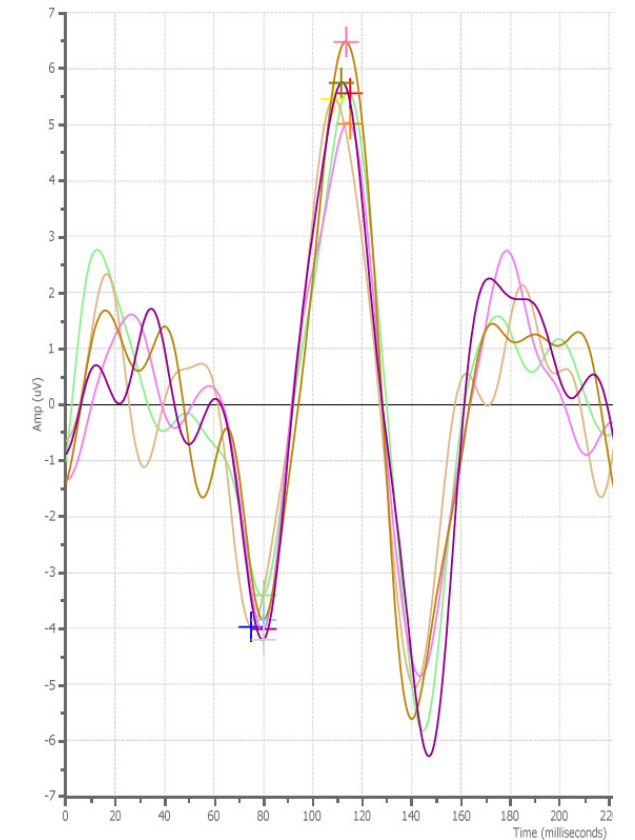
10 Percent Parameters (Mean of Standard Deviations)

	n	Mean	95% CI	SE	SD
N75 Absolute Amplitude (uV)	30.00	0.49	0.40 - 0.58	0.04	0.24
N75 Absolute Latency (mS)	30.00	7.32	5.60 - 9.04	0.84	4.60
P100 Absolute Amplitude (uV)	30.00	1.16	0.96 - 1.36	0.10	0.54
P100 Absolute Latency (mS)	30.00	5.71	4.01 - 7.42	0.83	4.56
Delta Amplitude (N75 - P100) (uV)	30.00	1.43	1.22 - 1.64	0.10	0.57
Delta Latency (N75 - P100) (mS)	30.00	6.95	5.70 - 8.21	0.61	3.35

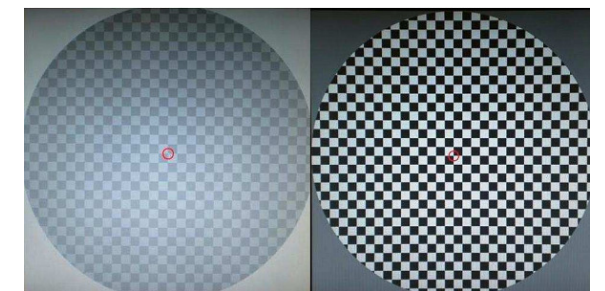
85 Percent Parameters (Mean of Standard Deviations)

	n	Mean	95% CI	SE	SD
N75 Absolute Amplitude (uV)	30.00	0.71	0.56 - 0.87	0.07	0.41
N75 Absolute Latency (mS)	30.00	3.79	2.57 - 5.02	0.60	3.28
P100 Absolute Amplitude (uV)	30.00	0.93	0.70 - 1.17	0.12	0.63
P100 Absolute Latency (mS)	30.00	2.96	2.10 - 3.84	0.43	2.33
Delta Amplitude (N75 - P100) (uV)	30.00	1.33	1.03 - 1.60	0.15	0.82
Delta Latency (N75 - P100) (mS)	30.00	3.85	2.35 - 5.34	0.73	4.01

A sample of 5 tests run at 85% contrast with a 3 minute interval between tests.



Stimulus screens presented at 10% and 85% contrast with a check size of 41.39 arc minutes.



Disclosures

J. Patel, Diopsys, E; C. Tello, Diopsys, Inc., R; P.H. Derr, Diopsys, E; C.G.V. De Moraes, None; E. Kim, None; T.S. Prata, None; J.M. Liebmann, Diopsys, R; R. Ritch, Diopsys, R.

References

Bray, L.S., Mitchell, K.W., Howe, J.W., et al. (1992). Visual function in glaucoma: a comparative evaluation of computerized static perimetry and the pattern visual evoked potential. Clin Vis Sci, 7, 21-29.
 Odom, J.V., Bach, M., Barber, C, et al. (2004). Visual evoked potentials standard. Doc Ophthalmol, 108, 115-123.
 Shaw, N.A., & Cant, B.R. (1981). Age-dependent changes in the amplitude of the pattern visual evoked potential. Electroencephalogr Clin Neurophysiol, 51, 671-673