

Comparison of Peripheral Visual Fields
on Non-dilated and Dilated Eyes

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INTRODUCTION

With the increased use of diagnostic pharmaceutical agents, optometrists may occasionally face a dilemma. After a dilated fundus examination, there may appear to be reason for peripheral visual field evaluation. A question then arises: what effect will the dilation have on the subsequent visual fields, and if the results are valid, how can they be compared to previously recorded visual fields performed under non-dilated conditions at the same isopter?

METHODS

Peripheral visual fields of twenty eyes were evaluated during undilated and dilated conditions. Each subject was determined to be free of ocular pathology, had 20/20 correctable vision and was between twenty and thirty years of age.

Visual field evaluations were performed with the Dikon Auto Perimeter 2000. Each subject's visual field was tested from thirty to eighty degrees without optical correction. Static perimetry was utilized testing seventy-four points at a stimulus intensity of 160 Asb, a bowl luminance of 31.50 Asb, and stimulus duration of 1.00 second. This is the equivalent of Goldmann I-3b. Fixation was monitored utilizing the Heijl-Krakau method, in which the reliability of patient fixation was determined by frequent stimulus presentations in the blind spot. These fixation checks occurred at least every sixth stimulus presentation. If a subject responded to a blind spot stimulus, a fixation loss was recorded, and all points tested since the last fixation check were repeated. To improve the overall reliability of the study, any subject with more than three fixation losses was omitted.

Each dilation was achieved with one drop of each of the following agents: 1% Proparacaine, 1% Tropicamide, 2½% Phenylephrine. Pupil size of 8mm or greater resulted from all dilations.

RESULTS

Recorded in Table 1 are the number of points missed during the seventy-four point peripheral visual field evaluations during both non-dilated and dilated states. Additionally, the difference between the two (d_i) is recorded. In Table 2, the calculations are shown for the determination of the mean difference (\bar{d}) the standard deviation (Sd), and the formulation of t calc. The t calc is used to determine if there is any statistical difference between two groups, such as a before and after comparison. In this case, the null hypotheses was that no significant difference existed between the two groups (non-dilated vs. dilated). The results of the t calc show that the null hypotheses is statistically shown to be true with a high level of confidence.

PATIENT:	TEST RESULTS:	BLINDSPOT RESULTS
Right Eye CORRECTION: sc	ELAPSED TIME: 5:07	+ + + +
<u>TEST PARAMETERS:</u> PATTERN: Peripheral 30 - 80 F METHOD: Suprathreshold	TOTAL POINTS: 74 MISSED IN BLINDSPOT: 21 FIXATION LOSSES: 0	+ + + + + + + +
STIMULUS INTENSITY: 160 Asb GOLDMANN: I-3b BOWL LUMINANCE: 31.50 Asb STIMULUS DURATION: 0.40 Sec STIMULUS INTERVAL: 1.00 Sec FIXATION MONITOR: Normal AUDIO LEVEL: 4	- SEEN POINTS + MISSED POINTS: 74 COOPERVISION DIAGNOSTICS AUTOPERIMETER 2000 (C) 1983	+ + + + + + + + + + + + + 840514- 5299-30000

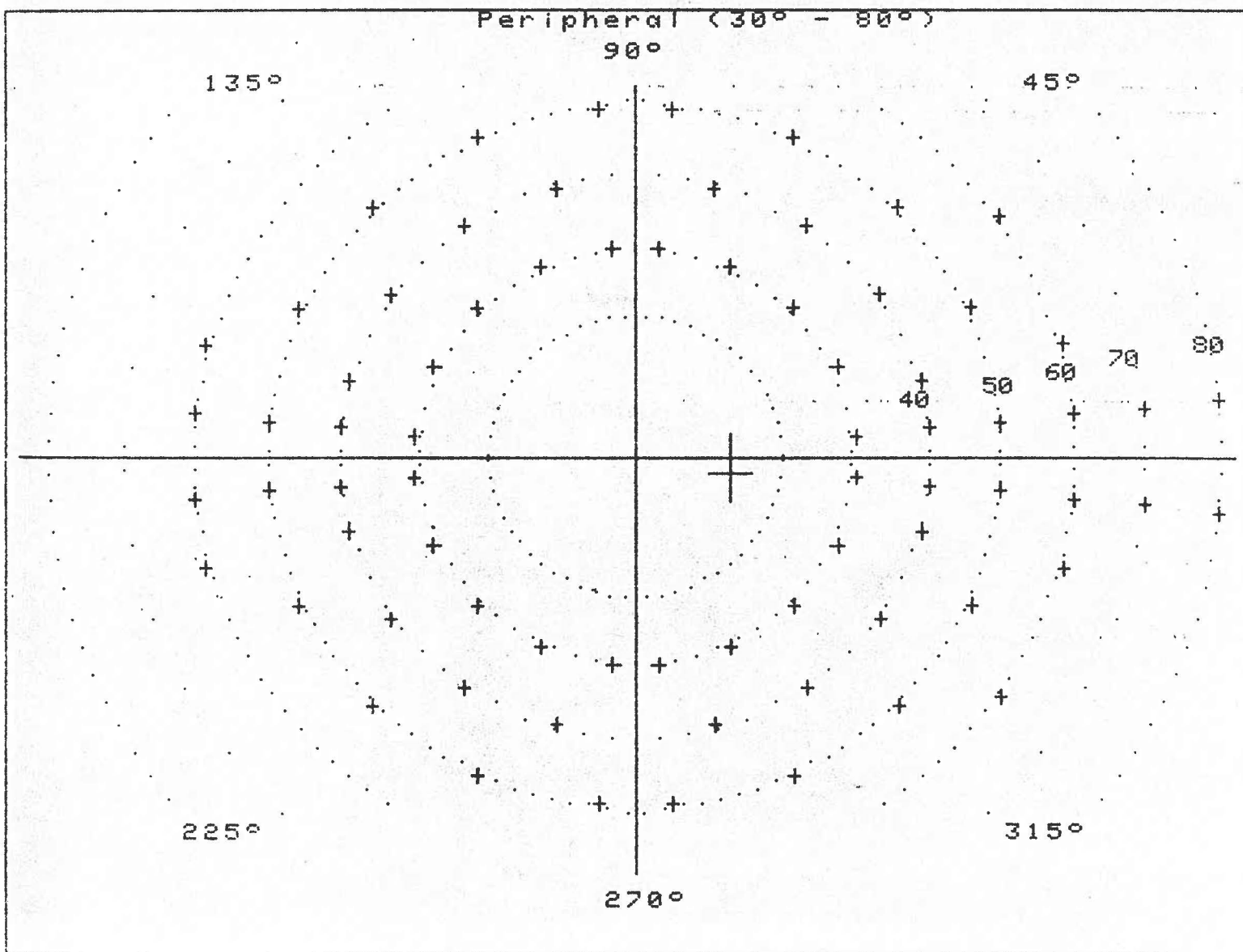


TABLE 1

Subject	Number missed non-dilated	Number missed dilated	Difference (di)
1	16	12	-4
2	24	10	-14
3	20	11	-9
4	13	13	0
5	28	10	-18
6	20	15	-5
7	4	4	0
8	6	8	+2
9	8	13	+5
10	7	14	+7
11	7	14	+7
12	13	10	-3
13	23	32	+9
14	17	28	+11
15	18	28	+10
16	28	17	-11
17	8	7	-1
18	8	9	+1
19	22	16	-6
20	11	16	+5

TABLE 2

$$\bar{d} = \frac{\sum d_i}{n} = -0.7$$

$$Sd^2 = \frac{n \sum d_i^2 - (\sum d_i)^2}{n(n-1)} = 66.01$$

$$Sd = 8.12$$

$$t \text{ calc} = \frac{\bar{d}}{Sd / \sqrt{n-1}} = \frac{-0.7}{8.12 / \sqrt{19}} = -0.376$$

Ho: $\mu d = 0$; no significant difference in the two samples

Hi: $\mu d \neq 0$; a significant difference exists between the two samples.

The null hypotheses is statistically proven with a high level of confidence.

DISCUSSION

As stated previously, all of the subjects in this study had healthy eyes and were of a relatively young age. Further study needs to be done to determine if peripheral visual fields can be considered valid when performed on dilated eyes of patients with various types of ocular pathology. For example, what would be the effect of nuclear sclerosis? The sclerosis would cause optical scatter which would reduce the extent of the peripheral visual field; however, it is unknown whether the dilation would increase or decrease the effects of the scatter.

Additionally, this study examined only one isopter, the equivalent of Goldmann I-3b. Expansion of this study needs to be performed to determine if the results of this study hold true at different isopters. If other isopters do not conform to the hypotheses of this study, it will be impossible to determine if any defects found are absolute or relative.

Yet another point to consider is that this study examined only peripheral visual fields. It was assumed that central visual fields would be unchanged if the proper optical correction were utilized. This, however, needs to be proven with clinical study.

CONCLUSIONS

It has been statistically shown that there is no difference between the peripheral visual fields of non-dilated eyes of young patients with healthy eyes. However, further study needs to be done before the results of this study can be extrapolated to other populations.