PRESBYOPIC REFRACTION: MANIFEST vs. MYDRIATIC

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OBJECTIVE: Ascertain whether or not presbyopes demonstrate any clinically significant refractive change with mydriasis.

METHOD: Direct comparison between manifest subjective refraction and subjective refraction obtained after inducing mydriasis (tropicamide alone or in combination with phenylephrine), using spherical equivalents.

POPULATION: Subjects ranged in age from 42 to 68, with mean age 61 and median 63. Total number of subjects was 20 with 18 males. 75% of the subjects manifest refractive errors with spherical-equivalents greater than or equal to zero.

DATA:

	MANIFEST REFRACTION	MYDRIATIC REFRACTION	SPHERE EQUIV CHANGE
1	+1.25	+1.25	0
	+0.75 <> -1.25 X 068	+0.50 <> -1.25 X 068	-0.25
2	plano	plano	0
	plano	plano	0
3	+2.75 <> -1.25 X 018	+3.00 <> -1.25 X 018	+0.25
	+2.00 <> -0.50 X 002	+2.25 <> -0.50 X 002	+0.25
4	+0.50 <> -0.50 X 100	+0.50 <> -0.50 X 100	0
	pl <> -1.00 X 077	pl <> -1.00 X 077	0
5	+0.50 <> -0.50 X 070	+0.75 <> -0.75 X 070	+0.125
	+1.25 <> -1.00 X 105	+1.50 <> -0.75 X 108	+0.375
6	+3.00 <> -1.00 X 174	+3.00 <> -1.00 X 174	0
	+2.50 <> -0.50 X 165	+2.50 <> -0.50 X 165	0
7	+2.75 <> -1.25 X 108	+3.00 <> -1.25 X 105	+0.25
	+2.00	+2.00	0
8	-8.00 <> -1.75 X 092	-8.00 <> -1.75 X 092	0
	-2.75	-3.50	-0.75
9	+0.50 <> -1.00 X 095	+0.50 <> -1.00 X 095	0
	+0.50 <> -0.50 X 085	+0.50 <> -0.50 X 085	0
10	+1.25 <> -0.75 X 091	+1.25 <> -0.75 X 117	axis
	-0.75 <> -0.50 X 065	-0.75 <> -0.50 X 047	axis
11	+0.25 <> -0.50 X 061	+0.25 <> -0.50 X 061	0
	-0.25	-0.25 <> -0.50 X 126	-0.25
12	+2.50	+2.25	-0.25
	+2.50	+2.25	-0.25
13	+2.50	+2.50	0
	+2.00	+2.50	+0.50

	MANIFEST REFRACTION	MYDRIATIC REFRACTION	SPHERE EQUIV CHANGE
14	+1.75 <> -0.75 X 065	+2.00 <> -0.75 X 065	+0.25
	+1.25 <> -0.75 X 090	+1.50 <> -0.75 X 105	+0.25, axis
15	+2.00 <> -1.25 X 075	+1.75 <> -1.25 X 075	-0.25
	+2.50 <> -1.50 X 100	+2.50 <> -1.50 X 100	0
16	+3.00 <> -1.00 X 180	+2.75 <> -1.00 X 180	-0.25
	+2.50 <> -0.50 X 111	+2.50 <> -0.50 X 111	0
17	+4.75 <> -4.75 X 089	+5.00 <> -4.75 X 089	+0.25
	+4.75 <> -4.00 X 079	+5.00 <> -4.00 X 079	+0.25
18	+1.00 <> -0.75 X 171	+1.00 <> -0.75 X 171	0
	+1.25 <> -0.75 X 015	+1.25 <> -0.75 X 015	0
19	+0.50	+0.25	-0.25
	+0.50 <> -0.25 X 154	+0.25 <> -0.25 X 154	-0.25
20	+1.75	+1.75	0
	+1.50	+1.50	0

DATA ANALYSIS

- 7 subjects (35%) demonstrated bilateral change, all exhibiting the same direction of change (plus or minus) for both eyes, with 4 of these subjects displaying equal magnitude of change O.D. and O.S. and 1 showing assymmetry of .25 diopter. One subject changed only in axis, and the largest change in these 6 was .375 diopters. 4 subjects increased in hyperopia and 2 in myopia in the mydriatic state.

- 7 subjects (35%) displayed unilateral shifts ranging from -0.75 to +0.50 in the mydriatic state. 5 shifted toward myopia, 4 by 0.25 D. and the other by 0.75 D. The hyperopic shifts were 0.25 and 0.50 D.

- 6 subjects (30%) showed no refractive change O.D. or O.S.

- The mean magnitude of all myopic changes was 0.32 D.

- The mean magnitude of all hyperopic changes was 0.28 D.

- The mean myopic change was 0.25 D. for bilateral shifts and 0.35 D. for the unilateral shifts.

- The mean hyperopic change was 0.25 D. for bilateral shifts and 0.38 D. for the unilateral shifts.

- Axis change greater than 10 degrees was noted unilaterally in one subject and bilaterally in 1 subject.

CONCLUSIONS

Subjective refraction, for some individuals, may be influenced by the state of mydriasis, but the inherent degree for variability in subjective testing may also be reflected in serialized measurements. Based on the findings with this population it appears as though the majority of presbyopes, for reasons related to mydriasis or subjective variance, can be expected to demonstrate some clinically measurable deviation from manifest refraction should a mydriatic refraction be performed. Frequency of unilateral or bilateral refractive change was essentially equal (35% each) for the study population. The fairly even distribution of subjects into categories representing no change, unilateral change, or bilateral change suggest random occurrence.

As a clinical consideration, patients typically perform their daily activities in a non-mydriatic state. It would seem logical that,in a presbyopic patient, a properly performed refraction under the most natural conditions would be most useful. Regardless of preferred technique, utilizing it consistently may provide the best continual care, possibly minimizing difficulties with spectacle adaptation.

REFERENCES

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