PAREMYD VS 1% TROPICAMIDE/2.5% PHENYLEPHRINE

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ABSTRACT

Background: As the scope of optometry expands to cover not only diagnosis, but treatment as well, more optometrists will dilate pupils regularly, although inconveniencing their patients. This article compares two mydriatic regimens: 2.5% phenylephrine/1.0% tropicamide and 1.0% hydroxyamphetamine/0.25% tropicamide. The onset and amount of maximal dilation, the patient's subjective evaluation of cycloplegic and photosensitivity inconvenience, and the clinician's subjective evaluation of ease of ophthalmoscopy were assessed.

Methods: One hundred forty subjects were dilated with phenylephrine/tropicamide or hydroxyamphetamine/tropicamide randomly. Mydriatic and cycloplegic effects were measured. Patients were later surveyed regarding their subjective evaluation.

Results: The onset and amount of mydriasis, as well as photosensitivity, were similar between the two regimens. Hydroxyamphetamine/tropicamide had less effect on cycloplegia than phenylephrine/tropicamide both objectively and subjectively. The clinicians noted some differences in the ease of ophthalmoscopy.

Conclusions: Pupillary dilation can be achieved by a variety of mydriatic regimens. Hydroxyamphetamine/tropicamide and phenylephrine/tropicamide have their advantages and disadvantages. In the future, a balance may be achieved to allow the clinician thorough eye examination while minimizing patient inconvenience.

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INTRODUCTION

Over the past ten years the professional responsibilities of optometrists have changed dramatically. As states have enacted laws that allow optometrists to use mydriatic drugs, and the courts have established standards for their utilization, there has been a movement toward increased use of pupillary dilation within optometry. This has created a dilemma for the modern optometrist. In order to thoroughly evaluate the retina and its periphery, the optometrist requires a dilated pupil that does not constrict in response to an intense, bright light. However, the resultant photosensitivity and cycloplegia that patients experience is a tremendous inconvenience. As a result, optometrists must struggle with which mydriatic to use in order to produce adequate pupillary dilation while minimizing patient inconvenience and discomfort.

The ideal mydriatic regimen would be one that facilitates quick, maximal dilation of the pupil, minimal cycloplegic and mydriatic recovery times, and no systemic side effects. This criteria excludes the parasympatholytic agents such as homatropine, hydrobromide, scopolamine, and cyclopentolate hydrochloride from consideration as the ideal mydriatic since their mydriatic effect is greater than 24 hours and they have significant side effects (Molinari, 781-784). This is also true for sympathomimetic agents such as phenylephrine hydrochloride (Neosynephrine) and hydroxyamphetamine hydrobromide (Paredrine) which have a slow onset

for maximum dilation and do not maintain adequate dilation under intense illumination (2-4).

Dapiprazole (Rev-Eyes), an alpha-adrenergic receptor blocker, has been advocated as a means to reverse mydriasis and in doing so, decrease patient discomfort. Recent studies have shown that Dapiprazole can reverse mydriasis and, to a limited extent, cycloplegia. However, the Dapiprazole-treated eye has a significantly larger pupil when compared to baseline throughout the 2 hour evaluation (6-8). Additionally, the use of Dapiprazole results in a variety of side effects, such as mild to moderate hyperemia and chemosis in a large percentage of patients (8). Thus, Dapiprazole does not appear to be a significant aid in the search for the ideal mydriatic regimen.

It has long been recognized that combining a sympathomimetic agent with a parasympatholytic agent resulted in a better mydriasis (2). There have been several comparative studies which have attempted to determine which combination of agents rendered the best mydriatic regimen (2-5). Two of the most commonly studied drug regimens are the phenylephrine-tropicamide combination and the hydroxyamphetamine-tropicamide combination. Semes and Bartlett compared 4 different mydriatic regimens; 1% hydroxyamphetamine hydrobromide and 1% tropicamide, 1% hydroxyamphetamine alone, 2.5% phenylephrine alone, and 2.5% phenylephrine in combination with 1% tropicamide. They concluded that the mydriasis induced by the 1% hydroxyamphetamine hydrobromide-1% tropicamide was equal in mydriatic effectiveness to the 2.5% phenylephrine-1% tropicamide combination and superior to the mydriasis achieved by either

phenylephrine or hydroxyamphetamine hydrobromide alone. What Semes and Bartlett did not investigate was the effect these different regimens had on pupillary dilation beyond 1 hour post instillation of the drops and the patients evaluation of inconvenience. In a similar study Paggiarino and colleagues found that tropicamide alone, or in combination with either 2.5% or 10% phenylephrine had a mydriatic effect lasting longer than 7.0 hours (5). Again, this study did not investigate the patients perceived inconvenience, but instead centered only on the onset and time course of mydriasis.

While there have been many studies that have compared different drug regimens to one another, there does not appear to be a study that has investigated the patients perceived inconvenience of pupillary dilation of these different mydriatic regimens. While it is difficult, if not impossible, to investigate patient's subjective evaluation of pupillary dilation, it is an important avenue to investigate. The present day optometrist must provide quality care while maintaining patient happiness. Often patient happiness is influenced by convenience as much as by thoroughness of the examination. For this reason, this study compared two mydriatic regimens and compared their onset to maximum dilation, the patients' subjective evaluation of mydriatic and cycloplegic inconvenience and the clinicians' subjective evaluation of ease of binocular indirect ophthalmoscopy. The two topical ophthalmic drug regimens were one drop of 1% tropicamide in combination with one drop of 2.5% phenylephrine and one drop of 1% hydroxyamphetamine/0.25% tropicamide (Paremyd). Mydriatic agents

were instilled after the cornea was anesthetized for goldmann tonometry.

SUBJECTS AND MATERIALS

One hundred forty subjects included in the study were between 18 and 75 years of age, of which 95 were males. None of the subjects exhibited heterochromia. Of the one hundred forty subjects, 55 had brown irides, 49 had blue irides and 36 had hazel irides.

Baseline horizontal pupillary diameters were recorded using shaded semi-circle PD rulers. The horizontal pupil diameter was measured by superimposing the appropriately sized shaded semicircle on the inferior half of each eye. Baseline near point of accommodation was measured using the push-up method.

After all the subjects had been evaluated in the clinic, the subjects were divided into Group A and Group B. The subjects in Group A had one drop 1% tropicamide (Mydriacyl) instilled into the lower conjunctival cul-de-sac of each eye followed by 5 minutes later by one drop 2.5% phenylephrine (Neosynephrine) instilled into the lower conjunctival cul-de-sac of each eye. Group B had one drop 1% hydroxyamphetamine/0.25% tropicamide (Paremyd) instilled in the lower conjunctival cul-de-sac of each eye. Subjects were instructed to close their eyes for 30 to 60 seconds following instillation of the agents. The drugs used in this study were fresh preparations of commercially available agents.

Pupil size and near point of accommodation were measured using the techniques previously described at 10 minutes, 20 minutes, and 30 minutes post instillation of the second drop. Each clinician

subjectively evaluated his ease of binocular indirect ophthalmoscopy using a 10 point scale with one representing very easy to view the periphery and ten representing extremely difficult to view the periphery.

Subjects were contacted within 36 hours of their examination and asked to rate their perceived cycloplegic inconvenience and photosensitivity inconvenience on a 10 point scale with one representing no inconvenience and ten representing maximal inconvenience. Subjects were also asked for any additional comments or inconveniences that they had.

DISCUSSION

Tropicamide, which is available in .5% and 1% concentrations, is an anticholinergic drug with few systemic side effects. It lacks any vasopressor effect and is therefore one of the safest mydriatic agents--especially in patients with systemic hypertension, angina, or heart disease (9). One percent tropicamide has also been found to have no adverse side effects in neonates (10).

Phenylephrine, which is available in .12% to 10% concentrations, is an alpha 1 agonist. Phenylephrine has a marked vasopressor effect, especially in the 10% concentration. Phenylephrine is contraindicated in patients taking reserpine, guanethidine, and methyldopa. Phenylephrine should not be used in patients taking MAO inhibitors or tricyclic antidepressants even 21 days past their cessation. MAO inhibitors and tricyclic antidepressants potentiate the cardiovascular effects of phenylephrine. 2.5% phenylephrine yields no significant change in

blood pressure in adults. However, a 50% increase in systolic blood pressure has been noted in low birth weight infants with the same concentration (10). Ten percent phenylephrine should be avoided in patients with heart disease, systemic hypertension, aneurysms, and advanced arteriosclerosis.

Hydroxyamphetamine is an indirect acting alpha 1 agonist. It is safer for patients afflicted with IDDM or idiopathic orthostatic hypertension. It may also be a better mydriatic for shallow angle dilation since its indirect mode of action is more easily reversed with miotics (9).

RESULTS

Onset of dilation and the size of the dilated pupil were fairly similar between the two drug regimens 30 minutes post drop instillation. There was roughly a 4mm increase in pupil diameter with iris color having only a minimal influence on dilation. Younger patients typically had a larger pre-dilation and dilated pupil as compared to the older patients.

Cycloplegic inconvenience was the next area that was addressed. At 30 minutes post drug instillation, patients dilated with Paremyd retained an average of 54% of their accommodative ability while those dilated with the standard cocktail retained an average of 47%. This difference was also evident in the patient responses regarding cycloplegic inconvenience. Only 15% of patients' dilation with Paremyd ranked their cycloplegic inconvenience 7 or greater, versus the 29% dilated with phenylephrine/tropicamide regimen.

In so far as photosensitivity resultant of pupil dilation,

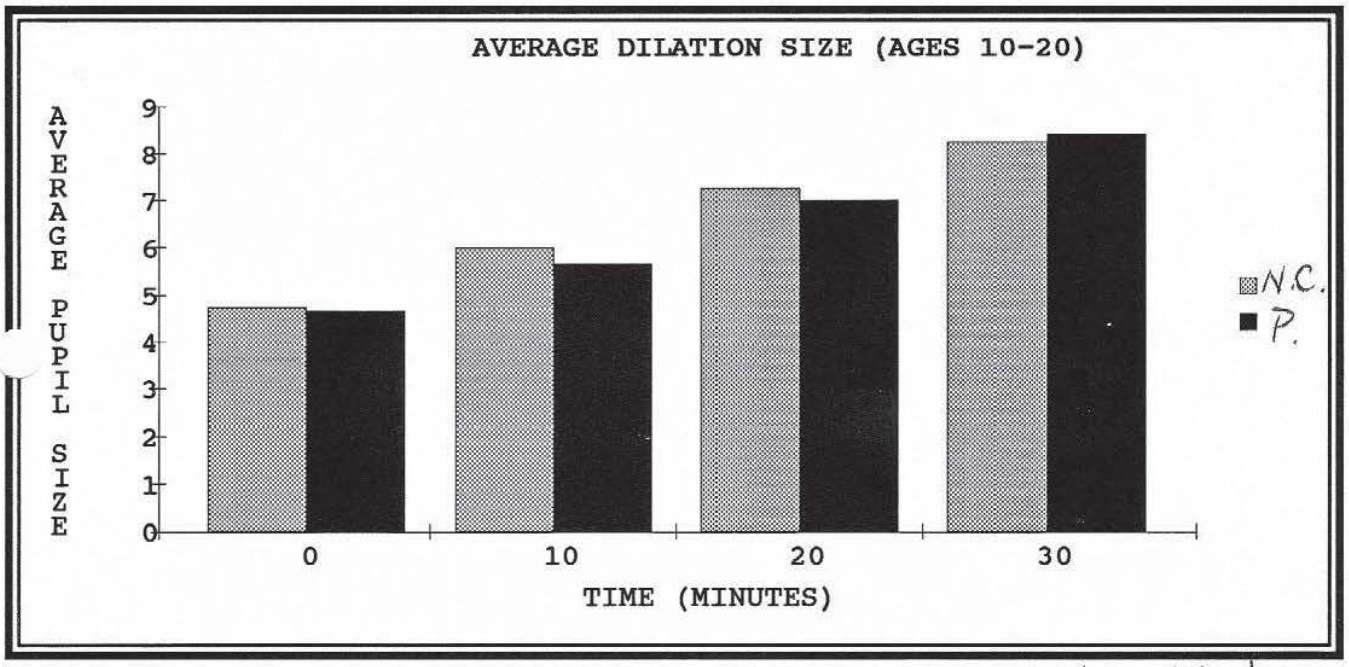
both regimens caused fairly equal amounts of photosensitivity. Patients' photosensitivity ratings ranged from 3 to 8, with the largest percentage being at 6.

Patients were provided additional space on the questionnaire for comments concerning their dilation. Fifteen percent stated near blur was bothersome. Eight percent commented that outdoor activities would have to be limited. Six percent reported difficulty with the drive and four percent complained of stinging pain upon drop instillation. Sixty-seven percent of patients surveyed had no additional comments.

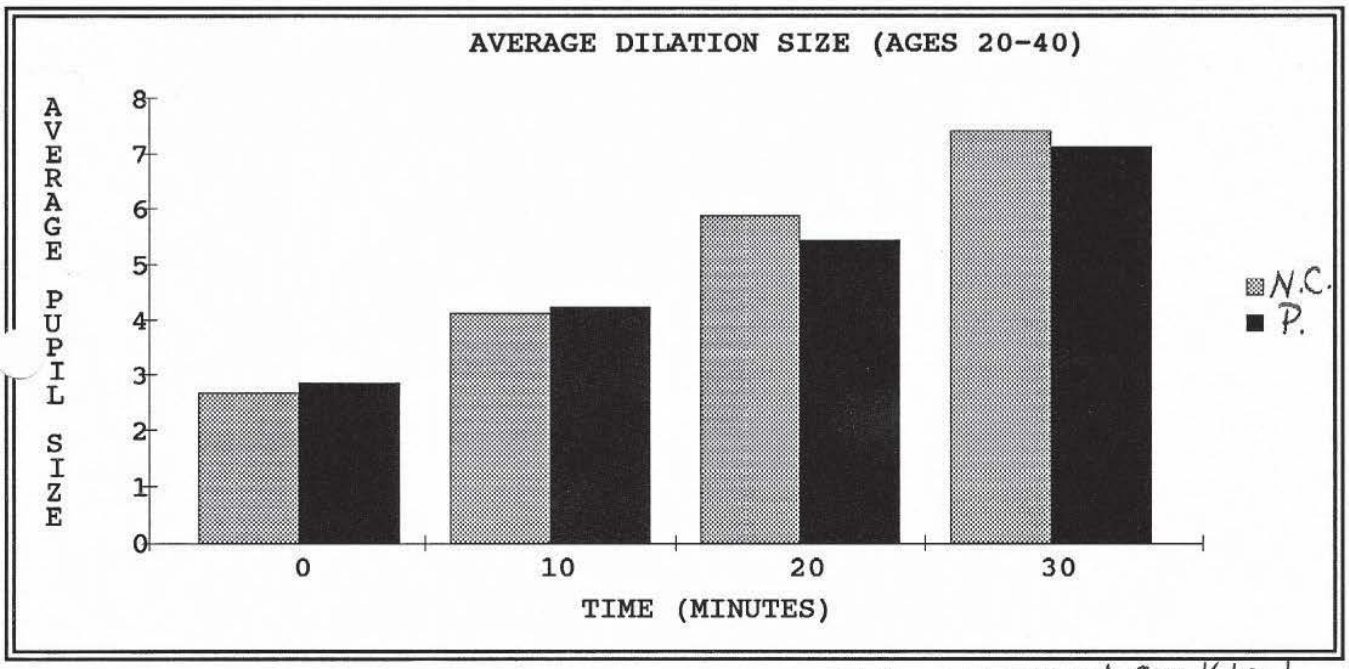
Both drug regimens received mixed reviews from the clinicians administering the study. Two of the four felt that Paremyd inadequately fixed both pupils. After indirect biomicroscopy of the first eye, the fellow pupil had constricted enough to increase the difficulty of fundus examination. One clinician felt that the Paremyd worked fairly well on light colored irides, but not as well on more pigmented irides. Another clinician noted no significant difference between the two regimens other than finding the one drug regimen was more convenient for the clinician as well as patients.

CONCLUSION

Pupillary dilation is an integral part of the eye examination and can be achieved by a variety of mydriatic regimens. Optometrists strive to offer the best eye and vision care while minimizing patient inconvenience. Hydroxyamphetamine/tropicamide have their advantages and disadvantages. In the future, new mydriatic regimens may better balance the goals of both the optometrist and patient.



N.C. : Normal Cocktail
P. : Paremyd



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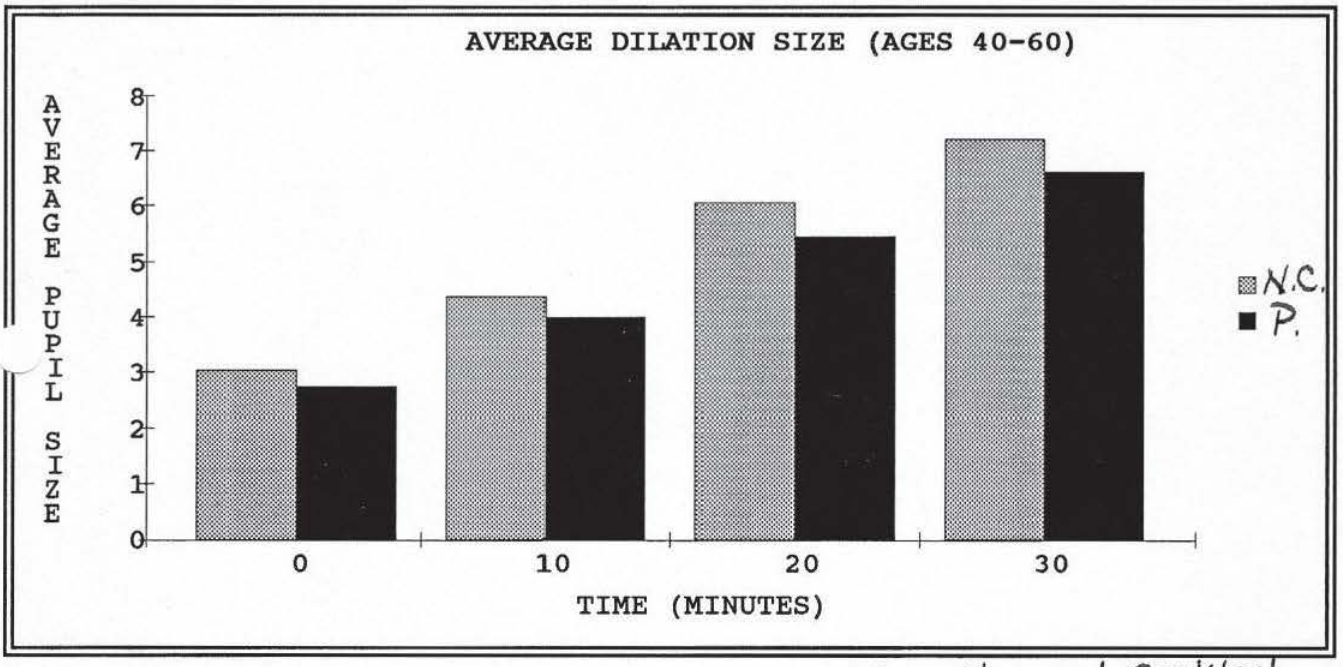

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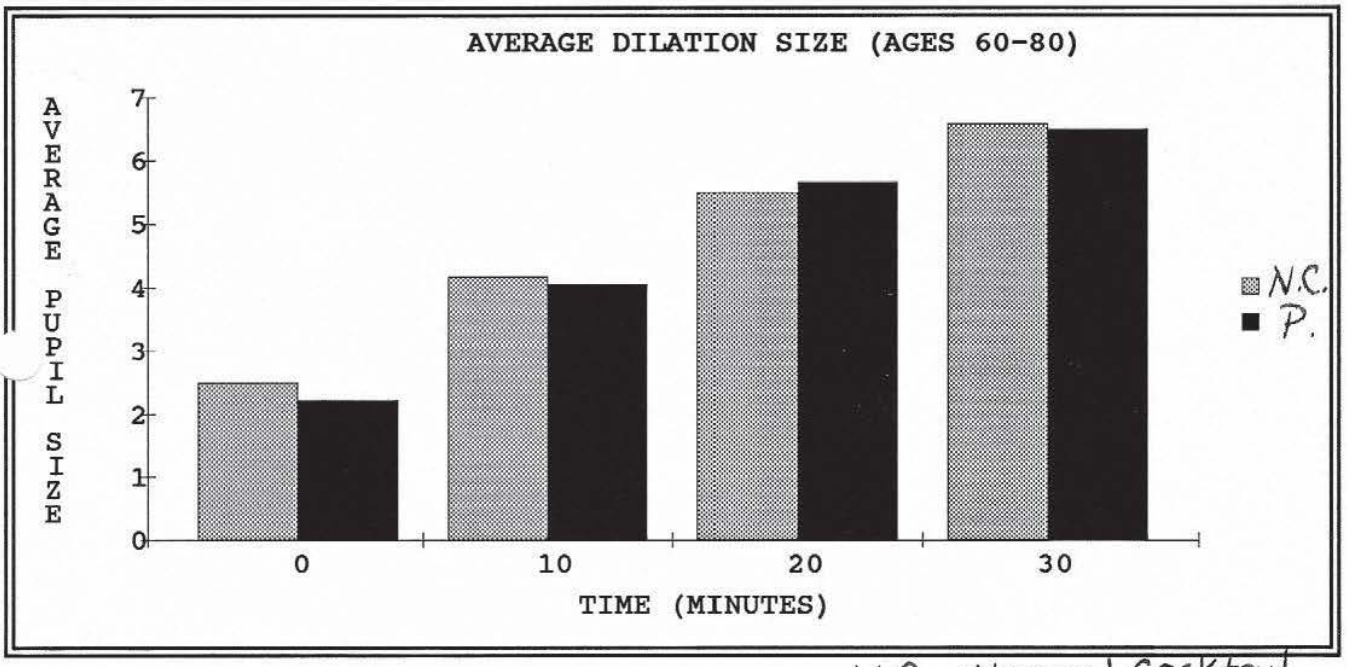

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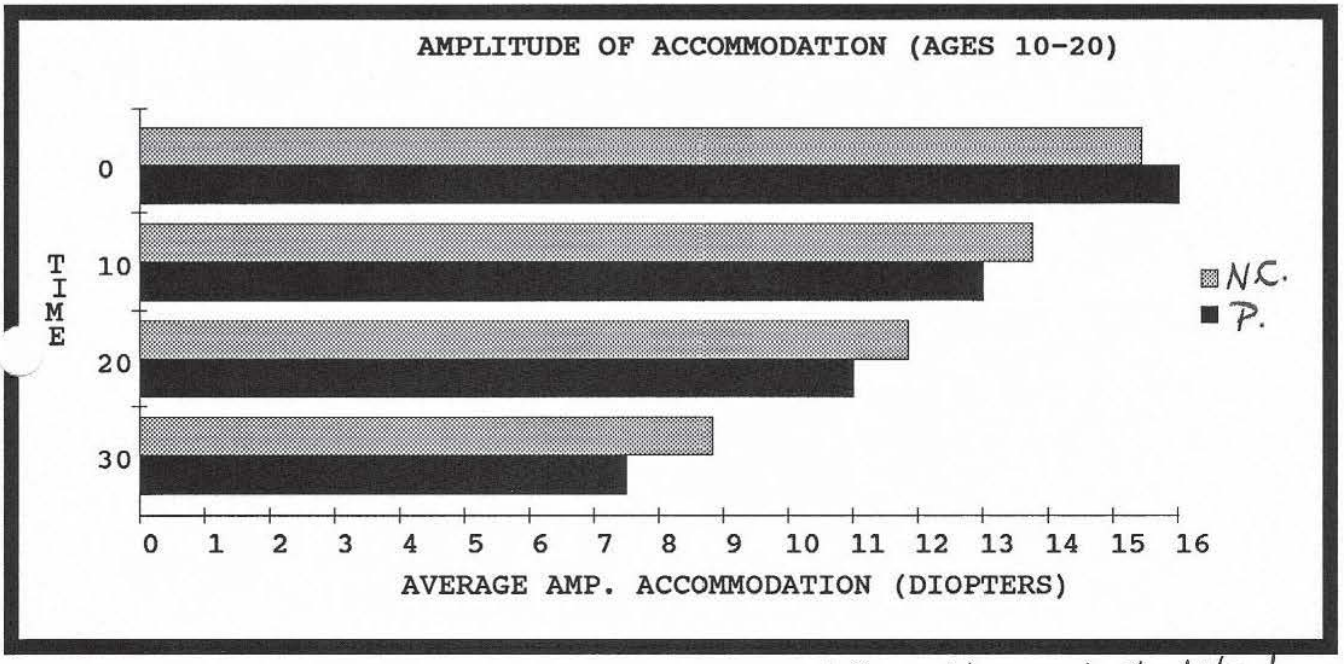
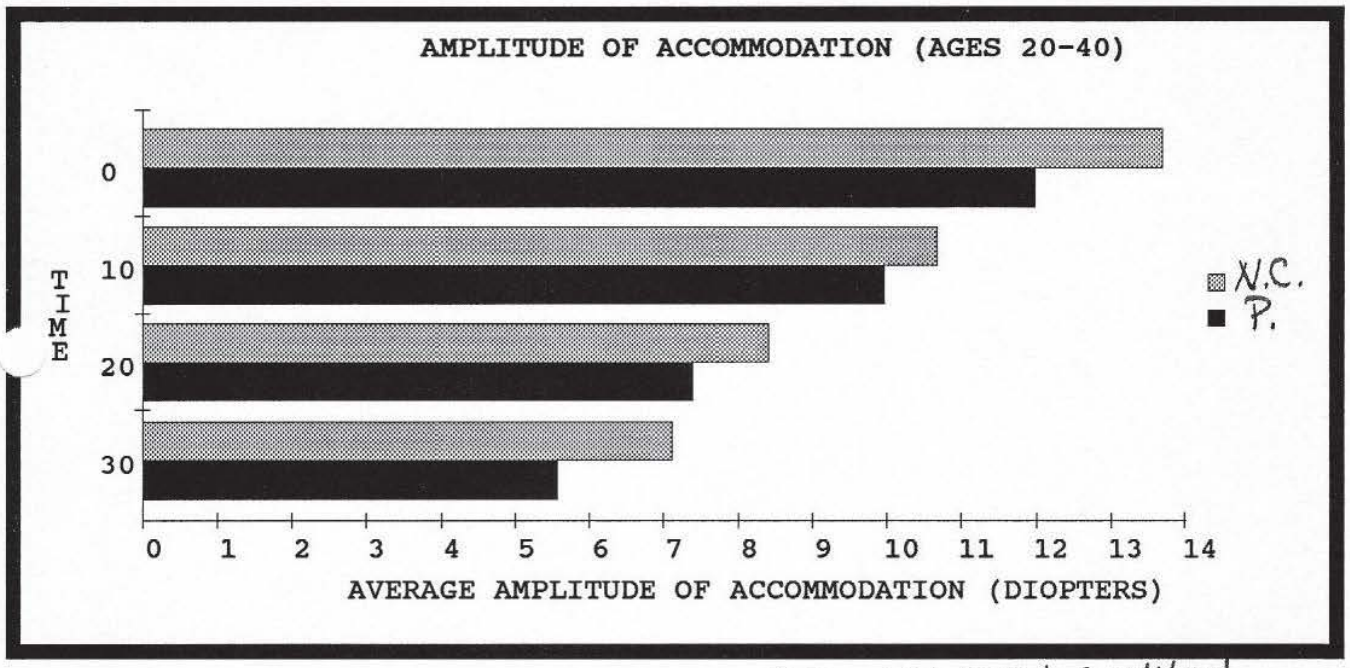
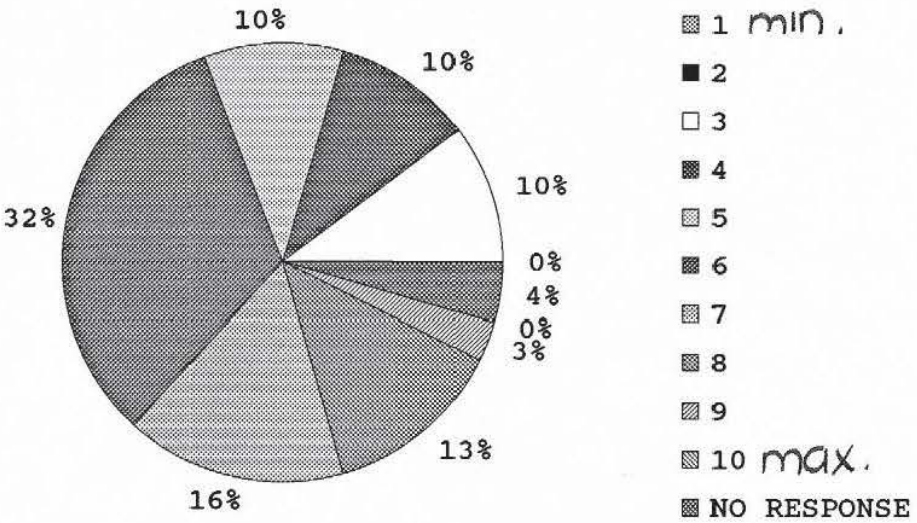


N.C. : Normal cocktail
P. : Paremyd

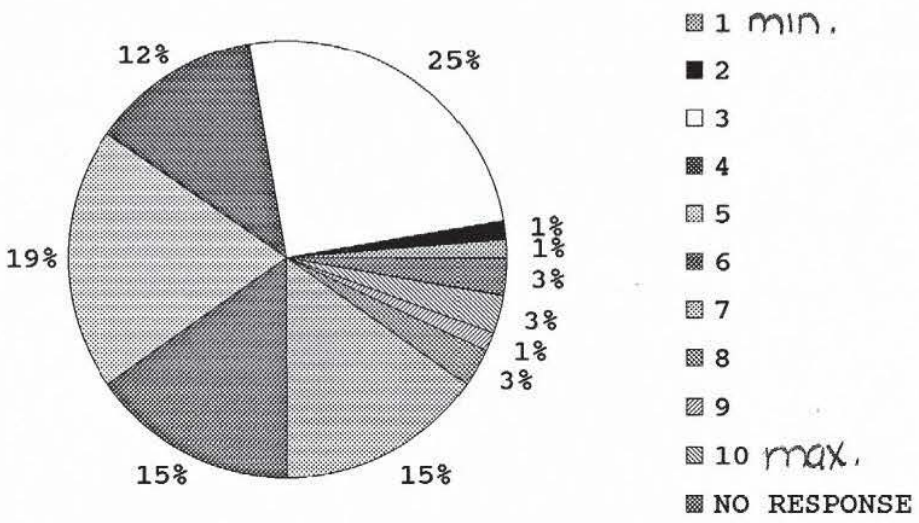


N.C. : Normal Cocktail
P. : Paremyd

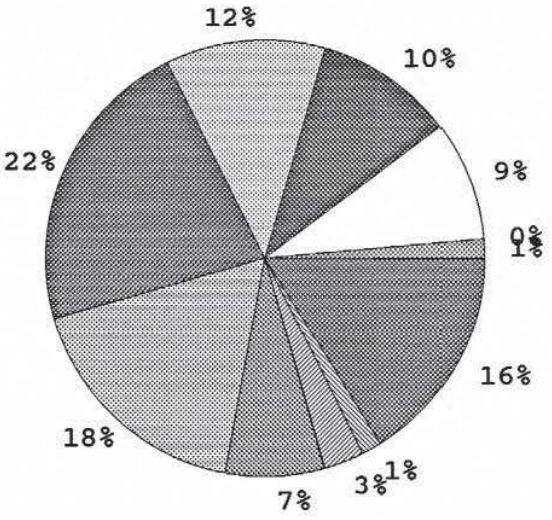
PHOTOSENSITIVITY INCONVENIENCE (NORMAL COCKTAIL)



PHOTOSENSITIVIY INCONVENIENCE (PAREMYD)



CYCLOPLEGIC INCONVENIENCE (NORMAL COCKTAIL)



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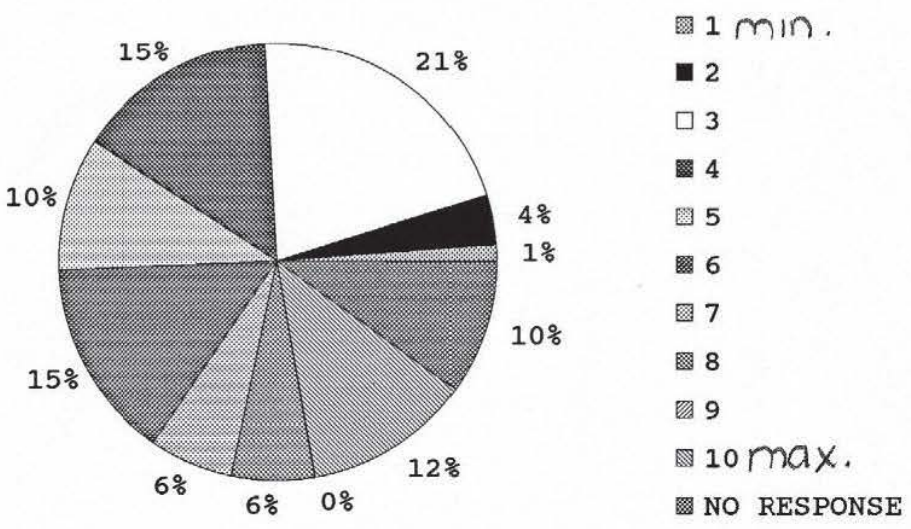

OTHER INCONVENIENCES NOTED BY PATIENTS

% OF PATIENTS	INCONVENIENCE EXPERIENCED
3.57	-Drops stung upon instillation
7.86	-Photosensitivity--confined to indoors
15.0	-Blur at near bothersome
5.71	-Difficulty driving post dilation
1.43	-Post dilation Headache
66.43	-No additional comments

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