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SENIOR PROJECT

"THE CLINICAL EFFICACY OF PAREMYD"

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THE CLINICAL EFFICACY OF PAREMYD

"Pupillary dilation to perform binocular indirect ophthalmoscopy has become a routine part" of an optometric comprehensive exam. Most "patients find the resulting photophobia," stinging upon instillation, and "incapacity of near vision to be an inconvenience. The effects of pupillary dilation have been reported to last from four to eight hours" (Campbell 634).

"Routine pupillary dilation usually entails the use of three pharmacological agents: .5% proparacaine, 2.5% phenylephrine," and .5% tropicamide. The use of a topical anesthetic is to reduce the amount of stinging and to increase the effect of the mydriatics. "Phenylephrine is an alpha agonist that produces contraction of the iris dilator" resulting in mydriasis and blanching of the conjunctiva. If phenylephrine is used as the sole dilating agent, the pupil is still reactive to bright light; therefore, it is difficult to perform binocular indirect ophthalmoscopy. Tropicamide is a parasympatholytic agent that blocks the activity of acetylcholine at muscarinic receptor sites in the iris sphincter and the ciliary body (Campbell 634). "Tropicamide's anticholinergic action causes cycloplegia and mydriasis through competition with acetylcholine at the effector cell. The typical duration of the mydriasis, following instillation of .5%

tropicamide, is approximately six hours. Maximal dilation occurs in about 30-40 minutes" (Molinari 629).

Paremyd, a new mydriatic agent, dilates the pupil sufficiently for a binocular indirect ophthalmoscopy but with significantly reduced or minimal side effects. This drug produces minimal stinging; therefore, no anesthetic is needed. The dilation is reported to last four to six hours and cycloplegia is eliminated in 60 to 90 minutes. Paremyd is a combination of two types of dilators: 1% hydroxyamphetamine (Paredrine), which stimulates dilation and .25% tropicamide, which inhibits constriction. This new dilating agent reportedly eliminates the two most common complaints among dilated patients: near-point blurring and stinging.

METHODS:

Twenty-six optometry students volunteered as subjects for a routine dilation. All were free of ocular and systemic disease and were between the ages of 22 and 32 with a mean of 22, and an average of 24.1, the median age being 23 years. There were 15 males and 11 females. Ten subjects had green eyes, 9 had blue eyes, and 7 had brown eyes. Prior to instillation of any diagnostic agents, distance and near acuities and monocular amplitude of accommodation were measured.

After completion of baseline measurements, one drop of .5% proparacaine, 2.5% phenylephrine, and .5% tropicamide were

instilled in the right eye. One drop of Paremyd was instilled in the left eye. Each student was to:

1. Measure the distance and near acuities in each eye 45 minutes after dilation.
2. Estimate the time for full dilation to occur for each eye.
3. Measure the pupil size of each eye after full dilation.
4. Measure the monocular amplitude of accommodation both 60 and 90 minutes after dilation.
5. Compare each pupil's reaction to light after dilation.
6. Compare the amount of stinging between the anesthetic instilled in the right eye and Paremyd instilled in the left eye.
7. Estimate the duration of mydriasis in the eye instilled with Paremyd (OS).

RESULTS:

Stinging

From the graph on page 13, you can see that 42% of the patients thought that the anesthetic in the right eye and the Paremyd in the left eye stung in equal amounts. Thirty-five percent thought that the right eye (anesthetic) stung more than the left eye (Paremyd).

Pupil Size

Each patient's pupil size was measured after full dilation occurred. Sixty-two percent of the patients had the same amount of pupillary dilation in each eye. Twenty-seven percent had a greater amount of pupillary dilation in the left eye (Paremyd).

Twelve percent had a larger pupil in the right eye (normal cocktail).

Light Reaction

After full dilation, each patient's pupillary light reaction was tested. Seventy-seven percent of the patients had an equal amount of constriction to light in each pupil. Fifteen percent had a greater amount of constriction to light in the left eye while eight percent had greater constriction in the right eye.

Estimated Time For Full Dilation

PAREMYD		NORMAL COCKTAIL	
23%	20 minutes	31%	30 minutes
19%	30 minutes	15%	10 minutes
15%	25 minutes	15%	15 minutes
12%	10 minutes	15%	25 minutes
12%	15 minutes	12%	20 minutes
8%	45 minutes	4%	12 minutes
4%	5 minutes	4%	14 minutes
4%	35 minutes	4%	45 minutes
4%	50 minutes		

The majority (23%) of the patients dilated with Paremyd had a full dilation in 20 minutes while 31% of the patients dilated with the normal cocktail had a full dilation in 30 minutes.

Paremyd's Duration Of Mydriasis

Each patient was instructed to estimate the duration of mydriasis in the left eye. Forty-six percent estimated the mydriasis to last four hours. Thirty-one percent estimated mydriasis to last less than four hours while twenty-three percent lasted longer than four hours.

Unaided Visual Acutities Before & After Dilation-OD

DISTANCE			
BEFORE DILATION		AFTER DILATION	
73%	20/15	36%	20/15
12%	20/20	28%	20/20
4%	20/25	16%	20/30
4%	20/30	4%	20/25
4%	20/80	4%	20/60
4%	20/400	4%	20/80
		4%	20/100
		4%	20/400
NEAR			
87%	20/15	29%	20/30
13%	20/20	21%	20/40
		14%	20/50
		14%	20/60
		7%	20/15
		7%	20/20
		7%	20/80

From this data, we can assume that the normal cocktail decreases vision at distance and near after dilation. We can see from the above table that at near 87% of the patients could see 20/15 before dilation, but only 7% could see 20/15 after dilation.

Unaided Visual Acutities Before & After Dilation-OS

Distance

BEFORE DILATION		AFTER DILATION	
73%	20/15	40%	20/15
12%	20/20	32%	20/20
12%	20/30	4%	20/25
4%	20/400	4%	20/50
		4%	20/60
		4%	20/400

Near

87%	20/15	38%	20/20
13%	20/20	23%	20/40
		23%	20/50
		8%	20/15
		8%	20/25

We can also see that by using Paremyd as the dilating agent, one gets a decrease in the distance and near acutities, yet still has 38% of the patients seeing 20/20 at near.

Amplitude of Accommodation-OD

From the graphs on pages 24-27, it can be assumed that the peak amplitude of accommodation is around ten Diopters before dilation. Sixty minutes after dilation, the peak shifts to five Diopters of accommodation. Ninety minutes after dilation, the peaks range from five Diopters, seven Diopters, and ten Diopters. As one can see, most accommodation starts to return to normal around ninety minutes after dilation.

Amplitude of Accommodation-OS

Before dilation, the peaks of accommodation are ten and twelve Diopters. Sixty minutes after dilation, the peak accommodation decreases to five Diopters. Again, after ninety minutes, the amplitude of accommodation returns to normal with a peak at ten Diopters.

Amplitude of Accommodation

When comparing the amount of decrease in accommodation between the two eyes, 75% of the patients (after 60 minutes) showed more of a decrease in the right eye whereas 0% was reported with the left eye. Fifty-eight percent of the patients showed more of a decrease in the right eye after ninety minutes.

DISCUSSION:

Stinging

From the study we performed on our fellow optometry students, the data does not show a significant difference in the amount of stinging with Paremyd versus the anesthetic used in the normal cocktail. Only thirty-five percent stated that the anesthetic stung worse.

Pupil Size

Sixty-two percent of the patients had the same amount of pupillary dilation with Paremyd and the normal cocktail. This high percentage indicates that there is not a significant difference in the amount of pupillary dilation with the two agents.

Light Reaction

We tested the pupil's reaction to light during the procedure to see if binocular indirect ophthalmoscopy could be performed. With both dilating agents, there was a minimum amount of pupillary constriction to light. Either agent would be sufficient to get the pupil large enough, yet prevent pupillary constriction to light.

Estimated Time For Full Dilation

It is safe to assume from this study that one gets maximum dilation in a shorter amount of time with Paremyd versus the normal cocktail. In a true clinical setting, one would want a quick dilation to occur so that the patient is inconvenienced as little as possible.

Paremyd's Duration of Mydriasis

Seventy-eight percent of the patients estimated the duration of mydriasis in the eye dilated with Paremyd to be four hours or less. The normal cocktail's mydriasis can last anywhere from four to eight hours. This is another benefit of Paremyd.

Visual Acuity

When comparing the two dilating agents for their effect on vision, it is apparent that Paremyd has less of an effect than the normal cocktail. With the normal cocktail, eighty-five percent of the patients were able to see 20/15 or 20/20 at distance before they were dilated. After dilation, sixty-four percent of the

patients were still able to see 20/15 or 20/20 at distance. At near, there was yet a bigger decrease in vision with the normal cocktail. Before dilation, one hundred percent of the patients could see 20/15 or 20/20. Forty-five minutes after dilation, only fourteen percent of these patients were still able to read 20/15 or 20/20.

On the other hand, when dilating with Paremyd, eighty-five percent of the patients could read 20/15 or 20/20 at distance before dilation. Forty-five minutes after dilation with Paremyd, seventy-two percent of these patients were still able to read 20/15 or 20/20 at distance. At near, before dilation, one hundred percent were able to read 20/15 or 20/20. After dilation, forty-six percent of the patients were able to continue reading 20/15 or 20/20. It is statistically significant to conclude that Paremyd has less of an effect on vision, both distance and near, than does the normal cocktail.

Amplitude of Accommodation

When comparing the effects on accommodation with the two dilating agents, there is a significant decrease in accommodation with the normal cocktail. Paremyd did decrease each patient's amplitude of accommodation but by a smaller factor than the normal cocktail. Also, the eye which was dilated with Paremyd returned to its normal accommodative range much quicker than the normal cocktail.

SUMMARY

From this study performed on twenty-six optometry students, it is suffice to conclude that with Paremyd:

1. One gets a quicker dilation.
2. One has a shorter duration of mydriasis.
3. One has less of a decrease in vision both at distance and near.
4. One has less of a decrease in amplitude of accommodation.

PAREMYD VS. NORMAL COCKTAIL

Name:

Age:

Eye Color:

OD: Normal Cocktail (.5% tropicamide and 2.5% phenylephrine)

OS: Paremyd (no anesthetic)

1. VA

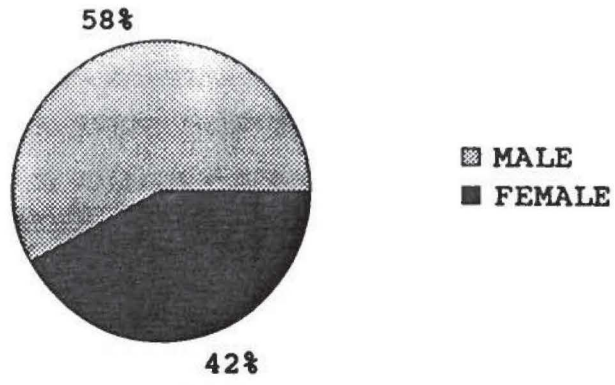
before dilation	45 minutes after dilation
OD	OD
OS	OS
2. Estimated time for full dilation

OD
OS
3. Pupil Size after dilation

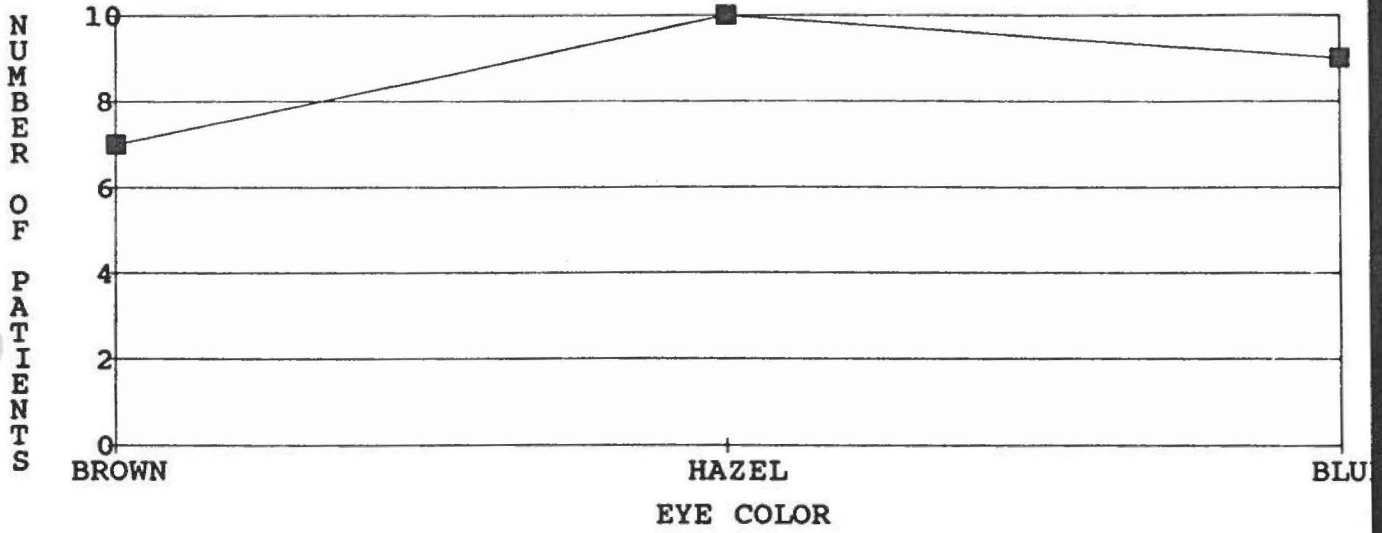
OD
OS
4. Amplitude of Accommodation (push-up)

before dilation:
OD
OS
60 minutes after dilation:
OD
OS
90 minutes after dilation:
OD
OS
5. How did the pupils light reaction compare in the two eyes?
 - a. OS constricted more to light than OD
 - b. OS = OD
 - c. OD constricted more to light than OS
6. How did the amount of stinging compare in the two eyes?
 - a. OS stung worse than OD
 - b. OS = OD
 - c. OD stung worse than OS
7. How long would you say your dilation lasted in the left eye?
 - a. less than 4 hours
 - b. 4 hours
 - c. greater than 4 hours

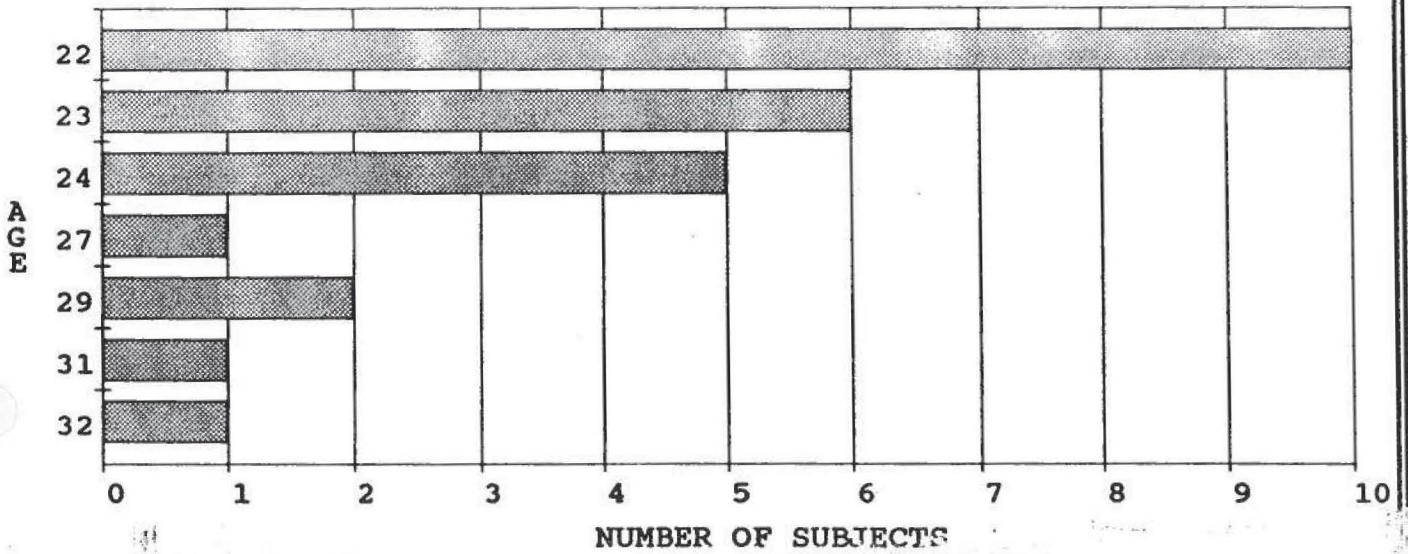
GENDER OF PATIENTS



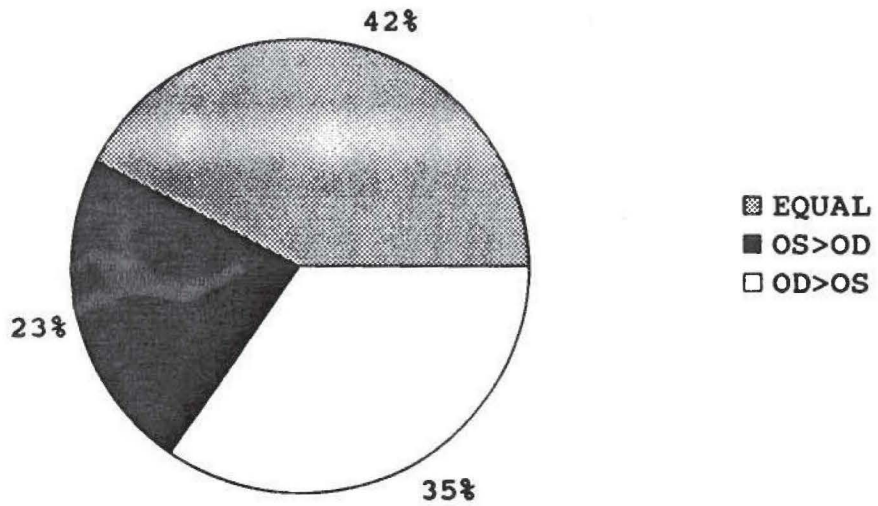
PATIENT'S EYE COLOR



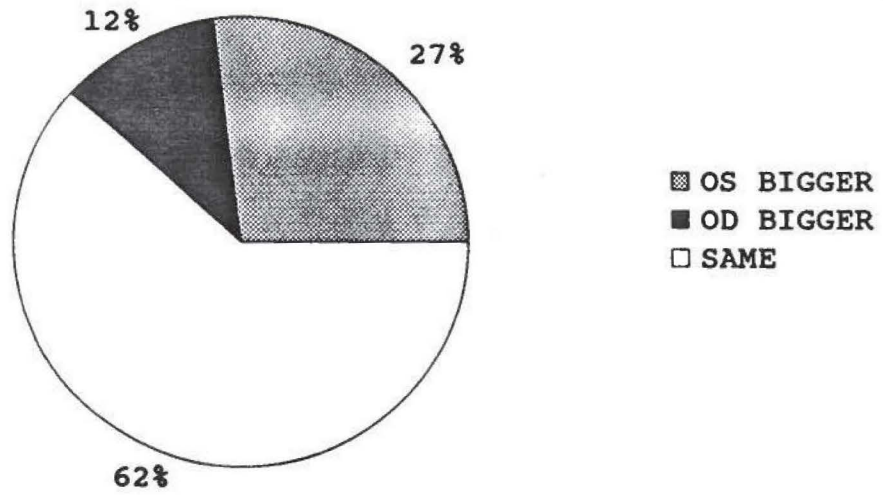
AGE OF SUBJECTS



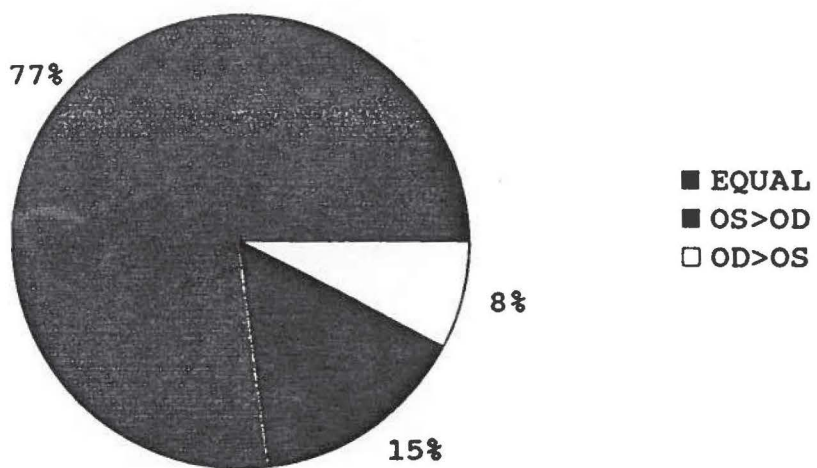
THE AMOUNT OF STINGING OF PAREMYD VS NORMAL COCKTAIL



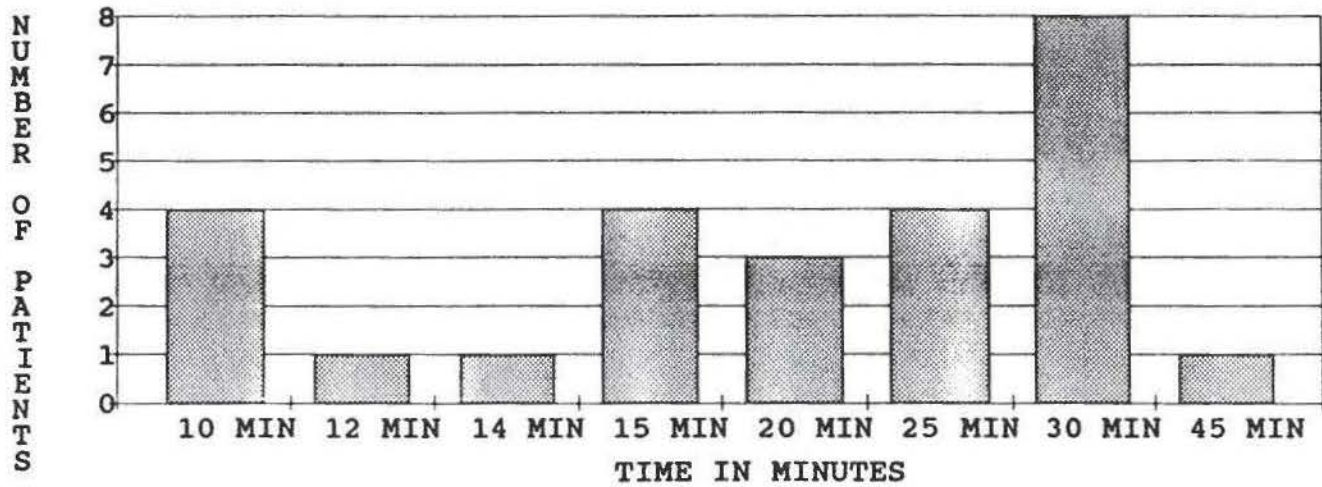
COMPARISON OF PUPIL SIZE AFTER FULL DILATION



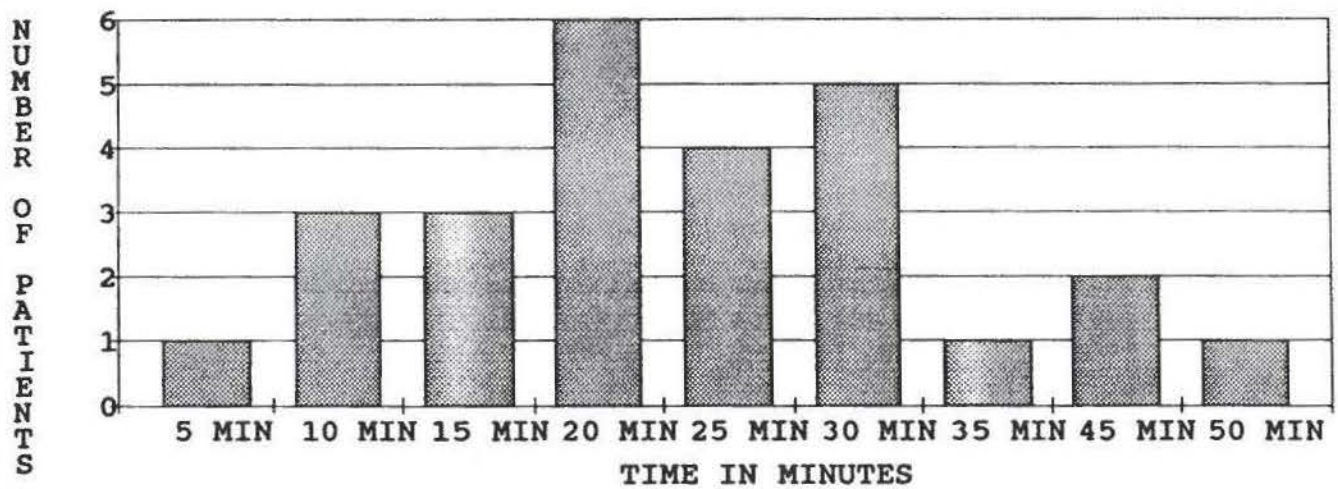
LIGHT REACTION OF PAREMYD VS NORMAL COCKTAIL



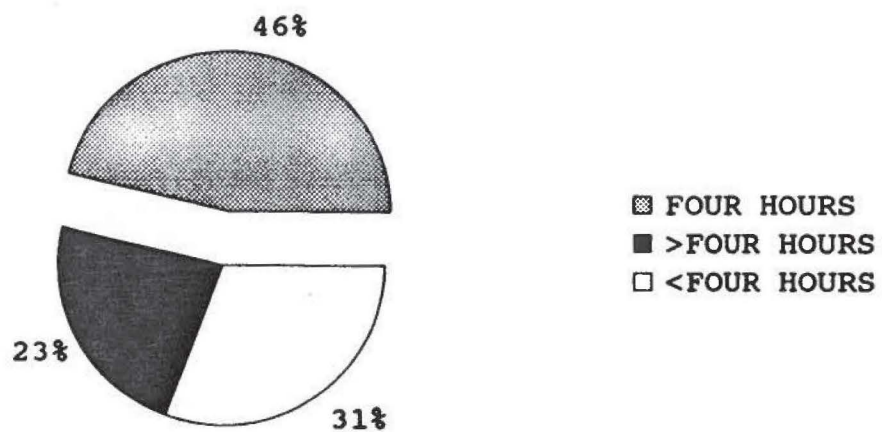
TIME OF FULL DILATION--NORMAL COCKTAIL



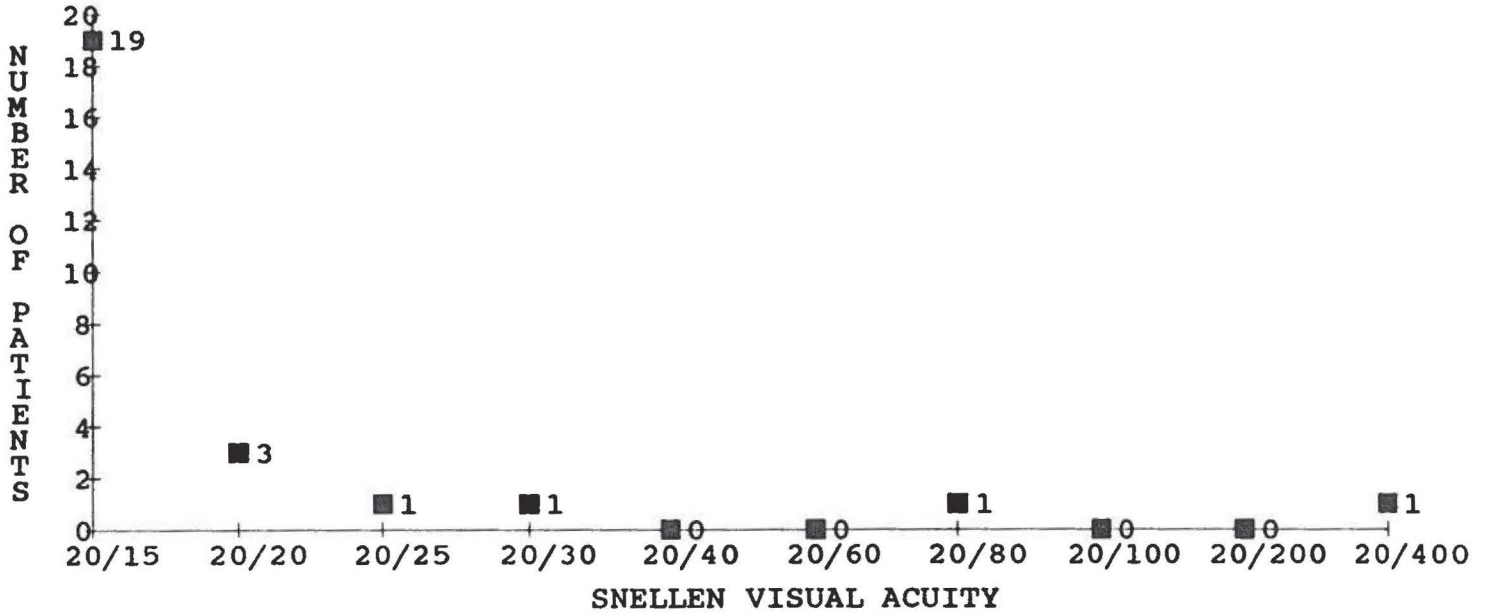
TIME OF FULL DILATION--PAREMYD



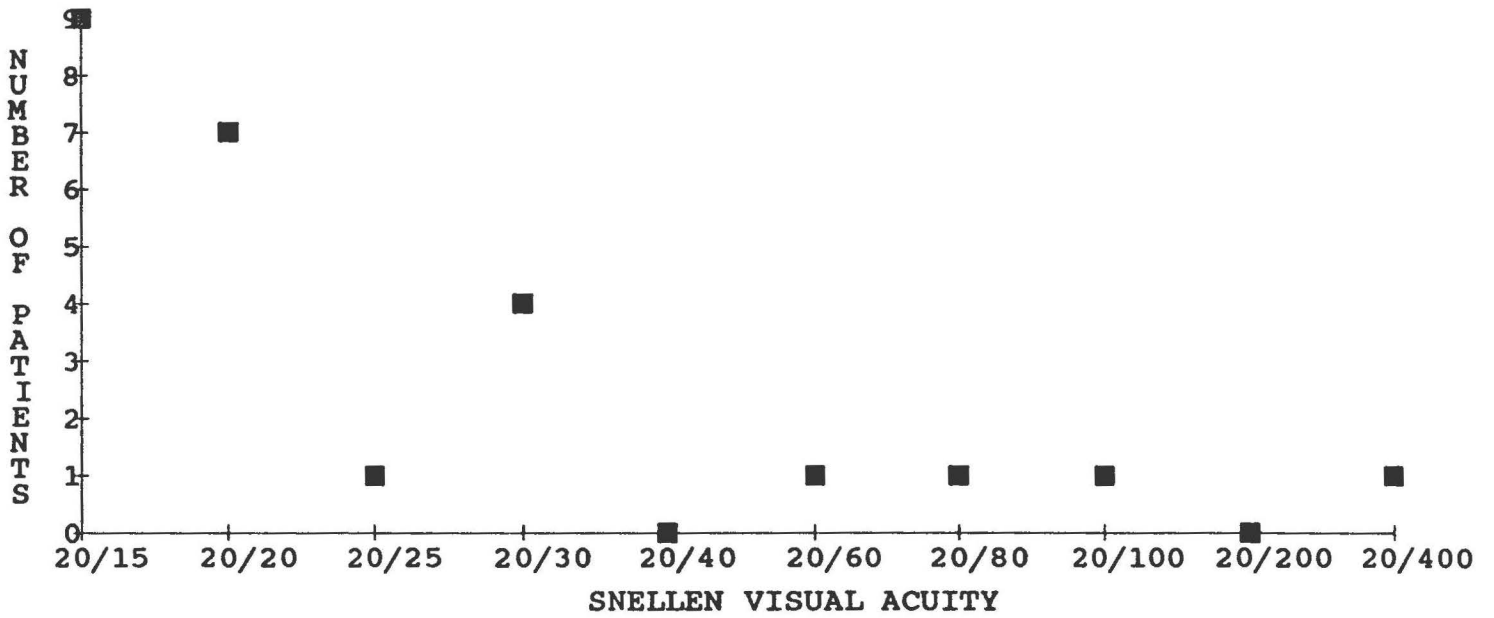
PAREMYD'S DURATION OF MYDRIASIS



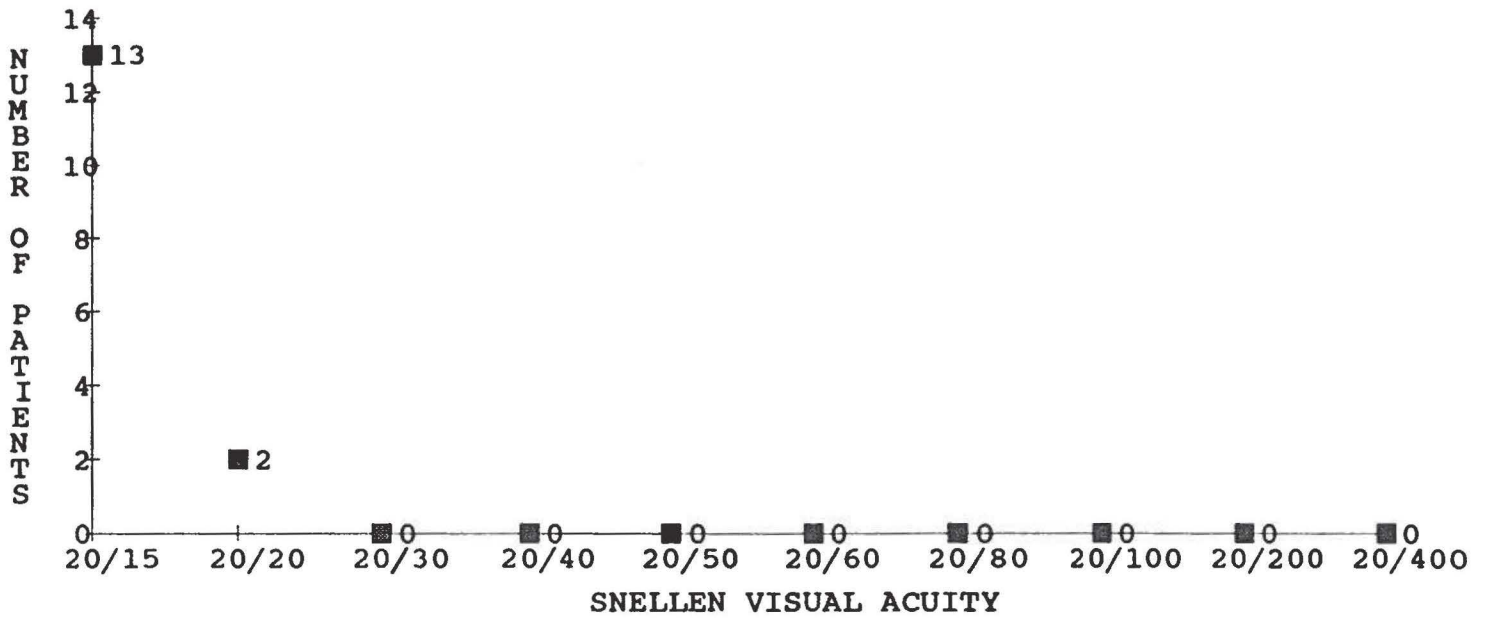
UNAIDED DISTANCE VISUAL ACUITIES BEFORE DILATION-OD



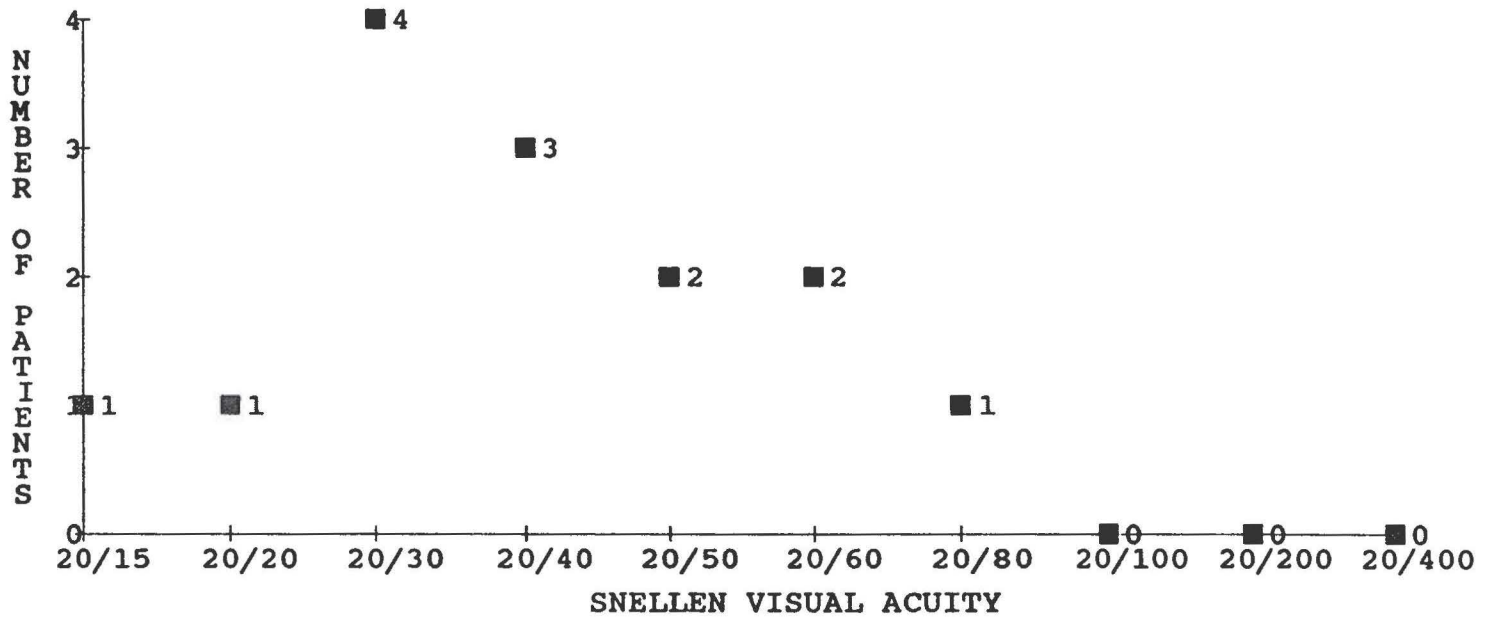
UNAIDED DISTANCE VISUAL ACUITIES AFTER DILATION-OD



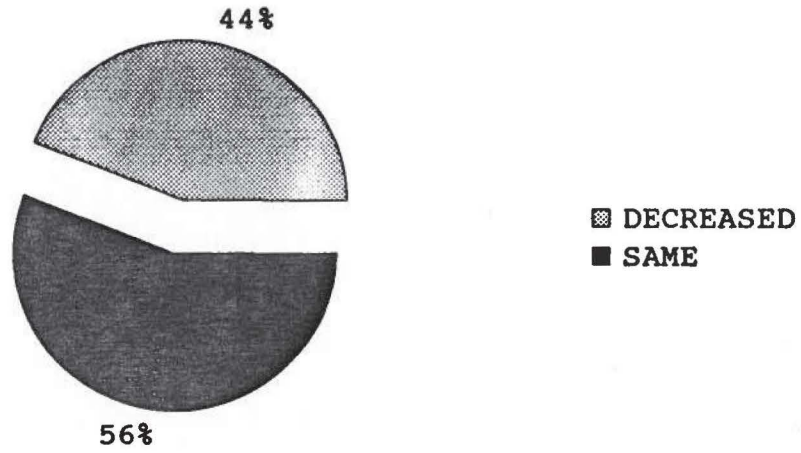
UNAIDED NEAR VISUAL ACUITIES BEFORE DILATION-OD



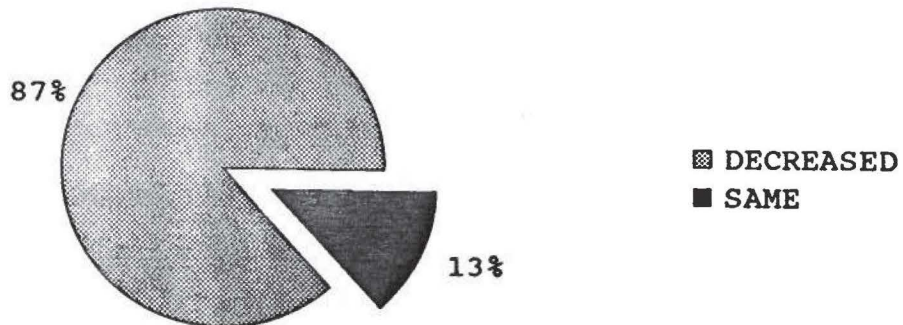
UNAIDED NEAR VISUAL ACUITIES AFTER DILATION-OD



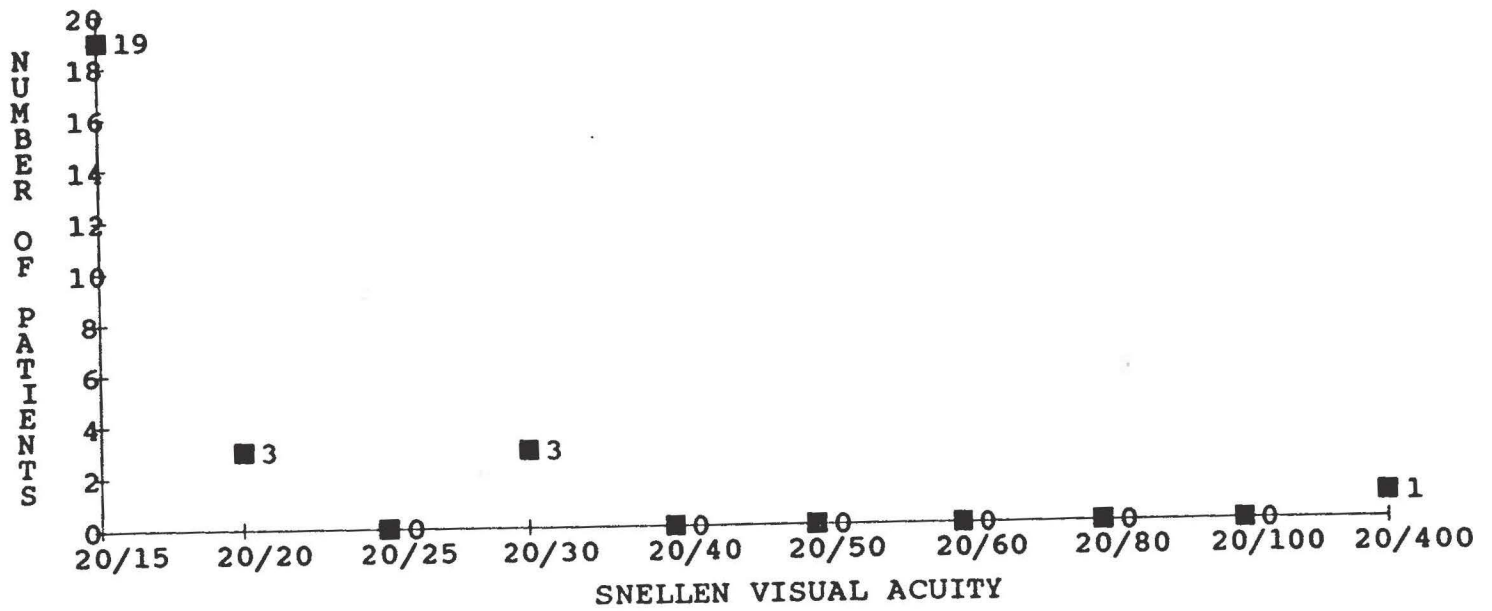
COMPARISON OF DISTANCE VISION BEFORE AND AFTER DILATION-OD



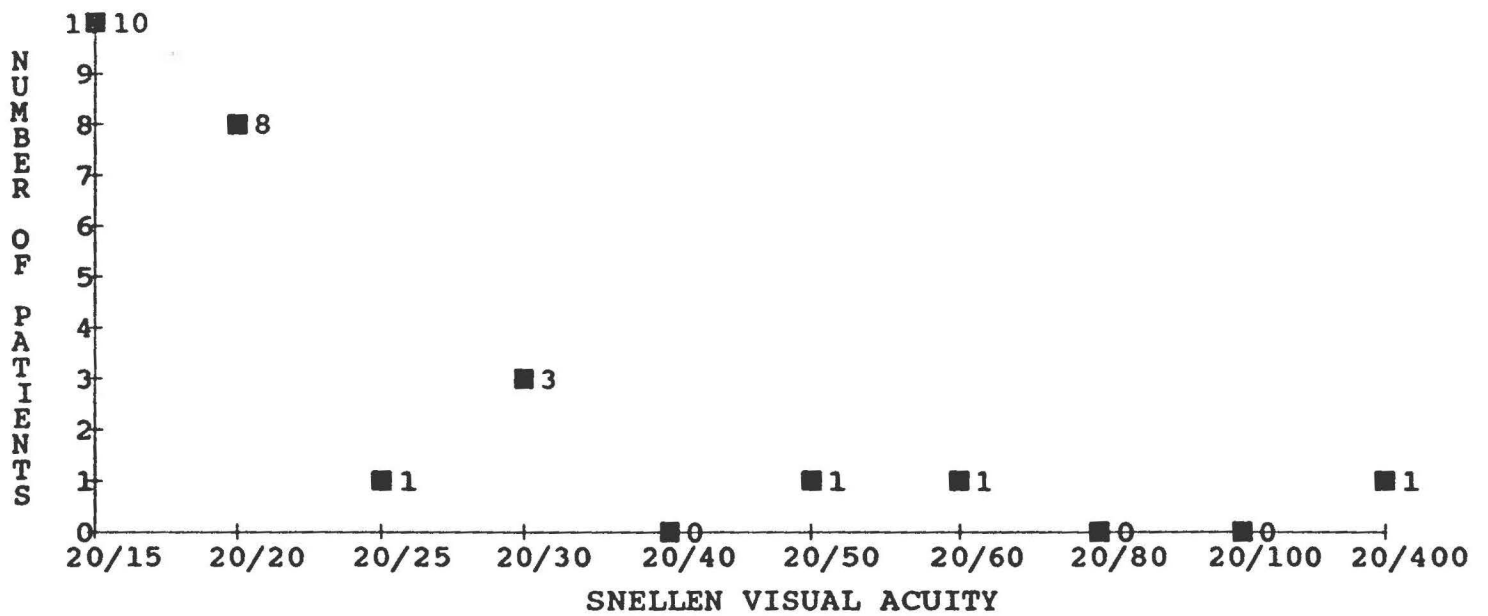
COMPARISON OF NEAR VISION BEFORE AND AFTER DILATION-OD



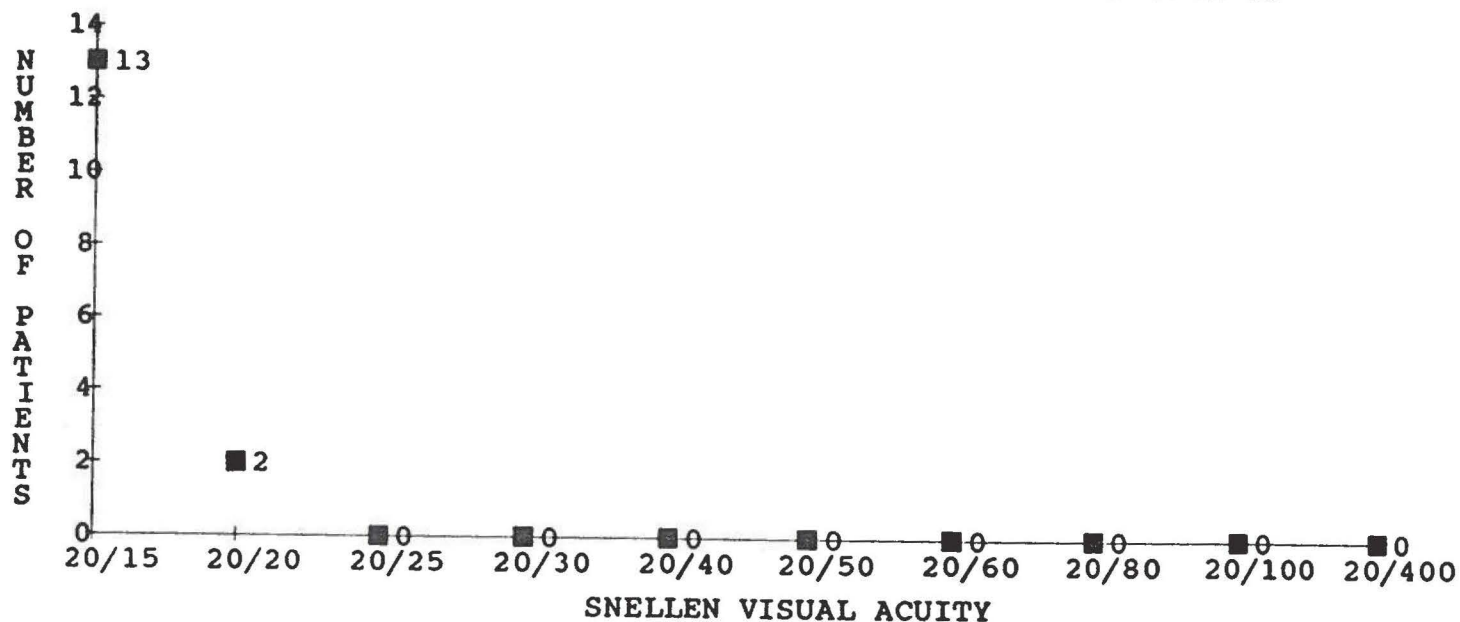
UNAIDED DISTANCE VISUAL ACUITIES BEFORE DILATION-OS



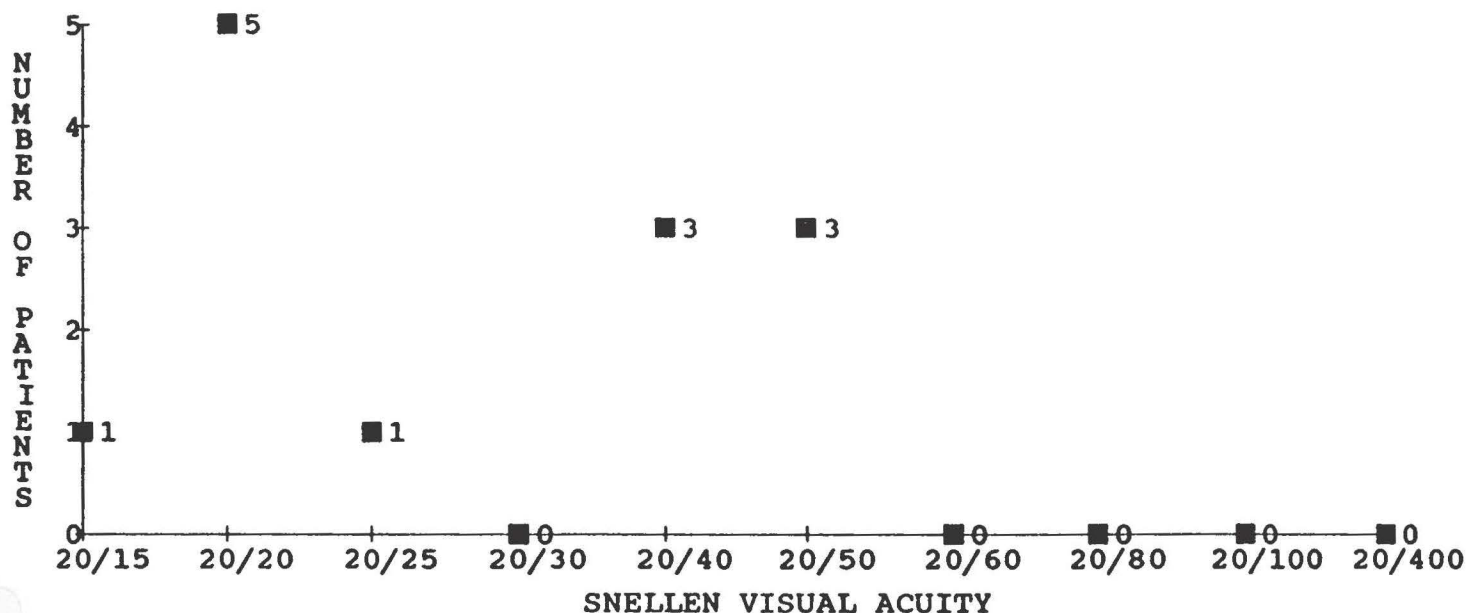
UNAIDED DISTANCE VISUAL ACUITIES AFTER DILATION-OS



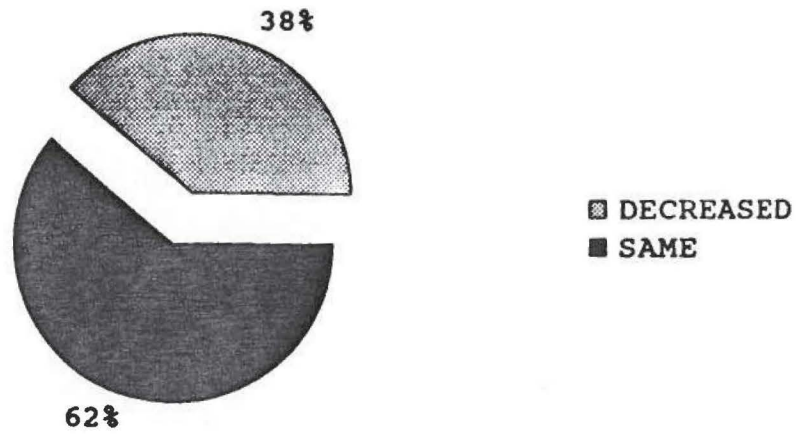
UNAIDED NEAR VISUAL ACUITIES BEFORE DILATION-OS



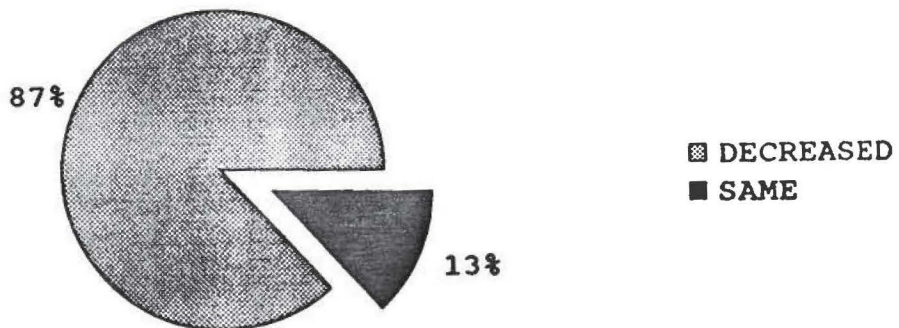
UNAIDED NEAR VISUAL ACUITIES AFTER DILATION-OS

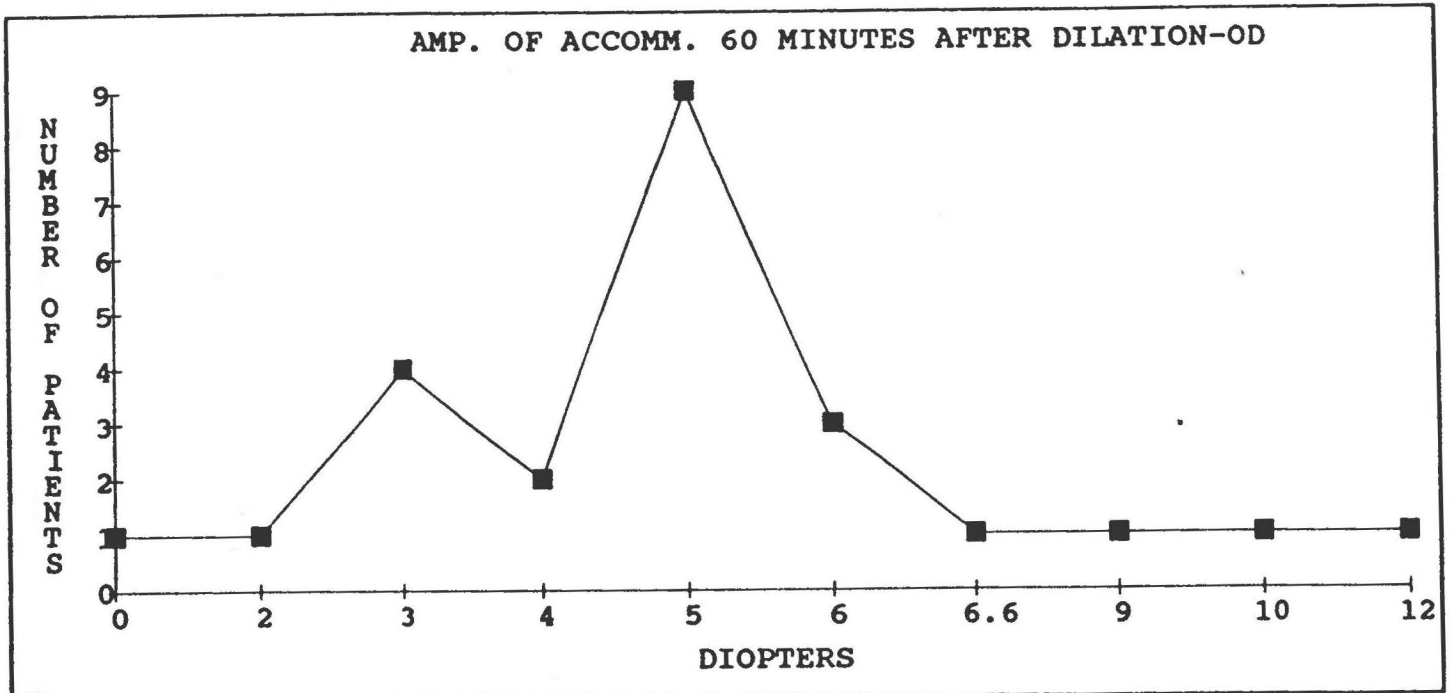
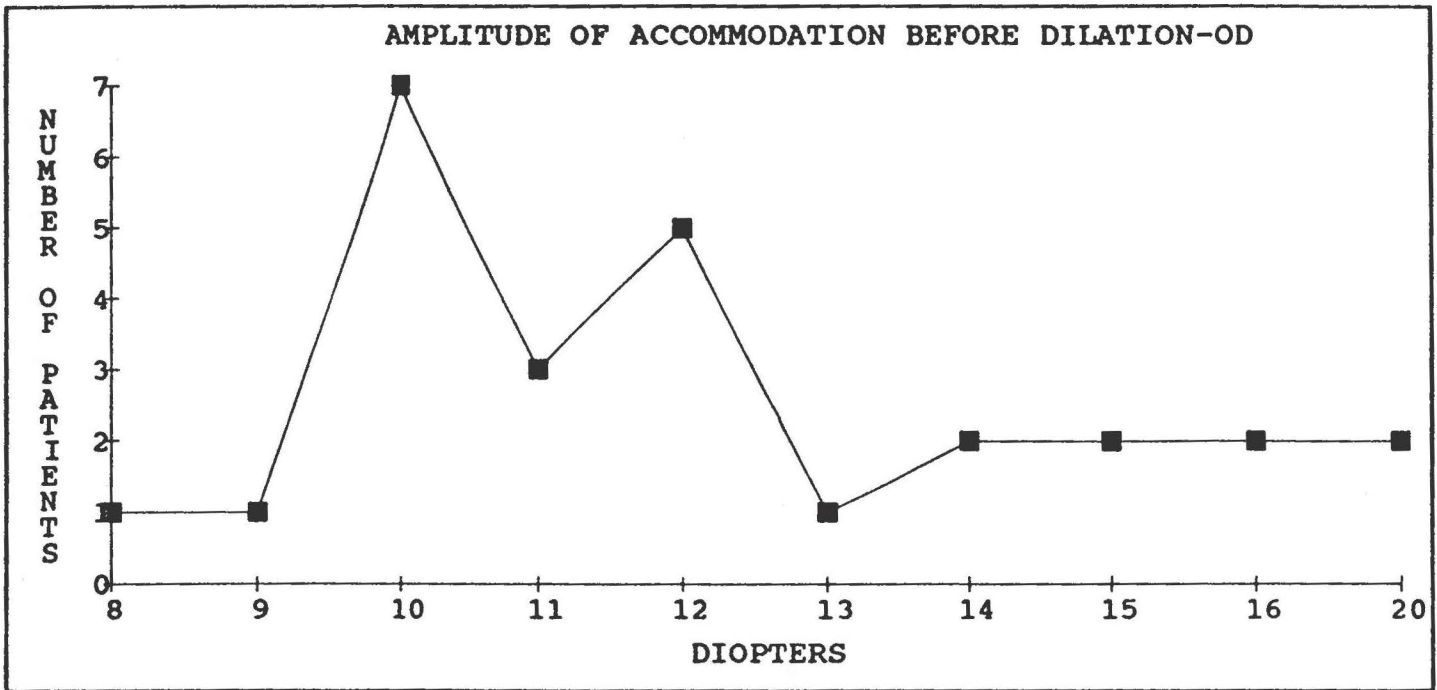


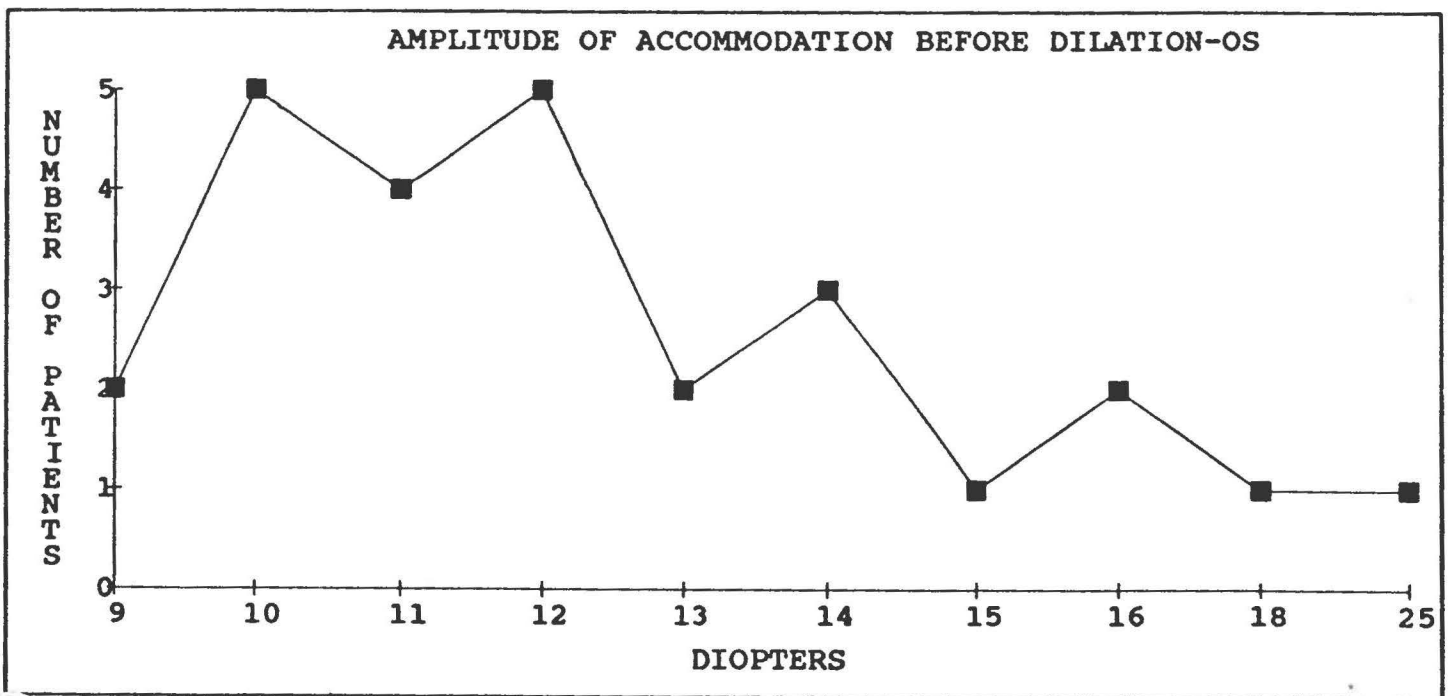
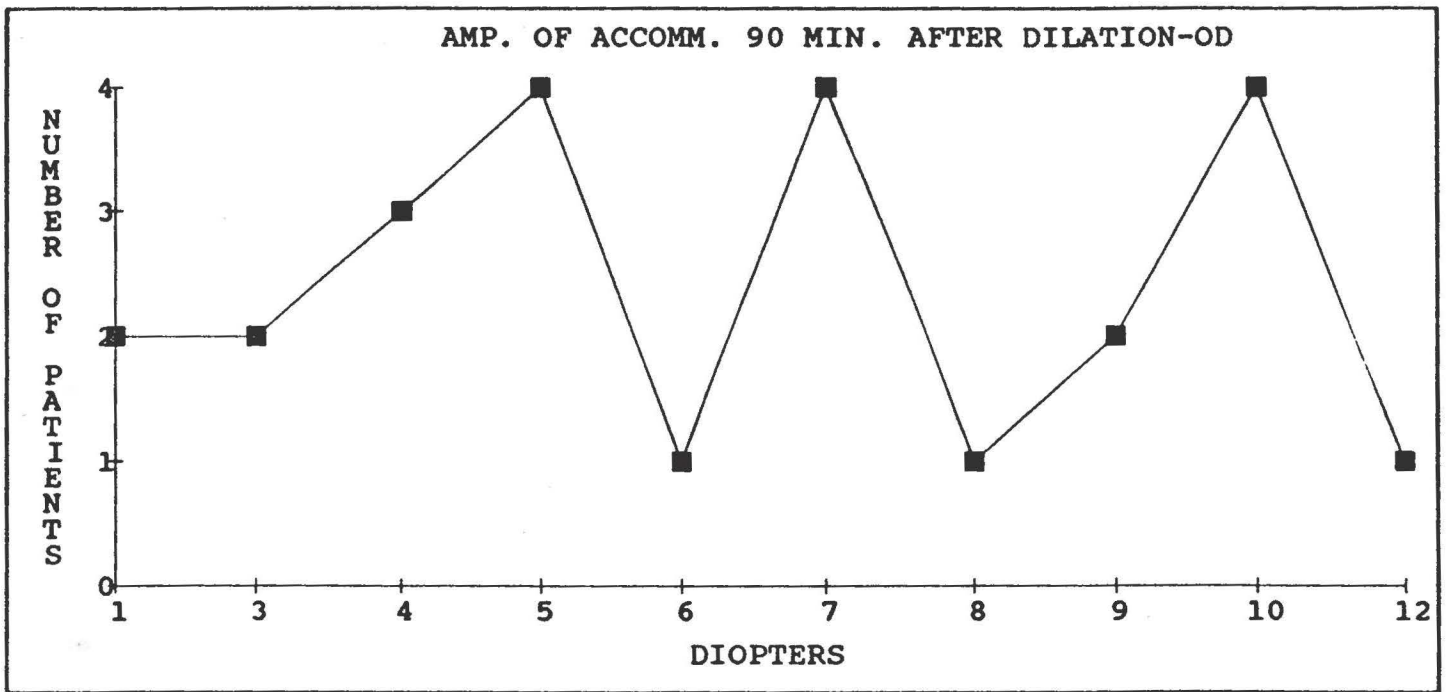
COMPARISON OF DISTANCE VISION BEFORE & AFTER DILATION-OS



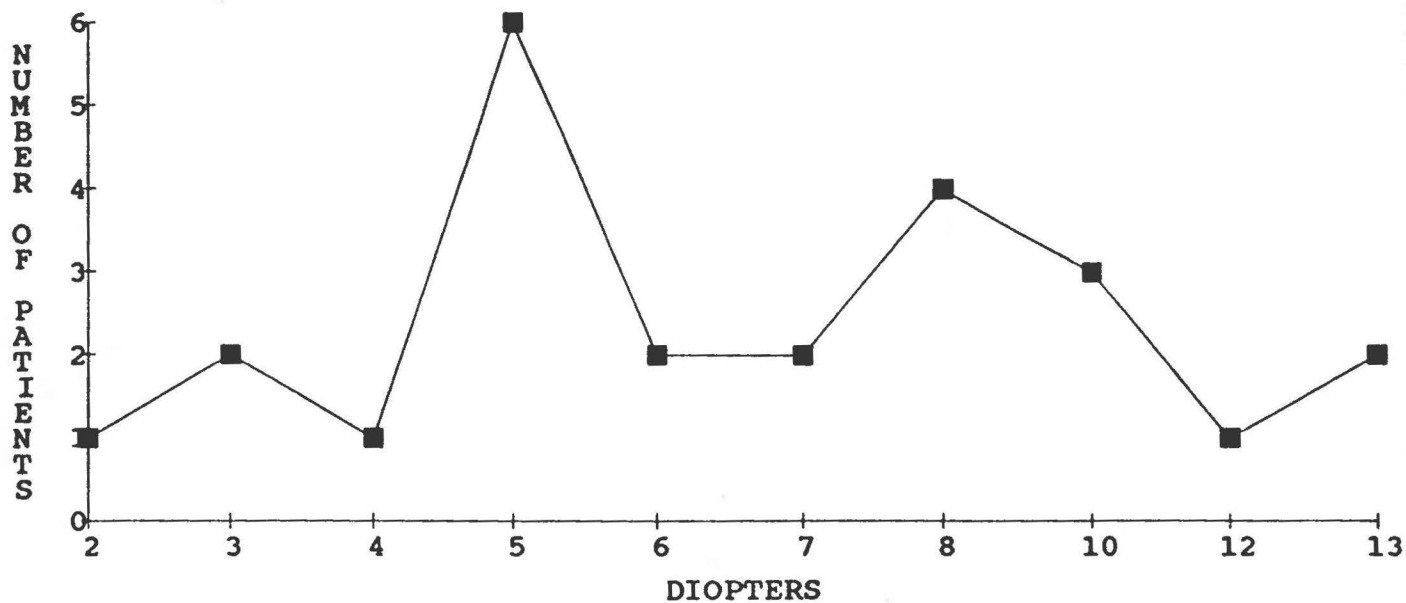
COMPARISON OF NEAR VISION BEFORE & AFTER DILATION-OS



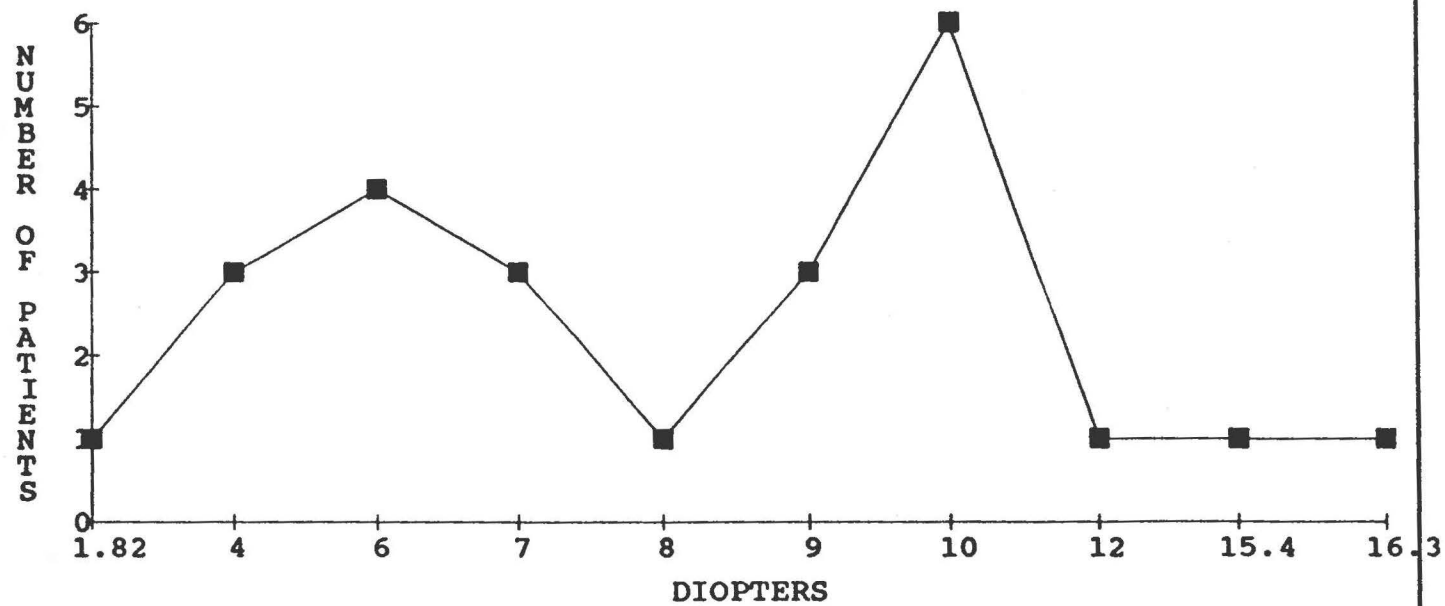




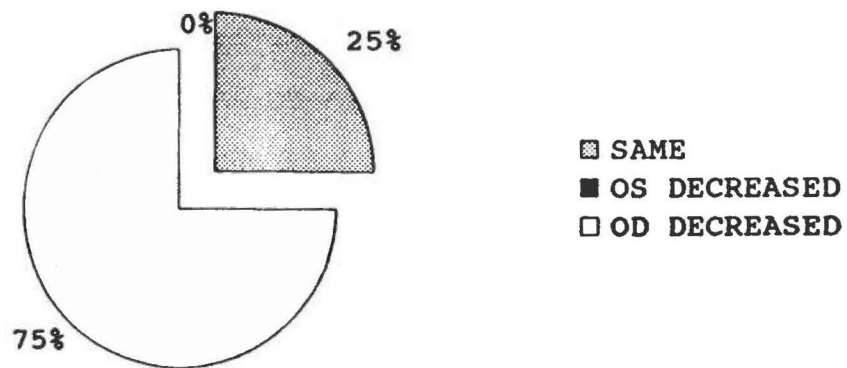
AMP. OF ACCOMM. 60 MIN. AFTER DILATION-OS



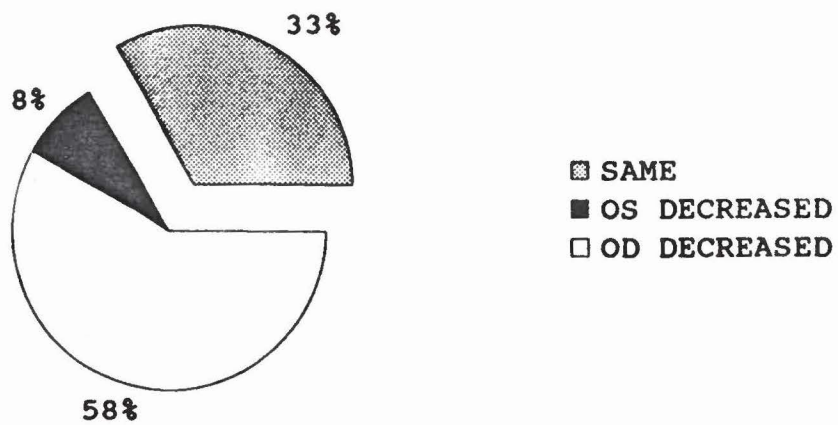
AMP. OF ACCOMM. 90 MIN. AFTER DILATION-OS



COMPARISON IN THE DECREASE OF AMP. OF ACCOMM. AFTER 60 MIN.



COMPARISON IN THE DECREASE OF AMP. OF ACCOMM. AFTER 90 MIN.



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Molinari, Joseph F. "Efficacy of Dapiprazole with Hydroxyamphetamine Hydrobromide and Tropicamide." American Optometric Association Journal September 1993: 629-633.