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# Effects of vergence findings on prepresbyopic near spectacle prescriptions

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## Abstract

Our study investigated effects of vergence findings on both prepresbyopic and presbyopic near spectacle prescriptions. It is possible that individuals with inadequate convergence abilities, maintain excessive accommodative effort for long periods of time to compensate for the convergence problem. This may result in a greater accommodative amplitude than one would expect based on age alone. If true, perhaps vision therapy programs utilizing sustained positive accommodative techniques, may delay the onset of presbyopia and the need for bifocals or reading glasses. We hypothesize that 36 - 50 year olds with convergence deficits will have larger accommodative amplitudes than an age matched control group. Five hundred forty clinic records were sampled from age 36 - 50 from the Pacific University Family Vision Facilities between October 25, 1998 and January 26, 1999. Data from completed vision examinations were collected and analyzed using the Statview Analysis Systems. A significant correlation was found between age and the add prescription, distance phoria and the add prescription, and the fused cross cylinder and the add prescription. No significant correlation was found between any of the near vergence findings (Base Out, Base In phoria, and NPC) amount of add, however, additional studies are needed to further investigate the role distance phoria plays in the amount of add given to patients.



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# Effects of Vergence Findings on Prepresbyopic Near Spectacle Prescriptions

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Advisor
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**Effects of Vergence Findings on Prepresbyopic Near Spectacle Prescriptions**

Signature Page

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**ABSTRACT**

Our study investigated effects of vergence findings on both prepresbyopic and presbyopic near spectacle prescriptions. It is possible that individuals with inadequate convergence abilities, maintain excessive accommodative effort for long periods of time to compensate for the convergence problem. This may result in a greater accommodative amplitude than one would expect based on age alone. If true, perhaps vision therapy programs utilizing sustained positive accommodative techniques, may delay the onset of presbyopia and the need for bifocals or reading glasses.

We hypothesize that 36 - 50 year olds with convergence deficits will have larger accommodative amplitudes than an age matched control group. Five hundred forty clinic records were sampled from age 36 - 50 from the Pacific University Family Vision Facilities between October 25, 1998 and January 26, 1999. Data from completed vision examinations were collected and analyzed using the Statview Analysis Systems. A significant correlation was found between age and the add prescription, distance phoria and the add prescription, and the fused cross cylinder and the add prescription. No significant correlation was found between any of the near vergence findings (Base Out, Base In phoria, and NPC) amount of add, however, additional studies are needed to further investigate the role distance phoria plays in the amount of add given to patients.

## INTRODUCTION

We have all heard the phrase "Use it or lose it"; so, can the fact that a problem with the vergence system positively affect your ability to accommodate? For example, if a person develops convergence insufficiency prior to presbyopia, can the constant state of increased accommodation, necessary to compensate for vergence, actually prolong the muscle weakening of the accommodative system in the adult?

Of particular interest is the interaction between phasic and tonic control mechanisms with the activity of cross-links between accommodation and convergence. These interactions are described by a heuristic model of accommodative-vergence interactions that was developed on the basis of several laboratory observations.[1]

Cross-coupling between accommodation and vergence provides a means of dynamically adjusting the tonic set points of the two motor systems to a common near or far working distance. Accommodative vergence cross-links play a dominant role in coordinating proximal changes in accommodation and convergence. The magnitude of cross-link interactions can be modified by imbalanced strength of tonic adaptation by accommodation and vergence. Reducing adaptation of tonic accommodation increases the AC/A ratio and decreases the CA/C ratio. Reducing adaptation of tonic vergence has the opposite effect.[1]

Rouse et al. states that convergence insufficiency consists of exophoria that is greater at near than distance, a remote near point of convergence (NPC), decreased positive fusional vergence (PFV), especially for near, and normal negative fusional vergence (NFV).[2] One of the earliest descriptions of convergence insufficiency as stated by Duane included norms for both distance

and near as follows: (1) at distance: orthophoria or slight exophoria [2-4 prism diopters]; normal versions; frequently subnormal abduction [8-10 prism diopters], not more than 15 prism diopters; and prism convergence often (but not always) decreased to 14-20 prism diopters or less; and (2) at nearpoint: marked exophoria [12 prism diopters] or greater; normal versions; and a NPC of 7.5 cm or greater.[2]

In independent studies, Marg showed that accommodation is under autonomic control.[3] Cornsweet and Crane found that voluntary control can be attained.[4] As a person can remain limber late into life by regular stretching and exercising, perhaps so too can the eye retain more of the flexibility of youth by following a certain regimen.[5] If accommodative abilities can be improved in prepresbyopic adults as well, it should be possible to delay the onset of presbyopia as there will be a larger 'cushion' of surplus ability between normal function and presbyopia.[5]

The amount of accommodation an individual has at any age is called the amplitude of accommodation. It signified the range of focus (or range of accommodation), from infinity to near, that can be used at any time during a person's life. The amplitude of accommodation, measured separately for each eye, is used to calculate the near add. View Appendix 1 for Table of Accommodative Amplitudes.[14]

Presbyopia is considered to be an inevitable part of the aging process. Enoch states that the hallmark of aging of the body is the loss of flexibility.[5] A widely accepted explanation for presbyopia is the loss of flexibility of the lens. But, as with the gymnast who, through continued exercise, can remain flexible late into life, perhaps with exercise the crystalline lens, too, can retain much of its flexibility. The notion that Vision Therapy may improve accommodative ability in adults, as was shown in children, is based on the idea that perhaps the

sensory motor processes of the eye, like skeletal muscle, will benefit from and be improved by regular exercise.[6]

Previous research which attempted to delay the onset of presbyopia concentrated on accommodative facility with techniques designed to rapidly move accommodation from distance to near and back. According to Kratka and Kratka, the usual routine for convergence insufficiency training consists of (1) proximation exercises; (2) prism base-out exercises for near and distance; (3) physiological diplopia, framing, bar reading; (4) synoptophore; (5) stereoscope (at home); and (6) ortho-fusor.[7]

The need for bifocal spectacles, while necessary, is considered undesirable by many patients. Some prepresbyopic patients with convergence insufficiency over accommodate to maintain fusion. In a retrospective study by Wick, subjective complaints were eliminated in 97% of the 161 convergence insufficient presbyopic patients between the ages of 45 and 89 years who were treated using vision therapy procedures. As well, 92% of the patients improved their performance on standard stereopsis and convergence tests.[8]

It is possible that individuals with convergence insufficiency, who are required to maintain excessive accommodative effort for long periods of time, will also maintain a greater accommodative amplitude than will individuals of equal age without convergence insufficiency. If true, then vision therapy programs could be specifically designed to delay the onset of presbyopia and the need for bifocals or reading glasses. We hypothesize that 35-45 year-old individuals with convergence deficits will have larger accommodative amplitudes than an age-matched control group.

| Drugs That May Cause An Increase in Accommodation |
|---|
| Cholinergic Agonists |
| Anti-Hypertensive Agents |
| Agents to treat Deficient Anemias |
| Morphine |
| Opium |
| Stimulants of the Gastrointestinal and Urinary Tracts |
| |
| Drugs That May Cause a Loss of Accommodation |
| Adjuncts to Anesthesia |
| Adrenalcorticosteroids |
| Agents to Treat Migrane |
| Amebicide Agents |
| Anorexiant agents |
| Antianxiety agents |
| Antibiotics |
| Cholingeric Agents |
| Anticoagulants |
| Anticonvulsants |
| Antidepressants |
| Antihistimines |
| Antihypertensives |
| Antimalarial agents |
| Antineoplastic agents |
| Antiparkinsons agents |
| Antispychotic agents |
| Antiarrythymic agents |
| Antirheumatic agents |
| Antispasmodic agents |
| Anthelminitic agents |
| Antithyroid agents |

**Table 1**

** For a detailed listing of specific agents, see list at end of thesis paper.

## RESULTS

Analysis of the spreadsheet was done with the Statview Analysis Systems. The data for all tests can be found at the end of the paper. These consist of a raw data table, a drug appendix, and graphs related to selected comparisons.

The following exam findings were compared to the amount of add prescribed. Chi-squared tests were run to establish whether there was a significant correlation between the following findings of the add prescribed. (See Table 2)

- Age
- NPC Break
- NPC Recovery
- Distance Phoria
- Near Phoria
- Difference between Distance and Near Phoria
- Binocular Cross Cylinder Net

For findings with a significant correlation, two-tailed t-tests were performed (see Table 3) . Amounts of add needed for patients with esophoria compared to patient exhibiting exophoria with orthophorics included within this population was conducted within the first t-test. The second two tailed t-test compared esophoric patients to exophoric patients, excluding orthophoric patients. See Tables 4 & 5.

**Correlation Coefficient**
**Hypothesized Correlation = 0**

| | Correlation | Count | Z-Value | P-Value | 95% lower | 95% upper |
|---|---|---|---|---|---|---|
| Age, Add | .579 | 103 | 6.616 | <.0001 | .435 | .695 |
| NPC bk, Add | .089 | 103 | 0.897 | .3695 | .1063 | .278 |
| NPC blur, Add | .165 | 103 | 1.669 | .0952 | -.029 | .348 |
| Dist. Phoria, Add | .252 | 103 | 2.579 | .0099 | .062 | .425 |
| Near Phoria, Add | .040 | 103 | .397 | .6910 | -.155 | .231 |
| Phoria Diff, Add | -.138 | 103 | -1.392 | .1638 | -.323 | .057 |
| FCC Net, Add | .292 | 103 | 3.009 | .0026 | .105 | .460 |

**Table 2**

**Correlation Coefficient**
**Hypothesized Correlation = 0**

| | Correlation | Count | Z-Value | P-Value | 95% lower | 95% upper |
|---|---|---|---|---|---|---|
| BO Break, Add | -0.75 | 103 | -.756 | .4499 | -.265 | -.120 |
| Add, BO Rec | .020 | 103 | .203 | .8388 | -.174 | .213 |
| Add, BI Break | -.033 | 103 | -.331 | .7409 | -.225 | .162 |
| Add, BI Rec | -.054 | 103 | -.538 | -.5907 | -.245 | .141 |

**Table 3**

Paired T-Tests
Hypothesized Difference

| | Mean Diff | DF | T-Value | P-Value |
|---|---|---|---|---|
| Esoadd, Exoadd (exos include orthos) | .385 | 51 | 2.742 | .0084 |

**Table 4 & 5**

Three of the seven Correlation Coefficient scores showed a P- value significance of <0.01. These were Age ($p<0.001$), Distance phoria ($p=0.0099$), and FCC net ($p=0.0026$). In analyzing the paired t-test, there was noticeable increase in significance of P-value when the orthophoric patients were excluded in the analysis (p-value from 0.0042 to 0.0015).

## DISCUSSION

The fact that there was no significant correlation between the power of the add and the other vergence findings (NPC break, NPC Blur, Near Phoria, Difference in Phoria) may have been due to accommodation not being held constant and/or variations in doctor instruction set.

Possible weaknesses that could have occurred within this study may include various environmental factors including different examination lanes, lighting conditions, and clarity of projected image of Snellen chart. Other variances may have occurred due to the fact that multiple interns, as well as advising doctors, performed the examinations.

In addition, patients could have variables as well including, but not limited to, dry eye, seasonal allergies, various systemic conditions, and also sociological and psychological conditions possibly affecting the final results. Diurnal variations in testing results may also have occurred over the three year span in which our queries were selected. Variations in near lenses used in near testing included the best spherical binocular visual acuity lens, fused cross cylinder lens, or the near subjective lens.

Ogle believes that proximal convergence makes up for the loss of accommodative convergence. It is also been proposed that a presbyopic individual has a nearly unrestrained use of accommodative convergence ability. The individual can therefore still innervationally try to accommodate, thus stimulating accommodative convergence, despite the absence of an accommodative response.[9]

Additionally, Hofstetter's study in 1942 showed that proximal convergence was effective in bringing about changes in convergence independent of changes in accommodation.[10] Morgan in 1950 proposed that proximal convergence is a learned function and a part of fusional convergence.[11]

A 1982 study indicated that proximal convergence is of greater relative importance in determining the fusion-free position for a presbyopic subject but that accommodative convergence is the more important component in prepresbyopic subjects.[12] This findings suggests that as accommodative convergence diminished with age, the proximal system makes up the difference as a learned response. Most investigators would probably agree that (1) an extra convergence system does exist, (2) this system operates independently of accommodation response, and (3) it is a learned function.[13]

One treatment modality for patients with convergence insufficiency is vision therapy. These patients are typically treated using the following tests: distance screen rocks, binocular lens flips, push-ups, loose lens tromboning, and eye stretching activities are just a few of the vision therapy techniques available.[5] Although this was investigated in the Portland Presbyopic Onset Delay Study, we were unable to support this due to the lack of patients meeting convergence insufficiency protocol in our study.

The table found in Appendix 1 can be used as a rough estimate, but not as an absolute prescribable amount of add. Multiple diagnostic test sequences are needed to properly prescribe an adequate add for each individual, such as midpoint of positive relative accommodation and negative relative accommodation, the near subjective, and fused binocular cross cylinder.

No significance was found connecting convergence problems with amount of add, however, more extensive studies are needed to investigate the role distance phoria plays in the amount of add given to patients.

## Conclusion

As the baby boomer population nears the presbyopic age, the answers to this question will become increasingly important as it will affect such a tremendous amount of the population.

Although we were unable to find data to support the hypothesis that individuals with convergence difficulties will have larger accommodative amplitudes than an age-matched control group, another area of interest found may lie in the fact that correlation was found between the distance phoria and the amount of add needed by the patient. We feel that these warrant further investigation with consistent examination protocols.

**Appendix 1**[14]

Age and Diopters of Accommodation*

| | |
|---|---|
| 4 years - 15.00D | 33 years - 7.75D |
| 5 years - 14.75D | 34 years - 7.50D |
| 6 years - 14.50D | 35 years - 7.25D |
| 7 years - 14.25D | 36 years - 7.00D |
| 8 years - 14.00D | 37 years - 6.75D |
| 9 years - 13.75D | 38 years - 6.50D |
| 10 years - 13.50D | 39 years - 6.25D |
| 11 years - 13.25D | 40 years - 6.00-5.66D |
| 12 years - 13.00D | 41 years - 5.25D |
| 13 years - 12.75D | 42 years - 4.87D |
| 14 years - 12.50D | 43 years - 4.40D |
| 15 years - 12.25D | 44 years - 4.00D |
| 16 years - 12.00D | 45 years - 3.66D |
| 17 years - 11.75D | 46 years - 3.25D |
| 18 years - 11.50D | 47 years - 2.87D |
| 19 years - 11.25D | 48 years - 2.40D |
| 20 years - 11.00D | 49 years - 2.00D |
| 21 years - 10.75D | 50 years - 1.90D |
| 22 years - 10.50D | 51 years - 1.87D |
| 23 years - 10.25D | 52 years - 1.75D |
| 24 years - 10.00D | 53 years - 1.66D |
| 25 years - 9.75D | 54 years - 1.50D |
| 26 years - 9.50D | 55 years - 1.40D |
| 27 years - 9.25D | 56 years - 1.33D |
| 28 years - 9.00D | 57 years - 1.25D |
| 29 years - 8.75D | 58 years - 1.10D |
| 30 years - 8.50D | 59 years - 1.00D |
| 31 years - 8.25D | 60 years - 1.00D |
| 32 years - 8.00D | 70 years - 0.00D |

*Calculations made by Nora Nypomnyaschy, COT, Graduate of the Boston University School of Medicine Ophthalmic Technician Program

**Appendix 2**[15]

Drugs that May Cause an Increase in Accommodation

| Class and Generic Name | Increase in Accommodation |
|---|---|
| Cholinergic agonist | |
| Aceclidine* | Accommodative Spasm |
| Acetylcholine* | Accommodative Spasm |
| Carbachol* | Accommodative Spasm |
| Demecarium* | Accommodative Spasm |
| DFP* | Accommodative Spasm |
| Echothiophate* | Accommodative Spasm |
| Isoflurophate* | Accommodative Spasm |
| Neostigmine* | Accommodative Spasm |
| Physostigmine* | Accommodative Spasm |
| Pilocarpine* | Accommodative Spasm |
| Antihypertensive agent | |
| Guanethidine | Accommodative spasm |
| Agents to treat deficiency anemias | |
| Methylene blue | Accommodative spasm |
| Relief of pain drugs | |
| Morphine | Accommodative spasm |
| Opium | Accommodative spasm |
| Stimulants of the gastrointestinal and urinary tracts | |
| Carbachol* | Accommodative spasm |

* These drugs may be used or are principally used in ophthalmic practice.

**Appendix 3**[15]

Drugs that May Cause a Loss of Accommodation

| Class and Generic Name | Loss of Accommodation |
|---|---|
| Adjuncts to anesthesia | |
| Methscopolamine | Decrease/paralysis of accommodation |
| Scopolamine* | Decrease/paralysis of accommodation |
| Adrenal corticosteroids | |
| Betamethasone* | Paralysis of accommodation |
| Cortisone* | Paralysis of accommodation |
| Dexamethasone* | Paralysis of accommodation |
| Fluorometholone* | Paralysis of accommodation |
| Hydrocortisone* | Paralysis of accommodation |
| Medrysone* | Paralysis of accommodation |
| Prednisolone* | Paralysis of accommodation |
| Agents used to treat deficiency anemias | |
| Methylene blue | Decrease in accommodation |
| Agents used to treat migraine | |
| Methysergide | Decrease in accommodation |
| Amebicide agents | |
| Emetine | Paralysis of accommodation |
| Anorexiant agents | |
| Amphetamine | Decrease in accommodation |
| Benzphetamine | Decrease in accommodation |
| Chlorphentermine | Decrease in accommodation |
| Dexamphatamine | Decrease in accommodation |
| Diethylpropion | Decrease in accommodation |
| Fenfluramine | Decrease in accommodation |
| Methamphetamine | Decrease in accommodation |
| Phendimetrazine | Decrease in accommodation |
| Phenmetrazine | Decrease in accommodation |
| Phentermine | Decrease in accommodation |

* These drugs are or may be principally used in ophthalmic practice.

† These have been reported to be side effects, but may not be characteristic of the drug's primary action.

**Appendix 3 cont.**

| | |
|---|---|
| **Antianxiety agents** | |
| Carisoprodol | Decrease in accommodation |
| Chlorodiazepoxide | Decrease in accommodation |
| Clonazepam | Decrease in accommodation |
| Diazepam | Decrease in accommodation |
| Flurazepam | Decrease in accommodation |
| Lorazepam | Decrease in accommodation |
| Meprobamate | Decrease in accommodation |
| Nitrazepam | Decrease in accommodation |
| Oxazepam | Decrease in accommodation |
| Prazepam | Decrease in accommodation |
| **Antibiotics** | |
| Benzathine penicillin G | Decrease in accommodation |
| Chloramphenicol | Paralysis in accommodation |
| Hydrabamine penicillin V | Decrease in accommodation |
| Nalidixic acid | Decrease in accommodation |
| Potassium penicillin G | Decrease in accommodation |
| Potassium penicillin V | Decrease in accommodation |
| Potasssium phenethicillin | Decrease in accommodation |
| Procaine penicillin G | Decrease in accommodation |
| Streptomycin | Decrease in accommodation |
| **Cholineric agonists** | |
| Pilocarpine *† | Paralysis in accommodation |
| **Anticoagulants** | |
| Anisidione | Paralysis in accommodation |
| Diphenadione | Paralysis in accommodation |
| Phenindione | Paralysis in accommodation |
| **Anticonvulsant agents** | |
| Phenytoin | Decrease in accommodation |

* These drugs are or may be principally used in ophthalmic practice.

† These have been reported to be side effects, but may not be characteristic of the drug's primary action.

**Appendix 3 cont.**

| | |
|---|---|
| **Antidepressant agents** | |
| Anitriptyline | Decrease/Paralysis of accommodation |
| Amoxapine | Decrease/Paralysis of accommodation |
| Carbamazepine | Decrease/Paralysis of accommodation |
| Clomipramine | Decrease/Paralysis of accommodation |
| Desipramine | Decrease/Paralysis of accommodation |
| Doxepin | Decrease/Paralysis of accommodation |
| Imipramine | Decrease/Paralysis of accommodation |
| Nortriptyline | Decrease/Paralysis of accommodation |
| Protriptyline | Decrease/Paralysis of accommodation |
| Trimipramine | Decrease/Paralysis of accommodation |
| **Antihypertensive agents** | |
| Mecamylamine | Paralysis of accommodation |
| Pargyline | Paralysis of accommodation |
| Pentolinium | Paralysis of accommodation |
| Tetraethylammonium | Paralysis of accommodation |
| Trimethaphan | Paralysis of accommodation |
| Trimethidinium | Paralysis of accommodation |
| **Antihistamines** | |
| Antozoline* | Decrease in accommodation |
| Carbinoxamine* | Decrease/Paralysis of accommodation |
| Clemastine* | Decrease/Paralysis of accommodation |
| Diphenhydramine* | Decrease/Paralysis of accommodation |
| Diphenylpyraline* | Decrease/Paralysis of accommodation |
| Doxylamine* | Decrease/Paralysis of accommodation |
| Pyrilamine* | Decrease in accommodation |
| Tripelennamine | Decrease in accommodation |
| **Antimalarial agents** | |
| Amodiaquine | Decrease in accommodation |
| Chloroquine | Decrease in accommodation |
| Hydroxychloroquine | Decrease in accommodation |
| **Antineoplatic agents** | |
| Floxuridine | Decrease in accommodation |
| Fluorouracil | Decrease in accommodation |
| Procarbazine | Decrease in accommodation |

* These drugs are or may be principally used in ophthalmic practice.

**Appendix 3 cont.**

| | |
|---|---|
| **Antiparkinsons agents** | |
| Benztropine | Decrease/Paralysis of accommodation |
| Biperiden | Decrease/Paralysis of accommodation |
| Carampiphen | Paralysis of accommodation |
| Chlorphenoxamine | Decrease/Paralysis of accommodation |
| Procyclidine | Decrease/Paralysis of accommodation |
| Cycrimine | Decrease/Paralysis of accommodation |
| Trihexyphenidyl | Decrease/Paralysis of accommodation |
| **Antipsychotic agents** | |
| Acetophenazine | Decrease/Paralysis of accommodation |
| Butaperazine | Decrease/Paralysis of accommodation |
| Carphenazine | Decrease/Paralysis of accommodation |
| Chlorpromazine | Decrease/Paralysis of accommodation |
| Chlorprothixene | Decrease/Paralysis of accommodation |
| Diethazine | Decrease/Paralysis of accommodation |
| Droperidol | Decrease in accommodation |
| Ethopropazine | Decrease/Paralysis of accommodation |
| Fluphenazine | Decrease/Paralysis of accommodation |
| Haloperidol | Decrease in accommodation |
| Loxapine | Decrease in accommodation |
| Mesoridazine | Decrease/Paralysis of accommodation |
| Methidilazine | Decrease/Paralysis of accommodation |
| Methotrimeprazine | Decrease/Paralysis of accommodation |
| Perazine | Decrease/Paralysis of accommodation |
| Periciazine | Decrease/Paralysis of accommodation |
| Perphenazine | Decrease/Paralysis of accommodation |
| Piperacetazine | Decrease/Paralysis of accommodation |
| Prochlorperazine | Decrease/Paralysis of accommodation |
| Promazine | Decrease/Paralysis of accommodation |
| Promethazine | Decrease/Paralysis of accommodation |
| Propiomazine | Decrease/Paralysis of accommodation |
| Thiopropazate | Decrease/Paralysis of accommodation |
| Thioproperazine | Decrease/Paralysis of accommodation |
| Thioridazine | Decrease/Paralysis of accommodation |
| Thiothixene | Decrease/Paralysis of accommodation |
| Trifluoperazine | Decrease/Paralysis of accommodation |
| Trifluperidol | Decrease in accommodation |
| Triflupromazine | Decrease/Paralysis of accommodation |
| Trimeprazine | Decrease/Paralysis of accommodation |

**Appendix 3 cont.**

| | |
|---|---|
| Antiarrhythmic agents | |
| Methachloline | Decrease in accommodation |
| Antirheumatic agents | |
| Naproxen | Decrease in accommodation |
| Antispasmodic agents | |
| Adiphenine | Paralysis of accommodation |
| Ambutonium | Paralysis of accommodation |
| Anisotropine | Paralysis of accommodation |
| Atropine* | Decrease/Paralysis of accommodation |
| Belladonna | Decrease/Paralysis of accommodation |
| Clidinium | Paralysis of accommodation |
| Dicyclomine | Paralysis of accommodation |
| Diphemanil | Paralysis of accommodation |
| Glycopyrrolate | Paralysis of accommodation |
| Hexocyclium | Paralysis of accommodation |
| Homatropine* | Decrease/Paralysis of accommodation |
| Isopropamine | Paralysis of accommodation |
| Mepenzolate | Paralysis of accommodation |
| Methantheline | Paralysis of accommodation |
| Methixene | Paralysis of accommodation |
| Methylatropine nitrate | Paralysis of accommodation |
| Oxyphenonium* | Paralysis of accommodation |
| Oxyphencyclimine | Paralysis of accommodation |
| Pipenzolate | Paralysis of accommodation |
| Piperidiolate | Paralysis of accommodation |
| Poldine | Paralysis of accommodation |
| Propantheline | Paralysis of accommodation |
| Tridehyxethyl | Paralysis of accommodation |
| Anthelmintic agents | |
| Piperazine | Paralysis of accommodation |
| Antithyroid agents | |
| Iodide and iodine solution and compounds | Paralysis of accommodation |
| Radioactive iodides | Paralysis of accommodation |

* These drugs are or may be principally used in ophthalmic practice.

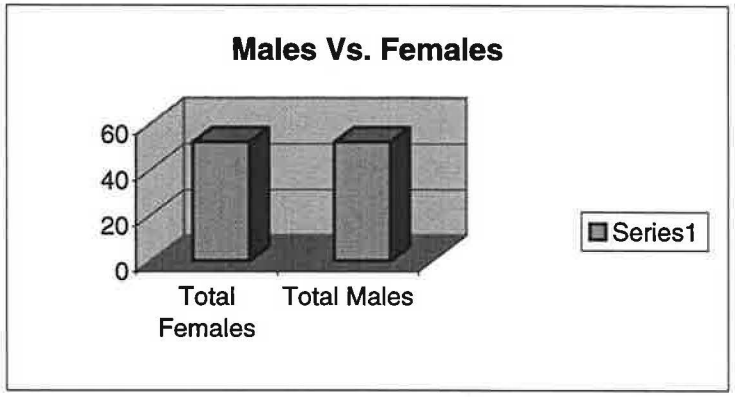
| *FEMALES* | | | | | | | BSBVA | OD | | OS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Patient # | Date of Birth | Date of Exam | Age | Sex | NPC bk | NPC bl | Sph | Cyl | Axis | Sph | Cyl | Axis | DLPh | NLPh | Phdiff | FCC OD | FCC net | BObl | BObr |
| 15758 | 4/21/57 | 9/8/98 | 40 | F | 4 | 6 | -2.00 | -0.25 | 90 | -2.00 | -0.75 | 50 | -3 | -13 | -10 | -1.25 | 0.75 | 18 | 18 |
| 25518 | 6/14/57 | 6/24/97 | 40 | F | 0 | 0 | -1.75 | -0.25 | 77 | -2.00 | 0.00 | 0 | -1 | -13 | 12 | -0.75 | 1.00 | x | 18 |
| 34856 | 5/10/54 | 10/5/98 | 44 | F | 6 | 6 | 0.25 | 0.00 | 0 | 0.50 | 0.00 | 0 | -1 | -12.5 | 12 | 2.00 | 1.75 | x | 11 |
| 20230 | 6/8/55 | 2/6/97 | 41 | F | 2 | 3 | 0.25 | -0.50 | 170 | 0.50 | 0.00 | 0 | 0 | -11.5 | 11.5 | 1.00 | 0.75 | 8 | 20 |
| 15758 | 4/21/57 | 9/8/98 | 41 | F | 4 | 6 | -2.00 | -0.25 | 90 | -2.00 | -0.25 | 50 | -3 | -11 | -8.5 | -1.25 | 0.75 | x | 18 |
| 23422 | 3/6/59 | 2/26/97 | 37 | F | 20 | 30 | 0.00 | -0.50 | 178 | -0.50 | -0.75 | 165 | 2 | -11 | 12.5 | 0.75 | 0.75 | 8 | 24 |
| 17880 | 7/7/57 | 10/2/98 | 41 | F | 5 | 7 | 0.75 | 0.00 | 0 | 0.50 | 0.00 | 0 | -3 | -11 | 8 | 2.00 | 1.25 | x | 18 |
| 24235 | 3/2/53 | 4/7/97 | 44 | F | 8 | 10 | -0.25 | -1.00 | 90 | -0.25 | -0.75 | 85 | -4 | -10.5 | 7 | 1.00 | 1.25 | 6 | 10 |
| 26100 | 7/30/53 | 7/8/97 | 43 | F | 12 | 15 | -0.50 | -0.75 | 130 | -1.00 | -0.75 | 150 | -3 | -10.5 | 8 | -0.25 | 0.25 | x | 24 |
| 29739 | 11/29/56 | 1/3/98 | 42 | F | 2 | 6 | 0.25 | -1.00 | 140 | 0.75 | -1.00 | 10 | 2 | -9.5 | 11 | 0.50 | 0.25 | x | 10 |
| 33427 | 4/5/57 | 8/18/98 | 41 | F | 2 | 3 | -3.00 | 0.00 | 0 | -3.75 | 0.00 | 0 | -5 | -9 | 4.5 | -2.00 | 1.00 | x | 18 |
| 17660 | 8/23/53 | 4/19/96 | 42 | F | 6 | 14 | 0.75 | -0.25 | 180 | 0.00 | 0.00 | 0 | 1 | -9 | 10 | 2.25 | 1.50 | x | 12 |
| 139629 | 12/25/53 | 9/25/98 | 44 | F | 0 | 5 | 0.00 | 0.00 | 0 | 0.00 | -0.50 | 20 | -2 | -9 | -7 | 1.75 | 1.75 | 16 | 16 |
| 22520 | 10/18/60 | 1/13/97 | 36 | F | 15 | 20 | 0.25 | -0.50 | 60 | 0.50 | -0.50 | 105 | 0 | -8 | 8 | 0.25 | 0.00 | x | 6 |
| 22164 | 12/13/60 | 3/2/98 | 37 | F | 0 | 3 | -3.50 | -0.25 | 93 | -3.50 | -1.00 | 135 | 0 | -8 | -8 | -4.00 | -0.50 | 8 | 8 |
| 6147 | 9/1/56 | 12/6/94 | 38 | F | 0 | 5 | 0.25 | -1.25 | 180 | 0.00 | -0.75 | 180 | 1 | -8 | 9 | 2.00 | 1.75 | 10 | 14 |
| 35401 | 10/23/53 | 10/29/98 | 45 | F | 0 | 0 | 0.00 | -0.25 | 166 | 0.00 | -0.75 | 15 | 1 | -8 | 8.5 | 1.50 | 1.50 | x | 20 |
| 5733 | 7/5/57 | 12/9/94 | 37 | F | 2 | 4 | -1.25 | -0.50 | 95 | -1.50 | -0.50 | 95 | -2 | -7.5 | 6 | 0.50 | 1.75 | x | 20 |
| 18386 | 7/9/54 | 2/13/97 | 42 | F | 4 | 5 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | -3 | -7.5 | 4.5 | 0.25 | 0.25 | x | 12 |
| 8909 | 7/2/55 | 3/30/95 | 39 | F | 5 | 7 | 0.50 | -0.75 | 90 | 0.75 | -0.50 | 90 | 0 | -7 | 7 | 0.50 | 0.00 | 0 | 12 |
| 17701 | 6/25/54 | 4/22/96 | 41 | F | 18 | 25 | -0.50 | 0.00 | 0 | -1.00 | 0.00 | 0 | 2 | -7 | 9 | 0.50 | 1.00 | x | 6 |
| 3906 | 12/13/56 | 4/2/97 | 40 | F | 6 | 5 | -1.00 | 0.00 | 0 | -1.00 | -0.25 | 115 | 6 | -6.5 | 12.5 | 0.00 | 1.00 | x | 14 |
| 12926 | 2/17/57 | 2/19/98 | 41 | F | 10 | 10 | -0.50 | -0.50 | 95 | -0.50 | -0.25 | 99 | 2 | -6.5 | 8.5 | 0.25 | 0.75 | x | 26 |
| 20733 | 12/26/54 | 10/23/96 | 41 | F | 8 | 25 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 1 | -6.5 | 7.5 | 1.75 | 1.25 | 14 | 16 |
| 6147 | 9/1/56 | 7/20/98 | 41 | F | 8 | 8 | 0.50 | -0.25 | 28 | 0.25 | 0.00 | 0 | 0 | -6 | 6 | 1.50 | 1.00 | 10 | 14 |
| 13915 | 6/2/55 | 4/23/96 | 40 | F | 6 | 7 | 0.25 | -0.25 | 75 | 0.50 | -0.50 | 115 | 0 | -5.5 | 5.5 | 1.00 | 1.25 | x | 26 |
| 34528 | 2/24/49 | 10/24/98 | 49 | F | 5 | 5 | -0.50 | 0.00 | 0 | 0.00 | 0.00 | 0 | 1 | -5.5 | -6 | 1.00 | 1.50 | x | 10 |
| 1933 | 3/17/56 | 3/28/94 | 38 | F | 10 | 14 | 0.25 | 0.00 | 0 | 0.50 | -0.75 | 180 | 1 | -4 | 4.5 | 1.25 | 1.00 | x | 20 |
| 17806 | 3/26/59 | 4/22/96 | 37 | F | 4 | 5 | 0.75 | -0.75 | 165 | 0.75 | -2.00 | 180 | 3 | -3.5 | 6 | 2.00 | 1.25 | 6 | 18 |
| 20955 | 8/16/60 | 11/7/98 | 38 | F | 3 | 14 | 0.00 | -0.25 | 5 | 0.00 | -0.25 | 130 | 2 | -3.5 | 5 | 1.00 | 1.00 | x | 22 |
| 25153 | 7/14/57 | 5/20/97 | 39 | F | 3 | 5 | -1.75 | -0.75 | 82 | -2.50 | 0.00 | 0 | -3 | -3.5 | 0.5 | -1.75 | 0.00 | x | 30 |
| 32631 | 7/28/58 | 6/27/98 | 39 | F | 6 | 7 | 0.25 | -0.25 | 28 | 0.50 | -0.25 | 160 | -3 | -3 | 0.5 | 0.75 | 0.50 | x | 24 |
| 32186 | 2/16/57 | 5/29/98 | 41 | F | 0 | 0 | 0.50 | -0.50 | 10 | 0.00 | -0.50 | 35 | 0 | -3 | 3 | 2.00 | 1.50 | x | 30 |
| 20968 | 4/19/54 | 10/30/96 | 42 | F | 0 | 0 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 1 | -3 | 4 | 0.50 | 0.00 | 6 | 22 |
| 32469 | 3/17/53 | 6/9/98 | 45 | F | 7 | 7 | 1.00 | -0.75 | 165 | 1.00 | -0.50 | 5 | 0 | -3 | 3 | 2.25 | 1.25 | 16 | 18 |
| 24589 | 7/23/58 | 4/17/97 | 38 | F | 0 | 1 | -3.00 | -0.50 | 135 | -2.25 | -1.00 | 20 | 1 | -2.5 | 3.5 | -2.25 | 0.75 | 20 | 24 |
| 17930 | 9/3/55 | 5/15/96 | 40 | F | 0 | 0 | 1.00 | -0.25 | 30 | 0.50 | -0.50 | 170 | 3 | -2.5 | 5.5 | 1.75 | 0.75 | x | 18 |
| 5833 | 9/13/55 | 11/11/94 | 39 | F | 3 | 8 | 0.50 | -1.00 | 178 | 0.00 | -0.75 | 3 | 2 | -2 | 4 | 1.50 | 1.00 | 12 | 18 |
| 583 | 6/16/53 | 11/4/96 | 43 | F | 5 | 10 | 1.25 | -0.75 | 70 | 1.00 | 0.00 | 0 | 3 | -2 | 4.5 | 2.25 | 1.00 | 8 | 16 |
| 25955 | 8/16/58 | 6/28/97 | 38 | F | 0 | 3 | -1.50 | -0.75 | 20 | -2.00 | -0.75 | 170 | 0 | -0.5 | 0.5 | -0.50 | 1.00 | 8 | 16 |
| 17053 | 12/11/59 | 4/2/96 | 37 | F | 0 | 5 | -0.75 | -0.50 | 165 | -0.75 | -0.25 | 155 | 6 | 0 | 5.5 | 0.25 | 1.00 | 16 | 16 |
| 19189 | 12/25/53 | 7/8/92 | 38 | F | 3 | 6 | 0.00 | 0.00 | 0 | 0.25 | 0.00 | 0 | 0 | 0 | 0 | 0.25 | 0.25 | 6 | 12 |
| 21091 | 8/2/57 | 10/24/96 | 39 | F | 8 | 8 | -3.25 | -1.00 | 30 | -3.25 | -0.75 | 160 | -1 | 2 | 3 | -3.25 | 0.00 | 32 | 32 |
| 24623 | 8/29/57 | 4/17/97 | 40 | F | 2 | 4 | -2.50 | -1.25 | 5 | -2.75 | -0.50 | 45 | 6 | 2 | 3.5 | -1.50 | 1.00 | x | 16 |
| 27350 | 6/3/54 | 9/20/97 | 43 | F | 0 | 0 | 0.25 | 0.00 | 0 | 0.00 | 0.00 | 0 | -1 | 2.5 | 3.5 | 1.75 | 1.50 | x | 24 |
| 3067 | 12/25/55 | 10/29/98 | 42 | F | 15 | 25 | -1.00 | -0.50 | 90 | 0.00 | -1.00 | 95 | 9 | 2.5 | 6.5 | 0.50 | 1.50 | 12 | 18 |
| 35072 | 2/12/48 | 10/9/98 | 50 | F | 3.54 | 10.62 | 1.25 | 0.00 | 0 | 1.75 | 0.00 | 0 | 1 | 2.5 | 1.5 | 3.25 | 2.00 | 12 | 16 |
| 20667 | 5/13/58 | 10/6/96 | 38 | F | 3 | 4 | -2.25 | 0.00 | 0 | -2.25 | 0.00 | 0 | 0 | 3 | 3 | -0.50 | 1.75 | 18 | 22 |
| 19595 | 6/25/58 | 9/8/98 | 40 | F | 2 | 5 | -0.75 | 0.00 | 0 | -1.25 | 0.00 | 0 | -3 | 3 | 6 | -0.25 | 0.50 | 10 | 14 |
| 13529 | 5/10/55 | 11/17/98 | 43 | F | 0 | 5.5 | -2.00 | -0.50 | 170 | -2.50 | -0.75 | 175 | 5 | 3 | 2 | -2.00 | 0.00 | 4 | 10 |
| 32494 | 1/12/58 | 6/11/98 | 40 | F | 0 | 0 | -0.25 | -0.25 | 105 | 0.25 | -0.50 | 85 | 4 | 8.5 | 5 | 0.25 | 0.50 | 26 | 30 |
| 20048 | 9/2/56 | 11/10/98 | 42 | F | 3 | 11 | -4.00 | -0.75 | 35 | -4.25 | -1.25 | 173 | 14 | 12 | 2 | -3.75 | 0.25 | 0 | 28 |

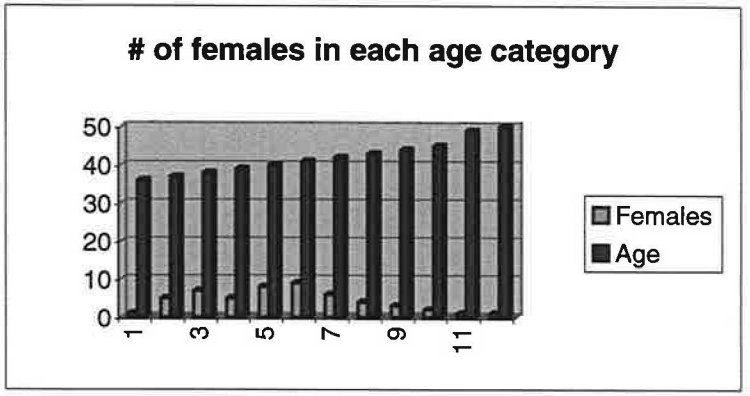
| *FEMALES* | | | | | | Final Rx | OD | | OS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOrec | Blbl | Blbr | Blrec | PRA | NRA | Sph | Cyl | Axis | Sph | Cyl | Axis | Add |
| 12 | -24 | -28 | -18 | -2.75 | 1.00 | -2.00 | -0.25 | 93 | -2.00 | -0.25 | 70 | 0.75 |
| 12 | x | 20 | 16 | -3.25 | 1.25 | -2.00 | 0.00 | 0 | -2.00 | 0.00 | 0 | 1.00 |
| 6 | x | 16 | 12 | 1.00 | 3.00 | 0.25 | 0.00 | 0 | 0.50 | 0.00 | 0 | 1.50 |
| 6 | x | 18 | 17 | -1.25 | 1.00 | 0.75 | 0.00 | 0 | 0.75 | 0.00 | 0 | 0.00 |
| 12 | 24 | 28 | 18 | -2.75 | 1.00 | -2.00 | -0.25 | 93 | -2.00 | -0.25 | 70 | 0.75 |
| 12 | 10 | 12 | 6 | -2.50 | 1.50 | 0.00 | -0.50 | 178 | -0.50 | -0.75 | 165 | 1.00 |
| 12 | x | 12 | 12 | 0.00 | 2.50 | 0.75 | 0.00 | 0 | 0.50 | 0.00 | 0 | 1.25 |
| -14 | x | 26 | 22 | 0.50 | 2.25 | -0.25 | -1.00 | 100 | -0.25 | -0.75 | 85 | 0.00 |
| 16 | x | 30 | 14 | -1.25 | 1.00 | -0.75 | -0.25 | 130 | -1.25 | -0.25 | 150 | 1.00 |
| -2 | x | 12 | 6 | -1.00 | 2.50 | 0.25 | -1.00 | 140 | 0.75 | -1.00 | 10 | 0.00 |
| 4 | x | 22 | 20 | -6.75 | -0.50 | -3.25 | 0.00 | 0 | -4.00 | 0.00 | 0 | 0.00 |
| 2 | x | 8 | 10 | 1.75 | 2.25 | 2.25 | 0.00 | 0 | 1.50 | 0.00 | 0 | 0.00 |
| 24 | -18 | -20 | -22 | 1.00 | 2.50 | 0.00 | 0.00 | 0 | 0.25 | -0.50 | 20 | 1.75 |
| 0 | x | 18 | 0 | -2.25 | 1.50 | 0.75 | -0.50 | 63 | 0.75 | -0.50 | 110 | 0.00 |
| 2 | -18 | -18 | -14 | -6.75 | -0.50 | -3.50 | -0.25 | 93 | -3.50 | -1.00 | 135 | 0.00 |
| -2 | 12 | 14 | 8 | -0.25 | 1.75 | 0.75 | -1.25 | 180 | 0.50 | -0.75 | 180 | 0.00 |
| 0 | 14 | 20 | 18 | 0.50 | 2.75 | 1.25 | -0.25 | 166 | 1.25 | -0.75 | 15 | 0.00 |
| 12 | x | 14 | 6 | -2.50 | 2.00 | -1.50 | 0.00 | 0 | -1.50 | 0.00 | 0 | 0.00 |
| 2 | x | 14 | 4 | -1.75 | 1.75 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| 4 | 4 | 14 | 12 | -0.25 | 1.75 | 0.50 | -0.75 | 90 | 0.75 | -0.50 | 90 | 0.00 |
| 4 | 16 | 20 | 12 | -2.25 | 2.00 | -0.50 | 0.00 | 0 | -1.00 | 0.00 | 0 | 0.00 |
| 14 | x | 14 | 8 | -3.50 | 2.25 | -1.00 | 0.00 | 0 | -1.00 | -0.25 | 115 | 0.00 |
| 24 | x | 12 | 10 | -0.75 | 1.75 | -0.50 | -0.50 | 95 | -0.50 | -0.25 | 99 | 0.00 |
| 4 | 12 | 18 | 16 | 0.00 | 2.50 | 0.25 | 0.00 | 0 | 0.25 | 0.00 | 0 | 1.25 |
| 6 | x | 10 | 14 | 0.75 | 2.25 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 1.25 |
| 18 | x | 24 | 18 | -0.50 | 2.25 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| 2 | x | 18 | 4 | 0.50 | 2.00 | -0.50 | 0.00 | 0 | 0.00 | -1.00 | 90 | 2.00 |
| 10 | 8 | 18 | 8 | 1.00 | 2.00 | 0.75 | 0.00 | 0 | 1.00 | -0.75 | 150 | 0.00 |
| 2 | 12 | 18 | 10 | -3.25 | 3.00 | 0.50 | -0.75 | 165 | 0.50 | -1.75 | 180 | 0.00 |
| 8 | x | 14 | 4 | -4.25 | 2.75 | 0.00 | -0.25 | 5 | 0.00 | -0.25 | 130 | 0.00 |
| 18 | x | 6 | 4 | -4.00 | 0.25 | -1.75 | -0.75 | 82 | -2.50 | 0.00 | 0 | 0.00 |
| 12 | x | 18 | 12 | -0.75 | 2.25 | 1.00 | 0.00 | 0 | 1.00 | 0.00 | 0 | 0.00 |
| 6 | 12 | 18 | 12 | -0.50 | 3.00 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 0.00 |
| 10 | 6 | 12 | 6 | -2.75 | 3.00 | 0.25 | 0.00 | 0 | 0.25 | 0.00 | 0 | 1.00 |
| 0 | 16 | 18 | 12 | 0.50 | 3.75 | 1.00 | -0.75 | 165 | 1.00 | -0.50 | 5 | 1.25 |
| 18 | x | 12 | 10 | -4.75 | -0.75 | -3.00 | -0.50 | 135 | -2.25 | -1.00 | 20 | 0.00 |
| 10 | x | 12 | 6 | 0.50 | 3.50 | 0.75 | -0.25 | 30 | 0.50 | -0.50 | 170 | 1.00 |
| 14 | x | 6 | 2 | -0.50 | 2.75 | 0.25 | -1.00 | 180 | 0.00 | -0.75 | 180 | 0.75 |
| 12 | 8 | 10 | 6 | 0.75 | 3.75 | 1.25 | -0.75 | 70 | 1.00 | 0.00 | 0 | 1.25 |
| 8 | x | 16 | 6 | -3.50 | 1.75 | -1.25 | -0.75 | 13 | -2.00 | -1.25 | 175 | 0.00 |
| 10 | 12 | 12 | 3 | -2.00 | 1.75 | -0.75 | -0.50 | 165 | -0.75 | -0.25 | 155 | 0.00 |
| 5 | 4 | 10 | 6 | -2.50 | 2.50 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 1.00 |
| 30 | -18 | -18 | -18 | -6.50 | -0.25 | -3.25 | -0.75 | 30 | -3.25 | -0.75 | 160 | 0.00 |
| 4 | x | 12 | 4 | -3.25 | 0.50 | -2.50 | -0.50 | 150 | -2.75 | -0.50 | 45 | 1.00 |
| 12 | 6 | 12 | 10 | 0.25 | 2.75 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 0.00 |
| 0 | 9 | 18 | 12 | -1.00 | 1.75 | -1.00 | -0.50 | 90 | 0.00 | -1.00 | 95 | 1.00 |
| 12 | x | 18 | 6 | 2.75 | 4.25 | 1.25 | 0.00 | 0 | 1.75 | 0.00 | 0 | 1.75 |
| 18 | x | 2 | 2 | -4.25 | 1.00 | -2.00 | 0.00 | 0 | -2.00 | 0.00 | 0 | 0.00 |
| 10 | 16 | 18 | 6 | -3.50 | 1.75 | -0.75 | 0.00 | 0 | -1.00 | 0.00 | 0 | 0.00 |
| 0 | 6 | 10 | 6 | -2.25 | -1.25 | -2.50 | -1.00 | 170 | -2.75 | -1.00 | 175 | 0.00 |
| 18 | x | 6 | -2 | -1.50 | 2.00 | -0.50 | 0.00 | 0 | -0.25 | 0.00 | 0 | 1.00 |
| 18 | 0 | 8 | 6 | -6.00 | -1.50 | -4.00 | -0.75 | 35 | -4.25 | -1.25 | 173 | 2.00 |
| | | | | | | | | | | | | |
| | | | | | | | | | Page 2 | | Avg Ad | 0.50 |

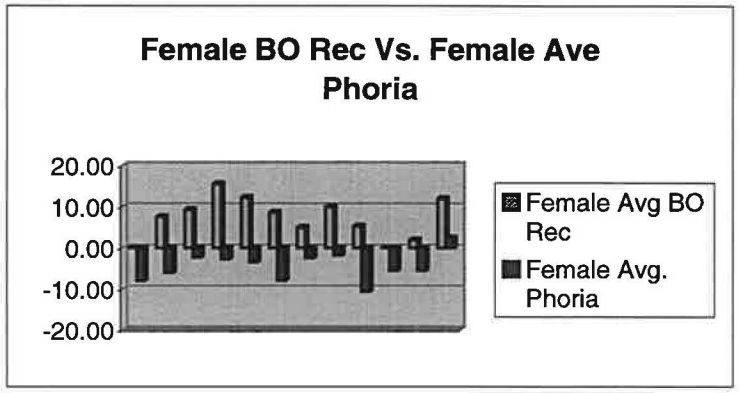
| | | | | | | | Sph | Cyl | Axis | Sph | Cyl | Axis | DLPh | NLPh | Phdiff | FCC OD | FCC net | BOdl | BOdr | BOrec | Bldl | Bldr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | BSBVA | | OD | BSBVA | | OS | | | | | | | | | | BSBVA |
| 23707 | 11/4/57 | 3/12/97 | 39 | M | 6 | 16 | 0.25 | 0.00 | 0 | 0.75 | 0.00 | 0 | -2 | -17.5 | 15.5 | 1.50 | 1.25 | x | 10 | -10 | -18 | -24 |
| 23875 | 5/7/60 | 3/13/97 | 36 | M | 4 | 4 | -1.00 | -1.25 | 105 | -0.50 | -1.50 | 50 | -4 | -14.5 | 11 | 0.00 | 1.00 | x | 12 | 6 | 14 | 20 |
| 21797 | 4/6/60 | 12/5/96 | 36 | M | 14 | 14 | 0.75 | -0.75 | 105 | 0.75 | -1.25 | 80 | 0 | -12 | 12 | 0.50 | 0.25 | x | 18 | 6 | 10 | 24 |
| 27269 | 1/28/54 | 9/15/97 | 43 | M | 2 | 5 | -1.75 | -0.75 | 48 | -1.25 | -0.75 | 110 | -1 | -12 | 11 | -1.75 | 0.00 | x | 5 | 4 | 7 | 18 |
| 20497 | 11/25/55 | 10/14/98 | 42 | M | 8 | 30 | 0.25 | -0.50 | 75 | 0.25 | -0.50 | 105 | -4 | -10 | 6 | 1.75 | 1.50 | 9 | 18 | 9 | 14 | 24 |
| 20650 | 5/19/53 | 10/23/96 | 43 | M | 10 | 12 | -1.00 | 0.00 | 0 | -1.00 | -1.00 | 18 | 0 | -10 | 10 | 1.00 | 2.00 | x | 6 | 6 | x | 12 |
| 16379 | 7/26/56 | 2/19/96 | 39 | M | 3 | 10 | -1.50 | 0.00 | 0 | -2.25 | 0.00 | 0 | 0 | -9 | 9 | 0.25 | 1.75 | x | 18 | -2 | x | 20 |
| 18710 | 11/24/55 | 10/24/98 | 42 | M | 7 | 20 | -0.25 | -0.50 | 92 | -0.25 | -1.00 | 92 | 1 | -9 | 10 | 1.00 | 1.25 | 14 | 24 | -4 | 8 | 22 |
| 21841 | 5/29/54 | 11/19/96 | 42 | M | 10 | 9 | -0.50 | -0.50 | 90 | -0.50 | -1.00 | 70 | 1 | -9 | 10 | 0.75 | 1.25 | 4 | 6 | 2 | 12 | 20 |
| 24697 | 6/26/48 | 10/9/98 | 50 | M | 0 | 0 | -0.50 | 0.00 | 0 | -0.25 | 0.00 | 0 | 1 | -9 | 10 | 1.50 | 2.00 | 14 | 18 | 6 | x | 18 |
| 1309 | 11/19/55 | 9/15/94 | 38 | M | 8 | 6 | -3.50 | 0.00 | 0 | -3.75 | -0.50 | 145 | -4 | -8.5 | 5 | -2.00 | 1.50 | x | 18 | 6 | x | 14 |
| 26198 | 1/13/57 | 7/26/97 | 40 | M | 16 | 18 | 0.25 | -0.25 | 40 | 0.00 | 0.00 | 180 | -10 | -8.5 | 1 | 1.25 | 1.00 | x | 18 | 18 | x | 10 |
| 95598 | 2/22/54 | 4/13/95 | 41 | M | 0 | 0 | -0.50 | -0.25 | 110 | -0.50 | -0.25 | 77 | -2 | -8.5 | 7 | 0.25 | 0.75 | 10 | 12 | 6 | x | 18 |
| 20229 | 4/8/54 | 9/30/96 | 42 | M | 8 | 14 | 0.75 | -2.00 | 106 | 0.75 | -1.00 | 73 | 3 | -8 | 10.5 | 1.25 | 0.50 | 26 | 38 | 30 | 12 | 24 |
| 20484 | 8/25/55 | 9/25/96 | 41 | M | 9 | 11 | 0.00 | 0.00 | 0 | 0.00 | -0.50 | 180 | 3 | -7.5 | 10 | 1.25 | 1.25 | 4 | 8 | 4 | 6 | 10 |
| 16437 | 1/9/54 | 2/21/96 | 42 | M | 2 | 5 | -0.25 | -1.00 | 85 | -0.75 | -1.00 | 85 | 1 | -7.5 | 8 | 1.00 | 1.25 | x | 6 | 2 | x | 4 |
| 28146 | 3/25/55 | 10/25/97 | 42 | M | 6 | 6 | 0.25 | -0.25 | 180 | 0.50 | 0.00 | 0 | 0 | -7.5 | 7.5 | 1.75 | 1.50 | x | 18 | 9 | x | 18 |
| 17644 | 5/7/56 | 4/19/96 | 39 | M | 5 | 5 | -0.75 | -2.00 | 120 | -1.50 | -2.50 | 65 | 5 | -7 | 12 | -0.25 | 0.50 | x | 4 | 0 | x | 6 |
| 16109 | 3/8/56 | 2/16/96 | 39 | M | 8 | 8 | -4.25 | -0.75 | 10 | -4.00 | -1.00 | 180 | -3 | -7 | 4.5 | -2.75 | 1.50 | x | 4 | 2 | 8 | 14 |
| 20063 | 8/8/59 | 9/25/96 | 36 | M | 10 | 5 | 0.75 | -0.50 | 180 | 0.75 | 0.00 | 0 | -2 | -6.5 | 5 | 2.25 | 1.50 | x | 12 | -2 | 18 | 24 |
| 20241 | 8/20/56 | 9/28/96 | 40 | M | 0 | 6 | -2.00 | -0.50 | 10 | -2.25 | -0.50 | 175 | -1 | -6.5 | 5.5 | 1.25 | 0.75 | x | 14 | 10 | x | 10 |
| 20301 | 3/27/60 | 11/5/97 | 37 | M | 2 | 7 | 0.25 | -0.25 | 170 | 3.00 | -1.25 | 67 | 1 | -6 | -7 | 1.75 | 1.50 | 6 | 6 | 6 | -10 | -10 |
| 24364 | 1/31/53 | 11/13/98 | 45 | M | 1 | 5 | 0.50 | 0.00 | 0 | 0.50 | -0.50 | 90 | 4 | -6 | 9.5 | 2.00 | 1.50 | x | 28 | 16 | x | 14 |
| 23142 | 4/7/55 | 2/5/97 | 41 | M | 0 | 0 | 0.50 | -0.50 | 119 | 0.25 | 0.00 | 0 | -1 | -5 | 4 | 1.50 | 1.00 | x | 20 | 0 | x | 22 |
| 13758 | 4/29/55 | 10/9/95 | 40 | M | 6 | 8 | -2.00 | -0.25 | 5 | -2.00 | -0.25 | 180 | 3 | -4.5 | 7 | 0.00 | 2.00 | x | 24 | 2 | 18 | 24 |
| 34818 | 4/1/49 | 10/3/98 | 49 | M | 1 | 5 | 0.50 | 0.00 | 0 | 0.50 | -0.75 | 140 | 2 | -4 | -5.5 | 3.00 | 2.50 | 20 | 24 | 10 | 12 | 18 |
| 22482 | 6/16/56 | 1/20/97 | 40 | M | 3 | 6 | 0.50 | -0.50 | 110 | 0.50 | -0.50 | 95 | -3 | -3 | 0 | 2.50 | 2.00 | X | 14 | 8 | 12 | 18 |
| 34431 | 3/12/55 | 9/25/98 | 43 | M | 1 | 30 | -2.75 | 0.00 | 0 | -2.50 | 0.00 | 0 | 0 | -3 | -3 | -1.75 | 1.00 | 12 | 12 | -6 | -16 | -16 |
| 3120 | 12/19/54 | 7/21/98 | 44 | M | 5 | 9 | -0.75 | -0.75 | 20 | -1.00 | -1.00 | 165 | 2 | -3 | 5 | 0.50 | 1.25 | x | 12 | -2 | x | 16 |
| 23336 | 11/5/55 | 2/15/97 | 42 | M | 3 | 5 | 2.00 | -0.25 | 180 | 1.50 | 0.00 | 0 | 1 | -3 | 3.5 | 3.50 | 1.50 | x | 12 | 10 | 4 | 18 |
| 27132 | 1/6/56 | 9/19/97 | 41 | M | 10 | 14 | 0.50 | -0.25 | 90 | 0.00 | 0.00 | 0 | 1 | -3 | 3.5 | 1.25 | 0.75 | x | 12 | -2 | x | 18 |
| 4373 | 11/4/53 | 2/5/98 | 44 | M | 15 | 10 | -0.50 | -0.50 | 105 | -0.50 | -1.00 | 80 | 3 | -3 | 6 | 0.75 | 1.25 | x | 15 | 0 | x | 18 |
| 24881 | 8/19/59 | 5/17/97 | 37 | M | 0 | 4 | -2.50 | 0.00 | 0 | -2.00 | 0.00 | 0 | -3 | -2.5 | 0.5 | -2.00 | 0.50 | x | 8 | 2 | x | 12 |
| 17571 | 12/10/55 | 4/24/96 | 40 | M | 10 | 15 | -4.00 | 0.00 | 0 | -4.25 | -1.00 | 150 | 2 | -2.5 | 4 | -2.75 | 1.25 | x | 6 | 8 | 12 | 14 |
| 20945 | 7/7/59 | 10/18/96 | 37 | M | 10 | 12 | 0.50 | -0.50 | 80 | 0.75 | -0.50 | 95 | 2 | -2.5 | 4 | 2.25 | 1.75 | x | 12 | 2 | x | 16 |
| 26567 | 10/24/55 | 8/2/97 | 41 | M | 0 | 0 | 0.75 | -0.25 | 80 | 0.75 | -0.50 | 90 | 0 | -2 | 2 | 2.00 | 1.25 | x | 12 | 8 | 8 | 10 |
| 27535 | 11/5/55 | 10/7/97 | 41 | M | 0 | 0 | -1.50 | -1.25 | 165 | -1.50 | -2.00 | 165 | 1 | -1.5 | 2.5 | -2.50 | 1.00 | x | 18 | 12 | 6 | 14 |
| 22961 | 5/23/53 | 3/1/97 | 43 | M | 0 | 13 | -0.50 | -0.75 | 100 | -0.75 | -1.00 | 105 | -3 | -0.5 | 2.5 | 1.00 | 1.50 | x | 24 | 18 | x | 24 |
| 22790 | 10/28/53 | 8/17/98 | 44 | M | 0 | 0 | -2.50 | -1.50 | 95 | -2.25 | -1.00 | 95 | 0 | 0 | 0 | -1.25 | 1.25 | x | 20 | 16 | x | 16 |
| 15734 | 9/11/54 | 1/23/96 | 41 | M | 15 | 20 | 1.00 | -0.25 | 180 | 0.25 | 0.00 | 0 | 0 | 1 | 1 | 2.25 | 1.25 | 14 | 18 | 16 | x | 14 |
| 3917 | 7/10/57 | 9/15/95 | 38 | M | 6 | 5 | 1.00 | -0.50 | 84 | 1.25 | -0.75 | 90 | 2 | 1.5 | 0 | 1.75 | 0.75 | 20 | 24 | 22 | x | 8 |
| 27270 | 6/5/55 | 9/15/97 | 42 | M | 5 | 7 | -1.50 | -0.75 | 40 | -1.25 | -0.50 | 115 | 11 | 1.5 | 9.5 | -0.50 | 1.00 | x | 12 | 6 | x | 12 |
| 25919 | 12/6/52 | 6/28/97 | 44 | M | 8 | 10 | -0.50 | 0.00 | 0 | -0.75 | 0.00 | 0 | 2 | 2 | 0 | 1.00 | 1.50 | x | 12 | 4 | x | 12 |
| 25520 | 1/22/56 | 6/10/97 | 41 | M | 0 | 0 | -1.50 | -0.25 | 10 | -2.25 | -0.75 | 179 | 0 | 2.5 | 2.5 | -0.50 | -1.00 | x | 6 | 4 | x | 8 |
| 29796 | 4/10/55 | 1/29/98 | 42 | M | 0 | 0 | 1.00 | -0.50 | 50 | 0.75 | -0.75 | 165 | 0 | 3 | 3 | 1.50 | 0.50 | x | 32 | 24 | x | 24 |
| 19909 | 11/28/52 | 9/24/96 | 44 | M | 14 | 19 | -4.25 | 0.00 | 0 | -3.50 | -0.50 | 130 | 1 | 3 | 2 | -4.25 | 0.00 | x | 20 | 14 | x | 16 |
| 28932 | 11/13/55 | 12/2/97 | 42 | M | 9 | 6 | -3.12 | 0.00 | 0 | -3.25 | 0.00 | 0 | 3 | 3.5 | 1 | -1.75 | 1.37 | x | 16 | 14 | x | 10 |
| 28339 | 3/26/59 | 10/30/97 | 38 | M | 0 | 0 | -0.25 | -0.50 | 104 | -0.50 | -0.50 | 31 | 5 | 4 | 1 | 0.00 | -0.25 | 16 | 18 | 10 | 16 | 18 |
| 34680 | 12/4/60 | 9/26/98 | 37 | M | 0 | 0 | -1.25 | 0.00 | 0 | -1.00 | 0.00 | 0 | 1 | 4 | 3 | 0.25 | 1.50 | 16 | 18 | 14 | -12 | -12 |
| 18067 | 7/9/55 | 5/8/96 | 40 | M | 0 | 0 | -2.75 | -1.25 | 75 | -3.75 | -1.00 | 103 | 4 | 5 | 1 | -1.25 | 1.50 | 30 | 30 | 12 | 8 | 8 |
| 33977 | 10/20/57 | 9/8/98 | 40 | M | 3 | 5 | -1.25 | -0.75 | 75 | -1.25 | 0.00 | 0 | -2 | 9 | 11 | 0.25 | 1.50 | 16 | 30 | 6 | x | 24 |
| 22790 | 10/28/53 | 2/21/94 | 40 | M | 0 | 0 | -2.25 | -2.00 | 103 | -2.00 | -1.25 | 103 | 2 | 14.5 | 13 | -1.00 | 1.25 | x | 40 | 36 | x | 10 |

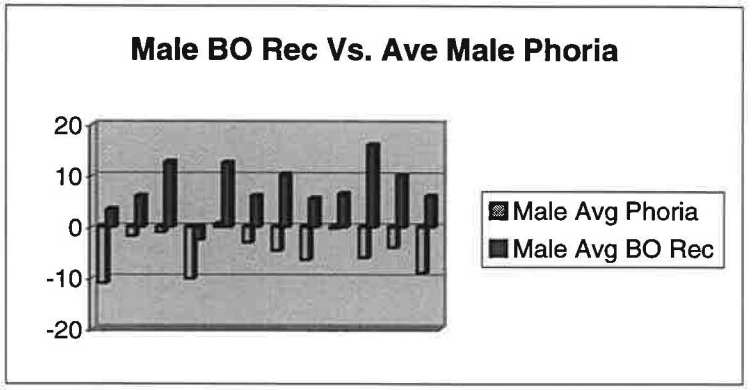
| | | | Final | Rx | OD | Final | Rx | OS | Add | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| -22 | -0.50 | 1.75 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | | |
| 14 | -5.25 | 1.75 | -1.50 | -1.25 | 105 | -0.50 | -1.50 | 50 | 0.00 | | |
| 8 | -2.75 | 3.50 | 0.50 | -0.75 | 105 | 0.50 | -1.25 | 80 | 0.00 | | |
| 10 | -3.75 | 0.00 | -2.00 | -0.75 | 48 | -1.75 | -0.75 | 110 | 1.25 | | |
| 14 | 0.75 | 2.75 | 0.25 | -0.50 | 75 | 0.25 | -0.50 | 105 | 1.25 | | |
| 12 | -0.50 | 2.00 | -1.00 | 0.00 | 0 | -1.00 | -1.00 | 18 | 1.75 | | |
| 12 | -3.75 | 1.50 | -0.75 | 0.00 | 0 | -1.50 | 0.00 | 0 | 0.00 | | |
| 15 | 0.50 | 2.25 | -0.25 | -0.50 | 92 | -0.25 | -1.00 | 92 | 1.25 | | |
| 12 | -0.25 | 1.50 | -0.25 | -0.50 | 90 | -0.50 | -1.00 | 70 | 1.25 | | |
| 12 | 0.50 | 2.25 | -0.50 | 0.00 | 0 | -0.25 | 0.00 | 0 | 1.75 | | |
| 6 | -7.00 | -0.75 | -3.50 | 0.00 | 0 | -3.75 | -0.50 | 145 | 0.00 | | |
| 6 | -0.75 | 2.75 | 1.00 | 0.00 | 0 | 1.00 | 0.00 | 0 | 0.00 | | |
| 12 | -2.75 | 2.75 | -0.50 | -0.25 | 110 | -0.50 | -0.25 | 77 | 0.00 | | |
| 18 | -0.75 | 3.25 | 0.75 | -2.00 | 106 | 0.75 | -1.00 | 73 | 0.00 | | |
| 3 | 0.50 | 2.25 | 0.50 | 0.00 | 0 | 0.50 | 0.00 | 0 | 0.75 | | |
| 4 | -0.75 | 2.50 | -0.25 | -1.00 | 85 | -0.75 | -1.00 | 85 | 1.00 | | |
| 14 | -0.25 | 3.00 | 0.00 | 0.00 | 0 | 0.25 | 0.00 | 0 | 1.25 | | |
| 4 | -1.75 | 2.50 | -0.75 | -1.75 | 115 | -1.75 | -1.75 | 59 | 0.00 | | |
| 12 | -6.00 | -1.00 | -4.25 | -0.75 | 10 | -4.00 | -1.00 | 180 | 0.00 | | |
| 22 | -1.25 | 4.00 | 0.75 | -0.50 | 180 | 0.75 | 0.00 | 0 | 0.00 | | |
| 6 | -3.75 | -1.00 | -2.00 | -0.50 | 10 | -2.25 | -0.50 | 175 | 0.00 | | |
| -10 | -1.25 | 2.25 | plano | 0.00 | 0 | 2.25 | -1.25 | 60 | 1.00 | | |
| 16 | 1.25 | 3.25 | 0.50 | 0.00 | 0 | 0.50 | -0.50 | 90 | 1.25 | | |
| 18 | -0.25 | 2.50 | 0.50 | -0.50 | 119 | 0.25 | 0.00 | 0 | 0.00 | | |
| 12 | -2.75 | 0.75 | -2.00 | -0.25 | 5 | -2.25 | -0.25 | 180 | 0.00 | | |
| 10 | 2.00 | 3.75 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 2.50 | | |
| 6 | -0.75 | 2.25 | 1.00 | -0.50 | 110 | 1.00 | -0.50 | 95 | 0.00 | | |
| -8 | -2.75 | -0.50 | -2.75 | 0.00 | 0 | -2.50 | 0.00 | 0 | 1.00 | | |
| 8 | -0.50 | -1.25 | -0.75 | -0.75 | 20 | -1.00 | -1.00 | 165 | 1.00 | | |
| 10 | 1.50 | 3.50 | 1.75 | 0.00 | 0 | 1.25 | 0.00 | 0 | 1.25 | | |
| 12 | -0.25 | 2.75 | 0.50 | -0.25 | 90 | 0.00 | 0.00 | 0 | 1.50 | | |
| 0 | -0.25 | 2.75 | -0.25 | -0.50 | 105 | -0.25 | -0.75 | 80 | 1.50 | | |
| 6 | -4.75 | 0.75 | -2.25 | 0.00 | 0 | -2.00 | 0.00 | 0 | 0.00 | | |
| 4 | -5.50 | -1.75 | -4.00 | 0.00 | 0 | -4.25 | -1.00 | 150 | 1.00 | | |
| 14 | -1.00 | 3.00 | 0.50 | -0.50 | 80 | 0.75 | -0.50 | 95 | 1.50 | | |
| 8 | -0.75 | 2.25 | 0.75 | -0.25 | 80 | 0.75 | -0.50 | 90 | 0.00 | | |
| 10 | -2.25 | 1.00 | -1.50 | -1.25 | 165 | -1.50 | -2.00 | 165 | 1.00 | | |
| 18 | -2.25 | 2.75 | -0.50 | -0.75 | 100 | -0.75 | -1.00 | 105 | 0.00 | | |
| 10 | -2.25 | 0.5 | -2.50 | -1.50 | 95 | -2.25 | -1.00 | 95 | 1.50 | | |
| 6 | -0.75 | 3.00 | 0.75 | -0.25 | 180 | 0.00 | 0.00 | 0 | 0.00 | | |
| 6 | 0.00 | 3.75 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | | |
| 4 | -2.00 | 1.00 | -1.50 | -0.75 | 40 | -1.25 | -0.50 | 115 | 1.00 | | |
| 3 | -5.00 | 2.00 | -0.75 | 0.00 | 0 | -0.75 | 0.00 | 0 | 1.25 | | |
| 2 | -5.00 | 0.50 | -1.50 | -0.25 | 10 | -2.25 | -0.50 | 179 | 0.00 | | |
| 12 | 0.50 | 2.50 | 1.00 | -0.50 | 50 | 0.75 | -0.75 | 165 | 0.00 | | |
| 6 | -6.25 | -1.25 | -4.25 | 0.00 | 0 | -3.50 | -0.50 | 130 | 1.00 | | |
| 6 | -4.75 | 0.00 | -2.87 | 0.00 | 0 | -3.00 | 0.00 | 0 | 0.00 | | |
| 10 | -2.75 | 2.00 | -0.25 | -0.50 | 104 | -0.25 | -0.50 | 31 | 0.00 | | |
| 0 | -3.25 | 1.25 | -1.00 | 0.00 | 0 | -0.75 | 0.00 | 0 | 0.75 | | |
| 6 | -3.75 | 0.25 | -3.00 | -1.25 | 75 | -3.75 | -1.00 | 103 | 0.00 | | |
| 16 | -2.25 | 2.00 | -1.25 | -0.75 | 75 | -1.25 | 0.00 | 0 | 0.00 | | |
| 4 | -2.25 | 1.00 | -2.25 | -2.00 | 103 | -2.00 | -1.00 | 105 | 1.00 | | |
| | | | | | | | | Avg Male Add | 0.63 | | |
| | | | | | | | | | | | |

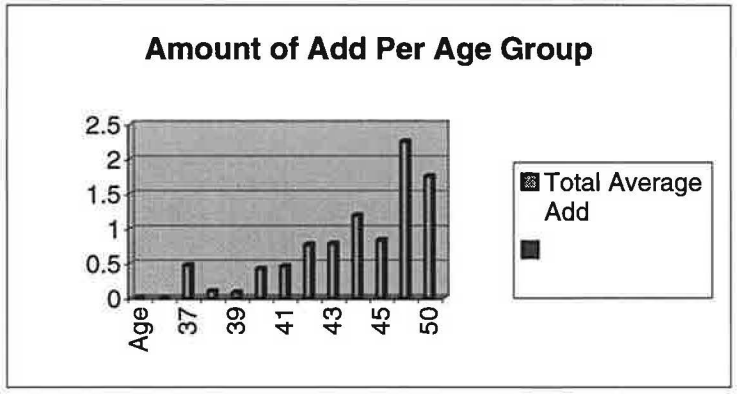
| Total Average Add for Females and Males | Female Avg BO Rec | Female Avg. Phoria | Females | Age | Males | Male Avg Phoria | Male Avg BO Rec | | Age | Total Average Add for Females and Ma |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | -8.00 | 1 | 36 | 3 | -11 | 3.33 | | 36 | 0 |
| 0.47 | 7.60 | -6.00 | 5 | 37 | 4 | -1.75 | 6.00 | | 37 | 0.47 |
| 0.10 | 9.28 | -2.20 | 7 | 38 | 3 | -1 | 12.67 | | 38 | 0.1 |
| 0.08 | 15.60 | -2.70 | 5 | 39 | 4 | -10.1 | -2.50 | | 39 | 0.08 |
| 0.42 | 12.25 | -3.38 | 8 | 40 | 8 | 0.5 | 12.50 | | 40 | 0.42 |
| 0.46 | 8.67 | -7.90 | 9 | 41 | 8 | -3 | 6.00 | | 41 | 0.46 |
| 0.77 | 5.00 | -2.40 | 6 | 42 | 10 | -4.6 | 10.20 | | 42 | 0.77 |
| 0.78 | 10.00 | -1.75 | 4 | 43 | 4 | -6.4 | 5.50 | | 43 | 0.78 |
| 1.19 | 5.33 | -10.67 | 3 | 44 | 5 | -0.2 | 6.40 | | 44 | 1.19 |
| 0.83 | 0.00 | -5.50 | 2 | 45 | 1 | -6 | 16.00 | | 45 | 0.83 |
| 2.25 | 2.00 | -5.50 | 1 | 49 | 1 | -4 | 10.00 | | 49 | 2.25 |
| 1.75 | 12.00 | 2.50 | 1 | 50 | 1 | -9 | 6.00 | | 50 | 1.75 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Total Females | 52 | | | | | | | | | |
| Total Males | 52 | | | | | | | | | |
| Total | 104 | | | | | | | | | |

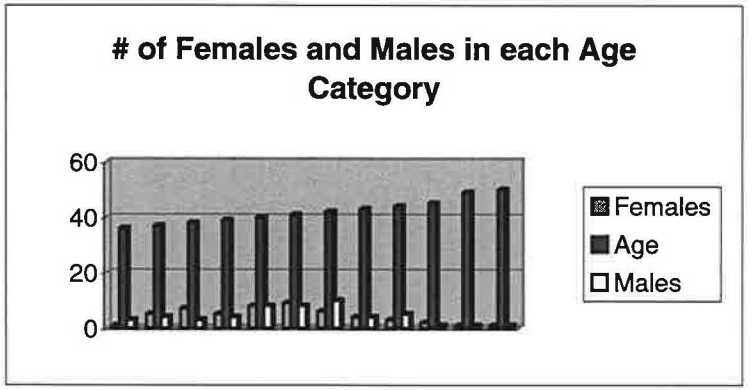

Males Vs. Females
60
40
20
0
Total Females
Total Males
Series1

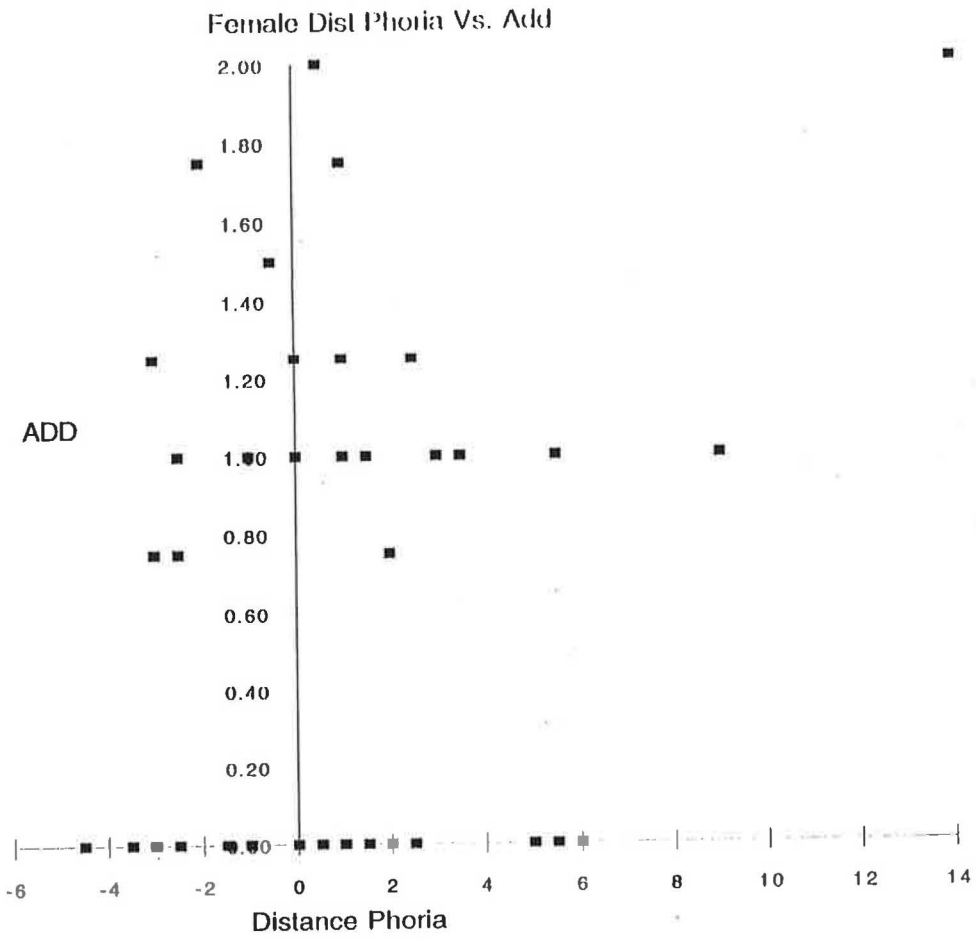

# of females in each age category
50
40
30
20
10
0
1
3
5
7
9
11
Females
Age

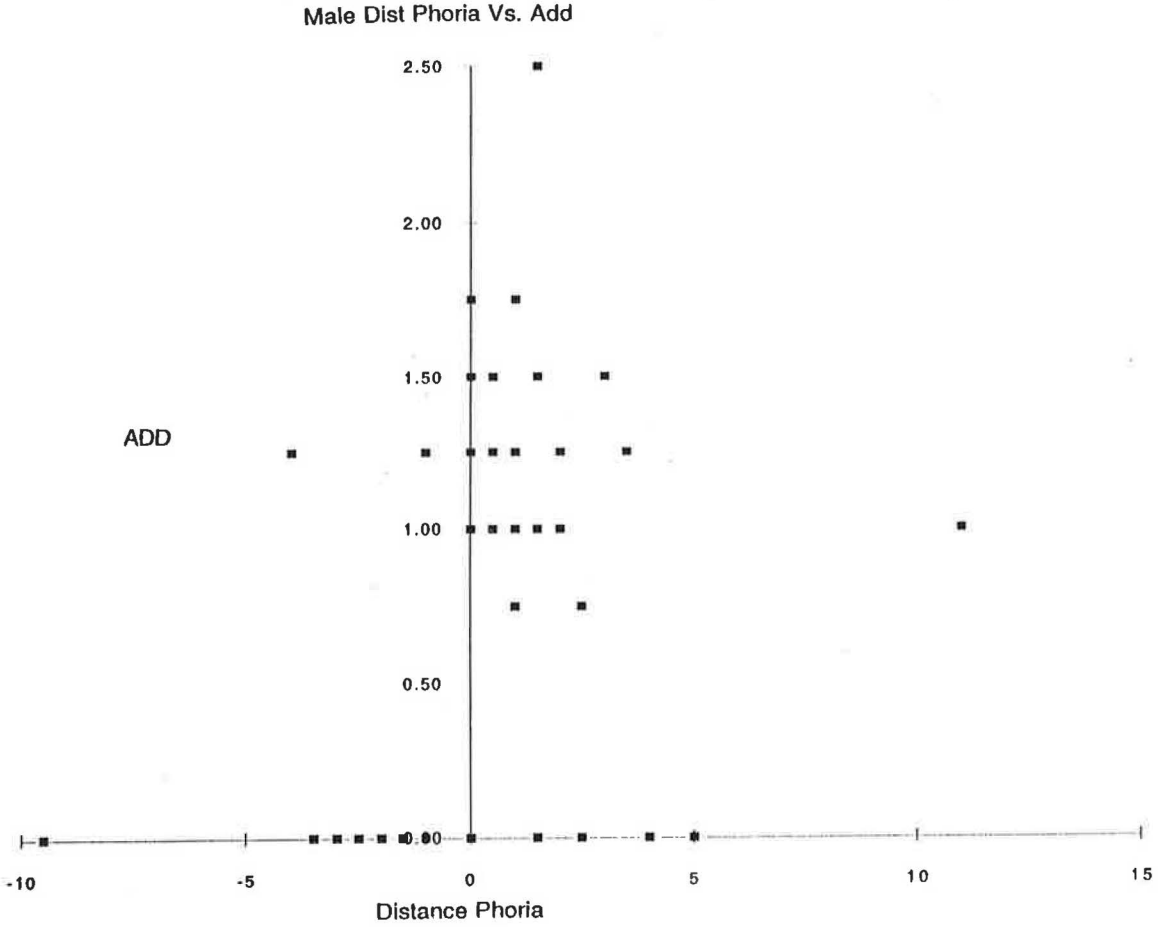

Female BO Rec Vs. Female Ave Phoria
20.00
10.00
0.00
-10.00
-20.00
Female Avg BO Rec
Female Avg. Phoria


Male BO Rec Vs. Ave Male Phoria
20
10
0
-10
-20
Male Avg Phoria
Male Avg BO Rec


Amount of Add Per Age Group
2.5
2
1.5
1
0.5
0
Age
37
39
41
43
45
50
Total Average Add


# of Females and Males in each Age Category
60
40
20
0
Females
Age
Males


Female Dist Phoria Vs. Add
2.00
1.80
1.60
1.40
1.20
ADD
1.00
0.80
0.60
0.40
0.20
0.00
-6
-4
-2
0
2
4
6
8
10
12
14
Distance Phoria


Male Dist Phoria Vs. Add
2.50
2.00
1.50
ADD
1.00
0.50
0.00
-10
-5
0
5
10
15
Distance Phoria

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