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Abstract

A questionnaire was sent to one third of the ophthalmologists and optometrists in Oregon and Washington. It contained questions pertaining to practitioner attitudes toward their educational backgrounds in visual training. Questions dealing with some of the controversial issues in visual training's role in strabismus and amblyopia therapy were also included. Lastly, profile information and data concerning the practice in general was gathered from each survey recipient. The respondent population was divided into groups by profession and extent of VT offered. The different groups' responses were then tabulated and statistically compared within and between professions.

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A SURVEY OF ATTITUDES TOWARD VISUAL TRAINING IN THE NORTHWEST

by: Greg Schober and
Doug Crotty

The role of orthoptics in the eye-health care field has long been a source of controversy and confusion to ophthalmic practitioners. The literature abounds in conflicting reports of the effectiveness of visual training, the success rates of both surgery and orthoptics in strabismus, the use of visual training as an alternative to surgery in strabismus, and so-called "original techniques" in visual training. Some of the most significant and disputed questions that face eye-care professionals today involve the various means of treatment of "problem cases", such as; amblyopes, post-surgical strabismic failures, ARC's, and perceptual problems, among others. The ocular health practitioner is faced with the critical decision of whether certain treatment methods are valid and best for their particular patients. Bartley (1977), discusses this situation with VT as a specific example:

> This (visual training) was originally not a part of either optometry or ophthalmology. Visual training is time-consuming, and a clinician scarcely has time for it.
>
> ...Does he see this area as having something to offer that might provide new insights, changing his whole outlook on the task he must perform for the patient? [1]

Support for visual training can be found in the journals of both medical eye-care professions. Dr. Cooper M.D., (1963),

stated in the American Orthoptic Journal:

> I am thoroughly in accord with the principle of orthoptics and feel that it is unfortunate that many ophthalmologists have a negative attitude toward orthoptic therapy.
>
> ...after spending a considerable amount of time teaching ocular motility to residents and student orthoptists and even more important after observing the benefits of orthoptics I am convinced that orthoptics is here to stay. [2]

However, this opinion must be tempered with another widely accepted ophthalmological view that orthoptics never was intended to straighten the eyes except in conjunction with surgery or glasses. [3] Also, it must be pointed out that the ophthalmological literature contains very few references pertaining to "functional treatment" in orthoptics, and even fewer references to visual-perceptual-motor treatment of ocular dysfunctions.

Articles on visual training in the optometric journals are almost exclusively supportive and educationally oriented toward that discipline and its advances. Wold et. al. (1978), in their assessment of visual training effectiveness provide a typical optometric opinion; "Using a performance rating scale it was demonstrated that optometric vision therapy does produce positive changes in visual functionings" [4]

This is not to say, however, that optometry does not have its share of differing opinions and reservations in regard to orthoptics/visual training. Many optometric practitioners may find that alternatives to orthoptics are the

best approach for portions of their patient population. Simpson (1974), denounces the use of orthoptics and surgery as primary treatment in favor of strong prismatic lenses. [5]

In addition to the varied opinions toward VT/orthoptics in general, it seems that both strabismus treatment and the amblyopia-age question are a more specific source of further controversy.

Success rates of surgery and orthoptics in strabismic treatment show wide ranging statistical results in ophthalmic literature. Ludlam (1961), sites articles from British and American optometric and ophthalmologic literature which give success rates of orthoptics. These success rates ranged from 16% to 92.7% (with the 92.7% found only on a population selected as to prognosis). However, many of these results were complicated by the fact that surgeries were done in addition to the training, no definition of "cure" was made, and that population selection obscured some facts. Ludlam personally found a 76% cure rate in his two "cured" categories. He stated, "It was shown in the present study that orthoptics as a therapeutic measure in strabismus can help three out of four concomitant, previously untreated, unselected (as to prognosis) strabismic patients". [6] Ludlam's follow-up study in 1965 showed that of the successfully treated patients re-examined 3-7 years after training completion, 89% had retained their functionally cured status. [7]

These figures appear to correspond to most of the optometric studies and reviews published in recent years. Optometric articles reviewed on visual training report considerable success and show no lower than a 64% functional cure rate for a total strabismic sample (with the 64% figure attained in a non-exclusive strabismic population). [8,9,10,11]

A review of the ophthalmological literature shows many different attitudes toward orthoptics and surgery as treatment for strabismus. One cannot ignore Lancaster's accolade toward orthoptics and its contribution to strabismic treatment, and yet other literature mentions simply that surgery is the cure for strabismus and visual training is of declining importance. [12,13] This is in direct contrast with Kennedy et. al. (1959), Hardesty (1965), and others who relate their difficulties in treating esotropes and exotropes, respectively, with surgery. [14,15,16,17] Other ophthalmologists are pleased with their surgical procedures and results. [18,19] Still another group of ophthalmologists and orthopists report that surgery combined with pre- or post-operative orthoptics is the choice treatment plan for strabismics. [10,20,21,22]

This same confusion exists in the literature pertaining to amblyopia and age. An attitude has been present that amblyopia must be treated before age six for the treatment to be successful. [23] Ophthalmological literature supports this view and yet also states the older amblyope would benefit

from therapy. [24,25,26,27] Birnbaum (1977), an optometrist, reviewed twenty-three studies of amblyopia treatment implemented by both professions and wrote, "There is no evidence that amblyopia therapy should be withheld on the basis that the patient is too old." [28]

The greatest amount of disagreement concerning VT seems to be within ophthalmology and between optometry and ophthalmology. This could be a result of differing emphasis placed on VT/orthoptics in the curricula of the respective training programs. Formal optometric curricula generally include significant credit hours of visual training lecture, lab, and clinical application. It is further stated that visual training.... "is an integral and vital part of optometric practice generally mentioned in the legal definition of an optometrist among the various states and occupying a significant portion of the professional school training of the optometrist". [10] Also, an optometry curriculum model lists as one of its goals under the heading, Curricular Elements in Patient Care, the need for the clinician to be able to examine and care for patients with strabismus, vergence problems, motility problems, eccentric fixation, amblyopia, ARC, aniseikonia, accommodative anomalies, etc. [29]

While orthoptics/VT has a prominent place in optometric education, it does not seem to be emphasized in ophthalmological education. This was found to be the case after

personal communication with staff members and residents at the University of Oregon and Fitzsimon's Army Medical Center residency programs. These programs include clinical experience and a lecture series which may include orthoptics. The inclusion of this topic, however, is at the discretion of the ophthalmological staff and literature dealing with VT/orthoptics is available for study only on an informal and individual basis.

This contrast in education or interest emphasis is also evident when reviewing recent literature from each profession. A total of eight articles pertaining to visual training are present in 1976 and 1977 issues of the American Journal of Ophthalmology and the Journal of Pediatric Ophthalmology and Strabismus. And, while only a few articles pertaining to visual training are present in the ophthalmological literature, twenty-six articles dealing with VT can be found in the 1976 and 1977 issues of the American Optometric Association Journal and the American Journal of Optometry and Physiological Optics. Furthermore, an inspection of the Red Book 1977 revealed no area ophthalmologists listing their practices as those offering orthoptic services. The Blue Book 1978, however, listed forty-nine area optometrists as those providing visual or developemental training.

Because the ophthalmic literature has such widely varying opinions and opposing views, this project was designed to

investigate on a practical level what impact this confusion has had on area ophthalmic practitioners. Specifically, we are interested initially in showing what percentages of practitioners are and are not providing VT services and why they do or do not provide them. Secondly, we are interested in examining practitioner attitudes and opinions toward VT and some of the accompanying issues.

METHODS

A twenty-one item questionnaire was sent to approximately one third of the ophthalmologists and one third of the optometrists in Washington and Oregon. Three-hundred thirty-nine questionnaires were sent ot 125 optometrists and 48 ophthalmologists in Oregon, 110 optometrists and 50 ophthalmologists in Washington, and all six of the registered orthoptists practicing in both states. Survey recipients were chosen from the Red Book 1977 and the Blue Book 1978 using a random number table. A random sample was used in order to insure that those surveyed represented a good cross section of practitioners coming from many different population areas.

Having written both state optometric associations, the American Optometric Association, and contacting the Academy of Oregon Ophthalmologists it was found that these organizations were not aware of any similar studies. A written survey was utilized in lieu of other methods so that the largest number of practitioners could be surveyed for the

least amount of expense. The questions used were reviewed by three Pacific University optometry faculty members and formulated in order to obtain information pertaining to:

I. Attitudes toward educational backgrounds in VT

II. Attitudes toward some basic disputed VT issues

III. Who is and is not practicing visual training

A) Of those providing VT services;

1) Why those services are provided
2) The types of VT patients treated
3) Where their VT referrals are obtained

B) Of those not providing VT services

1) Why those services are not provided
2) To whom VT patients are referred
3) Is the practitioner interested in learning more about VT

In any survey, difficulties in assumptions and generalities must be dealt with in order to be able to address a given population. Vision training and orthoptics means many things to many people.[11] Therefore, a definition for the purpose of the survey was in order. The definition used in the questionnaire equated VT and orthoptics as did the reference providing that definition.[30] Though the terms were equated in the survey definition, an inherent limitation is present in that we are unable to control how each respondent interpreted that definition. These same qualifications apply to the term "functional binocularity" in question six and remain as a similar limitation.

ORTHOPTICS/VISUAL TRAINING
SURVEY

For the purposes of this survey, Orthoptics and Visual Training (VT) are synonymously defined as "the teaching and training process for the improvement of visual perception and the coordination of the two eyes for efficient and comfortable binocular vision." (Schapero, Max, Dictionary of Visual Science, 2nd ed., Radnor, PA : Chilton Book Co., 1968, p. 516.)

Profile Information (circle one)

1. What is your profession?
   a. Ophthalmologist b. Optometrist c. Orthoptist
2. What is your age?
   a. 20-35 b. 36-45 c. 46-55 d. 56 and over
3. In what year did you complete your professional training?
   a. 1970 or later b. 1960-69 c. 1950-59 d. 1940-49 e. prior to 1940
4. From what professional school did you graduate?
   (Please write in)
   _____
5. How many hours per week are you working at your practice?
   a. less than 10 b. 11-20 c. 21-30 d. 31-40 e. more than 40

General (circle one)

1. I feel my formal education in orthoptics/VT was:
   a. Good b. Average c. Poor d. I had no formal VT training
2. Most of my knowledge of orthoptics/VT came from:
   a. Formal education in professional school b. Clinical experience c. Other practitioners
   d. Continuing education e. I know very little about orthoptics/VT f. Other sources
   (Please specify)
   _____
3. In my opinion, orthoptics/VT is:
   a. Helpful in almost all cases b. May be helpful in some cases c. Is a waste of the patient's time and money d. No opinion
4. With regard to amblyopia due to eccentric fixation (a non-foveal fixation point demonstrated monocularly), I feel that improving visual acuity with orthoptics/VT is:
   a. Possible only if administered before age six b. Possible when administered at any age
   c. Not possible at any age
5. Do you feel that the best means for providing optimum care to a strabismic patient is:
   a. Surgery alone b. Orthoptics/VT c. Surgery combined with orthoptics/VT
   d. Surgery and/or VT depending on the individual case
6. In your estimation, what percent of strabismic surgeries result in functional binocularity?
   a. 80-100% b. 60-79% c. 40-59% d. 20-39% e. less than 20%
7. In your estimation, what percent of VT/orthoptics programs result in functional binocularity?
   a. 80-100% b. 60-79% c. 40-59% d. 20-39% e. less than 20%
8. Do you provide VT/orthoptic services in your practice?
   a. Yes (If yes, continue) b. No (If no, skip to Question 14)

Most of the questions in the survey were followed with multiple responses. Obviously when asking opinions, the answers provided in a multiple choice format may not be satisfactory for each respondent. Therefore, most of the questions were followed with an "other" blank. Also, a "Comments" section was placed at the end of the survey to encourage further response.

Respondents were divided into three professional categories:

1.) ophthalmologists
2.) optometrists
3.) orthoptists

Each professional category was then organized into three groups depending on the percentage of their patient population provided with orthoptic/VT services (question #11). Those who indicated that twenty percent or more of their patient population received VT services were assembled into one group, (>20%); the more serious VT practitioners. Secondly, those who indicated VT services but less than twenty percent constituted another group, (<20%); practitioners occassionally doing VT. The third group included those respondents who indicated they did not provide VT services, (non-VT).

With these groupings established, it was possible to tabulate how each group responded to each question in the survey. Following tabulation, the data was examined for obviously interesting trends. Statistical treatment was

performed where called for in terms of interest and the scope of this study. A chi-square (x^2) statistic was calculated both within and between professional categories to determine if a given group responded significantly different from the other groups. When the source of a significantly different response was not apparent, arbitrary ranked values were assigned to the responses provided for that question and a t-test between groups was performed in order to determine which group was responsible for the significant chi-square statistic.

RESULTS

The population of respondents is described in Tables I,II, and III. They portray, by profession, the total number of respondents, return rate, age, graduation date, and percentage of the respondent's patient population that is provided with VT services. A total of twenty-five of ninety-eight ophthalmologists, one-hundred thirty of two-hundred thirty-five optometrists, and four of six orthoptists returned surveys. This represents return rates of 25, 55, and 67 percent, respectively. Because so few orthoptists were involved in the study, they were excluded from analyses.

Upon study of the numbers of ophthalmologists (MD's) and optometrists (OD's) that are providing varying amounts of VT services, it is interesting to note that a chi-square statistic corresponding with a $P<.25$ shows there is little

POPULATION DESCRIPTION

	no. of surveys sent	no. of surveys returned	percent return	Professions breakdown by % of VT in total patient population >20% no.	%	<20% no.	%	no VT no.	%
Ophth.	98	25	25%	0	0	7	28	18	72
Optom.	235	130	55%	13	10	44	34	73	56
Orth.	6	4	67%	3*	75	0	0	0	0

* one orthoptist put 'not available' on question #11

Table I. Survey return rate and professions breakdown by % of VT in total patient population. (profile question #1)

	Age (in years) (a) 20 - 35	(b) 36 - 45	(c) 46 - 55	(d) 56 & over	no response
Ophth.	4	12	7	1	1
Optom.	43	18	33	35	1
Orth.	2	1	1	0	0

Table II. Professions breakdown by age. (profile questions #1 and #2)

	Graduation Year (a) post-1970	(b) 1960-69	(c) 1950-59	(d) 1940-49	(e) pre-1940
Ophth.	9	11	5	0	0
Optom.	35	24	45	19	7
Orth.	1	2	1	0	0

Table III. Professions breakdown by graduation year. (profile questions #1 and #3)

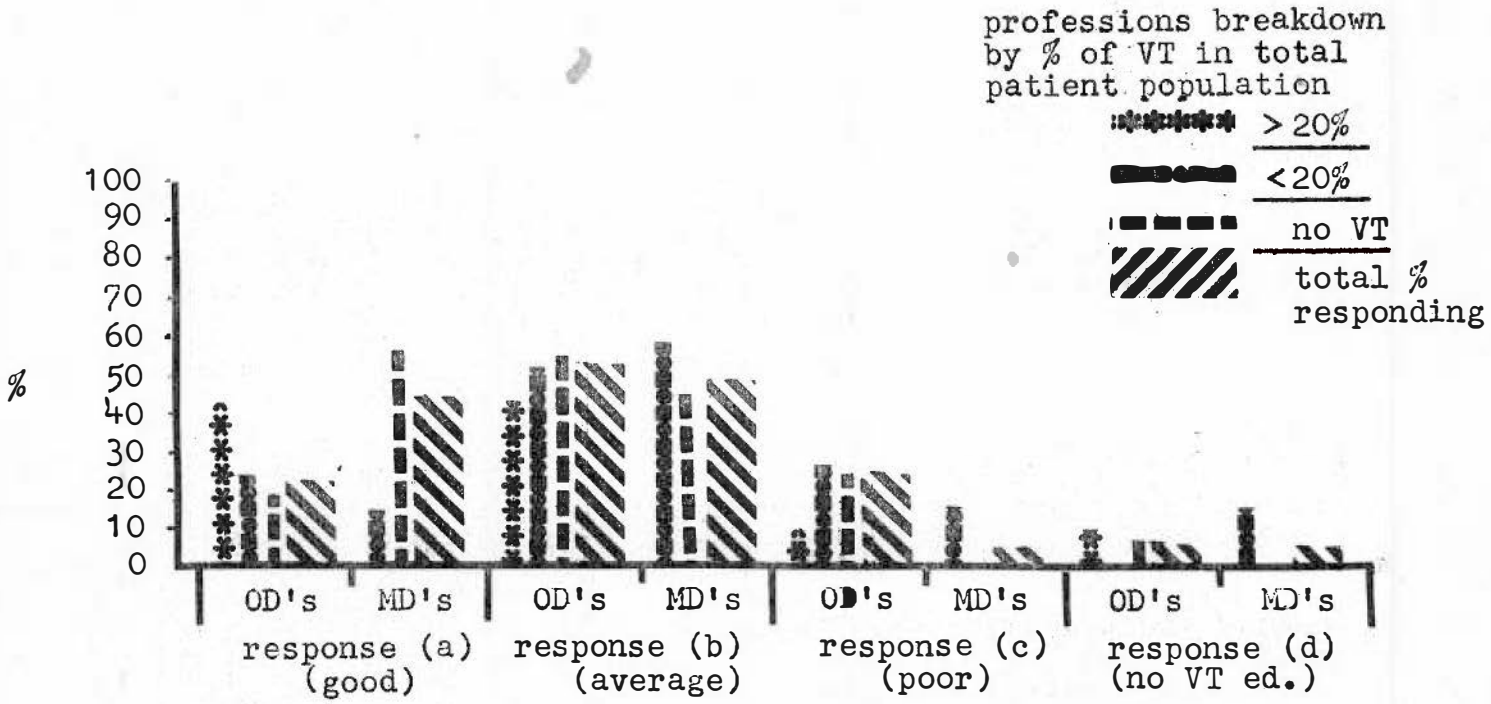
difference between the numbers of MD's and OD's in each category. That is to say there is no significant difference in the amount or degree of VT services provided between each professional population.

When profession and hours worked per week were examined against amount of VT provided, a trend was evident that OD's indicated choice (d), 31-40 hours per week, regardless of VT category. MD's indicated choice (e), more than 40 hours per week, again, regardless of the VT category grouping.

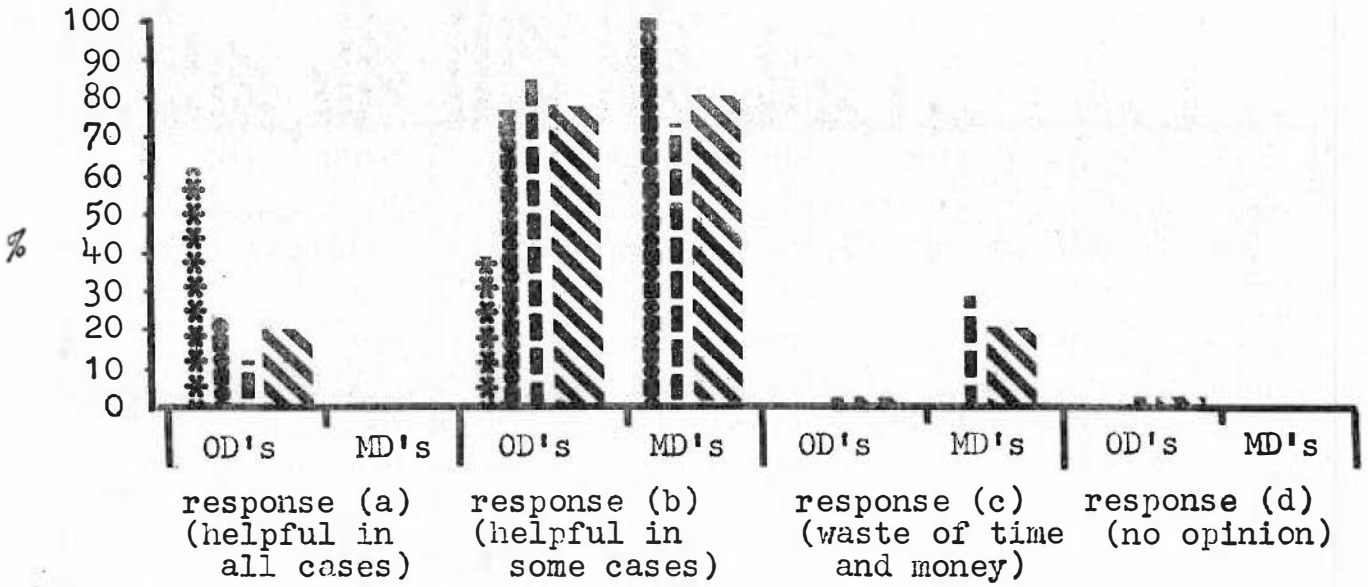
Inspection of the age and graduation date of the practitioners in the different VT categories showed a tendency for the OD's in the >20% and <20% groups to be younger and to have graduated more recently than the non-VT group. Also, as might be expected, a high correlation was found between graduation date and age.

Graph I. illustrates each profession broken down into the different VT categories against how they assess the quality of their formal VT education (survey question #1 - general section). A chi-square statistic relating to a $P<.05$ shows a weakly significant difference in how the two professions responded. This apparently reflects the normal distribution around the (b), average, answer within OD's contrasted to a distribution with a higher percentage of (a), good, responses within the MD's professional category.

Upon examination of raw data obtained from question #2, general section, it was apparent that all groups responded



Graph I. Practitioners assessment of their formal VT education.
(see survey - general section, question #1)



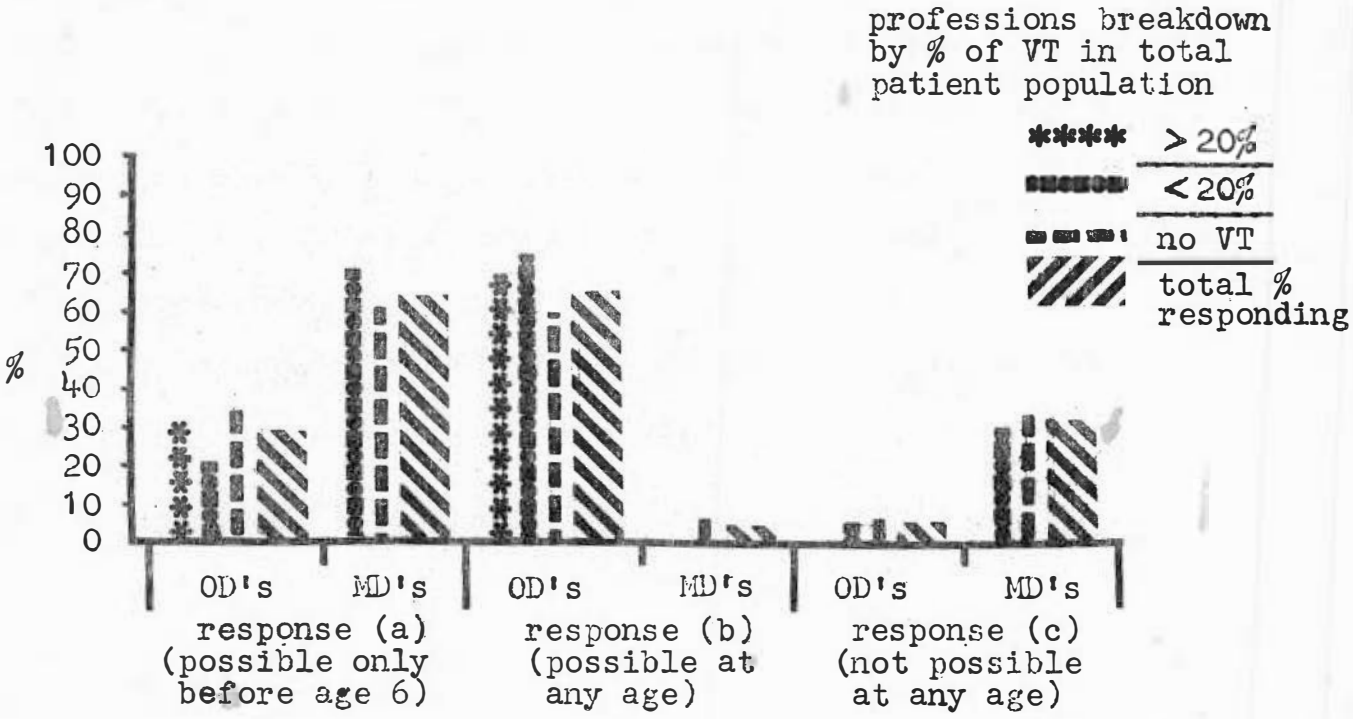
Graph II. Practitioners opinions of general VT helpfulness.
(see survey - general section, question #3)

most frequently to choice (a), Formal education in professional school.

In graph II., the attitudes are depicted of the various groups toward the effectiveness of VT in general (survey question #3 - gen. sect.). A chi-square statistic ($P<.001$) illustrates a highly significant difference between MD's and OD's opinions regarding this question. Eighty percent of each profession responded (b), May be helpful in some cases. The remaining 20% of each profession was diametrically opposed in their responses. The remaining 20% of the MD population responded (c), Is a waste of the patients time and money, and the OD's 20% responded (a), Helpful in almost all cases. It is interesting to note that no MD's indicated (a), Helpful in almost all cases, and only one OD indicated choice (c). Further statistical investigation revealed significant disagreement among the different VT classifications within the OD population. Assigning arbitrary ranked values of 5,3,1, and 0 to responses a,b,c, and d, respectively, enabled us to employ a t-test to determine the seat of this disagreement. It was found that the >20% VT category significantly ($P<.001$) felt that VT is helpful in almost all cases. The combination of the <20% and non-VT groups responded highly to choice (b), May be helpful in some cases.

Attitudes toward the amblyopia/age question are shown in Graph III. (survey question #4 - gen. sect.). Chi-square

testing revealed agreement within professions regardless of VT category. However, a x^2 statistic with an attending $P<.001$ represents a highly significant difference between professions. This difference stems from the fact that 65% of the OD's responded to answer (b), Possible when administered at any age, and 64% of the MD's responded to answer (a), Possible only if administered before age six. Also only 5% of the OD population, as opposed to 30% of the MD population, indicated answer (c), Not possible at any age.



Graph III. Practitioners opinions of age and amblyopia treatment. (see survey - general sect., ques. #4)

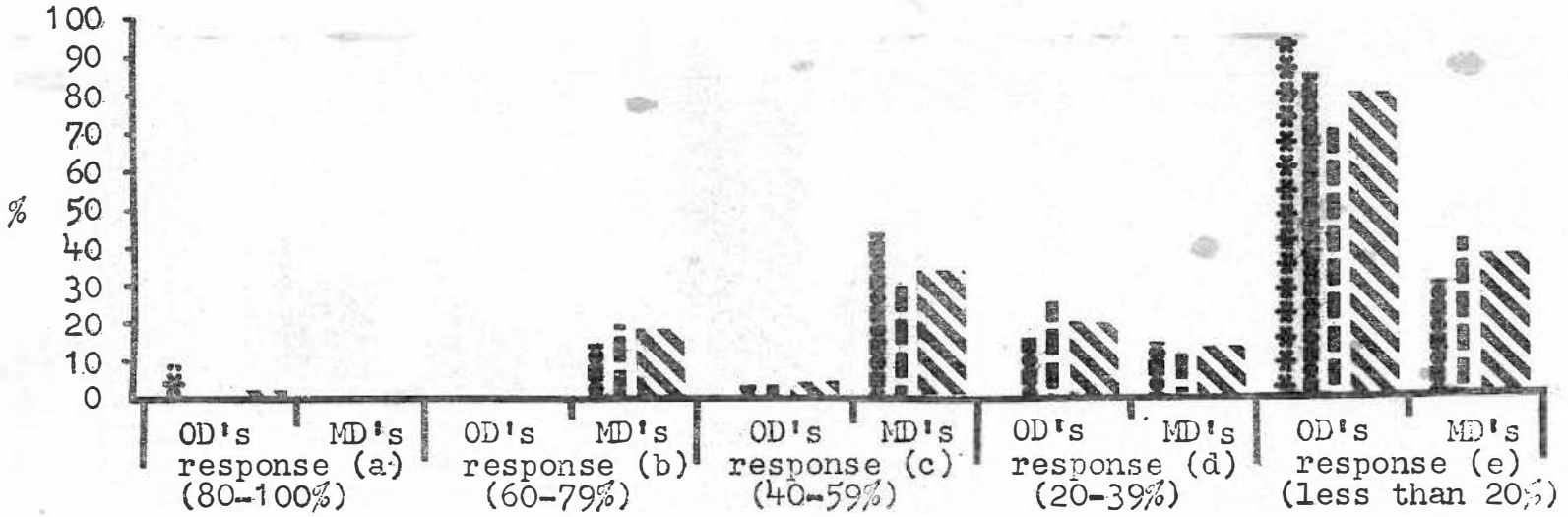
Question #5 in the general section investigated practitioner opinions toward surgery and/or VT as the best treatment plan for strabismic patients. No significant difference within each profession was present. About 70% of each profession indicated choice (d), Surgery and/or VT depending on the individual case. In retrospect, one can see that the design of the question itself seems to encourage that response. Nevertheless, testing between professions uncovered significant differences (x^2, $P<.001$). The data shows that within the OD population, about 20% indicated choice (b), Orthoptics/VT, and no one indicated choice (a), Surgery alone. This is contrasted with the MD population who responded to choices (a) and (b) oppositely to that of optometry and with similar percentages.

Statistical agreement within professions was again found in regard to the respondents opinions toward the success rate of strabismus surgery (survey question #6). However, between professions significantly different opinions were revealed. (t-test, with response values of: a-5, b-4, c-3, d-2, e-1, $P<.001$) Almost eighty percent of the OD population indicated response (e), less than 20%. Ninety-seven percent indicated choices (d), 20-39%, or (e). Ophthalmologists, as a population, show highly varying responses even though statistically they are considered to be in agreement. About one third responded to answer (c), 40-59%,

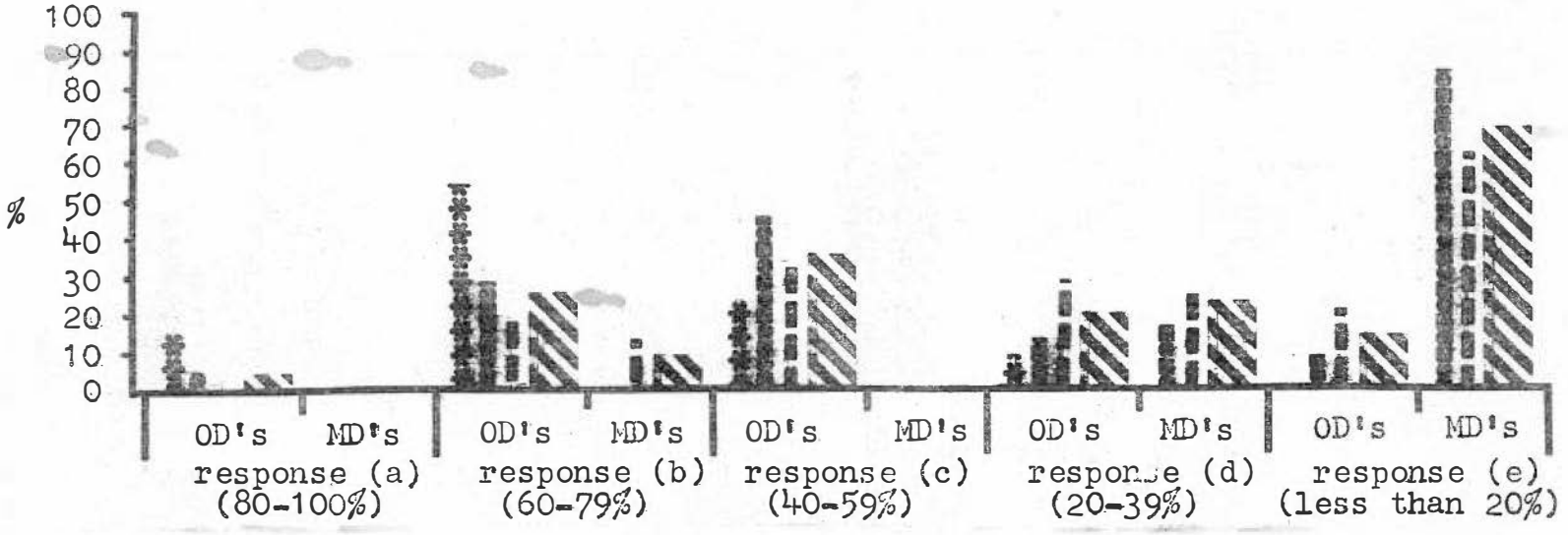
and one third to answer (e). The remaining third of the MD's is split between answers (b), 60-79%, and (d), 20-39%. (see Graph IV.)

The data applying to the question concerned with the success rate of strabismic VT showed agreement within MD's surveyed. (see survey question #7 and Graph V.) Nearly seventy percent felt VT established functional binocularity only 20% of the time (response e). Another twenty-three percent chose response (d), 20-39%, thereby establishing that about 90% of the MD population felt VT is successful in establishing functional binocularity less than 40% of the time. In contrast, the fact that approximately 65% of the OD's felt VT was successful greater than 40% of the time is responsible for the significant difference in opinion between the two professions (t-test, response values: a-5, b-4, c-3, d-2, e-1, $P<.001$). OD's, as a population, significantly disagree on this issue (x^2, $P<.01$). The disagreement lying between; 1) the $>20\%$ group combined with the $\leq 20\%$ VT group and, 2) the non-VT group (t-test, $P<.001$). The former groups indicating a higher success rate of VT than the latter group.

The offering of VT services by ophthalmic practitioners is based mainly on the premise that these services are a "responsibility to the public and the profession"; the (b) response being chosen 84% of the time by OD's and 100% of the time by MD's offering these services (see survey quest.



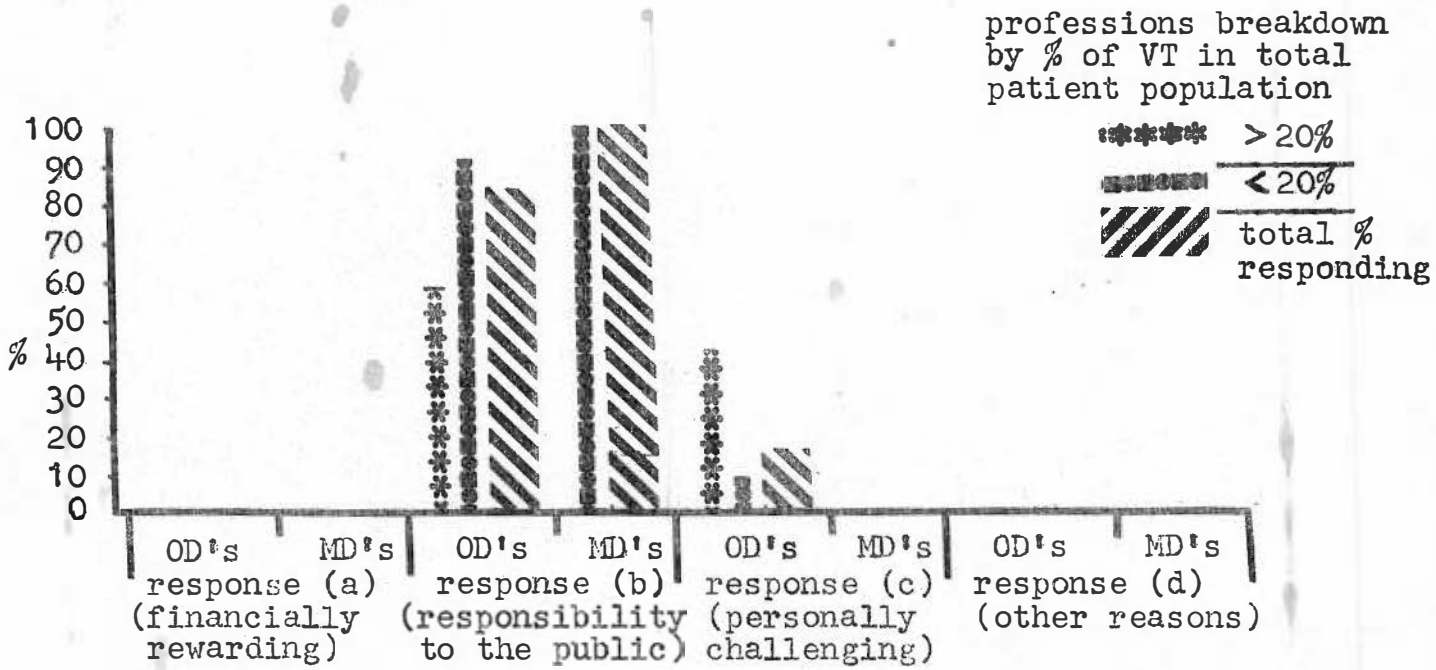
Graph IV. Practitioners estimates of success in strabismus surgery (by percent). (see survey - question #6)



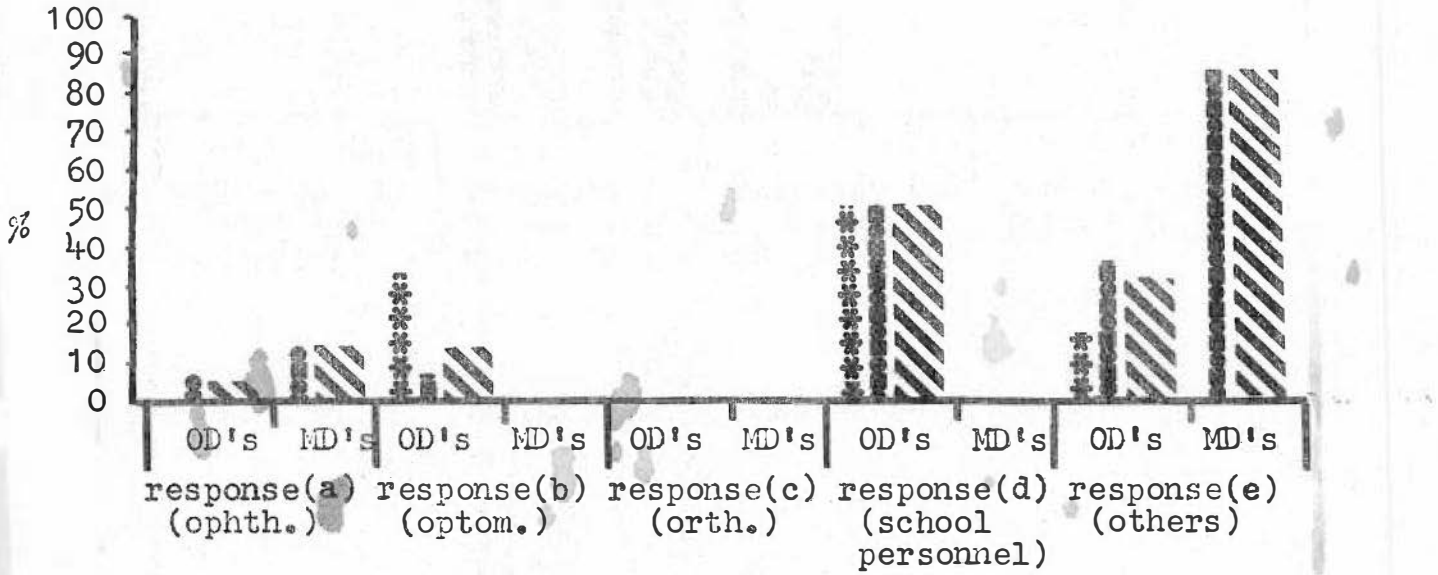
Graph V. Practitioners estimates of success in VT treatment of strabismus (by percent). (see survey - question #7)

professions breakdown by % of VT in total patient population

***** > 20% ▬▬▬ < 20% ▬▬▬ no VT ▨ total % responding



Graph VI. Primary reason practitioners provide VT services.
(see survey - question #9)



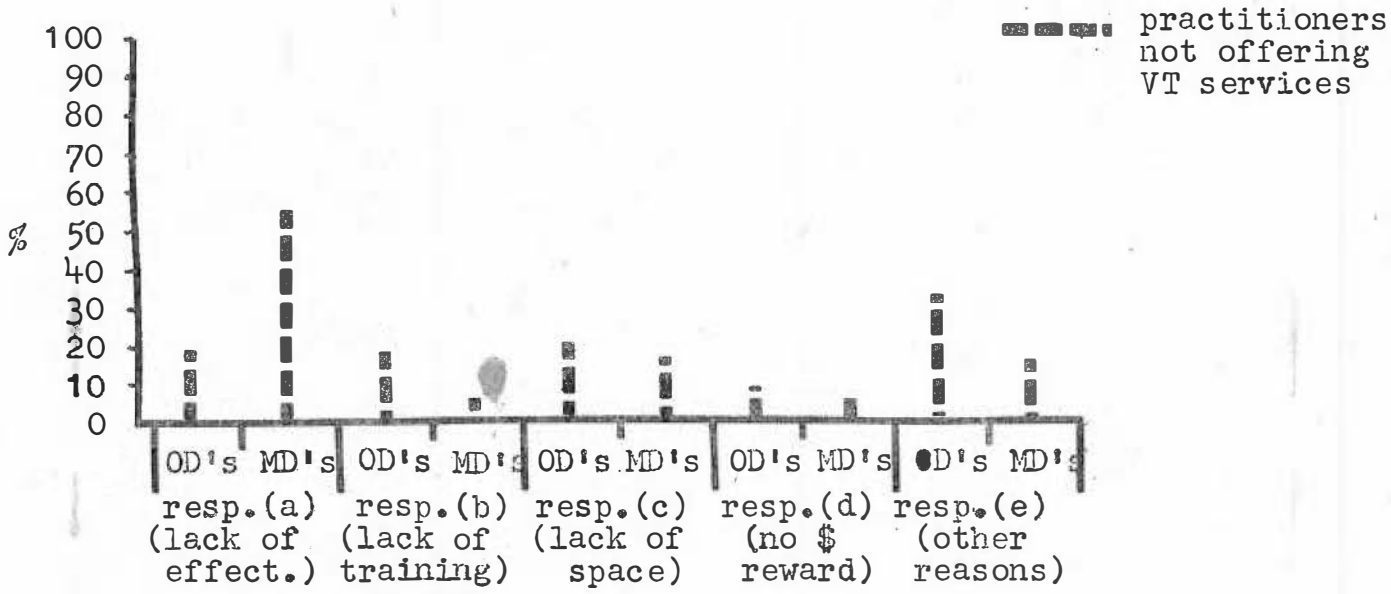
Graph VII. VT practitioners primary source of VT referrals.
(see survey - question #12)

#9 and Graph VI.). However, it must be noted that serious VT practitioners (>20%) differed significantly (x^2, $P<.005$) from part time VT practitioners (<20%) by choosing response (c), Personally challenging and rewarding, 42% of the time.

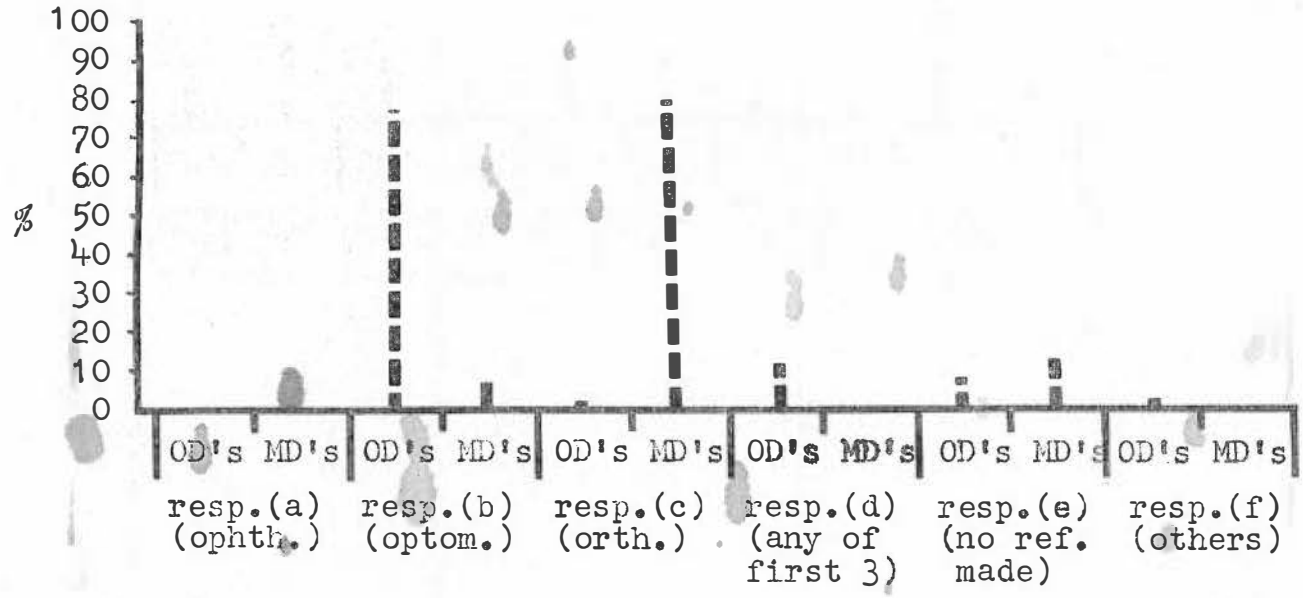
An interesting trend was shown in response to the question that asked where VT practitioners received the majority of their VT referrals (see survey question #12 and Graph VII.). Half of the OD's indicated choice (d), Public School personnel. The further breakdown of optometrist's responses is best illustrated in Graph VII. Only 6% of the OD's received VT referrals from ophthalmologists, and no MD's surveyed received referrals from OD's. The ophthalmologists in this group, though small in number, indicated almost exclusively choice (e), Others.

The responses to question thirteen were widely varied. Around 10% of the OD's responded to answers (a), (a),(e), and (a),(b),(c). Nearly 20% responded to (a),(b),(c), and (e), and about 15% responded to (a),(b),(c),(d), and (e). Two ophthalmologists responded to (a),(b) and (a),(b),(c), and (d) each. Also, one answer each was indicated for the responses of (a), of (c), and of (b),(c), and (d).

The optometrists responding to the question that asked why they do not offer VT services (see survey question # 14 and Graph VIII.) showed a diverse reaction with response (e), Other reasons, having the largest grouping at 33%. The ophthalmologists not providing orthoptic/VT services,



Graph VIII. The primary reason practitioners do not offer VT services. (see survey - question #14)



Graph IX. Non-VT practitioners channels of referral for patients needing VT/orthoptics. (see survey - question #15)

however, revealed a trend (56%) by answering with choice (a), Lack of effectiveness of VT/orthoptics in helping patient.

Non-VT practitioners show definite tenor in regard to who receives their VT referrals (see survey question #15 and Graph IX.). Approximately three fourths of the OD population refer to other optometrists with no referral to ophthalmologists. Nearly 80% of the ophthalmologists refer to orthoptists, and less than 10% refer to optometrists.

Less than half of the non-VT practitioners indicated interest in learning more about visual training. Twenty-nine percent of the MD's and forty-five percent of the OD's denoted they would be interested in learning more about VT/orthoptics.

Breaking down the total population by profession, age, and graduation date and then comparing responses to all the survey questions within and between the groups brought forth results similar to those obtained with the original VT practitioner groupings. Since similar trends were found in these areas, repitition can be avoided by deletion of this material and concentration on the original comparisons.

DISCUSSION

The data pertaining to the percentage of each profession in the different VT classifications provides an insignificant difference between MD's and OD's. This implies

that nearly the same percentage of each profession is providing VT services. However, these percentages are relative to the total number of respondents in each profession. The raw data provides necessary further insights. It shows that though the percentages are similar, no MD's fell into the >20% VT category. With this in mind, a more accurate concept of who is providing VT can be realized. The data shows that of those surveyed, a very small percentage of practitioners offer VT, and of those offering it, optometrists are providing the bulk of those services. VT/orthoptics is apparently a wide-open field in this area.

In light of the research done on education emphasis in the two different professions, it is interesting to note that more MD's felt they had a good education in orthoptics/VT than OD's. Optometrists mainly felt their education was of average quality. This is curious in that we found the MD's training, at best, de-emphasized VT/orthoptics and the optometrists' training includes considerable emphasis on this subject.

The purpose of general section question three was to quantify the professionals of extreme opinions; those who are convinced that VT/orthoptics is either "helpful almost always" or "a waste of the patients time and money". It was found that 20% of the OD's felt it was helpful nearly always, and 20% of the MD's felt it a waste of patient's time and money. The OD population more involved with VT

indicated significantly that they felt it was successful almost always. And, though most chose the moderate answer, the fact that no MD's indicated choice (a), Helpful almost always, corresponds with the smaller amount of MD's providing VT services.

The literature review regarding the amblyopia/age question showed general optometric agreement that the older amblyope can obtain improvement in acuity with training. This agreement seemed to be supported by our data; as well over half of the OD's indicated response (b). The ophthalmological literature contained disagreement as to the likelihood of improving the older amblyope's acuity. This disagreement was not present in the data. Ninety-six percent of the surveyed MD's indicated that amblyopes of greater than six years of age could not improve acuity with training. Thirty percent felt amblyopes of any age could not improve acuity with training. The data presents highly significant differences in opinion between the two professions. The OD's, in agreement with their literature, feel improvement in acuity with training is possible at any age. The MD's, on the other hand, largely concur that amblyopes beyond age six cannot improve acuity with training, even though the literature is divided on this issue.

Question five of the general section was designed in order to detect those portions of the population that feel, on one hand, that surgery alone is the best means for

treating strabismus, or, on the other hand, that VT/orthoptics is the best treatment plan. The results show that the majority of each profession views both methods of treatment as viable alternatives. Yet, within professions, there exists similar percentages of practitioners who consider only one or the other as the optimum treatment approach. Also, these extreme response percentages are similar to those discussed in question three (VT helpfulness).

Though analysis of question six revealed significant differences between professions, examination of the raw data reveals agreeing trends. Eighty-three percent of the MD's felt surgery resulted in functional binocularity less than 60% of the time. Also, nearly all the OD's estimated this result was obtained less than 40% of the time. This says that the majority of both professions estimate the strabismic patient has about a one in two chance of obtaining functional binocularity through surgery. An interesting point here is that the percentage of MD's supporting surgery as the best strabismus treatment corresponds to the percentage of MD's indicating higher surgery success rates.

In addition to their low estimates of obtaining functional binocularity with surgery, most of the MD's also expressed the opinion that VT is successful in procuring this goal less than 40% of the time. Therefore, though the ophthalmological literature contains varying opinions about the value of orthoptic treatment of strabismus, our data

shows that area ophthalmologists in this study seem to agree that it is of little benefit in obtaining functional binocularity. This paints a bleak picture for those strabismics desiring functional binocularity. The OD's present a somewhat brighter picture, with about 65% expressing the opinion that VT could obtain this result greater than 40% of the time. About half of this 65% felt it could be obtained more than 60% of the time. Yet, even with this brighter outlook, attention must be drawn to the optometric literature's general concurrence that functional binocularity is obtained about three fourths of the time with training, while only about one third of area OD's agree with that figure.

The results of the questions posed to the VT practitioners (>20% and <20% groups combined) show initially that the plurality are providing visual training because they consider it a responsibility to the public and profession. Secondly, the responses show that public school personnel are a very valuable resource for referrals; as about 50% of the OD's indicated. The data shows optometry can consider ophthalmology as a referral source that is in need of developement, but the fact that very few MD's offer VT services is likely responsible for the low OD to MD referral rate. Six of the seven MD's in this category indicated (e), Others, as their main referral source. Of these six, half denoted "no referrals", and the other half wrote in "patients in their own practices" as their main referral source.

Optometrists choosing response (e) also showed a very similar reply pattern.

No firm trends are evident in the results received from the question that asked what patient types are treated. All that can be said is that those providing VT services offer a wide variety of such to an assortment of patient types.

When asked why they do not provide orthoptics/VT, the bulk of the ophthalmological non-VT practitioners chose answer (a), Lack of effectiveness of VT/orthoptics in helping the patient. This response pattern may relate to, and aid in understanding the (c) respondents in questions three and four (gen. section), and those answering (a) and (e) to questions five and seven (gen. section), respectively. About forty percent of the total MD population is not doing VT because they consider it ineffective. With this in mind, one may be surprised that more did not indicate the extreme responses to the questions just mentioned. The reasons why optometrists are not providing VT varied to the point that no solid generalities can be discussed. Study of the graph would best describe the results received.

Non-VT practitioners referring their patients out showed, by profession, that OD's mainly refer to other optometrists. In that few MD's provide VT services and a considerable number view visual training negatively, it is not surprising that no referrals are made to them by OD's, and that most of their VT referrals are made to orthoptists.

Question sixteen was included in the survey in order to discern if those not providing VT find it valid and interesting enough to learn more about it. The results show, however, that most of those not doing VT are uninterested in pursuing further education in this field.

Though they were omitted from analyses, a brief overview of some of the orthoptists' responses follows. Three of the four respondents felt visual acuity improvement is possible with VT at any age. The fourth indicated training must be done before age six. Three of the four responded similarly to MD's in their estimate of successful strabismus surgery. The fourth marked an 80-100% success rate. Half felt VT was successful in strabismics 80-100% of the time and half felt it successful 60-79% of the time. All four received the majority of their referrals from opthalmologists. Only one provides treatment to all the patient types listed in the survey. The other three treat all but anomalous correspondence and developmental cases.

It should be mentioned that there were nearly as many medical schools written in as there were MD's responding, and therefore no conclusions about any one school can be made. However, 112 out of 130 OD respondents attended Pacific University College of Optometry and therefore one could consider the optometric responses reflective of Pacific graduates' opinions.

Comments were included with some of the surveys, but

because they were generally represented in, and agreed with a given part of the data, they will be omitted from presentation here. They are available for review upon request.

SUMMARY AND CONCLUSIONS

In an overview, the intention of this paper was to place in perspective the actual utilization of visual training techniques and ideas by ophthalmic professionals in everyday practice. A review of ophthalmic literature supplies mainly optimum informations by a select population of authors; not to mention, a great deal of confusion and contradictions. For the typical ophthalmic practitioner, a pragmatic approach to the field of orthoptic/VT is probably the best approach. The common professional must weigh many factors concerned with plying his livelihood and treating his patients. Expenses in time and money must be balanced against the returns they net for both doctor and patient. Therefore, this project, in many ways, attempts to qualify and quantify the "state of the art" in orthoptics/VT as employed by average eye-care practitioners.

The results of the survey tabulated for this thesis illustrate many longstanding, yet heretofore, undocumented concepts about the more controversial aspects of VT. At the same time, at least a few attitudes can be dispelled or moderated by unforseen responses. Some very large differences of opinion between optometry and ophthalmology are

exemplified by the responses to the amblyopia/age question and some of the strabismus treatment questions. In fact, the results of this study portray a greater division than the literature in this area.

The concentration of VT-oriented practices in this area seems to be surprisingly low, considering the central location and high alumni percentage of Pacific University's College of Optometry (sometimes termed a "functional school"). This low concentration leads us to speculate on why more professionals do not offer VT services on a regular basis. Possibilities include; 1) lack of education or training, 2) lack of faith in effectiveness of VT, 3) lack of time, and 4) lack of motivation. The optometric response statistics rule out the first two reasons, leaving lack of time and motivation as possible causes. Ophthalmological responses corroborate their lack of VT services by adhering to the last three reasons. Research into MD's education indicates that this could also be a reason.

The fact that so few practitioners in this area specialize in VT and that such diversity exists within and between the professions may set some definite trends for the future of the eye health-care field.

BIBLIOGRAPHY

1) Bartley, Howard S., Optometry and ophthalmology - some differences that professionals and the public should recognize, Am. J. Opt., 54(3): 185-186, 1977.

2) Cooper, Charles F., Orthoptic appraisal, Am. Orth. J., Vol. 13, 127-134, 1963.

3) Folk, Eugene R., Treatment of Strabismus, Charles C. Thomas, Springfield, Illinois, 1965, p 72.

4) Wold, R. Jr., J. Pierce and Joan Keddington, Effectiveness of optometric vision therapy, AOA.J., 49(9): 1047-1054, 1978.

5) Simpson, Walter, Optometric management of convergence insufficiency, Opt. J. - Rev. Opt., 1110(12): 18-26, 1974.

6) Ludlam, William M., Orthoptic treatment of strabismus, Am. J. Optom. and Arch. Am. Acad. Optom., 38(7): 369-388, 1961.

7) Ludlam, William M., and Burton I. Kleinman, The long range results of orthoptic treatment of strabismus, Am. J. Optom. and Arch. Am. Acad. Optom., 42(11): 647-683, 1965.

8) Hoffman, Leon, Allen H. Cohen, Gary Feuer, and Ivan Klayman, Effectiveness of optometric therapy for strabismus in a private practice, Am. J. Optom. and Arch. Am. Acad. Optom., 47(12): 990-995, 1970.

9) Etting, Gary, Visual training for strabismus - success rate in private practice, Opt. Weekly, 64(48): 1172-1175, 1973.

10) Flax, Nathan, and Robert Duncan, Orthoptic treatment of strabismus, AOA.J., 49(12): 1353-1361, 1978.

11) Birnbaum, M.H., and I. Greenwald, Orthoptics and visual training, AOA.J., 38(12): 1022-1026, 1967.

12) Lancaster, Walter B., Refraction and Motility, Charles C. Thomas, Springfield, Illinois, 1952, p 252.

13) Raab, Edward L., The strabismus patient: an outline of examination and treatment, S-S Rev., 47(4): 157-165, 1977-1978.

bibliography (con't)

14) Kennedy, Roscoe J., and James L. McCarthy, Surgical treatment of exotropia, Am J. of Ophth., 47(4): 508-519, 1959.

15) Hardesty, Hiram, Treatment of recurrent intermittent exotropia, Am. J. Ophth., 60(6): 1036-1046, 1965.

16) Costenbader, Frank D., Symposium: Intermittent exotropia, Am. Orth. J., Vol. 13, 33-36, 1963.

17) Fisher, Norman, Merton Flom and Arthur Jampolsky, Early surgery of congenital esotropia, Am. J. of Ophth., 65(3): 439-443, 1968.

18) Taylor, Daniel M., Congenital Esotropia: Management and Prognosis, Intercontinental Medical Book Corp, New York, 1973.

19) Ing, Malcolm, F.D. Costenbader, M.M. Parks, and D.G. Albert, Early surgery for congenital esotropia, Am. J. Ophth., 61, 1419-1427, 1966.

20) Mulberger, Robert D. and P. Robb Mcdonald, Surgical management of non-paralytic exotropia, Arch. Ophth., 52(5): 664-668, 1954.

21) Kapp, P., Divergent deviations, Strabismus Ophthalmic Symposium II, St. Louis, Mosby, 1958, pp 354-363.

22) Costenbader, Frank D., Clinical course and management of esotropia, Strabismus Ophthalmic Symposium II, St. Louis, Mosby, 1958, pp 325-353.

23) Lewerenz, David C., Visual acuity and the developing visual system, AO J.J., 49(10): 1155-1158, 1978.

24) Santos, George P., Strabismus, S-S Rev, 45(2): 51-57, 1975.

25) Kuppers, Karl, Treatment of amblyopia ex anopsia in adults, Am. J. of Ophth., 43(6): 918-922, 1957.

26) Brown, M.H., and P.M. Edelman, Conventional occlusion in the older amblyope, Am. Orth. J., 26, 34-36, 1976.

27) Malik, S.R.K., Prem Singh Virdi, and B.K. Goel, Follow-up results of occlusion and pleoptic treatment, Acta Ophth., 53, 620-625, 1975.

28) Birnbaum, M.H., K. Koslowe and R. Sanct, Success in amblyopia therapy as a function of age, Am. J. Opt. 54(5): 269-275, 1977.

bibliography (con't - 2)

29) Eskridge, J.B., Optometry curriculum model, J. Opt. Ed., 4(1): 11-22, 1978.

30) Schapero, Max, D. Cline, H. Hofstetter, Visual Science Dictionary, 2nd ed. Radnor, Pa., Chilton Book Co., 1968, pp. 516, 767.