Visual therapy for relief of common headache is an optometrist's primary area of service to humanity

Headaches and Binocular Stress (Part 1)

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In the October 1955 Optometric Extension Program papers, Ralph Barstow published a report on the symptoms which send patients to the optometrist. Leading this list by an overwhelming margin was the symptom *headache.*

In commenting on this fact, he brought out that this is optometry's primary area of visual service to humanity. To illustrate the importance of the headache to an optometrist, he gave the analogy that as the toothache drives many people to the dentist, so the headache drives many patients to the optometrist. His closing admonition was that more thought and more study must be given to the subject of headaches.

Headache has plagued mankind since the very dawn of time. From the very earliest records of the ills which have beset mankind, headache will be found at the top of the list. In fact, the earliest evidence of surgery was found to be skull trepanning, done in the hope of relieving a severe headache. Some of these early fossil skulls have been found with even two or three holes drilled through in an attempt to make an exit for the troublesome demons whose habitation in the head was believed to be the cause of the severe pain. Even today, with all of the advance knowledge and techniques of medical skill, I have heard numerous patients describe the major or minor surgery they have undergone, along with pharmacotherapy and psychotherapy, in unsuccessful attempts to find relief.

Actually, chronic severe headache has become such a hopeless plague down through the ages that many times it is considered a disease in itself, rather than a symptom. After listening to the histories of countless migraine sufferers, and hearing of the warped lives, the sacrifices, the lost opportunities, the reclusion, the personality changes, and the many other physiological, neurological, and emotional disturbances of these peope, one soon realizes that what is basically a symptom eventuates into a malady of its own.

Because headache is man's most common complaint, more treatment is given for it than for any other one problem. With regard to pharmacotherapy, we find headache remedies are first on the lists of the purveyors of nostrums. The problem of headache is a constant challenge to all professions in the health-care field.

Optometry's Part

Moench, in his book, *Headache*, says: "Eye strain is one of the most common causes of headache. The lay mind is so convinced of this simple aphorism that the ophthalmologist, oculist, and optometrist are usually the first to be consulted by the person with a headache."

Barstow's 1955 survey of the symptoms which send patients to optometrists revealed that 30% seek vision care because they hope for relief of headache. The second most common symptom was "sleepiness following reading," which accounted for but 12% of the patients. Thus, headache was the predominant stimulus for almost ⅓ of the patients seeking optometric service.

Dr. Raymond R. Roy
since the dawn of time

With some of these simple and evident facts before us, is it any wonder that headache therapy is optometry's primary area of visual service to humanity? Clear vision and visual efficiency will always take a secondary position where severe or chronic pain is involved. If efficiency is improved as a result of pain-relieving therapy, it is indeed appreciated, but nothing motivates man's interest in health-care more than pain. This is not to minimize the importance of visual efficiency, nor the improvement of visual skills, nor to belittle the importance of intensive research in this area, but currently, the primary optometric research and writing are concerning a very secondary phase of our work.

Optometry, as the only profession specializing in the art and science of vision-care, should be a foremost leader in headache research. Ophthalmology is concerned primarily with pathology and ocular surgery. Proof of this is found in its archives. During the first

six months of 1955, there was a total of 117 articles published in one of the leading ophthalmological journals. Of this number, seven were concerned with visual anomalies, instruments, or visual surveys. Of these seven, one was authored by an optometrist, one by the research department of an optical manufacturer, with only five articles on visual problems being submitted by ophthalmologists. The remaining 110 were concerned with pathology and surgery. This means that less than 4½% of the articles published in this ophthalmological journal were written by ophthalmologists on subjects relative to vision, refraction, lenses, instruments, etc.

Another reason why optometry must be a leader in this field of ocular cephalalgia is the problem of man power. In some states the optometrists outnumber the ophthalmologists by nearly eight to one. There are many of the ophthalmologists whose appointments for refractions are taken for three months ahead.

From the above facts, we see that optometry stands in a position of leadership in the vision-care field, and is indispensable to American economy. It is utterly impossible for ophthalmology alone to cope with the vision needs of the American people, and we readily see by their writings that the great majority treat refraction as merely a sideline of only nominal interest.

Hence, optometry has a distinct obligation to the public, and to the allied professions, to do extensive research in the area of the headache patient; not only the patient with mild-to-average headache, but the one suffering the most intense possible cephalalgic pain.

Ocular Migraine

Recent optometric research has revealed that many migraine sufferers can be relieved by means of visual therapy. The syndrome of the headache symptoms can cover any of the current concepts regarding migraine, from the very strict and limited description of migraine simplex, to the migraine equivalents; namely, abdominal migraine, facioplegic migraine, etc.; or, to the present universal medical concept of migraine, which was summed up by Walter C. Alvarez, M.D., in these words: "Migraine can be either a mild trouble, not worth talking about, or it can be a terrible affliction, which several times a week prostrates the victim. Unfortunately for the diagnostician, many migraine headaches are not unilateral, but are felt all over the head."

When a patient has had chronic migraine for many years, with the pain periodically reaching the severest known intensity; when the history reveals anywhere from one to ten medical diagnoses of migraine headache; and when visual stress is found ultimately to be the etiological factor, then it can be definitely diagnosed as ocular migraine.

Etiology of Ocular Migraine

It is not the intent and purpose of this discussion to delve into the subject of ocular migraine in minutiae, but merely to refer to its etiology in a broad and general sense, so as to challenge the thinking and research of the ophthalmic professions.

The etiology of ocular migraine might be summed up in a few words by saying that it is caused from binocular stress. If man were a uniocular organism, there would be little need for a profession to deal with visual problems. A six-month course in optics in the form of an apprenticeship would qualify any intelligent person to find and measure the hyperopia, myopia, or astigmia of a single eye quickly and accurately. *Yet today in both optometry and ophthalmology many men do just this to the right eye, then to the left eye, write down the lens prescription and they are through.* Oh yes, the ophthalmologist might use a mydriatic, in very professional environs, and the patient may be delayed a long time in the preparation, *but the actual refraction itself concerns a right eye refraction and a left eye refraction,* and is no more a comprehensive investigation into binocular problems, than the commercial optometrist who is anxious for a quick turnover.

Some vision specialists feel very self-sufficient in doing a complete analytical routine, even the so-called "21 points," and perhaps even adding to this an investigation of visual skills; yet, if they do not *prescribe* for binocular stress, they are no more professional men than are the "quickies"! It takes more than a routine, and a professional looking office, to make a man professional! *The greatest need in the ophthalmic professions today is for men who will not only test for binocular dysfunction, but who will prescribe for it as well.*

Heterophoria

There are only four ways to treat heterophorias: namely, (1) plus and minus spheres, (2) prism, (3) visual training, and (4) surgery.

The last form, surgery, is generally reserved for heterotropias, or very high phorias; and most authorities will agree that it should be a last resort, after other methods have failed. To quote Worth-Chavasse: "The aim of surgical treatment is to supplement other reputable treatment; namely optical and orthoptic." It will, therefore, be given little attention in this discussion.

Plus or minus spheres are very limited in their application to reduce lateral heterophorias, per se, unless they are used in conjunction with extensive visual training. In fact, some authors refer to excessive phorias, caused by high degrees of ametropia, as pseudo-heterophorias, or, perhaps more acurately, accommodative heterophorias. The use of

spheres in squint cases has been covered by Wesley and Jessen, of Chicago.

We now have two left: namely, visual training *and* prism therapy. You will notice the emphasis was on *and*, and that the word *or* was eliminated. When are men of the ophthalmic professions going to use the word *and* instead of *or* when speaking of binocular therapy? This very narrow and limited view of being either *pro-prism* or *pro-training* stems from a lack of education and experience in both forms of therapy; or from a limited, rigid philosophy about visual stress. Primarily, it stems from mechanical testing routines, which make true differential diagnosis difficult, and in some cases impossible. I sincerely believe that the inability to make a proper differential diagnosis of binocular stress accounts for the bulk of the misunderstanding about proper binocular therapy.

There are many in the ophthalmic professions today who advocate that all binocular therapy should be visual training or orthoptics. They have preached against prism therapy for so long that some men have a guilt-complex if they prescribe prism, and will not speak of it publicly.

Then, there are those who concede that it is permissible to prescribe prism for vertical anomalies, but that the use of horizontal prism is archaic. A typical example of this thinking is found in Worth-Chavasse: "For the most part, prisms are not advised in the treatment of horizontal heterophoria."

The antithesis of this feeling, which is now creeping into literature, advocates the empirical use of small amounts of base-in prism, even in cases of measurable esophoria. This attitude is an outward indication of the inward groping for more adequate knowledge regarding binocular stress. It results only from inadequate testing procedures and a poor understanding of latent binocular stress.

Now let us summarize the present concepts of both prism therapy and visual training, with a brief comment on each. A more comprehensive and detailed analysis of binocular therapy will be given in subsequent articles.

Prism

There have been four concepts concerning prism therapy which have been the principal impediments to its widespread acceptance and use. Recently a fifth has been added. As a result of these concepts, prism therapy has been held in disrepute generally and its use has been curtailed. To substantiate this statement, two of the large optical laboratories in this area, which fill prescriptions for both optometrists and opticians in Oregon and Washington, have furnished me with figures of several thousand consecutive prescriptions filled by them in February and March, 1956. These figures are based on complete prescriptions, not on duplicate lenses.

Number of complete prescriptions	5,462
Number ordering some prism	281
Percentage of prism Rx's	5.1%

1. Prism Is a Crutch.

How long we have heard this time-worn epitaph of prism which is based on the obsolete concept of a "weak" muscle! In the days when a heterophoria was considered the result of a "weak" muscle, it was felt that a prism replaced the function of that muscle. A crutch does replace function, but that is a false concept in the use of a prism. Prism therapy in its new concept relieves stress. It inhibits stress in the fixation reflex, and relieves the frustrations set up at cortical level due to constant cortical supervision when binocularity is in discord.

When are the ophthalmic professions going to shake off this concept of "weak" muscles? Lancaster estimated that less than 5% of the oculorotary muscle fibers are made to contract at any one time. Scobee estimated less than 1%, although he granted an extra allowance for tonus. When these thoughts are correlated with Mosso's work on finger ergographs, it would be almost inconceivable to think of heterophorias in terms of muscle-weakness.

In the light of modern thinking, with the correlated research of psychology, psychiatry, and related fields, it is absolutely erroneous to continue to say that "prism is a crutch." Much more concerning this will be said later.

2. Prism Is Progressive.

Here again, we find a false concept concerning binocularity and again, it stems from the concept of the "weak" muscle. It has been noted often that after a patient has worn a prism correction for a period of time, the manifest phoria measurements show an increase on subsequent testing. It was concluded, therefore, that application of prism created a greater binocular discord by further "weakening" the already weak muscle, as though the muscles were made "lazy" by the use of prism. Here again, we find an example of *post hoc* reasoning in ophthalmic research. These are conclusions based on inconclusive data and thus they have created another obstacle to advancement in binocular therapy.

After several years of experience in using a standardized procedure for prolonged monocular occlusion, it can now be said that what formerly was considered a progressive phoria was merely a latent phoria being made manifest in gradual changes. Had a proper prolonged occlusion test been done at the inception, the full amount of the phoria would have been made manifest at one time and no further increase in prism would be necessary. *It would be physically impossible for a phoria to progress beyond a certain point as long as fusion was retained.*

3. Fear.

The first fear on the part of the practitioner, about prescribing prism, is his own personal feeling of guilt in doing so. The prescribing of prism has been ridiculed for so long that many of the rank and file of ophthalmic practitioners have come to accept the same doubtful position in relation to it. Anyone who prescribes extensive amounts of prism is referred to by colleagues as an "extremist," a "hobbyist," or, even a plain "crack-pot." I have talked with men who have admitted to me that they never have prescribed prism. This attitude has been born largely from the concept that "prism is poison." Young graduates of our universities have little respect for prism therapy and only a hazy concept of how to prescribe it.

The second fear on the part of the vision specialist is that the patient will not be comfortable and will "complain;" hence the specialist will lose professional prestige. This originates in unsuccessful past performance in the use of prism therapy and is a subject which I intend to cover very thoroughly in later articles on the procedures and instrumentation for determining binocular stress.

4. No Formula for Prescribing Prism.

There is perhaps no other one question put to me more often than this: "What formula or rule do you use to prescribe prism?" This desire for a formula, graph, or equation, from which one can derive a prescription, is a result of an unforgivable philosophy in optometry and ophthalmology which attempts to put the human eye and vision on a mathematical level. It assumes that our testing procedures are infallible, and that when we measure a phoria this one simple test is a true mathematical computation of the position of rest of the two eyes in relation to each other. Consequently, many formulas exist for prescribing prism, but none will give consistent results.

Because we use numbers and we add and subtract them, it is only natural to feel that we are dealing in the "exact" science of mathematics, rather than in the art of determining visual stress factors in a living human organism with its multitude of variables.

A similitude of prism therapy in the human organism would be thyroid therapy. A physician might have three patients, each of whom would record a −20 on a B. M. R.; yet there is no rule or formula which he could use to prescribe thyroid medication. Nor is the fact that all tests showed −20 indicative that all persons need the same dosage of thyroid. The physician has one way to determine the individual level of tolerance: namely, trial and error.

With both prism therapy and thyroid therapy, the human equation must be added to the test results. This human equation is a great unknown; therefore, no mathematical formula can be devised which will apply to all people. Yet, use of the therapy is not precluded merely because there is no formula, nor because it requires a trial-and-error procedure. These factors merely make the problems greater challenges to creative thought and constant research.

5. Seeing Is Learned.

The champion of this hypothesis proclaims that the human organism is not organized in anatomical segments, but in movement patterns. It accepts the statement that "Like every other measure of human function, this turns out to be a measure of range."

This hypothesis further assumes that there is a vertical component to this range, as well as a lateral, and near-far range. Therefore, to explain a vertical phoria by this hypothesis, it is said that a stress occurs which absorbs a range, thus making difficult the matching of the apices of the light density gradients. Consequently, it is within the potentials of the freedoms of the visual process to use the vertical range component as a means of escaping the demand for matching the fine-grained apices of the light density gradients. This view of the origin of a vertical phoria would lead to the opinion that there would be no need for the development of a vertical phoria where sufficient latitudes or degrees of freedom are attained in the visual process.

Thus, the proponents of this discipline advocate that, by means of visual training and plus spheres, adequate degrees of freedom may be built into the visual process, and prism is never a necessity.

However, it is of interest to note that, if the visual training should fail, the explanation states that the distortion from characteristic performance had been so deeply embedded that its disinterment would require more than would be worth while to the organism.

So upon that premise, it would then be expedient to allow the deviation as a permanent deviancy by means of a prism prescription.

For some reason, this hypothesis seems to rule out anatomical variances and asymmetry completely. It assumes that all deviations are of the mind, and that all visual stress is functional. How function can operate without being influenced by structure, however, has yet to be explained.

(to be continued)

Northwest Congress Dates Set

According to Martha S. Stem, director of professional and public relations of the Optometric Extension Program, the Northwest Congress, a regional educational congress, will take place on December 9, 10 and 11. Headquarters for this three-day event will be the Hotel Multnomah in Portland, Oregon.

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Headaches and Binocular Stress* (Part 2)

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Visual Training

Now that we have reviewed the current criticism against prism therapy, let us look at the status of visual training in America today.

Visual training is the most popular topic found in optometric literature, at conventions, congresses, and seminars throughout the country; *and yet it is one of the least practiced therapies today.* In ophthalmological literature orthoptics is extremely conspicuous by its absence. In the aforementioned leading ophthalmological journal, there was only one article dealing with orthoptics during the entire year of 1955, and this approach was merely its use as an adjunct for surgery in cases of strabismus. The conclusions reached were that after the age of six years, functional cures following surgery can be attained in most cases only with the aid of orthoptic training, and, the older the patient, the less chance of success, whether orthoptic training is used or not.

At the 1955 convention of the American Optometric Association, Dr. Harold Haynes, chairman of the national committee on orthoptics and visual training, found it necessary to report that a woefully small percentage of optometrists are actively engaged in visual training work and his report was a near carbon of what Dr. Thaddeus Murroughs reported for the preceding three years. In 1954 Dr. Murroughs said, regarding the scarcity of visual training practice in America, that it was "like chasing a rabbit in a brier patch."

In January 1956, Vodnoy reported his estimate of the men doing visual training to be about 15%. Now, it is to be remembered that of the estimated 15% of the men doing some training, they are training from 1% to 10% of their patients. On a national scale, this means that an infinitely small number of patients receive any training. This closely correlates Dr. Harold Haynes' survey.

Now, in view of these statistics, which indicate that there is very little training being done, there must be reasons for it. Let us analyze some of these reasons briefly.

1. Differential Diagnosis.

One of the most fundamental and basic underlying problems about training is that there is no clear understanding of the goals to be accomplished by training. There is a great lack in a basic understanding of those cases which need training. The question is asked, "When do we train a patient?"

Some do training to reduce a phoria, per se. If it does not reduce after training, then to them training is valueless. Some are not concerned with the measurable phoria, but train so as to build up a high duction. Others will pay small heed to phorias or ductions, but will train to enhance visual skills. Some do visual training in myopia to reduce the myopia. If the myopia is not reduced, then training is worthless. Some train only to stimulate fusion; others give fixation training; others only rotational training; and still others will have a training routine through which problem cases or grief cases are put, in the hope that it will help them. If they are helped, they do not know why, but the magic word "training" was responsible.

In these latter cases the successful patient is grateful I am sure, but the empirical use of training is as big a deterrent to professional progress as is the empirical use of base in prism merely because there is nothing else to do. It is a commendable feature to do something, rather than nothing; but it is an elementary state of mind, and one which will not consistently bring results or progress.

Some advocate that training is designed to increase visual performance to optimum levels. For two reasons, this does not appeal to many practitioners: First, they are confused as to what are optimum performance levels; and, second, they feel that mortal man operates in such a restricted area of optimum performance in every other physiologic function, why should he seek optimum visual performance when he is comfortable and performing to his own satisfaction?

Lastly, we know of some who do visual training merely to impress a patient, or to give themselves more prestige. They know the training cannot hurt and that it is bound to do some good. A series of "treatments" is so impressive to John Q. Public! This is the same philosophy which underlies extensive use of mydriatics with many ophthalmologists, so the desire to impress the patient is not restricted either to optometry or visual training. The desire to impress is a basic human trait, but a dangerous premise upon which to build scientific reasoning.

Therefore, through this review of the many reasons for training, it is easy to see that the primary problem concerning "to train or not to train" stems from faulty differential diagnosis and confusion of philosophy; resulting in doing nothing about binocular problems.

*Continued from October 11, 1956.

2. Financial.

One of the most profound yet simple statements of the ages is found in Holy Writ: "For where your treasure is, there will your heart be also." To apply this to the ophthalmic professions, we might say that economics dictates policy.

In this case it works both ways; namely, from the public viewpoint, and from the professional viewpoint. To the patient, visual training costs far more than "a pair of glasses;" therefore, it would take a real selling job to convince him that he should part with that much extra money. The doctor cannot charge the patient as much for his time while giving training as he can charge for his diagnostic routine in the refracting room. If he could, there would be a great deal more training being done in America today.

I have personally talked with good practitioners, highly respected in their profession, whose problem is not one of differential diagnosis, yet who are doing training at such a token fee that their time spent would have to be charged to advertising; but they are doing it because of the patient's need. One of the greatest reasons for advocating home training is that of economics. I sincerely believe that "a servant is worthy of his hire," and if training is good, if it is necessary, then it is worth that cost to the patient.

This is not a discussion of economics, with all of its ramifications, but merely a presentation of one of the greatest stumbling-blocks to more extensive training.

3. Time-consuming.

Perhaps this could have been included in the foregoing "Financial" section, as we know that time is money; but time consumption is a definite reason given for not doing training, and it is often referred to as an item separate from the high cost of training.

To a child, time is not money because he is not gainfully employed. Therefore, to spend time, three days a week, going to and from the doctor's office could mean merely missing out on some ball games, school, or play. But to the adult who is working and supporting a family it is impossible to spend much time away from work. If he is employed, the employer objects; if he is self-employed, it takes away from his productive hours, and this can be much more expensive than the fee for training. The following typical example of this problem is quoted from a recent published case study involving training:

"It would have been highly desirable for this patient to have been on a definite office schedule of three times weekly. Owing to many factors entering into the situation, this regularity could not be achieved. The patient was seen at irregular intervals that make day in, day out protocol reference difficult."

The second problem in relation to training being time-consuming, is that too many men extend training over a period of months, instead of weeks. Many people might sacrifice a month to take training three times a week, but not many could spend several months. Parents and school authorities may object to spending so much time even for children patients. So again, the problem of prolonged training can be traced, in many cases, back to faulty differential diagnosis and a lack of a clear understanding of the goals to be achieved by training.

4. No Standardized Procedure.

Many men fail to do training because they have listened to so many different techniques that they are confused. Everyone who writes or lectures will stress some different phase of training, or some different instrument, yet all will claim success with the methods used.

Anyone who has been in optometry more than ten years can look back on the rise and fall, in popularity, of certain instruments and techniques with such rapidity that the man at the grass-roots level is confused. This is not the fault of the human organism, as it hasn't changed for centuries, but it is the changing tide of philosophies affecting optometric therapy. It is proof that what is actually accomplished by training is strictly a hypothesis which may change tomorrow.

However, because philosophy is changing in a fast growing profession, we have no license to stand on the side lines and do nothing about binocular stress.

Many men do not like to experiment with their own patients. This is only natural, as they want the best for their own. When a new instrument is perfected, accompanied by a shiny and colorful instruction manual, it takes him a long time to absorb it all and to utilize it to the fullest degree. When he becomes adept with it, and establishes a certain confidence in it, he ventures to speak about it to a friend, or some authority on training. When the friend or the training authority remarks that he doesn't use that instrument, but he gets fabulous results with such-and-such an instrument, the man feels defeated and again insecure. It results in a decrease in his training enthusiasm, and, in many cases, a lack of further interest in training.

Again, we refer back to the basic problem of proper diagnosis and a proper understanding of the goals to be achieved. When a man has a clear understanding of his objectives, then every new instrument will not sway him, nor will he be spending money for training equipment disproportionate to his income from training.

Even the Bates technique claims cures of visual problems; and wherein those claims are reasonable, can you refute them? One of the latest optometric publications presented a case

analysis in which part of the training routine was deep breathing exercises, along with other bodily posture training. I saw a myope of −3.00 diopters who was "talked" into a cure by a Bates practitioner, and then went without a correction for a year, thinking she was seeing normal. It is easy to prove that this was purely a case of psychology, and to condemn the whole procedure; but how about the patient with a mild asthenopia who takes Bates training, and then feels fine and throws his +.50 spheres away? Could anyone convince this person that the training was of no value, and that he should go back to his +.50 spheres? I doubt it! Yet, is this to mean that, because of that successful case, we are to adopt the Bates method in our offices?

No, but herein lies much of the confusion about training techniques. Because of a lack of understanding of certain basic objectives, we are swayed by every new technique and instrument, until soon we are confused. From that confusion too often comes cessation of further training.

5. No Spectacular Results to Patient.

There may be some exceptions to this rule, such as squints who are straightened as a result of training, or a person suffering constant headache who is relieved; but, as a rule, many patients would have a difficult time telling a friend exactly what was accomplished from the training unless he was well-grounded by the doctor. Talk with some one else's patient a year or more after training, and ask him what the training did for him.

Some who read this, who are exceptionally proficient in training and who are very selective with their training patients, could take exception to this, *but they are the ones still doing training, and they have learned to overcome this stumbling-block.* What about the men who once did training but are doing none now?

6. No Advance Guarantee to the Patient.

This is a great deterrent to handling squint cases. I am sure that very few orthoptists can guarantee each training patient that his problem will be solved by training, unless he is so selective that he has few training patients.

In this respect, the art of orthodontia far exceeds orthoptics. The orthodontist can know in advance that the teeth will straighten, and the result of his work is very visible and tangible; thus it commands respect which warrants very large fees. In spite of the cost, orthodontia is so popular today that men cannot be trained fast enough to fill the need.

Can an optometrist guarantee in advance to straighten a squint? Can he guarantee to increase a reading rate and comprehension rate so as to materially show results in the classroom and on the report card? Can he guarantee to reduce a phoria? Can he guarantee to produce fusion? Can he guarantee to reduce an amblyopia? Can he guarantee optimum visual performance?

Any man with many years of experience knows that to be successful he must consistently produce results. Unless he can feel sure that he can produce results from training, he is reticent even to try, hence another big stumbling block to training.

The Remedy

The remedy for this apathy in relation to binocular stress lies in continued research and in an open mind. It has been said that "foolish consistency is the hobgoblin of little minds." Hence, when a certain discipline in the profession embraces a functional hypothesis, to the exclusion of all structural probabilities, then of necessity true professional advancement is limited.

In this limited sphere of function, we have set up a certain battery of tests and skills which are given in a methodical routine on every patient; then, from resultant mathematical equations or graphs, we diagnose and prescribe. *We have completely ignored the fact that these tests should be given in different ways to different individuals.* We have completely ignored the human equation—the organism as a whole. We set up certain arbitrary standards of visual performance, and then strive to bring our patients to this standard.

I sincerely believe the optometrist is a diagnostician, and that all patients should not be handled in the same manner. A thorough examination is essential; but it should not take the place of a good history.

I am reminded of a recent book written by a very famous physician for the benefit of internists. In it he has a chapter entitled, "The Ordering or Not Ordering of Tests." In this chapter he tries to stress how completely decerebrate the "thorough" practice of internal medicine can become by the modern trend of putting every patient through a battery of laboratory tests and roentgenologic reports, to the exclusion of first listening to the patient. He prevails upon the internist not to worship tests and tests alone.

This same warning could well apply to the general practitioner in optometry; and this, especially so, in relation to measurements to determine binocular stress, for many of the techniques being used today to measure binocular deviations are worthless in the information they give.

Therefore, until optometrists and ophthalmologists alike are willing to begin each consultation with a thorough case history, and until they have a complete understanding of the symptoms which they are expected to relieve by means of binocular therapy, and until they have a complete understanding of the various testing procedures used in determining

binocular stress, thousands of people will go uncared for, and the specialty of vision-care will remain in the elementary sphere of acuity betterment.

Summary

From the foregoing, we see many reasons why men are not doing visual training. We also see many reasons why men do not prescribe prism. The facts and figures of these surveys indicate the lack of interest generally in binocular therapy.

Let us be realistic and truthful and face the facts as they actually exist. Diplomatic or scientific double-talk has no place in professions dealing with human suffering. If men generally were having outstanding success, if they understood properly all forms of binocular therapy, and if their diagnostic tests were sufficient to establish true differential diagnosis, then all objections to prism and visual training would vanish, and there would be universal acceptance of both forms of binocular therapy. It would be economically feasible, *because we would make it so.* We do what we want to do, and this simple aphorism indicates that the men of the ophthalmological professions are not yet convinced of the benefits of binocular therapy.

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Why those studying medicine should be examined for color blindness

Color Vision in Medical Science

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It is self-evident that in order to be thoroughly conversant with pathological conditions, their causes and their results, a physician and his laboratory collaborator must have normal color vision. Thanks to the important contributions to the field of medicine that have come from biological and chemical research, the doctor of today is assisted in his work of diagnois and analysis by various specialists, laboratory technicans, biologists and chemists, most of whom use color comparisons in their work.

It should be clear, therefore, that when we set out to explore what happens when medical men have defective color vision, we are considering not only the physician himself, but all of those who, by performing for him the various chemical and biological tests, render invaluable assistance in his work. If neither they nor the doctor can see the red end of the spectrum properly or have deficient or weak color vision, the results may be very serious indeed for the people whom they are all trying to help.

Color-blindness has been a subject of jest, and indeed many amusing stories can be told of the awkward and embarrassing situations in which those who cannot distinguish between red and black, or who have difficulty in telling the difference between orange and green, have found themselves. But when we realize that at least eight million members of our male population suffer some degree of color-blindness, the subject becomes somewhat less humorous. And when we consider the errors that may be committed, quite innocently indeed, by those who suffer from this disability in the course of practicing a profession so vital to public welfare as medicine, then the subject of color-blindness ceases to be funny.

The chemical and biological tests that are so indispensable today in successful pathological diagnosis are both qualitative and quantitative. An example of a qualitative test is that simple but very useful one wherein the laboratory technician prepares a histology slide for microscopic examination, using a small section of tissue from the patient. A quantitative test is illustrated by the chemical examination of a specimen of the patient's urine, in order to discover the amount of sugar therein.

In both of these tests, as well as in dozens of others that are made in the pathological laboratory, the ability to distinguish color correctly is essential. In the examination of living tissue, in the effort to discover whether there is or there is not a pathological condition, the technician uses a chemical preparation that is actually a dye. But it is a very special kind of dye, for normal tissue thus treated will show one color, whereas diseased tissue will show another. It is this difference which constitutes the "test," and if the technician or the consulting physician cannot distinguish accurately between the two colors, what meaning can there possibly be in the test?

It is a foregone conclusion that all of these tests should be a matter of prime importance