

A survey of the treatment of **CONVERGENCE INSUFFICIENCY**

By Optometrists in the Greater San Francisco Bay Area

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Abstract

We wanted to determine the percentage of optometrists who adequately treat patients with convergence insufficiency. To do this we surveyed 300 optometrists in the San Francisco Bay Area and asked them to identify their primary mode of treatment for this condition. Possible treatment methods were: 1) minimal vision therapy, 2) advanced vision therapy, 3) prescription of prisms, 4) referral, and 5) no treatment. We received a 35.3% response rate.

We found less than half of the optometrists who reported treating patients with convergence insufficiency adequately do so by incorporating advanced vision therapy techniques. The survey also indicated there was no significant difference between optometrists who treat convergence insufficiency who graduated within the last 10 years and those treating convergence insufficiency who graduated more than 10 years ago.

Key Words

convergence insufficiency, vision therapy, nearpoint of convergence, exophoria, positive relative convergence, negative accommodation

The purpose of this study is to determine the percentage of optometrists who diagnose and adequately treat patients with convergence insufficiency.

Convergence insufficiency has been described as a "syndrome consisting of a receded nearpoint of convergence, exophoria at near, reduced positive relative convergence, and reduced negative accommodation."¹ The symptoms associated with convergence insufficiency are usually discomfort after reading or near work, frontal headaches, diplopia and blurred vision. Eyestrain, pulling sensation around the eyes, heavy eyelids, sleepiness and loss of concentration have also been associated with convergence insufficiency.¹ According to Daum, there are three classes of exodeviation: divergence excess, equal exodeviations and convergence insufficiency. He found that convergence insufficiency occurred most frequently.² The reported incidence of convergence insufficiency varies from as low as 1.75%³ to as high as 25%⁴ of the population. We believe it is a significant public health problem and a factor in school and workplace inefficiencies.

Vision therapy has been reported to be quite successful in the treatment of convergence insufficiency. This has been reported for adult populations as well as for pediatric populations.¹ In a review of 13 clinical studies that have evaluated vision therapy as a treatment for this binocular dysfunction, the cure rate ranged from 68% to 94%, with the exception of one very low value (9.2%).¹ According to

Daum, who used more restrictive criteria than previous investigators, 41% achieved total success, 56% partial success and 3% no success.² Grisham has also shown that convergence insufficiency can easily be treated with high success.⁵ It is generally accepted that appropriate vision therapy can be an extremely effective method for the management and treatment of convergence insufficiency. Furthermore, "advanced vision therapy" techniques, according to most binocular vision practitioners, is *the* effective treatment for convergence insufficiency. "Advanced vision therapy" is using equipment that serves to increase motor and sensory fusional ranges, increases the zone of clear single binocular vision and which improves the quality of fusion within that zone. This equipment includes Brock string, eccentric circles, vectograms and cheirosopes, in addition to pencil push-ups and jump ductions. Minimal vision therapy, such as pencil push-ups and jump ductions alone, is considered to be inadequate treatment.⁶

Appropriate therapy for convergence insufficiency requires minimal expense for instrumentation and often requires but several months to expand the zone of clear, single, binocular vision sufficiently to solve a patient's problem. It can easily be done combining in-office with home therapy, using instruments that serve to increase fusional ranges, such as red-green eccentric circles or other such devices.

If a patient's symptoms are not alleviated by therapy, it may be necessary to prescribe base-in prism for close work only.

It is the purpose of this study to determine whether optometrists treat convergence insufficiency cases by prescribing appropriate vision therapy. As can be seen above, it is quite evident that convergence insufficiency is easily treated. However, it is the hypothesis of the authors of this manuscript that a majority of optometrists would not adequately treat this clinical entity by prescribing advanced vision therapy.

Methods

To gather information on the treatment for convergence insufficiency (CI) by optometrists, we designed an appropriate survey. To disguise our intent, questions were asked regarding the optometrist's primary work location and the percentage of time he/she performed the following tests: case history, stereo testing, binocular vision testing, biomicroscopy, tonometry, dilation and perimetry. We also asked the percentage of professional time spent in vision therapy as well as the preferred method of treatment for CI. We designed a seven-page survey to consist of fill-in and multiple choice questions to facilitate responses.

A random sample was obtained by using a number program and the Blue Book of Optometrists.⁷ The surveys were mailed to optometrists in the San Francisco Bay Area with a pre-stamped and pre-addressed return envelope. After receiving the surveys, the authors categorized the data based upon how a CI patient would be treated. The responses fell into the following five categories: minimal therapy, advanced therapy, prescription of prism, referral and no treatment.

We made the following assumptions:

1. Optometrists listed in the *Blue Book of Optometrists* are representative of the general optometric population.
2. The percentage of optometrists who responded and said they train CI patients is similar to the percentage of optometrists who did not respond and also train CI patients.
3. San Francisco Bay Area optometrists polled are representative of all optometrists.

Results and Discussion

A total of 300 surveys were sent to San Francisco Bay Area optometrists. The response rate was 35.3% (106). The treatment modes of CI were classified into the following categories:

1. Minimal therapy, i.e., pencil push-ups and simple jump ductions, without the use of prisms, lenses or additional equipment
2. Advanced therapy, i.e., vectographic instruments, Brock string, eccentric circles, cheirosopes, and other instruments that serve to increase motor and sensory fusional ranges, increase the zone of clear single binocular vision and which improve the quality of fusion within that zone and serve to enhance the appreciation of physiological diplopia
3. Prescription of prism
4. Referral
5. No treatment

To statistically analyze the data, the standard error (SE) for a proportion was calculated as follows:

$$\text{STANDARD ERROR} = \text{SE} =$$

$$\sqrt{\frac{N-n}{N-1}} \times \sqrt{\frac{P(1-P)}{n}}$$

Where, N = size of total population
 n = size of sample
 P = proportion of sample

Table 1 summarizes the results of the responses. Of the 106 responses, 56.6% of optometrists indicated that they would treat CI with some form of vision therapy. However, it is evident that most of these doctors would treat only with minimal vision therapy (34%). Only 22.6% would adequately treat convergence insufficiency incorporating advanced vision therapy techniques.

T = 106			
Mode of Treatment	#	%	SE
Minimal Therapy	36	34.0	4.1
Advanced Therapy	24	22.6	3.8
Prescription of Prism	21	19.8	3.5
Referral	19	17.9	3.4
No Therapy	6	5.7	2.0

Table 1.

The remaining respondents answered the question of treating CI as follows: 1) 19.8% would only prescribe prism, 2) 17.9% would refer the patient, and 3) 5.7% indicated no therapy. When the respondents indicated they would refer the patient, it was found not all doctors said

specifically to whom the patient would be referred. Most stated that they would refer to a vision therapy specialist. These included doctors in their practice, doctors outside their practice and specialty clinics at the University of California at Berkeley, School of Optometry.

In addition to the above findings we wanted to determine if there was a significant difference between responses from optometrists who said they treat CI and who graduated within the last 10 years and those treating CI who graduated more than 10 years ago. Sixty optometrists had indicated they treat CI with some form of vision therapy. For optometrists who graduated within the last 10 years, 25.5% said they treat with advanced vision therapy, while 29.8% said they treat with minimal vision therapy. For optometrists graduating more than 10 years ago, 23.7% said they treat with advanced vision therapy, while 33.9% said they treat with minimal vision therapy (see Table 2). There was no significant difference, based on standard error, between optometrists who said they treat CI with advanced or minimal vision therapy and who graduated within the last 10 years versus those graduating more than 10 years ago. However, we are assuming that the percentage of optometrists who responded and said they train CI patients is similar to the percentage of optometrists who did not respond and also train CI patients.

O.D.s Practicing <10 Years	#	%	SE
Advanced Therapy	12	25.5	3.9
Minimal Therapy	14	29.8	4.1
O.D.s Practicing >10 Years	#	%	SE
Advanced Therapy	14	23.7	3.9
Minimal Therapy	20	33.9	4.3

Table 2.

Conclusion

Based on the results of this survey, our findings indicate that a substantial number of optometrists (77.4%) in the San Francisco Bay Area do not integrate advanced vision therapy into their management of a patient with CI (convergence insufficiency)

Continued on Page 109

Furthermore, less than half (40%) of those optometrists who stated they would train a CI patient would incorporate advanced vision therapy techniques.

It was also found there was no significant difference, based on standard error, between optometrists who said they treat CI with advanced vision therapy and who graduated within the last 10 years, versus those treating CI who graduated more than 10 years ago. The same result was also found for optometrists who said they treat CI with minimal vision therapy. However, a greater percentage of optometrists who graduated more than 10 years ago preferred minimal vision therapy versus advanced vision therapy as their primary method of treatment for CI. The difference between optometrists who use advanced, versus minimal, vision therapy among those who graduated within the last 10 years was not statistically different based on standard error. The indication that optometrists who graduated more than 10 years ago have a greater tendency to use minimal vision therapy to treat CI reflects either upon their education or their method of practice based on their optometric experience. Which, is not answerable by this study.

A definition for the cure of CI should be mentioned. According to Grisham, success is determined by the amelioration of symptoms and the achievement of normal vergence function through vision therapy.⁸ This view is generally accepted by binocular vision practitioners. It is interesting to note, considering the relative ease of training convergence insufficiency, that this study indicates less than 25% of optometrists in the San Francisco Bay Area adequately treat convergence insufficiency with advanced vision therapy techniques. While we do not feel that all optometrists need to be capable of providing appropriate therapy for CI, we do feel all optometrists should be capable of making an appropriate diagnosis and referral to those who do treat this condition. This is in the best interest of their patients.

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