

# The Treatment of Convergence Insufficiency

**S**CHEIMAN ET AL<sup>1</sup> ARE TO BE CONGRATULATED for using good science and methodology to study the treatment of convergence insufficiency (CI). Although CI is quite common, with reported rates of prevalence ranging between 2.25% and 8.3%,<sup>1</sup> there is a paucity of good studies that compare popular treatment modalities. As such, the pilot study by Scheiman and colleagues does move forward our understanding of the treatment of this disorder. They compared a rather intensive (and relatively expensive) office-based treatment program with both a very minimally intensive program of home exercises and a placebo treatment. Although the number of subjects was small in this pilot study (between 11 and 15 in each of the 3 treatment arms), the authors found that their intensive office-based program worked quite well. Both the home-based treatment and the placebo, however, did not.

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Like all scientific studies, this one can only answer the specific questions it asks. In this case, if one wants to know if 12 weeks of intensive office-based orthoptic exercises (referred to as “vision therapy”) work better than a minimally intensive home-based program of one specific type of convergence exercise (pencil push-ups performed in a particular manner), the authors have addressed that question and have concluded the former works better. However, if one wants to compare this same vision therapy program with the type of home-based exercise program that is most commonly prescribed by the ophthalmic community, I believe the authors may not have asked the correct questions.

The authors compared what they call “vision therapy” with a home-based orthoptic treatment program. The use of the moniker “vision therapy” reflects a difference in the cultures of optometry and ophthalmology. The 2 groups do not always speak the same language. The exercises listed in Table 2<sup>1</sup> are all forms of what ophthalmologists who specialize in strabismus would simply call “orthoptic treatment.” In my mind, the vision therapy program used by the authors differs from what I consider to be orthoptic treatment mainly with respect to the duration and variety of treatment (in other words, the “dose”) as well as the use of a weekly office-based treatment session with vision therapy. How much treatment, both with respect to variety and duration, is necessary before “orthoptic treatment” is called “vision therapy” seems arbitrary to my mind.

For the home-based treatment arm, the authors chose to study the efficacy of 20 pencil push-ups 3 times a day, based on the belief that this treatment is the standard of care. I feel they are wrong in this belief. They came to this conclusion after a survey of 863 ophthalmologists and 863 optometrists suggested that pencil push-ups were the most commonly prescribed treatment for both groups of practitioners.<sup>2</sup> Although I cannot comment on the standard of care in the optometric community, I feel this survey misled the authors with respect to the ophthalmologic community for several reasons. First, only 23% of the 863 ophthalmologists responded to the survey. This is an unacceptably low response rate to permit meaningful conclusions. Second, although the questionnaire asked about the use of pencil push-ups, it addressed neither the method of performing the exercise nor the intensity of treatment. Third, I believe that in the ophthalmologic community, the vast majority of patients with CI are referred to pediatric ophthalmologists, many of whom work with certified orthoptists (members of the American Association of Certified Orthoptists) when treating this disorder. The 863 ophthalmologists surveyed by the authors were chosen by selecting every 20th name from an American Academy of Ophthalmology list of its members, organized by ZIP code. With this selection method, one would only expect approximately 5% of the sample to be pediatric ophthalmologists and none to be certified orthoptists. It would thus substantially underrepresent those practitioners who treat the majority of patients with CI. Had pediatric ophthalmologists and certified orthoptists been targeted, I believe a different standard of care would have emerged. To substantiate this, I surveyed 20 pediatric ophthalmologists and 15 certified orthoptists regarding their treatment of CI, to aid in preparing this editorial. The results are described herein.

Most treatments for CI involve exercises designed to improve fusional convergence and in some cases accommodative convergence. Typically, these involve having the patient converge on a target as it moves closer to the eyes. This type of exercise is often called a pencil push-up as it was initially done by having the patient focus on the tip of a pencil. With this form of exercise, the amount of convergence needed is always equal to just that amount necessary to maintain bifoveal fixation at the given distance. This exercise can be made more challenging, however, by having the patient perform it while looking through base-out prisms. This can be likened to adding weights to a barbell while weight training, and it undoubtedly does more to strengthen fusional convergence. Another form of exercise, jump convergence ex-

ercise, involves having a patient look at a distant target and then suddenly converge on a near target. This convergence is stimulated by physiologic diplopia and more accurately mimics the demand on the convergence system that occurs in real-world circumstances with changes in fixation. Several other forms of convergence exercise involve the use of stereograms or recession from a target, to name a few. In my survey, although most pediatric ophthalmologists and certified orthoptists recommend some form of pencil push-ups, not one of the 35 surveyed practitioners limit their treatment to that alone. Most examine patients at intervals of approximately 4 weeks, adding 1 or more of the aforementioned exercises to increase the intensity. Of course, the duration (or "dose") of any treatment program is also important. Although the authors indicated that the pencil push-up exercise in their study averaged 15 minutes per day, I have trouble reconciling this with their prescribed program of 20 push-ups 3 times a day. It takes me 2 to 2.5 minutes to complete 20 pencil push-ups in the manner used by the authors. I suspect that the patients the authors assigned to pencil push-ups may in fact have only been exercising 6 to 7.5 minutes per day. All of the practitioners I surveyed recommend 3 to 5 times that duration. Also, almost all I surveyed pointed out the importance of using a target that controls accommodation for pencil push-ups, such as a letter or picture. Focusing on the tip of a pencil, as was done in this study, may result in the use of accommodative convergence to maintain a single image and would do little to improve fusional convergence. In short, the pencil push-up treatment program prescribed in this study is not representative of the standard of care of the ophthalmologic community. Given the low intensity of that program, I am not surprised the authors found it of no benefit.

In preparing this editorial, I also reviewed the medical records of the last 20 patients of mine with CI who were treated with home exercises by the certified orthoptists with whom I work and who would have met the authors' inclusion criteria. Sixteen (80%) of them would have met the authors' criteria for cure with respect to objective measurement of convergence amplitudes and near point of convergence. Although I did not use the authors' 15-point symptom survey, all 16 of my patients described being symptom free. I recognize the limitations of this type of a retrospective review, but the disparity between my 80% cure rate with home exercises and the 0% found by the authors strongly suggests that their home-based treatment program does not adequately represent the potential benefits of home-based treatment.

The authors calculated that their office-based treatment program would cost up to \$1125 more per patient than their home-based program. These calculations underestimate the true cost difference, as they only consider the actual cost of the treatment itself. One should add to that figure the cost of 10 additional days away from work for the weekly office sessions, as well as the inconvenience of 10 additional school days missed.

One of the most interesting aspects of this study is the lack of improvement in the placebo treatment group. This should dispel the beliefs of those naysayers who believe that CI is not a real entity and that all perceived benefit of treatment is a result of a placebo effect. This study should convince them that both of those beliefs are incorrect.

My concern about this study is simple. Given how the lay media and professional tabloids hype sensationalist 1-line quotations from the abstracts of scientific articles, I fear this study will herald the belief that an office-based treatment program is superior to a home-based program, per se. That would be a serious misrepresentation of this study. It has only shown that an intensive office-based treatment is better than a specific home-based program of minimal intensity, the latter of which is not really representative of the standard of care. With this pilot study, the authors have a good infrastructure in place for evaluating the treatment of CI. I hope they take the logical next step by comparing 2 similarly intensive programs of orthoptic exercises. One should be home-based with monthly office visits for the purpose of monitoring progress and increasing the intensity of treatment. The other should be an office-based program. This would have a real benefit in helping clinicians know how to allocate precious health care dollars. Given my own experience, I suspect both will be found effective.

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## REFERENCES

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