

### Convergence Insufficiency: Randomized Clinical Trial

I read the article by Scheiman et al<sup>1</sup> entitled "A Randomized Clinical Trial of Treatments for Convergence Insufficiency in Children" in the January 2005 issue of the ARCHIVES with great interest. I would like to congratulate Scheiman and colleagues for venturing into this area where, truly, not many randomized clinical trials have been done.

I would, however, like to raise some important issues regarding the entire study, particularly with reference to the treatment regimens. As Kushner<sup>2</sup> has rightly pointed out, the intensive therapy that Scheiman and colleagues have provided for the treatment group is much more intensive than the therapy for home exercises. For example, a child in group 1 exercises for only a total of 15 hours (15 min/d for 12 weeks, although this could have been just 6-8.5 min/d) whereas a child in group 2 exercises for nearly 75 hours (an excess of 60 hours of the intensive office-based exercises). I also think this shows in the results.

Though Scheiman and colleagues looked for adherence to the treatment protocol, that too was only subjective (in terms of percentage), and the authors do not have any control over that. This point, as they have rightly commented, could easily be looked into once they began a treatment arm that would include office-based pencil push-ups (group 1 treatment).

Also, Kushner has pointed out that patients are not instructed to do pencil push-ups alone very commonly, and if they are instructed to do so, the pencil push-ups are supplemented by other exercises once the patients are not showing results in 4 weeks when doing pencil push-ups alone.

Finally, I would like to commend Scheiman and colleagues for undertaking the study and preparing the ground for a more rigorous randomized clinical trial that will be needed to address this issue.

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1. Scheiman M, Mitchell GL, Cotter S, et al; Convergence Insufficiency Treatment Trial Study Group. A randomized clinical trial of treatments for convergence insufficiency in children. *Arch Ophthalmol*. 2005;123:14-24.
2. Kushner BJ. The treatment of convergence insufficiency. *Arch Ophthalmol*. 2005; 123:100-101.

### In reply

We are pleased to read that Dr Jethani values our past and ongoing efforts to investigate the effectiveness of vision therapy using rigorous scientific methodology and welcome the opportunity to respond to the issues raised in his letter.

He expressed concern that there was a great disparity in treatment time or dosage between home-based pencil push-ups and office-based vision therapy/orthoptics and calculated a difference of 60 hours between the 2 groups. His calculations are inaccurate. The home-based pencil push-ups group performed 15 minutes of treatment, 5 days per week. This yielded 75 minutes of treatment per week for 12 weeks or 15 total hours. The office-based vision therapy/orthoptics group also performed 15 hours of home therapy over the course of 12 weeks, but also received 12 hours of office-based treatment (1 hour per week) for a total of 27 hours; not the 75 hours incorrectly calculated by Dr Jethani. Thus, the office-based vision therapy/orthoptics group spent about twice as much time in treatment (rather than 5 times as much as calculated by Dr Jethani) as the home-based pencil push-ups group.

Dr Jethani suggests that it is this difference in treatment dosage that accounts for the results of our study. This may very well be true; however, it does not minimize the importance of our results nor the need to scientifically study these treatments. In clinical practice, the use of home-based pencil push-ups alone is widely used by both ophthalmologists and optometrists for the treatment of convergence insufficiency.<sup>1</sup> We must assume, therefore, that eye care professionals prescribing this treatment believe that it is an effective treatment for convergence insufficiency in children even though it involves limited therapy at home. Our pilot data suggest that the use of home-based pencil push-ups is not effective for the treatment of convergence insufficiency in children. In fact, our data demonstrate that it is no more effective than prescribing placebo treatment.

Dr Jethani commented that we did not carefully control adherence to the home-based treatment. We do agree that the use of a home therapy log is subjective and may not accurately reflect the amount of time spent performing the home therapy. However, it is important to recognize that this is one of the weaknesses of any treatment that is solely home-based. We believe that the protocol used in our study to monitor adherence was significantly more rigorous than that used in clinical practice and potentially biased the study in favor of the home-based pencil push-ups. In our current randomized clinical trial<sup>2</sup> we have added additional methods to gather information about adherence.

Finally, Dr Jethani repeated Kushner's<sup>3</sup> contention that pencil push-ups are generally not prescribed in isolation by pediatric ophthalmologists. They both suggest that pencil

push-ups are usually supplemented with other exercises. Although our survey study had only a 23% response rate from ophthalmologists, it is nevertheless the only published study that used scientific sampling methods to survey eye care professionals about their treatment recommendations for convergence insufficiency. This survey demonstrated that 50% of the responding ophthalmologists often or always recommended pencil push-ups alone, while only 21% recommended pencil push-ups supplemented with other techniques. Ironically, Dr Jethani counters these scientifically acquired data using Kushner's anecdotal report of his "personal" and unpublished survey of 20 pediatric ophthalmologists and 10 orthoptists. We are surprised that experienced scientists would use such anecdotal evidence to support their argument.

To address Kushner's criticism we recently surveyed a large group of pediatric ophthalmologists at a recent meeting of the PEDIG (Pediatric Eye Doctors Investigator Group) group. The response rate for this survey was high with a 72% response rate (72/100). The results of this survey indicated that 53% of the responding pediatric ophthalmologists usually or always recommended unsupplemented, home-based pencil push-ups as the sole treatment of convergence insufficiency in children. They prescribe this treatment 5 to 7 days per week for between 5 and 15 minutes per day. This is essentially the same dosage we used in our study. Only 38% indicated that they supplement pencil push-ups with other treatment techniques. These results closely correspond with our previously published data and confirm our belief that unsupplemented, home-based pencil push-ups is the most commonly prescribed treatment for convergence insufficiency by both ophthalmologists and optometrists.

We would also like to mention that in our National Eye Institute-funded, full-scale, randomized clinical trial now

under way, we will have 4 treatment groups: office-based vision therapy/orthoptics, placebo office-based vision therapy/orthoptics, home-based pencil push-ups alone, and home-based pencil push-ups with additional convergence exercises. We are confident that this new study design will address some of the concerns raised by Drs Kushner and Jethani and will more definitively answer the question about the importance of dosage of the prescribed vision therapy/orthoptics.

We thank Dr Jethani again for his encouragement in our endeavor to rigorously investigate the effectiveness of vision therapy/orthoptics using randomized clinical trial methodology.

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1. Scheiman M, Cooper J, Mitchell GL, et al. A survey of treatment modalities for convergence insufficiency. *Optom Vis Sci.* 2002;79:151-157.
2. Scheiman M, Mitchell GL, Cotter S, et al. A randomized clinical trial of treatments for convergence insufficiency in children. *Arch Ophthalmol.* 2005;123:14-24.
3. Kushner BJ. The treatment of convergence insufficiency. *Arch Ophthalmol.* 2005;123:100-101.

#### From the Archives of the ARCHIVES

The author said that it was sometimes impossible to relieve eyestrain, because impossible to reach causes. This should be understood, so that (1) the occupation and use of the eyes may be regulated to lessen symptoms; (2) that other physicians may not err in treatment which cannot reach the causes.

**Reference:** Gould GM. Incurable eyestrain. *Arch Ophthalmol.* 1906:445.