Point: Office Vision Therapy Activities at Home are a Necessary Part of the Program

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Optometric vision training/therapy (VT) comprises therapeutic optometric procedures that are used to modify visual function.[1] Office-based VT typically involves one to three visits to the office each week. The question is whether these in-office visits are sufficient on their own or whether practice at home is a necessary part of a VT program.

Birnbaum advocated seeing patients twice a week in-office, as he found this produced better results in a shorter period of time. In his experience, the benefits of this modality of treatment became more readily visible to both patients and parents, resulting in better compliance. Birnbaum felt that home practice was a foundation of therapy and reinforcement of skills learnt between in-office sessions.[2] Peachey talks of seeing patients in-office either once or twice a week, supported whenever possible by home practice of 15-30 minutes daily. A VT program without home practice would be considered a compromise.[3]

The provision of VT varies throughout the world depending on where you practice. In the U.S. and Canada, the cost of VT may be covered by private health insurance, whilst in Australia, VT is mainly paid for by the State funded Medicare system, with patients sometimes also making a contribution to the cost of the care. In other parts of the world, patients may have to pay for provision of care privately, though in the UK some health funds will pay for the care, providing that a referral has been made by a local ophthalmologist.[4]

The ideal that Birnbaum recommends of seeing patients in-office twice a week is sometimes not achievable, either because the necessary funding is not available or it is not feasible for the patient to come to the office more than once a week. In such circumstances, the home practice of office VT activities becomes an essential adjunct to the success and compliance of a given VT program. Even when the patient is able to come to the office two or more times a week, home practice allows consolidation of skills learnt in-office.

It is known that improvements in perception are determined by self-directed sensorimotor experience,[5] and an individual moves from novice performance, where visual responses are controlled consciously, to automatic responses, where pre-programmed mechanisms are in effect.[6] Case talks of the need for repetition of a cognitive manipulation for the eventual emergence of an automatic process,[7] and Vygotsky felt that where automaticity was not achieved, the individual would be bound by their work instead of being its master.[8]

With regard to learning theory, Eysenck and Frith found that in terms of learning, there was little improvement in performance when a subject was performing a motor task. However, when a rest-pause was introduced, performance showed considerable improvement once practice was resumed in a phenomenon they called reminiscence. Eysenck and Frith postulated that practice has to be consolidated before it shows up in performance, and that this consolidation occurs during rest.[9] Applying these principles to the provision of VT, the more often a patient repeats an activity, such as when practicing in-office VT activities at home, the better the possibility of the consolidation of visual skills, the better the compliance, and the better the outcomes.

Papoušek did work with infants and felt that they showed joy at mastering a task, setting this against an inner standard of performance,[10] and he felt that from this, children would gauge an internal sense of their competence even before they got to school. Blank writes of the need for children to make errors when learning in order to facilitate their learning process,[11] though it is how these errors are handled by the teacher and parents that influences the child's willingness to learn. When such children are treated with care and sensitivity, as they would be in VT, parents and teachers can be guided in how to deal with the child in order to encourage their learning.

Birnbaum felt that it was all-important that the optometrist/training room assistant employ an effective instructional set in teaching VT activities so that the patient was more likely to internalize their understanding of a particular visual process.[12] It would be hoped that with the provision of office VT procedures as home activities that parents might also learn how to do this, as well as being guided in how to encourage their children's learning in an appropriate way beyond the time they spend in office and so encourage independence in everyday life.

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Counterpoint: Questioning the Value of VT "Homework"

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The assignment of specific VT procedures to be completed as "homework" is frequently included in descriptions of VT.[1-6] The primary rationale for this inclusion seems to be that if repetition is a necessary element of the therapy, more repetition through homework is better. Naturally enough, this follows a line of thought in the field of education where acceptance of homework as an element of school programs is nearly universal. Our personal experience with required homework in our formal schooling may have established a model that we glibly adapt to our VT programs.

While optometrists did not originate the concept of homework, if we are going to exploit the practice, we should understand it. Although little research is available on the role of homework in VT, there is some research on perceptual learning, and there is significant literature on the efficacy of homework in educational programs.

The work of Avi Karni is sometimes cited to support the idea that a homework model should be used to develop visual abilities in VT. In *Adult Cortical Plasticity and Reorganization,*[7] Karni describes important work that demonstrates improved measures of very basic visual functions, such as Vernier acuity, even in adults. The protocol employed a very specific schedule of practice on the same task that was tested with pre- and post-treatment measures. A closer look at the results reveals that the perceptual learning achieved was extremely specific and limited. The training was done monocularly using lines at specific orientations. The intensive training resulted in improved measures only when the test conditions matched the training conditions. There was no improvement on the practiced activity when the fellow eye was tested. There was no improvement when the lines used for training were oriented differently than the lines used for testing. So, there was no generalized improvement and no transfer effect. If the goals of VT are a more global improvement in performance, Karni's work may not provide an adequate model for designing a treatment program.

The extensive use of homework in schools might suggest that there is ample evidence to support the effectiveness of the practice. There is a significant body of research devoted to studying the effectiveness of homework as a strategy to improve learning. Alfie Kohn provides an interesting review and analysis of the literature in *The Homework Myth.*[8] Kohn is not without his critics, but he makes a thought-provoking case that the evidence supporting the practice is underwhelming. In fact, the evidence is not strong, clear, or even consistently positive. "Research generally doesn't substantiate the belief that children need to do homework. Neither academic nor nonacademic justifications are supported by the available evidence. Yet homework is nearly universal and rarely questioned; indeed, some people insist that kids should get more of it."[8] Many of our patients are children in early school grades. It may be particularly relevant that, in education, "most of the explosive growth in homework over the past decade or two has taken place with younger children, even though this is the age-group for which studies clearly fail to show any positive effect."[8]

School performance difficulties frequently trigger the referral for an evaluation of visual development and possible VT services. It may be no surprise that "Family conflict is also more common when the children are struggling."[8] A frequent comment by the parents of these children is that homework is a nightmare. Family interactions can fall into a nightly regimen consisting of hours of one-on-one supervision accompanied by the disturbing panoply of arguments, threats, tears, bribes, and temper tantrums. Some parents learn to share the misery by taking turns. Some parents simply find a way to do the homework for the child.

It seems a little perverse to require an additional time commitment for VT homework. It is also likely that the parents have little more than a basic understanding of the procedures. Just as with the educational homework, this can create doubt and anxiety about whether the procedures are being done correctly. "When an assignment is particularly challenging – or simply unclear – the probability of unpleasant interactions is even higher."[8] Yes, there is a myriad of arguments to justify and enforce the extra burdens, ranging from guilt (your son/daughter won't improve), to trivial (it's not that much time), to entertainment (it's fun). The likely fact is that there is little evidence to support any of these arguments.

There are parents who want VT homework assignments. Some of these parents feel that the VT procedures are simple activities, easy to understand and perform, and they (or a computer) can oversee them as well as someone with training and experience. Since progress is viewed as simply the result of repetition, then doing the procedures at home will save them money compared to in-office therapy. Similarly, there are parents who believe that the more homework their children are assigned by the school, the more they are learning and the better their education. While there are studies that show that doing homework related to a test of the specific material in the homework will yield higher scores on that test, there is little to no evidence that it "enhances the depth of students' understanding of ideas or their passion for learning."[8]

Many of the children in VT programs have not been able to exploit the enormous potential of the visual process to solve problems and meet demands. Despite questions about the value of typical homework aimed at repetition, are there approaches to home-based activities that might assist in furthering the VT program? Our evaluations and interactions in VT would ideally provide a view of how the child's visual process is structured and organized to direct action. When the child can begin to respond to the structure and organization of the in-office VT program, new possibilities become apparent. We should then have openings to suggest activities, or new ways to approach activities, that supplement the in-office VT program. Setting the table is a responsibility within the daily pattern of family activities that becomes an opportunity to explore left and right. Learning to look ahead instead of at the ground becomes a key step in learning to ride a bike and becomes quickly reinforcing. Working together to plan a family trip or picnic can become a lesson in anticipating and visualizing as well as making a list (and checking it twice). Regularly using a family calendar to track the days until special events provides a visual and concrete structure to placing events in time, as well as simple lessons about numbers, counting, addition, and subtraction.

All of the activities above, and many more, are suited to a home environment and fit within the parameters of normal family activities. They can all capitalize on the organization and structure of activities developed in office VT. By highlighting the importance of the visual process for directing daily activities in the normal environment, we may facilitate a transfer of abilities, an improved general performance, and the development of an independent learner. The decision to use VT homework is one that each optometrist should evaluate, but the rationale for requiring it is neither overwhelming nor universally accepted.

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