Article • Virtual Vision Therapy: Lessons Learned

Nancy Torgerson, OD • Lynnwood, Washington
Audra Ashmore, COVT • Lynnwood, Washington
Leslie Muto, COVT • Lynnwood, Washington

Nancy Torgerson, OD
Lynnwood, Washington

OD, Pacific University College of Optometry

Fellow and past President, COVD

Recipient, COVD's Presidents Award and Outstanding Young Woman in America Award

Adjunct Professor, Pacific University College of Optometry

Introduction

In the early phases of the COVID-19 pandemic, our vision therapy (VT) practice, Alderwood Vision Therapy Center (AVTC), quickly pivoted into remote vision therapy. We detailed our experiences in an article two years ago,[1] and this paper serves as an update on our team approach to the transformation to virtual VT, also known as remote VT. As we write this paper, the pandemic has gone through several iterations in the form of variants, which reinforces our philosophy of being prepared to offer a hybrid of traditional in-office therapy that dovetails with virtual VT. The option of telehealth appears to be "the new normal" in increasing numbers of healthcare practices.

With the necessity of shifting to telehealth services for many service providers at the start of the pandemic twenty months ago, VT offices predictably followed suit. Although virtual VT had been offered in limited ways before the pandemic, it became the main course of action for many offices across the country in order to maintain services to patients. While some of our therapists at AVTC had some limited experience with virtual VT, it was never used as the primary way to provide VT for patients in our office.

Thankfully, there was a lot of crowd sourcing, sharing new VT tools and ideas throughout the vision therapy/optometry community to build a foundation. This was crucial for our office; all of our fifteen therapists pulled together to share and to build what virtual VT would become during the lockdown. This was an exceptional and extraordinary time for all of us as we supported each other in this unknown and unpredictable phase. After the lockdown was lifted for medical clinics in our state, most of the staff, including the doctors and therapists, resumed doctor appointments and vision therapy sessions in the office with a variety of new COVID safety protocols.

Background

It appeared that virtual VT had served its temporary purpose, and in-office vision therapy would continue as it is best known. However, two of our vision therapists fell into the high-risk category for COVID and by default have become the primary providers of virtual VT throughout the last twenty months of the pandemic in our clinic. Their goal was to develop a quality and viable virtual VT option for those patients whose own health risks prevented them from attending traditional in-person therapy. These therapists discovered that with flexibility, creativity, and a commitment to exploring new techniques that adapted traditional methods to the online platform, virtual vision therapy could indeed not only be beneficial, but also successful.

It became clear that there were distinct advantages to offering virtual VT to our patients. Not only was it an option for those who felt safer during the ongoing pandemic by not having to come into the office, but we have also been able to provide therapy to patients who are out of state and even out of the country. Some of our virtual patients don't have VT clinics in their community, so virtual VT provides easier access to these patients who are at a significant distance.

Another discovery was that virtual VT is accommodating to patients who struggle with vertigo, dizziness, and vestibular issues due to a TBI. Surprisingly, many of these patients who also struggle with light sensitivity and screens found that the on-screen option was a greater advantage over having to drive to the office, when driving itself was a major obstacle. Representative comments from one such patient can be found in Appendix A.

Another patient in her late 70s, who had in-office therapy off and on for about three years, typically between traveling months at a time prior to COVID, continued online during the pandemic. She struggled with deficient stereopsis and depth perception,

spatial awareness, and balance issues and had been diagnosed with convergence insufficiency, a slight vertical imbalance, and eye movement irregularities. In the past, she would show some improvement following each unit of VT, but after traveling and returning, she would regress and need to start over. Rarely if ever did she make time to practice between her office sessions. Her comments can be found in Appendix B.

These two patient success stories are typical of a vast majority of the positive outcomes in which we have had the privilege to share while practicing virtual VT during the pandemic. Despite the overall success of this option, there have been some patients who were not adequately served through the online platform. The balance of this article addresses our experiences with factors that contribute to the success of our patients, as well as some of the challenges in delivering virtual VT. Practice management implications are included as well.

Conducting Virtual Evaluations

This section will be relatively brief because we learned that initial patient evaluations do not work well for us when conducted virtually. We are aware that some practices have been successful in conducting evaluations virtually by having another doctor or assistant in a remote location administer tests under the video supervision of the specialist. In other instances, doctors are using the virtual encounter initially as an extended form of intake or patient interview. Our overall experience has been that there are nuances of the doctor-patient encounter that cannot adequately be administered remotely, at least for the initial evaluation. While the same generally holds true for progress evaluations, there is more flexibility in that regard. We refer the reader again to our previous paper, which encompassed this subject.[1]

Remote communication with patients continues to be either through Zoom or doxy.me (Table 1). We have digitized some of our assessment tools, such as the DEM, but screen sharing can be challenging.

Table 1. Comparison of doxy.me Versus Zoom Platforms

	doxy.me	Zoom
HIPAA compliant	Yes	No (patients sign a consent)
Screen share cost	Yes ($39, $59 per user/month)	No cost
In our office	Doctors use at $59/month	Most use Zoom

Obviously, the competence of the patient on the other end, as well as the presence of individuals who can be of assistance in the patient's remote location, plays a large role in the success of conducting remote evaluations or progress evaluations. A tool that we have used extensively for remote vision therapy has been NeuroVisual Trainer (NVT), spearheaded by Drs. Cameron McCrodan and Paul Rollett. Dr. Rollett has an excellent blog with an embedded YouTube video that demonstrates how to conduct virtual or remote progress checks using the NeuroVisual Trainer program.[2]

We use the Compulink EHR system in our practice, and accessing this through the cloud has been a key component to our success. We integrate reports about the patient from other providers for the doctor to review prior to the initial consultation. Compulink has a telehealth portal,[3] but to date we have not implemented that and continue to rely on doxy.me or Zoom for remote encounters with the patient.

Success Factors in Virtual Vision Therapy

The patient profile best suited to success in virtual VT is not bound to a conventional category or set of diagnostic criteria. On the contrary, virtual VT has been successful with a variety of case types, ranging from vision and learning to strabismus and amblyopia to patients with traumatic brain injury (TBI).

Crucial factors that influence patient success in virtual therapy include an open mindset and the willingness and ability to adapt their home environment to vision therapy as needed. Is the patient willing to trust their therapist and the therapeutic process? As with traditional in-office therapy, mindset makes all the difference between success and failure. Even with an open mindset, there still needs to be the willingness to adapt their home. Are they willing to take the time to set up a Marsden ball in their home or use common home items for therapy? Do they have access to a printer so that charts and other materials can readily be printed?

While we mentioned earlier that we do not favor conducting initial progress evaluations remotely, the issues above lend themselves to being discussed during a patient video conference prior to beginning VT. Patients have become increasingly receptive to such videoconferencing due to telemedicine protocols encountered with other healthcare practitioners.

Regarding virtual VT programs, as previously noted, a core program that we have used successfully

is NVT. Virtual reality (VR) programs with home therapy access have also yielded positive outcomes. These range from Oculus technology with VividVision[4] to proprietary versions of VR available online,[5] and practices have begun actively to promote the option of virtual VT, making patients more comfortable with its viability.[6] We have incorporated Dr. Sarah Lane's excellent array of downloadable materials, which are accessible online.[7]

Aside from VR technology, commercially available apps, and the downloadable materials noted above, we have created a home therapy kit to provide materials that patients use during remote VT sessions. These are individualized for the patient and can include an array of lenses, prisms, and filters, as well as materials such as Brock strings, life savers, and eccentric circles. Some practices use customizable kits from Bernell (https://www.bernell.com/category/Vision-Therapy) or Emergent (https://www.emergentvt.com/free-kit). For optometric phototherapy, we use Syntonac goggles and other home therapy kits and materials (https://www.syntonac.com/goggles). Patients pre-pay for home therapy kits either by coming to the office or by paying remotely, in which case they also pay shipping and handling fees.

As important as materials can be in facilitating virtual VT, the observations that a therapist makes regarding patient performance and the feedback provided to the patient remain a mainstay of any successful vision therapy experience. Our therapists communicate closely with one another on ways in which to watch small signs in the face, neck, and shoulders, and they can see effort in the muscles as a patient is working on a task. Verbal coaching around body awareness has also helped, especially for patients who are teens and older. Patients have learned to pay attention and to report any body changes and increases or decreases in tension. In that respect, monitoring the patient is not too different than what occurs during in-person therapy with regard to patient education and awareness. The therapist can communicate remotely by asking probing questions about body awareness, feet placement, and balance.

Successful patients have adapted to the idea that they need to move around in their spaces at home or the office. They can set up the camera so that the therapist can observe reflex work on the floor, infinity walk, jumping jacks, and even Marsden ball activities. Overall, despite it being more challenging to observe body movement virtually, it can be done with an open mindset, flexibility, and a willing patient.

The limited access to the variety of VT supplies that can be used in-office may constrain virtual therapy, but it also allows the therapist to be curious and to discover new ways to introduce visual concepts and skills to the patient at home. For example, in virtual vision therapy, we don't have access to a pegboard, but most people have a colander at home and some toothpicks or q-tips. In addition, the colander can be manually turned to create a rotating pegboard.

Consider yoked prisms as another example. They can be obtained through our office for home use and have been instrumental for patients in learning about spatial changes and adjustments. Stick prisms can be used for observing and experiencing spatial changes and making adjustments. Additionally, two dissociated stick prisms work wonderfully for practicing voluntary vergence or squinchel.

Tranaglyphs and 3D peripheral sliding circles at home enable a version of what we do in-office with vectograms, along with multi-depth slides, 3D anaglyph YouTube videos, and the NVT flat vergence and random stereo options. NVT added a rotator with eye-hand coordinator and peripheral charts upon our request to offer options similar to the Sanet Visual Integrator (SVI) at home. Parquetry was adapted to virtual vision therapy by placing magnets on the back of foam shapes so that they can be viewed attached to a magnetic slant board vertically in the camera. Dr. Sarah Lane also created a virtual slide version of parquetry that has been helpful.

Overall, many tools have been successfully adapted to meet the same visual goals as traditional vision therapy equipment. As hybrid forms of therapy continue to evolve, in which patients alternate coming to the office with doing virtual VT outside of the office, the materials and communication methodologies developed help the patient practice and transfer their skills between VT sessions as well.

Challenges with Virtual Vision Therapy

The profile of a patient not amenable to virtual VT is typically someone who struggles with attention and motivation, especially when it involves engaging with or communicating through the screen. This has been particularly true for children who are younger than age nine. It is essential in these cases to have an involved parent, older sibling, or a responsible individual present throughout the duration of therapy. In addition, the parent's investment in understanding the therapy and commitment to supporting their child with home practice increases

their level of success. This condition has also been true with traditional office therapy as well.

Some of the challenges with virtual VT verge on the comical. This has included curious pets who decided to become part of the experience, or partially clad family members walking by who unwittingly became part of the scene. In other instances, meeting these challenges can help convert potentially disastrous outcomes into successes. Two examples of this with children are provided in Appendix C.

However, sometimes even with an open mindset and the willingness to adapt, some people's home environments have not been conducive to spatial exploration and movement, they may not have had proper lighting or a dedicated quiet space to hold a virtual session, or their internet connection has not been reliable. It is vital to have an adequate screen size on which the patient can work at home. In addition, patients who need more proprioceptive feedback from their environment and/or an in-person assistant during therapy tend to opt for in-office sessions over virtual, even when hybrid therapy combining in-office and remote VT is offered.

Even with the best intent of all parties, technology can be challenging to navigate. This includes, for example, poor internet connectivity that makes transmission during the session spotty, or difficulty with patient positioning of the camera to allow the doctor or therapist to monitor eye movements, alignment, postural skews, etc. However, when all is working well, virtual technology can provide some distinct advantages, such as capturing eye position, head tilts, or Hirschberg reflexes on screen shots to photodocument performance in the patient's file. While activities such as primitive reflexes are amenable to virtual therapy, sometimes the patient has to work their way into a comfort zone of being observed at home.

The management side of virtual VT can be very challenging. This includes patient communication with patient care coordinators regarding scheduling. Appropriate HIPAA forms need to be completed and kept on file. Additionally, of course, there is the issue of fees, as well as third party considerations, which we will discuss in the next section.

Practice Management Aspects of Virtual Vision Therapy

A key component in arriving at a reasonable fee structure for VT revolves around the time structure for each therapy visit and associated administrative considerations. Each session of virtual vision therapy through our practice is 30 minutes. We have found that more than 30 minutes of screen time induces a counterproductive fatigue factor. The fee for service for 30 minutes of therapy is the same as our fee for a 45 minute in-office therapy session. The 15-minute differential is spent in administrative and support time for that session. These services include e-mailing, planning, and accessing resources specific to individual patients for each session.

It is important to stay on time when rendering virtual VT. On one hand, there is less uncertainty with patients having travel issues in getting to the office on time. On the other hand, connectivity issues can present unplanned delays. That is another reason that the 30-minute session virtual therapy session affords a needed buffer. Even when a hybrid vision therapy program is undertaken, and a patient comes in for an in-office session, our 45-minute time slot includes 40 minutes of engagement and 5 minutes allowed for proper cleaning and disinfecting measures.

Two of our fifteen vision therapists have been solely engaged in virtual VT since the pandemic started, one working five days per week and the other three days per week, representing 48 patient sessions of VT weekly. Parenthetically, the fact that they do not have access to our inter-office chat system renders communication a bit more challenging when they are working from home. Between those two therapists and the rest of our therapy staff, we have had as many as 164 patients in virtual VT per week. Before June 2021, the demand for virtual VT had been decreasing. Since that date, with COVID variants increasing, and in particular the recent spike from the Omicron version of COVID, demand has been increasing again.

There is variability in terms of third-party reimbursement policies for virtual VT as telehealth. Our understanding is that with all insurances, everything is billable in the same manner for either virtual or in-office visits until the pandemic is declared to be over. However, it is vital to check with your state optometric board to ascertain what the guidelines are for conducting telehealth visits. For treating patients who are from a state in which you do not hold an optometric license, it is wise to check with their optometric board as well. When speaking with patients regarding virtual VT services, we are careful to use the word "billable" rather than "covered," as covered implies that the service will be reimbursed. A good reference on the subject of virtual VT and telehealth/telemedicine billing and coding was authored by Drs. Richman and Fitzpatrick.[8]

Conclusion

Parents can be hands-on and part of the virtual VT process, enabling them not only to be more involved, but also to witness their child working toward mastery and to see changes directly. Therapists enjoy the creative aspect of virtual VT, including finding items around the house that can be adapted for therapy use. Complementing that are the apps, downloadable materials, and customized VT kits that have been developed for virtual VT.

Our patients, as well as our staff, have generally transitioned well to virtual VT or to a hybrid combination of in-office and virtual VT, although it is not optimal for everyone. Some patients, particularly those who have travel constraints or who do better in home environments due to sensory or other issues, actually do better with remote/Zoom therapy than in-office therapy, consistent with positive telemedicine experiences in other healthcare fields. They can modify aspects of the home environment, such as the lighting or sound levels, to maximize comfort.

Our impression is that telehealth and virtual VT is here to stay and is therefore an important tool to master and to use as appropriate. The extent to which various hybrid arrangements evolve, and the balance between in-office and virtual therapy sessions, will be a function of how long the pandemic remains with us.

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Correspondence regarding this article should be emailed to Nancy Torgerson, OD at drt@alderwoodvisiontherapy.com.

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APPENDIX A: Comments From Patient with TBI After Virtual Vision Therapy

These are comments from a patient who was life-flighted to a hospital after a devastating car accident, was intubated, and spent ten days in a trauma center. Her goal was to address and alleviate the headaches that she experienced following her TBI when using screens. She also wanted to increase her screen tolerance so that she could return to work full-time as an online educator.

"As I started VT during the pandemic, I only ever did vision therapy online from home. I was very impressed by my therapist's ability to adapt vision therapy exercises for online application, as well as with her ability to ask questions that told her what was happening for me and what I was experiencing with my vision…I learned that my headaches stemmed from problems related to eye teaming and seeing in depth, which also very often made me dizzy and unstable when walking or moving in various planes (squatting, bending, turning, etc.) I didn't feel stable on my feet or in many situations before I started vision therapy. The vision/TBI caused vertigo and made me nauseous frequently as well. …I loved how plugged in my therapist was to how I was feeling or what I was experiencing, and it was very helpful that she verified and checked in on how I felt about the exercises. She was always ready to accommodate and adapt the VT exercises. She took time to explain what value each exercise added and what problem of mine they addressed, as well as explaining goals we were working toward so that I knew what we were going for even as I worked at my own level. I can say that having virtual vision therapy rather than driving in to the office was a far superior situation for me. Driving was one of the problems I needed to address with VT, so not having to drive back and forth to Lynnwood in traffic was great for me. Additionally, the added time that I gained by not driving gave me space in my schedule to breathe and reduced my stress, which is especially key when recovering from a TBI or a car accident, in general. …I am now working pretty much full-time and can be on screens long enough to get a lot done. When I need a break, I respect my limits and apply the exercises I was taught to relax my eyes, or I take a break and go for a walk. I no longer have vertigo and have extensive knowledge that I can apply to my vision issues… I feel online therapy was a better option for me than in-office would have been."

APPENDIX B: Comments from Geriatric Patient About Virtual Vision Therapy

These are comments from a patient in her 70s diagnosed with convergence insufficiency, a slight vertical imbalance, and eye movement irregularities. She previously did vision therapy over the course of three years, frequently interrupted by her travel plans, and failed to do any consistent out-of-office therapy reinforcement. She began doing virtual VT at the end of November 2020, and she has improved by leaps and bounds during the past year. Her near point of convergence (NPC) has normalized, and her fusion and depth perception are more stable, with expanded fusional vergence ranges. Balance has improved, especially in downgaze, which has allowed her to step off curbs with more confidence while walking. She has been seeing steady progress and commented that doing therapy virtually has been better and more successful for her personally than any other time she has done VT in the office. The added bonus of having therapy set up in her home allowed her to practice and reinforce therapy procedures more often than before. One of her goals was to improve her spatial awareness so that she could resume typing effectively. Here's what she has to say about her experience.

"In my case, I live an hour-plus from in-person therapy options that were threatening to this aging patient in a period of COVID-19. While the initial decision to go virtual was made based on distance and protection, the advantages of the approach were found to be in how service was provided and the surprisingly positive benefits of the creativity involved in adjusting tools and approaches to work well in a virtual environment. A number of tools just don't work virtually but gave rise to innovative development of other, highly effective alternatives that actually worked better for me in terms of improving my eye teaming and my depth perception. The therapist was able to focus on my issues in a way not possible in person and to suggest reworks that made a real difference. For example, I had found that my spatial judgment was weak, but the therapist found ways to help me actually improve my accuracy when typing on a keyboard. For a writer and researcher like me, this was invaluable."

APPENDIX C: Challenges of Virtual VT with Young Children

While all cases are thankfully not this extreme, one of the unique aspects of virtual therapy is enabling the patient to operate in a "safe zone" at home, as occurred with a young patient who was accepted into vision therapy who has suicidal ideations. It is an understatement to say that his mindset was difficult for success, and that resulted in us changing the way that we start our sessions. He is encouraged to tell the therapist one thing that is challenging and three things that are successful. Although communication has been challenging, we are working together to focus his attention on things that make him feel successful. He is able to have his dog present while doing therapy. His room makes him more comfortable. We use objects that have meaning to him; for example, we use his favorite stress ball to track. Mirror superimposition was done with his mom's face superimposed on his dog's face. Superimposing the two created humor while working on binocularity. He is able to share his successes in soccer and introduced us virtually to a soccer coach from England who was staying with him. Our patient was proud of himself and excited about what he was doing and sharing.

Virtual therapy has helped children diagnosed with ADHD; for example, this hyperactive young girl we worked with had a very limited attention span. I learned that she liked to be creative. She was better able to pay attention when engaged in a search task directed through the screen. For example, asking her: Can you find a white object that you could catch something in? Can you now find a white object that you can throw into something? She found a colander and a ball that the dog played with. She was excited about putting them together. We used red/green glasses and made several luster activities this way. Her attention and planning skyrocketed. We also modified a a visual motor worksheet concept so that she drew on the kitchen tiles and created her own patterns. We were able to get her to clap and jump with shapes on the floor. She was able to do this activity for 20 minutes and didn't want to stop! The challenge in a case of this nature was to enable the patient to make her own modifications to the activity, rather than being forced to follow pre-set rules, which gave her a greater sense of control and better engaged her attention. Being able to put her spin on things and increase the complexity of activities as she built confidence was very helpful in building her attention skills. In this instance, not having traditional therapy material but relying on exploring together virtually to access what was in her natural environment at home helped with the transfer of skills that we were building, such as assisting with setting the table and attention to detail.