

Cortical Visual Impairment: Considerations for Distance Learning

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During the COVID-19 pandemic, families and professionals have been significantly challenged to provide child-centered, meaningful instruction and opportunities to continue to implement CVI interventions throughout the day. Families are faced with myriad difficulties in maintaining their own livelihood while also facilitating the continuation of educational services via remote learning, in collaboration with their child(ren)'s educational team. Professionals are faced with the inherent incongruity between distance learning platforms and the need for direct, hands-on, child-centered interactions.

While districts, schools, and agencies across the country have varied approaches to how instruction is being implemented, almost all resources for implementing distance learning involve a tablet, and some degree of video conferencing (whether in consultation to the family, or direct service with the child). Of course, many families do not have access to this technology, or time to facilitate.

For children who are in Phase I or early Phase II and do not have eye to object contact, the use of video conferencing for direct service provision may not be appropriate in meeting the child's access needs and visual goals.

There are many wonderful and creative resources being developed and shared across our communities, but as always, it is important to emphasize that **CVI intervention is not a "one size fits all" approach**, and the individual child's functional vision assessment (CVI Range [Roman-Lantzy, 2007; Rev. 2018]) results should be the central guide for intervention. Intervention itself is guided by the unique goals of each **Phase**, and adapted to meet the child's visual behaviors and goals in terms of the CVI Characteristics. This tool provides general considerations for distance learning in each Phase of CVI.

** Notes:*

It is important to use age-appropriate materials for all learners, regardless of the student's visual functioning on The CVI Range.

Remember that the child's best visual functioning may be at home, because of the characteristic of Visual Novelty. Home may be the most familiar environment, with the most familiar objects/materials and routines. However, home-based instruction is likely very novel for the child.

Many of these approaches may be applicable to orientation and mobility; However, these considerations are not all-inclusive, and will require additional input to apply to O&M and other disciplines.

General Considerations Across CVI Phases:

Working with families to facilitate meaningful sessions:	<p>Teachers need to be especially mindful and considerate of the family's previous experience with technology, schedules, personal stress levels, and available resources at home including internet speed, physical materials (e.g. the toys and adaptive materials that families often rely on professionals to provide). <i>It is mandatory to consider and respect social, cultural and family norms in the use of all electronic technology.</i></p> <p>Remember that families have varied past experience with observing instructional and related service sessions, as well as widely varied specific knowledge of educational practices, prompt hierarchy, and CVI-specific interventions.</p> <p>Make a plan for turn-taking and communication between the teacher/provider, student, and parent(s). To reduce unnecessary multisensory complexity, it may be helpful for the teacher and parent to communicate via text (e.g., text messaging, chat box in the video conferencing platform, etc.) rather than speak during the session with the student.</p> <p>Work with the family to identify the best positioning, physical supports, and environmental adaptations to maximize visual access and reduce visual fatigue during sessions.</p> <p>Conduct, review, and update the CVI Range Interview.</p>
Use of video conferencing:	<p>For all Phases, it is important for the teacher/service provider to see what the student is looking at and how they are responding to visual information presented (e.g. widening of eyes, shift of gaze, indirect vs. direct visual fixation, facial expressions, etc.).</p> <p>Allow for latency and provide wait time for each student as needed.</p> <p>It is important for the teacher to be able to see the environment and conditions in which the child is learning (visual complexity, lighting, positioning, background and ambient noise). Additionally, students may position their head or body in an off-center position to best access the material, which could impact the provider's ability to see the student's face. It is important to strike a balance between the student's visual access to materials and the teacher's visual access to observe the student's face.</p>

<i>Use of screen sharing:</i>	<p>The student can share their screen for the teacher to be able to observe what the child is looking at. This may be especially important if the student and teacher are not using the same platform (e.g. Android vs. iOS). For any applications or materials requiring the student to activate movement or an effect (such as interactive light box and book applications, or cause/effect activities), the student should share their screen with the teacher.</p> <p>In many applications, if the student is sharing their screen with the teacher, they can no longer see the teacher via webcam; the teacher would still be able to see the student's webcam depending on positioning. These are all logistical considerations when choosing a platform and when to choose to implement screen sharing.</p> <p>The teacher/service provider can share their computer screen for the student to directly engage in the use of teacher-created materials (e.g. to share a PowerPoint book made by the teacher).The provider can also share their tablet's screen with the student. However, this poses a unique obstacle in many video conferencing programs, as the provider will no longer be able to see the student's face, thus impacting the ability to monitor visual responses. However, the provider could join the video conferencing call from two platforms (e.g., the tablet and a computer) simultaneously. This would allow the student to view the tablet and the provider to view the student.</p>
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PHASE I: Goal of Phase I	Approaches and Techniques	Role of CVI Provider (educational service provider)	Role of Family
<p>Building visual behavior</p> <p>Notes: Looking is a goal in itself. Children in Phase I cannot “look while doing.”</p> <p>Most or all of the CVI Characteristics impact visual functioning.</p>	<p>High level of environmental control for vision interventions (reduced multisensory complexity and complexity of array)</p> <p>Identify specific times of day for vision intervention (vision-focused activities)</p> <p>Maximize visual access, but don’t expect visual fixation; dorsal stream vision dominates visual attention</p> <p>Expect visual latency, provide adequate wait time without additional prompting; be quiet!</p>	<p>Support the family to develop reasonable activities for vision intervention. Recognize that with other children or adults in the home, opportunities for environmental control may occur infrequently or in atypical learning settings (bedroom, hallway without windows, etc.)</p> <p>Support the family to adapt the home environment to meet the controlled environmental needs for vision intervention sessions. This may include: background complexity of array, lighting, sound/ambient noise levels.</p> <p>Help identify routines that would be compatible with Phase I activities.</p>	<p>Send the TVI photos of the home environment for support in environmental adaptations</p> <p>Make a list of favorite objects, toys</p> <p>Make a list of common/frequent routines and which objects/materials are used</p> <p>Create and share video recordings of home activities for input/coaching from the CVI Provider (create a “Video Diary”)</p>
<p>2-D Access and Use of Tablets</p> <p>Considerations for video conferencing & screen mirroring</p>	<p>Access to 2D materials is limited to some moving, single-color images on iPads or other back-lit devices</p> <p>Tablets and iPads are only appropriate for “light box”-style activities and apps – looking at interesting movement and colors</p> <p>Do not expect visually guided reach when interacting with visual info on tablets (it may be helpful to activate the movement/action for the child rather than expect the child to touch/look simultaneously)</p> <p>Auditory access to direct video/remote teaching if possible; student attention will be most accessible auditorily in early to mid Phase I</p>		

	<p>Lightbox app may be substituted for an actual lightbox if the family has an iPad/tablet (see resource below)</p> <p>It will be important for the teacher/provider to see the student and observe visual responses. Minimize the extent to which the student is distracted given the additional technology (e.g. the family's phone or tablet should be positioned so that it doesn't distract the student, but allows for the teacher to view the student as much as possible).</p> <p>Screen mirroring with applications such as Cause & Effect Light Box: The student/family should share their screen with the teacher, so that the student can interact with the app.</p> <p>Screen mirroring with presentations and teacher-made materials: The teacher should share their screen with the student/family so that the teacher can navigate the materials, while the student attends.</p>
Phase I additional resources	<p>Phase I (PCVIS): https://pcvis.vision/educators-and-therapists/phase-i-cvi/</p> <p>Roman on CVI – Object Selection in Phase I (Roman, 2019): https://www.youtube.com/watch?v=Pd21oF37mu0</p> <p>Cause and Effect Light Box App: https://apps.apple.com/us/app/sensory-light-box/id533976433</p> <p>Cause and Effect Sound Box App: https://apps.apple.com/us/app/sensory-sound-box/id548622567</p>

PHASE II Goal of Phase II	Approaches and Techniques	Role of CVI Provider (educational service provider)	Role of Family
<p>Integrate vision with function</p> <p>Notes:</p> <p>The child is able to use vision in the context of activities and routines if the appropriate adaptations are in place; dorsal stream visual function and beginning eye-to-object/ventral stream function are improving.</p> <p>Visual fatigue will occur when the environment or the task are complex or challenging</p>	<p>CVI Schedule (Roman, 2007; Rev., 2018)</p> <p>Visual fixation precedes the action of reach or touch</p> <p>Identify specific materials and environmental landmarks to adapt in order to promote visual attention and fixation at targeted points in routines throughout the day</p> <p>Warm-up time and pre-teaching are required before more visually taxing activities and materials with which visual fixation is expected</p> <p>Key question: What needs to be adapted visually in order to elicit and sustain visual attention at targeted points in a routine?</p>	<p>Support the family to set up a Home CVI Schedule (e.g. via GoogleDrive); guide the development of adaptations for the Home CVI Schedule</p> <p>For Early Phase II: Focus extensively on supporting the development of the Home CVI Schedule</p> <p>For Late Phase II (and Phase III):</p> <ul style="list-style-type: none"> · Establish a salient features dictionary (online/GoogleDrive), make visual adaptations and list salient feature descriptors for the photos the family includes · Create PowerPoints or other slide formats with targeted images for salient feature instructions, use animation or transition settings on PowerPoint to highlight features with color and to block off background complexity · Use Explain Everything or other apps (see resource below) to record short salient feature scripts over targeted 	<p>Add activities and routines to the CVI Schedule, communicate with TVI and team members to add in unique adaptations</p> <p>Take photos of important objects, landmarks, areas of the home and share with the TVI/educational team *Reduce background complexity by taking photos of objects against a black or plain background</p> <p>Identify preferred materials, activities, objects that can be integrated into instructional lessons</p> <p>Create and share video recordings of home activities for input/coaching from the CVI Provider (create a "Video Diary")</p>

		<p>images, highlighting salient features with color</p> <p>Create and model 2-D processing adaptations focus on salient feature instruction and appropriate level of complexity</p> <p>Locate YouTube videos to reinforce concepts associated with specific subject matter</p> <p>Model comparative language & provide examples for families</p>	
<p>Access to 2-D Use of iPads/Tablets</p> <p>Considerations for video conferencing & screen mirroring</p>	<p>Early Phase II: In early Phase II, eye-to-object contact is brief and/or intermittent. Anything presented in 2-D must be presented against a backlit surface, with reduced complexity of array, and/or with movement.</p> <p>Late Phase II: In late Phase II, eye-to-object contact will be established, and greater access to detail is appropriate if paired with salient feature instruction. Backlighting will help to extend visual attention and reduce visual fatigue. Movement will continue to be an important factor.</p> <p>Use animation or annotate features in video conferencing platforms and applications (e.g. PowerPoint, Zoom, Keynote) during screen sharing.</p> <p>Digital books adapted specifically for CVI may be appropriate for visual goals in mid- to late-Phase II.</p> <p>Visual goals in attending to video/direct instruction should be specifically identified. Do not expect the child to maintain prolonged visual fixation to the screen if the material is novel or if there are competing sources of sensory information.</p> <p>Consider reducing or eliminating auditory components especially when materials are initially being introduced.</p>		

	<p>Use a slantboard or other slanted surface for 2-D materials including tablets/iPad</p> <p>Use the iPad to make photo albums of routines: take photos of the materials, landmarks, locations in routines; highlight salient features with preferred color(s) in photo mark-up/editing; preview the routines by going through the photos and discussing each photo/part of the routine; take the iPad with you to the routine and refer to/match photos with real targets; review the album at the end of the routine (this also serves as an emergent literacy routine and sequence)</p> <p>Reduce background complexity in video feed (the background behind the presenter/teacher should be contrasting in relation to skin tone or, be a neutral color)</p> <p>Unexpected sources of movement in the learner’s environment or the presenter’s environment will be a source of distraction. A pause in instruction will help the student visually “reset”</p> <p>The learner may choose to position their head/body in an off-center position to best access visual content</p> <p>Use occluders to block off unnecessary background information, a cut-out window to highlight a target, and/or a pointer to direct the child’s attention to a specific target on the screen</p>
<p>Phase II additional resources</p>	<p>Phase II (PCVIS.vision): https://pcvis.vision/educators-and-therapists/phase-ii-cvi/</p> <p>The What’s the Complexity Framework (Tietjen, M.). In Roman-Lantzy, C. (2019) <i>Advanced Principles of Cortical Visual Impairment</i>. Louisville, KY: APH Press</p> <p>Tips for Providing Remote Video Instruction for Students with CVI (Allie Futtie/Perkins E-Learning, 2020): https://www.perkinselearning.org/technology/blog/tips-providing-remote-video-instruction-students-cvi</p> <p>CVI-Friendly Videos (Videos by Alissa Desousa, TVI; article by Diane Brauner/Perkins E-Learning, 2020)*: https://www.perkinselearning.org/technology/blog/cvi-friendly-videos-resources-students-cvi *Note age-appropriateness of videos, and child-specific CVI goals of your child/student with regard to 2-D processing and sight word identification</p> <p>Explain Everything app: https://explaineverything.com</p> <p>Animate/draw and record audio over images/photos</p>

PHASE III Goal of Phase III	Approaches and Techniques	Role of CVI Provider (educational service provider)	Role of Family
<p>Refinement of the CVI Characteristics</p> <p>Ventral stream & dorsal stream vision are used throughout the day</p> <p>The CVI characteristics continue to impact the learner though they present in a potentially more subtle way</p> <p>Children in Phase III can demonstrate visual curiosity, this may be more evident in familiar settings</p> <p>Instruction and reinforcement of salient visual features and use of comparative language is critical</p>	<p>Need adaptations to support learning and visual vocabulary</p> <p>Salient feature instruction, use of comparative language to support visual recognition, identification, and discrimination</p> <p>Responses to instructional or incidental learning that are atypical should be considered an opportunity to use comparative language to indicate the similarities and differences between two or more concepts</p>	<p>Support the family to add to the individualized salient feature dictionary for home</p> <p>Create additional 2D materials, adapt 2D curricular materials e.g. worksheets and curricula for other classes</p> <p>Continue to support instruction in salient features and comparative thought through video conferencing as possible</p> <p>Help families create supports for visual fatigue which will occur as a result of use of tasks that require ventral stream recognition, identification, and interpretation of materials</p>	<p>Support the provider to update salient feature dictionaries and CVI Schedules for home focus</p> <p>Share information and photos with the provider to support adaptations to materials</p> <p>Facilitate environmental and other considerations to maximize the child's visual access to technology and curricula</p> <p>Create and share video recordings of home activities for input/coaching from the CVI Provider (create a "Video Diary")</p>
<p>2-D Access and Use of iPads/Tablets</p> <p>Considerations for video conferencing & screen mirroring</p>	<p>Individuals in Phase III can access 2-D, and can view and explore visual information on screens/tablets with appropriate adaptations to reduce complexity of array and target</p> <p>Reduce background complexity in video feed (the background behind the presenter/teacher should be contrasting in relation to skin tone)</p> <p>Use color highlighting to organize and highlight critical portions of the instructional materials</p> <p>Avoid use of black and white materials</p>		

	<p>Do not require the student to demonstrate eye-to-eye contact with the image of the instructor as a sign of attention to the teacher/therapist.</p> <p>The learner may choose to position their head/body in an off-center position to best access visual content.</p> <p>Use a slantboard or other slanted surface for 2-D materials including tablets/iPad</p> <p>Consider the student’s ability to visually scan a screen or tablet array: Can the student scan visually to find a specific target, left to right, top to bottom, diagonally, in a circular scanning pattern? Can the student find a point of reference on the screen (e.g. a home button, an app logo, etc.)? These may be relevant skills for additional practice, and may require adaptations such as the use of pointers, occluders, color highlighting, etc.</p> <p>Materials should be adapted based on the degree of complexity appropriate to the individual student (See What’s the Complexity Framework). Use the student’s salient feature dictionary to develop materials, and with any new materials/images, add them to the dictionary.</p> <p>The student may or may not be able to navigate visually between looking at the speaker (via webcam) and materials on the screen.</p> <p>As with all Phases, it will be important to note environmental/multisensory complexity in the student’s home and specific location.</p> <p>Unexpected sources of movement in the learner’s environment or the presenter’s environment will be a source of distraction. A pause in instruction will help the student visually “reset”</p>
<p>Phase III additional resources</p>	<p>Salient Features Collaborative: https://cvicollaborative.wixsite.com/salientfeatures</p> <p>The What’s the Complexity Framework (Tietjen, M.). In Roman-Lantzy, C. (2019) <i>Advanced Principles of Cortical Visual Impairment</i>. Louisville, KY: APH Press</p> <p>Roman Word Bubbling App: http://roman-word-bubbling.appspot.com/</p>

Phase III (PCVIS): <https://pcvis.vision/educators-and-therapists/phase-iii-cvi/>

Salient Features & Comparative Thought (PCVIS): <https://pcvis.vision/educators-and-therapists/salient-features-and-comparative-thought/>

Roman on CVI - Digging Deeper: Comparative Thought (Roman, 2019):
https://www.youtube.com/watch?time_continue=7&v=cKm9xUTeD1g&feature=emb_logo

General Resources:

Roman-Lantzy, C. (2018). *Cortical visual impairment: An approach to assessment and intervention* (2nd Ed.). Louisville, KY: APH Press

Roman-Lantzy, C. (2019) *Advanced Principles of Cortical Visual Impairment*. Louisville, KY: APH Press

CVI Resources: <http://cviresources.com/services/blog/>

At Home: Everyday CVI Adaptations and Approaches (PCVIS): <https://pcvis.vision/families-and-caregivers/at-home-everyday-cvi-adaptations-and-approaches/>

Tips for Providing Remote Video Instruction for Students with CVI (Allie Futtie/Perkins E-Learning, 2020): <https://www.perkinselearning.org/technology/blog/tips-providing-remote-video-instruction-students-cvi>

Roman on CVI (YouTube Channel): <https://www.youtube.com/channel/UCx6owBfWYCWd6SQc37wfwQ>

Kaleidoscope: The Cortical Visual Impairment Podcast: <https://thecvipodcast.libsyn.com/>

See CVI Speak AAC: <http://seecvispeakaac.com/>

National family teleconference group for families of children/youth with CVI (hosted by Lighthouse Guild International). Register [here](#) or for more information contact Dr. Linda Gerra (GerraL@lighthouseguild.org)

New York Deaf-Blind Collaborative (Chris Russell) CVI Tools:

CVI Fact Sheet: <http://bit.ly/CVIFACTSHEET> (*Note: Many additional resources are listed on this Fact Sheet)

CVI Observation Notes: <http://bit.ly/CVIOBSERVATION>

CVI Activity Planning Tool: <http://bit.ly/CVIACTIVITYPLANNING>

CVI-AAC Considerations Tool: <http://bit.ly/CVI-AAC>

CVI Positioning & Adaptations Tool: <http://bit.ly/CVIPOSITIONING>

CVI Schedule Template & Description: <http://bit.ly/CVISCHEDULE-template>