FRIENDS OF NEUROVISUAL TRAINING NEWSLETTER. ISSUE 1, VOLUME 3.

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Introduction.

Welcome back! This is the launch of Volume 3 of the Friends of NVT Newsletter. We appreciate all of the support and feedback we received with both of our Volume 1 and Volume 2 of this newsletter. Volume 3 of the FoNVT Newsletter will again feature 8 articles explaining and investigating relevant topics in Neuro-Visual Training, Concussions, Traumatic Brain Injuries, Diagnostics, Rehabilitation, and much more! As usual, be on the lookout for our weekly newsletter published/sent out every Thursday.

Today's feature article is by Dr. Joe Clark, Ph.D. and it is a discussion on how appropriate Neuro-Visual Training exercises have been shown to effectively help with the rehabilitation of sports-related concussion patients. Furthermore, the discussion also includes a suggested NVT-related assessment that could be used for evaluation and have been highlighted throughout previous issues of the Friends of NVT Newsletter.

Our "How To" this week is a discussion of how we consider adding and/or including cognitive drills into traditional vision training programs. This is a rather interesting "How To", because it is often one of the most difficult practices when attempting to conduct effective and appropriate NVT.

We also have many important announcements this week! So please check them out at the bottom of this newsletter after reading the NVT content and "How To".

Thanks for staying with us!

NVT for Concussion Rehabilitation.

There is a lot of buzz concerning sports concussion. While many medical personnel are engaging in active rehabilitation to treat sports related concussion (SRC), there are still sadly a lot of questionable practices concerning the treatment of the injured brain. Please keep in mind that a concussion is in fact a traumatic brain injury, and the injured brain needs to heal. Some of these philosophies that are unfortunately still employed are the

wait and see philosophy. That is wait until the brain “tells us” how much healing it can do and then evaluate what treatment as needed. This is sometimes called a ‘reactive’ strategy. Another patient management strategy is against rehabilitation activities that target deficiencies because some practitioners believe this is training to pass the concussion test. There is a philosophy that suggests if you have a panel to assess return to play (RTP) that includes for example, memory; that memory training should not be involved in the rehab. Such a philosophy boarders on malpractice because a patient could appear to be denied needed treatment. Today’s article discusses the opportunities and rationale for engaging in NVT for SRC rehabilitation using an aggressive RTP treatment.

We will limit the current discussion to NVT consistent with our ethos. Although we are happy to discuss other aspects of SRC rehab. The traumatic brain injury (TBI) literature shows an interesting dichotomy concerning neuro-visual deficiencies in patients. Patients with mTBI report visual disturbances at a rate of about 20%. Conversely if physicians test mTBI patients for visual disturbances over 65% of patients are found to have deficiencies. People with a brain injury often do not know something is wrong or cannot identify their deficiencies. So, it is important to test for multiple systems to determine what might be deficient. Treating the TBI injured patient somewhat follows the philosophy of Niccolò Machiavelli, which suggests that it is easier to treat early when hard to diagnose; as opposed to being hard to treat late, yet easy to diagnose. Therefore, it is beneficial to look for problems early before deficiencies manifests.

As we have put forward the concept of the three pillars of NVT for performance enhancement, I1V1, it is also worthwhile to consider the three pillars of NVT when evaluating a post-concussion patient. We have presented some suggestions that could be employed as post SRC evaluations. The following NVT-related exercises and methods are examples to illustrate this point.

Reading & Scanning Saccades (I7V1): Reading and/or Scanning Saccades will give an indication of ocular motor performance related to Pillar 1.

Gaze Stabilization (I8V1): Gaze stabilization is a method to assess ocular motor and eye discipline. This activity covers pillars 1 and 2 of ocular motor and eye discipline. Gaze stabilization is a test and a training modality that can be used to observe and treat deficiencies should they be observed.

Stroop Methods (I8V2): Stroop testing and training method that covers ocular motor and cognitive pillars. We have presented a testing panel that can be modified to a rehab program.

Suppression (I6V2): Suppression is extremely common post mTBI. Ensuring normal binocularity is critical post SRC and needed for many competitive sports. Thus, the test is a strong component of a RTP decision and there are methods in I6V2 to treat suppression.

Assessments using the Dynavision D2™ (I4V2): The Dynavision D2™ is a strong tool which output data is extremely useful for measuring rehabilitative progress, as well as eye-hand coordination and both motor and visual reaction times; all of which could potentially be dysfunctional when the brain is injured. If you have access to the Dynavision D2™, it is a standalone device that can aid a clinician's ability to diagnose and treat a SRC. It is also a device where you can give the patient target scores to achieve for successful rehabilitation. The Dynavision D2™ software allows one to edit and add new programs/exercises which cover all 3 NVT pillars.

The afore mentioned modalities are not prescriptive. You, the clinical practitioner should pick and choose the test and treatment modalities. We've revisited a few that have been presented in the newsletter but there are numerous other NVT tests one can employ. Concerning NVT related issues post SRC try to consider the 3 pillars when making RTP decisions or patient management strategies as needed.

Motivation for rehabilitation following injury is always an important topic. For every clinical practitioner one must make decisions as to how to motivate your patient. When appropriate you may wish to consider the testing and training activities as part of the motivation. That is, give the patient a reasonable target score to shoot for. Consider saying that they need to pass the reading saccades test in less than 50 seconds and encourage them to practice the test. They are effectively doing targeted rehab. A majority of the modalities discussed above can be both tests and rehab methods to, when appropriate, motivate your patient. Because you'll have multiple tests and pillars to establish before a RTP decision you'll be more likely to ensure the health and wellbeing of your client.

"How To" – Adding Cognitive Drills to Vision Training

Vision training is becoming a more regularly discussed topic in the conversation of concussions and traumatic brain injuries. However, unfortunately, traditional vision training has been established for decades and routinely associated with optometric practices. We all can probably tell a story of a younger child with a lazy eye who had to wear an eye patch while performing certain reading, word finding, or other common vision training exercises. This complicates the discussion of Neuro-Visual Training specifically, because traditional vision training fails to adequately address the neuro-component of the NVT (unless the Optometrist has been educated in neuro-cognitive rehabilitation using vision training).

That being said, one of the most difficult concepts to grasp when learning NVT is how to effectively incorporate the cognitive component to traditional vision training. In this section, we are going to discuss ways to add methods on how to do this with certain exercises. This concept focuses processing and incorporating exercises that challenge the brains processing abilities.

Let us begin with reading saccades. In I7V1, we discussed methods for reading saccades and they are a great extraocular muscle exercise, which is exactly strength & conditioning for the muscles that surround your eyes. To level up this methodology by incorporating a cognitive component, we then discussed Word-Finding Saccades, that adds a level of recognition, and then we can add a level a memory recall at the end of the exercise; recalling the words identified throughout the saccadic eye chart. Essentially, this can be thought of as 3 different levels of difficulty. The first level being standard reading saccades, the second level adding neuro-components for word-recognition, and then the final level of both visual and audible (because you're calling these words out loud) memory recall after completing the task.

There are even more ways we can add cognitive levels be switching the alphanumerics in the saccadic eye chart to colored characters instead of black & white text. This then enhances the involvement of color processing which is found in different compartments of the Occipital Lobe.

We can also use the Marsden Balls and Pitch & Catch NVT drills we discussed in I1V2 as an example for this How To. Traditionally, Marsden Balls are an optometric tool used in a variety of ways but more so to increase peripheral vision and eye discipline by identifying small letters or numbers on a moving ball. We call our cognitively enhanced Marsden Balls, "Squirckle" (a combination of square, circle, and triangle). To do this, we first start with essentially "play-pen" balls or whiffle balls and simply play pitch and catch while the participant fixates their vision of their partner's nose. We start off so easy to wake up their eye-hand coordination and peripheral vision. As described in I1V2, if these are white whiffle balls we are using, they usually have red, green, or blue shapes (the same shape; squares, circles, or triangles, per 1 ball) on the balls. Thus, the next step would be to introduce new rules on how to catch these balls, which includes catching the balls with red shapes with their right hand, green shapes with their left hand, and blue shapes with both hands, while still engaging their peripheral vision to do this.

This adds an inhibitory process to the Pitch & Catch drill, a similar concept to the common "Go, No Go" exercise. The participant learned that the primary task is to catch the ball, but now has rules to which hand catches which color, which forces them to resist catching the ball with a certain hand. The next level of difficulty is then to instruct the participant to call out the shape on the ball using their peripheral vision, while still maintaining the integrity of the previous instructions. So when a ball is thrown, the participant must first catch the ball with their vision fixated on their partner, but matching the color of the shape to the correct hand, and recognize the colored shape, calling it out loud while the ball is still in the air. This is heavily working the brain's frontal lobe via executive function processing, through prioritizing the tasks, integrating all the information, making the decision to use what hand while simultaneously deciding what the corresponding shape is and resisting the incorrect hand.

Taking this a step further, you could even include this and/or similar types of drills while the participant is on a half-bosu ball, integrating balance and proprioception via the cerebellum on top of the other multiple brain compartments discussed above.

Clearly this type of enhancement, when to increase the difficulty, and how much to increase the difficulty/layer of cognition takes a lot of time to learn and subsequently master. It is a very important thing to consider however, because if started to soon the patient could experience "sensory overload", a common symptom with TBI patients, leading to an overwhelming exhaustion that clinician's wouldn't necessarily want to express in their patients. Although, too slow of a progression and the patient wouldn't be engaging and training their cognitive injuries, leading to possible plateaued recovery.

This may be one of the single most important concepts to investigate and learn when considering NVT for concussion and TBI rehabilitation, and we are more than happy to help by answer questions and providing demonstrations. So please feel free to reach out to either Dr. Joe Clark at clarkjf@gmail.com and/or info@inneuractive.com.

Announcements.

Our launch of Volume 3 picks up as we near the NCAA Football Bowl season, where our Cincinnati Bearcats are currently ranked at 7th in the College Football Playoff Rankings! This week, the Bearcats fortunately have a bye-week, so they can rest up and plan to win the rest of their games.

The Carrick Institute, leaders in clinical neuroscience education and functional neurology are hosting a lecture series taught by Dr. Joe Clark next week in Cincinnati, OH from December 11 to December 13. For more information, visit The Carrick Institute's website at https://carrickinstitute.com/.

Also, we'd like to shoutout a recent publication related to this discussion, which comes from a collaborative effort between the University of Colorado and University of Virginia, "Visuomotor therapy modulates corticospinal excitability in patients following anterior cruciate ligament reconstruction: A randomized crossover trial." The article can be found using the following link:

https://www.sciencedirect.com/science/article/pii/S0268003320303570

It is a great article that helps provide further value to our discussion. Several of the methodologies discussed involving an aggressive approach to SRC utilizing NVT programs can be found through one of Dr. Joe Clark's publications, "Aggressive rehabilitation pathway targeting concussion symptoms: Illustration with a case study". This publication can be viewed with the following link:

https://www.longdom.org/open-access/aggressive-rehabilitation-pathway-targeting-concussion-symptoms-illustration-with-a-case-study-2168-975X.1000131.pdf

As always, if there are any questions, comments, or concerns please feel free to reach out to Dr. Joe Clark at clarkjf@gmail.com or info@inneuractive.com and please visit www.inneuractive.com for more information on NVT, available NVT products, and NVT services.

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