FRIENDS OF NEUROVISUAL TRAINING NEWSLETTER. ISSUE 4, VOLUME 1.

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Introduction.

Welcome to Issue 4 of the Friends of NVT newsletter. In this issue we are trying something new in we have added a “how to” blurb. We’ve identified some NVT specific or NVT relevant methods that we want to present here. Last week’s survey results showed interest in how to assess eye dominance, so that is the topic for today’s “How To” section. As NVT is a hybrid of neuro and visual, sometimes the two disciplines may or may not overlap. In the interest of being Neuro and Visual, we will be assessing the continuum of eye dominance to show how dominant a person’s eye preference is. We relate the significance of this assessment to sports, although it can be impactful in a traumatic brain injured patient. For today’s how to, we stick to how to perform the test. We’ll cover how to use this information in a future issue.

If you have how to questions, please let us know and we’ll add them to an upcoming issue.

Our main content this week is by Jon Vincent on neuro plasticity. Neuro plasticity is something we hope for and work towards when doing NVT and Jon discusses what it is and why it is important when doing NVT.

What is Neuroplasticity and how might it be involved in NVT?

The brain is a miraculous organ that is undeniably complex. With its main roles of receiving information, processing/interpreting this information, and then controlling the action or decision from this interpretation, it goes without question that our brains are constantly being shaped by our experiences and surroundings. This shaping or remodeling of our brain cells is called “neuroplasticity”. Neuroplasticity, also known as brain plasticity or neural plasticity, is classically defined as the ability of the brain to undergo physiological changes, ranging from cellular all the way to large-scale cortical remapping. Research in this field has related neuroplasticity to the brains ability to heal and recover from trauma and disease, as well as a central mechanism for learning and adaptation. So how does neuro-visual training (NVT) fit into neuroplasticity?

In Issue 1, Volume 1 of our Friends of NeuroVisual Training Newsletter, we discussed our philosophy of NVT, which focused on the “Three Pillars of NVT”. For a quick refresher, Pillar 1 involves training proper eye movement, Pillar 2 involves training eye discipline, and Pillar 3 involves training the brain to process information it receives from the senses (see Issue 1, Volume 1 for more information). Pillar 3’s focus on training the neural machinery to efficiently process information is directly related to neuroplasticity and how our NVT philosophy/training attempts to put our participants’ brains into a plastic state so that they can either heal, recover, or grow stronger more naturally through neuroplastic mechanisms. We work the brain through our NVT exercises by making people think in situations where they are distracted, and when the participants become more proficient, we progress the difficulty levels of the NVT exercises, leading to a continual challenge for the brain. We want the brain to start making new neurons, making new glial cells, strengthening axons, increasing synapses from the neurovisual training, and progressing the difficulty of the NVT exercises aids this plasticity. Once the brain is in a plastic state, making the afore mentioned cellular changes, this is where we can focus in on areas for improvement. For example, after already having identified areas for improvement through our Better Baseline™ methodology, which is our neuro-centric performance baseline, we then tailor the NVT exercises to really focus on improving these deficient areas.

Studies in mice and rats have shown that brain training, can increase synapses, increase axonal sprouting and increase microtubule density. These cellular changes in the brains of these rodents are consistent with the types of neuroplasticity changes we are working towards with NVT. If these changes were to occur in human brains, they would likely produce some of the electrophysiological changes seen post NVT.

Furthermore, peer-reviewed research utilizing electrophysiological data has shown increased voltage output from the eyes, suggesting more power coming from the brain post-NVT. This is significant when discussing the neuroplastic potential of NVT, but there is not enough information to make the claims of NVT inducing targeted neurogenesis. There is reason to believe that some type of cells in the brain are growing or increasing. These could include cells such as glial cells like astrocytes, or even neurons developing more synapses/connections to other neurons helping process and transmit information more quickly. Perhaps no new cells are developing, but the cells are more efficiently processing information. These are distinctly hypotheses, but it does suggest that NVT, when performed appropriately, can aid the brains innate neuroplastic abilities.

While the mechanisms for the benefits of NVT need a lot more research, especially at the cellular level, there appears to be a large and growing body of evidence that NVT can support a beneficial environment in the brain for neuro plasticity and improved cognitive and sports performance.

How To: Eye dominance.

Determining eye dominance is a common and simple assessment. A person can be left-handed or right-handed as well as left eye or right eye dominant. In the eyes, like the hands, there is somewhat of a continuum to the degree of dominance. An athlete might bat left-handed but throw right-handed. The eyes can have a similar continuum and may be condition dependent. For example, a person may have eye dominance tied to their hands. It is relatively common for a right-handed person to be left eye dominant when doing tasks with the right hand or, conversely, be right eye dominant when doing tasks with their left hand. We like to know this when doing NVT and it can be important for various sports (think baseball and batting). Therefore, we suggest testing for eye dominance a minimum of 7 times with 7 different tasks, using one and both hands. These individual tests can be scored to give someone a continuum of their eye dominance as well as eye – hand preferences.

<u>Our protocol for determining eye dominance</u>:

Step 1: Overall eye dominance.

Have the person look at your head from > 6 feet away.

Have the person make a diamond or triangle with the two thumbs and two index finger. They do this while looking at your head through the diamond. They shrink the diamond until just your eye are visible. From your perspective you should see ONE eye in the diamond. That is the dominant eye – for both hands.

Step 2: Determine eye hand dominance.

Now using one hand instead of two, the identical protocol as described above is followed. The athlete makes a circle between their thumb and index finger and places their arm perpendicular to their body and parallel to the ground. With their right hand they start to swing their arm in front of them while putting the circle such that they circle the tester's head. This is the dominant eye for the right hand.

The test is repeated 5 more times with alternating hands. The tests include the hands coming from the right to left, left to right, right hand top down, left hand top down, right hand bottom up, left hand bottom up.

The total result is <u>7 tests</u>:

1. Two hands – to left or right eye.

Horizontal one hand.

2. Right hand – to left or right eye.
3. Left hand – to left or right eye.

Top down

4. Right hand – to left or right eye.
5. Left hand – to left or right eye.

Bottom up

6. Right hand – to left or right eye.
7. Left hand – to left or right eye.

Note: It is not uncommon to have the hands cross to the opposite eye.

What do you then do with this information? Say for example you have an athlete who is right eye dominant with two hands but each hand crosses to the opposite eye? This means that they are somewhat ambidextrous with eye choice in that they can use either eye, however, have a preference with crossing over from eye to hand. If I had a baseball player and he/she wanted to learn how to switch hit, I would say that this result is NOT an impediment to that task.

Another example may be a soccer player who was a wing and would commonly be the target for a fast break along the sideline. If I saw eye dominance that was all right eye I would first check for suppression*. If no suppression, I would then ask if they had more comfort doing fast breaks from one side versus the other. If they said they perceived difficulties where the ball was coming over their left shoulder (non-dominant eye) I might think that the eye dominance was contributing to that. They perceived better performance with their dominant eye. If practicable, and the coach and athlete were interested, we could improve the perception of eye performance on the non-dominant eye and work with the coaches to improve performance with plays coming from the "weak" side for him or her.

**we will talk about suppression in a future issue.*

Announcements.

In today's issue we have accompanying multimedia. You can find a video of the How To article here; https://drive.google.com/file/d/18tWME00xpKvSPF6x513Kfj_Kk9uFLtWs/view?usp=sharing. This is a quick, less than 2 minute, video of the instructions with a demonstration of how to determine eye dominance and eye – hand dominance.

Please let us know if you have any requests for discussion topics in future issues.

Also, we just discovered this series that occurs on Wednesdays. https://community.ingo.me/eye2eye-webinar-

start/?fbclid=IwAR2qZHT5AXbcI2DN1WQa6MnLNxvZuSxvRi-Mzk7kxjR2a1nKqEAPTDckWBA. It is a weekly pod cast on vision training. This weeks was on sports vision training during COVID.
